North Creek/Ski Bowl Connectivity Study

Prepared for the Town of Johnsburg

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Introduction and Project Goals

The hamlet of North Creek, located in the Town of Johnsburg, is experiencing a convergence of projects which provide an opportunity to shape the future of the community. Several large-scale development projects, both public and private, are slated to converge in or around Ski Bowl Park, located just across NYS Route 28 from the heart of the hamlet. These projects will bring together a wide variety of recreational and residential uses, which in turn create the potential for additional traffic impacts.

In addition to concerns that the traffic volume from these projects will exceed the capacity of the existing intersections, there is potential for quality-of-life impacts and increased congestion, especially during peak events. Another key priority for the Town is improving pedestrian accommodation at existing and proposed crossings of NYS Route 28.

The Town is also planning to reclaim an area currently being used for sand and gravel mining by the Department of Public Works. This area, located adjacent to the current Ski Bowl Park, will be redesigned to provide additional recreational amenities for the community. In addition, it has been a long-standing desire to increase the strength of the connection between the hamlet and Ski Bowl Park, especially in terms of bicycle/pedestrian accommodations and gateway amenities.

On behalf of the Town of Johnsburg, the Adirondack/Glens Falls Transportation Council enlisted MJ Engineering and Land Surveying for transportation planning and engineering assistance. This is intended to fulfill two goals:

- Complete a comprehensive analysis of traffic impacts from all of the projected development activity in and around Ski Bowl Park
- Provide technical support as a framework for the Town to redesign Ski Bowl Park

Project Area

The project study area encompasses NYS Route 28 between Peaceful Valley Road to the south and Ski Bowl Road to the north, and includes the section of NYS Route 28N between NYS Route 28 and Main Street. (See Figure 1)

Figure 1 - Project Study Area

Existing Conditions

Within the study area, NYS Route 28 and 28N carry the majority of vehicular traffic. Although NYS Route 28 provides critical north-south connectivity in the region, locally this highway acts as a by-pass of the hamlet, as well as a barrier between Ski Bowl Park and North Creek. As described in greater detail below, the roadway itself is typical of rural NYS highways in Warren County in terms of lane width and speed limit; roadway shoulders along NYS Route 28 in the study area are somewhat wider than found in the region at large. Visually, both sides of NYS Route 28 are undeveloped or sparsely developed, with topography and vegetation screening both the hamlet and the park.

Before any recommendations for future improvements can be made, a thorough analysis of existing conditions must be undertaken. This includes the measurements of the roadway geometry, traffic counts, accident rates, sight distance, and pedestrian/bicycle amenities and constraints.

Roadway Geometry:

Measurements were taken for lane width, shoulder width and stopping sight distance within the study area. The New York State Department of Transportation (NYSDOT) Highway Inventory Listing lists NY Route 28 as a Rural Minor Arterial. Chapter 2 of NYSDOT Highway Design Manual (HDM) provides standards for lane widths and shoulder widths along with other elements such as stopping sight distance. For this roadway classification, the standard for lane width is 11 feet (minimum) and shoulder width is four feet. **Table 1** includes a summary of the field measurements for the roadway widths (see also Figure 2).

Figure 2 -- Typical Lane Configuration – Looking South from Ski Bowl Road North

TABLE 1

Field Measurements – Lane and Shoulder Widths (ft)

ATR Location No.	Southbound Shoulder	Southbound Lane	Northbound Lane	Northbound Shoulder
1	10	10.5	10.5	9
2	8.75	10.5	11.5	7.25
3	8	11.5	11.5	8
4	7.5	11.5	11.5	8
5	8	11.75	10.25	7.25
6	9	11.5	10.5	8.5

Traffic Data Collection

Automatic Traffic Recorders (ATRs) are tubes installed across the roadway connected to a data collection device used to collect data related to traffic volume, vehicle classification or type and speed. ATRs were installed at six (6) locations between August 6 and 14, 2019 within the study area as indicated on Figure 3. See Table 2 for a breakdown of Average Daily Traffic volumes.

TABLE 2			
ADT Volumes (vehicles/day)			
ATR Location No.	**Southbound**	**Northbound**	**Two-Way Total**
1	1,704	1,691	3,395
2	1,795	1,657	3,452
3	2,597	1,975	4,572
4	2,349	2,238	4,587
5	2,447	2,162	4,609
ATR Location No.	**Westbound**	**Eastbound**	**Two-Way Total**
6	1,147	993	2,140

A review of the available data from NYSDOT for this section of NY Route 28 revealed the peak travel commuter periods to be from 7:00am to 9:00am and 3:00pm to 5:00pm. Turning movement volumes were collected on Tuesday, August 6, 2019 during the peak travel commuter periods at the following three (3) intersections with NY Route 28:

- Ski Bowl Road North (Intersection A)
- NY Route 28N (Intersection B)
- Ski Bowl Road South (Intersection C)

Turning movements were also collected for Manor Road near Ski Bowl Road North which provides access to the Senior Center and senior housing. The tabulations of the turning movement counts for each intersection are located in **Appendix 1.**

Figure 3 -- Traffic Count/Intersection Count Locations

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Accident Analysis

Accident data was requested from the NYSDOT and the Adirondack/Glens Falls Transportation Council for the study area along NY State Route 28 between the intersection with Main Street to the north and the intersection of County Route 29 (Peaceful Valley Road) to the south. The accident data was provided for the five-year period from May 2014 to January 2019 and is summarized in **Appendix 2.**

Accident rates are calculated according to the NYSDOT Highway Design Manual Chapter 5 and compared to the statewide average accident rate for similar facilities. Accident rates are measured in Accidents per Million Vehicle Miles (MVM) for linear segments of roadways and Million Entering Vehicles (MEV) for intersections and are summarized in **Table 3**.

TABLE 3

Accident Rates

Segment	**Accident Rate (acc/MVM)**	**Statewide Avg. Rate (acc/MVM)**
NY Route 28	1.84	2.11
Intersection	**Accident Rate (acc/MEV)**	**Statewide Avg. Rate (acc/MEV)**
NY Route 28/Ski Bowl Road N	**2.42**	0.4
NY Route 28 / NY Route 28N	0.21	0.17
NY Route 28/Ski Bowl Road S	0.35	0.17
NY Route 28 / Peaceful Valley Rd.	1.04	0.17
NY Route 28 / Manor Rd.	0.35	0.12
NY Route 28N / Main St.	0.34	0.4

While the segment accident rate is below the statewide average accident rate for similar facilities, the intersections are not below the statewide average accident rate. For the NY Route 28N, Ski Bowl Road South, Manor Road, and NY Route 28N with Main Street intersections there was only a single accident in each of the five (5) years examined. Additionally, at the intersection of NY Route 28 with Peaceful Valley Road, two (2) of the three (3) accidents were collisions with deer. Since NY Route 28 has a lower ADT, even a small number of identified accidents will result in an accident rate higher than the statewide average. Three intersections have accident rates more than two times the statewide average for similar facilities. The intersections of NY Route 28 with Ski Bowl Road North and Peaceful Valley Road have rates approximately six (6) times the statewide average while the intersection with Manor Road has a rate three (3) times the statewide average.

A severity distribution was also performed for the study area. There were no fatal accidents and only two (2) of the 30 accidents resulted in a personal injury. The severity distribution for the study area was determined to be not significant.

Intersection Sight Distance (ISD)

Adequate intersection sight distances are required at each intersection to allow drivers to identify potential conflicts. Intersection sight distances are measured using sight triangles, which are defined by the American Association of State Highway and Transportation Officials (AASHTO) as "specified areas along intersection approach legs and across their included corners that should be clear of obstructions that might block a driver's view of potentially conflicted vehicles." **Table 4** summarizes the intersection sight distances.

TABLE 4

Intersection Sight Distances (ft)

Location	Left Turn			Right Turn			Crossing		
	Standard	Looking		Standard	Looking		Standard	Looking	
		North	South		North	South		North	South
Ski Bowl Rd North	665	>750	>1000	575	>750	>1000	575	750	>1000
NY 28N (Bridge St)	665	750	>1000	575	NA	>1000	575	NA	NA
Ski Bowl Rd South	665	>1000	500	575	>1000	NA	575	NA	NA

The only location that does not meet the minimum required intersection sight distances is at Ski Bowl Road South looking south, where the sight lines are obscured by the Adopt-A-Highway sign as seen in Figure 4. This non-standard feature can be resolved by relocating the existing sign a minimum of 165 ft away from the intersection; relocation will allow for all minimum sight distance qualifications to be met in both the north and south directions for the Ski Bowl Road South intersection.

Figure 4 -- Intersection C Looking South, Sight Distance blocked by sign

Stopping Sight Distance (SSD):

When sufficient, stopping sight distance allows drivers enough time to perceive, react, and stop for an obstruction in the roadway; it is measured based on an eye height of 3.5 feet and object height of 2.0 feet. Stopping sight distances are evaluated when intersection sight distances requirements are not satisfied, or a potential pedestrian crossing is being investigated. AASHTO recommends a minimum stopping Sight distance of 570 feet for a 60-mph design speed.

All uncontrolled approaches to the study area intersections satisfy the stopping sight distance requirements

with the NY Route 28N (Bridge Street) and Ski Bowl Road South having continuous sight lines between the intersections. **Table 5** summarizes the stopping sight distances along NY Route 28.

TABLE 5					
Stopping Sight Distances (ft)					
ID	**Location**	**Traveling North**		**Traveling South**	
		Standard	**Available**	**Standard**	**Available**
A	NY 28 & Ski Bowl Rd North	570	>750	570	>1000
B	NY 28 & Bridge St (NY 28N)	570	>1000	570	>750
C	NY 28 & Ski Bowl Rd South	570	>750	570	>1000

Pedestrian Facilities

There are currently minimal pedestrian accommodations within the project corridor. There is one existing crosswalk, also known as a high visibility crosswalk, located at the south side of the intersection of NY Route 28 with Ski Bowl Road North. This crosswalk is currently heavily worn and faded to the point where striping is only visible in the northbound lane as shown in Figure 5. This crossing does not connect to any dedicated pedestrian facilities. The wide shoulders provide access to the Senior Citizen Center via Manor Road and to Ski Bowl Road North which leads to the North Creek Health Center. However, the crosswalk connects from pavement edge to pavement edge with no dedicated pedestrian facilities accessible beyond the shoulders on NY Route 28. Ski Bowl Road North on the east side of NY Route 28 does not have any delineated shoulders and the pavement width is not sufficient to safely support two vehicles in addition to pedestrians. This results in the crosswalk connecting a large front lawn on the west side to a drainage ditch on the east.

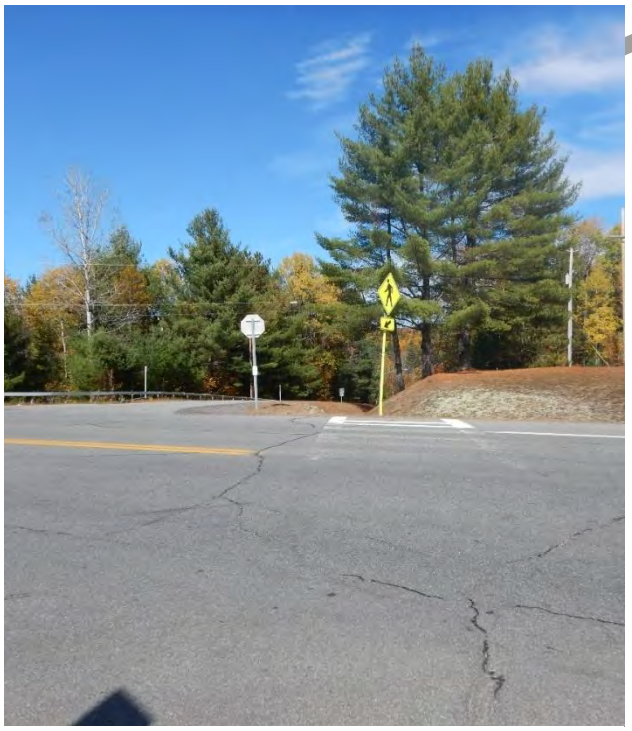

Figure 5 - Faded crosswalk marking at Intersection A

Although the crosswalk is demarcated with signs placed according to the guidance of the MUTCD (six total, with three in each direction), two of these signs lack a retroreflective strip on the pole. To upgrade the signs to current standards, the proper reflective markings on the posts should be installed on the signs where they are missing. This is a cost-effective upgrade to bring more attention to the presence of pedestrians in the study area.

The shoulders along NY Route 28 and 28N exceed the minimum 4 feet width to accommodate pedestrians. However, the high vehicle speeds and unprotected nature of the road shoulder act as deterrents for

pedestrian activity. While there were some pedestrians observed in the study area during data collection, for pedestrian users, a small amount or lack of use does not necessarily indicate a low demand. There are no dedicated pedestrian facilities on Ski Bowl Road North or South; with the narrow pavement widths of 21 feet, there is minimal room for a pedestrian if two vehicles are using the roadway at the same time.

One additional pedestrian accommodation to note is the underpass located south of Ski Bowl Road South. Located on the Carol Thomas Trail, this underpass has the potential to connect Ski Bowl Park to Town Hall and Main Street. It is currently the safest way to cross NY Route 28 and terminates just north of the Dr. Jacques Grunblatt Memorial Beach, but does not currently provide direct access to the center of Ski Bowl Park.

Bicycle Facilities

There are no dedicated bicycle facilities within the study area. Cyclists on NYS Route 28 and 28N can use the wide shoulders. Ski Bowl Road and Peaceful Valley Road, in contrast, do not feature wide shoulders, so cyclists must use the travel lane. Within the park itself, the narrow roadway is low speed and does not currently receive heavy traffic; the roadside is also relatively flat, unobstructed lawn, which some cyclists may also utilize when seasonal conditions permit. Peaceful Valley Road, however, has higher traffic speeds and volumes. In addition, the roadsides are heavily vegetated, steeply sloped, and feature extensive guiderails. This can reduce the comfort and confidence of casual cyclists, though those more experienced with on-road cycling may be willing to utilize this route.

Proposed Developments

Future development of Ski Bowl Park is comprised of both private and public projects. **Table 6** below contains the proposed developments and anticipated year for completion of construction.

TABLE 6		
Ski Bowl Park Future Developments		
Development	**Location**	**Estimated Year of Completion**
Olympic Regional Development Authority (ORDA)	Existing Ski Mountain and Adjacent Land	2024
Town Park Expansion	Town Highway Garage & Surrounding Area	2024
Museum of Skiing and Ski Hall of Fame	Town Park Expansion	2027
Front Street Development		
Hotel	Parcel B	2029
Seasonal Housing	Front Street Mountain Development	2029
Retail	Parcel B	2029

See **Figure 6** for a map of the proposed areas and the following paragraphs for description of the developments.

- The ORDA site will include new lighting for night operation, replacing two ski lifts, new ski trails and multi-season activities including a zip coaster, miniature golf and a summer/winter tubing hill.
- The Town Park expansion will occur on the existing Town Highway Garage property once it is vacated. Preliminary plans include a skating rink, expanded fields, relocated tennis courts and parking modifications.
- The Museum of Skiing and Ski Hall of Fame is proposed to be located within the Town Park Expansion with the exact location yet to be determined.
- The Front Street Development is proposed to include a new hotel, new ski hut and retail at the base of the Ski Bowl mountain area with additional seasonal housing expanded upon the existing housing that exists to the north.

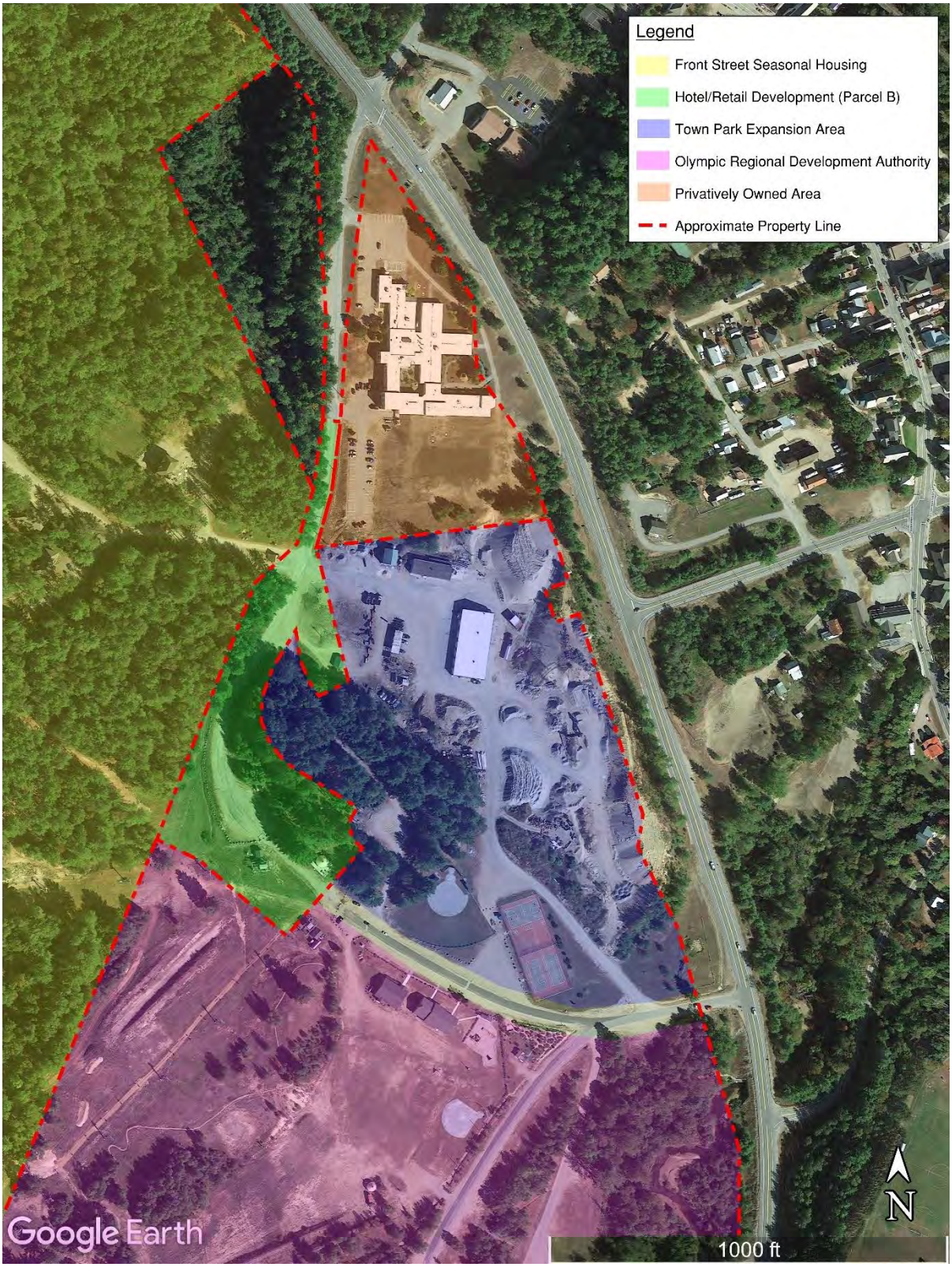

Figure 6 - Proposed Development Location Plan

Impacts of Future Development

An analysis of the future conditions was performed that included the increased traffic volumes from the proposed future developments planned for Ski Bowl Park and the surrounding properties. The Institute of Transportation Engineers, Trip Generation Manual, 10th Edition (ITE Manual) was utilized for guidance while developing the proposed trips. The Land Use Codes (LUC) selected for this site are as follows:

- LUC 466 – Snow Ski Area (Visitors: Winter Season 215,000; Summer Season 40,000)
- LUC 411 – Town Park Expansion (Additional 14 Acres)
- LUC 580 – Museum of Skiing and Ski Hall of Fame (25,000 visitors per year)
- LUC 310 – Hotel (300 Rooms)
- LUC 260 – Recreational Homes (150 Units)
- LUC 861 – Retail (94,000 GSF)

The A summary of the proposed trips generated by the proposed development is presented below in **Table 7** below.

TABLE 7

TRIP GENERATION

Use Description	LUC	AM Peak Hour Trips			PM Peak Hour Trips		
		ENTER	EXIT	**TOTAL**	ENTER	EXIT	**TOTAL**
Snow Ski Area	466	62	3	**65**	3	83	**86**
Public Park	411	0	0	**0**	1	1	**2**
Museum	580	7	1	**8**	1	4	**5**
Hotel	310	86	59	**154**	101	98	**199**
Recreational Homes	260	22	11	**33**	18	24	**42**
Retail	861	26	6	**32**	96	105	**201**
Totals		**202**	**81**	**283**	**221**	**313**	**535**

With the Ski Bowl Park redevelopment, this area will be transformed into a resort area with multiple land uses and will experience some internal trip capture between the retail, recreational and residential land uses. The anticipated adjustment during the AM peak is minimal at 1% while the PM is higher at 11%. Internal trips are trips with origins and destinations within the same site and do not use the external roadway network. The internal trip capture rates provided in the ITE Manual were utilized. This analysis does not include these reductions to provide a conservative analysis.

Existing and Future Capacity Analysis

One way to measure the functionality of an intersection is by quantifying Level of Service (LOS); for intersections, this measures the average vehicle delay in seconds. Levels of Service are graded from LOS A (less than 10 seconds of delay per vehicle) to F (more than 80 seconds of delay per vehicle). LOS E and F are usually considered failing conditions.

LOS analysis was performed using traffic analysis software Synchro 10© to examine the collected turning movements at the study intersections for Existing, No-Build 2029, and No-Build 2039 conditions. The results of this analysis are presented in **Table 1** below. For the overall intersection LOS, all intersections currently operate at LOS A and will continue under the No-Build conditions. The largest delay for an intersection is 3.1 seconds for the PM 2039 peak. This indicates there are no concerns for the future No-Build conditions. Examining the LOS of the individual legs, the only movements with a LOS lower than A are the eastbound and westbound approaches to Intersection 1, westbound approach to Intersection 2, and the eastbound to Intersection 3 with the largest delay in this group of 12 seconds corresponding to LOS B.

To model the intersection capacity for future Buildout conditions, the results of the trip generation analysis were distributed on the adjacent roadway network considering existing travel patterns, volumes, as well as population centers and origins. These trips were then added to the no-build volumes and resulted in the Buildout volumes. Most of the intersections will continue to operate at LOS A in the future Buildout condition. However, The intersection with Ski Bowl Road South is anticipated to operate at **LOS E** in the PM peak due to the large number of exiting vehicles and associated increase in delay.

TABLE 8

Overall Intersection LOS Table (Delay in Seconds)

Location		Existing		No-Build 2029		No-Build 2039		Buildout, 2039	
		AM	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
1	NY 28 & Ski Bowl Rd North	A (1.6)	A (2.0)	A (2.7)	A (2.3)	A (2.6)	A (2.3)	A (3.1)	A (6.0)
2	NY 28 & Bridge St (NY 28N)	A (2.9)	A (2.9)	A (2.9)	A (3.0)	A (3.0)	A (3.1)	A (4.6)	A (6.8)
3	NY 28 & Ski Bowl Rd South	A (1.6)	A (1.0)	A (1.7)	A (1.1)	A (1.7)	A (1.1)	A (5.7)	**E (46.4)**

Signal Warrant Analysis

A signal warrant analysis is the study of traffic volumes, pedestrian characteristics, and physical characteristics of an intersection to determine if consideration of a traffic signal is justified. The investigation of the need for a traffic signal includes analysis of factors related to the existing operation and safety at the study intersection and the potential to improve these conditions. Signal warrant thresholds and analysis requirements are set forth in the Manual on Uniform Traffic Control Devices for Streets and Highways, 2009 Edition as published by the Federal Highway Administration. The warrant analysis worksheets are included in **Appendix 3.**

A signal warrant analysis has also been performed for the existing and future conditions. Two warrants relating to traffic volume were satisfied under the Existing conditions, future No-Build and future Buildout conditions. The number of hours satisfying the volume thresholds increase as the volumes increase, but all the design years satisfy the same warrants. There is no threshold that modified the results of the warrant analysis.

Table 9 Signal Warrant Summary				
Warrant	Applicable	Signal Warrant Met		
		Existing Condition	No-Build	Future Buildout
Eight-Hour Vehicular Volume	YES	**YES**	**YES**	**YES**
Four-Hour Vehicular Volume		**YES**	**YES**	**YES**
Peak Hour Vehicular Volume		NO	NO	NO
Pedestrian Volume	NO	N/A		
School Crossing				
Coordinated Signal System				
Crash Experience				
Roadway Network				
Intersection Near a Grade Crossing				

It is important to note that although the signal warrant thresholds have been satisfied, it does not mean that a signal must be installed. In this case, the intersection in question, NYS Route 28/28N, currently operates at LOS A, and is anticipated to continue to operate satisfactorily in No-Build and future Buildout Condition if no other changes are made to the circulation pattern in the study area. Conversely, installing a signal at NYS Route 28 & 28N will not alleviate future congestion at Ski Bowl Road South. As such, the decision to install a traffic signal is not necessarily justified on the basis of traffic volume alone.

Summary of Anticipated Traffic Impacts

- Future development is projected to increase trips in/out of Ski Bowl Park by 283 trips in the AM peak hour and 535 trips in the PM peak hour
- All intersections are projected to continue to operate at LOS A in future No-build and Build conditions, with the exception of Ski Bowl Road South, which will operate at LOS E in the 2039 Build condition.
- The intersection of NYS Route 28 & 28N currently meets the 4-hour and 8-hour volume warrants for traffic signal, and would continue to meet this warrant in all future conditions. However, installing a traffic signal at the intersection will not alleviate future capacity shortfalls at Ski Bowl Road South.

Concept Alternatives

In addition to the goals of the community of Johnsburg, the analysis of existing and future conditions revealed a number of opportunities, constraints, and impacts which will affect the development and design of Ski Bowl Park, including:

- The need to connect Ski Bowl Park more directly with the hamlet
- Level-of-service impacts at Ski Bowl Road South during future buildout conditions
- Inadequate pedestrian accommodations, as well as high operational/posted speed limit on NYS Route 28
- The need to create a gateway from NYS Route 28
- The potential for private development to limit access/through traffic between North and South Ski Bowl Road

Many of these concerns could be partially addressed by creating a 4-way intersection at the junction of NYS Route 28 & 28N, thereby opening access directly into Ski Bowl Park. This would create a direct access point from the center of the hamlet, bring an entrance to the Park within reasonable walking distance, create the opportunity for a gateway, and potentially provide traffic calming.

As such, two intersection concepts were developed with the project goals of improving vehicular, pedestrian, and bicycle access between North Creek and the Park. The two intersection concepts are as follows:

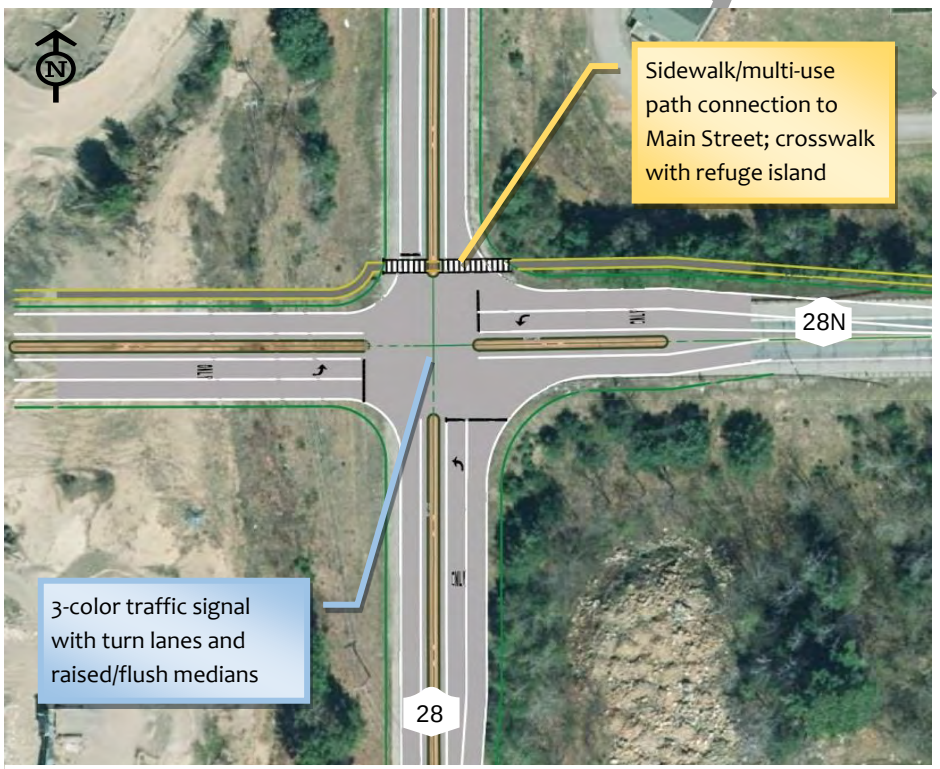

Figure 7 -- Traffic Signal Concept

A. **Traffic Signal** at intersection of NY Route 28 with NY Route 28N and the new access to Ski Bowl Park (Figure 7)

- 100 feet long curbed islands on intersection approaches on NY Routes 28 & 28N for traffic calming and pedestrian refuge at crossing locations
- Ski Bowl Road South treatment is an interim option to provide a northbound left-turn lane
- Sidewalk/multi-use path connection to Main Street on north side of NY Route 28N

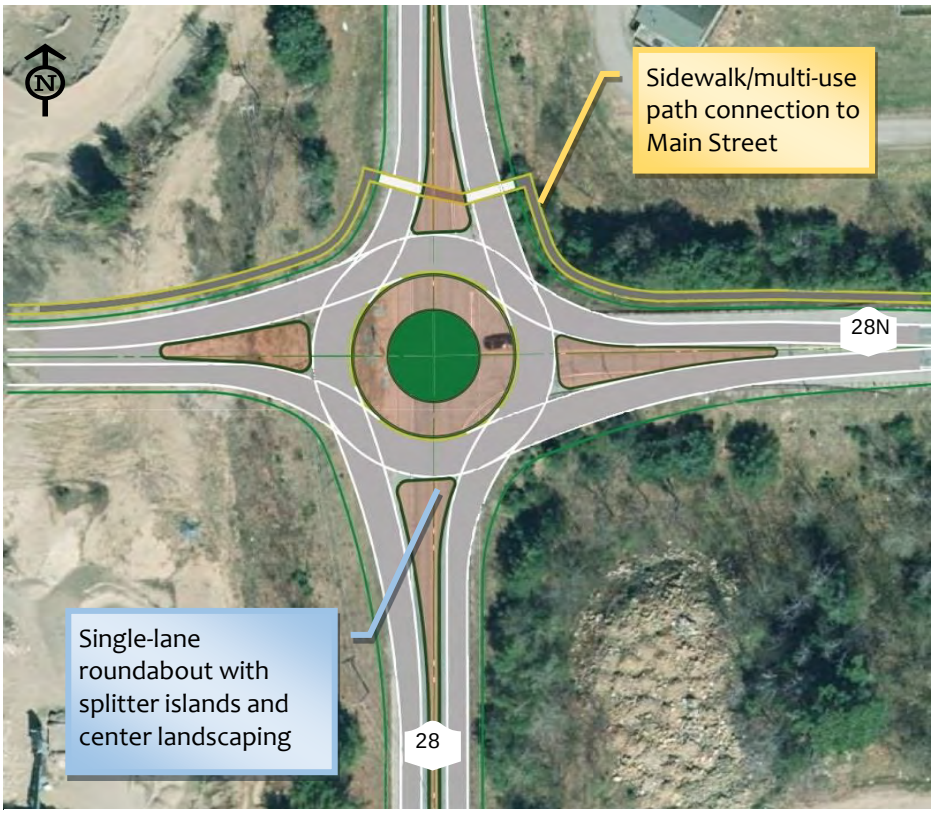

Figure 8 – Single-Lane Roundabout

B. **Single Lane Roundabout** at intersection of NY Route 28 with NY Route 28N and the new access to Ski Bowl Park (Figure 8)

- Curbed islands for the length of the study area and on NY Route 28N for traffic calming and pedestrian refuge at crossing locations
- Ski Bowl Road South treatment is permanent option to provide a northbound left-turn lane with median island
- Sidewalk/multi-use path connection to Main Street on north side of NY Route 28N

Both intersection concepts include a connection to the sidewalks at the intersection of NY Route 28N with Main Street to allow for a dedicated pedestrian and/or bicycle facility to be provided for a separate and more comfortable experience for users who prefer to use alternate modes of transportation to access Ski Bowl Park.

The typical section or cross section of the roadway is consistent between the two concepts outside of the NY Route 28 intersection with NY Route 28N. Lane widths are 11' with 8' shoulders on the outside. The raised medians with curb need to be a minimum of 6' wide; when used on intersection approaches, are required to be a minimum of 100' long. The shoulders adjacent to the raised median would be 4' wide. The circulatory roadway inside the roundabout is 21' wide with varying shoulder widths, a truck apron, and center island. See **Appendix 4** for typical sections and corresponding concept plan drawings.

In addition to analyzing the intersection concepts, access to the park was also explored. Currently, agreements between the Town and FrontStreet Development may restrict through traffic access along the west side of the park, thereby limiting the connection between the Health Center and the Park. Similarly, the Town could opt to close the Ski Bowl Road South access (or limit it to emergency vehicle access only), thereby directing the traffic to the proposed 4-way intersection at NYS Route 28 & 28N.

Three alternatives were developed that modify the access to Ski Bowl Park. The third option was also modeled with three intersection treatments, as follows:

1. Access Alternative 1 – Access to Ski Bowl Park is granted from all three intersections
2. Access Alternative 2 – Access to Ski Bowl Park is restricted from Ski Bowl Road North (entrance to North Creek Health Center would remain); Ski Bowl Road South remains open
3. Access Alternative 3 – Access to Ski Bowl Park is limited to NYS Route 28/28N only
    a. Turn Lanes added at NYS Route 28/28N
    b. Traffic Signal Installed at NYS Route 28/28N
    c. Roundabout Installed at NYS Route 28/28N

The anticipated trips distributed to Ski Bowl Road North and South were redistributed in the roadway network for Access Alternatives 2 and 3. The figures depicting the trip distribution, assignment, and build volumes are presented in **Appendix 1**. These alternatives were analyzed for the 2039 Future Buildout condition, outlined in Table 10.

TABLE 10

Concept Alternatives - Overall Intersection LOS Table (Delay in Seconds)

Location	Access Alt 1		Access Alt 2		Access Alt 3	
	AM	**PM**	**AM**	**PM**	**AM**	**PM**
NY 28 & Ski Bowl Rd North*	3.1 (A)	6.0 (A)	2.4 (A)	2.9 (A)	2.3 (A)	2.9 (A)
NY 28 & Bridge St (NY 28N)	4.6 (A)	6.8 (A)	4.7 (A)	7.6 (A)	7.8 (A)	**34.2 (D)**
NY 28 & Ski Bowl Rd South	5.7 (A)	**46.4 (E)**	5.1 (A)	**45.7 (E)**	-	-
Location	**Alt 3a Turn Lanes**		**Alt 3b Signal**		**Alt 3c Roundabout**	
	PM		**PM**		**AM**	**PM**
NY 28 & Ski Bowl Rd North*	2.9 (A)		2.9 (A)		2.3 (A)	2.9 (A)
NY 28 & Bridge St (NY 28N)	17.1 (B)		7.2 (A)		5.5 (A)	7.1 (A)
NY 28 & Ski Bowl Rd South	-		-		-	-

*Note: Values for Ski Bowl Road North intersection in Alternatives 2 & 3 assume that vehicles are restricted to accessing the Health Center only.

In the Access Alternative 1 and 2 scenarios, the only significant impacts in terms of Level-of-Service would be experienced during the PM Peak hour at the intersection of Ski Bowl Road South/NYS 28. The intersection with Ski Bowl Road South is anticipated to operate at LOS E in the PM peak due to the large number of exiting vehicles and associated increase in delay. Although it may be possible to mitigate this impact by adding turn lanes to this intersection, this intervention would not meet the other goals of the community, such as fostering a gateway to the hamlet, and may further degrade access for pedestrians.

If Ski Bowl Road South is closed, as proposed in Alternative 3, the burden of access would shift northward to the intersection of NYS 28/28N, which would operate at LOS D in the PM peak hour. This decrease is operations is due to the concentration of entering and exiting traffic from Ski Bowl Park to one access point where previously, the trips were distributed among three access points. However, if any of the proposed intersection improvements (3a, 3b, or 3c) were constructed at NYS 28/28N, the LOS would improve to acceptable conditions.

A table that includes the LOS for all approach lanes are included in **Appendix 5** with all the Synchro© output files included in **Appendix 6.**

Recommendations

The traffic analysis contained in this study is intended to guide the Town of Johnsburg in future efforts to redevelop Ski Bowl Park. As such, it presents a menu of options to select from at such time as the Town reclaims the gravel mining operation and moves forward with park design.

Given the analysis that has been completed, creating a 4-way intersection at NYS Route 28/28N could benefit traffic circulation while also providing tangible co-benefits by improving connections to the hamlet and increasing opportunities for pedestrian access. An overview of recommendations has been mapped on Figure 9.

In terms of vehicle circulation, creating a new access to Ski Bowl Park at NYS 28/28N will provide the most benefit if it is combined with closing off access from Ski Bowl Park South. In combination with a traffic signal or roundabout, this would allow for the best Level-of-Service by reducing the impact of increased traffic volumes from the additional development. If the new intersection is created while Ski Bowl Road South remains open, the southern intersection will likely still face degraded operations in future buildout conditions. However, it is important to keep in mind that if the amount of proposed development within the park is reduced, especially in terms of hotel and retail uses, the potential impact to vehicle circulation at Ski Bowl Road South would also be reduced. In this case, it may be possible that both intersections would retain acceptable Level-of-Service; additional analysis would be required to confirm this, however. Table 11 outlines the Pros and Cons of adding a traffic signal or roundabout at the intersection of NYS Route 28/28N.

TABLE 11

Intersection Alternatives, Pros and Cons
NY Route 28/28N & Proposed Access to Ski Bowl Park

Concept	**Pros**	**Cons**
Traffic Signal	• Traffic Calming • Stopped traffic would allow for views into Ski Bowl/Hamlet • Pedestrian signals • Can be combined with turning lanes to provide a phased implementation	• Signal maintenance time and cost • Increased emissions from stopped vehicles • Less potential to create a gateway feature
Roundabout	• Traffic calming • Improved traffic flow over signal • Less perceived delay, vehicles in motion • Through vehicles don't need to stop if there are no vehicles or pedestrians in the roundabout • Slower speeds and less severe accidents • Gateway feature for Hamlet and Ski Bowl • Improved landscape features	• No pedestrian signals • Increased construction costs compared to traffic signal

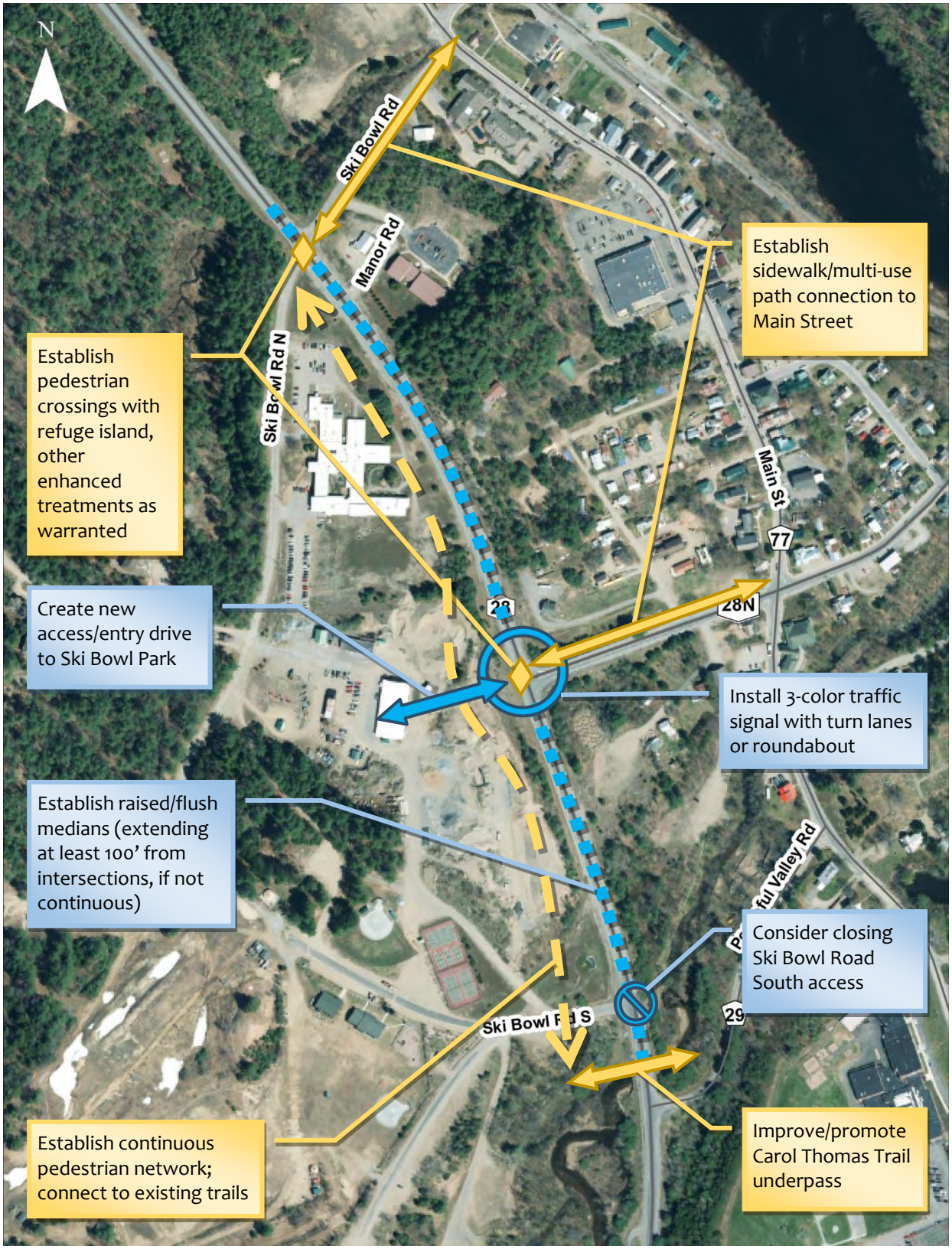

Figure 9 -- Recommended Improvements

As revealed in the analysis in the previous section, from a transportation perspective both options have the potential to handle increased traffic due to future development. The roundabout offers a greater number of benefits, but comes with a higher potential construction cost. However, if a traffic signal is installed, this may require much more landscaping, signage, pedestrian amenities (as discussed in the following section) and design features in order to accomplish the goal of creating a gateway into the hamlet.

Ultimately, the choice between a traffic signal and a roundabout should ideally folded into the comprehensive redesign of Ski Bowl Park. This will allow for the final design to be fully integrated into the Park, taking into consideration all of the goals of the community. In addition, this will allow for a true estimate of costs to be developed, which will give the Town a concrete goal to solicit funding. (See Implementation for more information.)

Pedestrian/Bicycle Recommendations

Improving pedestrian access to Ski Bowl Park is one of the primary goals of this project. The downtown hamlet core is within a 5-minute walk of the proposed entrance to the Park at NYS 28 & 28N. North Creek itself has an extensive pedestrian network along Main Street, which could allow visitors to park in the hamlet and walk to Ski Bowl, and vice versa. The following recommendations are intended to guide the development of pedestrian facilities which link to Ski Bowl Park.

Crosswalks

There are many factors which influence the design and location of crosswalks: traffic volume and speed, roadway width, number of travel lanes, sight distances, traffic signal timing (if applicable) and pedestrian volume. The 2016 NYSDOT Pedestrian Safety Action Plan (PSAP) recommends that pedestrian crossings are best accommodated across roadways with a maximum speed of 45 mph; the posted speed limit on NYS 28 is 55 mph. Within New York State, changes to posted speed limits are enacted by NYSDOT. Historically, such changes are not undertaken often, and very rarely without a material change to the context of the roadway itself, such as a significant increase in development density or vehicle crashes. Ultimately, given enough redevelopment in Ski Bowl Park, it may be feasible to request a reduction in the speed limit on NYS Route 28 within the study area upon full buildout.

However, in the meantime, the Town should make every effort to increase and improve pedestrian crossing facilities on NYS Route 28. For roadway corridors with posted speeds of 50mph and above, the NYSDOT recommendation is to implement measures to reduce operational speeds and then to consider enhanced treatments.

Lowering operational speeds without changing the posted speed limit can be a challenge. Even if the posted speed limit was reduced, the current roadway configuration – wide shoulders, relatively low traffic, and unobstructed views -- does not encourage drivers to slow down. One method to provide traffic calming would be to install raised medians along NYS Route 28 as shown in the concepts in **Appendix 5.** This would emulate a boulevard, which would not only provide the visual friction to signal to drivers to slow down, but would also add to the sense of arriving at a gateway. With careful design it may be possible to establish landscaping features within the medians, to create further visual interest. If continuous medians are not feasible, it is recommended to install shorter sections in conjunction with the crosswalk treatments, described further below.

Additional traffic calming treatments to consider during next phase of design could be to install speed limit markings in the roadway per the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) and the New York State Supplement; the use of speed feedback signs should also be considered.

With appropriate traffic calming measures in place, the use of enhanced crosswalk treatments is also recommended. These include:

- Pedestrian crossing signs installed in advance of and at the high-visibility crosswalk (Figure 10)
- Rectangular rapid flashing beacons (RRFBs) (Figure 10)
- Raised median refuge islands (Figure 11)
- High-intensity activated crosswalk (HAWK) beacon. (not shown)

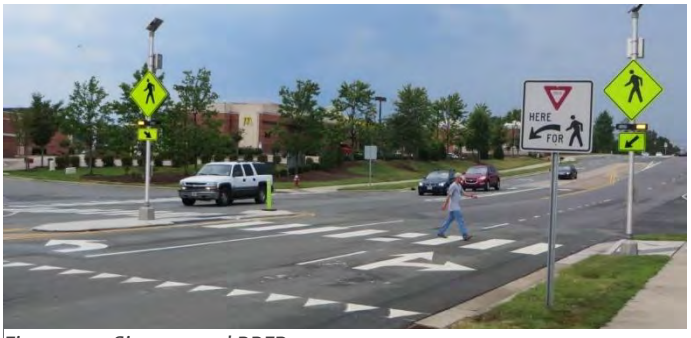

Figure 10 – Signage and RRFB

Figure 11 -- Pedestrian Refuge Island

In combination with enforcement efforts, these enhanced treatments would also contribute to traffic calming, which may lower speeds even without a change in posted speed limit. In particular, the raised median islands also offer co-benefits relating to the goal of establishing a gateway between Ski Bowl Park and the hamlet.

The location of roadway crossings is as important as their design. As stated in the Existing Conditions section of this report, there is only one designated crosswalk located at NYS 28 & Ski Bowl Road North. It is recommended that this facility should be improved to foster a safe, accessible connection between the Health Center and the Senior Center. It is also recommended that an additional crossing should be created at the intersection of NYS 28 & 28N.

Both of these locations would be appropriate for the installation of a raised median/pedestrian refuge island. The installation of a pedestrian refuge median island is recommended in the guidelines provided by the American Association of State Highway and Transportation Officials (AASHTO) Guide for Pedestrian Facilities, 1st Edition 2004 (or most current version) and the NYSDOT PSAP. The design must meet all NYSDOT standards including the installation of detectable warnings on each side of the island. Additional enhancements such as signage and beacons may also be beneficial. The exact configuration should be determined in the design phase.

If a roundabout is selected as the preferred intersection treatment at NYS Route 28/28N, the pedestrian refuge islands would be integrated directly into the design. A single-lane roundabout reduces vehicle/pedestrian exposure to one lane at a time, similar to a refuge island. However, unlike traffic signals which stop vehicle movement, in a roundabout motorists must yield to pedestrians in the crosswalks. This can create challenges for visually-impaired pedestrians who may be less able to judge the movement of approaching vehicles. This should be taken into consideration during the design phase.

Figure 12 -- Pedestrian underpass, Carol Thomas Memorial Trail

In addition, the town should take advantage of the existing pedestrian underpass, which is accessed via the Carol Thomas Memorial Trail (see figure 12). This provides a way for pedestrians to cross NYS Route 28 completely separate from traffic. This facility could be improved with features such as lighting, improved handicap accessibility, and resurfacing, which could make it a more attractive way to access the park on foot in the short term.

Sidewalks/Multi-use Paths

In addition to providing safe and accessible facilities to cross NYS Route 28 on foot, pedestrian amenities such as sidewalks and multi-use paths should also be constructed. These will ideally link to the existing pedestrian network within North Creek.

A sidewalk/multi-use trail should be considered along the eastern leg of Ski Bowl Road North and NYS Route 28N, both of which connect to Main Street. These could tie into the recommended crosswalk locations, providing direct access to the Park from the hamlet.

Dedicated pedestrian accommodations should also be created on the west side of NY Route 28 between Ski Bowl Road North and South. This facility, which could be comprised of a sidewalk or multi-use path with pedestrian level lighting, should be incorporated into the proposed redesign of the park and be located outside the highway boundary. Similarly, the redesign effort should foster a more direct connection between the proposed pedestrian accommodations west of NYS Route 28, the Park itself, and the Carol Thomas Memorial Trail. Currently, this trail head connects to a larger network of trails within Ski Bowl Park but does not provide direct access to the main area of the lodge, tennis courts and pavilion.

Peaceful Valley Road, which provides access to Gore Mountain, is located approximately 0.5 miles to the south of Ski Bowl Road South. Due to the proximity of the creek on the west side of NY Route 28 between these two roads and the steep side slopes, the best option for a connection to the park from Peaceful Valley Road would be a dedicated trail connecting to The Loop, south of the Dr. Jacques Grunblatt Memorial Beach near the camp sites.

Bicycle Recommendations

Although this study has focused mainly on improving connections for pedestrians, cyclists must be accommodated as well. Along NYS Route 28, this can be accomplished by maintaining at least 4' wide shoulders within the study area. The aforementioned traffic calming will also benefit cyclists as well. In addition, the Town should strongly consider using multi-use pathways (as opposed to sidewalks) to connect Main Street to Ski Bowl Park along NYS Route 28N. This would allow cyclists to use the facility separate from vehicle traffic, which is preferable to many casual cyclists. To cross NYS Route 28, these cyclists could dismount and walk their bicycles across the roadway. More experienced cyclists could still use the vehicle lanes as allowed under NYS law. Within the park, multi-use paths should also be integrated to encourage bicycle use.

Summary of Recommended Pedestrian/Bicycle Improvements:

- Install raised median/pedestrian refuge islands at the intersections of NYS 28/Ski Bowl Road North and NYS Route 28/28N. Consider other enhancements, such as RRFBs, during the design phase.
- Install sidewalk/multi-use trail connections to Main Street on NYS Route 28N and Ski Bowl Road North.
- Create multi-use trail west of NYS Route 28 as part of the park redevelopment effort. This should connect to the proposed crossings as well as to the established trail system and Peaceful Valley Road.
- Work with NYSDOT to promote traffic calming measures such as speed feedback signs, and with NYS Police for increased enforcement efforts, to lower operational speeds on NYS Route 28 within the study area.
- Continue to improve Carol Thomas Trail and consider promoting this as a primary pedestrian access point as an interim solution until the crosswalks ion NYS Route 28 can be improved.

Implementation & Next Steps

As stated previously, the purpose of this study is to provide a framework for the town to pursue efforts to reclaim/redevelop Ski Bowl Park. The intention was to provide a solid background of transportation engineering data for future use by design professionals when the Town moves forward with the reclamation of the gravel pit and DPW facility. The analysis contained in this document is contingent on the best available information concerning development in and around the Park. Should conditions change significantly, the recommendations may no longer be valid and should be reassessed.

TABLE 7: POTENTIAL FUNDING SOURCES

Intersection/Roadway Improvements

- Transportation Improvement Program (A/GFTC)
- USDOT BUILD grants

Recreation Park

- Office of Parks, Recreation, & Historic Preservation (OPRHP): Environmental Protection Fund Program for Parks, Preservation, and Heritage
- Environmental Facilities Corporation Green Innovation Grant Program

Pedestrian Improvements

- OPRHP: Recreational Trails Program
- NYSDOT Transportation Alternatives Program (TAP)
- A/GFTC Make the Connection Program

From a planning perspective, undertaking the design of the Park and improvements to associated pedestrian infrastructure at the same time would theoretically create efficiencies which might result in reduced design costs and a shorter approval process. However, any improvements to the roadway on State-owned roadways, or which receive Federal Highway (FHWA) funds, must adhere to NYSDOT design standards and process for locally-administered projects. This includes intersection improvements as well as any pedestrian features within the highway boundary.

Historically, it has been possible to include the design of recreation park amenities within the scope of Federally-funded alternative transportation projects; the Charles R Wood park in Lake George is a regional example. However, recent changes to funding mechanisms make it unlikely that a project with extensive recreation facilities would be likely to receive Federal transportation dollars. Similarly, it is unlikely that the Town would be able to find sufficient funding to allow for construction of both the Park and the transportation facilities from another source.

As such, the Town should consider pursuing a conceptual design for the Park and related transportation improvements, which will be used to guide the implementation of the project as a whole. As stated in the previous section, the decision to select either a traffic signal or a roundabout for the proposed 4-way intersection at NYS Route 28/28N should be heavily influenced by the potential design for the Park. For example, if the existing DPW structure is to remain in place, the traffic signal option may allow more room for the entrance road. Other non-transportation amenities like gateway treatments could also be folded into the design, even if the construction is later conducted in phases. It would also be crucial to gain the input from stakeholders, especially FrontStreet Development and ORDA. A single concept would also allow for comprehensive public outreach and could help create a feasible phasing plan for construction, including realistic cost estimates. The Town could then pursue appropriate funding channels for the Park and the transportation facilities.

The drawback to this approach is that there may be some replication of steps or inefficiencies during detailed design. As stated above, the NYSDOT design procedure would be required for improvements to NYS Route 28. This process also mandates public input and consideration of environmental impacts as well as an analysis of feasible alternatives. This may lead to confusion or frustration for community members. However, a pragmatic and transparent public information campaign can go a long way towards engendering continuing support for the project.

Appendix 1

Turning Movement Counts

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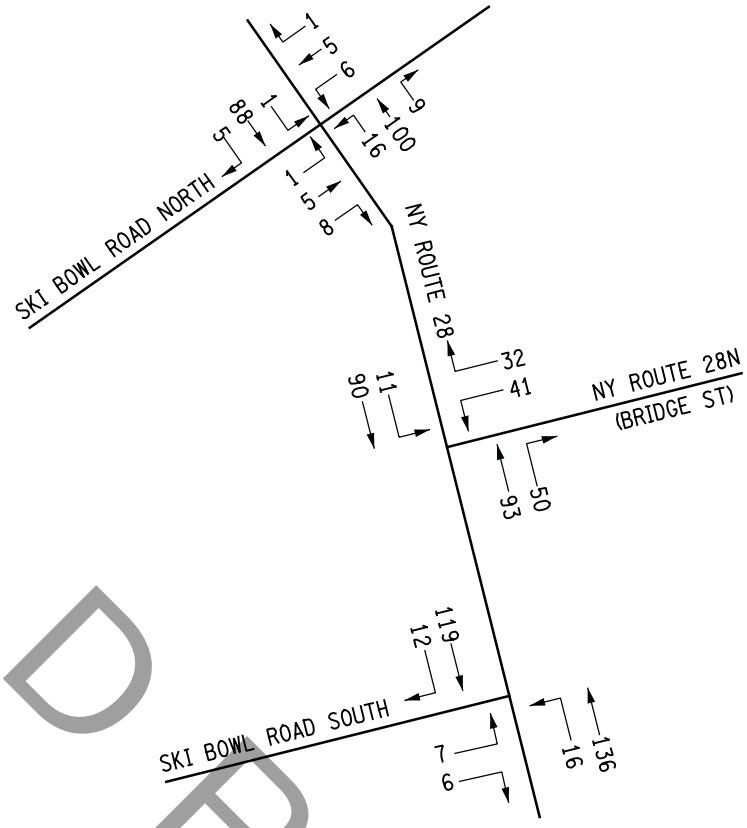

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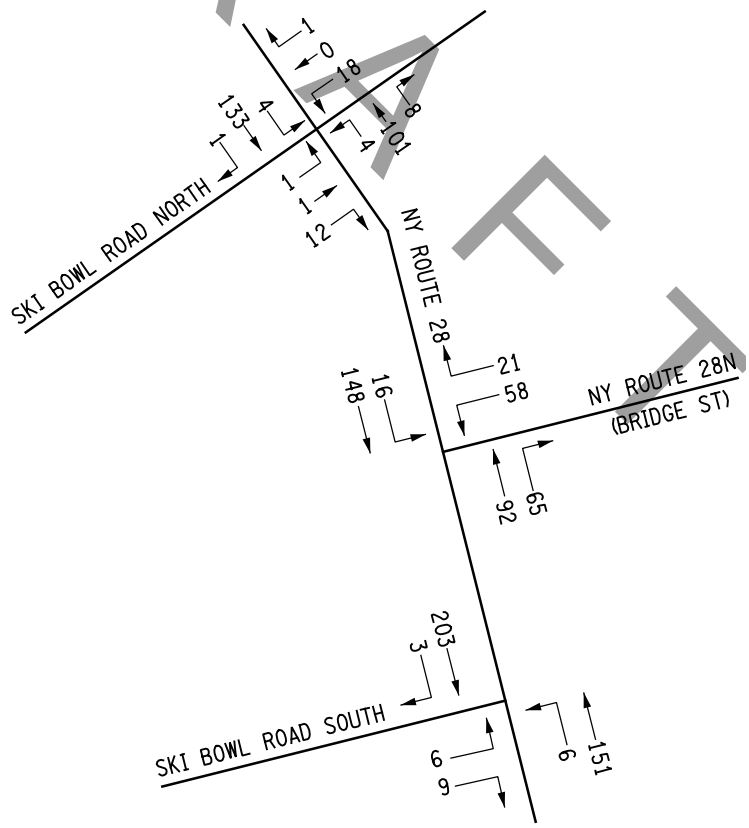

EXISTING (2019)

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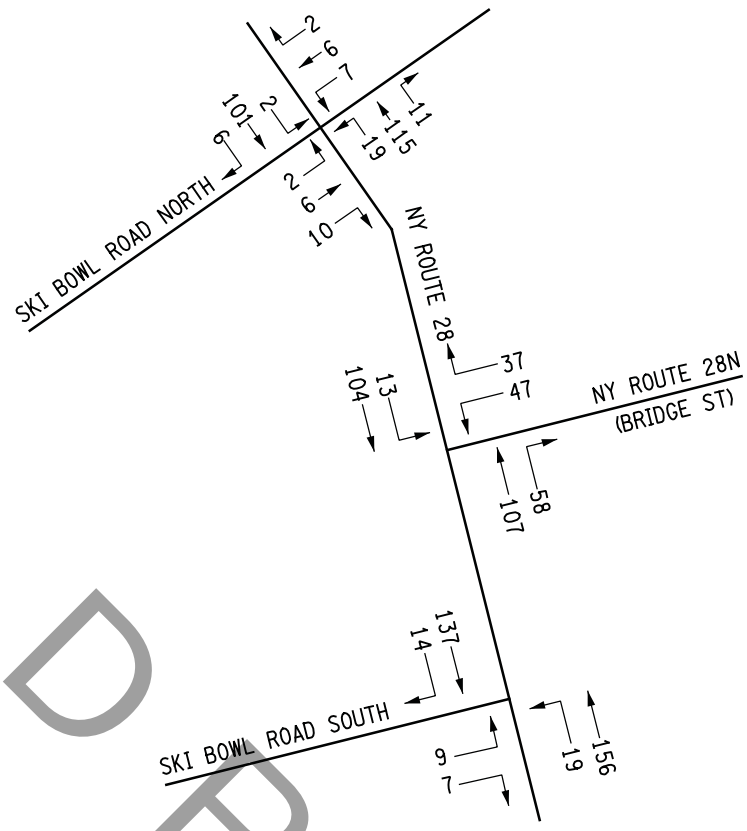

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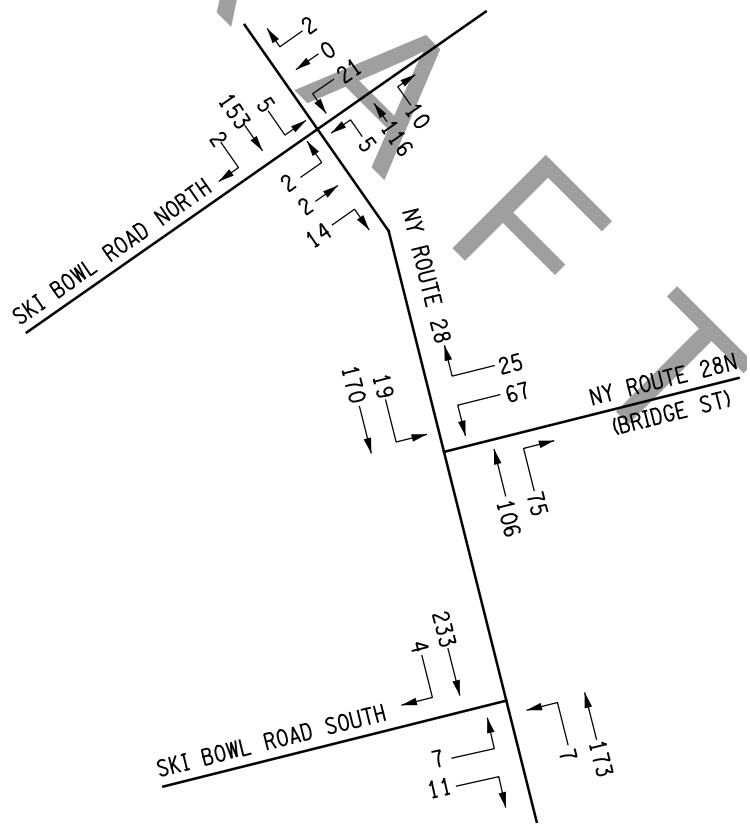

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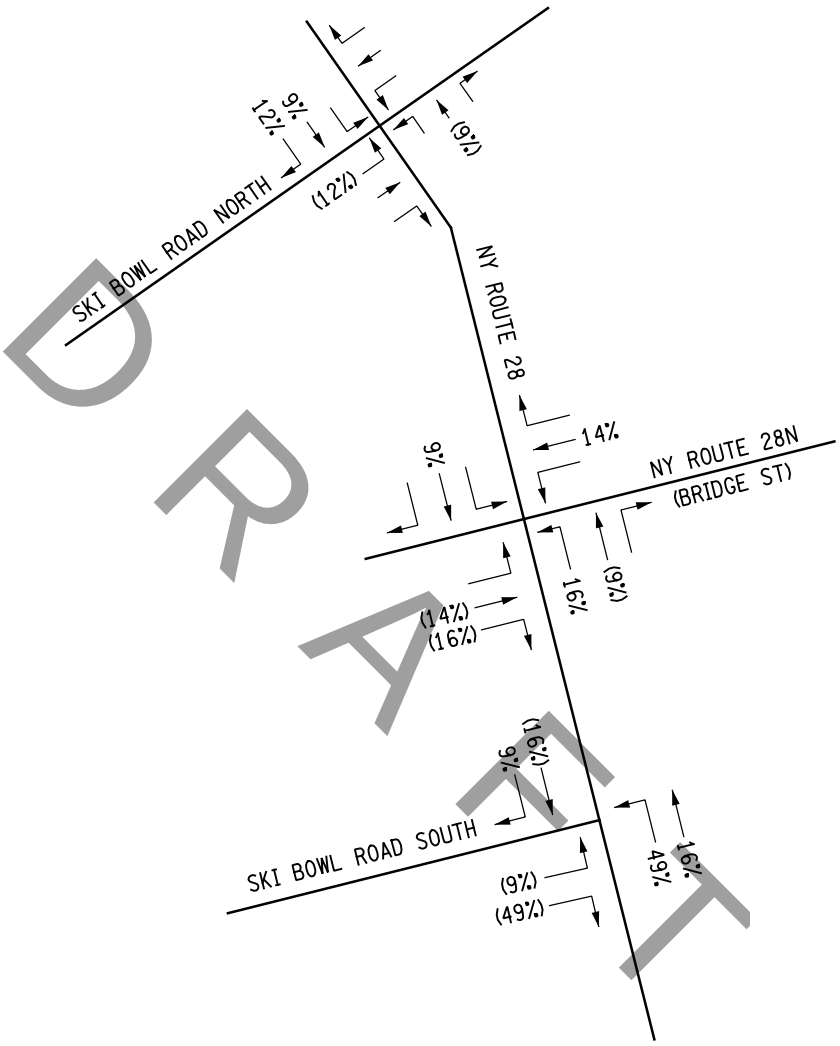

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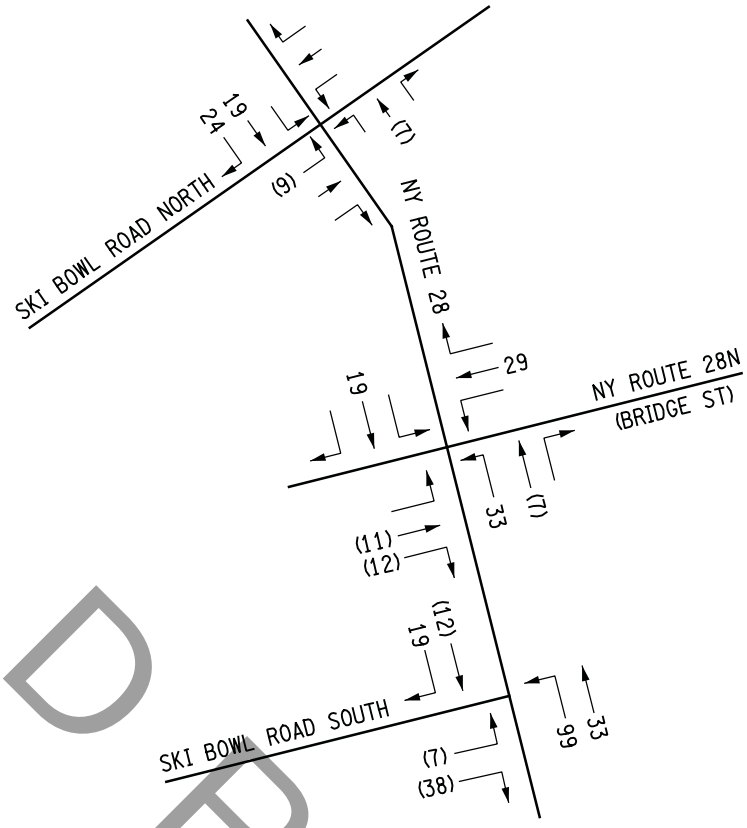

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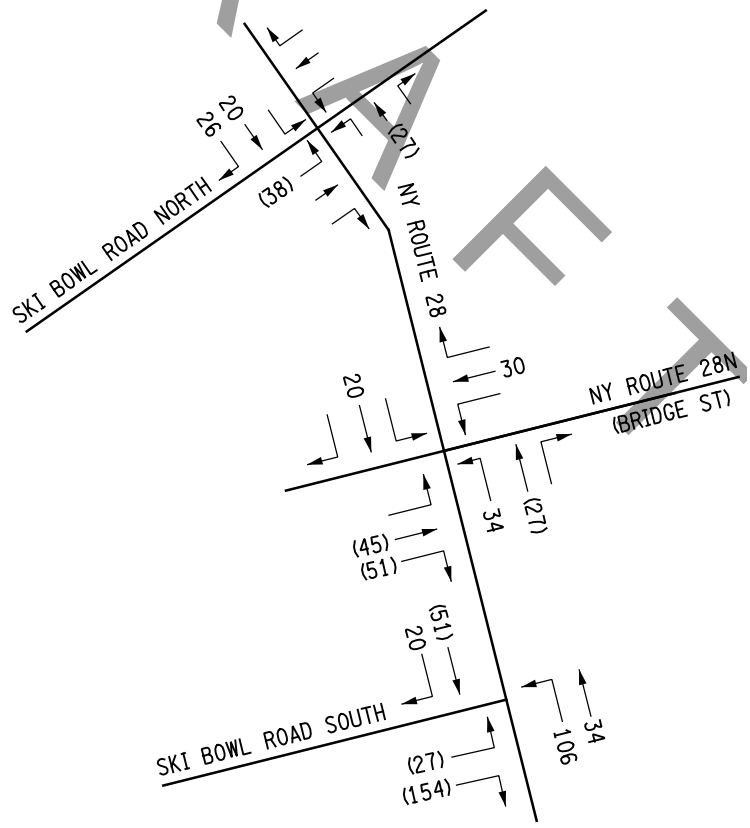

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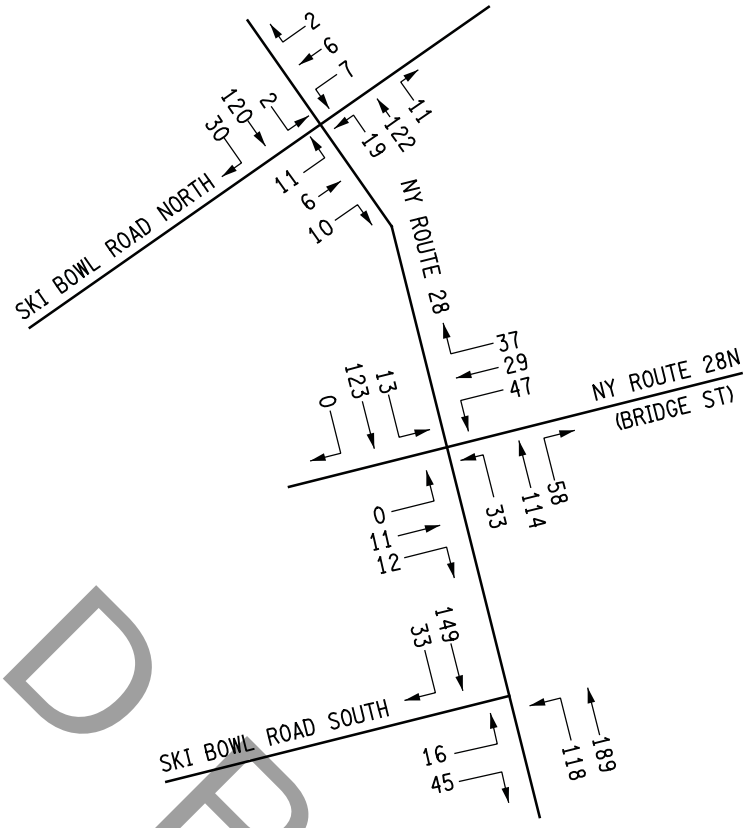

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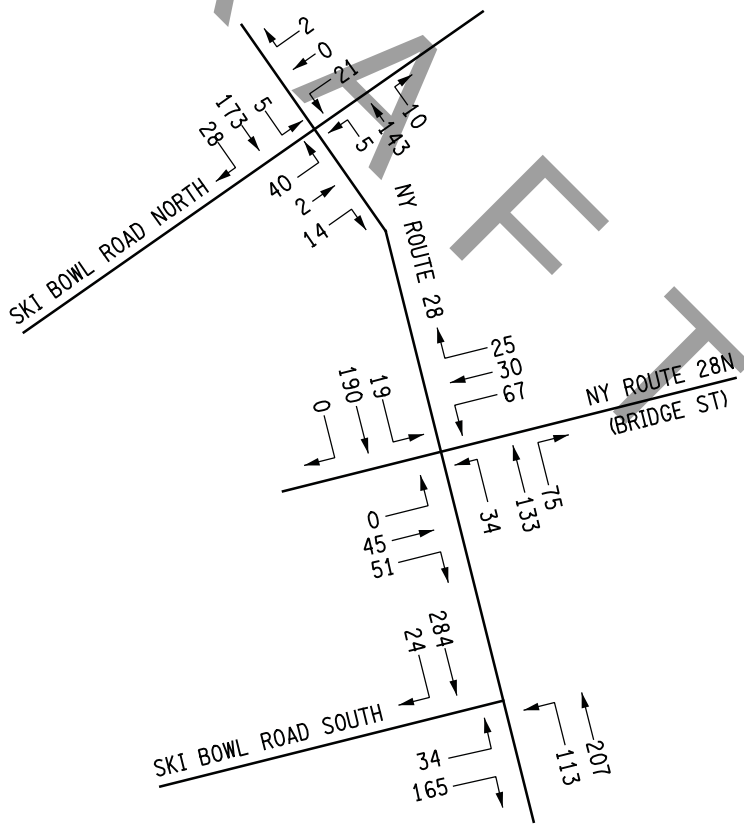

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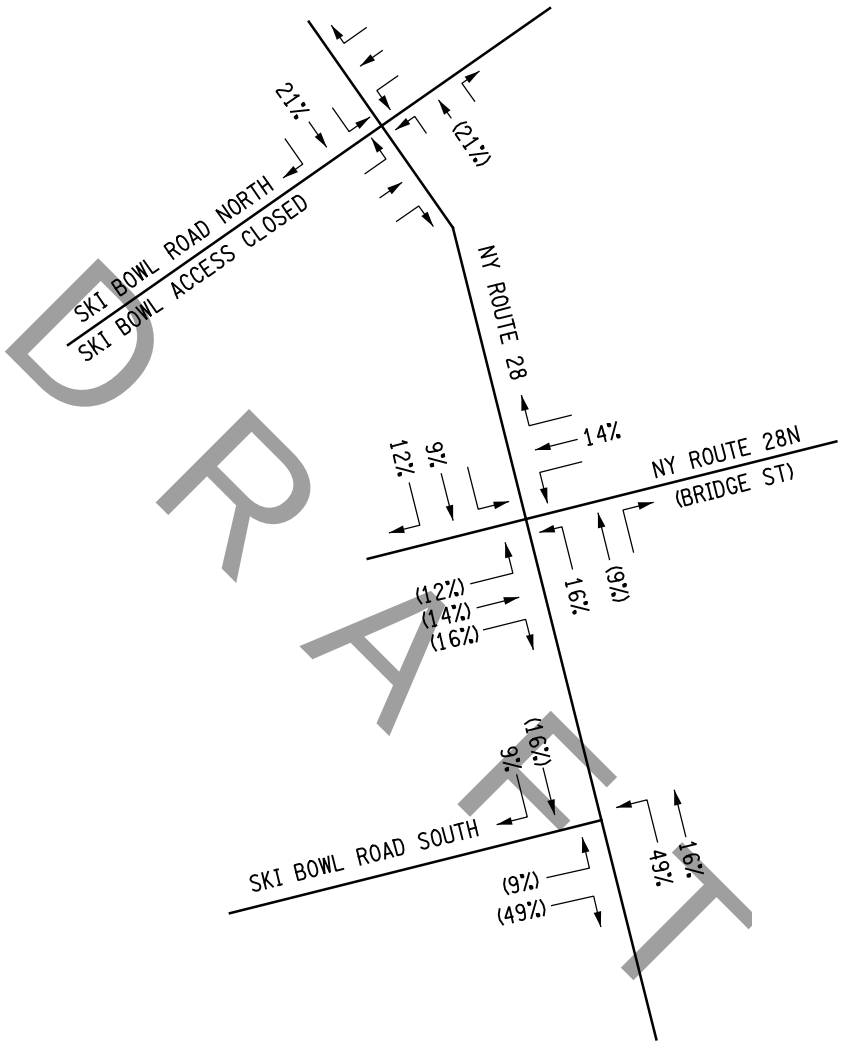

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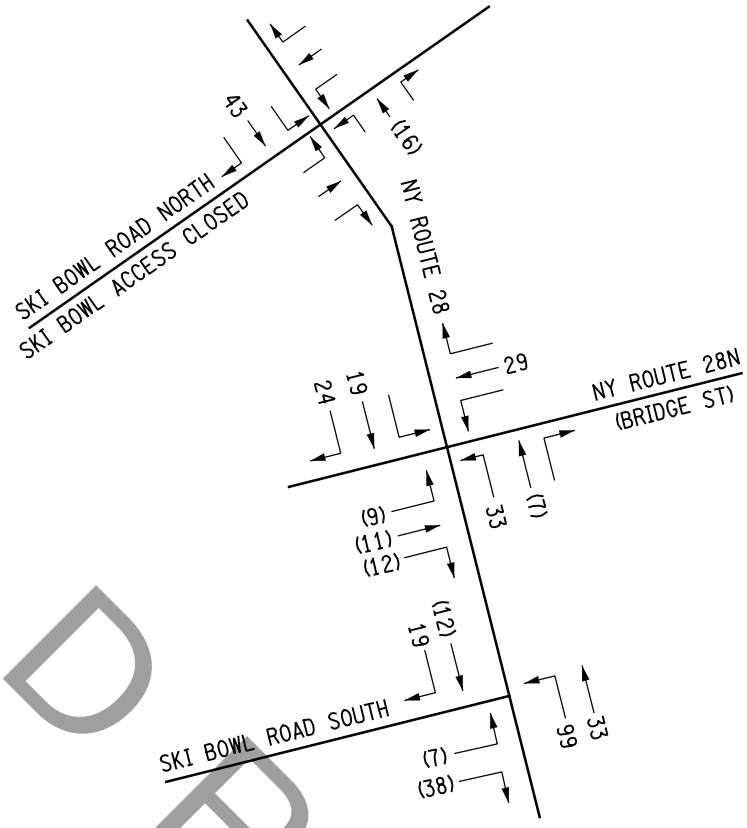

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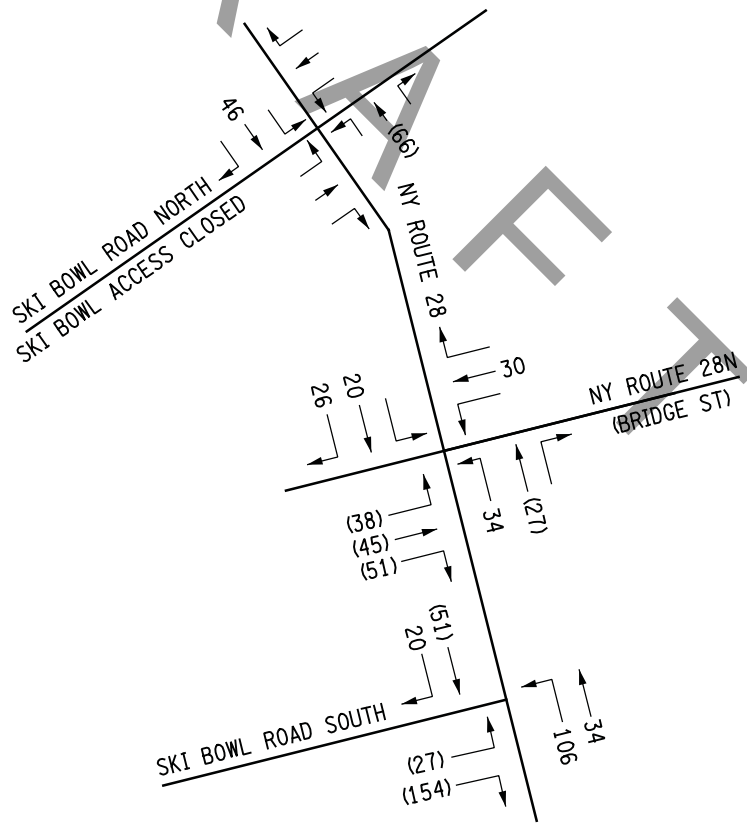

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MJ1624; TOWN OF NORTH CREEK, WARREN COUNTY

FIGURE NO.	SCALE	DATE
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Engineering and Land Surveying, P.C.
1533 Crescent Road - Clifton Park, NY 12065

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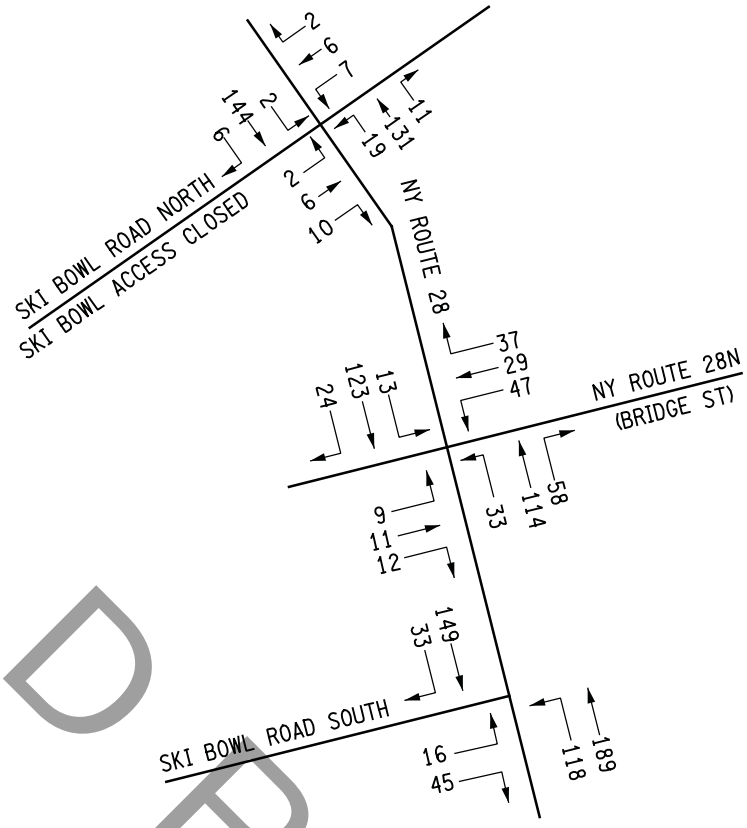

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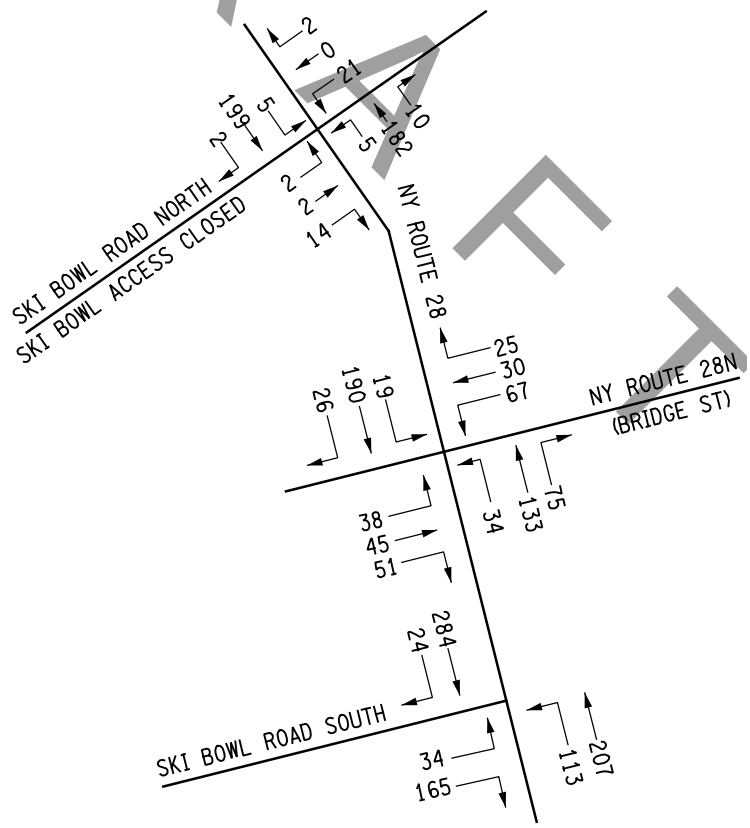

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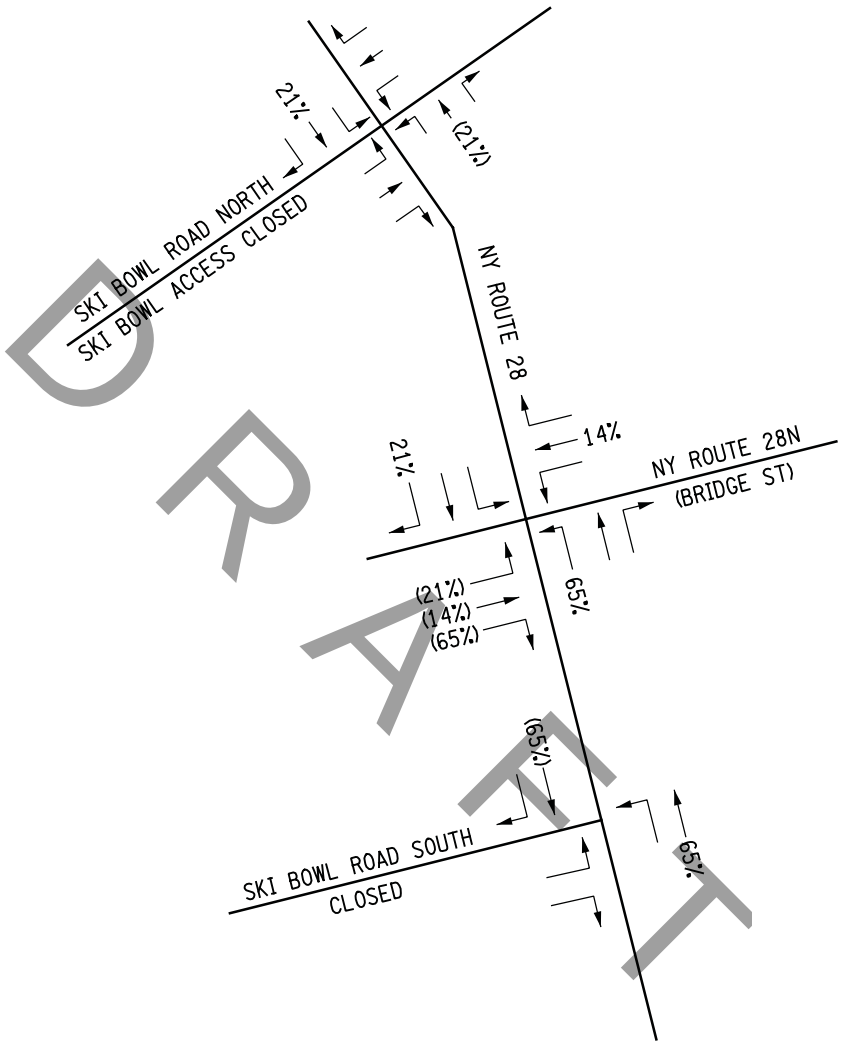

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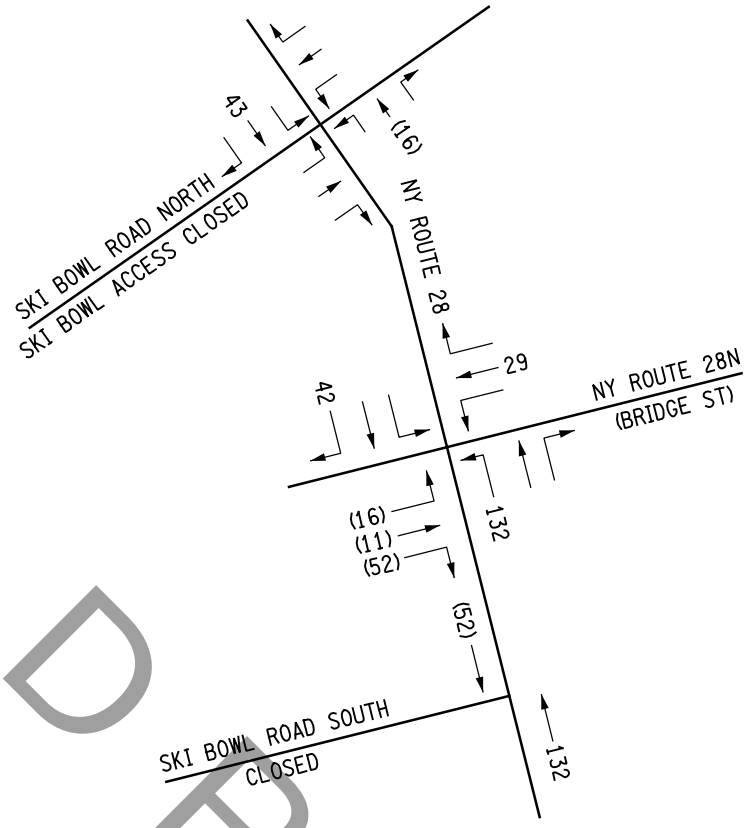

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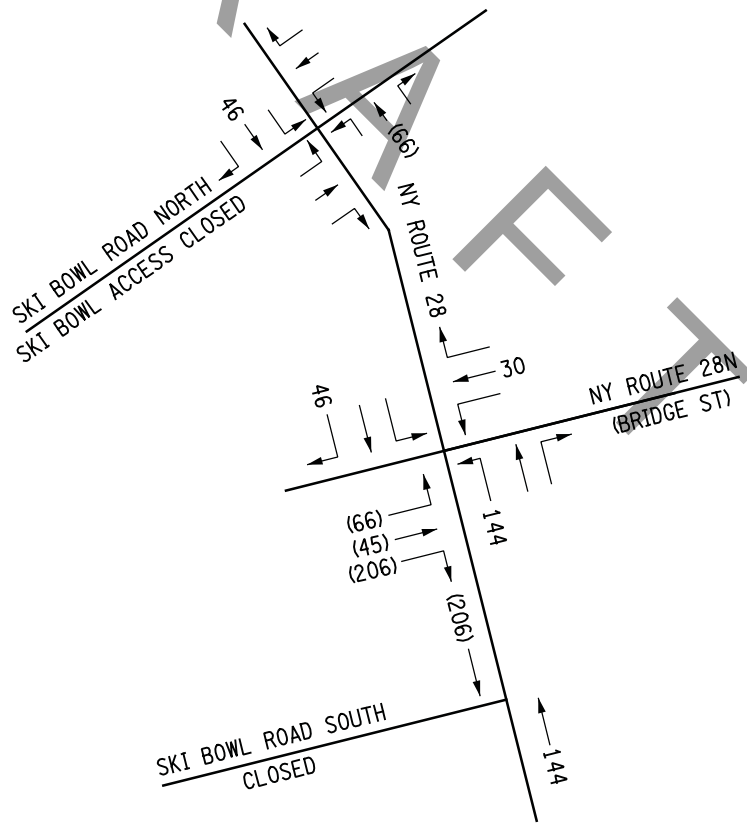

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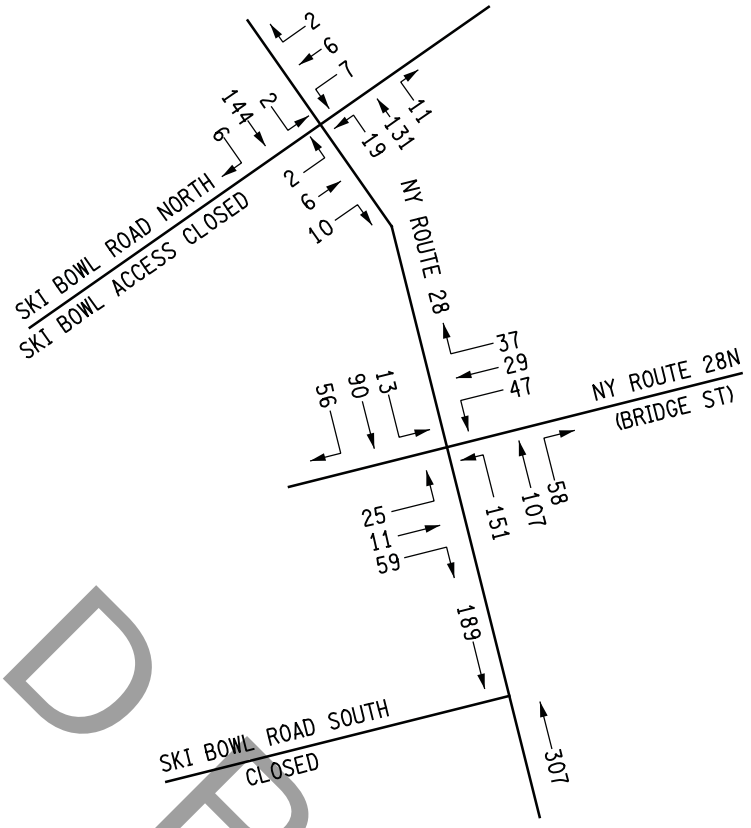

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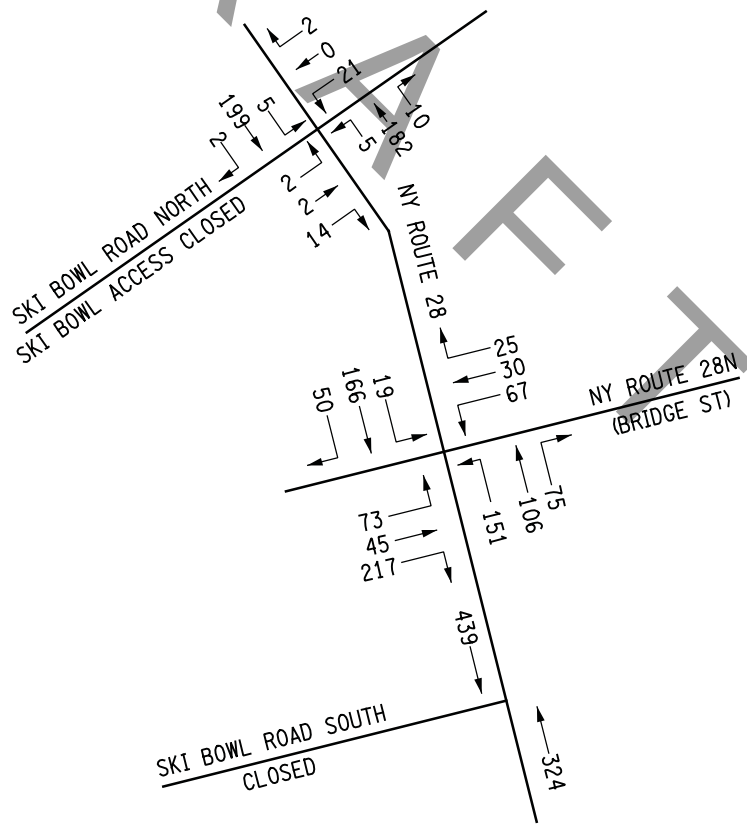

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Appendix 2
Accident Analysis

NORTH CREEK-SKI BOWL ACCIDENT SUMMARY TABLE

Section	Right Angle	Left Turn	Rear End	Fixed Object	Sideswipe	Overturn	Head On	Overtake	Animal	Pedestrian	Bicycle	Other	Non Reportable		Total Accidents	Personal Injury	Property Damage Only	No Record
													Uknown	Rear End				
State Route 28			1	4	1				2						8		7	1
State Route 28/Ski Bowl Rd N Intersection	4	2	1												7	1	4	2
State Route 28/State Route 28 N Intersection	1														1		1	
State Route 28/Ski Bowl Rd S Intersection				1											1		1	
State Route 28/Peaceful Valley Rd Intersection			1						2						3	1	1	1
State Route 28/Manor Rd Intersection			1												1			1
State Route 28N/Main Street Intersection				1											1		1	
Out of Project Area	2		1	3					1			1			8		6	2
Totals	7	2	5	9	1	0	0	0	5	0	0	1	0	0	30	2	21	7

NORTH CREEK/SKI BOWL ACCIDENT SUMMARY DESCRIPTIONS

NO.	CASE	DATE	DAY	TIME	NO. VEH	SEVER*	LC	RC	RSC	WEATH	CONTR FACT.	REF MARK	ACC TYPE	DIR N	DIR S	DIR E	DIR W	DIR UNKN	DESCRIPTION OF ACCIDENT
1	35270986	5/20/2014	TUE	14:47	2	PDO	1	1	1	1	07, YY	28 17101050	LEFT TURN	1			1		V2 EB ON SKI BOWL ROAD N RAN STOP SIGN TURNING LEFT ONTO SR 28 STRIKING V1 NB ON SR 28
2	35297998	6/5/2014	THU	9:45	1	PDO	1	1	1	1	20, YY	28 17101048	FIXED OBJECT		1				V1 SB ON SR 28 SWERVED AND STRUCK ROADSIGNS
3	35326854	7/5/2014	SAT	12:26	1	NR	1	1	1	1	61, YY	28 17101046	ANIMAL		1				V1 SB ON SR 28 STRUCK DEER
4	35366572	8/15/2014	FRI	20:38	1	NR	5	2	1	1	61, YY	28 17101055	ANIMAL		1				V1 SB ON SR 28 STRUCK DEER
5	35603726	2/7/2015	SAT	22:51	1	PDO	5	4	4	4	19, 66	28 17101057	FIXED OBJECT	1					V1 NB ON SR 28 LOST CONTROL AND STRUCK RETAINING WALL
6	35614177	2/17/2015	TUE	16:30	2	PI	1	1	1	1	07, 19, YY	28 17101050	RIGHT ANGLE	1		1			V2 EB ON SKI BOWL ROAD N FAILED TO YEILD AND STRUCK BY V1 NB ON SR 28
7	35753788	6/9/2015	TUE	05:41	1	NR	2	1	2	3	26, YY	28 17101050	FIXED OBJECT		1				V1 SB ON SR 28 SWERVED TO AVOID MOTORCYCLE, STRUCK GUIDERAIL
8	35824937	8/1/2015	SAT	17:31	2	NR	1	1	1	1	04, YY	28 17101050	REAR END	2					V1 NB ON SR 28 STOPPED TO TURN ONTO SKI BOWL ROAD N, STRUCK BY V2
9	35925966	10/9/2015	FRI	11:55	2	PDO	1	2	2	3	13, 18, YY		RIGHT ANGLE	1			1		V2 NB ON SR 28 STRUCK V1 ATTEMPTING TO PASS V1 AS V1 WAS TURNING
10	36061274	1/18/2016	MON	10:40	2	PDO	1	1	2	1	13, YY	28 17101050	LEFT TURN	2					V1 NB ON SR 28 STRUCK V2 ATTEMPTING TO PASS V2 AS V2 WAS TURNING
11	36291027	7/4/2016	MON	12:55	2	PDO	1	1	1	1	07, YY	28 17101050	RIGHT ANGLE	1			1		V1 WB ON SKI BOWL ROAD ATTEMPTED TO TURN ONTO SR 28 STRUCK V2 NB
12	36321189	7/17/2016	SUN	17:25	1	PDO	1	1	1	1	61, YY	28 17101049	ANIMAL		1				V1 SB ON SR 28 STRUCK DEER
13	36339016	8/7/2016	SUN	14:07	1	PDO	1	5	1	1	61, YY	28 17101056	ANIMAL		1				V1 SB ON SR 28 STRUCK DEER
14	36454374	11/2/2016	WED	15:10	2	NR	1	2	1	1	07, YY	28 17101050	RIGHT ANGLE	1		1			V1 EB AT STOP SIGN ON SKI BOWL ROAD N STRUCK V2 NB ON SR 28 TURNING RIGHT ONTO SKI BOWL ROAD N
15	36585460	1/7/2017	SAT	09:02	1	PDO	1	2	1	1	02, 27	28 17101046	FIXED OBJECT			1			V1 EB ON MAIN ST STRUCK FIRE HYDRANT
16	36670081	3/23/2017	THU	14:18	4	PI	1	1	1	1	04, 09, YY	28 17101055	REAR END	1	3				V1 SB ON SR28 STRUCK V2 WAITING FOR V3 TO MAKE LEFT ONTO PEACEFUL VALLEY RD. V4 NB ON SR 28 UNABLE TO AVOID AND STRUCK BY V3
17	36718783	3/23/2017	THU	00:00	1	PDO	Z	Z	Z	4	XX		FIXED OBJECT					1	V1 ON MAIN ST HIT CURB UNDER SHOW
18	36859715	8/12/2017	SAT	12:18	2	NR	1	1	1	1	09, YY	28 17101050	REAR END	2					
19	36926268	10/8/2017	SUN	12:43	2	PDO	1	1	1	2	04, 13, YY	28 17101046	RIGHT ANGLE	1			1		V1 NB ON SR 28 STRUCK V2 WAITING AT STOP SIGN
20	37060912	12/27/2017	WED	07:59	1	PDO	1	5	4	1	66, YY	28 17101059	FIXED OBJECT				1		V1 NB ON SR 28 LOST CONTROL TURNING LEFT ONTO SKI BOWL RD S STRUCK SNOW BANK
21	37167352	2/18/2018	SUN	17:27	1	PDO	3	2	1	2	02, 13	28 17101060	FIXED OBJECT		1				V1 SB ON S8 STRUCK SNOW BANK
22	37259949	4/27/2018	FRI	10:09	1	PDO	1	1	1	2	08, YY	28 17101054	FIXED OBJECT		1				V1 ON SR 28 FELL ASLEEP DROVE OFF ROADWAY
23	37303436	4/28/2018	SAT	02:03	1	NR	4	3	1	1	04, YY	28 17101046	FIXED OBJECT		1				V1 SB ON SR 28 DISTRACTED AND STRUCK SIGN
24	37328273	6/6/2018	WED	05:43	1	PDO	1	1	1	2	61, YY		ANIMAL		1				V1 SB ON PEACEFUL VALLEY RD STRUCK DEAR
25	37427955	7/27/2018	FRI	12:17	2	PDO	1	1	1	2	07, YY	28 17101050	RIGHT ANGLE	1		1			V1 EB ON SKI BOWL ROAD N AT STOP SIGN, DID NOT STOP FOR V2 AND STRUCK V2 NB ON S8
26	37603591	10/31/2018	WED	13:08	2	PDO	1	1	1	2	03, YY		OTHER			1	1		V1 WB SKI BOWL ROAD N STRUCK PARKED V2
27	37665105	12/29/2018	SAT	07:48	3	PDO	1	5	4	1	66, YY	28 17101059	REAR END	3					V1 NB ON SR 28 SLID INTO V2 AND V3
28	37684427	12/29/2018	SAT	07:48	2	PDO	2	2	4	2	19, 27, YY	28 17101059	SIDESWIPE		2				V1 NB ON SR 28 LOSS CONTROL AND STRUCK V2 SB ON SR 28
29	37707155	1/22/2019	TUE	12:30	2	PDO	1	1	4	1	03, 69, YY		REAR END	1	1				V1 BACKED INTO PARKED V2 IN DPW PARKING LOT
30	37734586	1/29/2019	TUE	20:36	2	PDO	5	1	4	4	19, 66, YY	28N17031045	RIGHT ANGLE	1			1		V1 NB ON SR 28 TURNING RIGHT ONTO SR 28 N LOSS CONTROL AND STRUCK STOPPED V2 WB ON SR 28 N

Accident Rate Calculations
MJ1624; Safety Improvements on
Ski Bowl at North Creek, State Route 28

Roadway	No. of Accidents	2019 AADT
State Route 28	8	3,172
State Route 28 with Ski Bowl Rd N	7	
State Route 28 with State Route 28 N	1	2,146
State Route 28 with Ski Bowl Rd S	1	
State Route 28 with Peaceful Valley Rd	3	
State Route 28 with Manor Rd	1	
State Route 28 N with Main St	1	1,105

From NYSDOT HDM, Chapter 5, Section 5.3.4, the following equations were used to calculate accident rates:

Segment Accident Rate (acc/MVM) = $\dfrac{1{,}000{,}000 \times \text{No. of accidents per year}}{365 \times \text{AADT} \times \text{Segment length (miles)}}$

Intersection Accident Rate (acc/MEV) = $\dfrac{1{,}000{,}000 \times \text{No. of accidents per year}}{365 \times (1/2 \text{ sum of AADTs on all approaches})}$

Segment Accident Rates

State Route 28

No. of Accidents / Year =	1.60
AADT =	3,172
Segment Length (miles) =	0.75
Accident Rate (acc/MVM) =	1.84

Intersection Accident Rates

State Route 28 with Ski Bowl Rd N

No. of Accidents / Year =	1.40
AADT =	3,172
Accident Rate (acc/MVM) =	2.42

State Route 28 with State Route 28 N

No. of Accidents / Year =	0.20
AADT =	5,318
Accident Rate (acc/MVM) =	0.21

State Route 28 with Ski Bowl Rd S

No. of Accidents / Year =	0.20
AADT =	3,172
Accident Rate (acc/MVM) =	0.35

Accident Rate Calculations
MJ1624; Safety Improvements on
Ski Bowl at North Creek, State Route 28

State Route 28 with Peaceful Valley Rd

No. of Accidents / Year =	0.60
AADT =	3,172
Accident Rate (acc/MVM) =	1.04

State Route 28 with Manor Rd

No. of Accidents / Year =	0.20
AADT =	3,172
Accident Rate (acc/MVM) =	0.35

State Route 28 N with Main St

No. of Accidents / Year =	0.20
AADT =	3,251
Accident Rate (acc/MVM) =	0.34

North Creek / Ski Bowl Circulation and Capacity Analysis

Segment **State Route 28**

	FATAL	INJURY	F & I	PDO	NR	TOTAL
a. % by severity	0.00%	6.66%	6.66%	70.00%	23.33%	100%
b. actual	0	0	0	7	1	8
c. expected	0.0	0.5	0.5	5.6	1.9	8.0
d. difference	0.0	0.5	0.5	1.4	0.9	0.0
e. significance	no	no	no			

Intersection **Ski Bowl Rd N**

	FATAL	INJURY	F & I	PDO	NR	TOTAL
a. % by severity	0.00%	6.66%	6.66%	70.00%	23.33%	100%
b. actual	0	1	1	4	2	7
c. expected	0.0	0.5	0.5	4.9	1.9	7.2
d. difference	0.0	0.5	0.5	0.9	0.1	0.2
e. significance	no	no	no			

Intersection **State Route 28 N**

	FATAL	INJURY	F & I	PDO	NR	TOTAL
a. % by severity	0.00%	6.66%	6.66%	70.00%	23.33%	100%
b. actual	0	0	0	1	0	1
c. expected	0.0	0.1	0.1	0.7	1.9	2.6
d. difference	0.0	0.1	0.1	0.3	1.9	1.6
e. significance	no	no	no			

Intersection **Ski Bowl Rd S**

	FATAL	INJURY	F & I	PDO	NR	TOTAL
a. % by severity	0.00%	6.66%	6.66%	70.00%	23.33%	100%
b. actual	0	0	0	1	0	1
c. expected	0.0	0.1	0.1	0.7	1.9	2.6
d. difference	0.0	0.1	0.1	0.3	1.9	1.6
e. significance	no	no	no			

Intersection **Peaceful Valley Rd**

	FATAL	INJURY	F & I	PDO	NR	TOTAL
a. % by severity	0.00%	6.66%	6.66%	70.00%	23.33%	100%
b. actual	0	1	1	1	1	3
c. expected	0.0	0.1	0.1	0.7	1.9	2.6
d. difference	0.0	0.9	0.9	0.3	0.9	0.4
e. significance	no	no	no			

Intersection **Manor Rd**

	FATAL	INJURY	F & I	PDO	NR	TOTAL
a. % by severity	0.00%	6.66%	6.66%	70.00%	23.33%	100%
b. actual	0	0	0	0	1	1
c. expected	0.0	0.1	0.1	0.7	1.9	2.6
d. difference	0.0	0.1	0.1	0.7	0.9	1.6
e. significance	no	no	no			

Intersection **State Route 28 N with Main Street Intersection**

	FATAL	INJURY	F & I	PDO	NR	TOTAL
a. % by severity	0.00%	6.66%	6.66%	70.00%	23.33%	100%
b. actual	0	0	0	1	2	3
c. expected	0.0	0.1	0.1	0.7	1.9	2.6
d. difference	0.0	0.1	0.1	0.3	0.1	0.4
e. significance	no	no	no			

Appendix 3
Signal Warrant Analysis

Traffic Signal Warrant Analysis Workbook

2/27/2020

STUDY AND ANALYSIS INFORMATION

Municipality:	Johnsbyrg	**Analysis Date:**	12/9/2019
County:	Warren	**Conducted By:**	CWS
NYSDOT Region:	1	**Agency/Company Name:**	MJ Engineering

Analysis Information

Data Collection Date:	8/7/2019
Day of the Week:	Monday

Is the intersection in a built-up area of an isolated community of <10,000 population? Yes

Major Street Information

Major Street Name and Route Number:	NY Route 28
Major Street Approach #1 Direction:	S-Bound
Major Street Approach #2 Direction:	N-Bound

Number of Lanes for Moving Traffic on Each Major Street Approach:	1	**LANE(S)**
Speed Limit or 85th Percentile Speed on the Major Street:	55	**MPH**

Minor Street Information

Minor Street Name and Route Number:	NY Route 28N / Ski Bowl Entrance
Minor Street Approach #1 Direction:	W-Bound
Minor Street Approach #2 Direction:	E-Bound

Number of Lanes for Moving Traffic on Each Minor Street Approach:	1	**LANE(S)**

TRAFFIC SIGNAL WARRANT ANALYSIS FINDINGS

	Applicable?	Warrant Met?
Warrant 1, Eight-Hour Vehicular Volume	**Yes**	**Yes**
Warrant 2, Four-Hour Vehicular Volume	**Yes**	**Yes**
Warrant 3, Peak Hour	**Yes**	**No**
Warrant 4, Pedestrian Volume	**No**	**N/A**
Warrant 5, School Crossing	**No**	**N/A**
Warrant 6, Coordinated Signal System	**No**	**N/A**
Warrant 7, Crash Experience	**No**	**N/A**
Warrant 8, Roadway Network	**No**	**N/A**
Warrant 9, Intersection Near a Grade Crossing	**No**	**N/A**

ENTER VOLUME DATA PER 15 MINUTE INTERVAL, PER APPROACH						
Time Interval		Major Street Approach #1 (S-Bound)	Major Street Approach #2 (N-Bound)	Major Street Combined	Minor Street Approach #1 (W-Bound)	Minor Street Approach #2 (E-Bound)
Begin At	End Of	Volume	Volume	Total Volume	Volume	Volume
12:00 AM	12:14 AM	1	4	5	1	1
12:15 AM	12:29 AM	1	4	5	0	1
12:30 AM	12:44 AM	1	3	4	0	1
12:45 AM	12:59 AM	1	3	4	0	1
1:00 AM	1:14 AM	1	2	3	0	0
1:15 AM	1:29 AM	3	3	6	0	0
1:30 AM	1:44 AM	0	3	3	0	1
1:45 AM	1:59 AM	1	1	2	0	0
2:00 AM	2:14 AM	2	1	3	0	0
2:15 AM	2:29 AM	0	2	2	0	0
2:30 AM	2:44 AM	1	2	3	1	1
2:45 AM	2:59 AM	0	2	2	0	1
3:00 AM	3:14 AM	1	3	4	0	1
3:15 AM	3:29 AM	0	2	2	0	0
3:30 AM	3:44 AM	1	2	3	1	2
3:45 AM	3:59 AM	3	4	7	1	1
4:00 AM	4:14 AM	1	4	5	2	3
4:15 AM	4:29 AM	0	2	2	1	3
4:30 AM	4:44 AM	6	6	12	2	4
4:45 AM	4:59 AM	1	7	8	2	4
5:00 AM	5:14 AM	5	11	16	3	6
5:15 AM	5:29 AM	4	13	17	3	6
5:30 AM	5:44 AM	8	15	23	7	14
5:45 AM	5:59 AM	2	17	19	5	9
6:00 AM	6:14 AM	7	25	32	6	11
6:15 AM	6:29 AM	14	34	48	9	17
6:30 AM	6:44 AM	14	37	51	10	19
6:45 AM	6:59 AM	11	48	59	15	29
7:00 AM	7:14 AM	19	42	61	9	18
7:15 AM	7:29 AM	12	43	55	12	24
7:30 AM	7:44 AM	18	50	68	13	25
7:45 AM	7:59 AM	24	62	86	16	30
8:00 AM	8:14 AM	23	62	85	15	29
8:15 AM	8:29 AM	31	72	103	19	37
8:30 AM	8:44 AM	31	73	104	19	36
8:45 AM	8:59 AM	18	74	92	19	36
9:00 AM	9:14 AM	38	78	116	20	38
9:15 AM	9:29 AM	32	82	114	21	39
9:30 AM	9:44 AM	28	84	112	17	32
9:45 AM	9:59 AM	24	94	118	20	37
10:00 AM	10:14 AM	38	101	139	21	40
10:15 AM	10:29 AM	20	103	123	22	41
10:30 AM	10:44 AM	39	96	135	17	32
10:45 AM	10:59 AM	32	117	149	22	43
11:00 AM	11:14 AM	35	117	152	23	43
11:15 AM	11:29 AM	29	119	148	27	52
11:30 AM	11:44 AM	30	119	149	23	45
11:45 AM	11:59 AM	45	114	159	23	44

Traffic Signal Warrant Analysis Workbook

ENTER VOLUME DATA PER 15 MINUTE INTERVAL, PER APPROACH

Time Interval		Major Street Approach #1 (S-Bound)	Major Street Approach #2 (N-Bound)	Major Street Combined	Minor Street Approach #1 (W-Bound)	Minor Street Approach #2 (E-Bound)
Begin At	End Of	Volume	Volume	Total Volume	Volume	Volume
12:00 PM	12:14 PM	20	113	133	23	44
12:15 PM	12:29 PM	37	112	149	24	46
12:30 PM	12:44 PM	32	104	136	24	45
12:45 PM	12:59 PM	20	109	129	26	49
1:00 PM	1:14 PM	39	100	139	23	43
1:15 PM	1:29 PM	24	105	129	24	46
1:30 PM	1:44 PM	33	103	136	23	44
1:45 PM	1:59 PM	37	102	139	21	40
2:00 PM	2:14 PM	41	111	152	22	41
2:15 PM	2:29 PM	35	105	140	24	46
2:30 PM	2:44 PM	35	101	136	20	37
2:45 PM	2:59 PM	40	107	147	24	45
3:00 PM	3:14 PM	53	105	158	23	44
3:15 PM	3:29 PM	35	106	141	24	46
3:30 PM	3:44 PM	39	112	151	22	42
3:45 PM	3:59 PM	38	104	142	21	41
4:00 PM	4:14 PM	39	102	141	23	45
4:15 PM	4:29 PM	40	107	147	24	45
4:30 PM	4:44 PM	43	101	144	24	46
4:45 PM	4:59 PM	40	106	146	23	45
5:00 PM	5:14 PM	47	105	152	23	45
5:15 PM	5:29 PM	32	93	125	22	42
5:30 PM	5:44 PM	33	85	118	17	32
5:45 PM	5:59 PM	27	77	104	15	29
6:00 PM	6:14 PM	27	70	97	13	25
6:15 PM	6:29 PM	19	71	90	14	28
6:30 PM	6:44 PM	22	65	87	15	28
6:45 PM	6:59 PM	14	63	77	12	23
7:00 PM	7:14 PM	26	56	82	11	21
7:15 PM	7:29 PM	12	50	62	13	24
7:30 PM	7:44 PM	15	46	61	9	17
7:45 PM	7:59 PM	11	44	55	9	17
8:00 PM	8:14 PM	10	40	50	11	21
8:15 PM	8:29 PM	10	36	46	6	11
8:30 PM	8:44 PM	9	37	46	8	16
8:45 PM	8:59 PM	11	33	44	7	13
9:00 PM	9:14 PM	11	29	40	7	13
9:15 PM	9:29 PM	9	28	37	5	10
9:30 PM	9:44 PM	7	21	28	4	8
9:45 PM	9:59 PM	5	21	26	4	8
10:00 PM	10:14 PM	3	21	24	3	7
10:15 PM	10:29 PM	1	17	18	3	5
10:30 PM	10:44 PM	5	14	19	2	4
10:45 PM	10:59 PM	4	11	15	2	3
11:00 PM	11:14 PM	7	9	16	1	2
11:15 PM	11:29 PM	3	10	13	1	1
11:30 PM	11:44 PM	1	7	8	1	1
11:45 PM	11:59 PM	1	5	6	0	1
	Approach Totals:	1758	5241	6999	1147	2192

Traffic Signal Warrant Analysis Workbook

MUTCD WARRANT 1, EIGHT-HOUR VEHICULAR VOLUME

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	1 Lane
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes

Combination of Conditions A and B Necessary?*: No

**Only applicable for Warrant 1 if after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems. See Section 4C.02 of the 2009 MUTCD for application.*

Condition A - Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or More	1	600	480	420	336	150	120	105	84
2 or More	2 or More	600	480	420	336	200	160	140	112
1	2 or More	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or More	1	900	720	630	504	75	60	53	42
2 or More	2 or More	900	720	630	504	100	80	70	56
1	2 or More	750	600	525	420	100	80	70	56

Condition A Evaluation

Number of Unique Hours Met: 11 **Condition A Satisfied?** Yes

Condition B Evaluation

Number of Unique Hours Met: 7 **Condition B Satisfied?** No

Combination of Condition A and Condition B Evaluation

Number of Unique Hours Met for Condition A: N/A

Number of Unique Hours Met for Condition B: N/A

Combination of Condition A and Condition B Satisfied? N/A

MUTCD WARRANT 2, FOUR-HOUR VEHICULAR VOLUME

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	1 Lane
Minor Street:	1 Lane

Total Number of Unique Hours Met On Figure 4C-2
9

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
12:00 AM	18	4	
12:15 AM	16	3	
12:30 AM	17	2	
12:45 AM	16	2	
1:00 AM	14	1	
1:15 AM	14	1	
1:30 AM	10	1	
1:45 AM	10	1	
2:00 AM	10	2	
2:15 AM	11	3	
2:30 AM	11	3	
2:45 AM	11	4	
3:00 AM	16	4	
3:15 AM	17	6	
3:30 AM	17	9	
3:45 AM	26	11	
4:00 AM	27	14	
4:15 AM	38	17	
4:30 AM	53	20	
4:45 AM	64	30	
5:00 AM	75	35	
5:15 AM	91	40	
5:30 AM	122	51	
5:45 AM	150	56	
6:00 AM	190	76	
6:15 AM	219	83	
6:30 AM	226	90	
6:45 AM	243	96	
7:00 AM	270	97	
7:15 AM	294	108	
7:30 AM	342	121	
7:45 AM	378	132	
8:00 AM	384	138	
8:15 AM	415	147	
8:30 AM	426	149	
8:45 AM	434	145	
9:00 AM	460	146	Met
9:15 AM	483	148	Met
9:30 AM	492	150	Met
9:45 AM	515	150	Met
10:00 AM	546	156	Met
10:15 AM	559	159	Met
10:30 AM	584	170	Met
10:45 AM	598	183	Met
11:00 AM	608	184	Met
11:15 AM	589	185	Met

Traffic Signal Warrant Analysis Workbook

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
11:30 AM	590	179	Met
11:45 AM	577	179	Met

Traffic Signal Warrant Analysis Workbook

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
12:00 PM	547	184	Met
12:15 PM	553	183	Met
12:30 PM	533	183	Met
12:45 PM	533	182	Met
1:00 PM	543	173	Met
1:15 PM	556	171	Met
1:30 PM	567	171	Met
1:45 PM	567	164	Met
2:00 PM	575	169	Met
2:15 PM	581	172	Met
2:30 PM	582	172	Met
2:45 PM	597	177	Met
3:00 PM	592	173	Met
3:15 PM	575	174	Met
3:30 PM	581	173	Met
3:45 PM	574	177	Met
4:00 PM	578	181	Met
4:15 PM	589	181	Met
4:30 PM	567	178	Met
4:45 PM	541	164	Met
5:00 PM	499	148	Met
5:15 PM	444	128	
5:30 PM	409	114	
5:45 PM	378	110	
6:00 PM	351	104	
6:15 PM	336	100	
6:30 PM	308	96	
6:45 PM	282	85	
7:00 PM	260	79	
7:15 PM	228	79	
7:30 PM	212	66	
7:45 PM	197	65	
8:00 PM	186	61	
8:15 PM	176	53	
8:30 PM	167	52	
8:45 PM	149	44	
9:00 PM	131	39	
9:15 PM	115	33	
9:30 PM	96	28	
9:45 PM	87	24	
10:00 PM	76	19	
10:15 PM	68	14	
10:30 PM	63	10	
10:45 PM	52	7	
11:00 PM	43	5	

MUTCD WARRANT 3, PEAK HOUR

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	1 Lane
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
Is this signal warrant being applied for an unusual case, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time?	No

Indicate whether all three of the following conditions for the same 1 hour (any four consecutive 15-minute periods) of an average day are present*	
Does the total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equal or exceed 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach?	N/A
Does the volume on the same minor-street approach (one direction only) equal or exceed 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes?	N/A
Does the total entering volume serviced during the hour equal or exceed 650 vehicles per hour for intersection with three approaches or 800 vehicles per hour for intersections with four or more approaches?	N/A
**If applicable, attach all supporting calculations and documentation.*	

Total Number of Unique Hours Met On Figure 4C-4
1

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
12:00 AM	18	4	
12:15 AM	16	3	
12:30 AM	17	2	
12:45 AM	16	2	
1:00 AM	14	1	
1:15 AM	14	1	
1:30 AM	10	1	
1:45 AM	10	1	
2:00 AM	10	2	
2:15 AM	11	3	
2:30 AM	11	3	
2:45 AM	11	4	
3:00 AM	16	4	
3:15 AM	17	6	
3:30 AM	17	9	
3:45 AM	26	11	
4:00 AM	27	14	
4:15 AM	38	17	
4:30 AM	53	20	
4:45 AM	64	30	
5:00 AM	75	35	
5:15 AM	91	40	
5:30 AM	122	51	
5:45 AM	150	56	

Traffic Signal Warrant Analysis Workbook

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
6:00 AM	190	76	
6:15 AM	219	83	
6:30 AM	226	90	
6:45 AM	243	96	
7:00 AM	270	97	
7:15 AM	294	108	
7:30 AM	342	121	
7:45 AM	378	132	
8:00 AM	384	138	
8:15 AM	415	147	

Traffic Signal Warrant Analysis Workbook

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
8:30 AM	426	149	
8:45 AM	434	145	
9:00 AM	460	146	
9:15 AM	483	148	
9:30 AM	492	150	
9:45 AM	515	150	
10:00 AM	546	156	
10:15 AM	559	159	
10:30 AM	584	170	
10:45 AM	598	183	Met
11:00 AM	608	184	Met
11:15 AM	589	185	Met
11:30 AM	590	179	
11:45 AM	577	179	
12:00 PM	547	184	
12:15 PM	553	183	
12:30 PM	533	183	
12:45 PM	533	182	
1:00 PM	543	173	
1:15 PM	556	171	
1:30 PM	567	171	
1:45 PM	567	164	
2:00 PM	575	169	
2:15 PM	581	172	
2:30 PM	582	172	
2:45 PM	597	177	
3:00 PM	592	173	
3:15 PM	575	174	
3:30 PM	581	173	
3:45 PM	574	177	
4:00 PM	578	181	
4:15 PM	589	181	
4:30 PM	567	178	
4:45 PM	541	164	
5:00 PM	499	148	
5:15 PM	444	128	
5:30 PM	409	114	
5:45 PM	378	110	
6:00 PM	351	104	
6:15 PM	336	100	
6:30 PM	308	96	
6:45 PM	282	85	
7:00 PM	260	79	
7:15 PM	228	79	
7:30 PM	212	66	
7:45 PM	197	65	
8:00 PM	186	61	
8:15 PM	176	53	
8:30 PM	167	52	
8:45 PM	149	44	
9:00 PM	131	39	
9:15 PM	115	33	
9:30 PM	96	28	
9:45 PM	87	24	
10:00 PM	76	19	
10:15 PM	68	14	
10:30 PM	63	10	

Traffic Signal Warrant Analysis Workbook

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
10:45 PM	52	7	
11:00 PM	43	5	

Traffic Signal Warrant Analysis Workbook

2/27/2020

STUDY AND ANALYSIS INFORMATION

Municipality:	Johnsbyrg	**Analysis Date:**	12/9/2019
County:	Warren	**Conducted By:**	CWS
NYSDOT Region:	1	**Agency/Company Name:**	MJ Engineering

Analysis Information

Data Collection Date:	8/7/2019
Day of the Week:	Monday

Is the intersection in a built-up area of an isolated community of <10,000 population? Yes

Major Street Information

Major Street Name and Route Number:	NY Route 28
Major Street Approach #1 Direction:	S-Bound
Major Street Approach #2 Direction:	N-Bound

Number of Lanes for Moving Traffic on Each Major Street Approach:	1	**LANE(S)**
Speed Limit or 85th Percentile Speed on the Major Street:	55	**MPH**

Minor Street Information

Minor Street Name and Route Number:	NY Route 28N / Ski Bowl Entrance
Minor Street Approach #1 Direction:	W-Bound
Minor Street Approach #2 Direction:	E-Bound

Number of Lanes for Moving Traffic on Each Minor Street Approach:	1	**LANE(S)**

TRAFFIC SIGNAL WARRANT ANALYSIS FINDINGS

	Applicable?	Warrant Met?
Warrant 1, Eight-Hour Vehicular Volume	**Yes**	**Yes**
Warrant 2, Four-Hour Vehicular Volume	**Yes**	**Yes**
Warrant 3, Peak Hour	**Yes**	**No**
Warrant 4, Pedestrian Volume	**No**	**N/A**
Warrant 5, School Crossing	**No**	**N/A**
Warrant 6, Coordinated Signal System	**No**	**N/A**
Warrant 7, Crash Experience	**No**	**N/A**
Warrant 8, Roadway Network	**No**	**N/A**
Warrant 9, Intersection Near a Grade Crossing	**No**	**N/A**

ENTER VOLUME DATA PER 15 MINUTE INTERVAL, PER APPROACH

Time Interval		Major Street Approach #1 (S-Bound)	Major Street Approach #2 (N-Bound)	Major Street Combined	Minor Street Approach #1 (W-Bound)	Minor Street Approach #2 (E-Bound)
Begin At	End Of	Volume	Volume	Total Volume	Volume	Volume
12:00 AM	12:14 AM	2	6	8	1	2
12:15 AM	12:29 AM	2	5	7	1	2
12:30 AM	12:44 AM	2	4	6	1	2
12:45 AM	12:59 AM	2	4	6	1	2
1:00 AM	1:14 AM	2	3	5	1	0
1:15 AM	1:29 AM	4	4	8	1	0
1:30 AM	1:44 AM	0	3	3	1	2
1:45 AM	1:59 AM	2	2	4	1	0
2:00 AM	2:14 AM	3	2	5	1	0
2:15 AM	2:29 AM	0	2	2	1	0
2:30 AM	2:44 AM	2	3	5	1	2
2:45 AM	2:59 AM	0	3	3	1	2
3:00 AM	3:14 AM	2	4	6	1	2
3:15 AM	3:29 AM	0	3	3	1	0
3:30 AM	3:44 AM	2	3	5	2	3
3:45 AM	3:59 AM	4	5	9	1	2
4:00 AM	4:14 AM	2	5	7	3	4
4:15 AM	4:29 AM	0	3	3	2	4
4:30 AM	4:44 AM	7	7	14	3	5
4:45 AM	4:59 AM	2	9	11	3	5
5:00 AM	5:14 AM	6	13	19	4	7
5:15 AM	5:29 AM	5	16	21	4	7
5:30 AM	5:44 AM	10	18	28	9	17
5:45 AM	5:59 AM	3	20	23	6	11
6:00 AM	6:14 AM	9	29	38	7	13
6:15 AM	6:29 AM	17	39	56	11	20
6:30 AM	6:44 AM	17	43	60	12	22
6:45 AM	6:59 AM	13	56	69	18	34
7:00 AM	7:14 AM	22	49	71	11	21
7:15 AM	7:29 AM	14	50	64	15	28
7:30 AM	7:44 AM	21	58	79	16	29
7:45 AM	7:59 AM	28	71	99	18	35
8:00 AM	8:14 AM	27	71	98	18	34
8:15 AM	8:29 AM	36	83	119	22	43
8:30 AM	8:44 AM	36	85	121	22	42
8:45 AM	8:59 AM	21	85	106	22	42
9:00 AM	9:14 AM	44	90	134	23	44
9:15 AM	9:29 AM	37	94	131	24	45
9:30 AM	9:44 AM	33	96	129	20	37
9:45 AM	9:59 AM	28	109	137	23	43
10:00 AM	10:14 AM	44	116	160	24	46
10:15 AM	10:29 AM	23	118	141	25	47
10:30 AM	10:44 AM	45	110	155	20	37
10:45 AM	10:59 AM	37	134	171	26	50
11:00 AM	11:14 AM	41	134	175	27	50
11:15 AM	11:29 AM	34	137	171	31	60
11:30 AM	11:44 AM	35	137	172	27	52
11:45 AM	11:59 AM	52	131	183	27	51

Traffic Signal Warrant Analysis Workbook

ENTER VOLUME DATA PER 15 MINUTE INTERVAL, PER APPROACH

Time Interval		Major Street Approach #1 (S-Bound)	Major Street Approach #2 (N-Bound)	Major Street Combined	Minor Street Approach #1 (W-Bound)	Minor Street Approach #2 (E-Bound)
Begin At	End Of	Volume	Volume	Total Volume	Volume	Volume
12:00 PM	12:14 PM	23	130	153	27	51
12:15 PM	12:29 PM	43	129	172	28	53
12:30 PM	12:44 PM	37	119	156	28	52
12:45 PM	12:59 PM	23	125	148	30	57
1:00 PM	1:14 PM	45	115	160	26	50
1:15 PM	1:29 PM	27	121	148	28	53
1:30 PM	1:44 PM	38	118	156	27	51
1:45 PM	1:59 PM	42	118	160	25	46
2:00 PM	2:14 PM	47	128	175	25	47
2:15 PM	2:29 PM	41	121	162	28	53
2:30 PM	2:44 PM	41	116	157	23	43
2:45 PM	2:59 PM	46	123	169	27	52
3:00 PM	3:14 PM	61	120	181	27	51
3:15 PM	3:29 PM	40	122	162	28	53
3:30 PM	3:44 PM	45	129	174	26	49
3:45 PM	3:59 PM	44	119	163	25	47
4:00 PM	4:14 PM	45	117	162	27	52
4:15 PM	4:29 PM	46	123	169	28	52
4:30 PM	4:44 PM	49	116	165	28	53
4:45 PM	4:59 PM	46	122	168	27	52
5:00 PM	5:14 PM	54	121	175	27	52
5:15 PM	5:29 PM	37	107	144	26	49
5:30 PM	5:44 PM	38	98	136	20	37
5:45 PM	5:59 PM	31	89	120	18	34
6:00 PM	6:14 PM	31	80	111	16	29
6:15 PM	6:29 PM	22	82	104	17	33
6:30 PM	6:44 PM	26	75	101	17	33
6:45 PM	6:59 PM	17	73	90	14	27
7:00 PM	7:14 PM	30	64	94	13	25
7:15 PM	7:29 PM	14	57	71	15	28
7:30 PM	7:44 PM	18	53	71	11	20
7:45 PM	7:59 PM	13	51	64	11	20
8:00 PM	8:14 PM	12	46	58	13	25
8:15 PM	8:29 PM	12	41	53	7	13
8:30 PM	8:44 PM	11	43	54	10	19
8:45 PM	8:59 PM	13	38	51	8	15
9:00 PM	9:14 PM	13	34	47	8	15
9:15 PM	9:29 PM	11	33	44	7	12
9:30 PM	9:44 PM	9	24	33	5	10
9:45 PM	9:59 PM	6	25	31	5	10
10:00 PM	10:14 PM	4	24	28	4	9
10:15 PM	10:29 PM	2	19	21	4	6
10:30 PM	10:44 PM	6	16	22	3	5
10:45 PM	10:59 PM	5	14	19	2	4
11:00 PM	11:14 PM	9	11	20	2	3
11:15 PM	11:29 PM	4	12	16	1	2
11:30 PM	11:44 PM	2	8	10	1	2
11:45 PM	11:59 PM	2	6	8	1	2
	Approach Totals:	2059	6047	8106	1364	2562

Traffic Signal Warrant Analysis Workbook

MUTCD WARRANT 1, EIGHT-HOUR VEHICULAR VOLUME

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	1 Lane
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes

Combination of Conditions A and B Necessary?*: No

**Only applicable for Warrant 1 if after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems. See Section 4C.02 of the 2009 MUTCD for application.*

Condition A - Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or More	1	600	480	420	336	150	120	105	84
2 or More	2 or More	600	480	420	336	200	160	140	112
1	2 or More	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or More	1	900	720	630	504	75	60	53	42
2 or More	2 or More	900	720	630	504	100	80	70	56
1	2 or More	750	600	525	420	100	80	70	56

Condition A Evaluation

Number of Unique Hours Met: 12 **Condition A Satisfied?** Yes

Condition B Evaluation

Number of Unique Hours Met: 9 **Condition B Satisfied?** Yes

Combination of Condition A and Condition B Evaluation

Number of Unique Hours Met for Condition A: N/A

Number of Unique Hours Met for Condition B: N/A

Combination of Condition A and Condition B Satisfied? N/A

MUTCD WARRANT 2, FOUR-HOUR VEHICULAR VOLUME

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	1 Lane
Minor Street:	1 Lane

Total Number of Unique Hours Met On Figure 4C-2
10

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
12:00 AM	27	8	
12:15 AM	24	6	
12:30 AM	25	4	
12:45 AM	22	4	
1:00 AM	20	4	
1:15 AM	20	4	
1:30 AM	14	4	
1:45 AM	16	4	
2:00 AM	15	4	
2:15 AM	16	6	
2:30 AM	17	6	
2:45 AM	17	7	
3:00 AM	23	7	
3:15 AM	24	9	
3:30 AM	24	13	
3:45 AM	33	15	
4:00 AM	35	18	
4:15 AM	47	21	
4:30 AM	65	24	
4:45 AM	79	36	
5:00 AM	91	42	
5:15 AM	110	48	
5:30 AM	145	61	
5:45 AM	177	66	
6:00 AM	223	89	
6:15 AM	256	97	
6:30 AM	264	105	
6:45 AM	283	112	
7:00 AM	313	113	
7:15 AM	340	126	
7:30 AM	395	141	
7:45 AM	437	154	Met
8:00 AM	444	161	Met
8:15 AM	480	171	Met
8:30 AM	492	173	Met
8:45 AM	500	168	Met
9:00 AM	531	169	Met
9:15 AM	557	171	Met
9:30 AM	567	173	Met
9:45 AM	593	173	Met
10:00 AM	627	180	Met
10:15 AM	642	184	Met
10:30 AM	672	197	Met
10:45 AM	689	212	Met
11:00 AM	701	213	Met
11:15 AM	679	214	Met

Traffic Signal Warrant Analysis Workbook

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
11:30 AM	680	207	Met
11:45 AM	664	207	Met

Traffic Signal Warrant Analysis Workbook

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
12:00 PM	629	213	Met
12:15 PM	636	212	Met
12:30 PM	612	212	Met
12:45 PM	612	211	Met
1:00 PM	624	200	Met
1:15 PM	639	197	Met
1:30 PM	653	197	Met
1:45 PM	654	189	Met
2:00 PM	663	195	Met
2:15 PM	669	199	Met
2:30 PM	669	199	Met
2:45 PM	686	205	Met
3:00 PM	680	200	Met
3:15 PM	661	201	Met
3:30 PM	668	200	Met
3:45 PM	659	204	Met
4:00 PM	664	209	Met
4:15 PM	677	209	Met
4:30 PM	652	206	Met
4:45 PM	623	190	Met
5:00 PM	575	172	Met
5:15 PM	511	149	Met
5:30 PM	471	133	
5:45 PM	436	129	
6:00 PM	406	122	
6:15 PM	389	118	
6:30 PM	356	113	
6:45 PM	326	100	
7:00 PM	300	93	
7:15 PM	264	93	
7:30 PM	246	78	
7:45 PM	229	77	
8:00 PM	216	72	
8:15 PM	205	62	
8:30 PM	196	61	
8:45 PM	175	52	
9:00 PM	155	47	
9:15 PM	136	41	
9:30 PM	113	35	
9:45 PM	102	30	
10:00 PM	90	24	
10:15 PM	82	18	
10:30 PM	77	14	
10:45 PM	65	11	
11:00 PM	54	9	

MUTCD WARRANT 3, PEAK HOUR

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	1 Lane
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
Is this signal warrant being applied for an unusual case, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time?	No

Indicate whether all three of the following conditions for the same 1 hour (any four consecutive 15-minute periods) of an average day are present*	
Does the total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equal or exceed 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach?	N/A
Does the volume on the same minor-street approach (one direction only) equal or exceed 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes?	N/A
Does the total entering volume serviced during the hour equal or exceed 650 vehicles per hour for intersection with three approaches or 800 vehicles per hour for intersections with four or more approaches?	N/A
**If applicable, attach all supporting calculations and documentation.*	

Total Number of Unique Hours Met On Figure 4C-4
7

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
12:00 AM	27	8	
12:15 AM	24	6	
12:30 AM	25	4	
12:45 AM	22	4	
1:00 AM	20	4	
1:15 AM	20	4	
1:30 AM	14	4	
1:45 AM	16	4	
2:00 AM	15	4	
2:15 AM	16	6	
2:30 AM	17	6	
2:45 AM	17	7	
3:00 AM	23	7	
3:15 AM	24	9	
3:30 AM	24	13	
3:45 AM	33	15	
4:00 AM	35	18	
4:15 AM	47	21	
4:30 AM	65	24	
4:45 AM	79	36	
5:00 AM	91	42	
5:15 AM	110	48	
5:30 AM	145	61	
5:45 AM	177	66	

Traffic Signal Warrant Analysis Workbook

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
6:00 AM	223	89	
6:15 AM	256	97	
6:30 AM	264	105	
6:45 AM	283	112	
7:00 AM	313	113	
7:15 AM	340	126	
7:30 AM	395	141	
7:45 AM	437	154	
8:00 AM	444	161	
8:15 AM	480	171	

Traffic Signal Warrant Analysis Workbook

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
8:30 AM	492	173	
8:45 AM	500	168	
9:00 AM	531	169	
9:15 AM	557	171	
9:30 AM	567	173	
9:45 AM	593	173	
10:00 AM	627	180	Met
10:15 AM	642	184	Met
10:30 AM	672	197	Met
10:45 AM	689	212	Met
11:00 AM	701	213	Met
11:15 AM	679	214	Met
11:30 AM	680	207	Met
11:45 AM	664	207	Met
12:00 PM	629	213	Met
12:15 PM	636	212	Met
12:30 PM	612	212	Met
12:45 PM	612	211	Met
1:00 PM	624	200	Met
1:15 PM	639	197	Met
1:30 PM	653	197	Met
1:45 PM	654	189	Met
2:00 PM	663	195	Met
2:15 PM	669	199	Met
2:30 PM	669	199	Met
2:45 PM	686	205	Met
3:00 PM	680	200	Met
3:15 PM	661	201	Met
3:30 PM	668	200	Met
3:45 PM	659	204	Met
4:00 PM	664	209	Met
4:15 PM	677	209	Met
4:30 PM	652	206	Met
4:45 PM	623	190	Met
5:00 PM	575	172	
5:15 PM	511	149	
5:30 PM	471	133	
5:45 PM	436	129	
6:00 PM	406	122	
6:15 PM	389	118	
6:30 PM	356	113	
6:45 PM	326	100	
7:00 PM	300	93	
7:15 PM	264	93	
7:30 PM	246	78	
7:45 PM	229	77	
8:00 PM	216	72	
8:15 PM	205	62	
8:30 PM	196	61	
8:45 PM	175	52	
9:00 PM	155	47	
9:15 PM	136	41	
9:30 PM	113	35	
9:45 PM	102	30	
10:00 PM	90	24	
10:15 PM	82	18	
10:30 PM	77	14	

Traffic Signal Warrant Analysis Workbook

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
10:45 PM	65	11	
11:00 PM	54	9	

Traffic Signal Warrant Analysis Workbook

2/27/2020

STUDY AND ANALYSIS INFORMATION

Municipality:	Johnsbyrg	**Analysis Date:**	12/9/2019
County:	Warren	**Conducted By:**	CWS
NYSDOT Region:	1	**Agency/Company Name:**	MJ Engineering

Analysis Information

Data Collection Date:	8/7/2019
Day of the Week:	Monday

Is the intersection in a built-up area of an isolated community of <10,000 population? Yes

Major Street Information

Major Street Name and Route Number:	NY Route 28
Major Street Approach #1 Direction:	S-Bound
Major Street Approach #2 Direction:	N-Bound

Number of Lanes for Moving Traffic on Each Major Street Approach:	1	**LANE(S)**
Speed Limit or 85th Percentile Speed on the Major Street:	55	**MPH**

Minor Street Information

Minor Street Name and Route Number:	NY Route 28N / Ski Bowl Entrance
Minor Street Approach #1 Direction:	W-Bound
Minor Street Approach #2 Direction:	E-Bound

Number of Lanes for Moving Traffic on Each Minor Street Approach:	1	**LANE(S)**

TRAFFIC SIGNAL WARRANT ANALYSIS FINDINGS

	Applicable?	Warrant Met?
Warrant 1, Eight-Hour Vehicular Volume	**Yes**	**Yes**
Warrant 2, Four-Hour Vehicular Volume	**Yes**	**Yes**
Warrant 3, Peak Hour	**Yes**	**No**
Warrant 4, Pedestrian Volume	**No**	**N/A**
Warrant 5, School Crossing	**No**	**N/A**
Warrant 6, Coordinated Signal System	**No**	**N/A**
Warrant 7, Crash Experience	**No**	**N/A**
Warrant 8, Roadway Network	**No**	**N/A**
Warrant 9, Intersection Near a Grade Crossing	**No**	**N/A**

ENTER VOLUME DATA PER 15 MINUTE INTERVAL, PER APPROACH

Time Interval		Major Street Approach #1 (S-Bound)	Major Street Approach #2 (N-Bound)	Major Street Combined	Minor Street Approach #1 (W-Bound)	Minor Street Approach #2 (E-Bound)
Begin At	End Of	Volume	Volume	Total Volume	Volume	Volume
12:00 AM	12:14 AM	2	5	7	1	2
12:15 AM	12:29 AM	2	5	7	1	2
12:30 AM	12:44 AM	2	4	6	1	2
12:45 AM	12:59 AM	2	4	6	1	2
1:00 AM	1:14 AM	2	3	5	1	0
1:15 AM	1:29 AM	4	4	8	1	0
1:30 AM	1:44 AM	0	4	4	1	2
1:45 AM	1:59 AM	2	2	4	1	0
2:00 AM	2:14 AM	3	2	5	1	0
2:15 AM	2:29 AM	0	3	3	1	0
2:30 AM	2:44 AM	2	3	5	1	2
2:45 AM	2:59 AM	0	3	3	1	2
3:00 AM	3:14 AM	2	4	6	1	2
3:15 AM	3:29 AM	0	3	3	1	0
3:30 AM	3:44 AM	2	3	5	2	3
3:45 AM	3:59 AM	4	5	9	1	2
4:00 AM	4:14 AM	2	5	7	3	4
4:15 AM	4:29 AM	0	3	3	2	4
4:30 AM	4:44 AM	7	7	14	3	5
4:45 AM	4:59 AM	2	9	11	3	5
5:00 AM	5:14 AM	6	13	19	4	7
5:15 AM	5:29 AM	5	15	20	4	7
5:30 AM	5:44 AM	11	19	30	9	17
5:45 AM	5:59 AM	4	20	24	6	11
6:00 AM	6:14 AM	10	30	40	7	13
6:15 AM	6:29 AM	18	40	58	11	20
6:30 AM	6:44 AM	18	44	62	12	22
6:45 AM	6:59 AM	15	56	71	18	34
7:00 AM	7:14 AM	26	52	78	11	21
7:15 AM	7:29 AM	17	53	70	15	28
7:30 AM	7:44 AM	25	62	87	16	29
7:45 AM	7:59 AM	33	76	109	18	35
8:00 AM	8:14 AM	32	76	108	18	34
8:15 AM	8:29 AM	43	90	133	22	43
8:30 AM	8:44 AM	43	91	134	22	42
8:45 AM	8:59 AM	27	90	117	22	42
9:00 AM	9:14 AM	51	98	149	23	44
9:15 AM	9:29 AM	44	102	146	24	45
9:30 AM	9:44 AM	40	105	145	20	37
9:45 AM	9:59 AM	36	116	152	23	43
10:00 AM	10:14 AM	54	125	179	24	46
10:15 AM	10:29 AM	31	126	157	25	47
10:30 AM	10:44 AM	55	119	174	20	37
10:45 AM	10:59 AM	47	143	190	26	50
11:00 AM	11:14 AM	51	143	194	27	50
11:15 AM	11:29 AM	44	146	190	31	60
11:30 AM	11:44 AM	45	146	191	27	52
11:45 AM	11:59 AM	62	141	203	27	51

Traffic Signal Warrant Analysis Workbook

ENTER VOLUME DATA PER 15 MINUTE INTERVAL, PER APPROACH

Time Interval		Major Street Approach #1 (S-Bound)	Major Street Approach #2 (N-Bound)	Major Street Combined	Minor Street Approach #1 (W-Bound)	Minor Street Approach #2 (E-Bound)
Begin At	End Of	Volume	Volume	Total Volume	Volume	Volume
12:00 PM	12:14 PM	33	139	172	27	51
12:15 PM	12:29 PM	53	138	191	28	53
12:30 PM	12:44 PM	47	129	176	28	52
12:45 PM	12:59 PM	31	134	165	30	57
1:00 PM	1:14 PM	55	124	179	26	50
1:15 PM	1:29 PM	36	130	166	28	53
1:30 PM	1:44 PM	48	127	175	27	51
1:45 PM	1:59 PM	53	126	179	25	46
2:00 PM	2:14 PM	57	137	194	25	47
2:15 PM	2:29 PM	51	130	181	28	53
2:30 PM	2:44 PM	51	125	176	23	43
2:45 PM	2:59 PM	56	132	188	27	52
3:00 PM	3:14 PM	71	131	202	27	51
3:15 PM	3:29 PM	51	131	182	28	53
3:30 PM	3:44 PM	55	138	193	26	49
3:45 PM	3:59 PM	54	129	183	25	47
4:00 PM	4:14 PM	55	126	181	27	52
4:15 PM	4:29 PM	56	132	188	28	52
4:30 PM	4:44 PM	60	125	185	28	53
4:45 PM	4:59 PM	56	131	187	27	52
5:00 PM	5:14 PM	64	130	194	27	52
5:15 PM	5:29 PM	45	115	160	26	49
5:30 PM	5:44 PM	46	106	152	20	37
5:45 PM	5:59 PM	38	96	134	18	34
6:00 PM	6:14 PM	38	86	124	16	29
6:15 PM	6:29 PM	215	282	497	17	33
6:30 PM	6:44 PM	28	77	105	17	33
6:45 PM	6:59 PM	19	75	94	14	27
7:00 PM	7:14 PM	32	67	99	13	25
7:15 PM	7:29 PM	16	59	75	15	28
7:30 PM	7:44 PM	20	54	74	11	20
7:45 PM	7:59 PM	14	52	66	11	20
8:00 PM	8:14 PM	13	47	60	13	25
8:15 PM	8:29 PM	13	43	56	7	13
8:30 PM	8:44 PM	12	44	56	10	19
8:45 PM	8:59 PM	14	39	53	8	15
9:00 PM	9:14 PM	14	35	49	8	15
9:15 PM	9:29 PM	12	34	46	7	12
9:30 PM	9:44 PM	10	26	36	5	10
9:45 PM	9:59 PM	7	26	33	5	10
10:00 PM	10:14 PM	5	26	31	4	9
10:15 PM	10:29 PM	3	20	23	4	6
10:30 PM	10:44 PM	7	17	24	3	5
10:45 PM	10:59 PM	5	13	18	2	4
11:00 PM	11:14 PM	9	11	20	2	3
11:15 PM	11:29 PM	4	12	16	1	2
11:30 PM	11:44 PM	2	9	11	1	2
11:45 PM	11:59 PM	2	6	8	1	2
	Approach Totals:	2669	6639	9308	1364	2562

Traffic Signal Warrant Analysis Workbook

MUTCD WARRANT 1, EIGHT-HOUR VEHICULAR VOLUME

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	1 Lane
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes

Combination of Conditions A and B Necessary?*: No

**Only applicable for Warrant 1 if after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems. See Section 4C.02 of the 2009 MUTCD for application.*

Condition A - Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or More	1	600	480	420	336	150	120	105	84
2 or More	2 or More	600	480	420	336	200	160	140	112
1	2 or More	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or More	1	900	720	630	504	75	60	53	42
2 or More	2 or More	900	720	630	504	100	80	70	56
1	2 or More	750	600	525	420	100	80	70	56

Condition A Evaluation

Number of Unique Hours Met: 12 **Condition A Satisfied?** Yes

Condition B Evaluation

Number of Unique Hours Met: 11 **Condition B Satisfied?** Yes

Combination of Condition A and Condition B Evaluation

Number of Unique Hours Met for Condition A: N/A

Number of Unique Hours Met for Condition B: N/A

Combination of Condition A and Condition B Satisfied? N/A

MUTCD WARRANT 2, FOUR-HOUR VEHICULAR VOLUME

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	1 Lane
Minor Street:	1 Lane

Total Number of Unique Hours Met On Figure 4C-2
11

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
12:00 AM	26	8	
12:15 AM	24	6	
12:30 AM	25	4	
12:45 AM	23	4	
1:00 AM	21	4	
1:15 AM	21	4	
1:30 AM	16	4	
1:45 AM	17	4	
2:00 AM	16	4	
2:15 AM	17	6	
2:30 AM	17	6	
2:45 AM	17	7	
3:00 AM	23	7	
3:15 AM	24	9	
3:30 AM	24	13	
3:45 AM	33	15	
4:00 AM	35	18	
4:15 AM	47	21	
4:30 AM	64	24	
4:45 AM	80	36	
5:00 AM	93	42	
5:15 AM	114	48	
5:30 AM	152	61	
5:45 AM	184	66	
6:00 AM	231	89	
6:15 AM	269	97	
6:30 AM	281	105	
6:45 AM	306	112	
7:00 AM	344	113	
7:15 AM	374	126	
7:30 AM	437	141	
7:45 AM	484	154	Met
8:00 AM	492	161	Met
8:15 AM	533	171	Met
8:30 AM	546	173	Met
8:45 AM	557	168	Met
9:00 AM	592	169	Met
9:15 AM	622	171	Met
9:30 AM	633	173	Met
9:45 AM	662	173	Met
10:00 AM	700	180	Met
10:15 AM	715	184	Met
10:30 AM	748	197	Met
10:45 AM	765	212	Met
11:00 AM	778	213	Met
11:15 AM	756	214	Met

Traffic Signal Warrant Analysis Workbook

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
11:30 AM	757	207	Met
11:45 AM	742	207	Met

Traffic Signal Warrant Analysis Workbook

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
12:00 PM	704	213	Met
12:15 PM	711	212	Met
12:30 PM	686	212	Met
12:45 PM	685	211	Met
1:00 PM	699	200	Met
1:15 PM	714	197	Met
1:30 PM	729	197	Met
1:45 PM	730	189	Met
2:00 PM	739	195	Met
2:15 PM	747	199	Met
2:30 PM	748	199	Met
2:45 PM	765	205	Met
3:00 PM	760	200	Met
3:15 PM	739	201	Met
3:30 PM	745	200	Met
3:45 PM	737	204	Met
4:00 PM	741	209	Met
4:15 PM	754	209	Met
4:30 PM	726	206	Met
4:45 PM	693	190	Met
5:00 PM	640	172	Met
5:15 PM	570	149	Met
5:30 PM	907	133	Met
5:45 PM	860	129	Met
6:00 PM	820	122	Met
6:15 PM	795	118	Met
6:30 PM	373	113	
6:45 PM	342	100	
7:00 PM	314	93	
7:15 PM	275	93	
7:30 PM	256	78	
7:45 PM	238	77	
8:00 PM	225	72	
8:15 PM	214	62	
8:30 PM	204	61	
8:45 PM	184	52	
9:00 PM	164	47	
9:15 PM	146	41	
9:30 PM	123	35	
9:45 PM	111	30	
10:00 PM	96	24	
10:15 PM	85	18	
10:30 PM	78	14	
10:45 PM	65	11	
11:00 PM	55	9	

Traffic Signal Warrant Analysis Workbook

MUTCD WARRANT 3, PEAK HOUR

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	1 Lane
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
Is this signal warrant being applied for an unusual case, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time?	No

Indicate whether all three of the following conditions for the same 1 hour (any four consecutive 15-minute periods) of an average day are present*	
Does the total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equal or exceed 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach?	N/A
Does the volume on the same minor-street approach (one direction only) equal or exceed 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes?	N/A
Does the total entering volume serviced during the hour equal or exceed 650 vehicles per hour for intersection with three approaches or 800 vehicles per hour for intersections with four or more approaches?	N/A
**If applicable, attach all supporting calculations and documentation.*	

Total Number of Unique Hours Met On Figure 4C-4
9

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
12:00 AM	26	8	
12:15 AM	24	6	
12:30 AM	25	4	
12:45 AM	23	4	
1:00 AM	21	4	
1:15 AM	21	4	
1:30 AM	16	4	
1:45 AM	17	4	
2:00 AM	16	4	
2:15 AM	17	6	
2:30 AM	17	6	
2:45 AM	17	7	
3:00 AM	23	7	
3:15 AM	24	9	
3:30 AM	24	13	
3:45 AM	33	15	
4:00 AM	35	18	
4:15 AM	47	21	
4:30 AM	64	24	
4:45 AM	80	36	
5:00 AM	93	42	
5:15 AM	114	48	
5:30 AM	152	61	
5:45 AM	184	66	

Traffic Signal Warrant Analysis Workbook

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
6:00 AM	231	89	
6:15 AM	269	97	
6:30 AM	281	105	
6:45 AM	306	112	
7:00 AM	344	113	
7:15 AM	374	126	
7:30 AM	437	141	
7:45 AM	484	154	
8:00 AM	492	161	
8:15 AM	533	171	

Traffic Signal Warrant Analysis Workbook

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
8:30 AM	546	173	
8:45 AM	557	168	
9:00 AM	592	169	
9:15 AM	622	171	
9:30 AM	633	173	Met
9:45 AM	662	173	Met
10:00 AM	700	180	Met
10:15 AM	715	184	Met
10:30 AM	748	197	Met
10:45 AM	765	212	Met
11:00 AM	778	213	Met
11:15 AM	756	214	Met
11:30 AM	757	207	Met
11:45 AM	742	207	Met
12:00 PM	704	213	Met
12:15 PM	711	212	Met
12:30 PM	686	212	Met
12:45 PM	685	211	Met
1:00 PM	699	200	Met
1:15 PM	714	197	Met
1:30 PM	729	197	Met
1:45 PM	730	189	Met
2:00 PM	739	195	Met
2:15 PM	747	199	Met
2:30 PM	748	199	Met
2:45 PM	765	205	Met
3:00 PM	760	200	Met
3:15 PM	739	201	Met
3:30 PM	745	200	Met
3:45 PM	737	204	Met
4:00 PM	741	209	Met
4:15 PM	754	209	Met
4:30 PM	726	206	Met
4:45 PM	693	190	Met
5:00 PM	640	172	Met
5:15 PM	570	149	
5:30 PM	907	133	Met
5:45 PM	860	129	Met
6:00 PM	820	122	Met
6:15 PM	795	118	
6:30 PM	373	113	
6:45 PM	342	100	
7:00 PM	314	93	
7:15 PM	275	93	
7:30 PM	256	78	
7:45 PM	238	77	
8:00 PM	225	72	
8:15 PM	214	62	
8:30 PM	204	61	
8:45 PM	184	52	
9:00 PM	164	47	
9:15 PM	146	41	
9:30 PM	123	35	
9:45 PM	111	30	
10:00 PM	96	24	
10:15 PM	85	18	
10:30 PM	78	14	

Hourly Vehicular Volume			
Hour Interval Beginning At	Major Street Combined Vehicles Per Hour (VPH)	Highest Minor Street Approach Vehicles Per Hour (VPH)	Hour Met?
10:45 PM	65	11	
11:00 PM	55	9	

Appendix 4

Concept Plans

NORTH CREEK RE-DESIGN INITIATIVE

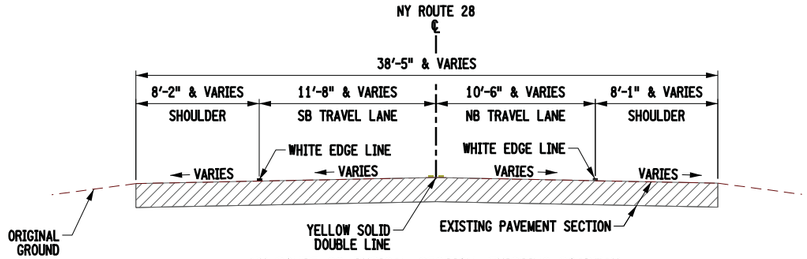
FEBRUARY 26, 2020

DWG. NO. RA-TS-1

SCALE: 1" = 10'-0"

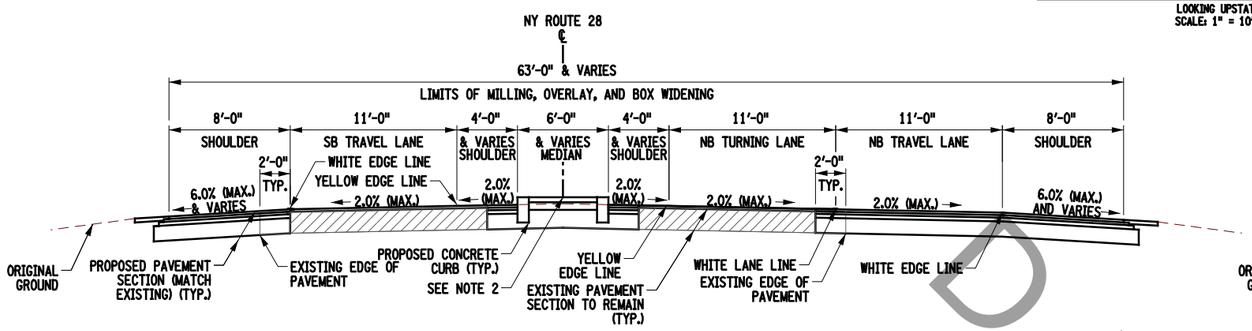
NOTES:

1. EXISTING PAVEMENT TREATMENT WOULD BE 1 1/2" MILL AND OVERLAY OR RECONSTRUCTION DEPENDING ON FUNDING AVAILIBILITY.
2. MEDIAN MAY BE FLUSH OR RAISED DEPENDING ON FUNDING AVAILIBILITY



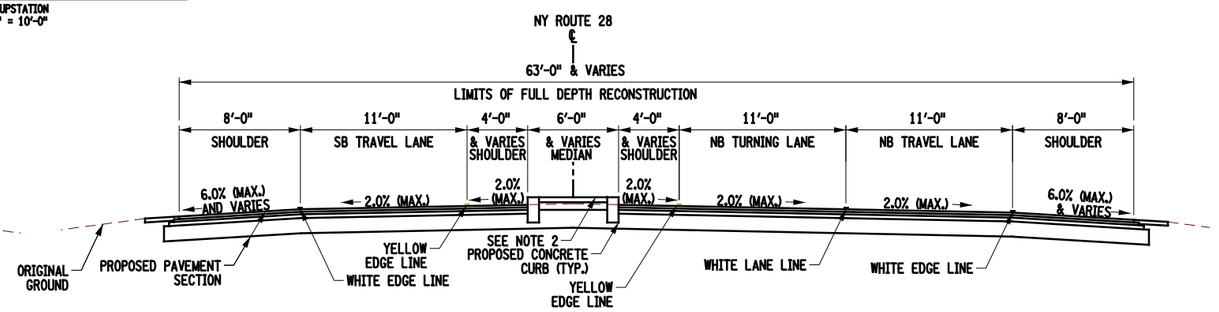
NY ROUTE 28 TYPICAL SECTION: EXISTING ROADWAY

LOOKING UPSTATION
SCALE: 1" = 10'-0"



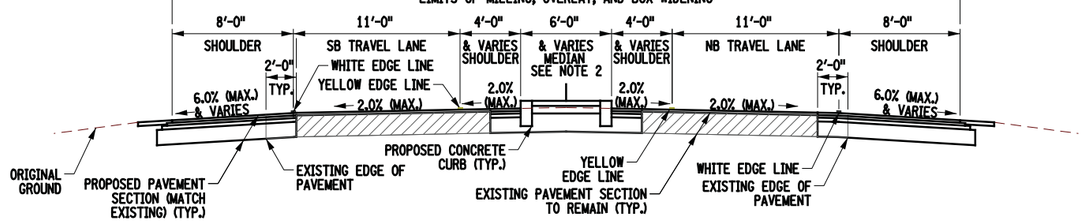
NY ROUTE 28 TYPICAL SECTION A: MILLING, OVERLAY, AND BOX WIDENING OPTION

LOOKING UPSTATION
SCALE: 1" = 10'-0"



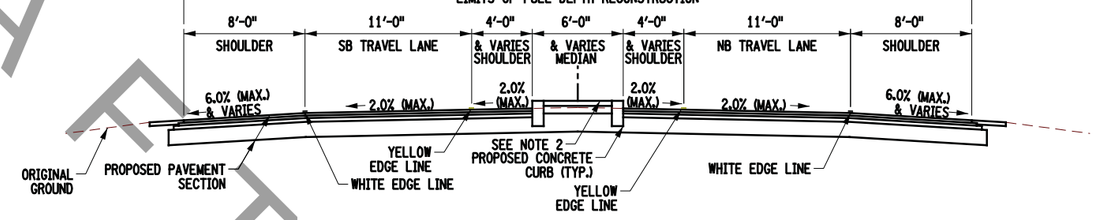
NY ROUTE 28 TYPICAL SECTION A: FULL DEPTH RECONSTRUCTION OPTION

LOOKING UPSTATION
SCALE: 1" = 10'-0"



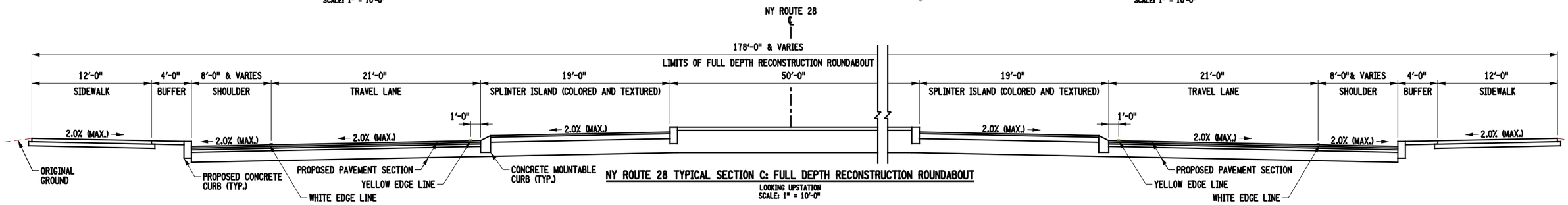
NY ROUTE 28 TYPICAL SECTION B: MILLING, OVERLAY, AND BOX WIDENING OPTION

LOOKING UPSTATION
SCALE: 1" = 10'-0"



NY ROUTE 28 TYPICAL SECTION B: FULL DEPTH RECONSTRUCTION OPTION

LOOKING UPSTATION
SCALE: 1" = 10'-0"



NY ROUTE 28 TYPICAL SECTION C: FULL DEPTH RECONSTRUCTION ROUNDABOUT

LOOKING UPSTATION
SCALE: 1" = 10'-0"

5 0 5 10 15 20'

1" = 10'

Engineering and Land Surveying, P.C.
1533 Crescent Road - Clifton Park, NY 12065

ROUNDABOUT ALTERNATIVE

TYPICAL SECTIONS

NOTES:

1. EXISTING PAVEMENT TREATMENT WOULD BE 1 1/2" MILL AND OVERLAY OR RECONSTRUCTION DEPENDING ON FUNDING AVAILIBILITY.

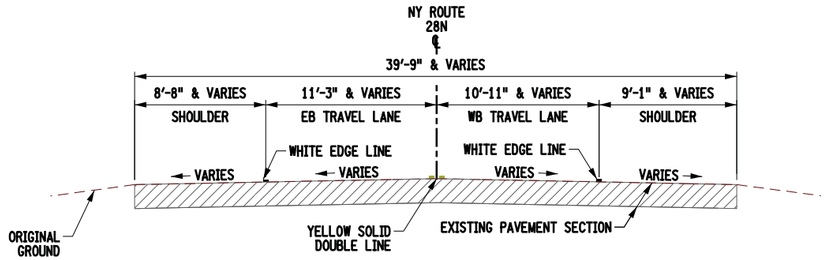
2. MEDIAN MAY BE FLUSH OR RAISED DEPENDING ON FUNDING AVAILIBILITY

NORTH CREEK RE-DESIGN INITIATIVE

FEBRUARY 26, 2020

DWG. NO. RA-TS-2

SCALE: 1" = 10'-0"



NY ROUTE 28N TYPICAL SECTION: EXISTING ROADWAY

LOOKING UPSTATION
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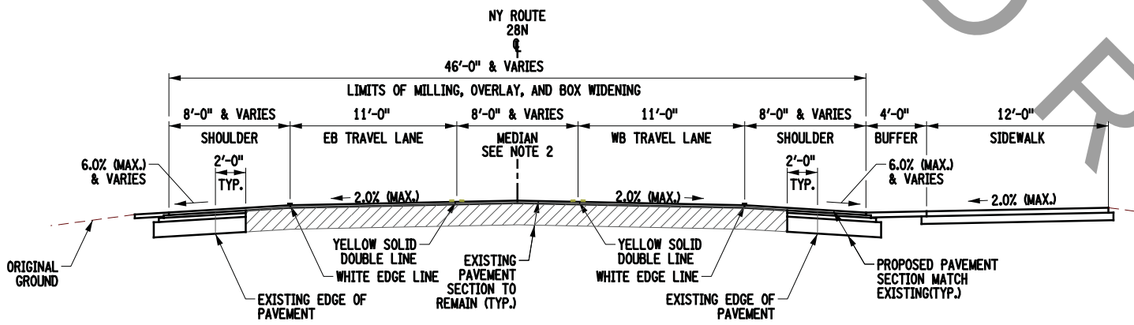

NY ROUTE 28N TYPICAL SECTION D: MILLING, OVERLAY, AND BOX WIDENING OPTION

LOOKING UPSTATION
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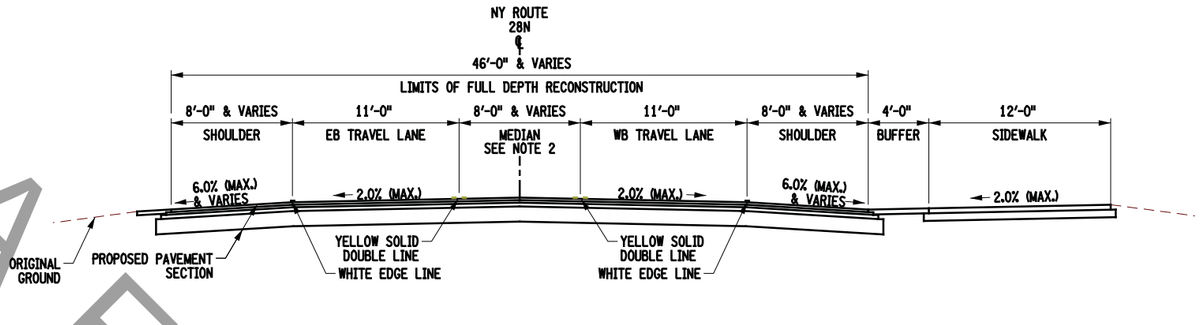

NY ROUTE 28N TYPICAL SECTION D: FULL DEPTH RECONSTRUCTION OPTION

LOOKING UPSTATION
SCALE: 1" = 10'-0"

5 0 5 10 15 20'

1" = 10'

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1533 Crescent Road - Clifton Park, NY 12065

ROUNDABOUT ALTERNATIVE

TYPICAL SECTIONS

NORTH CREEK RE-DESIGN INITIATIVE

FEBRUARY 26, 2020

DWG. NO. RA-1

SCALE: 1" = 80'-0"

NY ROUTE 28

SKI BOWL ROAD

PEACEFUL VALLEY ROAD

7'-7" SHOULDER
11'-8" TRAVEL LANE
10'-8" TRAVEL LANE
8'-8" SHOULDER

8'-0" SHOULDER
11'-0" TRAVEL LANE
14'-0" MEDIAN
11'-0" TURNING LANE
11'-0" TRAVEL LANE
8'-0" SHOULDER

8'-0" SHOULDER
11'-0' TRAVEL LANE
14'-0" MEDIAN
11'-0' TRAVEL LANE
8'-0" SHOULDER

SEE DWG. NO. RA-TS-1 FOR TYPICAL SECTION(S) (TYP.)

PROPOSED CURBED OR FLUSH MEDIAN (TYP.)

MATCHLINE - SEE DWG. NO. RA-2

40 0 40 80 120 160'

1" = 80'

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CONCEPTUAL ROUNDABOUT ALTERNATIVE

NORTH CREEK RE-DESIGN INITIATIVE

FEBRUARY 26, 2020

DWG. NO. RA-2

SCALE: 1" = 80'-0"

MATCHLINE - SEE DWG. NO. RA-3

NY ROUTE 28

PROPOSED CURBED OR FLUSH MEDIAN (TYP.)

8'-0" SHOULDER
11'-0" TRAVEL LANE
14'-0" MEDIAN
11'-0" TRAVEL LANE
8'-0" SHOULDER

PROPOSED CROSSWALK (TYP.)

PROPOSED ROUNDABOUT

PROPOSED SPLITTER ISLAND (TYP.)

12'-0"

5'-0" SIDEWALK
4'-0" SHOULDER
11'-0" TRAVEL LANE
8'-0" MEDIAN
11'-0" TRAVEL LANE
4'-0" SHOULDER

ACCESS ROAD

12'-0" SIDEWALK
8'-0" SHOULDER
11'-0" TRAVEL LANE
11'-0" TRAVEL LANE
8'-0" SHOULDER

ORDWAY LANE

NY ROUTE 28N

MAIN STREET

SEE DWG. NO. RA-TS-2 FOR TYPICAL SECTION(S)

SEE DWG. NO. RA-TS-1 FOR TYPICAL SECTION(S)

GRID NORTH

40 0 40 80 120 160'

1" = 80'

MATCHLINE - SEE DWG. NO. RA-1

Engineering and Land Surveying, P.C.

1533 Crescent Road - Clifton Park, NY 12065

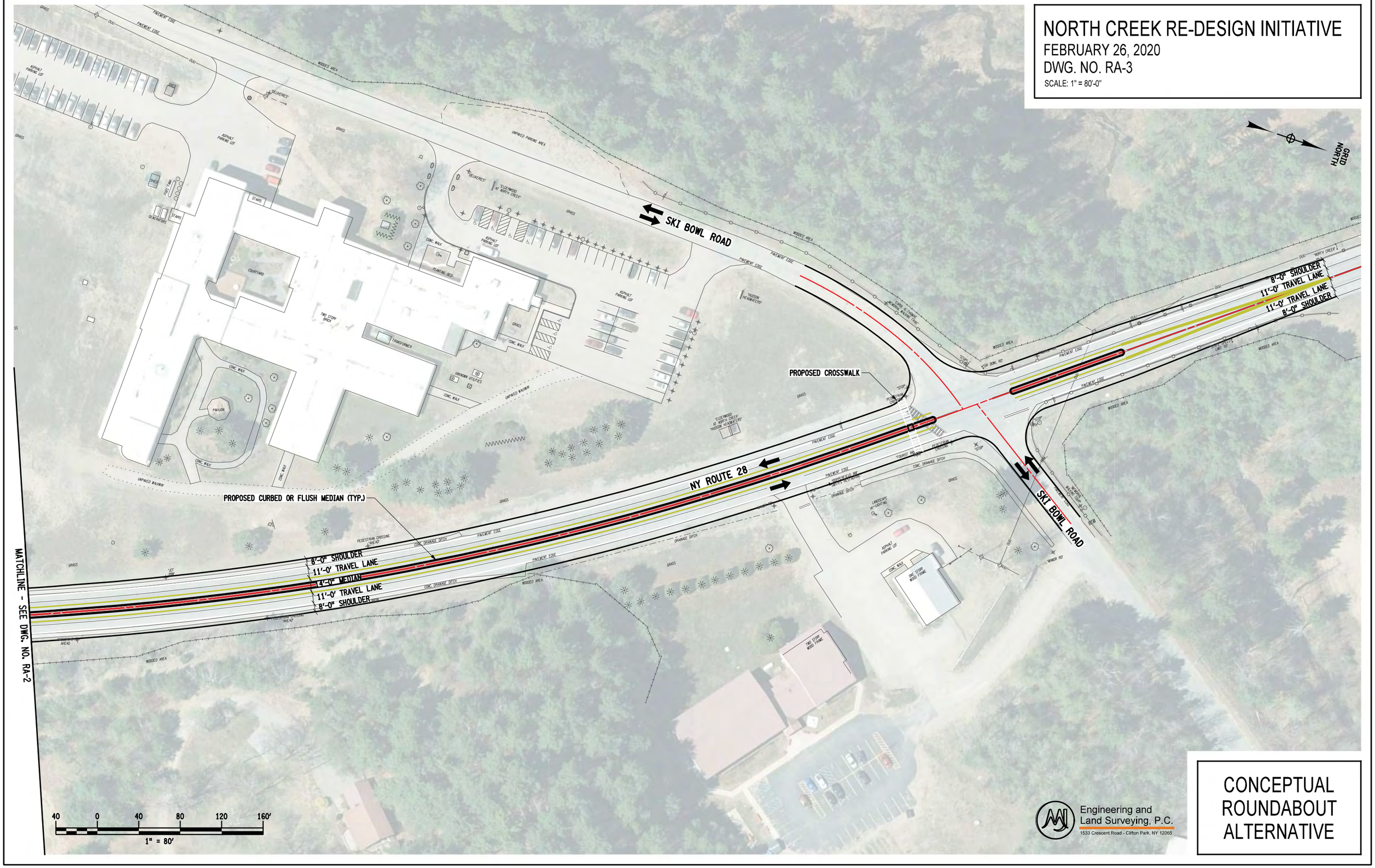
CONCEPTUAL ROUNDABOUT ALTERNATIVE

NORTH CREEK RE-DESIGN INITIATIVE

FEBRUARY 26, 2020

DWG. NO. RA-3

SCALE: 1" = 80'-0"



CONCEPTUAL ROUNDABOUT ALTERNATIVE

Engineering and Land Surveying, P.C.

1533 Crescent Road - Clifton Park, NY 12065

NORTH CREEK RE-DESIGN INITIATIVE

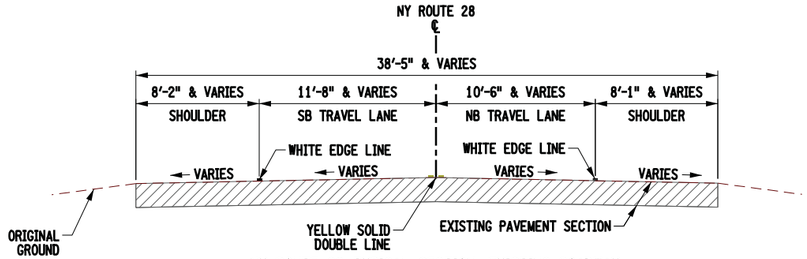
FEBRUARY 26, 2020

DWG. NO. SIG-TS-1

SCALE: 1" = 10'-0"

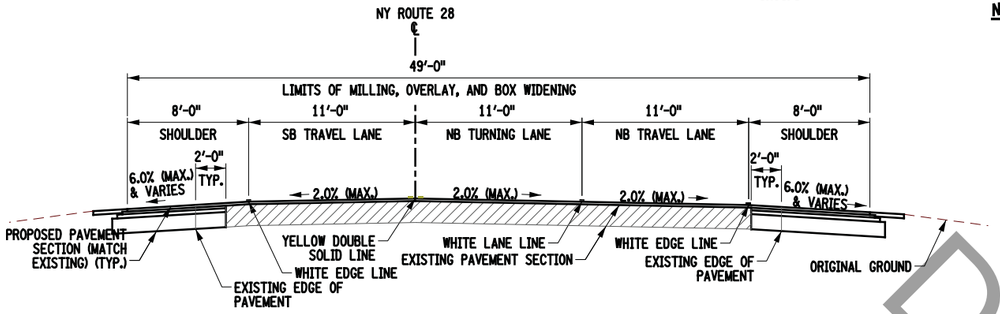
NOTES:

1. EXISTING PAVEMENT TREATMENT WOULD BE 1 1/2" MILL AND OVERLAY OR RECONSTRUCTION DEPENDING ON FUNDING AVAILIBILITY.
2. MEDIAN MAY BE FLUSH OR RAISED DEPENDING ON FUNDING AVAILIBILITY



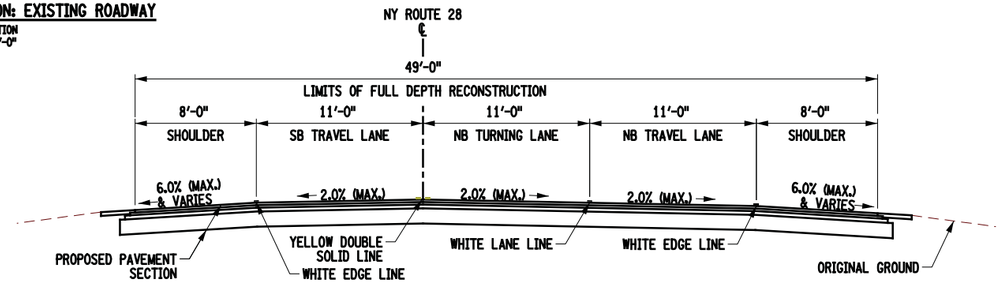
NY ROUTE 28 TYPICAL SECTION: EXISTING ROADWAY

LOOKING UPSTATION
SCALE: 1" = 10'-0"



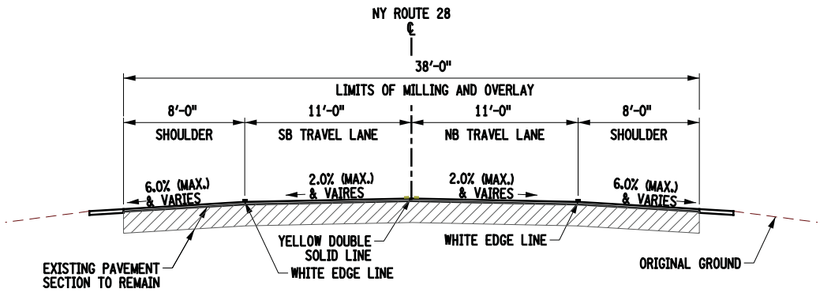
NY ROUTE 28 TYPICAL SECTION A: MILLING, OVERLAY, AND BOX WIDENING OPTION

LOOKING UPSTATION
SCALE: 1" = 10'-0"



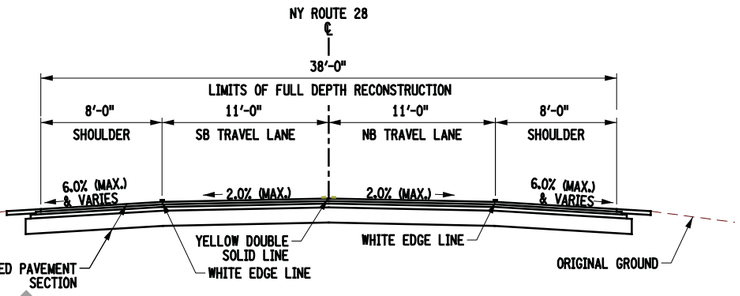
NY ROUTE 28 TYPICAL SECTION A: FULL DEPTH RECONSTRUCTION OPTION

LOOKING UPSTATION
SCALE: 1" = 10'-0"



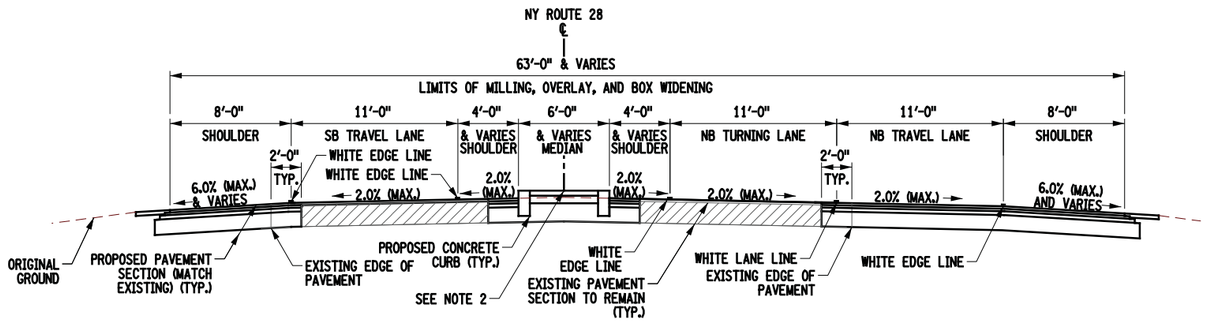
NY ROUTE 28 TYPICAL SECTION B: MILLING AND OVERLAY OPTION

LOOKING UPSTATION
SCALE: 1" = 10'-0"



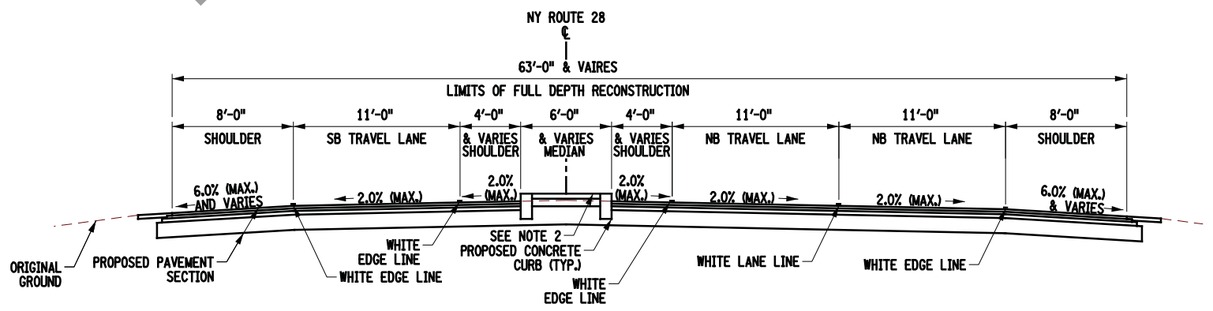
NY ROUTE 28 TYPICAL SECTION B: FULL DEPTH RECONSTRUCTION OPTION

LOOKING UPSTATION
SCALE: 1" = 10'-0"



NY ROUTE 28 TYPICAL SECTION C: MILLING, OVERLAY, AND BOX WIDENING OPTION

LOOKING UPSTATION
SCALE: 1" = 10'-0"



NY ROUTE 28 TYPICAL SECTION C: FULL DEPTH RECONSTRUCTION OPTION

LOOKING UPSTATION
SCALE: 1" = 10'-0"

5 0 5 10 15 20'

1" = 10'

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TRAFFIC SIGNAL ALTERNATIVE

TYPICAL SECTIONS

NOTES:

1. EXISTING PAVEMENT TREATMENT WOULD BE 1 1/2" MILL AND OVERLAY OR RECONSTRUCTION DEPENDING ON FUNDING AVAILIBILITY.

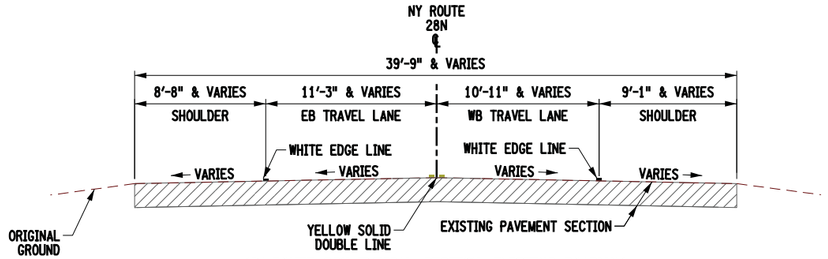
2. MEDIAN MAY BE FLUSH OR RAISED DEPENDING ON FUNDING AVAILIBILITY

NORTH CREEK RE-DESIGN INITIATIVE

FEBRUARY 26, 2020

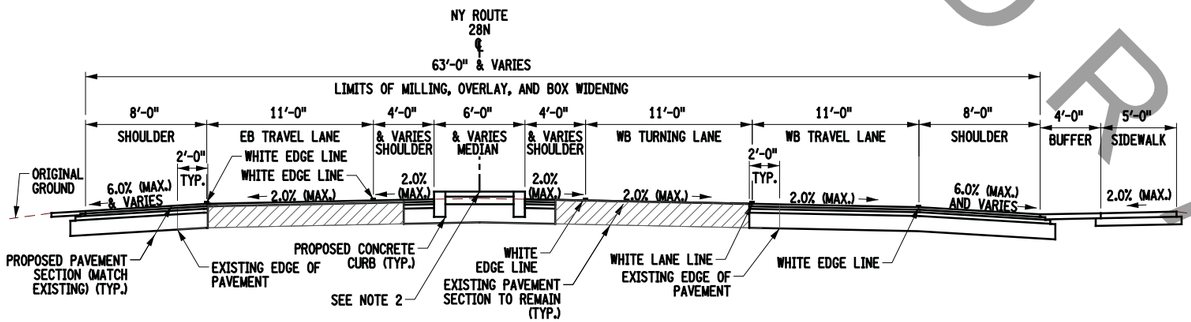
DWG. NO. SIG-TS-2

SCALE: 1" = 10'-0"



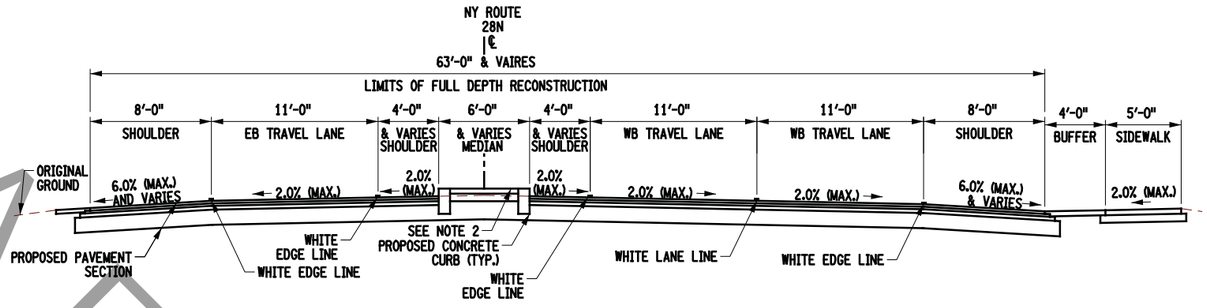
NY ROUTE 28N TYPICAL SECTION: EXISTING ROADWAY

LOOKING UPSTATION
SCALE: 1" = 10'-0"



NY ROUTE 28N TYPICAL SECTION D: MILLING, OVERLAY, AND BOX WIDENING OPTION

LOOKING UPSTATION
SCALE: 1" = 10'-0"



NY ROUTE 28N TYPICAL SECTION D: FULL DEPTH RECONSTRUCTION OPTION

LOOKING UPSTATION
SCALE: 1" = 10'-0"

5 0 5 10 15 20'

1" = 10'

Engineering and Land Surveying, P.C.
1533 Crescent Road - Clifton Park, NY 12065

TRAFFIC SIGNAL ALTERNATIVE

TYPICAL SECTIONS

NORTH CREEK RE-DESIGN INITIATIVE

FEBRUARY 26, 2020

DWG. NO. SIG-1

SCALE: 1" = 80'-0"

SKI BOWL ROAD

PEACEFUL VALLEY ROAD

NY ROUTE 28

8'-0" SHOULDER
11'-0" TRAVEL LANE
10'-10" TRAVEL LANE
8'-1" SHOULDER

8'-0" SHOULDER
11'-0" TRAVEL LANE
11'-0" TURNING LANE
11'-0" TRAVEL LANE
8'-0" SHOULDER

8'-0" SHOULDER
11'-0" TRAVEL LANE
11'-0" TRAVEL LANE
8'-0" SHOULDER

SEE DWG. NO. SIG-TS-1 FOR TYPICAL SECTION(S) (TYP.)

MATCHLINE - SEE DWG. NO. SIG-2

40 0 40 80 120 160'

1" = 80'

Engineering and Land Surveying, P.C.

1533 Crescent Road - Clifton Park, NY 12065

CONCEPTUAL TRAFFIC SIGNAL ALTERNATIVE

NORTH CREEK RE-DESIGN INITIATIVE

FEBRUARY 26, 2020

DWG. NO. SIG-2

SCALE: 1" = 80'-0"

MATCHLINE - SEE DWG. NO. SIG-3

NY ROUTE 28

8'-0" SHOULDER
11'-0" TRAVEL LANE
11'-0" TRAVEL LANE
8'-0" SHOULDER

PROPOSED TRAFFIC SIGNAL

PROPOSED CROSSWALK (TYP.)

5'-0" SIDEWALK
4'-0" SHOULDER
11'-0" TRAVEL LANE
14'-0" MEDIAN
11'-0" TURNING LANE
11'-0" TRAVEL LANE
4'-0" SHOULDER
5'-0" SIDEWALK

ACCESS ROAD

PROPOSED PEDESTRIAN SIGNAL

PROPOSED CURBED OR FLUSH MEDIAN (TYP.)

SEE DWG. NO. SIG-TS-1 FOR TYPICAL SECTION(S)

SEE DWG. NO. SIG-TS-2 FOR TYPICAL SECTION(S)

8'-0" SHOULDER
11'-0" TRAVEL LANE
14'-0" MEDIAN
11'-0" TURNINGLANE
11'-0" TRAVEL LANE
8'-0" SHOULDER

5'-0" SIDEWALK
8'-0" SHOULDER
11'-0" TRAVEL LANE
11'-0" TRAVEL LANE
8'-0" SHOULDER

ORDWAY LANE

NY ROUTE 28N

MAIN STREET

GRID NORTH

40 0 40 80 120 160'

1" = 80'

MATCHLINE - SEE DWG. NO. SIG-1

Engineering and Land Surveying, P.C.

1533 Crescent Road - Clifton Park, NY 12065

CONCEPTUAL TRAFFIC SIGNAL ALTERNATIVE

NORTH CREEK RE-DESIGN INITIATIVE

FEBRUARY 26, 2020

DWG. NO. SIG-3

SCALE: 1" = 80'-0"

GRID NORTH

SKI BOWL ROAD

NY ROUTE 28

PROPOSED CROSSWALK

PROPOSED CURBED OR FLUSH MEDIAN (TYP.)

8'-0" SHOULDER
11'-0" TRAVEL LANE
11'-0" TRAVEL LANE
8'-0" SHOULDER

8'-0" SHOULDER
11'-0" TRAVEL LANE
14'-0" MEDIAN
11'-0" TRAVEL LANE
8'-0" SHOULDER

MATCHLINE - SEE DWG. NO. SIG-2

40 0 40 80 120 160'

1" = 80'

Engineering and Land Surveying, P.C.

1533 Crescent Road - Clifton Park, NY 12065

CONCEPTUAL TRAFFIC SIGNAL ALTERNATIVE

Appendix 5
Level of Service Table

Ski Bowl Park
North Creek, New York
LOS TABLE

EXISTING (2019)			AM PEAK			PM PEAK		
INTERSECTION	**APPROACH**	**MOVEMENT**	**V/C***	**DELAY**	**LOS**	**V/C***	**DELAY**	**LOS**
NO. 1 - NY Route 28/Ski Bowl Road North	EASTBOUND	LEFT / THRU / RIGHT	0.02	9.6	A	0.05	9.8	A
	WESTBOUND	LEFT / THRU / RIGHT	0.02	10.4	B	0.04	11.1	B
	NORTHBOUND	LEFT / THRU / RIGHT	0.01	1.0	A	0.01	0.5	A
	SOUTHBOUND	LEFT / THRU / RIGHT	0.00	0.1	A	0.01	0.4	A
	INTERSECTION	**ALL**	**N/A**	**1.6**	**A**	**N/A**	**2.0**	**A**
NO. 2 - NY Route 28/Bridge St	WESTBOUND	LEFT / RIGHT	0.13	10.6	B	0.15	11.3	B
	NORTHBOUND	THRU / RIGHT	0.12	0.0	A	0.12	0.0	A
	SOUTHBOUND	LEFT / THRU	0.02	1.5	A	0.02	1.4	A
	INTERSECTION	**ALL**	**N/A**	**2.9**	**A**	**N/A**	**2.9**	**A**
NO. 3 - NY Route 28/Ski Bowl Road South	EASTBOUND	LEFT / RIGHT	0.04	10.0	A	0.05	10.5	B
	NORTHBOUND	LEFT / THRU	0.03	1.6	A	0.01	0.5	A
	SOUTHBOUND	THRU / RIGHT	0.10	0.0	A	0.13	0.0	A
	INTERSECTION	**ALL**	**N/A**	**1.6**	**A**	**N/A**	**1.0**	**A**

* - Volume-to-Capacity ratio

NO BUILD (2029)			AM PEAK			PM PEAK		
INTERSECTION	**APPROACH**	**MOVEMENT**	**V/C***	**DELAY**	**LOS**	**V/C***	**DELAY**	**LOS**
NO. 1 - NY Route 28/Ski Bowl Road North	EASTBOUND	LEFT / THRU / RIGHT	0.05	10.5	B	0.06	10.3	B
	WESTBOUND	LEFT / THRU / RIGHT	0.07	11.3	B	0.05	11.3	B
	NORTHBOUND	LEFT / THRU / RIGHT	0.01	0.8	A	0.01	0.5	A
	SOUTHBOUND	LEFT / THRU / RIGHT	0.01	0.6	A	0.01	0.5	A
	INTERSECTION	**ALL**	**N/A**	**2.7**	**A**	**N/A**	**2.3**	**A**
NO. 2 - NY Route 28/Bridge St	WESTBOUND	LEFT / RIGHT	0.14	10.9	B	0.17	11.7	B
	NORTHBOUND	THRU / RIGHT	0.12	0.0	A	0.13	0.0	A
	SOUTHBOUND	LEFT / THRU	0.02	1.5	A	0.02	1.5	A
	INTERSECTION	**ALL**	**N/A**	**2.9**	**A**	**N/A**	**3.0**	**A**
NO. 3 - NY Route 28/Ski Bowl Road South	EASTBOUND	LEFT / RIGHT	0.05	10.2	B	0.06	10.8	B
	NORTHBOUND	LEFT / THRU	0.03	1.7	A	0.01	0.6	A
	SOUTHBOUND	THRU / RIGHT	0.11	0.0	A	0.14	0.0	A
	INTERSECTION	**ALL**	**N/A**	**1.7**	**A**	**N/A**	**1.1**	**A**

* - Volume-to-Capacity ratio

NO BUILD (2039)			AM PEAK			PM PEAK		
INTERSECTION	**APPROACH**	**MOVEMENT**	**V/C***	**DELAY**	**LOS**	**V/C***	**DELAY**	**LOS**
NO. 1 - NY Route 28/Ski Bowl Road North	EASTBOUND	LEFT / THRU / RIGHT	0.06	10.6	B	0.07	10.4	B
	WESTBOUND	LEFT / THRU / RIGHT	0.07	11.5	B	0.05	11.6	B
	NORTHBOUND	LEFT / THRU / RIGHT	0.01	0.8	A	0.01	0.5	A
	SOUTHBOUND	LEFT / THRU / RIGHT	0.01	0.6	A	0.01	0.4	A
	INTERSECTION	**ALL**	**N/A**	**2.6**	**A**	**N/A**	**2.3**	**A**
NO. 2 - NY Route 28/Bridge St	WESTBOUND	LEFT / RIGHT	0.16	11.1	B	0.18	12.0	B
	NORTHBOUND	THRU / RIGHT	0.13	0.0	A	0.14	0.0	A
	SOUTHBOUND	LEFT / THRU	0.02	1.6	A	0.03	1.5	A
	INTERSECTION	**ALL**	**N/A**	**3.0**	**A**	**N/A**	**3.1**	**A**
NO. 3 - NY Route 28/Ski Bowl Road South	EASTBOUND	LEFT / RIGHT	0.06	10.5	B	0.06	11.0	B
	NORTHBOUND	LEFT / THRU	0.03	1.7	A	0.01	0.6	A
	SOUTHBOUND	THRU / RIGHT	0.11	0.0	A	0.15	0.0	A
	INTERSECTION	**ALL**	**N/A**	**1.7**	**A**	**N/A**	**1.1**	**A**

* - Volume-to-Capacity ratio

BUILD ETC 20 - ALT 1			AM PEAK			PM PEAK		
INTERSECTION	**APPROACH**	**MOVEMENT**	**V/C***	**DELAY**	**LOS**	**V/C***	**DELAY**	**LOS**
NO. 1 - NY Route 28/Ski Bowl Road North	EASTBOUND	LEFT / THRU / RIGHT	0.13	12.2	B	0.39	17.0	C
	WESTBOUND	LEFT / THRU / RIGHT	0.07	12.1	B	0.17	14.5	B
	NORTHBOUND	LEFT / THRU / RIGHT	0.01	0.8	A	0.00	0.2	A
	SOUTHBOUND	LEFT / THRU / RIGHT	0.01	0.4	A	0.02	0.8	A
	INTERSECTION	**ALL**	**N/A**	**3.1**	**A**	**N/A**	**6.0**	**A**
NO. 2 - NY Route 28/Bridge St	EASTBOUND	LEFT / THRU / RIGHT	0.04	11.3	B	0.21	14.0	B
	WESTBOUND	LEFT / RIGHT	0.26	14.0	B	0.44	23.3	C
	NORTHBOUND	THRU / RIGHT	0.03	1.2	A	0.03	1.1	A
	SOUTHBOUND	LEFT / THRU	0.02	1.4	A	0.03	1.5	A
	INTERSECTION	**ALL**	**N/A**	**4.6**	**A**	**N/A**	**6.8**	**A**
NO. 3 - NY Route 28/Ski Bowl Road South	EASTBOUND	LEFT / RIGHT	0.30	13.8	B	1.14	109.9	F
	NORTHBOUND	LEFT / THRU	0.21	5.5	A	0.22	5.7	A
	SOUTHBOUND	THRU / RIGHT	0.14	0.0	A	0.23	0.0	A
	INTERSECTION	**ALL**	**N/A**	**5.7**	**A**	**N/A**	**46.4**	**E**

* - Volume-to-Capacity ratio

BUILD ETC 20 - ALT 2			AM PEAK			PM PEAK		
INTERSECTION	**APPROACH**	**MOVEMENT**	**V/C***	**DELAY**	**LOS**	**V/C***	**DELAY**	**LOS**
NO. 1 - NY Route 28/Ski Bowl Road North	EASTBOUND	LEFT / THRU / RIGHT	0.06	11.2	B	0.06	11.4	B
	WESTBOUND	LEFT / THRU / RIGHT	0.05	12.3	B	0.19	15.7	C
	NORTHBOUND	LEFT / THRU / RIGHT	0.01	0.8	A	0.00	0.2	A
	SOUTHBOUND	LEFT / THRU / RIGHT	0.01	0.4	A	0.02	0.9	A
	INTERSECTION	**ALL**	**N/A**	**2.4**	**A**	**N/A**	**2.9**	**A**
NO. 2 - NY Route 28/Bridge St	EASTBOUND	LEFT / THRU / RIGHT	0.07	12.7	B	0.34	18.0	C
	WESTBOUND	LEFT / RIGHT	0.27	14.3	B	0.45	24.0	C
	NORTHBOUND	THRU / RIGHT	0.03	1.2	A	0.03	1.1	A
	SOUTHBOUND	LEFT / THRU	0.02	1.4	A	0.03	1.4	A
	INTERSECTION	**ALL**	**N/A**	**4.7**	**A**	**N/A**	**7.6**	**A**
NO. 3 - NY Route 28/Ski Bowl Road South	EASTBOUND	LEFT / RIGHT	0.30	13.6	B	1.14	109.0	F
	NORTHBOUND	LEFT / THRU	0.20	5.4	A	0.22	5.7	A
	SOUTHBOUND	THRU / RIGHT	0.14	0.0	A	0.23	0.0	A
	INTERSECTION	**ALL**	**N/A**	**5.6**	**A**	**N/A**	**46.1**	**E**

* - Volume-to-Capacity ratio

Ski Bowl Park
North Creek, New York
LOS TABLE

BUILD ETC 20 - ALT 3			AM PEAK			PM PEAK		
INTERSECTION	**APPROACH**	**MOVEMENT**	**V/C***	**DELAY**	**LOS**	**V/C***	**DELAY**	**LOS**
NO. 1 - NY Route 28/Ski Bowl Road North	EASTBOUND	LEFT / THRU / RIGHT	0.06	11.2	B	0.06	11.4	B
	WESTBOUND	LEFT / THRU / RIGHT	0.08	12.4	B	0.19	15.8	C
	NORTHBOUND	LEFT / THRU / RIGHT	0.01	0.7	A	0.00	0.2	A
	SOUTHBOUND	LEFT / THRU / RIGHT	0.01	0.4	A	0.02	0.9	A
	INTERSECTION	**ALL**	**N/A**	**2.3**	**A**	**N/A**	**2.9**	**A**
NO. 2 - NY Route 28/Bridge St	EASTBOUND	LEFT / THRU / RIGHT	0.22	15.1	C	0.88	51.4	F
	WESTBOUND	LEFT / RIGHT	0.41	22.3	C	1.02	137.5	F
	NORTHBOUND	THRU / RIGHT	0.12	3.9	A	0.12	4.0	A
	SOUTHBOUND	LEFT / THRU	0.02	1.3	A	0.03	1.4	A
	INTERSECTION	**ALL**	**N/A**	**7.8**	**A**	**N/A**	**34.2**	**D**
NO. 3 - NY Route 28/Ski Bowl Road South	EASTBOUND	LEFT / RIGHT	N/A	N/A	N/A	N/A	N/A	N/A
	NORTHBOUND	LEFT / THRU	N/A	N/A	N/A	N/A	N/A	N/A
	SOUTHBOUND	THRU / RIGHT	N/A	N/A	N/A	N/A	N/A	N/A
	INTERSECTION	**ALL**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

* - Volume-to-Capacity ratio

BUILD ETC 20 - ALT 3 TURN LANES			PM PEAK		
INTERSECTION	**APPROACH**	**MOVEMENT**	**V/C***	**DELAY**	**LOS**
NO. 1 - NY Route 28/Ski Bowl Road North	EASTBOUND	LEFT / THRU / RIGHT	0.06	11.4	B
	WESTBOUND	LEFT / THRU / RIGHT	0.19	15.8	C
	NORTHBOUND		0.00	0.2	A
	SOUTHBOUND	LEFT / THRU / RIGHT	0.02	0.9	A
	INTERSECTION	**ALL**	**N/A**	**2.9**	**A**
NO. 2 - NY Route 28/Bridge St	EASTBOUND	LEFT	0.36	30.1	D
		THRU / RIGHT	0.49	17.1	C
	WESTBOUND	LEFT	0.84	127.0	F
		THRU / RIGHT	0.17	16.2	C
	NORTHBOUND	LEFT	0.12	8.1	A
		THRU / RIGHT	0.14	0.0	A
	SOUTHBOUND	LEFT / THRU / RIGHT	0.03	1.4	A
	INTERSECTION	**ALL**	**N/A**	**17.1**	**C**
NO. 3 - NY Route 28/Ski Bowl Road South	EASTBOUND	LEFT / RIGHT	N/A	N/A	N/A
	NORTHBOUND	LEFT / THRU	N/A	N/A	N/A
	SOUTHBOUND	THRU / RIGHT	N/A	N/A	N/A
	INTERSECTION	**ALL**	**N/A**	**N/A**	**N/A**

* - Volume-to-Capacity ratio

BUILD ETC 20 - ALT 3 TRAFFIC SIGNAL			PM PEAK		
INTERSECTION	**APPROACH**	**MOVEMENT**	**V/C***	**DELAY**	**LOS**
NO. 2 - NY Route 28/Bridge St	EASTBOUND	LEFT	0.11	6.3	A
		THRU / RIGHT	0.56	7.5	A
	WESTBOUND	LEFT	0.17	8.7	A
		THRU / RIGHT	0.12	5.7	A
	NORTHBOUND	LEFT	0.22	6.4	A
		THRU / RIGHT	0.51	7.5	A
	SOUTHBOUND	LEFT / THRU / RIGHT	0.44	7.3	A
	INTERSECTION	**ALL**	**N/A**	**7.2**	**A**

* - Volume-to-Capacity ratio

BUILD ETC 20 - ALT 3 ROUNDABOUT			AM PEAK			PM PEAK		
INTERSECTION	**APPROACH**	**MOVEMENT**	**V/C***	**DELAY**	**LOS**	**V/C***	**DELAY**	**LOS**
NO. 2 - NY Route 28/Bridge St	EASTBOUND	LEFT / THRU / RIGHT	0.09	4.1	A	0.38	8.0	A
	WESTBOUND	LEFT / RIGHT	0.16	5.4	A	0.17	5.8	A
	NORTHBOUND	THRU / RIGHT	0.32	6.0	A	0.38	7.1	A
	SOUTHBOUND	LEFT / THRU	0.20	5.4	A	0.30	6.7	A
	INTERSECTION	**ALL**	**N/A**	**5.5**	**A**	**N/A**	**7.1**	**A**

* - Volume-to-Capacity ratio

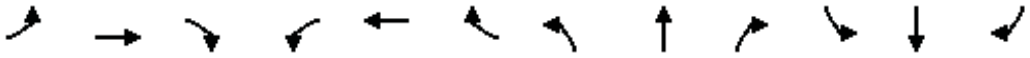
Appendix 6

Synchro Output

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	2	120	30	19	122	11	11	6	10	7	6	2
Future Volume (Veh/h)	2	120	30	19	122	11	11	6	10	7	6	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.79	0.62	1.00	0.71	0.56	0.25	0.62	0.50	0.30	0.62	0.25
Hourly flow rate (vph)	8	152	48	19	172	20	44	10	20	23	10	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	192			200			425	422	176	437	436	182
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	192			200			425	422	176	437	436	182
tC, single (s)	5.1			4.1			7.1	6.5	6.5	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	3.1			2.2			3.5	4.0	3.5	3.5	4.0	3.3
p0 queue free %	99			99			92	98	98	95	98	99
cM capacity (veh/h)	960			1384			521	515	811	504	505	866

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	208	211	74	41
Volume Left	8	19	44	23
Volume Right	48	20	20	8
cSH	960	1384	576	549
Volume to Capacity	0.01	0.01	0.13	0.07
Queue Length 95th (ft)	1	1	11	6
Control Delay (s)	0.4	0.8	12.2	12.1
Lane LOS	A	A	B	B
Approach Delay (s)	0.4	0.8	12.2	12.1
Approach LOS			B	B

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	29.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	11	12	47	29	37	33	115	58	13	123	0
Future Volume (Veh/h)	0	11	12	47	29	37	33	115	58	13	123	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.79	0.92	0.73	0.92	0.71	0.73	0.46	0.83	0.92
Hourly flow rate (vph)	0	12	13	59	32	51	36	162	79	28	148	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	544	517	148	496	478	202	148			241		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	544	517	148	496	478	202	148			241		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.2			2.4		
p0 queue free %	100	97	99	87	93	94	97			98		
cM capacity (veh/h)	385	441	899	446	464	829	1434			1237		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	25	142	277	176
Volume Left	0	59	36	28
Volume Right	13	51	79	0
cSH	599	540	1434	1237
Volume to Capacity	0.04	0.26	0.03	0.02
Queue Length 95th (ft)	3	26	2	2
Control Delay (s)	11.3	14.0	1.2	1.4
Lane LOS	B	B	A	A
Approach Delay (s)	11.3	14.0	1.2	1.4
Approach LOS	B	B		

Intersection Summary				
Average Delay	4.6			
Intersection Capacity Utilization	37.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	45	118	190	149	33
Future Volume (Veh/h)	16	45	118	190	149	33
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.58	0.30	0.44	0.83	0.82	0.60
Hourly flow rate (vph)	28	150	268	229	182	55
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	974	210	237			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	974	210	237			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	87	82	79			
cM capacity (veh/h)	224	836	1307			

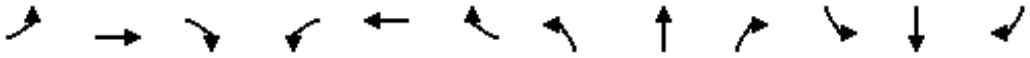
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	178	497	237
Volume Left	28	268	0
Volume Right	150	0	55
cSH	584	1307	1700
Volume to Capacity	0.30	0.21	0.14
Queue Length 95th (ft)	32	19	0
Control Delay (s)	13.8	5.5	0.0
Lane LOS	B	A	
Approach Delay (s)	13.8	5.5	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	2	144	6	19	131	11	2	6	10	7	6	2
Future Volume (Veh/h)	2	144	6	19	131	11	2	6	10	7	6	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.79	0.62	1.00	0.71	0.56	0.25	0.62	0.50	0.30	0.62	0.25
Hourly flow rate (vph)	8	182	10	19	185	20	8	10	20	23	10	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	205			192			449	446	187	461	441	195
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	205			192			449	446	187	461	441	195
tC, single (s)	5.1			4.1			7.1	6.5	6.5	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	3.1			2.2			3.5	4.0	3.5	3.5	4.0	3.3
p0 queue free %	99			99			98	98	97	95	98	99
cM capacity (veh/h)	948			1394			502	499	799	485	502	851

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	200	224	38	41
Volume Left	8	19	8	23
Volume Right	10	20	20	8
cSH	948	1394	623	535
Volume to Capacity	0.01	0.01	0.06	0.08
Queue Length 95th (ft)	1	1	5	6
Control Delay (s)	0.4	0.8	11.2	12.3
Lane LOS	A	A	B	B
Approach Delay (s)	0.4	0.8	11.2	12.3
Approach LOS			B	B

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	29.5%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	11	12	47	29	37	33	115	58	14	122	24
Future Volume (Veh/h)	9	11	12	47	29	37	33	115	58	14	122	24
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.79	0.92	0.73	0.92	0.71	0.73	0.46	0.83	0.92
Hourly flow rate (vph)	10	12	13	59	32	51	36	162	79	30	147	26
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	560	533	160	512	506	202	173			241		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	560	533	160	512	506	202	173			241		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.2			2.4		
p0 queue free %	97	97	99	86	93	94	97			98		
cM capacity (veh/h)	375	430	885	434	446	829	1404			1237		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	35	142	277	203
Volume Left	10	59	36	30
Volume Right	13	51	79	26
cSH	505	527	1404	1237
Volume to Capacity	0.07	0.27	0.03	0.02
Queue Length 95th (ft)	6	27	2	2
Control Delay (s)	12.7	14.3	1.2	1.4
Lane LOS	B	B	A	A
Approach Delay (s)	12.7	14.3	1.2	1.4
Approach LOS	B	B		

Intersection Summary				
Average Delay	4.7			
Intersection Capacity Utilization	35.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	45	114	190	148	33
Future Volume (Veh/h)	16	45	114	190	148	33
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.58	0.30	0.44	0.83	0.82	0.60
Hourly flow rate (vph)	28	150	259	229	180	55
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	954	208	235			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	954	208	235			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	88	82	80			
cM capacity (veh/h)	232	838	1309			

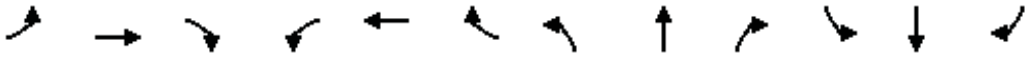
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	178	488	235
Volume Left	28	259	0
Volume Right	150	0	55
cSH	594	1309	1700
Volume to Capacity	0.30	0.20	0.14
Queue Length 95th (ft)	31	18	0
Control Delay (s)	13.6	5.4	0.0
Lane LOS	B	A	
Approach Delay (s)	13.6	5.4	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	5.6		
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	2	144	6	19	139	11	2	6	10	7	6	2
Future Volume (Veh/h)	2	144	6	19	139	11	2	6	10	7	6	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.79	0.62	1.00	0.71	0.56	0.25	0.62	0.50	0.30	0.62	0.25
Hourly flow rate (vph)	8	182	10	19	196	20	8	10	20	23	10	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	216			192			460	457	187	472	452	206
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	216			192			460	457	187	472	452	206
tC, single (s)	5.1			4.1			7.1	6.5	6.5	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	3.1			2.2			3.5	4.0	3.5	3.5	4.0	3.3
p0 queue free %	99			99			98	98	97	95	98	99
cM capacity (veh/h)	937			1394			494	492	799	477	495	840

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	200	235	38	41
Volume Left	8	19	8	23
Volume Right	10	20	20	8
cSH	937	1394	617	526
Volume to Capacity	0.01	0.01	0.06	0.08
Queue Length 95th (ft)	1	1	5	6
Control Delay (s)	0.4	0.7	11.2	12.4
Lane LOS	A	A	B	B
Approach Delay (s)	0.4	0.7	11.2	12.4
Approach LOS			B	B

Intersection Summary				
Average Delay	2.3			
Intersection Capacity Utilization	29.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	11	59	47	29	37	151	107	58	13	91	56
Future Volume (Veh/h)	25	11	59	47	29	37	151	107	58	13	91	56
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.79	0.92	0.73	0.92	0.71	0.73	0.46	0.83	0.92
Hourly flow rate (vph)	27	12	64	59	32	51	164	151	79	28	110	61
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	782	754	140	785	746	190	171			230		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	782	754	140	785	746	190	171			230		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.2			2.4		
p0 queue free %	89	96	93	76	89	94	88			98		
cM capacity (veh/h)	241	292	907	247	295	841	1406			1249		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	103	142	394	199
Volume Left	27	59	164	28
Volume Right	64	51	79	61
cSH	460	349	1406	1249
Volume to Capacity	0.22	0.41	0.12	0.02
Queue Length 95th (ft)	21	48	10	2
Control Delay (s)	15.1	22.3	3.9	1.3
Lane LOS	C	C	A	A
Approach Delay (s)	15.1	22.3	3.9	1.3
Approach LOS	C	C		

Intersection Summary				
Average Delay	7.8			
Intersection Capacity Utilization	46.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	316	197	0
Future Volume (Veh/h)	0	0	0	316	197	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.58	0.30	0.44	0.83	0.82	0.60
Hourly flow rate (vph)	0	0	0	381	240	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	621	240	240			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	621	240	240			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	100	100	100			
cM capacity (veh/h)	454	804	1304			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	381	240
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1304	1700
Volume to Capacity	0.00	0.00	0.14
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	20.0%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	5.5
Intersection LOS	A

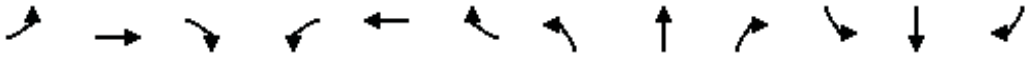
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	103	142	394	199
Demand Flow Rate, veh/h	105	149	415	208
Vehicles Circulating, veh/h	208	358	73	262
Vehicles Exiting, veh/h	262	130	240	245
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.1	5.4	6.0	5.4
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	105	149	415	208
Cap Entry Lane, veh/h	1116	958	1281	1056
Entry HV Adj Factor	0.979	0.955	0.949	0.955
Flow Entry, veh/h	103	142	394	199
Cap Entry, veh/h	1092	915	1216	1009
V/C Ratio	0.094	0.156	0.324	0.197
Control Delay, s/veh	4.1	5.4	6.0	5.4
LOS	A	A	A	A
95th %tile Queue, veh	0	1	1	1

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	5	174	28	5	143	10	40	2	14	21	0	2
Future Volume (Veh/h)	5	174	28	5	143	10	40	2	14	21	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.79	0.62	1.00	0.71	0.56	0.25	0.62	0.50	0.30	0.62	0.25
Hourly flow rate (vph)	20	220	45	5	201	18	160	3	28	70	0	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	219			265			510	512	242	532	525	210
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	219			265			510	512	242	532	525	210
tC, single (s)	5.1			4.1			7.1	6.5	6.5	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	3.1			2.2			3.5	4.0	3.5	3.5	4.0	3.3
p0 queue free %	98			100			65	99	96	84	100	99
cM capacity (veh/h)	934			1311			463	457	743	433	449	835

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	285	224	191	78
Volume Left	20	5	160	70
Volume Right	45	18	28	8
cSH	934	1311	490	456
Volume to Capacity	0.02	0.00	0.39	0.17
Queue Length 95th (ft)	2	0	46	15
Control Delay (s)	0.8	0.2	17.0	14.5
Lane LOS	A	A	C	B
Approach Delay (s)	0.8	0.2	17.0	14.5
Approach LOS			C	B

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	23.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	45	51	67	30	25	34	135	75	19	190	0
Future Volume (Veh/h)	0	45	51	67	30	25	34	135	75	19	190	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.79	0.92	0.73	0.92	0.71	0.73	0.46	0.83	0.92
Hourly flow rate (vph)	0	49	55	85	33	34	37	190	103	41	229	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	677	678	229	706	626	242	229			293		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	677	678	229	706	626	242	229			293		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.2			2.4		
p0 queue free %	100	86	93	69	91	96	97			97		
cM capacity (veh/h)	312	351	810	275	376	788	1339			1183		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	104	152	330	270
Volume Left	0	85	37	41
Volume Right	55	34	103	0
cSH	501	346	1339	1183
Volume to Capacity	0.21	0.44	0.03	0.03
Queue Length 95th (ft)	19	54	2	3
Control Delay (s)	14.0	23.3	1.1	1.5
Lane LOS	B	C	A	A
Approach Delay (s)	14.0	23.3	1.1	1.5
Approach LOS	B	C		

Intersection Summary				
Average Delay	6.8			
Intersection Capacity Utilization	40.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	34	165	113	210	284	24
Future Volume (Veh/h)	34	165	113	210	284	24
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.58	0.30	0.44	0.83	0.82	0.60
Hourly flow rate (vph)	59	550	257	253	346	40
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1133	366	386			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1133	366	386			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	66	20	78			
cM capacity (veh/h)	176	684	1151			

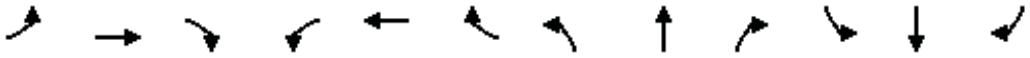
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	609	510	386
Volume Left	59	257	0
Volume Right	550	0	40
cSH	534	1151	1700
Volume to Capacity	1.14	0.22	0.23
Queue Length 95th (ft)	512	21	0
Control Delay (s)	109.9	5.7	0.0
Lane LOS	F	A	
Approach Delay (s)	109.9	5.7	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	46.4		
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	5	199	2	5	179	10	2	2	14	21	0	2
Future Volume (Veh/h)	5	199	2	5	179	10	2	2	14	21	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.79	0.62	1.00	0.71	0.56	0.25	0.62	0.50	0.30	0.62	0.25
Hourly flow rate (vph)	20	252	3	5	252	18	8	3	28	70	0	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	270			255			572	574	254	594	566	261
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	270			255			572	574	254	594	566	261
tC, single (s)	5.1			4.1			7.1	6.5	6.5	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	3.1			2.2			3.5	4.0	3.5	3.5	4.0	3.3
p0 queue free %	98			100			98	99	96	82	100	99
cM capacity (veh/h)	888			1322			421	421	732	393	425	783

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	275	275	39	78
Volume Left	20	5	8	70
Volume Right	3	18	28	8
cSH	888	1322	606	414
Volume to Capacity	0.02	0.00	0.06	0.19
Queue Length 95th (ft)	2	0	5	17
Control Delay (s)	0.9	0.2	11.4	15.7
Lane LOS	A	A	B	C
Approach Delay (s)	0.9	0.2	11.4	15.7
Approach LOS			B	C

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	26.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	45	51	67	30	25	34	133	75	19	189	26
Future Volume (Veh/h)	38	45	51	67	30	25	34	133	75	19	189	26
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.79	0.92	0.73	0.92	0.71	0.73	0.46	0.83	0.92
Hourly flow rate (vph)	41	49	55	85	33	34	37	187	103	41	228	28
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	687	688	242	716	650	238	256			290		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	687	688	242	716	650	238	256			290		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.2			2.4		
p0 queue free %	87	86	93	69	91	96	97			97		
cM capacity (veh/h)	307	346	797	270	364	791	1309			1186		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	145	152	327	297
Volume Left	41	85	37	41
Volume Right	55	34	103	28
cSH	421	339	1309	1186
Volume to Capacity	0.34	0.45	0.03	0.03
Queue Length 95th (ft)	38	56	2	3
Control Delay (s)	18.0	24.0	1.1	1.4
Lane LOS	C	C	A	A
Approach Delay (s)	18.0	24.0	1.1	1.4
Approach LOS	C	C		

Intersection Summary				
Average Delay	7.6			
Intersection Capacity Utilization	40.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	34	165	113	208	283	24
Future Volume (Veh/h)	34	165	113	208	283	24
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.58	0.30	0.44	0.83	0.82	0.60
Hourly flow rate (vph)	59	550	257	251	345	40
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1130	365	385			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1130	365	385			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	67	20	78			
cM capacity (veh/h)	177	685	1152			

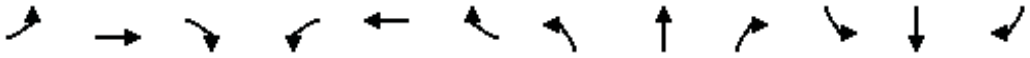
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	609	508	385
Volume Left	59	257	0
Volume Right	550	0	40
cSH	535	1152	1700
Volume to Capacity	1.14	0.22	0.23
Queue Length 95th (ft)	510	21	0
Control Delay (s)	109.0	5.7	0.0
Lane LOS	F	A	
Approach Delay (s)	109.0	5.7	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	46.1		
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	5	199	2	5	182	10	2	2	14	21	0	2
Future Volume (Veh/h)	5	199	2	5	182	10	2	2	14	21	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.79	0.62	1.00	0.71	0.56	0.25	0.62	0.50	0.30	0.62	0.25
Hourly flow rate (vph)	20	252	3	5	256	18	8	3	28	70	0	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	274			255			576	578	254	598	570	265
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	274			255			576	578	254	598	570	265
tC, single (s)	5.1			4.1			7.1	6.5	6.5	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	3.1			2.2			3.5	4.0	3.5	3.5	4.0	3.3
p0 queue free %	98			100			98	99	96	82	100	99
cM capacity (veh/h)	884			1322			418	419	732	391	423	779

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	275	279	39	78
Volume Left	20	5	8	70
Volume Right	3	18	28	8
cSH	884	1322	604	412
Volume to Capacity	0.02	0.00	0.06	0.19
Queue Length 95th (ft)	2	0	5	17
Control Delay (s)	0.9	0.2	11.4	15.8
Lane LOS	A	A	B	C
Approach Delay (s)	0.9	0.2	11.4	15.8
Approach LOS			B	C

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	26.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	45	217	67	30	25	151	101	75	19	165	50
Future Volume (Veh/h)	73	45	217	67	30	25	151	101	75	19	165	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.79	0.92	0.73	0.92	0.71	0.73	0.46	0.83	0.92
Hourly flow rate (vph)	79	49	236	85	33	34	164	142	103	41	199	54
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	880	881	226	1090	856	194	253			245		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	880	881	226	1090	856	194	253			245		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.2			2.4		
p0 queue free %	61	80	71	16	87	96	88			97		
cM capacity (veh/h)	204	241	813	101	250	838	1312			1233		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	364	152	409	294
Volume Left	79	85	164	41
Volume Right	236	34	103	54
cSH	414	150	1312	1233
Volume to Capacity	0.88	1.02	0.12	0.03
Queue Length 95th (ft)	225	192	11	3
Control Delay (s)	51.4	137.5	4.0	1.4
Lane LOS	F	F	A	A
Approach Delay (s)	51.4	137.5	4.0	1.4
Approach LOS	F	F		

Intersection Summary				
Average Delay	34.2			
Intersection Capacity Utilization	61.3%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	327	449	0
Future Volume (Veh/h)	0	0	0	327	449	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.58	0.30	0.44	0.83	0.82	0.60
Hourly flow rate (vph)	0	0	0	394	548	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	942	548	548			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	942	548	548			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	100	100	100			
cM capacity (veh/h)	294	540	1002			

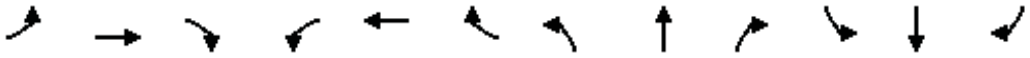
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	394	548
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1002	1700
Volume to Capacity	0.00	0.00	0.32
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	27.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	5	199	2	5	182	10	2	2	14	21	0	2
Future Volume (Veh/h)	5	199	2	5	182	10	2	2	14	21	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.79	0.62	1.00	0.71	0.56	0.25	0.62	0.50	0.30	0.62	0.25
Hourly flow rate (vph)	20	252	3	5	256	18	8	3	28	70	0	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	274			255			576	578	254	598	570	265
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	274			255			576	578	254	598	570	265
tC, single (s)	5.1			4.1			7.1	6.5	6.5	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	3.1			2.2			3.5	4.0	3.5	3.5	4.0	3.3
p0 queue free %	98			100			98	99	96	82	100	99
cM capacity (veh/h)	884			1322			418	419	732	391	423	779

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	275	279	39	78
Volume Left	20	5	8	70
Volume Right	3	18	28	8
cSH	884	1322	604	412
Volume to Capacity	0.02	0.00	0.06	0.19
Queue Length 95th (ft)	2	0	5	17
Control Delay (s)	0.9	0.2	11.4	15.8
Lane LOS	A	A	B	C
Approach Delay (s)	0.9	0.2	11.4	15.8
Approach LOS			B	C

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	26.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	45	217	67	30	25	151	101	75	19	165	50
Future Volume (Veh/h)	73	45	217	67	30	25	151	101	75	19	165	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.79	0.92	0.73	0.92	0.71	0.73	0.46	0.83	0.92
Hourly flow rate (vph)	79	49	236	85	33	34	164	142	103	41	199	54
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	828	881	226	1090	856	194	253			245		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	828	881	226	1090	856	194	253			245		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.2			2.4		
p0 queue free %	64	80	71	16	87	96	88			97		
cM capacity (veh/h)	221	241	813	101	250	838	1312			1233		

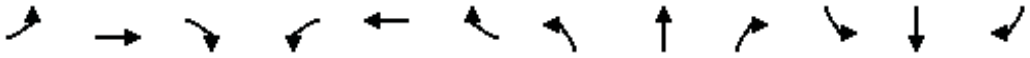
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	79	285	85	67	164	245	294
Volume Left	79	0	85	0	164	0	41
Volume Right	0	236	0	34	0	103	54
cSH	221	578	101	388	1312	1700	1233
Volume to Capacity	0.36	0.49	0.84	0.17	0.12	0.14	0.03
Queue Length 95th (ft)	38	68	119	15	11	0	3
Control Delay (s)	30.1	17.1	127.0	16.2	8.1	0.0	1.4
Lane LOS	D	C	F	C	A		A
Approach Delay (s)	19.9		78.1		3.3		1.4
Approach LOS	C		F				

Intersection Summary				
Average Delay	17.1			
Intersection Capacity Utilization	55.5%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	327	449	0
Future Volume (Veh/h)	0	0	0	327	449	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.58	0.30	0.44	0.83	0.82	0.60
Hourly flow rate (vph)	0	0	0	394	548	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	942	548	548			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	942	548	548			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	100	100	100			
cM capacity (veh/h)	294	540	1002			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	394	548
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1002	1700
Volume to Capacity	0.00	0.00	0.32
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	27.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	45	217	67	30	25	151	101	75	19	165	50
Future Volume (veh/h)	73	45	217	67	30	25	151	101	75	19	165	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1826	1870	1870	1870	1781	1781	1856	1856	1856
Adj Flow Rate, veh/h	79	49	236	85	33	34	164	142	103	41	199	54
Peak Hour Factor	0.92	0.92	0.92	0.79	0.92	0.73	0.92	0.71	0.73	0.46	0.83	0.92
Percent Heavy Veh, %	2	2	2	5	2	2	2	8	8	3	3	3
Cap, veh/h	697	88	422	495	265	273	744	280	203	219	355	89
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	1334	280	1348	1068	844	870	1127	960	696	133	1219	304
Grp Volume(v), veh/h	79	0	285	85	0	67	164	0	245	294	0	0
Grp Sat Flow(s),veh/h/ln	1334	0	1628	1068	0	1714	1127	0	1656	1656	0	0
Q Serve(g_s), s	1.0	0.0	3.3	1.6	0.0	0.6	0.0	0.0	2.8	0.7	0.0	0.0
Cycle Q Clear(g_c), s	1.7	0.0	3.3	5.0	0.0	0.6	1.6	0.0	2.8	3.5	0.0	0.0
Prop In Lane	1.00		0.83	1.00		0.51	1.00		0.42	0.14		0.18
Lane Grp Cap(c), veh/h	697	0	510	495	0	537	744	0	483	663	0	0
V/C Ratio(X)	0.11	0.00	0.56	0.17	0.00	0.12	0.22	0.00	0.51	0.44	0.00	0.00
Avail Cap(c_a), veh/h	1334	0	1287	1005	0	1355	1307	0	1309	1487	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.2	0.0	6.5	8.6	0.0	5.6	6.3	0.0	6.7	6.9	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	1.0	0.2	0.0	0.1	0.1	0.0	0.8	0.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.6	0.2	0.0	0.1	0.1	0.0	0.2	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.3	0.0	7.5	8.7	0.0	5.7	6.4	0.0	7.5	7.3	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		364			152			409			294	
Approach Delay, s/veh		7.2			7.4			7.1			7.3	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		11.1		11.6		11.1		11.6				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		18.0		18.0		18.0		18.0				
Max Q Clear Time (g_c+I1), s		4.8		5.3		5.5		7.0				
Green Ext Time (p_c), s		1.5		1.7		1.2		0.5				

Intersection Summary												
HCM 6th Ctrl Delay			7.2									
HCM 6th LOS			A									

Intersection	
Intersection Delay, s/veh	7.1
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	364	152	409	294
Demand Flow Rate, veh/h	372	159	431	308
Vehicles Circulating, veh/h	342	401	179	290
Vehicles Exiting, veh/h	256	209	535	270
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.0	5.8	7.1	6.7
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	372	159	431	308
Cap Entry Lane, veh/h	974	917	1150	1027
Entry HV Adj Factor	0.979	0.958	0.948	0.955
Flow Entry, veh/h	364	152	409	294
Cap Entry, veh/h	953	878	1090	980
V/C Ratio	0.382	0.173	0.375	0.300
Control Delay, s/veh	8.0	5.8	7.1	6.7
LOS	A	A	A	A
95th %tile Queue, veh	2	1	2	1