Glen St./Sanford St./Grant Ave. Intersection Study

Memo To: Mr. Aaron Frankenfeld, Director
Adirondack/Glens Falls Transportation Council (A/GFTC)
11 South Street, Suite 203
Glens Falls, NY 12801

Date: September 13, 2022

From: Barton & Loguidice, D.P.C.

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I. Introduction

A/GFTC and the City of Glens Falls initiated the Glen St./Sanford St./Grant Ave. Intersection Study to evaluate the overall intersection operation and pedestrian crossings at this location. The catalyst for the project was the school crossing guard at this location who expressed concern with the traffic flow and ability to safely cross the students between Grant Ave. and Sanford St. In addition to investigating this specific concern, the project also includes observations of traffic and pedestrian movement through the intersection, inventory of all existing transportation infrastructure, meetings with the City's Police Department, School Crossing Guard, and the City's Department of Public Works, and prioritized recommendations to address any improvement needs that are identified. The study is being administered through the A/GFTC Transportation Planning and Engineering Assistance Program.

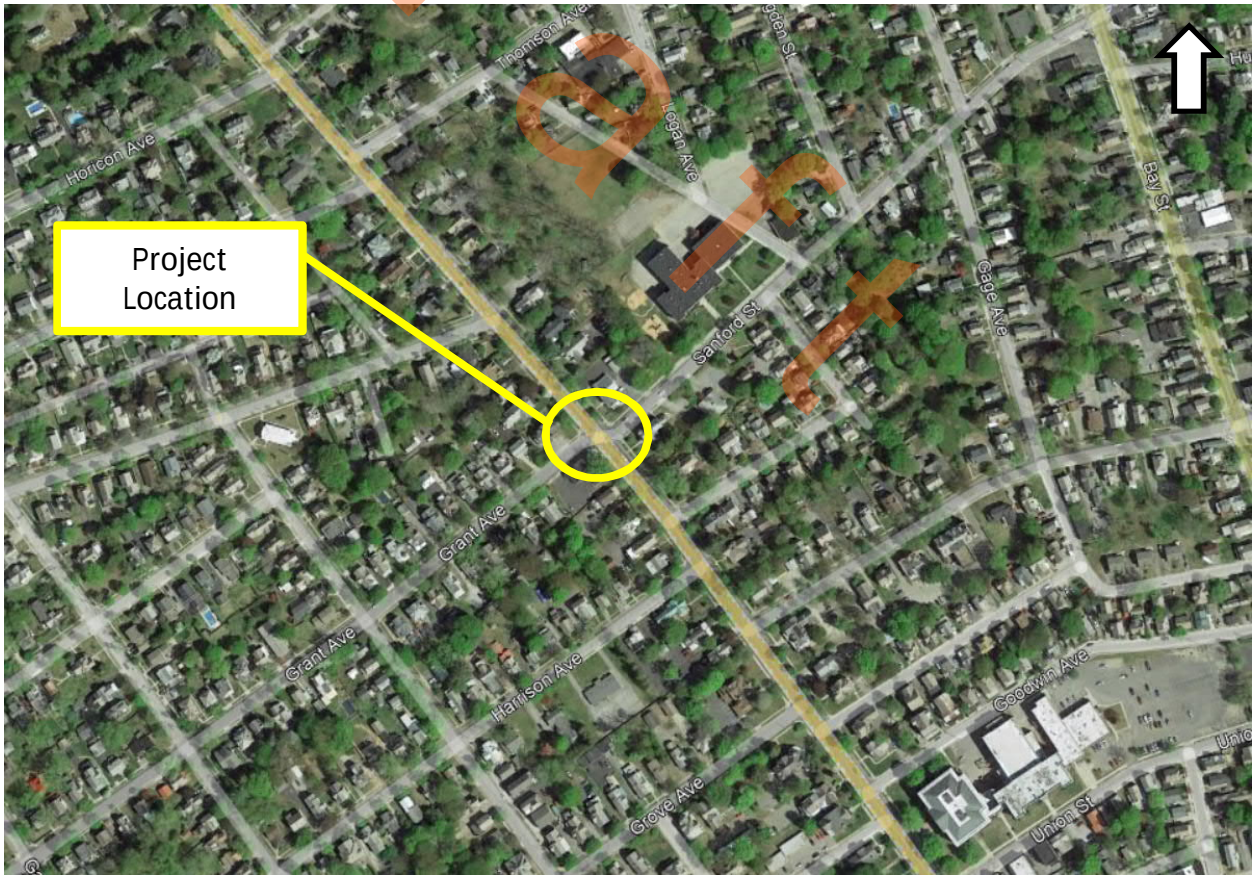

Figure 1 – Project Location Map

II. Existing Conditions

A site visit was conducted to observe and inventory existing field conditions on June 8, 2022. Video cameras were deployed for one 48-hour, weekday period at the intersection to identify pedestrian and traffic patterns, safety concerns, vehicular conflicts, and/or any confusion that was observed when pedestrians (including students) were accessing the intersection.

This is a four way signalized intersection located north of the City of Glens Falls downtown center. The surrounding area is primarily residential with multiple local businesses and schools nearby. There is a Greater Glens Falls Transit (GGFT) bus stop to the north of the intersection for busses traveling northbound for Route 11/12 that pass through the intersection approximately every half hour. Although there is not a formal bus stop, the Route 11/12 southbound route does make a planned stop on the west side of Glen St. approximately every half hour throughout the day. The intersection is located a 1/2 mile to the Glens Falls City School district campus and is a heavily travelled location for students walking and biking to and from school. A crossing guard is present in the morning (7:45 to 8:30 AM) and the afternoon (2:45 to 3:30 PM) to assist the students with crossing Glen St.

The intersection is signalized for vehicles but does not include pedestrian signal equipment. The Grant Ave. and Sanford St. approaches are offset from one another by approximately 25 ft. Sidewalks are located on all intersection roadway approaches with sidewalk ramps and crosswalks on the north, east and west sides of the intersection. The intersection signal operates in a basic fixed time mode with the minor approaches (Grant Ave. and Sanford St.) operating in the same phase. Glen St. southbound is provided with a leading green light interval, including a green left arrow for 15 seconds to allow turning movements onto Sanford St. After the leading interval, both the southbound and northbound movements have the green ball indication for the remainder of the signal phase.

Figure 2 – Glen St./Sanford St./Grant Ave. Intersection
Source: Google Earth Pro (aerial image)

Glen St. (Rt. 9) - is a mainline route in the north/south direction with one through lane in each direction. The centerline is striped with no edge line striping except on the north of the northbound section of road to delineate the bus stop and parking lane. Parking lanes are present on both sides of the road with signage preventing parking within 50' of the intersection. Drivers were often observed using this space to pass by queued left turning vehicles. A pedestrian crosswalk is marked on the north side of the intersection, the south side is not marked for crossing.

Sanford St. - the eastern leg to the intersection, features one travel lane in each direction and a parking lane on the north side of the street. There is pavement centerline striping present for 50 ft. on the approach and a ladder bar crosswalk is marked at the intersection. East of the intersection is the WSWHE BOCES Sanford Street Teaching and Learning Center; therefore Sanford St. is in a signed school zone and posted for a 15 MPH speed limit.

Grant Ave. - The eastbound approach has one travel lane in each direction with parking allowed on both sides of the street. Parking is restricted for 30 ft. at the approach to the intersection. The centerline is striped for 50 ft. on the approach to the intersection and a ladder bar crosswalk is marked at the intersection.

III. Site Assessment and Observations

1. The Grant Ave./Sanford St. approaches are offset from one another by 25 ft. at their centerlines. This offset alignment creates confusion and hesitation for drivers making left turn movements from both approaches. There were several instances where the left turning vehicle accelerated out to make the left turn in front of the opposing through movement vehicle. This scenario was witnessed consistently through the observation period.

Figure 3.1 – Grant Ave. and Sanford St. intersection offset

2. The Grant Ave. and Sanford St. offset alignment also creates a regularly occurring issue with Glen St. northbound and southbound left turn vehicles. The sketch below over the google aerial imagery depicts the scenario of the opposing left turn movements. Creating more confusion to the left turn vehicles, the through moving cars will go around the stopped turning vehicle as shown in the picture.

Figure 3.2 – Glen St. left turn movements

3. Although there were many pedestrians who did wait to cross the road at the correct time (parallel with green light traffic), there were also instances where pedestrians crossed whenever there was a gap in traffic, and some who misjudged their timing against the traffic signal resulting with vehicles that had to slow down or come to a stop. This could be a safety concern if there were an inattentive driver or pedestrian. Below is one example of a family crossing Grant Ave. although Grant Ave. and Sanford St. vehicles have the green light.

Figure 3.3 – Pedestrian crossing without the right of way

4. Some turning vehicles did have to wait for pedestrians to cross the intersection which is typical at all intersections without dedicated pedestrian signal phases. This is another example of something that could be a dangerous situation if there was a distracted driver.

Figure 3.4 – Turning vehicles with pedestrians crossing

5. Numerous right turn on red movements were observed throughout the data collection period, although there were no vehicle/pedestrian conflicts or near misses witnessed.

Figure 3.5 – Right turn on red movements

6. There were several occasions where pedestrians were crossing diagonally through the intersection or on the south side of Glen St. where there is no marked crosswalk. This movement is attributed to the School campus being located on the South side of Grant Ave.

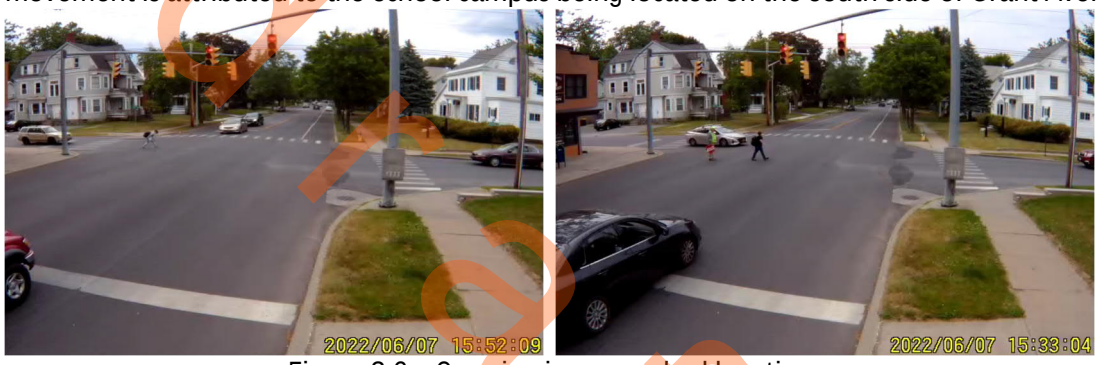

Figure 3.6 – Crossing in un-marked locations

7. The sight distance looking right on the Grant Ave. approach is limited due to the building on the south corner of the intersection being close to the road. A vehicle at the stop bar can see to the right, but sight lines from cars behind the lead car are obstructed by the building.

8. Pavement striping – Existing striping is faded and not visible in some locations.

9. Curb ramps – The existing curb ramps do not meet current ADA requirements. The ramps do not include detectable warning units, there are drainage structures located at the base of the ramp, and the positioning of the ramps do not line up with the crosswalk direction, as shown in Figure 3.3.

Figure 3.7 – Intersection striping and sidewalk ramp condition

10. There was a high volume of bicycle traffic through the intersection during the observation period, which was expected due to the nice weather in June and the school aged children going to and from school. Bicyclists were often observed utilizing the sidewalk, sidewalk ramps, and crosswalks to travel through the intersection. Although bicycles on sidewalks are not encouraged, the majority of these bicyclists were students and may not be comfortable riding in the road with vehicles yet.

Figure 3.8 – Bicyclists using the sidewalk

11. Several bicycles did not stop for the red light and cut in front of oncoming vehicles. It is noted that these instances happened outside of the school crossing hours.

12. The existing signal system appears to be operating effectively for the majority of the day, where all vehicles at the intersection are served by the signal during one full cycle length. There were a couple of time periods in the afternoon where longer queues of vehicles were witnessed on Glen St. that backed up several hundred feet as shown in the figure below. After clearing out the queue, the traffic flow and signal returned to normal operation.

Figure 3.9 – Glen St. southbound long queue

13. On July 27th the traffic signal cabinet, controller, and operation was inspected with the Glens Falls Department of Public Works. The controller is a Safetran 170E and in the future the controller may need to be replaced if issues cannot be repaired because the model and replacement parts have been discontinued. The controller unit is set up to run on a basic pre-timed schedule and is currently performing adequately. The controller is also adaptable to adding vehicular (wireless sensors or loops) and pedestrian (pushbuttons) to run on actuated control (alter the cycle to respond to the demand).

14. During the observation period, GGFT buses were observed travelling north and southbound on Glen St. approximately every half hour which coincides with the Route 11/12 schedule that is posted on the GGFT website. It was observed that the northbound bus stop was only used by the GGFT buses one time during the two-day review period. The infrequent stops could be attributed low ridership during this particular time of year. When the bus stop was utilized, there were no operational issues with pedestrians or vehicles. It was observed that throughout the day vehicles would park in the northbound parking lane and block the bus stop location, as shown in Figure 3.10.

Figure 3.10 – Vehicles Parked in the Bus Stop

IV. Conclusions and Recommendations

During the project meetings, the idea of an all- red phase or an exclusive pedestrian phase introduced to the signal were discussed. These options are not included in the recommendations at this time.

The exclusive pedestrian phase is when a portion of the traffic signal cycle is dedicated to pedestrian movements in all directions and all red signals are displayed to the vehicles. Due to the status of the current traffic signal controller and lack of pedestrian signal equipment, the exclusive pedestrian phase cannot be installed as a low-cost improvement. The exclusive pedestrian phase could be introduced if the signalization improvements are pursued.

Recommended improvements to the intersection to address the safety and operational issues that were observed are provided below. The recommendations are presented as two alternate approaches to address items that were found during the site assessments and observations.

Alternative Approach #1 – New Traffic Signal System

Alternative Approach #1 includes a feasibility study to analyze traffic data and review other potential geometric improvements as well as a full replacement of the signal system. The full replacement of the traffic signal will provide current materials and technology to provide improved detection, actuation, and other enhancements.

1. An additional Intersection Feasibility Study could be conducted to evaluate vehicular traffic and pedestrian operation at this intersection and develop an optimized signal timing plan for implementation with a new fully actuated traffic signal. The study could also analyze the potential benefits of intersection re-alignment, constructing turning lane lanes, and improved pedestrian measures.

   Cost to Implement = $ 10,000 - $ 15,000

2. Design and Install a new Traffic Signal System at the intersection that will meet all of the current standards and technology requirements. A new traffic signal would include all of the improvements described in the Alternative Approach #1 below, as well as a new signal controller, new poles and foundation, greater ability to add turn signals and change phases as needed, and will allow for overhead signs to be placed.

   A new traffic signal controller will also allow for a Leading Pedestrian Interval (LPI) to be programmed. A LPI is typically a 3-7 second head start for pedestrians when entering an intersection with a corresponding green signal in the same direction of travel. LPI's are recommended at intersections where high vehicular turning volumes come into conflict with higher volumes of crossing pedestrians during their shared phase of the signal cycle. Coupled with the Yield to Pedestrian sign, these two items would increase driver awareness of pedestrians at this intersection.

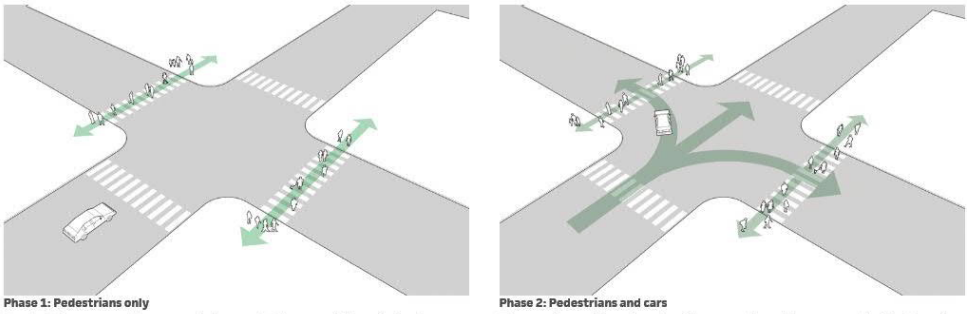

Figure 4.1 – LPI Phasing Diagram
Source: National Association of Transportation Officials

Cost to Implement = $ 180,000 - $ 250,000

Alternative Approach #1 Total Cost = $190,000 - $ 265,000**

*** Due to the current state of the economy, material availability, and volatility with construction costs, especially with traffic signal equipment, these costs could change if these options are pursued in the future.*

<u>Alternative Approach #2 – Individual Low and Mid-Range Cost Improvements:</u>
Alternative Approach #2 includes a listing of low and mid-range cost improvements that could be completed by the City or through contracted services. All of the improvements recommended could be completed at the same time or they could be installed individually as a series of improvements over time.

1. Install No Turn on Red (MUTCD R10-11 series) signs on all approaches. Although the observations performed during this study did not witness any conflicts with right turn on red vehicles, conflicts with these movements were brought up as a concern from the local crossing guard and the City's Police Department. To aid in restricting and discouraging these movements, a No Turn on Red Sign should be installed roadside near the stop bar. An additional time-of-day plaque may also be placed below the sign to indicate that the restriction is only in place during certain time periods.

Figure 4.2
Source: MUTCD

Cost to Implement = $ 200 Each (sign and post) x 6 Locations = $1,200

2. Install Turning Vehicles Yield to Pedestrians (MUTCD # R10-15) signs on all intersection approaches (with the exception of Grant Ave. if the Glen St. southern crosswalk is not installed), see Figure 4.3 below. Overhead installation on the signal mast arm will be most effective. Due to the unknown foundation conditions and age of the signal equipment, an analysis of the structural (overturning "moment") capacity of the footings could not be completed. It is suggested that these signs are installed on the signal poles or roadside rather than installed overhead. If the traffic signal is replaced in the future, these signs can be relocated overhead.

Figure 4.3
Source: MUTCD

Cost to Implement = $250 Each (sign and mounting bracket or post) x 4 Signs = $ 1,000.

3. Install the Pedestrian Cross Only on Green sign (MUTCD # R10-1). This sign will reinforce to the pedestrians that they need to wait for the green traffic signal corresponding with their direction of travel before using the crosswalk. These signs should be mounted near the sidewalk ramps and clearly visible to the pedestrians.

Figure 4.4
Source: MUTCD

Cost to Implement = $ 200 Each (sign and post) x 6 Locations = $1,200

4. Re-Striping the pavement would aid in guiding vehicles through the intersection and bring a greater awareness and attention to the crosswalks.

    a. High Visibility Crosswalks should be installed at this intersection to provide improved driver awareness of the pedestrian crossing locations. The crosswalks include the addition of two transverse lines to the perpendicular ladder bars that are on site currently as shown in the figure below. The pavement markings should be Epoxy paint with glass bead for retro-reflectivity or retro-reflective thermoplastic pavement marking tape.

The fourth crosswalk leg, on the southern side of Glen St. should be considered to be striped if this option is pursued to provide improved awareness of this crossing location that was observed to be used despite the lack of crosswalk striping.

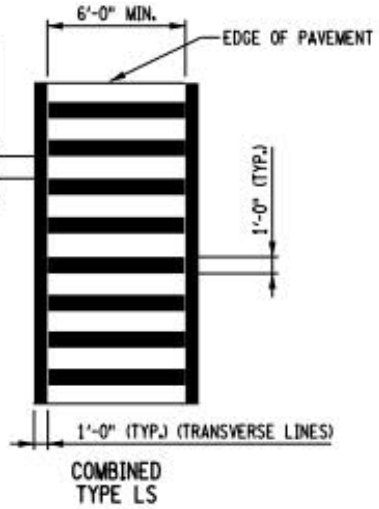

Figure 4.5 – High Visibility Crosswalk Striping
Source: NYSDOT

Cost to Implement = $ 5,000

b. It is suggested that all other intersection pavement markings are also replaced with Epoxy based retro-reflective paint.

   Cost to Implement = $ 2,000

5. Re-time and Phase the Traffic Signal: The traffic signal could be re-timed to place the minor approaches of Sanford St. & Grant Ave. on separate phases (this would operate similar to the Glen St. & Sherman Ave. intersection located 1,800 ft. south of this location). Although this split phase operation would increase vehicular delay at the intersection, it would also eliminate the confusion of the opposing offset left turning movements. As an additional benefit, this will allow the crossing guard two separate green phases for the side streets to better assist the students crossing the intersection. Also during the re-timing exercise, the all-red clearance time could be adjusted to allow an additional second or two of all red time before the next green light displays. To offset the additional time added to the cycle length with these changes, the City could also eliminate the 15 second, Glen St. southbound leading green interval and green arrow. It was observed that there did not appear to be a high volume of left turn vehicles for this movement.

   Cost to Implement = N/A

6. Routine training and education for the local driving public, school students, and crossing guards. All users of the roadway system need to know and follow the "rules of the road" to create a safe travel environment for all. Educational materials and training that is made available will provide all users with the same current day knowledge of the "rules of the road" and create a consistently operated and enforced transportation system. In general, crossing guards should enhance the understood "rules of the road" to assist students through a crossing location. At a signalized intersection, students with the assistance of the crossing guard, should be crossing on the traffic signal green light in their direction of travel or the pedestrian signal walk indication, when the pedestrian signal is in operation.

   The New York State Department of Transportation and Department of Health in 2019 launched the Pedestrian Safety Action Plan as an approach to making streets safer for pedestrians through Engineering, Enforcement, and Education. These departments developed educational posters, presentations, tip cards, warning notices, fact sheets, and several other tools that can be utilized to assist communities with educating their residents. These materials can be found here: https://www.ny.gov/programs/pedestrian-safety

   In addition, the Safe Routes to School program has developed guidelines for adult school crossing guards that establishes procedures for numerous crossing situations and provides a tool to create consistency in operation among the many crossing guards. The guidelines are available for review at: http://guide.saferoutesinfo.org/crossing_guard/index.cfm

   Cost to Implement = N/A

7. Vehicular Detection and Pedestrian Signals could be installed and are compatible with the existing traffic signal equipment. Wireless detection sensor units ("pucks") are the most reliable and easily installed detection equipment that would be feasible at this location. The introduction of detection will allow the signal controller to be re-timed to operate under actuated control (adapt to the demand of the traffic). The actuated signal also allows the introduction of pedestrian signals and pushbuttons, with the pushbuttons acting as the sensor for pedestrian demand. Using actuated control will optimize the intersection operation allowing the pedestrian phases to be skipped if there are no pedestrians. The pedestrian signals will also bring an additional awareness to drivers that pedestrians are present here at this intersection. The pedestrian signals and pushbuttons would also be utilized by the crossing guard rather than following the parallel green light movement only.

   Cost to Implement = $ 60,000

8. Reconstructing the curb ramps to meet current ADA requirements, provide new detectable warning units, relocate drainage structures, and provide a continuous smooth transition between the sidewalk and road surface.

   Cost to Implement = $ 50,000

9. The No Stopping Here to Corner sign (NYP1-11) can be added to prohibit vehicles from blocking the northbound GGFT bus stop. The NYS Supplement to the MUTCD allows No Parking, No Standing, and No Stopping signs to be installed. The No Stopping sign is being recommended as it is the most restrictive sign in accordance with the NYS Vehicle and Traffic Law. No Parking signs allow vehicles to stop while loading or unloading merchandise or passengers. No Standing signs allow vehicles to stop when loading or unloading passengers only. No Stopping signs do not allow vehicles to stop except to avoid conflict.

Figure 4.6
Source: MUTCD

Cost to Implement = $200 (sign and post) at 1 location

Total To Implement All of the Alternative Approach #2 = $120,600**

*** Due to the current state of the economy, material availability, and volatility with construction costs, especially with traffic signal equipment, these costs could change if these options are pursued in the future.*

V. Sources and References:

1. Safe Routes to School: saferoutesinfo.org
2. National Manual on Uniform Traffic Control Devices (MUTCD) (2009)
3. New York State Supplement to the MUTCD
4. New York State Department of Transportation – Pedestrian Safety Action Plan
5. National Association of Transportation Officials