

GENESEE TRANSPORTATION COUNCIL

RESOLUTION

Resolution 12-141 Accepting the *North Clinton/South Clinton Avenue, St. Paul Street/South Avenue Two-Way Conversion Study* as evidence of completion of UPWP Task 7211

WHEREAS,

1. The *FY 2012-2013 Unified Planning Work Program* includes Task 7211, St. Paul and North Clinton Two-Way Conversion Study, for the purpose of determining the feasibility of converting St. Paul Street and North Clinton Avenue between East Main Street and the Inner Loop to two-way traffic;
2. Said Task included an inventory and analysis of existing roadway geometry and lane configurations, traffic volumes and operations, pedestrian and bicycle volumes, transit operations and shelter locations, parking locations, and crash history; future traffic volume forecasts; conceptual recommendations for two-way conversion; and implementation actions with associated cost estimates;
3. Said Task has been completed and has resulted in the *North Clinton/South Clinton Avenue, St. Paul Street/South Avenue Two-Way Conversion Study*, which demonstrates that two-way conversion is a feasible option for St. Paul Street and North Clinton Avenue between East Main Street and the Inner Loop; and
4. Said Report has been reviewed by GTC staff and member agencies through the GTC committee process and has been found to be consistent with the goals, objectives, and recommendations of the Long Range Transportation Plan.

NOW, THEREFORE, BE IT RESOLVED

1. That the Genesee Transportation Council hereby accepts the *North Clinton/South Clinton Avenue, St. Paul Street/South Avenue Two-Way Conversion Study* as evidence of completion of UPWP Task 7211; and
2. That this resolution takes effect immediately.

CERTIFICATION

The undersigned duly qualified Secretary of the Genesee Transportation Council certifies that the foregoing is a true and correct copy of a resolution adopted at a legally convened meeting of the Genesee Transportation Council held on December 13, 2012.

Date _____

ROBERT A. TRAVER, Secretary
Genesee Transportation Council

1.0 INTRODUCTION

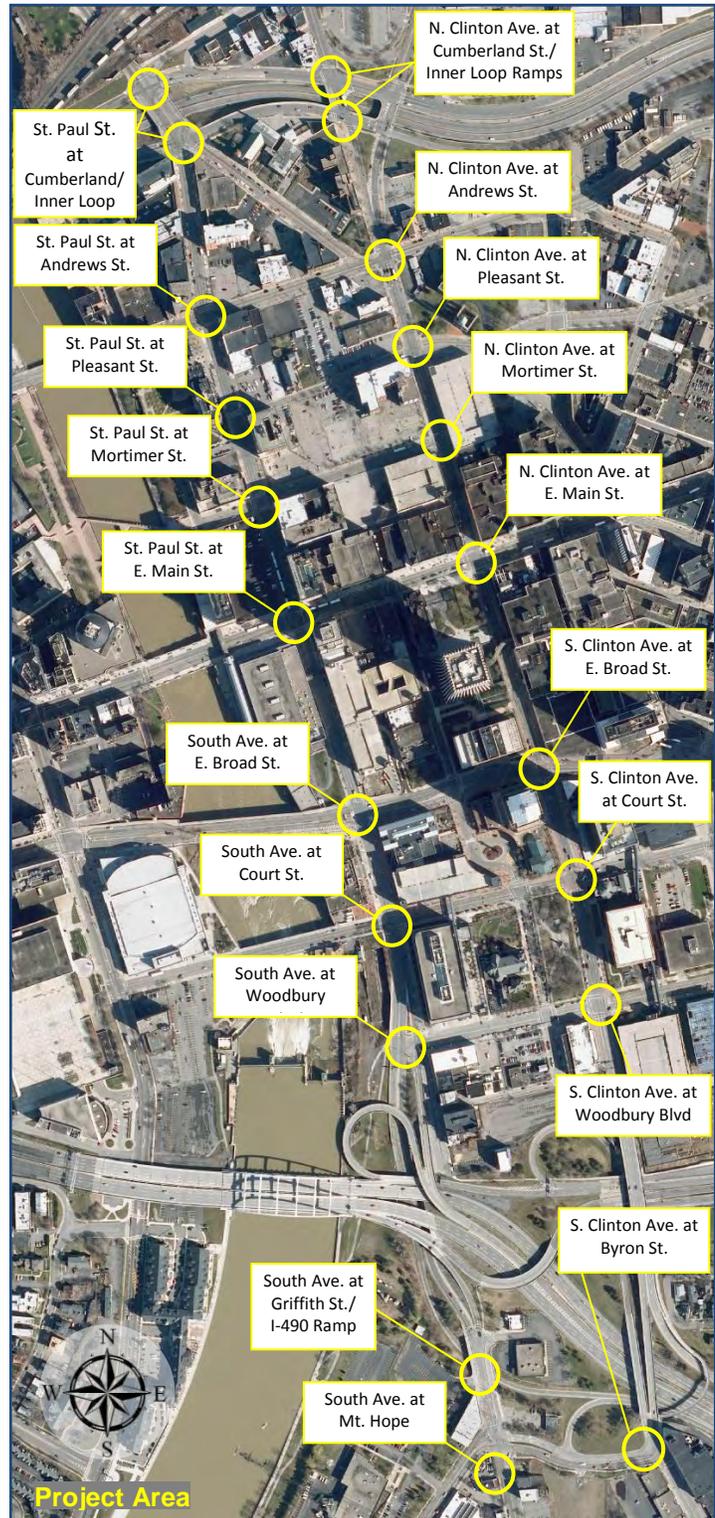
Laberge Group was retained by the City of Rochester to investigate the feasibility of converting the North/South Clinton Avenue and the St. Paul Street/South Avenue corridors from one-way to two-way traffic operations. This “Two-Way Conversion Study” will:

- Document existing conditions with regard to traffic operations, pedestrian and bicycle traffic, transit, safety and parking.
- Review future anticipated developments within the City and forecast one-way and two-way future peak hour traffic volumes that could result from those developments.
- Summarize the operational analysis and anticipated levels of service resulting from two-way conversion, providing information of pedestrian, bicycle and transit, as well as vehicular operations, and assessing the effect on parking and safety.
- List recommendations and requirements necessary, as well as potential impediments, to the conversion.

The complete Two-Way Conversion Study is comprised of three separate, but integrated reports, which have all been incorporated into a Final Report, which is summarized by this Executive Summary. The previously submitted reports include the Existing Conditions Analysis Report, accepted by the City in July 2011; the Traffic Forecasting Report, accepted by the City in January 2012; and the Feasibility Assessment Report, accepted by the City in August 2012.

2.0 PROJECT BACKGROUND

St. Paul Street, North Clinton Avenue and other downtown streets were converted to one-way traffic in the 1960s in order to reduce traffic congestion in the downtown area and to accommodate expressway ramp connections. With heavy industrialization in the northern neighborhoods and a number of large office developments in the southern downtown area, the need to efficiently process vehicles in and out of the City during commuter peaks was the City’s primary objective and the one-way roadways achieved that goal.



Today, in addition to the over 5 million square feet of office space that hosts over 18,000 workers, the eastern downtown area has nearly 5,000 residents, several college campuses, a significant commercial presence and soon a major transit center. This mix of land uses has shifted the City's goals from the "get them in and out" attitude of the past to a "complete streets" approach that focuses on multi-modal transportation (pedestrian, bicycle and transit in addition to vehicular traffic). In addition the City would like to see better wayfinding for visitors and better access for local businesses. Two-way traffic flow would help achieve all these goals.

For the Two-way Conversion Study, the analysis focus will be limited to 21 intersections along Clinton Avenue and St. Paul Street/South Avenue between Byron Street and Cumberland Street in downtown Rochester. Originally, only 20 intersections were included in this study, but after the initial analysis it was determined that the South Clinton Avenue at Byron Street intersection would be affected much more than originally anticipated, so that intersection was added during the feasibility assessment phase. A map of the study area is shown on the previous page.

3.0 EXISTING CONDITIONS ANALYSIS

The existing conditions were reviewed and analyzed for the North/South Clinton Avenue and the St. Paul Street/South Avenue corridors. This analysis includes the following:

- Summary of existing roadway geometry and lane arrangements
- Existing peak hour traffic volume information
- Existing pedestrian and bicycle traffic volume information
- Summary of transit operations and shelter locations
- Summary of parking locations
- Analysis of accident history
- Analysis of existing traffic operations

Items of note concerning the analyses contained in this section of the report include:

- Existing Traffic Volumes were estimated from traffic counts conducted over the past 5 years from previous studies supplements by select traffic counts recently conducted for this study.
- Traffic growth has been minimal over the last decade and in some cases traffic volumes have dropped. GTC anticipates traffic growth within the study area will be only 5% over the next 25 years (0.2% annually), exclusive of any major development within the study area.
- A significant pedestrian presence can be found at most of the intersections within the study area. Pedestrian traffic is particularly high where transit transfers occur along East Main Street. Bicycle activity is low with about 5 bike crossings per hour on the most traveled intersection approaches.
- Transit activity within the study area is extensive with many routes traveling along both the North/South Clinton Avenue and the St. Paul Street/South Avenue corridors, and several of the side street, most notably East Main Street, where the RTS Central Information Shelter can be found.
- Over 4,700 parking spaces exist within the study area with approximately 225 being on-street parking. Parking overall is generally 60% occupied during a typical weekday.
- The average accident rate within the study area is 0.65 accidents per million entering vehicles at the intersections. Two intersections stand out as high accident locations, both along East Main Street. The accident types found at these locations indicate that high pedestrian volume and transit activity at these locations may be a contributing factor.
- Both the North/South Clinton Avenue and St. Paul Street/South Avenue corridors operate at an arterial LOS D or better in the peak hours, and all intersections within the study area operate at LOS D or better as well. No significant operational deficiencies exist within either corridor.

4.0 FUTURE CONDITION TRAFFIC FORECASTING

To develop traffic forecasts for the two-way conversion scenario, the future traffic for the current geometry and traffic control (no-build condition) was first estimated. To do this, a three step process was utilized. First, 2011 peak hour traffic volumes were redistributed to account for known geometric changes that will occur in the near future. Next, a background growth rate was applied to approximate future traffic volume growth resulting from regional development. For this study, the background growth applied represents a 20 year design horizon. Finally, trip generation from known major developments within the study area were added to the existing traffic volumes. The know developments included in this study were the Midtown Redevelopment and the addition of the RTS Transit Center. The existing traffic volumes combined with these adjustments create the estimated future no-build traffic, which approximated future traffic volumes if two-way conversion did not occur.

Future Build Traffic Volumes resulting from a conversion to two-way traffic along both North/South Clinton Avenue and St. Paul Street/South Avenue were developed by attempting to balance northbound and southbound traffic entering the study area between the two corridors and by ensuring side street volumes in and out of the study area were consistent with no-build conditions.

Though northbound and southbound traffic are reasonably balanced between the two corridors at the local roadway entry and exit points, the location of Interstate ramps and the inability of both corridors to provide equally easy access, cause a significant skew in traffic between the two corridors at times. Most notably, the I-490 off-ramp skews northbound traffic to be much heavier on Clinton Avenue in the AM peak hour and the I-490 on-ramps skew southbound traffic to be higher along St. Paul/South Avenue in the PM peak hour. In addition, the positioning of Joseph Avenue and the heavy flow of traffic to that roadway skews northbound traffic at Andrews Street to be heavier at Clinton Avenue in both peaks.

A second future build alternative was also developed. This alternative, referred to as “Alternate 1”, projects future traffic volumes with all the conditions described above, but with the addition of geometric changes and traffic generation resulting from the Broad Street Aqueduct Project. The basis of the diversions and redistribution used for Alternate 1 is the *Broad Street Aqueduct Traffic Impact Study* developed by T.Y. Lin International in 2009.

The process to develop the Two-Way Conversion Traffic Volumes for Alternate 1 includes redistributing future no-build traffic to account for the closure of the Broad Street bridge, then assign new trips generated by the Broad Street Aqueduct Project to develop the Alternate 1 Future No-Build Traffic Volumes. These volumes were then used as a base for the future two-way conversion traffic redistribution for Alternate 1. For this alternative, most of the traffic redistribution will be the same as for the primary alternative, except in the area localize to Broad Street and its adjacent intersections, where traffic a more significant redistribution was required to reroute around the Broad Street bridge.

It should be noted that the forecasts were not limited to vehicular traffic. Pedestrian traffic was also redistributed near the Main Street and Mortimer Street intersections to account for the RTS Transit Center, the removal of bus stops within the area, and the additional crossings expected for SUNY Brockport students. Other pedestrian changes are not expected as conversion to two-way traffic should not affect pedestrian routes.

The report contains traffic volume figures that identify the traffic changes for each of the conditions discussed above for both the primary alternative and Alternate 1.

5.0 TWO-WAY CONVERSION FEASIBILITY ASSESSMENT

The conversion of the St. Paul Street/South Avenue corridor and the North/ South Clinton Avenue corridor to two-way traffic will require extensive changes to the existing roadways. Signing, pavement marking and traffic signals will need to be modified throughout the project area and road geometry changes will be required in some areas. As the concept for two-way traffic operations within these

corridors was being developed, issues such as parking, pedestrians, bicyclists and roadway capacity all needed to be considered.

Based on the projected future traffic volumes, it was determined that a single through lane, with a center turn median and other select turn lanes at the intersections, both northbound and southbound would generally be sufficient for capacity between Main Street and Andrews Street. For locations south of Main Street, South Avenue will generally require two southbound lanes to accommodate the high traffic entering the I-490 eastbound ramp at Woodbury Boulevard and South Clinton Avenue will generally require two northbound lanes to accommodate the high traffic coming off the I-490 westbound ramp.

A Conceptual Layout Plan for the proposed two-way conversion is presented in the Final Report. This concept plan depicts the striping layout necessary for the conversion and highlights the significant roadway improvements required. For the most part, the lanes required could be accommodated within the existing pavement width, but there are some locations that do require modification. The most significant of these roadway modifications include:

- Cut-back southwest corner radius at the Inner Loop & Clinton Avenue intersection to allow a smoother southbound transition through the intersection.
- Convert Bittner Street to one-way traffic traveling southeast. Though two-way operations could remain on Bittner if desired, the conversion to one-way traffic would provide operational and safety benefits by reducing conflicts at the Inner Loop / St. Paul intersection. This conversion would also allow for angled parking on Bittner, which would increase the number of spaces.
- Remove the east side parking lane being proposed by the Midtown Development project between Broad Street and Main Street in order to construct a full 3-lane roadway between the intersections. Parking will remain on the west side of the roadway and there may be a possibility of adding a small recessed parking area along the east side of Clinton between Broad and Elm to help reduce on-street parking reductions in this area.
- Remove traffic islands on South Avenue at the South Avenue Garage and reconfigure roadway in front of the structure. However, internal circulation of the garage may be a significant impediment to two-way conversion and will need to be studied before implementation south of Main St. could occur.
- Reconfigure Broad Street for two-way traffic between South Avenue and Clinton Avenue as proposed in the Midtown Redevelopment project. Construct bulbouts at the Broad Street / South Avenue intersection to improve pedestrian functions and increase parking.
- Eliminate bulbout on the northeast corner of Court Street & Clinton Avenue intersection to establish a 4-lane roadway section the entire length between Court Street and Broad Street.
- Reconstruct the South Avenue / Woodbury Boulevard intersection, removing the left side ramp to I-490 and the associated laneage, and constructing a raised right turn channelization island to shorten pedestrian crossing distances and maximize queue storage area.
- Remove and reconstruct traffic islands at Mt Hope / Byron Street intersection and along South Avenue between Byron Street and Griffith Street.

Traffic operations for both the Future No-Build Condition and the Future Build Condition, which includes the improvements described above were analyzed using the methodologies outlined in the Highway Capacity Manual with the Synchro traffic analysis software.

For the Future No-Build condition, all intersections are expected to operate at an overall LOS D or better during both the AM and PM peak hours. LOS D is considered acceptable operations for an intersection during peak periods. Alternate 1 no-build levels of service are similar to those shown above, with all intersections operating at LOS D or better. Alternate 1 however, does experience slightly more delay than the primary alternative under no-build conditions. Arterial Levels of Service for both corridors are LOS D with travel speeds in the 11-12 mph range.

Under build conditions, all intersections continue to operate at LOS D or above overall, and the arterial Levels of Service remain LOS D for both corridors, with travel speeds in the 11 mph range. This holds true for the Alternate 1 build condition as well. A few approached do operate at LOS E, but because two-way conversion allows alternate routing during congested periods, it is likely vehicles will reroute to make actual operations better than projected.

With the additional conflicts introduced by two-way conversion, vehicular queuing was reviewed to assess potential impacts. The results showed that there is a potential, under Build conditions, for queues to occasionally back up through an adjacent intersection during the peak hours at a few locations. However, in the PM peak there is actually a higher percentage of queue back-ups for the No-Build condition.

6.0 SUMMARY & CONCLUSIONS

The Final Report integrates three previous reports that study the feasibility of converting the St. Paul Street/South Avenue corridor and the North/South Clinton Avenue corridor to two-way traffic operations. The report not only details the existing conditions and the future condition traffic forecasting to estimate traffic volumes for a 20 year design horizon, but also details the feasibility of two-way conversion based on vehicular traffic operations, pedestrian, bicycle and transit operations, and the required improvements to the roadway, traffic signals, signing and pavement markings. The costs associated with these improvements are also discussed, as is an alternate concept that features the closure of the Broad Street bridge. A summary of the report findings concerning the feasibility of two-way conversion is below.

- The analyses for both the future no-build condition and the future two-way build condition show anticipated intersection levels of service that are no worse than LOS D for all the studied intersections during the AM and PM peak hours. Additionally, corridor levels of service are LOS D for both conditions. This indicates that both conditions can provide acceptable capacity.
- Pedestrian operations should operate no worse than existing with future two-way conversion. Heavier pedestrian traffic will shift from Main Street to Mortimer Street with the construction of the proposed RTS Transit Center, but capacity analyses show that the volumes of pedestrians can be accommodated. Improvements to Pedestrian facilities include leading pedestrian phases being implemented at five or more locations and curb extensions being installed at four locations to reduce crossing distances and calm traffic near the intersections.
- For bicycle facilities, there are some limited opportunities to provide 14 ft shared use travel lanes (Sharrows) if many of the other travel lanes go to a minimal width of 10 feet wide and with the possible removal of some on-street parking. However, because a detailed survey has not yet been conducted for the study area, pavement widths cannot be determined to the precision necessary to confidently recommend specific bicycle facility locations at this time. Every effort should be taken in design to optimize striping to provide these accommodations as appropriate. It is however recommended that efforts be taken to establish a permanent uninterrupted riverfront bicycle trail to accommodate bicyclists traveling through the Center City.
- Future Transit operations will be consolidated at the proposed RTS Transit Center allowing for the removal of 6 bus stops and significantly reducing the need for on-street bus transfers. This will greatly reduce the number of pedestrian road crossings near Main Street, which will in turn improve traffic flow through this area.
- On-street parking under future two-way traffic conditions will be increased by approximately 23 spaces. Clinton Avenue is expected to lose 36 spaces, but 40 or more will be gained along St. Paul Street/South Avenue. Side street reconfigurations along Bittner Street and Broad Street will account for the remaining space increase.

- Operational analyses were performed for a concept alternate that includes the closure of the Broad Street Bridge (Alternate 1). The analysis showed that little to no change in level of service would occur if this alternate was implemented. However, delay within the Study area would increase by 7% in the AM peak hour and 34% in the PM peak hour. All improvements shown for the primary concept continue to apply for this alternative in addition to improvements at South Avenue and Broad Street and at South Avenue and Court Street, which would see striping changes compared to the primary concept and the additions of a southbound right turn lane at Court Street. Overall improvement costs for Alternate 1 would be about \$50,000 higher than the primary concept.
- Roadway improvements required for two-way conversion are relatively minor, mostly being bulbout (curb extension) additions and removals and reconstruction of some intersection radii. The most significant improvements proposed include the removal of the east side parking lane between Main Street and Broad Street, and the reconstruction and ramp closure at the Woodbury Boulevard / South Avenue intersection. Roadway improvements as shown in this report should cost approximately \$335,000 to construct.
- Two-way conversion will require traffic signal modifications or replacements at 21 locations. The cost of signal improvements at 18 of these locations is expected to be under \$25,000 each, but three locations (South/Woodbury, South/Byron/Mt. Hope and Clinton/Byron) will require full or nearly full replacement at \$100,000 or more. Overall, traffic signal improvements will cost approximately \$710,000.
- Signing improvements will be required extensively throughout the project area to eliminate obsolete “one way” and “do not enter” signs and install other signs as appropriate. This includes the replacement of guide sign panels near Woodbury Blvd on both South Avenue and Clinton Avenue. The new lane geometry will also require new mast arm poles with lane designation signs be installed on St. Paul near the Inner Loop and Clinton near Andrews to help guide drivers to the correct lane. Overall, signing improvements will cost approximately \$60,000.
- Reconfiguration of the pavement striping and markings will be a major component of the two way conversion. Two methods of removing the existing striping could be considered. Grinding, which would leave rutting and pavement damage that could cause confusion at night or during inclement weather and which would cause a rougher and noisier ride for vehicles; or mill and pavement overlay, which provides a much cleaner and smoother surface that allows markings to be seen more clearly, but is much more costly. Using the grinding method for removal, striping will cost approximate \$330,000. If a mill and overlay were used, costs would jump to \$1,450,000.

Overall, the study shows that two-way conversion is a feasible option for the full length of both the St. Paul Street/South Avenue and North/South Clinton Avenue corridors. This conversion would not cause a significant detriment to traffic operations and would greatly improve driver way-finding, as well as business access within the study area. The study further shows that pedestrian mobility will improve slightly with the addition of bulbouts and leading pedestrian intervals at some locations, and that on-street parking could be increased.

Based on “order of magnitude” cost estimates for the improvements necessary for two-way conversion, it is estimated that fully converting both corridors to two-way operations would cost approximately \$1.6M (\$0.55M north of Main Street/\$1.05M south of Main Street) if pavement markings are removed through grinding, and approximately \$2.8M (\$1.2M north of Main street/\$1.6M south of Main Street) if milling and a pavement overlay is used. Of these two options, it is highly recommended that the milling and pavement overlay option be implemented if two-way conversion is performed. This will provide the best possible road surface and will significantly reduce any driver confusion that may be caused by poor pavement surface.