Capital District Transportation Committee (CDTC)/ Capital District Regional Planning Commission (CDRPC) Technical Assistance Program

TECHNICAL MEMORANDUM

City of Troy

Regional Growth and Infrastructure Capacity Analysis - Transportation

August 2021

Background

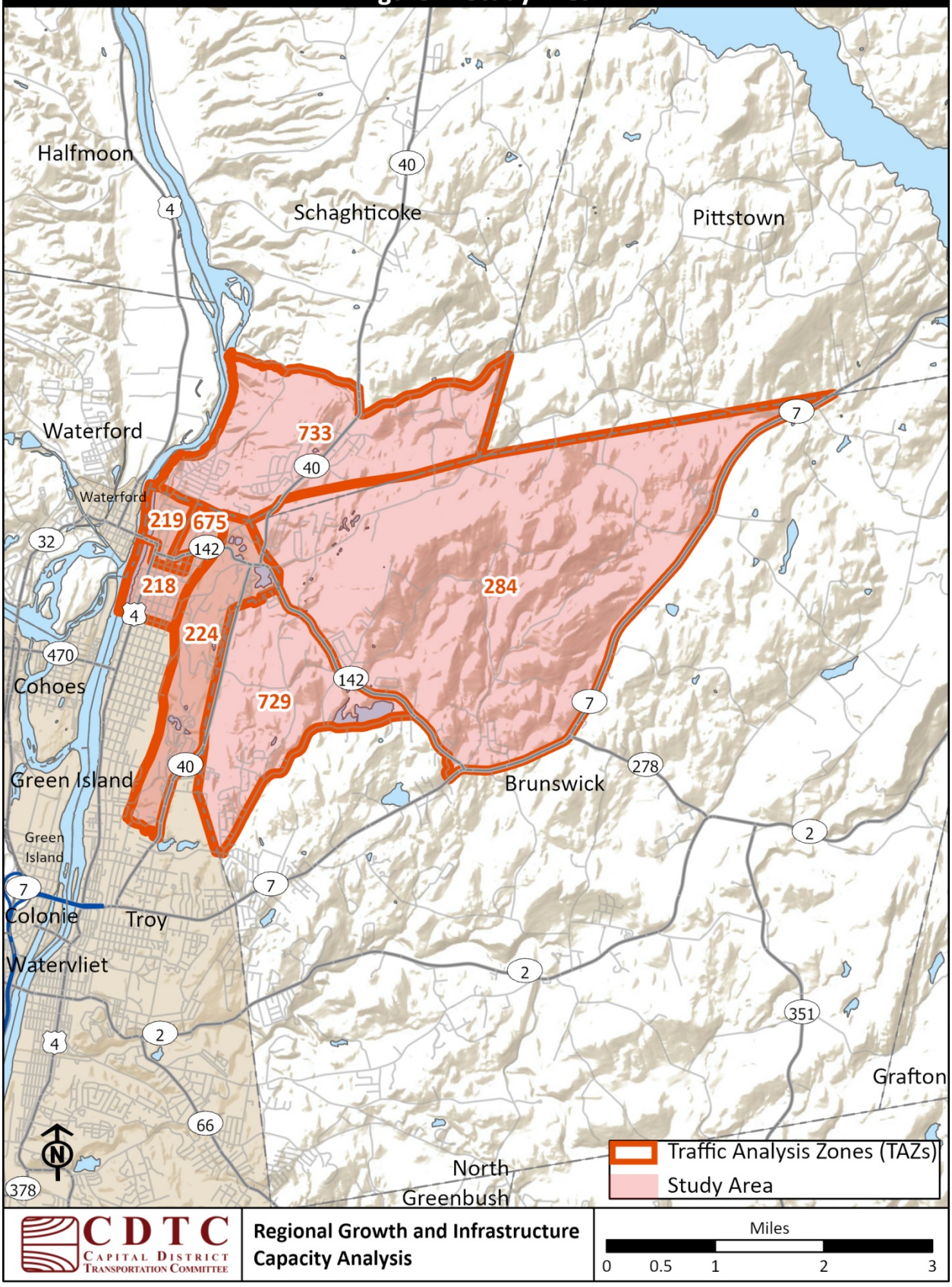
The purpose of this Technical Assistance effort is to understand more about the regional impacts of new residential and commercial developments in the City of Troy, the Town of Schaghticoke, and the Town of Brunswick in Rensselaer County, NY. This analysis focuses on the potential impacts of new development on the transportation system and makes recommendations for further actions to help alleviate any future potential traffic impacts. This analysis is at the planning/sketch level; further analysis and planning will be required.

Study Area

The Study Area, shown in Figure 1, consists of the northern portion of the City of Troy (Lansingburgh), the southern portion of the Town of Schaghticoke including the hamlet of Speigletown, and the north-eastern portion of the Town of Brunswick. The geographic unit of analysis is the Traffic Analysis Zone (TAZ) level. TAZs are commonly used for travel demand models. There are seven (7) TAZs in the Study Area.

NY 7/Hoosick St runs east-to-west along the southern boundary of the Study Area and is a common route used by travelers to/from the Study Area to access points west of the Hudson River. NY 40/10th St connects the Study Area to NY 7. Congestion has been cited as a concern along these two routes, particularly in the City of Troy.

Figure 1: Study Area



Trip Distribution

CDTC staff utilized the STEP Model (Systematic Transportation Planning and Evaluation Model), our regional travel demand model, for the analysis. The STEP model is calibrated to the PM peak hour of travel, 2020, pre-COVID-19 pandemic travel conditions.

For this analysis, two scenarios were developed. The 'no-build' *2030 Baseline* scenario includes regional growth and development consistent with the Capital District Regional Planning Commission's (CDRPC) population and employment projections. The *2030 Baseline* scenario reflects relatively slow regional growth, consistent with observations over the last 20-30 years.

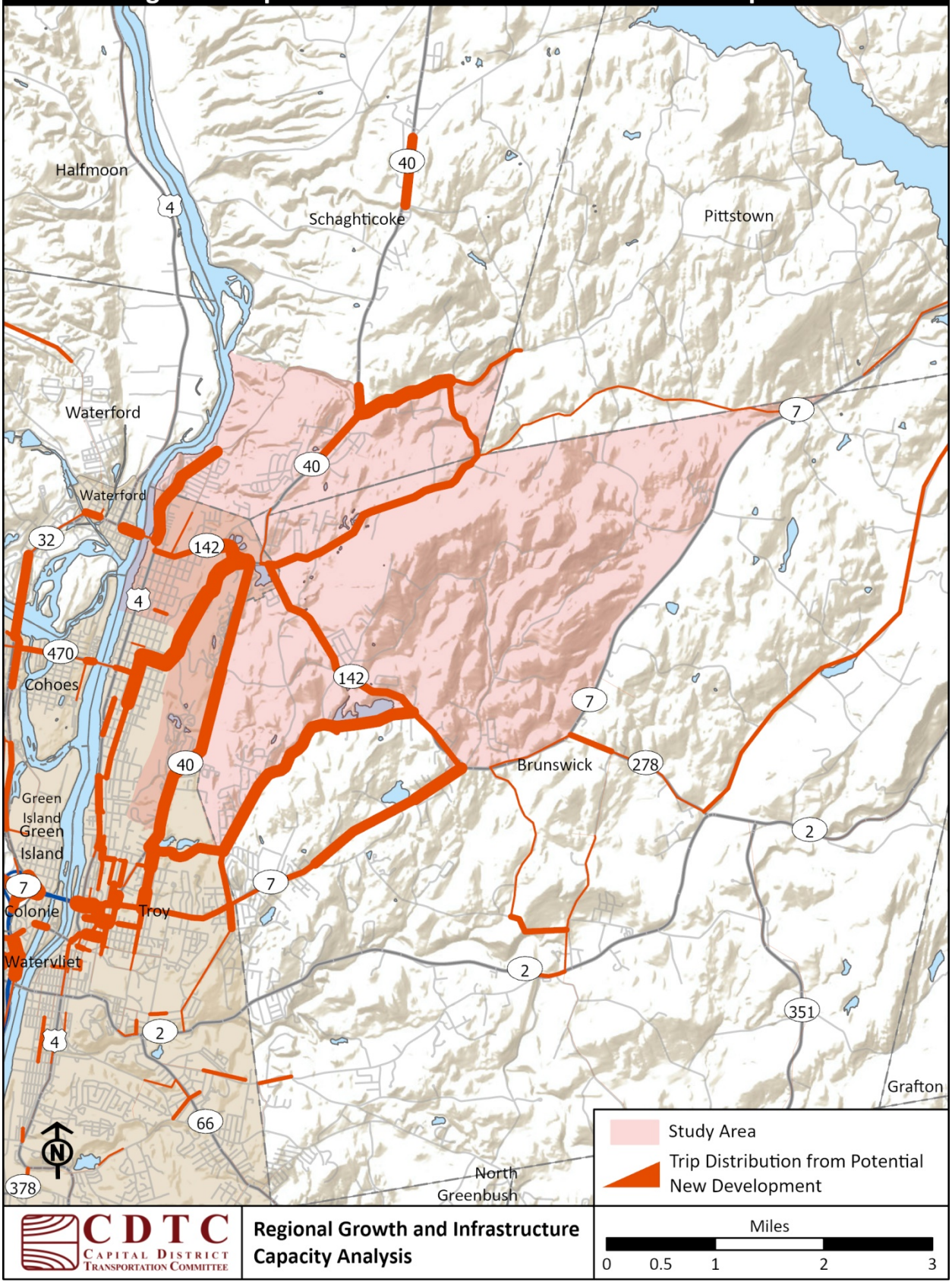
The 'build' *2030 Potential New Development* scenario reflects more rapid growth and development in the Study Area. Current land development controls[i] and available parcel-level property data were utilized to develop estimates of potential new residential and commercial development in the study. It was assumed that only vacant parcels were candidates for new development and that they would be developed using their current zoning[ii]. Estimates of PM peak hour vehicle trips were developed for the *2030 Potential New Development* scenario, and are summarized in Table 1.

Table 1: 2030 Potential New Development Trip Generation

	PM Peak Hour Trips		
TAZ	**Total New Trips**	**Productions**	**Attractions**
218	**36**	21	15
219	**32**	12	20
224	**475**	179	296
284	**352**	156	196
675	**32**	12	20
729	**331**	122	208
733	**62**	23	39
Total	**1,319**	**525**	**794**

Figure 2: Trip Distribution from Potential New Development illustrates the distribution of the additional traffic generated by the *2030 Potential New Development* scenario when compared to the *2030 Baseline* scenario. The orange line width is proportional to the increase in traffic volume from the *2030 Baseline* scenario to the *2030 Potential New Development* scenario.

Figure 2: Trip Distribution from Potential New Development



Observations

From Figure 2, the following observations about the *2030 Potential New Development* scenario can be made:

- The STEP model suggests the most common routes used by travelers to/from the Study Area are NY 40/10th St/Oakwood Ave, NY 7/Hoosick St, NY 142/Grange Rd, CR 144/N Lake Ave, Haughney Rd/2nd Ave, 5th Ave, Northern Dr, Plank Rd, and Frear Park Rd
- The STEP model suggests that as NY 40/10th St/Oakwood Ave becomes more congested, travelers will use multiple alternate routes to access the Study Area
- The STEP model suggests Troy's grid-style street network and multiple Hudson River crossings allows for traffic to disperse over a wide range of alternate routes within the City

The traffic distribution shown in Figure 2 is based on estimated modeled volumes, not actual traffic volumes; they are provided to get a sense of the order-of-magnitude of the impacts, not for precise traffic planning. CDTC's STEP model is a macroscopic regional travel demand model, and does not include every roadway; it is likely traffic will use all available roadways to some extent.

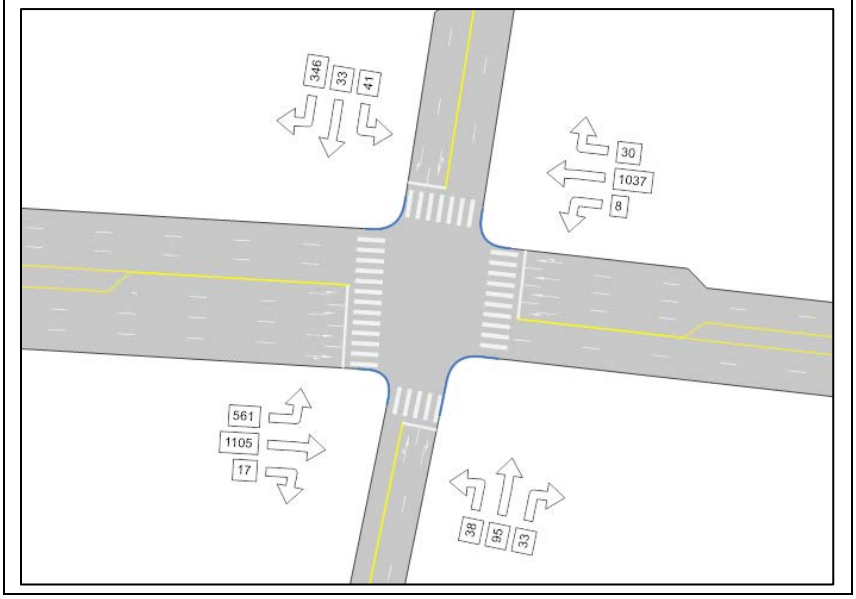
NY 7 (Hoosick St) & NY 40 (10th St) Level-of-Service Analysis

As part of the Hoosick-Hillside Linkage Study completed in December 2020, study consultant Creighton Manning Engineering prepared a Synchro traffic model of NY 7/Hoosick St from 6th Ave to 15th Ave. The Synchro model was calibrated using vehicle turning movement counts conducted in 2013 as part of the NYSDOT Route 7 Comprehensive Pedestrian Study. The Synchro model was imported into PTV Vistro 2020 (Version SP 0-6) by CDTC staff to conduct a level-of-service analysis at the intersection of NY 7/Hoosick St & NY 40/10th Street. The 2013 counts from the NYSDOT are used as the basis of this analysis. PTV Vistro uses Highway Capacity Manual (HCM) 2010 methodology to compute performance measures such as delay, level-of-service(LOS), and volume/capacity ratios.

Existing PM Peak Hour

Figure 3 below shows PM peak hour (5:00 PM to 6:00 PM) turning movement counts at NY 7/Hoosick St & NY 40/10th Street. This count data was collected on October 16, 2013, and was used to calibrate the Synchro model. Right-turning movements include right-on-red vehicles. The greatest volumes are seen on the eastbound and westbound through movements, each over 1,000 vehicles during the PM peak hour. The eastbound left-turn had 561 vehicles observed, and the intersection has two dedicated turn lanes and a protected left signal phase to handle this movement. On NY 40/10th Street, the movement with the highest volume is the southbound right turn onto NY 7/Hoosick St, with 346 vehicles in the PM peak hour.

Figure 3: PM Peak Hour Turning Movement Counts - Existing (2013)



In the PM peak hour, the overall intersection LOS was "D", with an average vehicle delay of 39.2 seconds. Figure 4 below depicts levels of service among vehicle movements. In the PM peak hour, eastbound through and left-turn movements have a LOS of "B". Westbound through and left-turn movements have levels of service of "C" and "D", respectively. Northbound and southbound traffic on NY 40/10th Street experiences the greatest delays and lowest levels of service.

Figure 4: PM Peak Hour Levels of Service - Existing (2013)

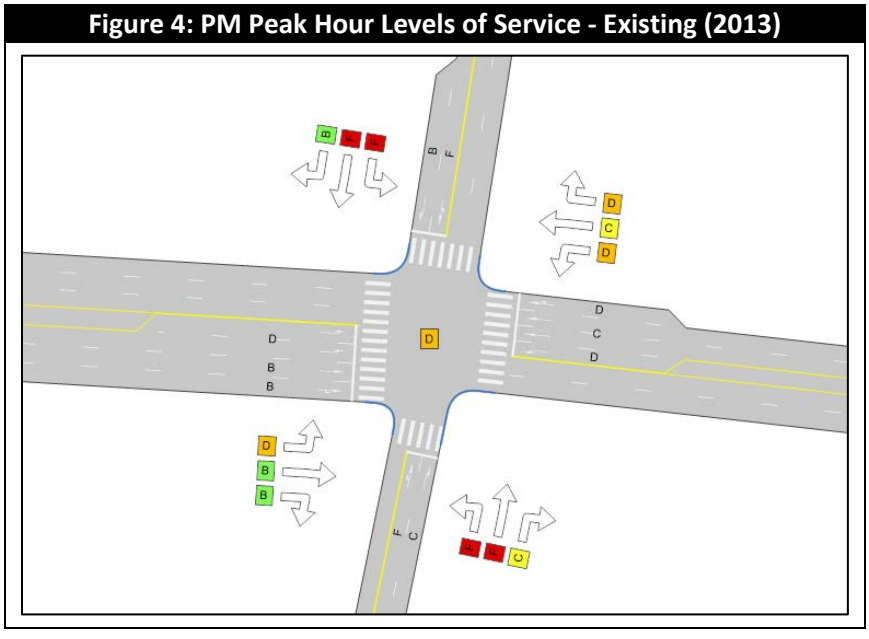
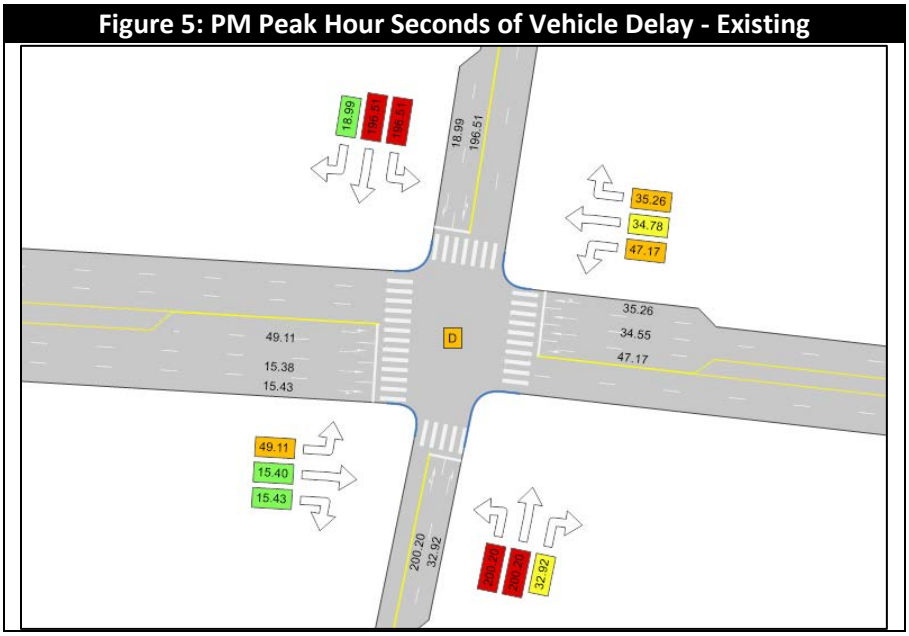


Figure 5, below, depicts the average seconds of vehicle delay on each vehicle movement. The lowest delay is experienced by eastbound vehicles, with 15 seconds of delay on average for the eastbound through and left-turning movements. The highest average delay is experienced by through and left-

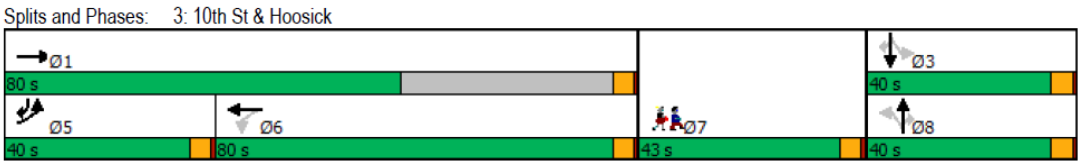
turning vehicles on NY 40/10th Street, as the signal allocates a majority of green time to the higher-volume NY 7/Hoosick St movements.

Figure 5: PM Peak Hour Seconds of Vehicle Delay - Existing



Additional notes on the Existing (2013) traffic analysis of this intersection:

- The signal timing plan was derived from the NYSDOT Route 7 Comprehensive Pedestrian Study (2013). In the signal timing plan provided, there is a 43-second long all-pedestrian crossing phase that occurs when any push button is actuated. The length of this phase is due to the long crossing distance on NY 7/Hoosick St – on the eastbound approach, seven lanes must be crossed, with an approximate crossing distance of 100 feet.
- In the signal timing plan provided, most green time is allocated to the NY 7/Hoosick St movements. In each cycle, up to 40 seconds of green time is allocated to eastbound through and protected left-turn movements, followed by up to 80 seconds of eastbound through and westbound through and permitted left-turns. This is followed by an all-pedestrian phase which is skipped if no push buttons are pressed. This is followed by up to 40 seconds of green time for the northbound and southbound movements. The only protected left turn is the eastbound left. All phases are actuated, and the northbound and southbound phases are skipped if no vehicles are detected. The timing plan is depicted below:



- This timing plan was observed in 2013 during the PM peak period. It is not known if time-of-day plans are in use.
- There is no signal coordination present in the Synchro model.

- Levels of service and delay in the Vistro model differ slightly from the Synchro model prepared for the Hoosick-Hillside Study for two reasons:
    - The Synchro 10 report produced for the Hoosick-Hillside Study used Highway Capacity Manual (HCM) 2000 methodology, whereas Vistro uses HCM 2010.
    - Synchro is reporting LOS and delay by lane group, whereas Vistro reports LOS and delay by movement.

2030 Baseline Scenario

The 'no-build' *2030 Baseline* scenario includes regional growth and development consistent with the Capital District Regional Planning Commission's (CDRPC) population and employment projections. The *2030 Baseline* scenario reflects relatively slow regional growth, consistent with observations over the last 20-30 years. The *2030 Baseline* scenario is described further in the 'Trip Distribution' section above. Figure 6, below, shows estimated PM peak hour turning movements for the *2030 Baseline* scenario.

Figure 6: Estimated PM Peak Hour Turning Movement Counts – *2030 Baseline* Scenario

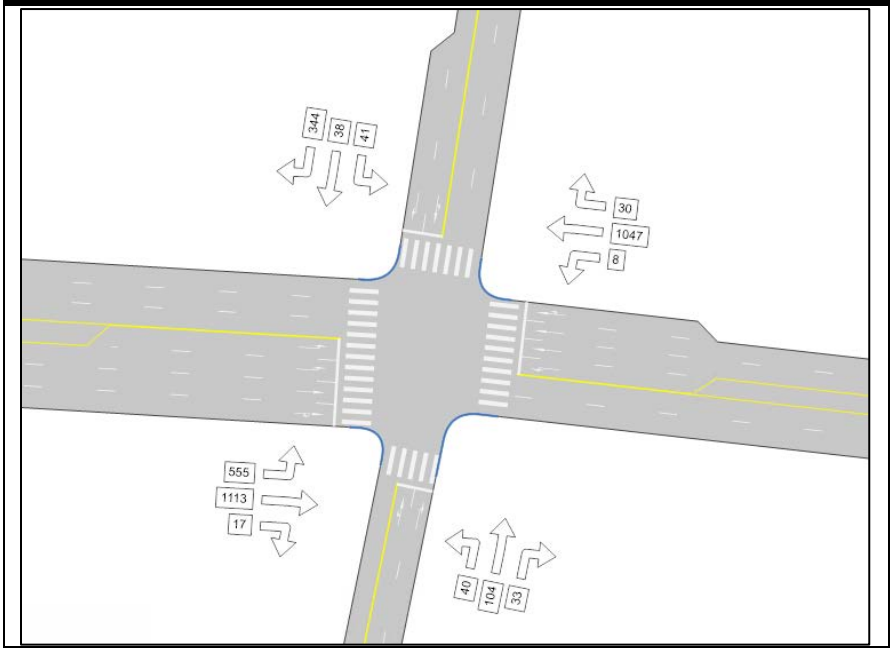


Figure 7, below, shows PM peak hour levels of service in the *2030 Baseline* scenario. In the *2030 Baseline* scenario, overall intersection LOS remains at "D".

Figure 7: PM Peak Hour Levels of Service – *2030 Baseline* Scenario

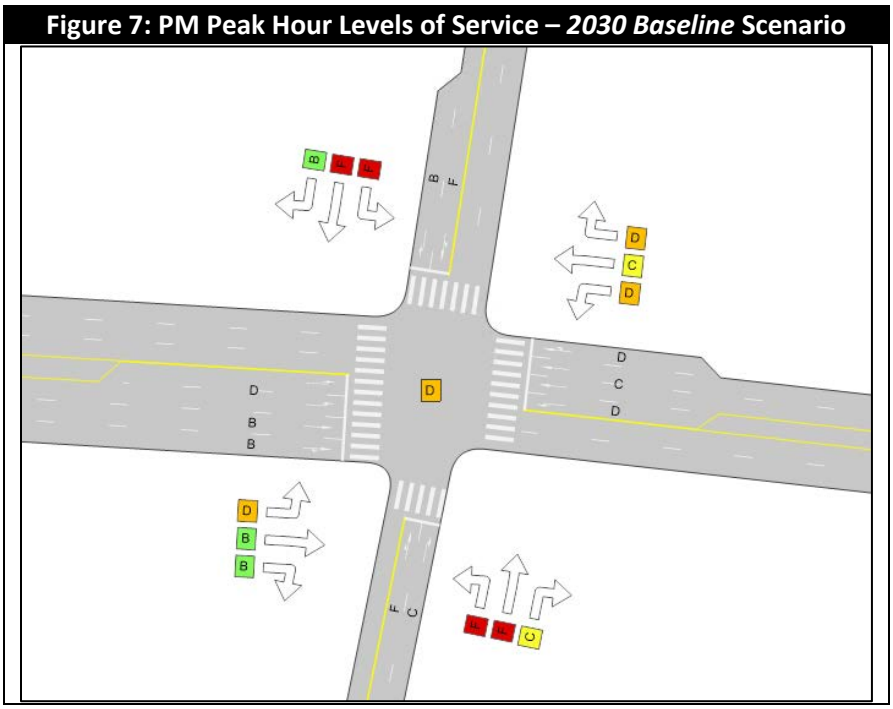
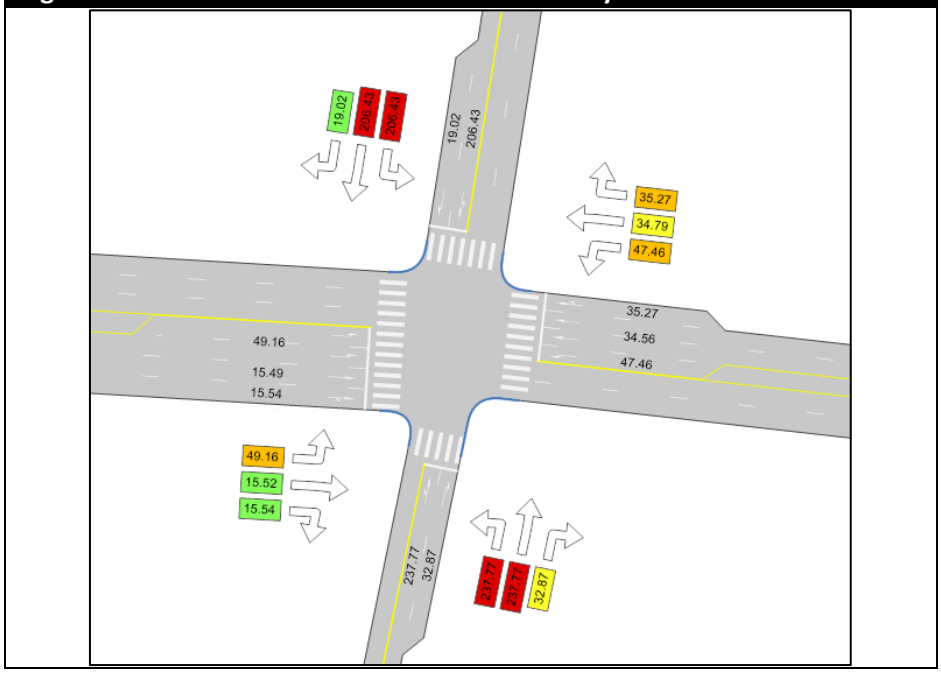


Figure 8, below, shows PM peak hour average seconds of vehicle delay in the *2030 Baseline* scenario. Average intersection delay is 41.8 seconds –higher than the Existing (2013) delay of 39.2 seconds. The minor increase in delay is due to the increased volume on underserved movements, such as the southbound through and northbound through. Delay on the high-volume movements (eastbound and westbound through movements) remains unchanged.

Figure 8: PM Peak Hour Seconds of Vehicle Delay – *2030 Baseline* Scenario



2030 Potential New Development Scenario

The 'build' *2030 Potential New Development* scenario reflects more rapid growth and development in the Study Area. Current land development controls and available parcel-level property data were utilized to develop estimates of potential new residential and commercial development in the study. The *2030 Potential New Development* scenario is described further in the 'Trip Distribution' section above. Figure 9, below, shows estimated PM peak hour turning movements for the *2030 Potential New Development* scenario.

Figure 9: PM Peak Hour Turning Movement Counts – *2030 Potential New Development* Scenario

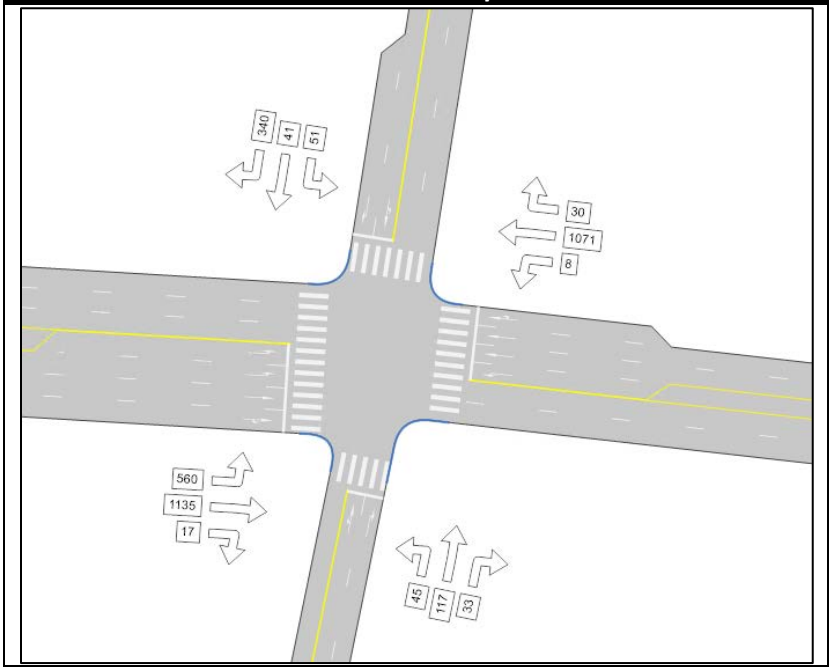


Figure 10, below, shows PM peak hour levels of service in the *2030 Potential New Development* scenario. In the *2030 Potential New Development* scenario, the overall intersection LOS remains at "D".

Figure 10: PM Peak Hour Levels of Service – *2030 Potential New Development* Scenario

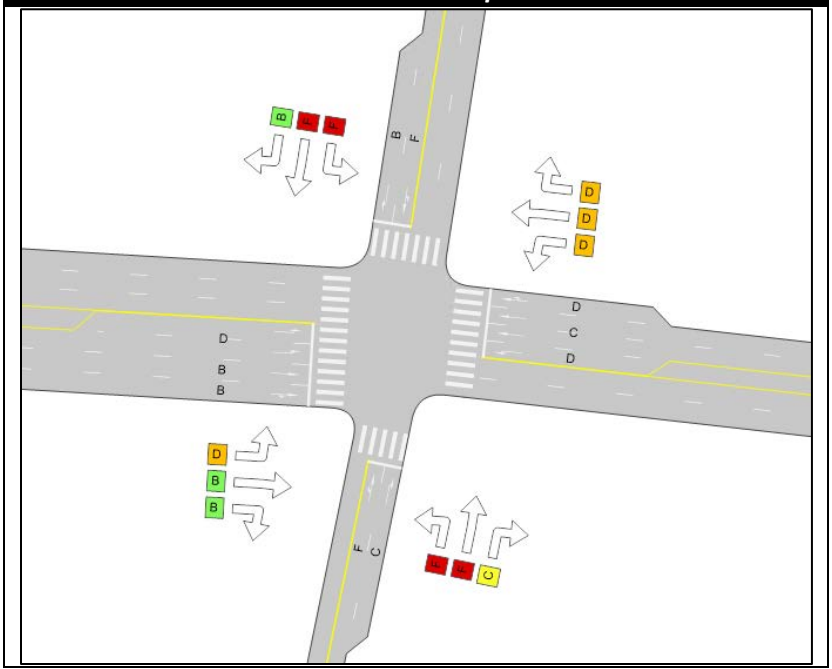


Figure 11, below, shows PM peak hour average seconds of vehicle delay in the *2030 Potential New Development* scenario. The average vehicle delay increases to 49.35 seconds. Average vehicle delay has increased over the 2030 build scenario due to higher volumes on underserved movements – northbound through and southbound left. Delay on the highest volume movements (eastbound and westbound through movements) remains unchanged compared to the *2030 Baseline* scenario and the Existing (2013) base-year scenario.

Figure 11: PM Peak Hour Seconds of Vehicle Delay - *2030 Potential New Development* Scenario

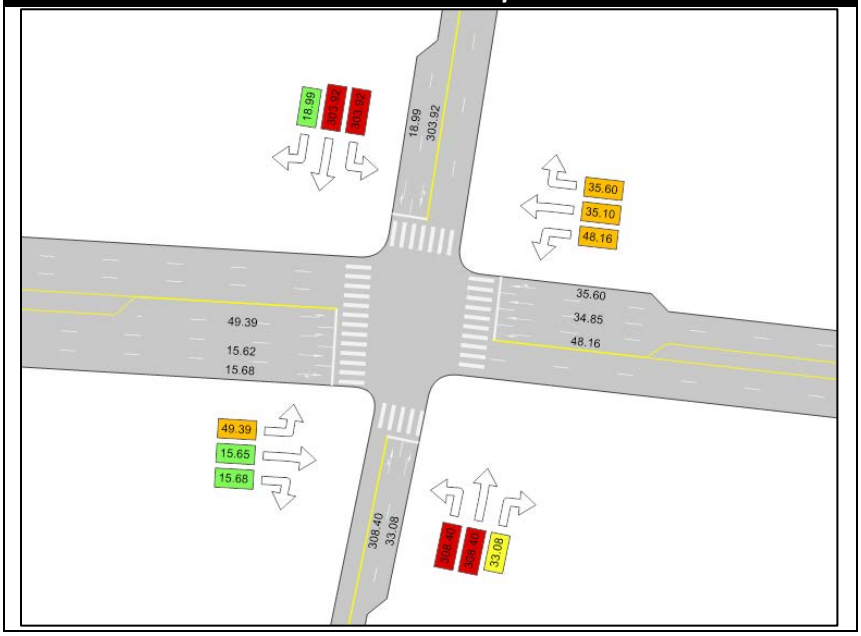


Table 2, below, summarizes the Level-of-Service Analyses.

Table 2: Level-of-Service Summary			
	Existing (2013)	**2030 Baseline**	**2030 Potential New Development**
LOS	D	D	D
Seconds of delay	39.2	41.8	49.4

Observations

From the Level-of-Service Analysis, the following observations can be made:

- The analysis suggests that overall average seconds of vehicle delay at the NY 7/Hoosick St & NY 40/10th St intersection increases by +/- 8 seconds from the *2030 Baseline* scenario to the *2030 Potential New Developmen*t scenario.
- The NY 7/Hoosick St & NY 40/10th St intersection may not be the ideal proxy for new congestion related to traffic to/from the Study Area; as noted above, the STEP model suggests that as congestion increases on NY 40, drivers will seek alternate routes.

Conclusions & Recommendations

A. As land uses transition from rural to suburban residential and commercial, the City of Troy, the Town of Brunswick, and the Town of Schaghticoke should monitor traffic conditions, and consider improvements as needed, to ensure safety and congestion impacts are addressed. Based on this analysis the roadways to monitor, at a minimum, are:
    a. 5th Ave
    b. CR 144/N Lake Ave

c. Frear Park Rd
d. Haughney Rd/2nd Ave
e. Northern Dr
f. NY 142/Grange Rd
g. NY 40/10th St/Oakwood Ave
h. NY 7/Hoosick St
i. Plank Rd

Special attention should be paid to locations where two or more of the roadways in the list above intersect. Of note, CDTC's STEP model is a macroscopic regional travel demand model, and does not include every roadway; it is likely traffic will use all available roadways to some extent.

B. The transportation network is a regional system; impacts of new development are not contained within municipal boundaries. The City of Troy, the Town of Brunswick, and the Town of Schaghticoke should work together to ensure that any negative impacts of new development, including traffic impacts, are mitigated.

One possible solution would be to develop a Generic Environmental Impact Statement (GEIS) for the Study Area, to help mitigate the traffic impacts of new development. Traffic impacts include, but are not limited to, increased congestion. Traffic congestion reduces traffic safety, diminishes the quality of life for residents, impedes the passage of visitors and commuters, and hampers future growth and economic development. A GEIS to address, among other subjects, traffic impacts could be used as a tool to identify and fund traffic improvements. This approach could help to avoid or reduce limitations that congestion could otherwise impose upon future travel and development opportunities within the Study Area.

Notes:

[i] City of Troy Zoning Code accessed on June 21, 2021, via https://ecode360.com/11133339; City of Troy Zoning Map accessed on July 5, 2021, via http://www.troyny.gov/wp-content/uploads/2017/01/troyzoningmap.pdf; Town of Brunswick Zoning Law accessed on June 21, 2021, via https://www.townofbrunswick.org/files/Introductory%20Local%20Law%201%20of%202017.pdf; Town of Brunswick Zoning Map accessed on June 21, 2021, via https://www.townofbrunswick.org/files/Zoning_Map%20Revised_2017-02-07.pdf; Town of Schaghticoke Zoning Law accessed on June 21, 2021, via https://townschaghticoke.digitaltowpath.org:10192/content/Generic/View/17:field=documents;/content/Documents/File/4.pdf; Town of Schaghticoke Zoning Map accessed on June 21, 2021, via https://townschaghticoke.digitaltowpath.org:10192/content/Generic/View/17:field=documents;/content/Documents/File/20.pdf

[ii] Assumptions for developing Potential New Development scenario:

- Vacant parcels utilizing 2019 New York State Property Class Codes including 'Residential Vacant Land', 'Rural Vacant < 10 acres', 'Rural Vacant > 10 acres', 'Vacant Commercial', 'Vacant Farmland', 'Vacant Land', 'Vacant Rural', 'Vacant with improvements', and
- Does not include industrial zoned properties, parcels less than 0.25 acres, parcels not buildable under current zoning, and vacant parcels in Brunswick A-40 zoning, and
- Residential development unit estimates were rounded down to the nearest whole number.