Regeneron Pharmaceuticals
Tempel Lane Campus
East Greenbush, NY

TRAFFIC IMPACT STUDY
2018 REVISED SITE PLAN

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1.0 INTRODUCTION

The following Traffic Impact Study (TIS) is an update to the October 2016 TIS completed for Regeneron Pharmaceuticals, Inc. for their Tempel Lane site in East Greenbush, NY. The October 2016 TIS was part of the Tempel Lane Campus – Supplemental Final Environmental Impact Statement which was approved by the Town of East Greenbush in May 2017. The site is located on Tempel Lane, north of Red Mill Road (NY Route 151), south of 3rd Avenue Extension, and west of US Route 4 (shown on page 3). The parcel is part of what was previously proposed as the Mill Creek Development Planned Development District (PDD). The October 2016 TIS analyzed the site with 187,000 SF of warehouse, 165,000 SF of manufacturing, and a 750-employee office/laboratory space for R&D. The project was broken out into phases as follows:

- Phase 1 – 187,000 SF Warehouse
- Phase 2 – 750 employee office/laboratory space
- Phase 3 and 3a – 165,000 SF Manufacturing

Construction of Phase 1 started in Summer 2017 and consists of a reduced size of the warehouse space from 187,000 square feet to 166,350 square feet. Traffic improvements included in this development phase consist of improvements to the pavement section on the existing portion of Tempel Lane connecting to Red Mill Road, and construction of a maintenance road between 3rd Avenue Extension (opposite Woodlawn Avenue) and the Regeneron site. This maintenance road involves construction of two bridges to cross areas of steep terrain and wetlands and will have limited use (i.e. it will not be available for general site traffic access to/from the Phase 1 development, and requires a third bridge for a complete connection). There are no off-site improvements at other study-area intersections required for the Phase 1 development. Site traffic on the driveway access to Tempel Lane will also be monitored after completion of Phase 1 to confirm that the site trips are consistent with the SFEIS.

Subsequent to the approval of the SFEIS, planning for the Phase 2 development has changed to increase the number of proposed employees in the office/laboratory space to 1,150 employees (an increase of 400 employees). An alternative concept for site access to 3rd Avenue Extension has also been identified as a preferred option to serve the full buildout of the site. This alternative would convert the maintenance road that is being constructed in Phase 1 (connecting to 3rd Avenue Extension opposite Woodlawn Avenue) to serve the Regeneron site as a private access road, and would involve the construction of a third bridge along the private access road. This alternative would replace the access concept that was presented in the FSEIS to extend Tempel Lane to connect to 3rd Avenue Extension opposite Cedar Crest Drive. The access on the existing segment of Tempel Lane connecting to Red Mill Road will be maintained in either access concept, and will continue to be the primary access to the Regeneron Tempel Lane site.

This traffic study update will evaluate the effect of the changes in Regeneron's Phase 2 development program on the transportation impact findings and recommendations of the SFEIS. A comparison of the previously approved and current proposed development is provided in Table 1.

Table 1 Comparison of Development Program			
Development Phase	Approved SFEIS Development Scenario	Current Proposed Development Scenario	Change
Phase 1	Warehouse: 187,000 SF	Warehouse: 166,350 SF	-20,650 SF
Phase 2	Office/Laboratory: 750 employees	Office/Laboratory: 1,150 employees	+400 employees
Phases 3 & 3a	Manufacturing: 165,000 SF	Manufacturing: 165,000 SF	No change

The current site development program is evaluated in this study for the following two access alternatives for the site connection to 3rd Avenue Extension as a secondary site access:

Alternative 1: Convert the Phase 1 maintenance road to a private access road, connecting the Regeneron site at 3rd Avenue Extension opposite Woodlawn Avenue.

Alternative 2: Extend Tempel Lane to 3rd Avenue Extension opposite Cedar Crest Drive, with Tempel Lane being a Town road from Red Mill Road to 3rd Avenue Extension. This is the approved access concept presented in the SFEIS.

Alternative 1 is the preferred option, but is contingent on the feasibility and cost to construct a necessary third bridge. Alternative 2 is proposed to be the contingency option if the preferred option is found not to be feasible.

In addition, this report reviews a phased implementation strategy for the identified off-site mitigation improvements.

Site Location Map

2.0 EXISTING CONDITIONS

2.1 ADJACENT STREET NETWORK

2.1.1 Study Area

The site is located north of Red Mill Road (NY Route 151), south of 3rd Avenue Extension and west of US Route 4. Primary access to the site is proposed on Tempel Lane.

Based on the location of the project and estimated routes to and from the site, the study area was selected to include the following intersections:

- US Route 4 & Red Mill Road/Luther Road (NY Route 151)
- US Route 4 & Hotel Access Road
- US Route 4 & I-90 Exit 9 Eastbound Ramps
- US Route 4 & I-90 Exit 9 Westbound Ramps
- US Route 4 & Mannix Road
- US Route 4 & 3rd Avenue Extension
- US Route 4 & Grandview Drive/Shoppes at Greenbush Commons
- Red Mill Road (NY Route 151) & Tempel Lane
- 3rd Avenue Extension & Cedar Crest Drive
- 3rd Avenue Extension & Woodlawn Avenue
- 3rd Avenue Extension (NY Route 151) & Barracks Road (NY Route 151)
- Tempel Lane & Hotel Access Road

2.1.2 Roadway Characteristics

Characteristics of the roadway network were documented through field and desktop investigations, including reviewing the *Western East Greenbush Final Generic Environmental Impact Statement*[1] (GEIS), *Route 4 Corridor Study*[2], and data published by NYSDOT.

I-90 is an east-west Urban Principal Arterial Interstate near the project site. Regionally, it extends from Buffalo, NY to Boston, MA. In the Capital Region, I-90 provides connections to I-87, I-787, and I-890. This system provides access to the site from the region's major urban and suburban population centers. The I-90 mainline has three lanes in each direction and a posted speed limit of 65 mph in the vicinity of the site. Exit 9 is located approximately two miles from the site on US Route 4.

US Route 4 is a north-south Urban Principal Arterial adjacent to the project site. It serves regional travel from US Routes 9/20 in East Greenbush north to the City of Troy and on to Saratoga and Washington Counties. Within the project study area, US Route 4 generally has a four-lane section. Between Grandview Drive and Mannix Road, US Route 4 generally has two southbound lanes and one northbound lane and a center two-way left-turn lane (11 ft lanes, 5-10 ft shoulders (varies)). Between Mannix Road

[1] *Western East Greenbush Final Generic Environmental Impact Statement, Laberge Group, July 2009*

[2] *Route 4 Corridor Study, Capital District Transportation Committee, 2006*

and south of the I-90 eastbound off-ramp intersection, US Route 4 consists of two lanes in both directions (12 ft lanes, 8 ft shoulders). US Route 4 consists of one lane in each direction north and south of the roundabout at US Route 4 & Red Mill Road/Luther Road (NY Route 151), with also a center two-way left-turn lane north of the roundabout. US Route 4 is primarily a commercial corridor within the study area. The posted speed limit on US Route 4 is 40 mph north of Thompson Hill Road (located ¼ mile south of 3rd Avenue Extension) and 45 mph south of Thompson Hill Road.

Mannix Road is an east-west local road south of the project site. It extends from US Route 4 east to Best Road. It is a two-lane roadway with approximately 10 to 11 foot lanes, one to two foot shoulders and a posted speed of 30 mph. It services primarily residential uses, with the exception of the East Greenbush Technology Park and Marriot Residence Inn, which are located near US Route 4 on Mannix Road. The intersection of US Route 4 & Mannix Road was reconstructed in 2013 to provide a roundabout traffic control.

Since NY Route 151, 3rd Avenue Extension and Tempel Lane are primary routes to the site, a more detailed assessment of the roadway conditions are included below.

NY Route 151 is an east-west Urban Major Collector that extends from 3rd Avenue Extension (named Barracks Road from 3rd Avenue Extension to Red Mill Road, then named Red Mill Road to US Route 4) to the east of US Route 4 (called Luther Road east of US Route 4) towards Burden Lake. The intersection of US Route 4 & NY Route 151 was reconstructed in 2011 to provide a roundabout traffic control.

The roadway section on NY Route 151 primarily consists of two 11 foot travel lanes. The paved shoulders are 8 feet in width from 3rd Avenue Extension to Red Mill Road and 10 feet from Red Mill Road to Route 4. The pavement section consists of asphalt layers over subbase consisting of gravel and stone from 3rd Avenue Extension to Red Mill Road. From Red Mill Road to US Route 4, the subbase consists of graded and drained natural soils. Pavement rehabilitation (either with cold in place recycling or mill & fill) was completed by NYSDOT on Route 151 in 2017 in the study area, since the October 2016 TIS was completed.

3rd Avenue Extension is an east-west Urban Minor Arterial that extends from US Route 4 to the west in the City of Rensselaer. It is a two-lane roadway with 10 to 11 foot lanes, 3 foot paved shoulders and a posted speed of 45 mph. A field pavement evaluation and the 2014 Pavement Data Report both found the roadway to be in fair condition with no notable deterioration. The last paving project to take place in this corridor was a 1”-1½” overlay in 2008.

Tempel Lane is a north-south local road that extends from Red Mill Road (NY Route 151) to a dead-end in the vicinity of the proposed project site. It consists of two unstriped travel lanes and a total width of 26 feet (+/-). Record plan information shows that the pavement section is 1” of asphalt over 3” Base Course (asphalt), 4” Subbase Course (select granular material) and 8” Subbase Course (granular material).

The US Route 4 & Hotel Access and Tempel Lane & Hotel Access intersections were recently constructed with the Hampton Inn on the Tempel Farm development site. These intersections are not included in the Existing condition analysis, but are provided in the subsequent No-Build and Build analyses for all alternatives.

2.2 TRAFFIC VOLUMES

Traffic volumes for the study intersections were compiled from previous traffic counts, data published by NYSDOT, and new traffic counts. Table 2 below provides which source data was used for each study area intersection.

Table 2
Traffic Data Sources

Intersection	AM	PM
US Route 4 & Red Mill Road/Luther Road (NY Route 151)	(1)(5)	(1)(5)
US Route 4 & I-90 Exit 9 Eastbound Ramps	(2)	(3)
US Route 4 & I-90 Exit 9 Westbound Ramps	(2)	(3)
US Route 4 & Mannix Road	(2)	(3)
US Route 4 & 3rd Avenue Extension	(1)(4)	(3)
US Route 4 & Grandview Drive/Shoppes at Greenbush Commons	(6)	(3)
Red Mill Road (NY Route 151) & Tempel Lane	(1)(4)	(1)(4)
3rd Avenue Extension (NY Route 151) & Barracks Road (NY Route 151)	(1)(4)	(1)(4)

(1) 2015 half-hour sample count
(2) 2015 peak hour count
(3) 2014 peak hour count
(4) NYSDOT ATR data
(5) PIN 1MB014 US Route 4 & NY Route 151 Intersection Project Final Design Report (2010)
(6) 2016 peak hour count

Turning movement volumes at the intersection of 3rd Avenue Extension & Cedar Crest Drive and 3rd Avenue Extension & Woodlawn Avenue were estimated using the ITE Trip Generation Manual, 9th Edition and the number of single family homes in the neighborhood. Since there are two accesses to the Cedar Crest Drive neighborhood via Cedar Crest Drive and Redwood Court, it was assumed that half of the calculated trips would use Cedar Crest Drive. The entering and exiting trips were distributed based on the directional distribution of 3rd Avenue Extension for both peak hours. The through volumes were balanced with the Barracks Road & 3rd Avenue Extension intersection counts.

Figure 1 in Appendix B shows the Existing AM and PM peak hour traffic volumes. Appendix C contains the turning movement counts.

ATR counts were conducted on US Route 4 from October 2, 2014 to October 12, 2014 between Mannix Road and the FedEx signal. ATR counts were conducted on 3rd Avenue Extension between Rosebud Court and Rockefeller Boulevard and on Red Mill Road (NY Route 151) west of Tempel Lane from May 2, 2016 to May 5, 2016. All counts were recorded at 15-minute increments and volume, classification, and speed data were collected.

Table 3
ATR Data

Location	US Route 4	3rd Avenue Extension	Red Mill Road (NY 151)
AAWDT*	18,600	8,500	7,000
Directional Distribution	49% NB / 51% SB	46% EB / 54% WB	50% EB / 50% WB
% Daily Trucks	5% NB / 4% SB	5% EB / 5% WB	5% EB / 6% WB
85th Percentile Speed	53 mph NB / 42 mph SB	47 mph EB / 44 mph WB	48 mph EB / 55 mph WB

*AAWDT = Average Annual Weekday Daily Traffic (Seasonally Adjusted Weekday Average)

2.3 PEDESTRIAN AND BICYCLE ACCOMMODATIONS

Currently there are segmented pieces of sidewalk along the Route 4 corridor. Sidewalk starts at the Mannix Road roundabout and continues north to the FedEx Distribution Center on the west side of US Route 4. At the Walmart / Mavis Tire intersection, short segments of sidewalk are provided for the pedestrian crossings. The sidewalk then picks up again approximately 250 feet north of the 3rd Avenue Extension intersection on both sides of US Route 4 to just north of the Greenbush Commons intersection. There are no sidewalks on Red Mill Road (NY Route 151) or 3rd Avenue Extension, with the exception of the roundabout at US Route 4 and Red Mill Road (NY Route 151).

Bicycle lanes are currently provided on US Route 4 at the intersection approaches with right-turn lanes. In the segments between the bike lanes, bicyclists may use the existing shoulder. Shoulder widths along Route 4 in the study area are generally greater than 5 feet. Shoulder widths on 3rd Avenue Extension generally vary between 2 and 3 feet. On Red Mill Road (NY Route 151) shoulders are generally greater than 6 feet between the roundabout at US Route 4 and Tempel Lane. A designated bicycle lane is typically 5-6 feet wide. US Route 4 is part of the Capital District Transportation Committee's (CDTC's) bicycle/pedestrian priority network. According to CDTC, roadways that are considered part of the priority network provide a major link for a region-wide bicycle and pedestrian travel system. They may have existing or potential bicycle and pedestrian traffic, but the existing roadway network may have high travel speeds and volumes, limited pavement space and/or confusing traffic patterns, which can be barriers for potential bicycle and pedestrian users.

2.4 TRANSIT

Bus service within the study area is provided by the Capital District Transportation Authority (CDTA). CDTA has two routes that currently serve the Route 4 corridor: Route 214 (Rensselaer 3rd St/Amtrak) and Route 224 (Albany-Troy via Route 4). Route 214 provides service between Downtown Albany and Rensselaer County Plaza (Wal-Mart Plaza on Route 4). Route 224 provides service between Downtown Albany, Hudson Valley Community College and Downtown Troy. Bus stops are located in the Walmart Plaza, adjacent to the Greenbush Commons / Grandview Drive intersection, the Thompson Court intersection, and at the Park and Ride lot north of the study area.

3.0 FUTURE YEAR NO-BUILD CONDITIONS

3.1 BACKGROUND GROWTH

It is anticipated that the Regeneron facility will be completed in 2020. To understand the traffic impacts of the project in the context of traffic operations at the time the project is built, existing traffic volumes were adjusted to reflect the estimated future volumes without the Regeneron project. The future No-Build volumes consider the influences of regional growth, general changes in socio-economic conditions that affect travel, and other development projects in the area that would collectively affect the volumes in the study area whether or not the Regeneron project is built. The Town of East Greenbush Planning Department was consulted to determine which projects to include in the background volume conditions. In addition, historic NYSDOT count data, growth projections from the *Route 4 Corridor Study,* and volume data from the *Village at Tempel Farm Traffic Impact Study* and the US Route 4 and NYS Route 151 Final design report were reviewed to determine background growth rates.

Through discussions with NYSDOT, it was determined that the Village at Tempel Farm development, located just south of the Regeneron site on Tempel Lane, would not be included in the background growth for this current study analysis, as only the hotel has been built on their site and it is unknown when in the future this site will be developed further. Not including the Village at Tempel Farm development in the analysis allows for a better determination of Regeneron's site traffic impact on the surrounding system, and does not include the mitigation that the Village at Tempel Farm will need to provide as part of their future development, as it may never be built. This analysis includes the 101 room hotel that was recently constructed on the Village at Tempel Farm's site in the background growth. This approach is consistent with the sensitivity analysis that was included in the original traffic study assessment for the SFEIS.

Other development included in the background growth includes the existing Regeneron Campus on Discovery Drive and the East Greenbush Tech Park on Mannix Road. At the existing Regeneron Campus, a new office building was recently constructed. While this office building will have an occupancy capacity of 600 employees, only 250 employees will be added to the site. The remainder of the capacity will be filled up by moving personnel out of temporary office trailers (which will then be removed from the site) and by personnel that are currently sharing offices and desks. Regeneron has paid GEIS mitigation fees to the town for 158 PM peak hour trips for the project which equates to approximately 250 employees. The AM and PM peak hour trips for the additional 250 employees have been added to the study network.

At the East Greenbush Tech Park, 100,000 SF of research and development space and general office space has been approved but not yet constructed. Site trips for this remaining square footage were determined based off of the existing trip rates for the site, 1.524 trips per 1,000 SF for the AM peak hour and 1.401 trips per 1,000 SF for the PM peak hour. The trips were distributed to the study network using the distribution percentages for the Phase 2 East Greenbush Tech Park study.

In addition to the site traffic added for these developments, a background growth rate was applied to the 2015 Existing traffic volumes. Based upon historic NYSDOT count data, there has only been minimal growth along the US Route 4 corridor, with approximately 0.5% growth per year between 2004 and 2012 in the project area. This is consistent with the forecasts in the *Route 4 Corridor Study* for the medium growth scenario between 2015 and 2025, and was also the growth rate used in the US Route 4 & NYS Route 151 Final Design Report which also included the Tempel Farm site traffic. As a result, a growth rate of 0.5% per year was assumed for the study area.

3.2 NO-BUILD CONDITIONS

The 2020 No-Build conditions were developed by applying the 0.5% annual growth rate and adding the Tempel Farm Hotel site trips, Regeneron existing campus site trips, and the East Greenbush Tech Park site trips to the 2015 Existing AM and PM peak hour volumes. Figure 2 in Appendix B shows the 2020 No-Build AM and PM peak hour volumes.

As part of the Village at Tempel Farm Hotel development (Hampton Inn), a right-in/right-out access on Route 4 to the Hotel Access Road (which connects to Tempel Lane) between the I-90 Exit 9 Eastbound Ramps and Route 151 was built (See Figure D-1 in Appendix D), and was included in the No-Build condition. It should be noted that the southbound right-turn lane on US Route 4 that is shown on Figure D-1, was not built with the right-in/right-out access. Per discussions with the Town of East Greenbush, this right-turn lane would be required for the next phase of development for Tempel Farms. However, there is no current timeline for this next phase.

In addition, per discussions with NYSDOT, a signal will be installed at the Route 4 & I-90 Westbound Ramp intersection as part of a Safety Improvement Project. This signal was included in the No-Build condition.

4.0 FUTURE YEAR BUILD CONDITIONS

The site is located north of Red Mill Road (NY Route 151), south of 3rd Avenue Extension and west of US Route 4. This study looks at the traffic impacts for the full build-out of the site as well as a phased implementation of the site components. In the full build-out, primary access to the site driveway is on Tempel Lane. Two alternatives for a second connection from 3rd Avenue Extension were reviewed with the preferred being a private access at 3rd Avenue Extension & Woodlawn Avenue and the second with Tempel Lane extended to 3rd Avenue Extension (across from Cedar Crest Drive) to provide access to the site via Red Mill Road and 3rd Avenue Extension. The recommendations for the phased implementation is included in Section 5.3.6.

4.1 SITE GENERATED TRAFFIC

Trip generation determines the quantity of traffic expected to travel to/from the project site. The ITE Trip Generation Manual, 9th Edition, is the industry standard for determining trip generation for various land uses. The manual was used to estimate trips generated by the proposed site land uses. The manufacturing component was estimated using land use code (LUC) 140, the warehouse component was estimated using LUC 150 and the office/laboratory component was estimated using LUC 760 (Research and Development Center).

Table 4 summarizes the trip generation estimates for the AM and PM peak hours.

Table 4

Trip Generation

Land Use	Weekday AM			Weekday PM		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Manufacturing 165,000 SF	94	26	120	43	77	120
Warehouse 208,000 SF*	97	26	123	24	71	95
Office/Lab 1150 Employees	387	63	450	47	425	472
Total	**578**	**115**	**693**	**114**	**573**	**687**

*The warehouse being constructed in Phase 1 is 166,350 SF; however, the warehouse was originally analyzed prior to this change for a larger site of 208,000 SF, which is a more conservative estimate of trips (the smaller size would result in 14 fewer AM trips and 12 fewer PM trips). Therefore, the trip generation estimate was not revised for the purposes of the analysis.

4.2 TRIP DISTRIBUTION AND ASSIGNMENT

The traffic generated by the project, for the full build-out, was distributed to the site based on the two proposed access scenarios. In the preferred access scenario, Alternative 1, access to the site will be via the existing segment of Tempel Lane to Red Mill Road and a private access on 3rd Avenue Extension at Woodlawn Avenue. In the second alternative, Alternative 2, access to the site will be via Tempel Lane to Red Mill Road (NY Route 151) and to 3rd Avenue Extension at Cedar Crest Drive. Both alternatives have the same trip distribution and assignment at 3rd Avenue Extension and Red Mill Road (NY Route 151), and the remaining study intersections. The projected distributions were based on the existing Regeneron employee origin (residence) data, a review of previous studies completed for the site and consideration

of population centers in the Capital District. It is assumed that traffic origin-destination patterns for the Regeneron site will be comparable to these studies based on existing travel patterns in the study area. The following distributions were assumed for the project site:

- 30% to/from west via I-90
- 10% to/from east via I-90
- 20% to/from north via US Route 4
- 10% to/from south via US Route 4
- 20% to/from west via 3rd Avenue Extension
- 5% to/from west via Red Mill Road (NY Route 151)
- 5% to/from east via Luther Road (NY Route 151)

Figures 3 and 4 show the projected trip distributions for the site for both alternatives. The resulting distributed site generated trips are shown on Figures 5-8.

4.3 BUILD TRAFFIC VOLUMES

The site generated traffic was combined with the 2020 No-Build volumes to represent the estimated future volume conditions for the site. Two volume conditions were analyzed for the Build Alternative, related to the two access alternatives.

Alternative 1

The first Build condition, which is the preferred alternative, is to maintain the primary access from the site to the existing Tempel Lane connection to Red Mill Road and to provide a private second access for Regeneron at the 3rd Avenue Extension & Woodlawn Avenue intersection. This private access would be built on the Phase 1 maintenance road, and would require the construction of a third bridge on the roadway. The 2020 Build volumes for this condition are shown on Figure 9 in Appendix B.

Alternative 2

The second Build condition provides an extension of Tempel Lane to connect to 3rd Avenue Extension across from Cedar Crest Drive. Tempel Lane would be open to the public from Red Mill Road (NY Route 151) to 3rd Avenue Extension and Regeneron would have their private site access off of Tempel Lane. With the extension of Tempel Lane, it is assumed that some non-site traffic will divert onto Tempel Lane from Route 151 and Route 4. The Capital District Transportation Committee (CDTC) was contacted to establish diverted trips on Tempel Lane using their Systematic Transportation Evaluation and Planning (STEP) Model, which is a travel demand model for the Capital Region. Through this model, it is estimated that the following number of non-site vehicle trips will divert to Tempel Lane:

AM Peak Hour

- 60 northbound vehicles
- 10 southbound vehicles

PM Peak Hour

- 10 northbound vehicles
- 35 southbound vehicles

These vehicles were diverted from Route 4 and Route 151 to Tempel Lane based on assumed traffic patterns for the No-Build analysis. Figure 2 in Appendix B shows the No-Build AM and PM peak hour traffic volumes. The 2020 Build volume for the Tempel Lane Extension condition are shown on Figure 10 in Appendix B.

4.4 SITE ACCESS & CIRCULATION

The site layout plan is provided in Appendix A. For both alternatives, the primary circulation of vehicles on-site stems from the entry road from the existing Tempel Lane segment. At the site access on Tempel Lane, two inbound lanes and one outbound lane with stop control are proposed. A security / training building is proposed at the site access, with an 18 space surface lot provided adjacent to the building. After this building a security gate is proposed where incoming and outgoing traffic must pass. Once vehicles pass through security there is a driveway that leads to the office/lab building, a surface lot, and the parking garage. The site circulatory roadway then leads to the warehouse and manufacturing buildings, providing access to two parking lots and a loading area. The site plan includes approximately 1,000 structured parking spaces and 584 surface parking spaces for a total of 1,702 spaces with the security lot.

Alternative 1

For Alternative 1, the secondary access on 3rd Avenue Extension would be located at the Woodlawn Avenue intersection, with Regeneron converting the maintenance road constructed in Phase 1 to a private access for passenger cars. The northbound Regeneron access would have a left/thru lane and right-turn lane at the intersection. A security gate would also be provided on this access. Tractor trailers would continue to use the access on Tempel Lane.

Alternative 2

The second alternative would extend Tempel Lane north to intersect with 3rd Avenue Extension across from Cedar Crest Drive. With this extension, a left/thru lane and right-turn lane would be provided on the northbound Tempel Lane approach. With this alternative, all traffic would enter the security gate at the Tempel Lane access driveway.

There is currently sufficient sight distance at both proposed access points on 3rd Avenue Extension (See Section 6.2).

4.4.1 Pedestrian and Bicycle Access

Access to the site for pedestrians and bicyclists will be through the same driveways as vehicular traffic. There are no sidewalks on adjacent roadways to the site; roadway shoulders on Red Mill Road, 3rd Avenue Extension and Tempel Lane will be used by pedestrians and bicyclists. Crosswalks and sidewalks are provided on site to provide connectivity from parking areas to the building entrances.

4.4.2 Transit

As discussed in Section 2.4, there are currently no bus service routes on Red Mill Road or 3rd Avenue Extension adjacent to the site. Discussions with CDTA indicate that they would be interested in reviewing the project for potential service planning. Coordination with CDTA will occur during the site plan review

process so that they can provide feedback on the site design as it relates to access for busses and pedestrian infrastructure.

The existing Regeneron campus on Discovery Drive currently utilizes three shuttles (27 passenger capacity) to transport employees between their various buildings on and off campus. Regeneron currently occupies office space in the East Greenbush Technology Park (Mannix Road) and the Rensselaer Technology Park (US Route 4, North Greenbush) and the shuttle makes a loop between the Discovery Drive campus and these two locations twice an hour. This operation is expected to continue with the Tempel Lane Campus. The use of the shuttle greatly reduces trips between sites by employees, and this site interaction is not expected to have an impact on surrounding roadways and neighborhoods.

4.4.3 Emergency Access

The site has been designed to accommodate maneuvers by emergency vehicles to have full access to all buildings on site. A concept showing the emergency vehicle maneuvers is provided in Appendix A.

4.4.4 Truck Traffic

Service and delivery vehicles will all enter the site at the Tempel Lane entrance. There will be truck deliveries to and from the site between 6 AM and 4 PM. It is estimated that the warehouse will generate up to 60 small trucks (up to 25 ft long) and 20 large trucks (25 ft to 53 ft) per day, and the manufacturing buildings will generate up to 3 bulk gas trucks per week. The majority of the truck deliveries will be between this site and Regeneron's existing campus on Discovery Drive, with Red Mill Road (NY Route 151) as the primary route. This could result in an increase of trucks on Red Mill Road, up to 1%. However, these truck trips are not necessarily new but will be diverted to the Tempel Lane site. Regeneron is currently storing materials from the Discovery Drive campus off-site. The proposed warehouse on the Tempel Lane site will eliminate the need for storage of materials at other rented facilities. It should also be noted that the truck traffic for the site is included in the peak hour trip generation calculations presented in Section 4.1.

The site is being designed to accommodate maneuvers by tractor trailers. A concept showing the truck maneuvers is provided in Appendix A.

4.5 ROADWAY CONDITIONS

A detailed assessment of the roadway conditions on roadways surrounding the site (NY Route 151, 3rd Avenue Extension and Tempel Lane) was presented in Section 2.1.2. As noted, Red Mill Road (NY Route 151) was rehabilitated (either with cold in place recycling or mill & fill) in 2017 by NYSDOT.

The condition of 3rd Avenue Extension was noted as fair and is not in need of pavement rehabilitation.

The pavement condition on Tempel Lane currently ranges from fair to poor condition. A detailed pavement evaluation was completed for the full build-out of the site, and is included in Appendix I. The following are recommended for the different phases of the project:

- Phase 1, which is currently under construction, will include milling of the existing 1" of top course pavement on Tempel Lane and placing a 1.5" top course asphalt layer on milled pavement.
- Phase 2, which includes the warehouse and office/lab traffic, will include box widening the roadway to a width of 32'. An additional 1.5" of top course pavement will also be included.

Improvements in this phase will also include drainage improvements such as regrading/reshaping of ditches and/or installation of edge drains.

- Phase 3, which includes traffic for the warehouse, office/lab, and manufacturing will not require additional improvements to the existing portion of Tempel Lane.

5.0 OPERATING CONDITIONS

5.1 LEVEL OF SERVICE METHODOLOGY

The operating conditions of transportation facilities are evaluated based on the relationship of existing or projected traffic volumes to the theoretical capacity of the highway. Various factors affect highway capacity, including traffic volume, speed, roadway geometry, grade, number and width of travel lanes and intersection control. The current standards for evaluating capacity and operating conditions are contained in the Highway Capacity Manual 2010 (HCM 2010), published by the Transportation Research Board (TRB). The procedures describe operating conditions in terms of Level of Service (LOS). In general, LOS "A" represents the best operating conditions and LOS "F" represents the worst.

To determine existing traffic operating conditions at the study area intersections, a capacity analysis was performed using SYNCHRO 10 software. The roundabout analyses were performed using Sidra 7 software. This is an update to the October 2016 TIS where SYNCHRO 8 and Sidra 6 software was used. The update in software resulted in minor differences in delay for the Existing and No-Build conditions when compared to the October 2016 TIS.

The HCM methodology for unsignalized intersections generally assumes that major street traffic is not affected by minor street flows. Left turns from the major street are assumed to be affected by opposing, or oncoming, major street flow. Minor street traffic is affected by all conflicting movements. The HCM methodology expresses the quality of flow at unsignalized intersections in terms of Levels of Service (LOS) based on the amount of delay that a driver experiences. This relationship differs somewhat from the criteria used for signalized intersections, primarily because drivers expect different levels of performance from the two different kinds of transportation facilities. For unsignalized intersections, LOS range from A, with minimal delay (ten seconds or less per vehicle), to F, which represents long delays (50 seconds or greater per vehicle). A LOS of E or better is generally considered acceptable for unsignalized movements during peak periods. For signalized intersections, LOS range from A, with minimal delay (ten seconds or less per vehicle), to F, which represents long delays (80 seconds or greater per vehicle). A LOS of D or better is generally considered acceptable for signalized movements during peak periods. Table 5 below summarizes the HCM LOS for signalized and unsignalized intersections.

Table 5
HCM LOS

LOS	Control Delay per Vehicle (seconds)	
	Signalized Intersection	Unsignalized Intersections
A	10 or less	10 or less
B	>10-20	>10-15
C	>20-35	>15-25
D	>35-55	>25-35
E	>55-80	>35-50
F	greater than 80	greater than 50

*A v/c ratio >1 results in LOS F

5.2 CAPACITY ANALYSIS

To determine the impact of the Regeneron facility on the operations of the adjacent transportation system, traffic operations of the study intersections were analyzed for the Weekday AM and PM peak hours for the following conditions:

- 2015 Existing Condition
- 2020 (ETC) No-Build Condition
- 2020 (ETC) Build Condition – Alternative 1 (Private Regeneron Access - 3rd Avenue Extension & Woodlawn Avenue)
- 2020 (ETC) Build Condition – Alternative 2 (Tempel Lane Extension to 3rd Avenue Extension & Cedar Crest Drive)

Capacity analysis worksheets are provided in Appendix F.

5.2.1 Existing Condition

Summaries of the LOS for the Existing condition are presented in Table 6. As shown in this analysis, the following study area intersections have one or more movements that experience LOS E or F during the Existing studied peak hours:

- US Route 4 & I-90 Westbound Ramps
  - Westbound left (AM and PM)
- US Route 4 & Grandview Drive/Greenbush Commons
  - Eastbound left/thru (PM)
  - Westbound left/thru/right (PM)

In addition to delay and LOS, the volume to capacity (v/c) ratio was reviewed for the study intersections. The v/c ratio identifies the proportion of the movement's capacity being used. Generally a v/c ratio less than 0.85 indicates that adequate capacity is available. A v/c ratio between 0.85 and 1.0 indicates that delay and queueing may occur. A v/c ratio greater than 1.0 means that the demand has exceeded the capacity of a movement and excessive delays and queues are likely. For the study intersections, the movement v/c ratios are estimated to be 0.85 or less with the exception of the following:

- US Route 4 & I-90 Eastbound Ramps
  - Eastbound right (PM)
- US Route 4 & 3rd Avenue Extension
  - Eastbound left (PM)
- US Route 4 & Grandview Drive/Greenbush Commons
  - Eastbound left/thru (PM)
  - Northbound thru/right (PM)
- US Route 4 & I-90 Westbound Ramps
  - Westbound left (AM and PM)
- US Route 4 & Red Mill Road (NY Route 151)
  - Northbound thru/right (AM)

5.2.2 No-Build Condition

Delay is estimated to increase through the ETC design horizon due to the background traffic growth. As noted in Section 3.2, the right-in/right-out access on Route 4 between the I-90 Eastbound Ramps and Route 151 and the Hotel Access Road to Tempel Lane is included since it was recently built with the hotel on the Tempel Farm site. In addition, a signal was included at the Route 4 & Westbound Ramps intersection, as it is going to be built by NYSDOT as part of a safety improvement project. As shown in Tables 7 and 8, the following study area intersections are projected to experience LOS E or F for one or more movements during the studied peak hours for the No-Build condition:

- US Route 4 & Grandview Drive/Greenbush Commons
    - Eastbound left/thru (PM)
    - Westbound left/thru/right (PM)
    - Northbound thru/right (PM)

The movement v/c ratios are estimated to be 0.85 or less with the exception of the following:

- US Route 4 & I-90 Eastbound Ramps
    - Eastbound right (PM)
- US Route 4 & 3rd Avenue Extension
    - Eastbound left (PM)
- US Route 4 & Grandview Drive/Greenbush Commons
    - Eastbound left/thru (PM)
    - Northbound thru/right (AM and PM)
- US Route 4 & Red Mill Road (NY Route 151)
    - Westbound right (AM)
    - Northbound thru/right (AM and PM)
    - Southbound thru/right (PM)

5.2.3 Build Condition – Alternative 1

The preferred alternative is for Regeneron to have two accesses to the Tempel Lane site, with the main access point on the existing Tempel Lane segment, and a second private access point on 3rd Avenue Extension across from Woodlawn Avenue. The existing Tempel Lane segment would remain open to the public.

Using the No-Build geometry and existing signal timings, the study intersections were analyzed using the projected Build Volumes for the Regeneron Tempel Lane site.

As shown in Tables 7 and 8, the addition of the project generated traffic does reduce the LOS for some movements at the study area intersections.

The following are the changes:

AM Peak Hour

- US Route 4 & I-90 Eastbound Ramps
    - Eastbound right – LOS B to LOS C
- US Route 4 & 3rd Avenue Extension
    - Eastbound right – LOS B to LOS C

- US Route 4 & Grandview/Greenbush Commons
    - Southbound left – LOS B to LOS C
- 3rd Avenue Extension & Woodlawn Avenue/Regeneron Access
    - Southbound left/thru/right – LOS B to LOS C
- Tempel Lane & Hotel Access
    - Westbound left/right – LOS A to LOS B
- US Route 4 & Red Mill Road (NY Route 151)
    - Westbound right – LOS D to LOSs F
    - Southbound thru/right – LOS A to LOS B

PM Peak Hour

- US Route 4 & I-90 Eastbound Ramps
    - Northbound thru – LOS B to LOS C
- US Route 4 & I-90 Westbound Ramps
    - Northbound right – LOS A to LOS B
- US Route 4 & 3rd Avenue Extension
    - Eastbound left – LOS C to LOS D
    - Southbound thru – LOS B to LOS C
    - Southbound thru/right – LOS B to LOS C
- US Route 4 & Grandview Drive/Greenbush Commons
    - Northbound thru/right – Increase in LOS F delay
- Red Mill Road (NY Route 151) & Tempel Lane
    - Southbound left/right – LOS C to LOS F
- US Route 4 & Hotel Access
    - Eastbound right – LOS C to LOS D
- 3rd Avenue Extension & Woodlawn Avenue/Regeneron Access
    - Southbound left/thru/right – LOS B to LOS C
- Tempel Lane & Hotel Access
    - Westbound left/right – LOS A to LOS B
- US Route 4 & Red Mill Road (NY Route 151)
    - Eastbound left – LOS C to LOS F
    - Eastbound thru/right – LOS C to LOS F
    - Westbound right – LOS A to LOS B
    - Northbound thru/right– LOS C to LOS F

At the new intersection of Tempel Lane & the Regeneron access, all movements are estimated to operate at LOS B or better.

5.2.4 Build Condition – Alternative 2

The alternative with Tempel Lane extended to 3rd Avenue Extension was also tested as this was the alternative tested in the original October 2016 Traffic Impact Study. This access alternative would be implemented if it is not feasible to build the third bridge necessary to complete the maintenance road that is being constructed as part of Phase 1. Because the extension of Tempel Lane would be a public roadway, the analysis of this alternative included the consideration of the local traffic diversions to Tempel Lane from US Route 4, as noted in Section 4.3.

Using the No-Build geometry and existing signal timings, the study intersections were analyzed using the projected Build volumes for the Regeneron Tempel Lane site with an extension of Tempel Lane. As shown in Tables 9 and 10, the addition of the project generated traffic does reduce the LOS for some movements at the study area intersections.

The changes in LOS are the same as Alternative 1 (See section 5.2.3) with the exception of the following:

AM Peak Hour

- US Route 4 & Red Mill Road (NY Route 151)
  - Westbound right – No change in LOS between No-Build and Build
  - Northbound left – LOS B to LOS C
- 3rd Avenue Extension & Cedar Crest Drive/Tempel Lane
  - Southbound left/thru/right – LOS B to LOS C

PM Peak Hour

- 3rd Avenue Extension & Cedar Crest Drive/Tempel Lane
  - Southbound left/thru/right – LOS B to LOS C

At the new intersection of Tempel Lane & the Regeneron Access, all movements are estimated to operate at LOS C or better.

Table 6
Regeneron
2015 Existing Condition

Intersection	Level of Service													
	AM							PM						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Signalized Intersections														
US Route 4 & I-90 Eastbound Ramps														
I-90 EB Off-Ramp	EB L	0.76	21.3	C	EB	19.8	B	EB L	0.29	15.9	B	EB	26.5	C
	EB R	0.62	17.8	B				EB R	0.88	29.8	C			
US Route 4	NB L	0.11	10.0	B	NB	10.7	B	NB L	0.31	17.8	B	NB	18.2	B
	NB T	0.59	10.7	B				NB T	0.63	18.2	B			
	SB T	0.32	13.5	B	SB	12.2	B	SB T	0.60	24.3	C	SB	20.5	C
	SB R	0.06	3.8	A				SB R	0.13	3.5	A			
OVERALL						13.9	B						21.5	C
US Route 4 & 3rd Avenue Extension														
3rd Avenue Ext	EB L	0.84	25.6	C	EB	23.9	C	EB L	0.88	24.5	C	EB	22.0	C
	EB R	0.19	17.2	B				EB R	0.34	16.1	B			
US Route 4	NB L	0.39	20.9	C	NB	9.6	A	NB L	0.31	22.1	C	NB	11.8	B
	NB T	0.44	6.5	A				NB T	0.57	10.1	B			
	SB T	0.61	13.3	B	SB	13.4	B	SB T	0.61	16.2	B	SB	16.2	B
	SB TR	0.61	13.5	B				SB TR	0.61	16.3	B			
OVERALL						14.2	B						16.4	B
US Route 4 & Grandview Drive/Greenbush Commons														
Greenbush Commons	EB LT	0.19	27.8	C	EB	27.5	C	EB LT	0.87	58.8	E	EB	51.5	D
	EB R	0.07	26.5	C				EB R	0.22	29.5	C			
Grandview Drive	WB LTR	0.69	33.5	C	EB	33.5	C	WB LTR	0.76	69.9	E	EB	69.9	E
US Route 4	NB L	0.11	8.8	A	NB	22.0	C	NB L	0.29	11.8	B	NB	37.3	D
	NB TR	0.84	22.8	C				NB TR	0.95	40.0	D			
	SB L	0.74	17.5	B	SB	11.6	B	SB L	0.30	24.1	C	SB	15.7	B
	SB T	0.41	10.0	A				SB T	0.46	15.7	B			
	SB R	0.05	7.6	A				SB R	0.19	13.1	B			
OVERALL						18.0	B						31.4	C
3rd Avenue Extension & Barracks Road														
3rd Avenue Ext	EB T	0.14	5.7	A	EB	5.7	A	EB T	0.23	6.5	A	EB	6.5	A
	EB TR	0.14	5.7	A				EB TR	0.24	6.5	A			
	WB LT	0.42	7.5	A	WB	7.4	A	WB LT	0.31	7.7	A	WB	7.3	A
	WB T	0.44	7.3	A				WB T	0.30	6.9	A			
Barracks Road	NB L	0.35	11.3	B	NB	11.0	B	NB L	0.16	8.2	A	NB	8.5	A
	NB R	0.13	10.0	A				NB R	0.25	8.7	A			
OVERALL						7.7	A						7.3	A

Table 6
Regeneron
2015 Existing Condition

Intersection	Level of Service													
	AM							PM						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Unsignalized Intersections														
Red Mill Road (NY Route 151) & Tempel Lane														
Red Mill Road (NY Route 151)	EB L	0.01	8.3	A				EB L	0.01	8.0	A			
Tempel Lane	SB LR	0.04	13.7	B				SB LR	0.19	18.0	C			
US Route 4 & I-90 Westbound Ramps														
I-90 WB Off-Ramp	WB L	0.86	185.8	F				WB L	1.49	699.1	F			
	WB R	0.51	17.2	C				WB R	0.38	14.2	B			
US Route 4	NBR	**	2.7	A				NBR	**	4.7	A			
	SB L	0.39	13.4	B				SB L	0.54	13.9	B			
3rd Avenue Extension & Cedar Crest Drive														
3rd Avenue Extension	EB L	0.00	8.7	A				EB L	0.01	8.1	A			
Cedar Crest Drive	SB LR	0.04	14.1	B				SB LR	0.02	13.0	B			
3rd Avenue Ext & Woodlawn Avenue/Regeneron Access														
3rd Avenue Ext	EB L	0.00	8.7	A				EB L	0.01	8.1	A			
Woodlawn Avenue	SB LR	0.05	14.0	B				SB LR	0.03	13.3	B			
Roundabout Intersections														
US Route 4 & Red Mill Road/Luther Road (NY Route 151)														
Red Mill Road (NY Route 151)	EB L	0.25	13.3	B	EB	11.3	B	EB L	0.52	20.6	C	EB	17.8	B
	EB TR	0.21	8.2	A				EB TR	0.67	16.0	B			
Luther Road (NY Route 151)	WB LT	0.51	17.8	B	WB	20.2	C	WB LT	0.23	12.4	B	WB	9.8	A
	WB R	0.81	21.2	C				WB R	0.31	8.3	A			
US Route 4	NB L	0.09	16.5	B	NB	14.6	B	NB L	0.06	17.0	B	NB	16.8	B
	NB TR	0.86	14.5	B				NB TR	0.84	16.8	B			
	SB L	0.25	14.2	B	SB	8.5	A	SB L	0.44	12.7	B	SB	10.0	A
	SB TR	0.54	7.0	A				SB TR	0.83	8.9	A			
OVERALL						13.8	B						12.9	B
US Route 4 & Mannix Road														
Mannix Road	EB LTR	0.05	7.8	A	EB	7.8	A	EB LTR	0.16	9.4	A	EB	9.4	A
	WB L	0.09	9.9	A	WB	8.2	A	WB L	0.31	10.9	B	WB	9.6	A
	WB LTR	0.09	6.6	A				WB LTR	0.31	8.3	A			
US Route 4	NB LT	0.44	6.0	A	NB	5.8	A	NB LT	0.39	6.6	A	NB	6.0	A
	NB TR	0.44	5.6	A				NB TR	0.39	5.4	A			
	SB LT	0.38	7.6	A	SB	6.9	A	SB LT	0.62	9.2	A	SB	8.9	A
	SB TR	0.38	6.2	A				SB TR	0.62	8.6	A			
OVERALL						6.4	A						7.9	A

*Movement; Volume to Capacity Ratio; Level of Service; Approach

**Delay From SimTraffic

Table 7
Regeneron
2020 No-Build & Build Analysis Alternative 1
AM Peak Hour

Intersection	Level of Service													
	No-Build							Build						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Signalized Intersections														
US Route 4 & I-90 Eastbound Ramps														
I-90 EB Off-Ramp	EB L	0.80	23.5	C	EB	21.6	C	EB L	0.71	22.1	C	EB	22.8	C
	EB R	0.64	19.0	B				EB R	0.79	23.4	C			
US Route 4	NB L	0.13	11.0	B	NB	12.4	B	NB L	0.17	13.1	B	NB	15.2	B
	NB T	0.64	12.5	B				NB T	0.68	15.3	B			
	SB T	0.34	14.8	B	SB	13.4	B	SB T	0.38	17.4	B	SB	15.7	B
	SB R	0.06	3.5	A				SB R	0.06	3.2	A			
OVERALL						15.5	B						17.9	B
US Route 4 & I-90 Westbound Ramps														
I-90 WB Off-Ramp	WB L	0.22	17.9	B	EB	15.1	B	WB L	0.30	18.6	B	EB	15.7	B
	WB R	0.51	14.4	B				WB R	0.54	14.6	B			
US Route 4	NB T	0.71	14.8	B	NB	12.5	B	NB L	0.71	15.5	B	NB	12.9	B
	NB R	0.44	6.9	A				NB T	0.46	7.1	A			
	SB L	0.68	11.9	B	SB	7.1	A	SB T	0.70	12.4	B	SB	7.5	A
	SB T	0.25	4.6	A				SB R	0.25	4.8	A			
OVERALL						11.1	B						11.6	B
US Route 4 & 3rd Avenue Extension														
3rd Avenue Ext	EB L	0.85	27.5	C	EB	25.4	C	EB L	0.88	30.3	C	EB	28.0	C
	EB R	0.23	18.8	B				EB R	0.24	20.7	C			
US Route 4	NB L	0.45	23.7	C	NB	10.5	B	NB L	0.63	29.9	C	NB	13.2	B
	NB T	0.45	6.8	A				NB T	0.45	7.4	A			
	SB T	0.64	13.9	B	SB	14.0	B	SB T	0.67	15.0	B	SB	15.6	B
	SB TR	0.64	14.1	B				SB TR	0.70	16.1	B			
OVERALL						15.1	B						17.2	B
US Route 4 & Grandview Drive/Greenbush Commons														
Greenbush Commons	EB LT	0.20	29.2	C	EB	28.8	C	EB LT	0.20	30.3	C	EB	29.9	C
	EB R	0.08	27.9	C				EB R	0.09	29.0	C			
Grandview Drive	WB LTR	0.71	35.6	D	EB	35.6	D	WB LTR	0.71	37.1	D	EB	37.1	D
US Route 4	NB L	0.12	9.3	A	NB	24.4	C	NB L	0.13	9.6	A	NB	26.1	C
	NB TR	0.86	25.3	C				NB TR	0.87	27.0	C			
	SB L	0.80	19.7	B	SB	12.5	B	SB L	0.84	21.4	C	SB	13.1	B
	SB TR	0.44	10.6	B				SB TR	0.50	11.2	B			
	SB R	0.05	7.8	A				SB R	0.05	7.9	A			
OVERALL						19.5	B						20.3	C
3rd Avenue Extension & Barracks Road														
3rd Avenue Ext	EB T	0.15	5.5	A	EB	5.5	A	EB T	0.22	5.6	A	EB	5.6	A
	EB R	0.15	5.5	A				EB R	0.22	5.6	A			
	WB L	0.45	7.9	A	WB	7.6	A	WB L	0.48	8.6	A	WB	7.8	A
	WB T	0.45	7.2	A				WB T	0.47	7.1	A			
Barracks Road	NB L	0.38	12.3	B	NB	11.9	B	NB L	0.40	13.5	B	NB	13.1	B
	NB R	0.13	10.7	B				NB R	0.15	11.9	B			
OVERALL						7.9	A						8.1	A

Table 7
Regeneron
2020 No-Build & Build Analysis Alternative 1
AM Peak Hour

Intersection	Level of Service													
	No-Build							Build						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Unsignalized Intersections														
Red Mill Road (NY Route 151) & Tempel Lane														
NYS Route 151	EB L	0.01	8.5	A				EB L	0.04	8.9	A			
Tempel Lane	SB LR	0.08	15.4	C				SB LR	0.23	20.1	C			
US Route 4 & Hotel Access														
Hotel Access	EB R	0.02	11.5	B				EB R	0.09	13.2	B			
3rd Avenue Ext & Woodlawn Avenue/Regeneron Access														
3rd Avenue Ext	EB L	0.00	8.8	A				EB L	0.00	8.8	A			
								WB L	0.14	8.8	A			
Regeneron Access								NB L	0.24	49.7	E			
								NB R	0.05	10.7	B			
Woodlawn Avenue	SB LTR	0.05	14.7	B				SB LTR	0.09	23.6	C			
Tempel Lane & Hotel Access														
Hotel Access	WB LR	0.01	8.6	A				WB LR	0.26	10.3	B			
Tempel Lane	SB L	0.00	0.0	A				SB L	0.02	7.5	A			
Tempel Lane & Regeneron Access														
Regeneron Access	WB LR							WB LR	0.08	9.8	A			
Tempel Lane	SB L							SB L	0.00	0.0	A			
Roundabout Intersections														
US Route 4 & Red Mill Road/Luther Road (NY Route 151)														
Red Mill Road (NY Route 151)	EB L	0.29	13.5	B	EB	11.6	B	EB L	0.33	13.7	B	EB	11.8	B
	EB TR	0.23	8.5	A				EB TR	0.26	8.7	A			
Luther Road (NY Route 151)	WB LT	0.60	21.0	C	WB	32.5	C	WB LT	0.70	24.1	C	WB	44.0	D
	WB R	0.95	37.4	D				WB R	1.02	53.8	F			
US Route 4	NB L	0.13	17.1	B	NB	20.5	C	NB L	0.33	19.0	B	NB	25.0	C
	NB TR	0.94	20.7	C				NB TR	0.97	25.9	C			
	SB L	0.27	14.7	B	SB	9.2	A	SB L	0.33	16.0	B	SB	11.7	B
	SB TR	0.59	7.7	A				SB TR	0.66	10.3	B			
OVERALL						19.1	B						24.2	C
US Route 4 & Mannix Road														
Mannix Road	EB LTR	0.05	8.1	A	EB	8.1	A	EB LTR	0.05	8.2	A	EB	8.2	A
	WB L	0.10	10.3	B	WB	8.6	A	WB L	0.10	10.4	B	WB	8.7	A
	WB LTR	0.10	7.0	A				WB LTR	0.10	7.1	A			
US Route 4	NB LT	0.52	6.5	A	NB	6.3	A	NB LT	0.54	6.5	A	NB	6.3	A
	NB TR	0.52	6.1	A				NB TR	0.54	6.1	A			
	SB LT	0.42	8.2	A	SB	7.3	A	SB LT	0.43	8.2	A	SB	7.2	A
	SB TR	0.42	6.3	A				SB TR	0.43	6.3	A			
OVERALL						6.8	A						6.8	A

*Movement; Volume to Capacity Ratio; Level of Service; Approach

Table 8
Regeneron
2020 No-Build & Build Analysis Alternative 1
PM Peak Hour

Intersection	Level of Service													
	No-Build							Build						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Signalized Intersections														
US Route 4 & I-90 Eastbound Ramps														
I-90 EB Off-Ramp	EB L	0.31	17.6	B	EB	31.8	C	EB L	0.32	19.2	B	EB	33.5	C
	EB R	0.91	36.2	D				EB R	0.92	37.8	D			
US Route 4	NB L	0.38	18.9	B	NB	19.0	B	NB L	0.52	19.8	B	NB	20.0	B
	NB T	0.64	19.1	B				NB T	0.70	20.0	C			
	SB T	0.64	25.9	C	SB	21.9	C	SB T	0.65	27.2	C	SB	23.0	C
	SB R	0.14	3.5	A				SB R	0.15	4.2	A			
OVERALL						23.8	C						24.7	C
US Route 4 & I-90 Westbound Ramps														
I-90 WB Off-Ramp	WB L	0.10	18.5	B	EB	11.8	B	WB L	0.13	19.3	B	EB	12.1	B
	WB R	0.33	10.8	B				WB R	0.33	10.8	B			
US Route 4	NB T	0.72	18.1	B	NB	15.6	B	NB T	0.72	18.8	B	NB	16.0	B
	NB R	0.38	9.1	A				NB R	0.50	10.4	B			
	SB L	0.85	14.1	B	SB	8.2	A	SB L	0.88	16.8	B	SB	9.2	A
	SB T	0.45	5.2	A				SB T	0.45	5.1	A			
OVERALL						11.2	B						12.0	B
US Route 4 & 3rd Avenue Extension														
3rd Avenue Ext	EB L	0.89	25.6	C	EB	22.9	C	EB L	0.93	35.9	D	EB	30.5	C
	EB R	0.35	16.7	B				EB R	0.35	16.7	B			
US Route 4	NB L	0.40	25.2	C	NB	13.7	B	NB L	0.49	32.6	C	NB	18.9	B
	NB T	0.62	11.5	B				NB T	0.67	16.2	B			
	SB T	0.63	17.3	B	SB	17.3	B	SB T	0.68	22.0	C	SB	22.0	C
	SB TR	0.63	17.4	B				SB TR	0.68	22.1	C			
OVERALL						17.7	B						23.7	C
US Route 4 & Grandview Drive/Greenbush Commons														
Greenbush Commons	EB LT	0.88	61.6	E	EB	53.7	D	EB LT	0.88	61.6	E	EB	53.6	D
	EB R	0.23	30.2	C				EB R	0.24	30.3	C			
Grandview Drive	WB LTR	0.79	78.5	E	WB	78.5	E	WB LTR	0.79	78.5	E	WB	78.5	E
US Route 4	NB L	0.29	11.8	B	NB	50.6	D	NB L	0.30	11.9	B	NB	86.3	F
	NB TR	1.01	54.4	F				NB TR	1.12	92.9	F			
	SB L	0.40	26.9	C	SB	15.8	B	SB L	0.40	26.9	C	SB	15.9	B
	SB T	0.48	15.7	B				SB T	0.49	15.9	B			
	SB R	0.19	12.9	B				SB R	0.19	12.9	B			
OVERALL						37.6	D						53.8	D
3rd Avenue Extension & Barracks Road														
3rd Avenue Ext	EB T	0.23	6.5	A	EB	6.5	A	EB T	0.23	6.3	A	EB	6.3	A
	EB R	0.23	6.6	A				EB R	0.24	6.4	A			
	WB L	0.33	7.9	A	WB	7.5	A	WB L	0.38	7.5	A	WB	7.4	A
	WB T	0.32	7.0	A				WB T	0.39	7.3	A			
Barracks Road	NB L	0.18	8.5	A	NB	8.8	A	NB L	0.19	9.2	A	NB	9.6	A
	NB R	0.27	9.0	A				NB R	0.28	9.8	A			
OVERALL						7.5	A						7.5	A

Table 8
Regeneron
2020 No-Build & Build Analysis Alternative 1
PM Peak Hour

Intersection	Level of Service													
	No-Build							Build						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Unsignalized Intersections														
Red Mill Road (NY Route 151) & Tempel Lane														
NYS Route 151	EB L	0.01	8.1	A				EB L	0.01	8.2	A			
Tempel Lane	SB LR	0.27	21.1	C				SB LR	0.91	68.9	F			
US Route 4 & Hotel Access														
Hotel Access	EB R	0.05	17.8	C				EB R	0.60	34.6	D			
3rd Avenue Ext & Woodlawn Ave/Regeneron Access														
3rd Avenue Ext	EB L	0.01	8.2	A				EB L	0.01	8.2	A			
								WB L	0.03	8.5	A			
Regeneron Access								NB L	0.58	42.0	E			
								NB R	0.27	13.5	B			
Woodlawn Avenue	SB LTR	0.03	14.0	B				SB LTR	0.05	21.1	C			
Tempel Lane & Hotel Access														
Hotel Access	WB LR	0.02	8.6	A				WB LR	0.08	10.1	B			
Tempel Lane	SB L	0.00	0.0	A				SB L	0.10	7.5	A			
Tempel Lane & Regeneron Access														
Regeneron Access	WB LR							WB LR	0.35	10.7	B			
Tempel Lane	SB L							SB L	0.00	0.0	A			
Roundabout Intersections														
US Route 4 & Red Mill Road/Luther Road (NY Route 151)														
Red Mill Road (NY Route 151)	EB L	0.65	24.2	C	EB	23.3	C	EB L	1.01	61.1	F	EB	56.8	E
	EB TR	0.81	22.7	C				EB TR	1.01	53.1	F			
Luther Road (NY Route 151)	WB LT	0.25	12.7	B	WB	10.1	B	WB LT	0.30	14.2	B	WB	12.0	B
	WB R	0.34	8.6	A				WB R	0.39	10.6	B			
US Route 4	NB L	0.09	17.6	B	NB	22.8	C	NB L	0.14	19.2	B	NB	59.0	E
	NB TR	0.91	23.0	C				NB TR	1.07	61.7	F			
	SB L	0.48	12.9	B	SB	12.4	B	SB L	0.59	13.7	B	SB	15.6	B
	SB TR	0.90	12.1	B				SB TR	0.94	16.6	B			
OVERALL						16.4	B						32.6	C
US Route 4 & Mannix Road														
Mannix Road	EB LTR	0.17	10.4	B	EB	10.4	B	EB LTR	0.18	10.6	B	EB	10.6	B
	WB L	0.42	12.0	B	WB	10.5	B	WB L	0.42	12.0	B	WB	10.6	B
	WB LTR	0.42	9.2	A				WB LTR	0.42	9.2	A			
US Route 4	NB LT	0.41	6.6	A	NB	6.0	A	NB LT	0.42	6.6	A	NB	6.0	A
	NB TR	0.41	5.4	A				NB TR	0.42	5.4	A			
	SB LT	0.69	10.7	B	SB	10.4	B	SB LT	0.71	10.9	B	SB	10.7	B
	SB TR	0.69	10.1	B				SB TR	0.71	10.4	B			
OVERALL						8.8	A						9.0	A

*Movement; Volume to Capacity Ratio; Level of Service; Approach

Table 9
Regeneron
2020 No-Build & Build Analysis Alternative 2
AM Peak Hour

Intersection	Level of Service													
	No-Build							Build						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Signalized Intersections														
US Route 4 & I-90 Eastbound Ramps														
I-90 EB Off-Ramp	EB L	0.80	23.5	C	EB	21.6	C	EB L	0.71	21.2	C	EB	21.7	C
	EB R	0.64	19.0	B				EB R	0.78	22.3	C			
US Route 4	NB L	0.13	11.0	B	NB	12.4	B	NB L	0.18	13.1	B	NB	14.8	B
	NB T	0.64	12.5	B				NB T	0.66	14.9	B			
	SB T	0.34	14.8	B	SB	13.4	B	SB T	0.39	17.5	B	SB	15.8	B
	SB R	0.06	3.5	A				SB R	0.06	3.3	A			
OVERALL						15.5	B						17.4	B
US Route 4 & I-90 Westbound Ramps														
I-90 WB Off-Ramp	WB L	0.22	17.9	B	EB	15.1	B	WB L	0.30	18.1	B	EB	15.2	B
	WB R	0.51	14.4	B				WB R	0.53	14.1	B			
US Route 4	NB T	0.71	14.8	B	NB	12.5	B	NB L	0.69	15.0	B	NB	12.5	B
	NB R	0.44	6.9	A				NB T	0.47	7.3	A			
	SB L	0.68	11.9	B	SB	7.1	A	SB T	0.68	11.9	B	SB	7.3	A
	SB T	0.25	4.6	A				SB R	0.25	4.8	A			
OVERALL						11.1	B						11.3	B
US Route 4 & 3rd Avenue Extension														
3rd Avenue Ext	EB L	0.85	27.5	C	EB	25.4	C	EB L	0.88	30.5	C	EB	28.3	C
	EB R	0.23	18.8	B				EB R	0.23	20.8	C			
US Route 4	NB L	0.45	23.7	C	NB	10.5	B	NB L	0.45	28.0	C	NB	11.4	B
	NB T	0.45	6.8	A				NB T	0.45	7.4	A			
	SB T	0.64	13.9	B	SB	14.0	B	SB T	0.66	15.0	B	SB	15.6	B
	SB TR	0.64	14.1	B				SB TR	0.71	16.3	B			
OVERALL						15.1	B						16.9	B
US Route 4 & Grandview Drive/Greenbush Commons														
Greenbush Commons	EB LT	0.20	29.2	C	EB	28.8	C	EB LT	0.20	30.3	C	EB	29.9	C
	EB R	0.08	27.9	C				EB R	0.09	29.0	C			
Grandview Drive	WB LTR	0.71	35.6	D	EB	35.6	D	WB LTR	0.71	37.1	D	EB	37.1	D
US Route 4	NB L	0.12	9.3	A	NB	24.4	C	NB L	0.13	9.6	A	NB	26.1	C
	NB TR	0.86	25.3	C				NB TR	0.87	27.0	C			
	SB L	0.80	19.7	B	SB	12.5	B	SB L	0.84	21.4	C	SB	13.1	B
	SB TR	0.44	10.6	B				SB TR	0.50	11.2	B			
	SB R	0.05	7.8	A				SB R	0.05	7.9	A			
OVERALL						19.5	B						20.3	C
3rd Avenue Extension & Barracks Road														
3rd Avenue Ext	EB T	0.15	5.5	A	EB	5.5	A	EB T	0.22	5.6	A	EB	5.6	A
	EB R	0.15	5.5	A				EB R	0.22	5.6	A			
	WB L	0.45	7.9	A	WB	7.6	A	WB L	0.48	8.6	A	WB	7.8	A
	WB T	0.45	7.2	A				WB T	0.47	7.1	A			
Barracks Road	NB L	0.38	12.3	B	NB	11.9	B	NB L	0.40	13.7	B	NB	13.3	B
	NB R	0.13	10.7	B				NB R	0.14	11.9	B			
OVERALL						7.9	A						8.0	A

Table 9
Regeneron
2020 No-Build & Build Analysis Alternative 2
AM Peak Hour

Intersection	Level of Service													
	No-Build							Build						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Unsignalized Intersections														
Red Mill Road (NY Route 151) & Tempel Lane														
NYS Route 151	EB L	0.01	8.5	A				EB L	0.07	9.2	A			
Tempel Lane	SB LR	0.08	15.4	C				SB LR	0.29	23.3	C			
	-	-	-	-				-	-	-	-			
US Route 4 & Hotel Access														
Hotel Access	EB R	0.02	11.5	B				EB R	0.09	13.2	B			
3rd Avenue Ext & Cedar Crest Drive/Tempel Lane														
3rd Avenue Ext	EB L	0.00	8.8	A				EB L	0.00	8.7	A			
								WB L	0.14	8.7	A			
Tempel Lane								NB L	0.64	80.5	F			
								NB R	0.07	10.7	B			
Cedar Crest Drive	SB LTR	0.04	14.8	B				SB LTR	0.07	22.9	C			
Tempel Lane & Hotel Access														
Hotel Access	WB LR	0.01	8.6	A				WB LR	0.28	11.0	B			
Tempel Lane	SB L	0.00	0.0	A				SB L	0.02	7.7	A			
Tempel Lane & Regeneron Access														
Regeneron Access	WB LR							WB LR	0.33	19.4	C			
Tempel Lane	SB L							SB L	0.25	9.2	A			
Roundabout Intersections														
US Route 4 & Red Mill Road/Luther Road (NY Route 151)														
Red Mill Road (NY Route 151)	EB L	0.29	13.5	B	EB	11.6	B	EB L	0.33	13.6	B	EB	11.8	B
	EB TR	0.23	8.5	A				EB TR	0.27	8.7	A			
Luther Road (NY Route 151)	WB LT	0.60	21.0	C	WB	32.5	C	WB LT	0.71	22.8	C	WB	32.8	C
	WB R	0.95	37.4	D				WB R	0.95	38.5	D			
US Route 4	NB L	0.13	17.1	B	NB	20.5	C	NB L	0.41	20.2	C	NB	20.8	C
	NB TR	0.94	20.7	C				NB TR	0.94	20.9	C			
	SB L	0.27	14.7	B	SB	9.2	A	SB L	0.35	16.7	B	SB	13.1	B
	SB TR	0.59	7.7	A				SB TR	0.69	11.9	B			
OVERALL						19.1	B						20.4	C
US Route 4 & Mannix Road														
Mannix Road	EB LTR	0.05	8.1	A	EB	8.1	A	EB LTR	0.05	8.1	A	EB	8.1	A
	WB L	0.10	10.3	B	WB	8.6	A	WB L	0.10	10.2	B	WB	8.5	A
	WB LTR	0.10	7.0	A				WB LTR	0.10	6.9	A			
US Route 4	NB LT	0.52	6.5	A	NB	6.3	A	NB LT	0.52	6.4	A	NB	6.2	A
	NB TR	0.52	6.1	A				NB TR	0.52	6.0	A			
	SB LT	0.42	8.2	A	SB	7.3	A	SB LT	0.43	8.2	A	SB	7.2	A
	SB TR	0.42	6.3	A				SB TR	0.43	6.3	A			
OVERALL						6.8	A						6.8	A

*Movement; Volume to Capacity Ratio; Level of Service; Approach

Table 10
Regeneron
2020 No-Build & Build Analysis Alternative 2
PM Peak Hour

Intersection	Level of Service													
	No-Build							Build						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Signalized Intersections														
US Route 4 & I-90 Eastbound Ramps														
I-90 EB Off-Ramp	EB L	0.31	17.6	B	EB	31.8	C	EB L	0.32	19.1	B	EB	33.0	C
	EB R	0.91	36.2	D				EB R	0.91	37.1	D			
US Route 4	NB L	0.38	18.9	B	NB	19.0	B	NB L	0.52	19.8	B	NB	20.0	B
	NB T	0.64	19.1	B				NB T	0.70	20.0	C			
	SB T	0.64	25.9	C	SB	21.9	C	SB T	0.64	27.2	C	SB	23.0	C
	SB R	0.14	3.5	A				SB R	0.15	4.2	A			
OVERALL						23.8	C						24.6	C
US Route 4 & I-90 Westbound Ramps														
I-90 WB Off-Ramp	WB L	0.10	18.5	B	EB	11.8	B	WB L	0.13	19.2	B	EB	12.0	B
	WB R	0.33	10.8	B				WB R	0.33	10.7	B			
US Route 4	NB T	0.72	18.1	B	NB	15.6	B	NB T	0.72	18.6	B	NB	15.9	B
	NB R	0.38	9.1	A				NB R	0.50	10.4	B			
	SB L	0.85	14.1	B	SB	8.2	A	SB L	0.88	16.6	B	SB	9.2	A
	SB T	0.45	5.2	A				SB T	0.44	5.1	A			
OVERALL						11.2	B						12.0	B
US Route 4 & 3rd Avenue Extension														
3rd Avenue Ext	EB L	0.89	25.6	C	EB	22.9	C	EB L	0.93	35.9	D	EB	30.6	C
	EB R	0.35	16.7	B				EB R	0.34	16.6	B			
US Route 4	NB L	0.40	25.2	C	NB	13.7	B	NB L	0.46	32.3	C	NB	18.7	B
	NB T	0.62	11.5	B				NB T	0.67	16.2	B			
	SB T	0.63	17.3	B	SB	17.3	B	SB T	0.68	21.9	C	SB	22.0	C
	SB TR	0.63	17.4	B				SB TR	0.68	22.1	C			
OVERALL						17.7	B						23.7	C
US Route 4 & Grandview Drive/Greenbush Commons														
Greenbush Commons	EB LT	0.88	61.6	E	EB	53.7	D	EB LT	0.88	61.6	E	EB	53.6	D
	EB R	0.23	30.2	C				EB R	0.24	30.3	C			
Grandview Drive	WB LTR	0.79	78.5	E	WB	78.5	E	WB LTR	0.79	78.5	E	WB	78.5	E
US Route 4	NB L	0.29	11.8	B	NB	50.6	D	NB L	0.30	11.9	B	NB	86.3	F
	NB TR	1.01	54.4	F				NB TR	1.12	92.9	F			
	SB L	0.40	26.9	C	SB	15.8	B	SB L	0.40	26.9	C	SB	15.9	B
	SB T	0.48	15.7	B				SB T	0.49	15.9	B			
	SB R	0.19	12.9	B				SB R	0.19	12.9	B			
OVERALL						37.6	D						53.8	D
3rd Avenue Extension & Barracks Road														
3rd Avenue Ext	EB T	0.23	6.5	A	EB	6.5	A	EB T	0.25	6.4	A	EB	6.4	A
	EB R	0.23	6.6	A				EB R	0.25	6.4	A			
	WB L	0.33	7.9	A	WB	7.5	A	WB L	0.38	7.5	A	WB	7.4	A
	WB T	0.32	7.0	A				WB T	0.39	7.2	A			
Barracks Road	NB L	0.18	8.5	A	NB	8.8	A	NB L	0.19	9.4	A	NB	9.7	A
	NB R	0.27	9.0	A				NB R	0.28	9.9	A			
OVERALL						7.5	A						7.5	A

Table 10
Regeneron
2020 No-Build & Build Analysis Alternative 2
PM Peak Hour

Intersection	Level of Service													
	No-Build							Build						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Unsignalized Intersections														
Red Mill Road (NY Route 151) & Tempel Lane														
NYS Route 151	EB L	0.01	8.1	A				EB L	0.01	8.2	A			
Tempel Lane	SB LR	0.27	21.1	C				SB LR	1.02	96.1	F			
	-	-	-	-				-	-	-	-			
US Route 4 & Hotel Access														
Hotel Access	EB R	0.05	17.8	C				EB R	0.59	34.2	D			
3rd Avenue Ext & Cedar Crest Drive/Tempel Lane														
3rd Avenue Ext	EB L	0.01	8.2	A				EB L	0.01	8.1	A			
								WB L	0.04	8.6	A			
Tempel Lane								NB L	0.64	49.0	E			
								NB R	0.28	13.7	B			
Cedar Crest Drive	SB LTR	0.02	13.5	B				SB LTR	0.04	20.6	C			
Tempel Lane & Hotel Access														
Hotel Access	WB LR	0.02	8.6	A				WB LR	0.08	10.4	B			
Tempel Lane	SB L	0.00	0.0	A				SB L	0.10	7.6	A			
Tempel Lane & Regeneron Access														
Regeneron Acces	WB LR							WB LR	0.72	19.2	C			
Tempel Lane	SB L							SB L	0.04	7.5	A			
Roundabout Intersections														
US Route 4 & Red Mill Road/Luther Road (NY Route 151)														
Red Mill Road (NY Route 151)	EB L	0.65	24.2	C	EB	23.3	C	EB L	1.01	60.4	F	EB	59.0	E
	EB TR	0.81	22.7	C				EB TR	1.03	57.8	F			
Luther Road (NY Route 151)	WB LT	0.25	12.7	B	WB	10.1	B	WB LT	0.30	14.0	B	WB	11.9	B
	WB R	0.34	8.6	A				WB R	0.38	10.5	B			
US Route 4	NB L	0.09	17.6	B	NB	22.8	C	NB L	0.16	19.2	B	NB	55.0	E
	NB TR	0.91	23.0	C				NB TR	1.06	57.8	F			
	SB L	0.48	12.9	B	SB	12.4	B	SB L	0.59	13.8	B	SB	15.9	B
	SB TR	0.90	12.1	B				SB TR	0.94	17.1	B			
OVERALL						16.4	B						32.6	C
US Route 4 & Mannix Road														
Mannix Road	EB LTR	0.17	10.4	B	EB	10.4	B	EB LTR	0.18	10.5	B	EB	10.5	B
	WB L	0.42	12.0	B	WB	10.5	B	WB L	0.42	12.0	B	WB	10.5	B
	WB LTR	0.42	9.2	A				WB LTR	0.42	9.2	A			
US Route 4	NB LT	0.41	6.6	A	NB	6.0	A	NB LT	0.41	6.6	A	NB	6.0	A
	NB TR	0.41	5.4	A				NB TR	0.41	5.4	A			
	SB LT	0.69	10.7	B	SB	10.4	B	SB LT	0.70	10.9	B	SB	10.6	B
	SB TR	0.69	10.1	B				SB TR	0.70	10.3	B			
OVERALL						8.8	A						8.9	A

*Movement; Volume to Capacity Ratio; Level of Service; Approach

5.3 MITIGATION

5.3.1 Build with Mitigation - Alternative 1

As discussed in Section 5.2, the addition of the project generated traffic does reduce the LOS for some movements at the study area intersections. To mitigate the operational impacts, the following improvements are proposed:

- US Route 4 & Grandview Drive/Greenbush Commons
  - Optimization of signal splits
- US Route 4 & 3rd Avenue Extension
  - Optimization of signal splits
- Red Mill Road (NY Route 151) & Tempel Lane
  - Construct an eastbound left-turn lane, westbound right-turn lane, and southbound right-turn lane consistent with the proposed geometry in the Village at Tempel Farm Traffic Impact Study (See Figure E-1 in Appendix E)
  - Install a traffic signal
- 3rd Avenue Extension & Woodlawn Avenue/Regeneron Access
  - Construct eastbound and westbound two-way-left-turn lanes (See Figure E-2 in Appendix E). The northbound right-turn lane is constructed with the construction of the private Regeneron Access.
- US Route 4 & Red Mill Road (NY Route 151)
  - Modify the roundabout to include two lanes northbound and southbound consistent with the improvements identified in the Village at Tempel Farm and Route 4 Corridor studies (See Figure E-3 in Appendix E). The new lane configuration will allow for a left/thru lane and thru/right lane northbound and southbound, and a left-turn lane and left/thru/right lane eastbound. The westbound approach will remain the same as existing with a left/thru lane and a right-turn lane (the figure only shows a single westbound left/thru/right lane).
- US Route 4 & Hotel Access
  - Construct a southbound right-turn lane at the right-in/right-out hotel access consistent with the proposed geometry in the Village at Tempel Farm Traffic Impact Study (See Figure E-4).

As shown in Tables 11 and 12, with these improvements, No-Build LOS will be maintained with the exception of the following:

AM Peak Hour

- US Route 4 & I-90 Eastbound Ramps
  - Eastbound right – LOS B to LOS C
- US Route 4 & 3rd Avenue Extension
  - Eastbound right – LOS B to LOS C
- US Route 4 & Grandview Drive/Greenbush Commons
  - Southbound left – LOS B to LOS C
- 3rd Avenue Extension & Woodlawn Avenue/Regeneron Access
  - Southbound left/thru/right – LOS B to LOS C
- Tempel Lane & Hotel Access
  - Westbound left/right – LOS A to LOS B

PM Peak Hour

- US Route 4 & I-90 Eastbound Ramps
  - Northbound thru – LOS B to LOS C
- US Route 4 & I-90 Westbound Ramps
  - Northbound right – LOS A to LOS B
- US Route 4 & 3rd Avenue Extension
  - Southbound thru – LOS B to LOS C
  - Southbound thru/right – LOS B to LOS C
- US Route 4 & Grandview Drive/Greenbush Commons
  - Westbound left/thru/right – LOS E to LOS F
  - Northbound thru/right – Increase in LOS F delay
- US Route 4 & Hotel Access
  - Eastbound right – LOS C to LOS D
- 3rd Avenue Extension & Woodlawn Avenue/Regeneron Access
  - Southbound left/thru/right – LOS B to LOS C
- Tempel Lane & Hotel Access
  - Westbound left/right – LOS A to LOS B
- US Route 4 & Red Mill Road (NY Route 151)
  - Eastbound left – LOS C to LOS D

The movement v/c ratios are estimated to be 0.85 or less with the exception of the following:

- US Route 4 & I-90 Eastbound Ramps
  - Eastbound right (PM)
- US Route 4 & I-90 Westbound Ramps
  - Southbound left (PM)
- US Route 4 & 3rd Avenue Extension
  - Eastbound left (AM and PM)
- US Route 4 & Grandview Drive/Greenbush Commons
  - Eastbound left/thru (PM)
  - Northbound thru/right (AM and PM)
- US Route 4 & Red Mill Road (NY Route 151)
  - Eastbound left (PM)
  - Eastbound left/thru/right (PM)
  - Westbound right (AM)

These movements are the same movements in the No-Build condition that are estimated to be greater than 0.85 with the exception of the following:

- US Route 4 & 3rd Avenue Extension
  - Eastbound left AM (0.85 No-Build, 0.87 Build)
- US Route 4 & I-90 Westbound Ramps
  - Southbound left PM (0.85 No-Build, 0.88 Build)
- US Route 4 & Red Mill Road (NY Route 151)
  - Eastbound left PM (0.65 No-Build, 0.92 Build)
  - Eastbound left/thru/right PM (0.81 No-Build, 0.92 Build)

US Route 4 & Red Mill Road (NY Route 151):

In the No-Build condition, the eastbound left-turn movement is estimated to operate at LOS C during the PM peak hour. With the addition of the Regeneron site traffic, the eastbound left-turn movement is estimated to operate at LOS D, with approximately 16 additional seconds per vehicle in delay. Although there is a change in LOS, LOS D is generally considered acceptable for movements during peak periods. It is requested that an exception from the NYSDOT policy to maintain the same LOS as No-Build in the Build Condition be granted at this location.

Due to the close proximity of the proposed signal at Red Mill Road (NY Route 151) & Tempel Lane, the queues for the westbound approach at that intersection and the eastbound approach of the US Route 4 & Red Mill Road (NY Route 151) intersection were reviewed. The available storage distance between the two intersections is approximately 525'. The 95th percentile queues are estimated to be as follows:

- Red Mill Road (NY Route 151) & Tempel Lane
    - Westbound thru AM: 177'
    - Westbound thru PM: 189'
- US Route 4 & Red Mill Road (NY Route 151)
    - Eastbound left/thru/right AM: 34'
    - Eastbound left/thru/right PM: 252'

As shown, the 95th percentile queues for both approaches are estimated to be within the available storage and are not projected to back-up into the adjacent intersections.

US Route 4 & Hotel Access:

In the No-Build condition, the eastbound right-turn movement is estimated to operate at LOS C during the PM peak hour. With the addition of the Regeneron site traffic, the eastbound right-turn movement is estimated to operate at LOS D, with approximately 14 additional seconds per vehicle in delay. Although there is a change in LOS, LOS D is generally considered acceptable for unsignalized movements during peak periods. It is requested that an exception from the NYSDOT policy to maintain the same LOS as No-Build in the Build Condition be granted at this location.

US Route 4 & Grandview Drive/Greenbush Commons

The northbound approach operates over capacity under the No-Build condition during the PM peak hour. Any increase in traffic volume results in an impact since the system is already over capacity. The addition of the Regeneron site traffic causes the northbound approach to have an increase in LOS F delay. For the mitigation analysis, the signal timings were optimized. With optimization, northbound delay is improved but does not get fully back to No-Build delay with approximately 24 seconds of added delay in the Build with Mitigation condition (54.4 sec/veh No-Build, 78.2 sec/veh Build). The optimization does impact the westbound approach which goes from LOS E to LOS F. However, it is a low volume approach, and the 50th and 95th percentile queues are 31' and 78', respectively.

Since there are existing operational deficiencies at the intersection in the No-Build condition, unrelated to the Regeneron project, capital improvements should be considered and programmed in this portion of the US Route 4 corridor. The only improvement that will fully alleviate the congestion at this location is the construction of an additional northbound through lane on US Route 4, which is a major corridor-wide improvement that the Town of East Greenbush, the Town of North Greenbush, and NYSDOT should consider. Other mitigation measures were considered for this intersection, including a roundabout and

signal coordination with adjacent signals. A roundabout does not appear to be feasible at this location as the footprint of a two-lane roundabout would have ROW impacts and impacts to the operation of properties on the east side of US Route 4. Coordination on US Route 4 between the Grandview Drive and 3rd Avenue Extension intersections was tested, and it could reduce the queues and delay for the northbound approach during the PM peak hour slightly. However, it does increase delay on the minor approaches. Implementing a coordinated system would have to be reviewed in a larger context than this study since there are other signals within the corridor that are not included in the study area. As a result, no additional mitigation measures are recommended for this intersection with this project. It is requested that an exception from the NYSDOT policy to maintain the same LOS as No-Build in the Build Condition be granted at this location.

3rd Avenue Extension & Woodlawn Avenue/Regeneron Access:

The southbound left/thru/right movement is estimated to operate at LOS B during the AM and PM peak hours for the No-Build condition. With the addition of the northbound approach and the two-way-left-turn lanes at the intersection, this movement is estimated to operate at LOS C in the Build with Mitigation condition, with approximately 8 additional seconds per vehicle in delay in the AM peak hour and approximately 7 additional seconds per vehicle in delay in the PM peak hour. It should also be noted that with the two-way-left-turn lanes, southbound left-turn vehicles will be able to make a two-stage turn, which will help improve operations for the movement. LOS C is generally considered acceptable for unsignalized movements during peak periods. It is requested that an exception from the NYSDOT policy to maintain the same LOS as No-Build in the Build Condition be granted at this location.

The northbound left-turn movement is a new movement in the Build condition with the construction of the Regeneron access. It is estimated to operate at LOS E during the AM and PM peak hours under the Build condition. As with the southbound left-turn movement, with the addition of the two-way-left-turn lanes, northbound left-turn vehicles will be able to make a two-stage left-turn, which will help improve operations for the movement. A signal warrant analysis was conducted for the intersection. It was found that only the peak hour warrant was met (See Section 5.4), therefore it is not recommended that a traffic signal be installed at this time. Conditions should be monitored in the future to determine if a signal is needed. No additional improvements are recommended for this intersection.

The remaining locations where there is a change in LOS, there are minor increases in delay, with approximately 5 seconds of additional delay being the maximum difference between No-Build and Build with Mitigation. It is requested that an exception from the NYSDOT policy to maintain the same LOS as No-Build in the Build Condition be granted at the locations where No-Build LOS cannot be maintained.

5.3.2 Build with Mitigation - Alternative 2

For this alternative, the same mitigation being proposed without the extension of Tempel Lane was included (see section 5.3.1). The eastbound and westbound two-way-left-turn lanes proposed at the 3rd Avenue Extension & Woodlawn Avenue/Regeneron access would instead be built at the Cedar Crest Drive/Tempel Lane intersection (See figure E-5 in Appendix E). As shown in Tables 13 and 14, all No-Build LOS will be maintained in the same locations as those in Alternative 1.

The movement v/c ratios are estimated to be 0.85 or less in the same locations as Alternative 1, with the exception of the AM westbound right-turn at US Route 4 & Red Mill Road (NY Route 151). This movement is less than 0.85 in this alternative (0.82).

US Route 4 & Red Mill Road (NY Route 151):

In the No-Build condition, the eastbound left-turn movement is estimated to operate at LOS C during the PM peak hour. With the addition of the Regeneron site traffic, the eastbound left-turn movement is estimated to operate at LOS D, with approximately 16 additional seconds per vehicle in delay. Although there is a change in LOS, LOS D is generally considered acceptable for movements during peak periods. It is requested that an exception from the NYSDOT policy to maintain the same LOS as No-Build in the Build Condition be granted at this location.

US Route 4 & Hotel Access:

In the No-Build condition, the eastbound right-turn movement is estimated to operate at LOS C during the PM peak hour. With the addition of the Regeneron site traffic, the eastbound right-turn movement is estimated to operate at LOS D, with approximately 13 additional seconds per vehicle in delay. Although there is a change in LOS, LOS D is generally considered acceptable for unsignalized movements during peak periods. It is requested that an exception from the NYSDOT policy to maintain the same LOS as No-Build in the Build Condition be granted at this location.

US Route 4 & Grandview Drive/Greenbush Commons

The northbound approach operates over capacity under the No-Build condition during the PM peak hour. Any increase in traffic volume results in an impact since the system is already over capacity. The addition of the Regeneron site traffic causes the northbound approach to have an increase in LOS F delay. For the mitigation analysis, the signal timings were optimized. With optimization, northbound delay is improved but does not get fully back to No-Build delay with approximately 24 seconds of added delay in the Build with Mitigation condition (54.4 sec/veh No-Build, 78.2 sec/veh Build). The optimization does impact the westbound approach which goes from LOS E to LOS F. However, it is a low volume approach, and the 50th and 95th percentile queues are 31' and 78', respectively.

Since there are existing operational deficiencies at the intersection in the No-Build condition, unrelated to the Regeneron project, capital improvements should be considered and programmed in this portion of the US Route 4 corridor. The only improvement that will fully alleviate the congestion at this location is the construction of an additional northbound through lane on US Route 4, which is a major corridor-wide improvement that the Town of East Greenbush, the Town of North Greenbush, and NYSDOT should consider. Other mitigation measures were considered for this intersection, including a roundabout and signal coordination with adjacent signals. A roundabout does not appear to be feasible at this location as the footprint of a two-lane roundabout would have ROW impacts and impacts to the operation of properties on the east side of US Route 4. Coordination on US Route 4 between the Grandview Drive and 3rd Avenue Extension intersections was tested, and it could reduce the queues and delay for the northbound approach during the PM peak hour slightly. However, it does increase delay on the minor approaches. Implementing a coordinated system would have to be reviewed in a larger context than this study since there are other signals within the corridor that are not included in the study area. As a result, no additional mitigation measures are recommended for this intersection with this project. It is requested that an exception from the NYSDOT policy to maintain the same LOS as No-Build in the Build Condition be granted at this location.

3rd Avenue Extension & Cedar Crest Drive/Tempel Lane:

The southbound left/thru/right movement is estimated to operate at LOS B during the AM and PM peak hours for the No-Build condition. With the addition of the northbound approach and the two-way-left-

turn lanes at the intersection, this movement is estimated to operate at LOS C in the Build with Mitigation condition, with approximately 7 additional second per vehicle in delay in the AM peak hour and approximately 7 additional seconds per vehicle in delay in the PM peak hour. It should also be noted that with the two-way-left-turn lanes, southbound left-turn vehicles will be able to make a two-stage left-turn, which will help improve operations for the movement. LOS C is generally considered acceptable for unsignalized movements during peak periods. It is requested that an exception from the NYSDOT policy to maintain the same LOS as No-Build in the Build Condition be granted at this location.

The northbound left-turn movement is a new movement in the Build condition with the construction of the Regeneron access. It is estimated to operate at LOS F during the AM peak hour and LOS E during the PM peak hour under the Build condition. As with the southbound left-turn movement, with the addition of the two-way-left-turn lanes, northbound left-turn vehicles will be able to make a two-stage left-turn, which will help improve operations for the movement. A signal warrant analysis was conducted for the intersection. It was found that only the peak hour warrant was met (See Section 5.4), therefore it is not recommended that a traffic signal be installed at this time. Conditions should be monitored in the future to determine if a signal is needed. No additional improvements are recommended for this intersection.

The remaining locations where there is a change in LOS, there are minor increases in delay, with approximately 5 seconds of additional delay being the maximum difference between No-Build and Build with Mitigation. It is requested that an exception from the NYSDOT policy to maintain the same LOS as No-Build in the Build Condition be granted at the locations where No-Build LOS cannot be maintained.

5.3.3 Comparison of Alternatives 1 and 2

As shown from these analyses, both access alternatives from 3rd Avenue Extension provide similar results for the study area intersections, with the same mitigation recommended. Regeneron's preferred alternative is to provide a private access to the site on 3rd Avenue Extension across from Woodlawn Avenue in addition to the access from the existing segment of Tempel Lane (Alternative 1). If it is found that building a third bridge on the maintenance access road (currently being constructed with the warehouse) is not feasible, Regeneron would then proceed with the alternative to extend Tempel Lane to 3rd Avenue Extension across from Cedar Crest Drive (Alternative 2). As it is currently unknown if the bridge can be constructed, it is requested that NYSDOT grant approval for an access on 3rd Avenue Extension in either location.

5.3.4 Comparison to the October 2016 TIS

The locations where there is a change in LOS between the No-Build condition and the Build with Mitigation condition were compared to the results from the October 2016 TIS Sensitivity Analysis (No Tempel Farm Development). For both Alternative 1 and Alternative 2, all changes in LOS are the same as the October 2016 TIS with the exception of the following:

AM Peak Hour

- US Route 4 & I-90 Westbound Ramps
    - Westbound right – No change in LOS with the signal

PM Peak Hour

- Red Mill Road (NY Route 151) & Tempel Lane
    - Southbound Left – LOS B with the signal
- US Route 4 & I-90 Westbound Ramps
    - Westbound right – No change in LOS with the signal

With the additional site trips for the 1,150 employees in the office/lab space (versus 750 employees in the October 2016 TIS), the following locations are estimated to have a change in LOS between the No-Build and Build with Mitigation Conditions that were not projected to occur in the October 2016 TIS:

AM Peak Hour

- US Route 4 & I-90 Eastbound Ramps
    - Eastbound right – LOS B to LOS C
- US Route 4 & 3rd Avenue Extension
    - Eastbound Right – LOS B to LOS C
- US Route 4 & Grandview Drive/Greenbush Commons
    - Southbound left – LOS B to LOS C

PM Peak Hour

- US Route 4 & I-90 Eastbound Ramps
    - Northbound thru – LOS B to LOS C
- US Route 4 & I-90 Westbound Ramps
    - Northbound right – LOS A to LOS B
- US Route 4 & 3rd Avenue Extension
    - Southbound thru – LOS B to LOS C
    - Southbound thru/right – LOS B to LOS C
- Tempel Lane & Hotel Access
    - Westbound left/right – LOS A to LOS B
- US Route 4 & Red Mill Road (NY Route 151)
    - Eastbound left – LOS C to LOS D

Although there are additional changes in LOS with the increase in 400 employees, the additional changes are minor in nature, and are all projected to be LOS D or better which is considered acceptable operations during peak hours.

Table 11
Regeneron
2020 No-Build & Build Analysis Alternative 1 - Mitigation
AM Peak Hour

Intersection	Level of Service													
	No-Build							Build w/Mitigation						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Signalized Intersections														
NYS Route 151 & Tempel Lane														
NYS Route 151								EB L	0.10	5.8	A	EB	3.8	A
								EB T	0.29	3.5	A			
								WB T	0.72	10.0	A	WB	8.9	A
								WB R	0.16	4.8	A			
Tempel Lane								SB L	0.30	13.8	B	SB	13.7	B
								SB R	0.02	11.3	B			
OVERALL													7.5	A
US Route 4 & I-90 Eastbound Ramps														
I-90 EB Off-Ramp	EB L	0.80	23.5	C	EB	21.6	C	EB L	0.71	22.1	C	EB	22.8	C
	EB R	0.64	19.0	B				EB R	0.79	23.4	C			
US Route 4	NB L	0.13	11.0	B	NB	12.4	B	NB L	0.17	13.1	B	NB	15.2	B
	NB T	0.64	12.5	B				NB T	0.68	15.3	B			
	SB T	0.34	14.8	B	SB	13.4	B	SB T	0.38	17.4	B	SB	15.7	B
	SB R	0.06	3.5	A				SB R	0.06	3.2	A			
OVERALL						15.5	B						17.9	B
US Route 4 & I-90 Westbound Ramps														
I-90 WB Off-Ramp	WB L	0.22	17.9	B	EB	15.1	B	WB L	0.30	18.6	B	WB	15.7	B
	WB R	0.51	14.4	B				WB R	0.54	14.6	B			
US Route 4	NB T	0.71	14.8	B	NB	12.5	B	NB T	0.71	15.5	B	NB	12.9	B
	NB R	0.44	6.9	A				NB R	0.46	7.1	A			
	SB L	0.68	11.9	B	SB	7.1	A	SB T	0.70	12.4	B	SB	7.5	A
	SB T	0.25	4.6	A				SB R	0.25	4.8	A			
OVERALL						11.1	B						11.6	B
US Route 4 & 3rd Avenue Extension														
3rd Avenue Ext	EB L	0.85	27.5	C	EB	25.4	C	EB L	0.87	29.8	C	EB	27.6	C
	EB R	0.23	18.8	B				EB R	0.24	20.4	C			
US Route 4	NB L	0.45	23.7	C	NB	10.5	B	NB L	0.63	29.7	C	NB	13.1	B
	NB T	0.45	6.8	A				NB T	0.45	7.4	A			
	SB T	0.64	13.9	B	SB	14.0	B	SB T	0.67	15.2	B	SB	15.7	B
	SB TR	0.64	14.1	B				SB TR	0.71	16.4	B			
OVERALL						15.1	B						17.2	B
US Route 4 & Grandview Drive/Greenbush Commons														
Greenbush Commons	EB LT	0.20	29.2	C	EB	28.8	C	EB LT	0.20	29.3	C	EB	28.9	C
	EB R	0.08	27.9	C				EB R	0.09	28.0	C			
Grandview Drive	WB LTR	0.71	35.6	D	EB	35.6	D	WB LTR	0.71	35.7	D	WB	35.7	D
US Route 4	NB L	0.12	9.3	A	NB	24.4	C	NB L	0.13	9.6	A	NB	27.5	C
	NB TR	0.86	25.3	C				NB TR	0.89	28.6	C			
	SB L	0.80	19.7	B	SB	12.5	B	SB L	0.84	21.2	C	SB	13.0	B
	SB TR	0.44	10.6	B				SB TR	0.50	11.2	B			
	SB R	0.05	7.8	A				SB R	0.05	7.8	A			
OVERALL						19.5	B						20.6	C
3rd Avenue Extension & Barracks Road														
3rd Avenue Ext	EB T	0.15	5.5	A	EB	5.5	A	EB T	0.22	5.6	A	EB	5.6	A
	EB R	0.15	5.5	A				EB R	0.22	5.6	A			
	WB L	0.45	7.9	A	WB	7.6	A	WB L	0.48	8.6	A	WB	7.8	A
	WB T	0.45	7.2	A				WB T	0.47	7.1	A			
Barracks Road	NB L	0.38	12.3	B	NB	11.9	B	NB L	0.40	13.5	B	NB	13.1	B
	NB R	0.13	10.7	B				NB R	0.15	11.9	B			
OVERALL						7.9	A						8.1	A

Table 11
Regeneron
2020 No-Build & Build Analysis Alternative 1 - Mitigation
AM Peak Hour

Intersection	Level of Service													
	No-Build							Build w/Mitigation						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Unsignalized Intersections														
Red Mill Road (NY Route 151) & Tempel Lane														
NYS Route 151	EB L	0.01	8.5	A										
Tempel Lane	SB LR	0.08	15.4	C										
US Route 4 & Hotel Access														
Hotel Access	EB R	0.02	11.5	B				EB R	0.08	11.7	B			
3rd Avenue Ext & Woodlawn Avenue/Regeneron Access														
3rd Avenue Ext	EB L	0.00	8.8	A				EB L	0.00	8.8	A			
								WB L	0.14	8.8	A			
Regeneron Access								NB L	0.22	45.7	E			
								NB R	0.05	10.7	B			
Woodlawn Avenue	SB LTR	0.05	14.7	B				SB LTR	0.09	22.5	C			
Tempel Lane & Hotel Access														
Hotel Access	WB LR	0.01	8.6	A				WB LR	0.26	10.3	B			
Tempel Lane	SB L	0.00	0.0	A				SB L	0.02	7.5	A			
Tempel Lane & Regeneron Access														
Regeneron Access	WB LR							WB LR	0.08	9.8	A			
Tempel Lane	SB L							SB L	0.00	0.0	A			
Roundabout Intersections														
US Route 4 & Red Mill Road/Luther Road (NY Route 151)														
Red Mill Road (NY Route 151)	EB L	0.29	13.5	B	EB	11.6	B	EB L	0.28	13.6	B	EB	11.6	B
	EB TR	0.23	8.5	A				EB LTR	0.28	9.3	A			
Luther Road (NY Route 151)	WB LT	0.60	21.0	C	WB	32.5	C	WB LT	0.60	17.8	B	WB	20.3	C
	WB R	0.95	37.4	D				WB R	0.86	21.6	C			
US Route 4	NB L	0.13	17.1	B	NB	20.5	C	NB LT	0.57	11.0	B	NB	10.2	B
	NB TR	0.94	20.7	C				NB TR	0.57	9.3	A			
	SB L	0.27	14.7	B	SB	9.2	A	SB LT	0.45	11.6	B	SB	9.5	A
	SB TR	0.59	7.7	A				SB TR	0.45	7.7	A			
OVERALL						19.1	B						12.8	B
US Route 4 & Mannix Road														
Mannix Road	EB LTR	0.05	8.1	A	EB	8.1	A	EB LTR	0.05	8.2	A	EB	8.2	A
	WB L	0.10	10.3	B	WB	8.6	A	WB L	0.10	10.4	B	WB	8.7	A
	WB LTR	0.10	7.0	A				WB LTR	0.10	7.1	A			
US Route 4	NB LT	0.52	6.5	A	NB	6.3	A	NB LT	0.54	6.5	A	NB	6.3	A
	NB TR	0.52	6.1	A				NB TR	0.54	6.1	A			
	SB LT	0.42	8.2	A	SB	7.3	A	SB LT	0.43	8.2	A	SB	7.2	A
	SB TR	0.42	6.3	A				SB TR	0.43	6.3	A			
OVERALL						6.8	A						6.8	A

*Movement; Volume to Capacity Ratio; Level of Service; Approach

Table 12
Regeneron
2020 No-Build & Build Analysis Alternative 1 - Mitigation
PM Peak Hour

Intersection	Level of Service													
	No-Build							Build w/Mitigation						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Signalized Intersections														
NYS Route 151 & Tempel Lane														
NYS Route 151								EB L	0.03	7.3	A	EB	7.0	A
								EB T	0.61	7.0	A			
								WB T	0.68	11.4	B	WB	10.9	B
								WB R	0.03	3.8	A			
Tempel Lane								SB L	0.59	13.0	B	SB	12.7	B
								SB R	0.05	9.7	A			
OVERALL													9.5	A
US Route 4 & I-90 Eastbound Ramps														
I-90 EB Off-Ramp	EB L	0.31	17.6	B	EB	31.8	C	EB L	0.32	19.2	B	EB	33.5	C
	EB R	0.91	36.2	D				EB R	0.92	37.8	D			
US Route 4	NB L	0.38	18.9	B	NB	19.0	B	NB L	0.52	19.8	B	NB	20.0	B
	NB T	0.64	19.1	B				NB T	0.70	20.0	C			
	SB T	0.64	25.9	C	SB	21.9	C	SB T	0.65	27.2	C	SB	23.0	C
	SB R	0.14	3.5	A				SB R	0.15	4.2	A			
OVERALL						23.8	C						24.7	C
US Route 4 & I-90 Westbound Ramps														
I-90 WB Off-Ramp	WB L	0.10	18.5	B	EB	11.8	B	WB L	0.13	19.3	B	WB	12.1	B
	WB R	0.33	10.8	B				WB R	0.33	10.8	B			
US Route 4	NB T	0.72	18.1	B	NB	15.6	B	NB T	0.72	18.8	B	NB	16.0	B
	NB R	0.38	9.1	A				NB R	0.50	10.4	B			
	SB L	0.85	14.1	B	SB	8.2	A	SB L	0.88	16.8	B	SB	9.2	A
	SB T	0.45	5.2	A				SB T	0.45	5.1	A			
OVERALL						11.2	B						12.0	B
US Route 4 & 3rd Avenue Extension														
3rd Avenue Ext	EB L	0.89	25.6	C	EB	22.9	C	EB L	0.92	26.9	C	EB	23.9	C
	EB R	0.35	16.7	B				EB R	0.35	16.2	B			
US Route 4	NB L	0.40	25.2	C	NB	13.7	B	NB L	0.49	32.4	C	NB	18.6	B
	NB T	0.62	11.5	B				NB T	0.67	15.9	B			
	SB T	0.63	17.3	B	SB	17.3	B	SB T	0.69	22.1	C	SB	22.2	C
	SB TR	0.63	17.4	B				SB TR	0.69	22.3	C			
OVERALL						17.7	B						21.6	C
US Route 4 & Grandview Drive/Greenbush Commons														
Greenbush Commons	EB LT	0.88	61.6	E	EB	53.7	D	EB LT	0.92	73.1	E	EB	62.9	E
	EB R	0.23	30.2	C				EB R	0.35	32.8	C			
Grandview Drive	WB LTR	0.79	78.5	E	WB	78.5	E	WB LTR	0.83	92.2	F	WB	92.2	F
US Route 4	NB L	0.29	11.8	B	NB	50.6	D	NB L	0.29	11.4	B	NB	72.8	E
	NB TR	1.01	54.4	F				NB TR	1.09	78.2	F			
	SB L	0.40	26.9	C	SB	15.8	B	SB L	0.42	28.5	C	SB	15.3	B
	SB T	0.48	15.7	B				SB T	0.47	15.2	B			
	SB R	0.19	12.9	B				SB R	0.18	12.4	B			
OVERALL						37.6	D						49.2	D
3rd Avenue Extension & Barracks Road														
3rd Avenue Ext	EB T	0.23	6.5	A	EB	6.5	A	EB T	0.23	6.3	A	EB	6.3	A
	EB R	0.23	6.6	A				EB R	0.24	6.4	A			
	WB L	0.33	7.9	A	WB	7.5	A	WB L	0.38	7.5	A	WB	7.4	A
	WB T	0.32	7.0	A				WB T	0.39	7.3	A			
Barracks Road	NB L	0.18	8.5	A	NB	8.8	A	NB L	0.19	9.2	A	NB	9.6	A
	NB R	0.27	9.0	A				NB R	0.28	9.8	A			
OVERALL						7.5	A						7.5	A

Table 12
Regeneron
2020 No-Build & Build Analysis Alternative 1 - Mitigation
PM Peak Hour

Intersection	Level of Service													
	No-Build							Build w/Mitigation						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Unsignalized Intersections														
Red Mill Road (NY Route 151) & Tempel Lane														
NYS Route 151	EB L	0.01	8.1	A										
Tempel Lane	SB LR	0.27	21.1	C										
US Route 4 & Hotel Access														
Hotel Access	EB R	0.05	17.8	C				EB R	0.57	31.5	D			
3rd Avenue Ext & Woodlawn Ave/Regeneron Access														
3rd Avenue Ext	EB L	0.01	8.2	A				EB L	0.01	8.2	A			
								WB L	0.03	8.5	A			
Regeneron Access								NB L	0.57	41.3	E			
								NB R	0.27	13.5	B			
Woodlawn Avenue	SB LTR	0.03	14.0	B				SB LTR	0.05	21.1	C			
Tempel Lane & Hotel Access														
Hotel Access	WB LR	0.02	8.6	A				WB LR	0.08	10.1	B			
Tempel Lane	SB L	0.00	0.0	A				SB L	0.10	7.5	A			
Tempel Lane & Regeneron Access														
Regeneron Access	WB LR							WB LR	0.35	10.7	B			
Tempel Lane	SB L							SB L	0.00	0.0	A			
Roundabout Intersections														
US Route 4 & Red Mill Road/Luther Road (NY Route 151)														
Red Mill Road (NY Route 151)	EB L	0.65	24.2	C	EB	23.3	C	EB L	0.92	39.9	D	EB	35.6	D
	EB TR	0.81	22.7	C				EB LTR	0.92	31.8	C			
Luther Road (NY Route 151)	WB LT	0.25	12.7	B	WB	10.1	B	WB LT	0.29	13.7	B	WB	11.3	B
	WB R	0.34	8.6	A				WB R	0.37	9.9	A			
US Route 4	NB L	0.09	17.6	B	NB	22.8	C	NB LT	0.59	14.3	B	NB	13.4	B
	NB TR	0.91	23.0	C				NB TR	0.59	12.7	B			
	SB L	0.48	12.9	B	SB	12.4	B	SB LT	0.72	12.4	B	SB	10.0	A
	SB TR	0.90	12.1	B				SB TR	0.72	7.7	A			
OVERALL						16.4	B						16.4	B
US Route 4 & Mannix Road														
Mannix Road	EB LTR	0.17	10.4	B	EB	10.4	B	EB LTR	0.18	10.6	B	EB	10.6	B
	WB L	0.42	12.0	B	WB	10.5	B	WB L	0.42	12.0	B	WB	10.6	B
	WB LTR	0.42	9.2	A				WB LTR	0.42	9.2	A			
US Route 4	NB LT	0.41	6.6	A	NB	6.0	A	NB LT	0.42	6.6	A	NB	6.0	A
	NB TR	0.41	5.4	A				NB TR	0.42	5.4	A			
	SB LT	0.69	10.7	B	SB	10.4	B	SB LT	0.71	10.9	B	SB	10.7	B
	SB TR	0.69	10.1	B				SB TR	0.71	10.4	B			
OVERALL						8.8	A						9.0	A

*Movement; Volume to Capacity Ratio; Level of Service; Approach

Table 13
Regeneron
2020 No-Build & Build Analysis Alternative 2 - Mitigation
AM Peak Hour

Intersection	Level of Service													
	No-Build							Build w/Mitigation						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Signalized Intersections														
NYS Route 151 & Tempel Lane														
NYS Route 151								EB L	0.13	6.1	A	EB	4.1	A
								EB T	0.28	3.6	A			
								WB T	0.73	10.6	B	WB	9.3	A
								WB R	0.20	5.0	A			
Tempel Lane								SB L	0.32	14.2	B	SB	14.0	B
								SB R	0.01	11.1	B			
OVERALL													7.9	A
US Route 4 & I-90 Eastbound Ramps														
I-90 EB Off-Ramp	EB L	0.80	23.5	C	EB	21.6	C	EB L	0.71	21.2	C	EB	21.7	C
	EB R	0.64	19.0	B				EB R	0.78	22.3	C			
US Route 4	NB L	0.13	11.0	B	NB	12.4	B	NB L	0.18	13.1	B	NB	14.8	B
	NB T	0.64	12.5	B				NB T	0.66	14.9	B			
	SB T	0.34	14.8	B	SB	13.4	B	SB T	0.39	17.5	B	SB	15.8	B
	SB R	0.06	3.5	A				SB R	0.06	3.3	A			
OVERALL						15.5	B						17.4	B
US Route 4 & I-90 Westbound Ramps														
I-90 WB Off-Ramp	WB L	0.22	17.9	B	EB	15.1	B	WB L	0.30	18.1	B	WB	15.2	B
	WB R	0.51	14.4	B				WB R	0.53	14.1	B			
US Route 4	NB T	0.71	14.8	B	NB	12.5	B	NB T	0.69	15.0	B	NB	12.5	B
	NB R	0.44	6.9	A				NB R	0.47	7.3	A			
	SB L	0.68	11.9	B	SB	7.1	A	SB T	0.68	11.9	B	SB	7.3	A
	SB T	0.25	4.6	A				SB R	0.25	4.8	A			
OVERALL						11.1	B						11.3	B
US Route 4 & 3rd Avenue Extension														
3rd Avenue Ext	EB L	0.85	27.5	C	EB	25.4	C	EB L	0.88	30.0	C	EB	27.8	C
	EB R	0.23	18.8	B				EB R	0.23	20.4	C			
US Route 4	NB L	0.45	23.7	C	NB	10.5	B	NB L	0.45	27.9	C	NB	11.4	B
	NB T	0.45	6.8	A				NB T	0.45	7.4	A			
	SB T	0.64	13.9	B	SB	14.0	B	SB T	0.67	15.1	B	SB	15.8	B
	SB TR	0.64	14.1	B				SB TR	0.71	16.6	B			
OVERALL						15.1	B						16.9	B
US Route 4 & Grandview Drive/Greenbush Commons														
Greenbush Commons	EB LT	0.20	29.2	C	EB	28.8	C	EB LT	0.20	29.3	C	EB	28.9	C
	EB R	0.08	27.9	C				EB R	0.09	28.0	C			
Grandview Drive	WB LTR	0.71	35.6	D	EB	35.6	D	WB LTR	0.71	35.7	D	WB	35.7	D
US Route 4	NB L	0.12	9.3	A	NB	24.4	C	NB L	0.13	9.6	A	NB	27.5	C
	NB TR	0.86	25.3	C				NB TR	0.89	28.6	C			
	SB L	0.80	19.7	B	SB	12.5	B	SB L	0.84	21.2	C	SB	13.0	B
	SB TR	0.44	10.6	B				SB TR	0.50	11.2	B			
	SB R	0.05	7.8	A				SB R	0.05	7.8	A			
OVERALL						19.5	B						20.6	C
3rd Avenue Extension & Barracks Road														
3rd Avenue Ext	EB T	0.15	5.5	A	EB	5.5	A	EB T	0.22	5.6	A	EB	5.6	A
	EB R	0.15	5.5	A				EB R	0.22	5.6	A			
	WB L	0.45	7.9	A	WB	7.6	A	WB L	0.48	8.6	A	WB	7.8	A
	WB T	0.45	7.2	A				WB T	0.47	7.1	A			
Barracks Road	NB L	0.38	12.3	B	NB	11.9	B	NB L	0.40	13.7	B	NB	13.3	B
	NB R	0.13	10.7	B				NB R	0.14	11.9	B			
OVERALL						7.9	A						8.0	A

Table 13
Regeneron
2020 No-Build & Build Analysis Alternative 2 - Mitigation
AM Peak Hour

Intersection	Level of Service													
	No-Build							Build w/Mitigation						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Unsignalized Intersections														
Red Mill Road (NY Route 151) & Tempel Lane														
NYS Route 151	EB L	0.01	8.5	A										
Tempel Lane	SB LR	0.08	15.4	C										
	-	-	-	-										
US Route 4 & Hotel Access														
Hotel Access	EB R	0.02	11.5	B				EB R	0.08	11.7	B			
3rd Avenue Ext & Cedar Crest Drive/Tempel Lane														
3rd Avenue Ext	EB L	0.00	8.8	A				EB L	0.00	8.7	A			
								WB L	0.14	8.7	A			
Tempel Lane								NB L	0.60	70.9	F			
								NB R	0.07	10.7	B			
Cedar Crest Drive	SB LTR	0.04	14.8	B				SB LTR	0.07	22.1	C			
Tempel Lane & Hotel Access														
Hotel Access	WB LR	0.01	8.6	A				WB LR	0.28	11.0	B			
Tempel Lane	SB L	0.00	0.0	A				SB L	0.02	7.7	A			
Tempel Lane & Regeneron Access														
Regeneron Access	WB LR							WB LR	0.33	19.3	C			
Tempel Lane	SB L							SB L	0.25	9.2	A			
Roundabout Intersections														
US Route 4 & Red Mill Road/Luther Road (NY Route 151)														
Red Mill Road (NY Route 151)	EB L	0.29	13.5	B	EB	11.6	B	EB L	0.28	13.6	B	EB	11.6	B
	EB TR	0.23	8.5	A				EB LTR	0.28	9.3	A			
Luther Road (NY Route 151)	WB LT	0.60	21.0	C	WB	32.5	C	WB LT	0.62	17.4	B	WB	18.6	B
	WB R	0.95	37.4	D				WB R	0.82	19.4	B			
US Route 4	NB L	0.13	17.1	B	NB	20.5	C	NB LT	0.57	11.6	B	NB	10.5	B
	NB TR	0.94	20.7	C				NB TR	0.57	9.4	A			
	SB L	0.27	14.7	B	SB	9.2	A	SB LT	0.48	12.5	B	SB	10.3	B
	SB TR	0.59	7.7	A				SB TR	0.48	8.4	A			
OVERALL						19.1	B						12.7	B
US Route 4 & Mannix Road														
Mannix Road	EB LTR	0.05	8.1	A	EB	8.1	A	EB LTR	0.05	8.1	A	EB	8.1	A
	WB L	0.10	10.3	B	WB	8.6	A	WB L	0.10	10.2	B	WB	8.5	A
	WB LTR	0.10	7.0	A				WB LTR	0.10	6.9	A			
US Route 4	NB LT	0.52	6.5	A	NB	6.3	A	NB LT	0.52	6.4	A	NB	6.2	A
	NB TR	0.52	6.1	A				NB TR	0.52	6.0	A			
	SB LT	0.42	8.2	A	SB	7.3	A	SB LT	0.43	8.2	A	SB	7.2	A
	SB TR	0.42	6.3	A				SB TR	0.43	6.3	A			
OVERALL						6.8	A						6.8	A

*Movement; Volume to Capacity Ratio; Level of Service; Approach

Table 14
Regeneron
2020 No-Build & Build Analysis Alternative 2 - Mitigation
PM Peak Hour

Intersection	Level of Service													
	No-Build							Build w/Mitigation						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Signalized Intersections														
NYS Route 151 & Tempel Lane														
NYS Route 151								EB L	0.04	7.4	A	EB	6.9	A
								EB T	0.58	6.9	A			
								WB T	0.69	11.6	B	WB	11.0	B
								WB R	0.04	3.8	A			
Tempel Lane								SB L	0.68	13.8	B	SB	13.5	B
								SB R	0.05	9.6	A			
OVERALL													9.8	A
US Route 4 & I-90 Eastbound Ramps														
I-90 EB Off-Ramp	EB L	0.31	17.6	B	EB	31.8	C	EB L	0.32	19.1	B	EB	33.0	C
	EB R	0.91	36.2	D				EB R	0.91	37.1	D			
US Route 4	NB L	0.38	18.9	B	NB	19.0	B	NB L	0.52	19.8	B	NB	20.0	B
	NB T	0.64	19.1	B				NB T	0.70	20.0	C			
	SB T	0.64	25.9	C	SB	21.9	C	SB T	0.64	27.2	C	SB	23.0	C
	SB R	0.14	3.5	A				SB R	0.15	4.2	A			
OVERALL						23.8	C						24.6	C
US Route 4 & I-90 Westbound Ramps														
I-90 WB Off-Ramp	WB L	0.10	18.5	B	EB	11.8	B	WB L	0.13	19.2	B	EB	12.0	B
	WB R	0.33	10.8	B				WB R	0.33	10.7	B			
US Route 4	NB T	0.72	18.1	B	NB	15.6	B	NB T	0.72	18.6	B	NB	15.9	B
	NB R	0.38	9.1	A				NB R	0.50	10.4	B			
	SB L	0.85	14.1	B	SB	8.2	A	SB L	0.88	16.6	B	SB	9.2	A
	SB T	0.45	5.2	A				SB T	0.44	5.1	A			
OVERALL						11.2	B						12.0	B
US Route 4 & 3rd Avenue Extension														
3rd Avenue Ext	EB L	0.89	25.6	C	EB	22.9	C	EB L	0.92	26.5	C	EB	23.6	C
	EB R	0.35	16.7	B				EB R	0.34	15.8	B			
US Route 4	NB L	0.40	25.2	C	NB	13.7	B	NB L	0.46	31.5	C	NB	18.3	B
	NB T	0.62	11.5	B				NB T	0.67	15.9	B			
	SB T	0.63	17.3	B	SB	17.3	B	SB T	0.68	21.9	C	SB	22.0	C
	SB TR	0.63	17.4	B				SB TR	0.68	22.0	C			
OVERALL						17.7	B						21.4	C
US Route 4 & Grandview Drive/Greenbush Commons														
Greenbush Commons	EB LT	0.88	61.6	E	EB	53.7	D	EB LT	0.92	73.1	E	EB	62.9	E
	EB R	0.23	30.2	C				EB R	0.25	32.8	C			
Grandview Drive	WB LTR	0.79	78.5	E	WB	78.5	E	WB LTR	0.83	92.2	F	WB	92.2	F
US Route 4	NB L	0.29	11.8	B	NB	50.6	D	NB L	0.29	11.4	B	NB	72.8	E
	NB TR	1.01	54.4	F				NB TR	1.09	78.2	F			
	SB L	0.40	26.9	C	SB	15.8	B	SB L	0.42	28.5	C	SB	15.3	B
	SB T	0.48	15.7	B				SB T	0.47	15.2	B			
	SB R	0.19	12.9	B				SB R	0.18	12.4	B			
OVERALL						37.6	D						49.2	D
3rd Avenue Extension & Barracks Road														
3rd Avenue Ext	EB T	0.23	6.5	A	EB	6.5	A	EB T	0.25	6.4	A	EB	6.4	A
	EB R	0.23	6.6	A				EB R	0.25	6.4	A			
	WB L	0.33	7.9	A	WB	7.5	A	WB L	0.38	7.5	A	WB	7.4	A
	WB T	0.32	7.0	A				WB T	0.39	7.2	A			
Barracks Road	NB L	0.18	8.5	A	NB	8.8	A	NB L	0.19	9.4	A	NB	9.7	A
	NB R	0.27	9.0	A				NB R	0.28	9.9	A			
OVERALL						7.5	A						7.5	A

Table 14
Regeneron
2020 No-Build & Build Analysis Alternative 2 - Mitigation
PM Peak Hour

Intersection	Level of Service													
	No-Build							Build w/Mitigation						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Unsignalized Intersections														
Red Mill Road (NY Route 151) & Tempel Lane														
NYS Route 151	EB L	0.01	8.1	A										
Tempel Lane	SB LR	0.27	21.1	C										
	-	-	-	-										
US Route 4 & Hotel Access														
Hotel Access	EB R	0.05	17.8	C				EB R	0.56	31.2	D			
3rd Avenue Ext & Cedar Crest Drive/Tempel Lane														
3rd Avenue Ext	EB L	0.01	8.2	A				EB L	0.01	8.1	A			
								WB L	0.04	8.6	A			
Tempel Lane								NB L	0.64	48.1	E			
								NB R	0.28	13.7	B			
Cedar Crest Drive	SB LTR	0.02	13.5	B				SB LTR	0.04	20.5	C			
Tempel Lane & Hotel Access														
Hotel Access	WB LR	0.02	8.6	A				WB LR	0.08	10.4	B			
Tempel Lane	SB L	0.00	0.0	A				SB L	0.10	7.6	A			
Tempel Lane & Regeneron Access														
Regeneron Acces	WB LR							WB LR	0.72	19.2	C			
Tempel Lane	SB L							SB L	0.04	7.5	A			
Roundabout Intersections														
US Route 4 & Red Mill Road/Luther Road (NY Route 151)														
Red Mill Road (NY Route 151)	EB L	0.65	24.2	C	EB	23.3	C	EB L	0.92	40.2	D	EB	37.3	D
	EB TR	0.81	22.7	C				EB LTR	0.94	34.8	C			
Luther Road (NY Route 151)	WB LT	0.25	12.7	B	WB	10.1	B	WB LT	0.29	13.5	B	WB	11.3	B
	WB R	0.34	8.6	A				WB R	0.37	9.8	A			
US Route 4	NB L	0.09	17.6	B	NB	22.8	C	NB LT	0.59	14.4	B	NB	13.5	B
	NB TR	0.91	23.0	C				NB TR	0.59	12.7	B			
	SB L	0.48	12.9	B	SB	12.4	B	SB LT	0.72	12.6	B	SB	10.2	B
	SB TR	0.90	12.1	B				SB TR	0.72	7.9	A			
OVERALL						16.4	B						16.9	B
US Route 4 & Mannix Road														
Mannix Road	EB LTR	0.17	10.4	B	EB	10.4	B	EB LTR	0.18	10.5	B	EB	10.5	B
	WB L	0.42	12.0	B	WB	10.5	B	WB L	0.42	12.0	B	WB	10.5	B
	WB LTR	0.42	9.2	A				WB LTR	0.42	9.2	A			
US Route 4	NB LT	0.41	6.6	A	NB	6.0	A	NB LT	0.41	6.6	A	NB	6.0	A
	NB TR	0.41	5.4	A				NB TR	0.41	5.4	A			
	SB LT	0.69	10.7	B	SB	10.4	B	SB LT	0.70	10.9	B	SB	10.6	B
	SB TR	0.69	10.1	B				SB TR	0.70	10.3	B			
OVERALL						8.8	A						8.9	A

*Movement; Volume to Capacity Ratio; Level of Service; Approach

5.3.5 Comparison to Findings of the Mill Creek PDD

A Traffic Engineering Report was completed for the original Mill Creek PDD (Chazen Companies, 2000). The findings of that report recommended the following off-site improvements to alleviate the traffic impacts:

- NY Route 151 & Tempel Lane
  - Install traffic signal
  - Coordinate with signal at US Route 4 & NY Route 151 (note that this recommendation is no longer relevant since a roundabout was constructed at US Route 4)
- NY Route 151 & Couse Place
  - Limit to right-in/right-out
- US Route 4 & NY Route 151
  - Additional lanes at the signalized intersection (note that this recommendation is no longer relevant since a roundabout was constructed at this intersection)

The mitigation improvements identified in Sections 5.3.1 are more extensive than those identified for the Mill Creek PDD. Additionally, the recommendations made for the Mill Creek PDD are no longer relevant since other capital improvement projects have occurred in the area since the completion of the study. The mitigation improvements identified for the Regeneron project are consistent with the Village at Tempel Farm TIS and Route 4 corridor studies, as identified in Sections 5.3.1 and 5.3.2.

The intersection of NY Route 151 & Couse Place was not included in the study area for the Regeneron project. But it is noted that the intersection was considered and reconstructed as part of the US Route 4 & NY Route 151 roundabout construction project.

5.3.6 Site Plan Phasing

Regeneron is proposing to construct the Tempel Lane site in 4 phases. Phase 1 includes the construction of the warehouse, Phase 2 includes the construction of the Office/Lab Building, Phase 3 is the construction of one of the manufacturing buildings, and Phase 3a includes the construction of the second manufacturing building. For the purposes of evaluating the phasing of mitigation improvements, both manufacturing buildings were considered for Phase 3 (full-build of the site). Table 15 and Exhibits 1 and 2 provide a summary of when each improvement identified for the full-build of the site (Alternatives 1 and 2, respectively) is recommended for implementation.

Since the project will be constructed in phases, it is recommended that a traffic monitoring program be implemented. This would include conducting traffic counts at the site to confirm the trip generation after each phase of development. In addition, intersections that are noted to be monitored in the future for traffic signal installation (3rd Avenue Extension & Tempel Lane/Cedar Crest Drive or 3rd Avenue Extension & Regeneron Access/Woodlawn Avenue) would also be included in the traffic monitoring program to determine if they meet signal warrant criteria. The traffic monitoring program will provide the opportunity to confirm that traffic volumes and patterns are consistent with those estimated, or if volumes vary than those estimated, to revise the phased mitigation implementation plan as needed.

The following are the proposed improvements for each phase of development:

Phase 1

Phase 1 of the Regeneron site plan consists of a 166,350 square foot (SF) warehouse. This phase has been approved by the Town of East Greenbush and is currently under construction. As per the Town's request at the 10/12/16 Regeneron Mill Creek Traffic Workshop, the Tempel Lane & Red Mill Road (NY Route 151) intersection and Route 4 & Hotel Access were analyzed with the estimated warehouse site trips. No changes in LOS are estimated with the addition of the warehouse traffic at these two intersections. As a result, no mitigation was identified for this phase at the study area intersections.

Per the pavement evaluation that was conducted for Tempel Lane, the existing 1" of top course of pavement will be milled, and a 1.5" top course asphalt layer will be placed on the milled pavement with the warehouse construction.

Phase 2

Phase 2 of the Regeneron site plan consists of the warehouse constructed in Phase 1 and an Office/Lab building with 1,150 employees. It is estimated that the warehouse and office/lab building will generate 573 total trips (484 in, 89 out) during the AM peak hour and 567 total trips (71 in, 496 out) during the PM peak hour. This phase was tested without the extension of Tempel Lane to 3rd Avenue Extension or a private access for Regeneron to 3rd Avenue Extension. The site trips for Phase 2 were distributed to the study intersections based on the directional distribution used for Phase 1. To determine what, if any, improvements will be needed for Phase 2, the PM peak hour was tested at the Route 4 & Red Mill Road (NY Route 151) intersection since these are the critical peak hour and location, respectively, within the study area without a second access on 3rd Avenue Extension.

It was found that the Route 4 & Red Mill Road (NY Route 151) eastbound approach is estimated to be over capacity without the 2nd access during the PM peak hour. As a result, it is recommended that a second access to the Regeneron site be provided with the construction of the office/lab building, and all mitigation recommended for the full build in Section 5.3.1 be implemented.

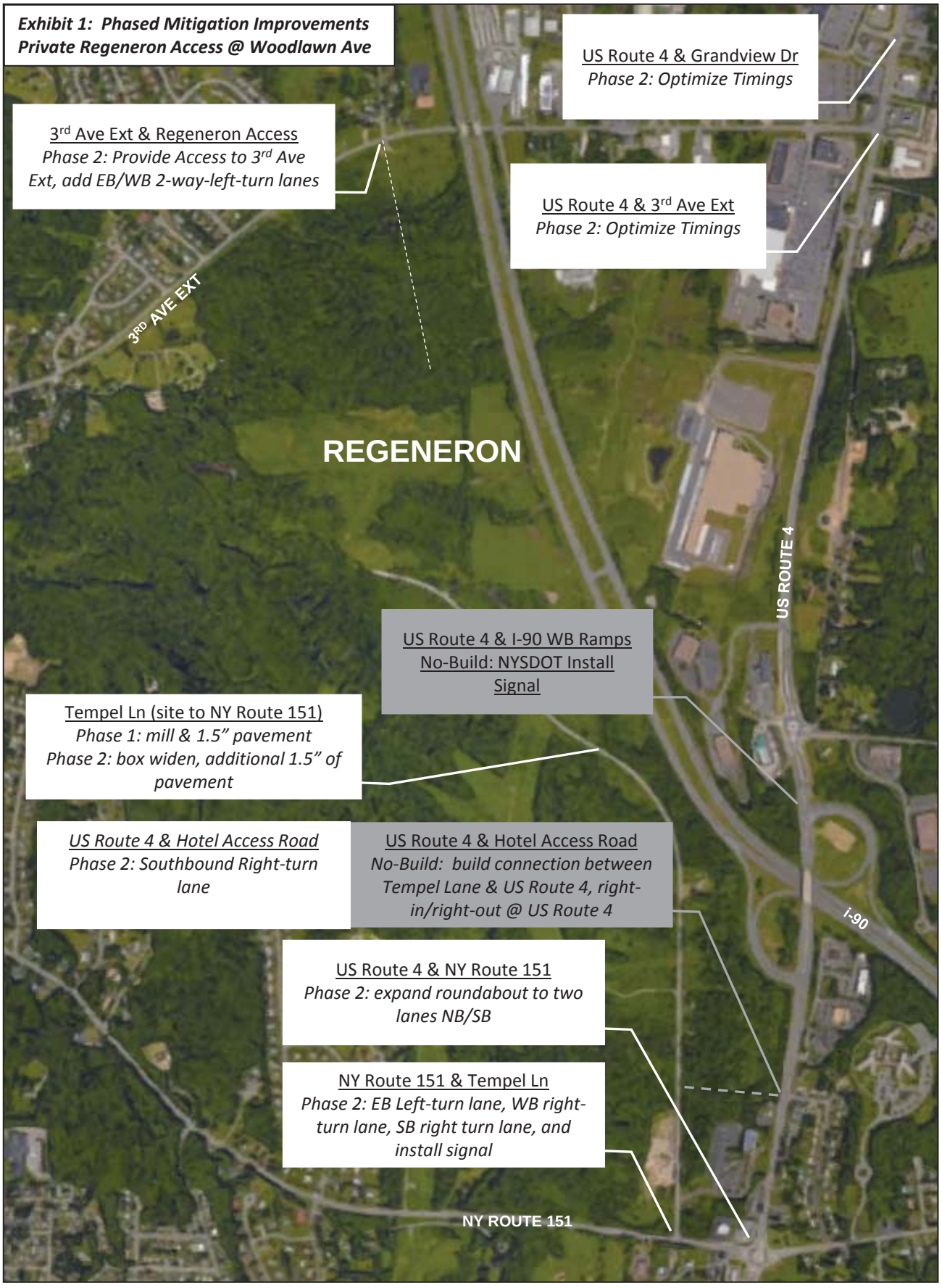
As stated in Section 4.5, Tempel Lane will be box widened to 32 feet for this phase, and an additional 1.5" of top course will be provided. Improvements in this phase will also include drainage improvements such as regrading/reshaping of ditches and/or installation of edge drains.

Phase 3 and 3a

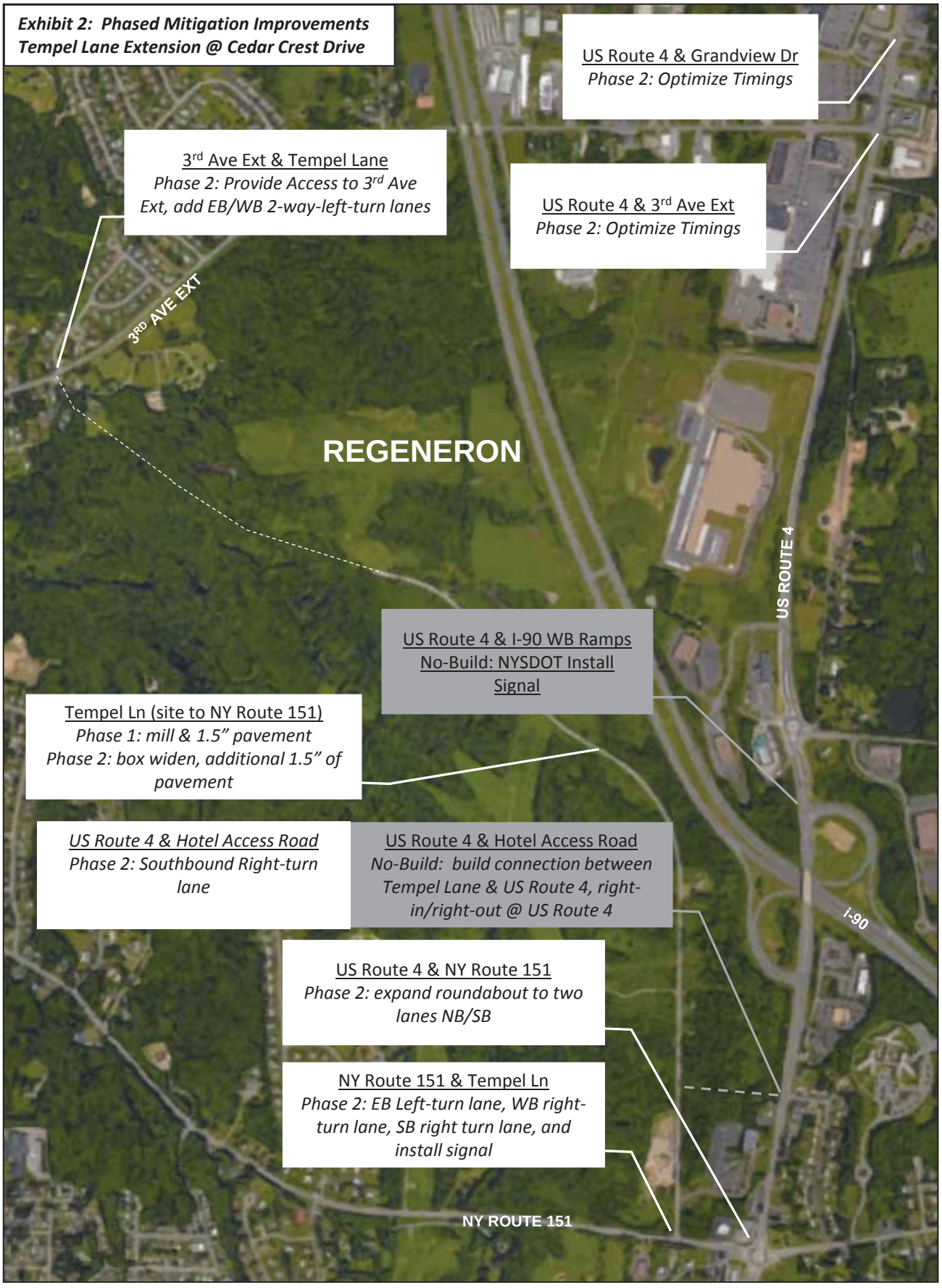
Phase 3 and 3a of the Regeneron site plan includes the warehouse constructed in Phase 1, Office/Lab building constructed in Phase 2, and the two manufacturing buildings totaling 165,000 SF. Since all mitigation recommended for full build is triggered in Phase 2, no additional mitigation is required for the construction of Phase 3.

Table 15
Phased Mitigation Improvements

	No-Build	Phase 1 Warehouse	Phase 2 Office	Phase 3 Manufacturing
Tempel Lane Extension/Provide Private Regeneron Access on 3rd Ave Extension	-	-	Construct 2nd Access to 3rd Avenue Ext	-
Tempel Lane & Route 151	-	-	EB Left-turn lane, WB right-turn lane, SB right-turn lane, and Signal	-
Route 4 & Route 151	-	-	Expand Rndbt to 2-lanes NB/SB	-
Route 4 & Hotel Access (right-in/right-out)	Tempel Farms - Connect to Route 4	-	SB right-turn lane	-
Route 4 & I-90 EB Off-Ramp	-	-	-	-
Route 4 & I-90 WB Off-Ramp	NYSDOT - Construct Traffic Signal	-	-	-
Route 4 & 3rd Ave Ext	-	-	Optimize Timings	-
Route 4 & Grandview	-	-	Optimize Timings	-
3rd Ave Ext & Tempel Lane or 3rd Ave Ext & Regeneron Access	-	-	EB/WB Two-Way-Left-Turn Lanes	-
Tempel Lane & Hotel Access	-	-	-	-
Tempel Lane & Regeneron Access	-	-	SB left-turn lane (Only for Tempel Lane Extension Alternative)	-
Tempel Lane (from site to Route 151)	-	Mill and Fill with 1.5" of Pavement	Box widen, additional 1.5" of pavement, drainage improvements	-



CHA *Regeneron Pharmaceuticals, Inc.*



CHA *Regeneron Pharmaceuticals, Inc.*

5.4 SIGNAL WARRANT ANALYSIS

A traffic signal warrant analysis was conducted for the intersections of Red Mill Road (NY Route 151) & Tempel Lane, 3rd Avenue Extension & Tempel Lane, and 3rd Avenue Extension & Regeneron Access. The analysis was conducted based on the warranting criteria described in the National *Manual on Traffic Control Devices* (NMUTCD), 2009 edition, published by the Federal Highway Administration (FHWA). The analysis was conducted for Warrant 1 (8-Hour Vehicular Volume), Warrant 2 (4-Hour Vehicular Volume) and Warrant 3 (Peak Hour Vehicular Volume). The detailed warrants and data are provided in Appendix G. It is noted that though all of these locations have a right-turn lane on the minor approach, the right-turn volume was not reduced in the evaluation of the warrants.

5.4.1 Red Mill Road (NY Route 151) & Tempel Lane

A signal warrant analysis was conducted with the Build condition traffic volumes for both alternatives.

Hourly volumes were developed for Red Mill Road (NY Route 151) using the hourly distribution pattern from the ATR data collected on Red Mill Road applied to the peak hour traffic estimated for the Build conditions. For Tempel Lane, hourly volumes were estimated by applying the hourly volume distribution presented in the *Village at Tempel Farm Traffic Impact Study* (CME, 2006) to the peak hour volumes for the existing traffic on Tempel Lane and the site generated trips for the hotel that was recently constructed. Hourly volumes for the proposed Regeneron site and through volume diverted to Tempel Lane (for Tempel Lane Extension alternative) were estimated by applying the hourly volume distribution at the existing campus on Discovery Drive to the peak hour site generated traffic.

Based on a review of the four, eight and peak hour vehicular volume warrants, only the peak hour volume warrant is met for two hours of the day for both Build alternatives. However, due to the addition of an eastbound left-turn lane and a westbound right-turn lane on Red Mill Road (NY Route 151) with a southbound right-turn lane on Tempel Lane, sight distance could be limited for vehicles exiting Tempel Lane. Due to this consideration, it is recommended that a signal be constructed at this location.

5.4.2 3rd Avenue Extension & Tempel Lane and 3rd Avenue Extension & Regeneron Access

Based on the capacity analysis results for this intersection, a signal warrant analysis was conducted with the Build condition traffic volumes for both alternatives.

Hourly volumes were developed for 3rd Avenue Extension using the hourly distribution pattern from the ATR data collected on 3rd Avenue Extension applied to the peak hour traffic estimated for the Build conditions. For Tempel Lane, hourly volumes for the proposed Regeneron site and through volume diverted to Tempel Lane were estimated by applying the hourly volume distribution at the existing campus on Discovery Drive to the peak hour site generated traffic. For the Regeneron Access, hourly volumes for the proposed Regeneron site were estimated by applying the hourly volume distribution at the existing campus on Discovery Drive to the peak hour site generated traffic.

Based on a review of the four, eight and peak hour vehicular volume warrants, only the peak hour volume warrant is met for two hours of the day for both alternatives. It should also be noted that the proposed two-way-left-turn lane will help improve operations for exiting traffic, allowing for a two-stage left-turn. It is not recommended that a signal be installed based on only meeting the peak hour warrant. It is recommended that the intersection be monitored in the future to determine the need for signalization.

5.5 LEFT-TURN LANE WARRANT ANALYSIS

Volume criteria was reviewed to determine if left-turn lanes are warranted at the intersections of Red Mill Road (NY Route 151) & Tempel Lane, 3rd Avenue Extension & Cedar Crest Drive/Tempel Lane, 3rd Avenue Extension & Woodlawn Avenue/Regeneron Access, Tempel Lane & Hotel Access Road, and Tempel Lane & Regeneron Access. *A Policy on Geometric Design of Highways and Streets, 6th Edition* (American Association of State Highway and Transportation Officials, 2011) provides traffic volumes guidelines where a left-turn lane should be considered on two-lane roadways.

5.5.1 Red Mill Road (NY Route 151) & Tempel Lane

The left-turn lane warrant analysis was conducted for both Build alternatives. And since the measured 85th percentile speeds on Red Mill Road varied between 48 and 55 mph (eastbound and westbound, respectively), the volumes were compared to the guidelines for both a 50 mph and 60 mph operating speed.

The graphed volumes and guidelines are presented in Appendix G. Based on a review of these guidelines, a left-turn lane is warranted for the AM and PM peak hours.

5.5.2 3rd Avenue Extension & Tempel Lane/Cedar Crest Drive and 3rd Avenue Extension & Woodlawn Avenue/Regeneron Access

The left-turn lane warrant analysis was conducted for both Build alternatives. The measured 85th percentile speeds on 3rd Avenue Extension varied between 44 and 47 mph (westbound and eastbound, respectively) so the volumes were compared to the guidelines for a 50 mph operating speed.

The graphed volumes and guidelines are presented in Appendix G. Based on a review of these guidelines, a left-turn lane is warranted for the AM and PM peak hours for both alternatives.

5.5.3 Tempel Lane & Hotel Access Road

The left-turn lane warrant analysis was conducted for both Build alternatives. The volumes were compared to the guidelines for a 40 mph operating speed, although the speed limit on Tempel Lane is 30 mph.

The graphed volumes and guidelines are presented in Appendix G. Based on a review of these guidelines, a left-turn lane is not warranted at this location.

5.5.4 Tempel Lane & Regeneron Access

This left-turn lane warrant analysis was only conducted for Alternative 2 (Tempel Lane extension to 3rd Avenue Extension), as there would be no left-turn volume on Tempel Lane for the Private Regeneron access alternative. The volumes were compared to the guidelines for a 40 mph operating speed, although the speed limit on Tempel Lane is 30 mph.

The graphed volumes and guidelines are presented in Appendix G. Based on a review of these guidelines, a left-turn lane is warranted for the AM peak hour.

6.0 TRAFFIC SAFETY ANALYSIS

6.1 ACCIDENT ANALYSIS

Accident data was obtained from NYSDOT for the three-year period from May 1, 2012 to April 30, 2015 for the following segments:

- US Route 4 from Red Mill Road (NY Route 151) to 3rd Avenue Extension
- Red Mill Road (NY Route 151) from US Route 4 to Tempel Avenue
- 3rd Avenue Extension from US Route 4 to Barracks Road

Additional roadway segments were added to the study after the initial accident analysis. The accident data for these segments were obtained for the three-year period of January 1, 2013 to December 31, 2015 and are as follows:

- US Route 4 from 3rd Avenue Extension to Grandview Drive/Greenbush Commons
- Red Mill Road (NY Route 151) from Tempel Avenue to 3rd Avenue Extension

Summaries of this data are included in Appendix H. The accident data showed a total of 343 accidents reported to have occurred within the study area over the three-year period. Inspection of the accident data showed that 155 of the crashes occurred at the study area intersections and 187 occurred on the links between the study intersections. The predominate accident types are shown in Tables 16 and 17.

Table 16

Intersection Collision Summary

Type of Collision	Number	Percentage
Rear End	69	45
Right Angle	39	25
Other	19	12
Left-Turn	12	8
Overtake	8	5

Most of the accidents at the intersections were property damage only (117 crashes). There were 17 non-fatal injury crashes, 20 non-reportable crashes, and 1 fatality in the study area during the analysis period. The accident rates at all of the studied intersections exceed statewide averages for similar facilities.

Red Mill Road (NY Route 151) & Tempel Lane

Although this intersection crash rate exceeded the state wide crash rate for similar facilities, it should be noted that only two accidents occurred over the three year study period. One was due to snow and ice on the roadway and the other was a collision with a deer. As a result, no additional mitigation measures are recommended for this intersection.

US Route 4 & Red Mill Road (NY Route 151)

See Figure 1 in Appendix H for a collision diagram documenting all collisions at this intersection. The majority of accidents at the intersection were right angle crashes and rear end crashes. Generally the right angle crashes were due to drivers not yielding the right-of-way to vehicles in the roundabout. This type of

accident is more common at a roundabout, however, they occur at lower speeds due to the traffic calming effect of the roundabout, resulting in fewer injury accidents. The majority of right angle crashes occurred at the conflict point with southbound entering traffic. This could be the result of insufficient gaps for southbound traffic to enter, resulting in drivers accepting smaller gaps to enter the roundabout. With the proposed mitigation to provide two northbound and southbound through lanes at the roundabout, the operations and safety will be improved at the intersection.

Rear end accidents were the second most prevalent crash at the intersection during the study period. Rear end accidents typically correlate to traffic congestion where vehicles are in stop-and-go traffic and/or reaching the end of forming queues. Generally the rear end crashes were due to driver inattention or following too closely. With the proposed mitigation to provide two northbound and southbound through lanes at the roundabout, the operations and queues will be improved at the intersection.

US Route 4 & I-90 Exit 9 Eastbound Off-Ramp

The majority of accidents at this location were rear end accidents (10 out of 14). A high occurrence of rear end accidents typically correlates to traffic congestion where vehicles are in stop-and-go traffic and/or reaching the end of forming queues. At this location, the accident cause was primarily listed as driver inattention. In addition, wet/snowy pavement was also a factor for some. No additional mitigation measures are recommended for this intersection.

US Route 4 & I-90 Exit 9 Westbound Off-Ramp

The majority of accidents at this location were rear end accidents (6 out of 10). A high occurrence of rear end accidents typically correlates to traffic congestion where vehicles are in stop-and-go traffic and/or reaching the end of forming queues. At this location, the accident cause was primarily listed as driver inattention or following too closely. No additional mitigation measures are recommended for this intersection as a traffic signal will be installed by NYSDOT as part of a safety improvement project.

US Route 4 & Mannix Road

See Figure 2 in Appendix H for a collision diagram documenting all collisions at this intersection. It should be noted that the intersection US Route 4 & Mannix Road was reconstructed in 2013 from a two-way stop controlled intersection to a roundabout to help address safety concerns and operations at the intersection. As a result, the analysis does not fully reflect the safety and operational benefits expected to be achieved from the roundabout improvement. Of the 31 accidents that occurred over the study period, 10 occurred prior to the opening of the roundabout.

The majority of accidents at the intersection were right angle crashes and rear end crashes. Generally the right angle crashes were due to drivers not yielding the right-of-way to vehicles in the roundabout. This type of accident is more common at a roundabout, however, they occur at lower speeds due to the traffic calming effect of the roundabout, resulting in fewer injury accidents. The rear end crashes occurred on three approaches, and generally were due to driver inattention or following too closely. Since this is a relatively new roundabout installation, some crashes could also be attributed to drivers inexperienced with roundabouts and not knowing the correct lane assignment. No additional mitigation measures are recommend for this intersection.

US Route 4 & 3rd Avenue Extension

The majority of accidents at this intersection were rear end accidents and other accidents. A high occurrence of rear end accidents typically correlates to traffic congestion where vehicles are in stop-and-go traffic and/or reaching the end of forming queues. Drivers encounter queues at this intersection due

to signal delay and over capacity movements at adjacent signals. Generally the rear end crashes were due to driver inattention or following too closely. For the majority of the other incidents, the police reports programmed the incidents as "other" but based on the verbal descriptions some appear to be rear-end incidents. However, there is insufficient data in the reports to conclusively say so. There was one fatality at the Route 4 & 3rd Avenue Extension intersection which was due to a left-turn incident. A southbound vehicle on Route 4 collided with a tractor-trailer turning left onto 3rd Avenue Extension from the northbound direction on Route 4. The accident report indicated that driver inattention was an apparent factor of the crash.

Signal optimization is proposed as mitigation at this intersection to help improve operations. No additional mitigation measures are recommended for this intersection.

US Route 4 & Grandview Drive/Greenbush Commons

The majority of accidents at this intersection were rear end accidents (22 of 31). A high occurrence of rear end accidents typically correlates to traffic congestion where vehicles are in stop-and-go traffic and/or reaching the end of forming queues. Drivers encounter queues at this intersection due to signal delay and over capacity movements in the northbound direction. Generally the rear end crashes were due to driver inattention or following too closely. Signal optimization is proposed as mitigation at this intersection to help improve operations. No additional mitigation measures are recommended for this intersection.

3rd Avenue Extension & Barracks Road

Although this intersection crash rate exceeded the state wide crash rate for similar facilities, it should be noted that only four accidents occurred over the three year study period. Three of the crashes had apparent factors listed as improper turn, failure to yield the right-of-way, and driver inattention. As a result, no additional mitigation measures are recommended for this intersection.

Table 17

Link Collision Summary

Type of Collision	Number	Percentage
Other	64	34
Rear End	49	26
Right Angle	32	17
Left Turn	14	7
Overtake	13	7

The majority of the accidents on the links were property damage only (126 crashes). There were 37 non-fatal injury crashes, 24 non-reportable crashes, and no fatalities in the study area during the analysis period. All links were below the statewide crash rate averages for similar facilities with the exception of Red Mill Road (NY Route 151) between Tempel Lane and US Route 4 and US Route 4 between the I-90 Westbound Ramps and Mannix Road.

As shown from the data above, there is a pattern of rear-end accidents along the US Route 4 corridor. A high occurrence of rear end accidents typically correlates to traffic congestion where vehicles are in stop-and-go traffic and/or reaching the end of forming queues. While the site is adding additional traffic to the corridor, signal timing optimization and geometric improvements are recommended at the study area

intersections. With these improvements, operations are estimated to be similar to No-Build Conditions. Many of the other "Other" accidents were related to incidents with deer, especially on the Red Mill Road (NY Route 151) segment between 3rd Avenue Extension and Tempel Lane.

High Accident Locations

In addition to the accident data obtained above, High Accident Location (HAL) data for the study area was requested from NYSDOT, including Priority Investigation Locations (PIL), Priority Investigation Intersections (PII), and Safety Deficient Locations (SDL). HAL's are identified where locations (roadway segments and intersections) exceed thresholds established by NYSDOT, and have statistically significant higher accident rates than expected for highway segments with similar characteristics. The HAL's identified in the study area during the study period are shown in Table 18.

The following study area intersections were identified as PIIs. The accident history at these locations is described above.

- US Route 4 & NY Route 151 (HAL Years 2013, 2014, 2015)
- US Route 4 & I-90 Exit 9 Eastbound Off-Ramp (HAL Years 2014, 2015)
- US Route 4 & I-90 Exit 9 Westbound Off-Ramp (HAL Year 2015)
- US Route 4 & Mannix Road (HAL Years 2014, 2015)
- US Route 4 & 3rd Avenue Extension (HAL Years 2013, 2014, 2015)
- US Route 4 & Grandview Drive/Greenbush Commons (HAL Years 2013, 2015)

The following study area segments were identified as SDL's and/or PIL's.

US Route 4

- US Route 4 just north and south of NY Route 151
- US Route 4 between NY Route 151 and Glaz Street
- US Route 4 between Glaz Street and just north of the I-90 Eastbound Ramps
- US Route 4 between just north of the I-90 Eastbound Ramps and I-90 Westbound Ramps
- US Route 4 between just north of the I-90 Eastbound Ramps and Mannix Road*
- US Route 4 between I-90 Westbound Ramps and Empire Drive*
- US Route 4 between I-90 Westbound Ramps and just north of Empire Drive *
- US Route 4 between FedEx signal and Walmart Signal
- US Route 4 between Thompson Hill Road and 3rd Avenue Extension
- US Route 4 between Thompson Hill Road and just north of Grandview Drive
- US Route 4 between Walmart signal and just north of Grandview Drive

NY Route 151

- NY Route 151 between just north of Discovery Drive and Sherwood Avenue
- NY Route 151 between just north of Discovery Drive to Robin Lane
- NY Route 151 between just south of Discovery Drive and Sherwood Avenue
- NY Route 151 between Eastern Avenue and Mill Creek
- NY Route 151 between just west of Tempel Lane and US Route 4*
- NY Route 151 between Tempel Lane and US Route 4*

**These segments correspond to the segments from the accident analysis that are above the statewide average.*

The majority of the crashes on the US Route 4 corridor are rear end crashes. A high occurrence of rear end accidents typically correlates to traffic congestion where vehicles are in stop-and-go traffic and/or reaching the end of forming queues. This is the case with the US Route 4 corridor where there are existing queue spillbacks at existing intersections and over capacity movements in the northbound direction. While the site is adding additional traffic to the corridor, signal timing optimization and geometric improvements are recommended at the study area intersections. With these improvements, operations are estimated to be similar to No-Build Conditions.

On the NY Route 151 corridor, the majority of accidents were “other” accidents. Many of these accidents were related to incidents with deer. The site is adding a small percentage of traffic to this corridor and operations are estimated to be similar to No-Build Conditions.

Table 18
NYSDOT High Accident Locations (HAL)

Reference Marker	HAL Year 2013 (8/1/2011 to 7/31/2013)			HAL Year 2014 (08/1/2012 to 07/31/2014)			HAL Year 2015 (11/1/2013 to 10/31/2015)		
	SDL	PIL	PII	SDL	PIL	PII	SDL	PIL	PII
US Route 4									
4 1401 1013 to 4 1401 1016		2.97**		0.12					
4 1401 1015			#79* - 4.92			#79 - 0.95			#79 - 7.92
4 1401 1015 to 4 1401 1015								8.01	
4 1401 1016 to 4 1401 1016							-0.01		
4 1401 1018 to 4 1401 1020				0.07					
4 1401 1020						#88 - 4.97			#88 - 5.10
4 1401 1020 to 4 1401 1022				0.53					
4 1401 1020 to 4 1401 1023							0.52		
4 1401 1022									#90 - 5.79
4 1401 1022 to 4 1401 1025								2.27	
4 1401 1022 to 4 1401 1026				0.24					
4 1401 1024						#92 - 11.50			#92 - 8.01
4 1401 1029 to 4 1401 1031	1.20			2.77				2.25	
4 1401 1030 to 4 1401 1032							1.71		
4 1401 1030 to 4 1401 1035		7.11			5.19				
4 1401 1031						#91 - 14.15			#91 - 10.00
4 1401 1031 to 4 1401 1035								6.72	
4 1401 1033			#97 - 7.63			#97 - 7.96			#97 - 12.02
4 1401 1034			#99 - 10.46						#99 - 7.71
NY Route 151									
151 1401 1005 to 151 1401 1008				0.32					
151 1401 1005 to 151 1401 1009	0.12								
151 1401 1006 to 151 1401 1008							0.08		
151 1401 1013 to 151 1401 1017				0.08			0.07		
151 1401 1019 to 151 1401 1023				0.74			0.26		
151 1401 1021 to 151 1401 1023	1.19								

*Intersection Number

#79 - Route 4 & Route 151; #88 - Route 4 & I-90 Eastbound Ramps; #90 - I-90 Westbound Ramps; #91 - Route 4 & Walmart

#92 - Route 4 & Mannix; #97 - Route 4 & 3rd Avenue Extension; #99 - Route 4 & Grandview Drive

**Severity Weight Rank

6.2 SIGHT DISTANCE ANALYSIS

Sight distance was assessed for two alternatives, a private Regeneron access to 3rd Avenue Extension at Woodlawn Avenue and Tempel Lane extended to 3rd Avenue Extension at Cedar Crest Drive. The available intersection sight distances were reviewed from the following perspectives:

- Driver exiting Tempel Lane/Regeneron Access onto 3rd Avenue Extension, looking left and right.
- Driver entering Tempel Lane/Regeneron Access turning left from 3rd Avenue Extension westbound
- Stopping sight distances along 3rd Avenue Extension approaching Tempel Lane/Regeneron Access.

The existing sight distances measured at the proposed location of the extension of Tempel Lane/Regeneron Access were compared to the guidelines in the Association of State Highways and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets, 2011* for a 50 mph design speed, since the 85th percentile speed on 3rd Avenue Extension eastbound is 47 mph (it is only 44 mph westbound).

Table 19
Sight Distance
3rd Avenue Extension & Woodlawn Avenue

	Intersection Sight Distance				Stopping Sight Distance	
	Right-turn from driveway (D_L)	Left-turn from driveway		Left-turn from Major Road (D_S)	SSD_1 EB	SSD_2 WB
		Looking Left (D_L)	Looking Right (D_R)			
Available	600 ft.	600 ft.	675 ft.	725 ft.	725 ft.	>1000 ft.
Recommended	480 ft.	555 ft.	555 ft.	405 ft.	425 ft.	425 ft.

Table 20
Sight Distance
3rd Avenue Extension & Tempel Lane

	Intersection Sight Distance				Stopping Sight Distance	
	Right-turn from Tempel Lane (D_L)	Left-turn from Tempel Lane		Left-turn from Major Road (D_S)	SSD_1 EB	SSD_2 WB
		Looking Left (D_L)	Looking Right (D_R)			
Available	>1000 ft.	>1000 ft.	650 ft.	>1000 ft.	>1000 ft.	585 ft.
Recommended	480 ft.	555 ft.	555 ft.	405 ft.	425 ft.	425 ft.

The analysis indicates that the available sight distance for both alternatives exceed the recommended minimum distances.

7.0 CONCLUSION & RECOMMENDATIONS

This TIS is an update to the October 2016 TIS completed for Regeneron Pharmaceuticals, Inc. for their Tempel Lane site in East Greenbush, NY. The October 2016 TIS was part of the Tempel Lane Campus – Supplemental Final Environmental Impact Statement which was approved by the Town of East Greenbush in May 2017. The October 2016 TIS analyzed the site with 187,000 SF of warehouse, 165,000 SF of manufacturing, and a 750-employee office/laboratory space for R&D. The project was broken out into phases as follows:

- Phase 1 – 187,000 SF Warehouse
- Phase 2 – 750 employee office/laboratory space
- Phase 3 and 3a – 165,000 SF Manufacturing

Construction of Phase 1 started in Summer 2017 and consists of a reduced size of the warehouse space from 187,000 SF to 166,350 SF. Subsequent to the approval of the SFEIS, planning for the Phase 2 development has changed to increase the number of proposed employees in the office/laboratory space to 1,150 employees (an increase of 400 employees). The Phase 3 and Phase 3a Manufacturing components are proposed to stay the same. This traffic study update evaluated the effect of the changes in Regeneron's Phase 2 development program on the transportation impact findings and recommendations of the SFEIS.

The full build-out of the proposed site now consists of 166,350 SF of warehouse, 165,000 SF of manufacturing, and 1,150 employee office/laboratory space for R&D. ITE's Trip Generation Manual data for LUC's 140, 150, and 760 was used for the trip generation. It is estimated that the project will generate 693 total trips (578 in, 115 out) during the AM peak hour and 687 (114 in, 573 out) during the PM peak hour.

The primary access to the Regeneron site will be via the existing segment of Tempel Lane which connects to Red Mill Road (NY Route 151). Two access alternatives for the site connection to 3rd Avenue Extension were evaluated:

Alternative 1: Convert the Phase 1 maintenance road to a private access road, connecting the Regeneron site at 3rd Avenue Extension opposite Woodlawn Avenue.

Alternative 2: Extend Tempel Lane to 3rd Avenue Extension opposite Cedar Crest Drive, with Tempel Lane being a Town road from Red Mill Road to 3rd Avenue Extension. This is the approved access concept presented in the SFEIS.

Alternative 1 is the preferred option, but is contingent on the feasibility and cost to construct a necessary third bridge. Alternative 2 is proposed to be the contingency option if the preferred option is found not to be feasible.

Capacity Analysis and Mitigation

The future year conditions considered background traffic growth as well as traffic from specifically identified developments. Capacity analyses of the study area were conducted to estimate the operations of the adjacent roadway system with and without the project generated traffic. The addition of the project generated traffic does reduce the LOS for some of the movements at the study area intersections. As a result, geometric and traffic control improvements have been identified to mitigate these impacts.

The following improvements have been identified at the study area intersections for Alternative 1 and Alternative 2:

- US Route 4 & Grandview Drive/Greenbush Commons
  - Optimization of signal splits
- US Route 4 & 3rd Avenue Extension
  - Optimization of signal splits
- Red Mill Road (NY Route 151 & Tempel Lane)
  - Construct an eastbound left-turn lane, westbound right-turn lane, and southbound right-turn lane consistent with the proposed geometry in the Village at Tempel Farm Traffic Impact Study
  - Construct a traffic signal
- 3rd Avenue Extension & Tempel Lane or 3rd Avenue Extension & Regeneron Access
  - Construct an eastbound and westbound two-way-left-turn lane
- US Route 4 & Red Mill Road (NY Route 151)
  - Modify the roundabout to include two lanes northbound and southbound consistent with the improvements identified in the Village at Tempel Farm and Route 4 Corridor studies.
- US Route 4 & Hotel Access (Hampton Inn)
  - Construct a southbound right-turn lane on Route 4

Alternatives 1 and 2 provide similar results for the study area intersections, with the same mitigation recommended. Regeneron's preferred alternative is to provide a private access to the site on 3rd Avenue Extension across from Woodlawn Avenue in addition to the access from the existing segment of Tempel Lane (Alternative 1). If it is found that building a third bridge on the maintenance access road (currently being constructed with the warehouse) is not feasible, Regeneron would then proceed with the alternative to extend Tempel Lane to 3rd Avenue Extension across from Cedar Crest Drive (Alternative 2). As it is currently unknown if the bridge can be constructed, it is requested that NYSDOT grant approval for an access on 3rd Avenue Extension in either location.

The pavement condition on Tempel Lane currently ranges from fair to poor condition. A detailed pavement evaluation was completed for the full build-out of the site. The following are recommended for the different phases of the project:

- Phase 1, which is currently under construction, will include milling of the existing 1" of top course pavement on Tempel Lane and placing a 1.5" top course asphalt layer on milled pavement.
- Phase 2, which includes the warehouse and office/lab traffic, will include box widening the roadway to a width of 32'. An additional 1.5" of top course pavement will also be included. Improvements in this phase will also include drainage improvements such as regrading/reshaping of ditches and/or installation of edge drains.
- Phase 3, which includes traffic for the warehouse, office/lab, and manufacturing will not require additional improvements to the existing portion of Tempel Lane.

Site Plan Phasing

Regeneron is proposing to construct the Tempel Lane site in 4 phases. Phase 1 includes the construction of the warehouse, Phase 2 includes the construction of the Office/Lab Building, Phase 3 is the construction of one of the manufacturing buildings, and Phase 3a includes the construction of the second manufacturing building. For the purposes of evaluating the phasing of mitigation improvements, both manufacturing buildings were considered for Phase 3 (full-build of the site). Table 15 and Exhibits 1 and

2 in Section 5.3.6 provide a summary of when each improvement identified for the full-build of the site is recommended for implementation. It was found that all mitigation improvements identified for the full build-out of the site are triggered in Phase 2 of the development.

Since the project will be constructed in phases, it is recommended that a traffic monitoring program be implemented. This would include conducting traffic counts at the site to confirm the trip generation after each phase of development. In addition, intersections that are noted to be monitored in the future for traffic signal installation (3rd Avenue Extension & Regeneron Access or 3rd Avenue Extension & Tempel Lane) would also be included in the traffic monitoring program to determine if they meet signal warrant criteria. The traffic monitoring program will provide the opportunity to confirm that traffic volumes and patterns are consistent with those estimated, or if volumes vary than those estimated, to revise the phased mitigation implementation plan as needed.

Safety:

There is a pattern of rear-end accidents along the Route 4 corridor. A high occurrence of rear end accidents typically correlates to traffic congestion where vehicles are in stop-and-go traffic and/or reaching the end of forming queues. While the site is adding additional traffic to the corridor, signal timing optimization and geometric improvements are recommended at the study area intersections. With these improvements, operations are estimated to be similar to No-Build Conditions.