

## 4.0 MITIGATION MEASURES

### 4.1 INTRODUCTION

Where significant adverse impacts are identified, the *CEQR Technical Manual* states that mitigation to reduce or eliminate the impacts to the fullest extent practicable is generally developed and evaluated. This chapter presents a summary of the analyses presented in the preceding chapters for each technical area regarding mitigation measures examined to minimize or eliminate identified potential impacts.

### 4.2 HISTORIC AND CULTURAL RESOURCES

#### 4.2.1 Year 2015

##### *Fairview Park*

As discussed in **Chapter 2.6**, “Historic and Cultural Resources,” two sites with historic and cultural resources have been identified within the current location of the proposed Fairview Park:

- *Fairview Prehistoric Site (NYS Site A08501.002815)*. This prehistoric site was located in 1999 during ~~John Milner Associates (JMA)~~ Phase II excavations at the Balthasar Kreischer Estate Ruins Site. Prehistoric material was recovered from a small, ~~60-foot-by-40-foot~~ area to the southeast of the main house foundation remains and from test units to the northwest and east of the main house foundation. The limited testing conducted to date suggests that at least portions of the prehistoric site retain sufficient integrity to contribute important archaeological data.
- *Balthasar Kreischer Estate (Fairview) Ruins*. Fieldwork at the Kreischer Estate in 1999 identified 18 features (including foundations and mid-Late-19<sup>th</sup> century and Early-20<sup>th</sup> century items), including visible surface remains across the estate ruins. The site is historically significant in local terms for its association with the Kreischer Brickworks, the establishment of Kreischerville (Charleston), and other 19<sup>th</sup> century works that were sponsored by the Kreischer family. The site is also significant as an intact archaeological example of a 19<sup>th</sup> century elite residence and its associated features.

To avoid impacts on these resources, the proposed Fairview Park has been designed to minimize the potential for adverse impacts to these identified archaeological sites. In the northwest portion of the proposed park where these sites are located, the Fairview Park plan would retain the existing walking trails with minimal changes to any surrounding areas. While the park would include playing fields and other active recreation facilities, they are not planned to be located in this area, and to the greatest extent possible, the park has been designed to avoid major grading and topographic changes that could result in impacts to these resources. With this resource-avoidance design, combined with careful attention to the presence of those resources during construction of other aspects of the park, adverse impacts to these resources due to the proposed park would be avoided.

##### *Retail Site “A”*

In addition, as discussed in **Chapter 2.6**, “Historic and Cultural Resources,” a prehistoric site was located during the Phase IB survey atop a prominent knoll in the east-central portion of the current Project Area. This approximately 150 foot by 40 foot site, which is considered to be archaeologically significant, is located in Block 7452, Lot 75, the parcel on which Retail Site “A” would be developed.

Development of Retail Site “A,” which would include the proposed public library, would have the potential to adversely impact this prehistoric site. Construction activities such as excavation, cutting, filling, grading, grubbing, vegetation-stripping, drainage improvements and subsurface utility installations would create subsurface disturbances that would potentially destroy or severely compromise the integrity of this prehistoric site.

Further archaeological investigation will be required to be undertaken in the parkland and on Retail Site “A” (limited to the area identified in the quadrant as C4-MCB-1) prior to construction or ~~substantial~~ ground disturbing activities. A Scope of Work for archaeological field testing will be prepared and submitted to the New York City Landmarks Preservation Commission (~~LPC~~NYCLPC) for review and approval. Remedial measures, including Phase 1B testing and, if needed as determined by NYCLPC based on the results of the Phase 1B testing, any necessary Phase 2 and 3 investigations, and continued consultation with NYCLPC ~~and/or, if appropriate, OPRHP~~, will be required to be undertaken by the developer(s) through provisions in the ~~contract~~Contract of sale ~~Sale~~ between ~~NYC~~NYCEDC and the developer(s).

### 4.2.2 Year 2020

Construction of the remainder of the Project Area by the year 2020 has the potential to disturb or destroy other prehistoric archaeological sites and areas that possess archaeological potential that have never been surveyed. These resources and the project components that could potentially impact them are noted below:

#### ***Englewood Avenue***

- *Site A7-MCB-1 (NYS Site A08501.002767)*. This prehistoric site was located during the Phase IB survey on a small, pronounced knoll or hill with a flat summit just south of the proposed route of Englewood Avenue, within the existing Conservation Area. This approximately 65 foot by 25 foot site is considered to be archaeologically significant.
- *Englewood Avenue Extension and Pedestrian/Bicycle Path*. It is possible that remains of prehistoric occupation are present in this 80-foot wide linear corridor. Given the density of prehistoric site locations already identified for this portion of Staten Island, including a site located less than 50 feet south of Englewood Avenue within the Project Area itself, it is possible that intact prehistoric resources are present.

#### ***Retail Site “B”***

- *Block 7494: Lots 8, 90, 95, 97, and 183 - Retail Site “B”*. It is possible that early features associated with the tenure of the Shea family (ca.1853–1887) are present on this property and would be disturbed by the development of Retail Site “B.” Such features could include wells, cisterns, or privies, in addition to foundation remains of the house itself. It is equally possible that features associated with the tenure of the Beckman family (ca.1887–ca.1917) are present. It is also possible that remains of prehistoric occupation are present on this parcel, given the number of previously identified prehistoric sites and traces of occupation noted in the area.
- *Block 7487, Lot 100 – Retail Site B*. Block 7487, Lot 100 lies in the southwestern portion of the current Project Area. This block has been impacted by recent development, notably the construction of the MTA Bus Depot that fronts on Arthur Kill Road. The bus annex occupies approximately one third of Block 7487. However, the portion of Block 7487 that lies to the south of the bus depot and north of Block 7494 and the areas within the existing sewer easement line running east-west through this section of the Project Area have not been previously surveyed.

#### ***Senior Housing Site***

- *Fairview Prehistoric Site (NYS Site A08501.002815) and Balthasar Kreischer Estate (Fairview) Ruins*, as discussed under Year 2015 above.

The full potential for Proposed Project components projected for completion by 2020 to result in significant adverse impacts on identified historic or prehistoric resources is not yet known.

At this time, there are no specific development proposals for the Senior Housing Site or Retail Site “B” and future developers will be selected pursuant to a ~~RPERFP~~RPERFP process. Further archaeological

investigation will be required to be undertaken by the developer(s) after selection.- For all developments in the Project Area to be completed by the year 2020, remedial measures, including Phase 1B testing, and if needed as determined by NYCLPC based upon the results of the Phase 1B testing, any necessary Phase 2 and 3 investigations, and continued consultation with LPCNYCLPC and/or, if necessary, OPRHP, will be undertaken. These remedial measures will be required to be undertaken by the developer(s) through the provisions in the of a contract of sale, lease, or other legally binding agreement between NYCNYCEDC or the City and the developer(s).

With these types of mitigation strategies, adverse impacts to these resources could potentially be avoided or substantially minimized.

### 4.3 NATURAL RESOURCES

In this section, mitigation strategies for impacts to ~~wetlands and habitats~~, especially habitat bifurcation-, and New York Department of Environmental Conservation (NYSDEC) regulated and United States Army Corps of Engineers (USACE) jurisdictional wetlands are discussed. These strategies are appropriate for the build ~~phases~~ years and options that impact regulated wetlands and/or bifurcate habitats.

#### 4.3.1 Wetlands

This subchapter identifies the applicable federal and state regulations with respect to wetland mitigation, the various compensatory options, and identification of potential wetland mitigation opportunities in the Development Area.

##### ***Federal Mitigation Regulations- Wetlands***

Federal Executive Order (EO) 11990 Protection of Wetlands, issued in 1977, is an overall wetlands policy for all agencies managing federal lands, sponsoring federal projects, or providing federal funds to state or local projects. EO 11990 requires that, when a construction project involves wetlands, a finding must be made by the federal agency that there is no practicable alternative to such construction, and that the Proposed Project includes all practicable measures to minimize impacts on wetlands resulting from such use. It requires federal agencies to follow avoidance, mitigation, and preservation procedures, with public input, before proposing new construction in wetlands, and generally requires the minimization of activities in wetlands and coordination with United States Army Corps of Engineers (USACE) regarding wetlands mitigation. If federal funding would be utilized for the Proposed Project, the Proposed Project would need to comply with EO 11990. Wetlands are also regulated under Section 404(b)(1) of the Clean Water Act-).

Permits from the USACE for work in and around jurisdictional wetlands would be required; the permits would require compensatory mitigation. Compensatory mitigation is the restoration, establishment, enhancement, or, in certain circumstances, preservation of aquatic resources to offset a pProposed pProject's unavoidable adverse impacts after all appropriate and practicable avoidance and minimization has been achieved (33 Code of Federal Regulations [CFR] Part 332.2). The principal objectives of compensatory mitigation are to replace the functions and values lost from the impacted aquatic resources, and to comply with the goal of no net loss of wetlands.

##### ***Wetland Mitigation – Compensatory Options***

The USACE and U.S. Environmental Protection Agency (USEPA) joint Compensatory Mitigation for Losses of Aquatic Resources, Final Rule (33 CFR Part 332; 73 Federal Register [FR] 19670, April 10, 2008) –establishes a hierarchy of preferred options for providing required compensatory mitigation. This part (33 CFR Part 332) is intended to further clarify mitigation requirements established under USACE and US EPA regulations at 33 CFR Part 320 and 40 CFR Part 230, respectively. The final rule instructs the USACE district engineer to consider the following type and location options in the order presented:

- 1) Mitigation bank credits – Offsetting anticipated, unavoidable aquatic resource impacts by securing credits from an approved mitigation bank, providing the permitted impacts are located within the service area of the bank and the bank has the appropriate number and resource type of credits available.
- 2) In-lieu fee program credits – Offsetting anticipated, unavoidable aquatic resource impacts by securing credits from an approved in-lieu fee program, providing the permitted impacts are located within the service area of the program and the program has the appropriate number and resource type of credits available.
- 3) Permittee-responsible mitigation under a watershed approach – Offsetting anticipated, unavoidable impacts by restoring, establishing, enhancing, or in certain circumstances preserving aquatic resources with the ultimate goal of maintaining and improving the quality and quantity of aquatic resources within the watershed through strategic selection of the mitigation resource type and site location.
- 4) Permittee-responsible mitigation through on-site and in-kind mitigation – Offsetting anticipated, unavoidable impacts by restoring, establishing enhancing, or in certain circumstances preserving aquatic resources of a similar structural and functional type to the impacted resources, on the same parcel of land as the impact site or on a parcel contiguous to the impact site.
- 5) Permittee-responsible mitigation through off-site and/or out-of-kind mitigation – Offsetting anticipated, unavoidable impacts by restoring, establishing, enhancing, or in certain circumstances preserving aquatic resources of a different structural and functional type from the impacted resources and/or in a location that is neither on the same parcel of land as the impact site nor on a parcel contiguous to the impacts site.

Currently, there are no wetland mitigation banks within Staten Island. Thus, wetland mitigation generally takes the form of wetland restoration, creation, and/or enhancement. USACE regulations at 33 CFR 332.3(a)(2) stipulate that restoration of existing wetlands generally should be the first option considered. The regulations contend that using restoration “the likelihood of success is greater and the impacts to potentially ecologically important uplands are reduced compared to establishing new wetlands, and the potential gains in terms of aquatic resource functions are greater, compared to enhancement and preservation” (33 CFR 332.3[a][2]).

#### ***NYSDEC Mitigation Regulations – Freshwater Wetlands***

The Freshwater Wetlands Act (NYS Environmental Conservation Law Article 24) recognizes that wetlands provide a variety of functions and benefits important to the people and environment of New York. The Act requires that wetlands be preserved, protected and conserved "consistent with the general welfare and beneficial economic, social and agricultural development of the state".

To meet the standards in *Freshwater Wetlands Permit Requirements Regulations* (6 NYCRR 663) and receive a freshwater wetland permit, an applicant must perform the following actions:

- Demonstrate that impacts to the wetland cannot be avoided entirely;
- Then demonstrate that unavoidable losses or impacts on the functions or benefits of the wetland have been minimized; and
- Finally, fully compensate for (replace) any remaining loss of wetland acreage and function unless it can be shown that the losses are inconsequential or that, on balance, economic or social need for the project outweighs the losses.

The NYSDEC prioritizes wetland mitigation options differently than do the USACE and the USEPA. NYSDEC guidelines (NYSDEC, 1993) specify that preferably compensatory mitigation should be on site. Off-site mitigation, although generally not preferred, is acceptable in some circumstances; notably, when on-site mitigation is not possible or desirable. NYSDEC guidelines on compensatory mitigation specify

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that the preferred order of compensatory mitigation is wetland restoration, then creation, and finally enhancement. Also, New York State wetland laws do not allow the use of in-lieu fee programs.

The NYSDEC typically regulates a 100-foot adjacent area to NYSDEC-regulated freshwater wetlands. Mitigation is required for impacts to these wetlands and the regulated adjacent area; although, impacts to adjacent areas typically require mitigation of a smaller magnitude than regulated wetlands.

NYSDEC-regulated Freshwater Wetlands within the Development Area are Class II Wetlands. As indicated in Part 663: Freshwater Wetlands Permit Requirements "A permit shall be issued only if it is determined that the proposed activity satisfies a pressing economic or social need that clearly outweighs the loss of or detriment to the benefit(s) of the Class II wetland." Thus, the purpose and need for impacts to these wetlands would need to be demonstrated and the project sponsor would need to demonstrate that the loss of functions and value would be minimized and mitigation performed.

### **Required Mitigation**

**Table 4-1** identifies the anticipated impacts to NYSDEC-regulated and USACE-jurisdictional wetlands and adjacent areas that will require mitigation. It is anticipated that approximately 0.07 acres of NYSDEC-regulated and USACE-regulated jurisdictional wetlands and 0.9 acres of NYSDEC-regulated adjacent areas would require mitigation.

**Table 4-1**  
**Estimated impacts to Regulated Wetland Habitats and Adjacent Areas**

Wetlands	Retail Site A, School, Senior Housing, and Retail Site B	Englewood Avenue	Total Impacts**
NYSDEC-Regulated Wetlands and USACE Jurisdictional Wetlands * ( <u>Wetlands C</u> )	-	0.07	0.07
NYSDEC Regulated Adjacent Area (Wetlands B and C)***	-	0.9	0.89
<p>Notes: * Awaiting concurrence from the USACE on the <u>has identified</u> wetland delineation. It is assumed the USACE would identify wetlands B, C, H, HA, NB, and NW as jurisdictional. The only regulated wetlands to be impacted are Wetlands B (<u>regulated only by NYSDEC</u>) and C, <u>which are both (a</u> NYSDEC-regulated and USACE-jurisdictional <u>wetlands-wetland</u>).</p> <p>** The project would also impact an additional 0.4 acres of isolated (non-jurisdictional) wetlands. These impacts would not require mitigation.</p> <p>***The regulated adjacent area for Wetlands B and C overlap. It is assumed that in the future the NYSDEC would not count the area of overlap twice in the calculation of required mitigation.</p>			

### **On Site Wetland Mitigation Strategies**

Within the Development Area, opportunities for restoration, creation and/or enhancement exist. Wetland restoration opportunities are limited; however, there are creation and/or enhancement opportunities.

~~It is anticipated that the wetlands impacted by the Proposed Project would require mitigation by the USACE and NYSDEC. These are Wetland C and regulated adjacent areas area of Wetlands B and C (see Figure 2.8-6 provided in Chapter 2.8), both of which occur in mature forests. These potential impacts would be associated with the development of Englewood Avenue in the vicinity of these wetlands.~~

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If compensatory mitigation is required, regulatory agencies prefer to have mitigation occur within the same watershed as the impacted wetlands. The ratio of mitigation for regulated wetlands and adjacent areas would be determined in consultation with the regulatory agencies. Currently, the amount of regulated wetlands and adjacent areas that would require mitigation is 0.07 and 0.89 acres, respectively. ~~As noted earlier, other wetlands delineated in the area, may be considered jurisdictional by the USACE. If so, additional wetland mitigation may be required.~~

~~Given the sensitive nature of the surrounding forest of wetlands B and C, mitigation would likely not occur in either the CPPSPP or the Conservation Area. However, some mitigation opportunities may~~In addition to other nearby sites, areas within the 20-acre Conservation Area may provide wetland mitigation opportunities to offset the anticipated impacts to Wetlands B and C in 2020. Once design plans for Englewood Avenue are progressed to a sufficient level of detail, further ecological studies and consultation with involved regulatory agencies at the time of application for the Part 663 permit, would need to be conducted to determine the suitability of the Conservation Area to provide mitigation opportunities in 2020. Some mitigation opportunities may also exist within the proposed Fairview Park section of the Development Area. In the southern portion of proposed Fairview Park, in the vicinity of Wetland A (see **Figure 4-1**) the land area is of lower elevation than much of the Development Area and it is anticipated that hydrology (e.g., sheet flow, runoff, etc.) could be conveyed to this location. Thus, this area should be examined as a potential candidate for wetland creation on site as well.

Regulatory agencies typically favor the creation and/or enhancement of wetlands to have the same covertype as the impacted wetlands. Wetlands B and C are forested wetlands; thus, if wetland mitigation is to occur on site, forested wetland creation could be considered. If the ~~Proposed Utility Access easement eCorridor were developed, mitigation for any impacts to the emergent wetlands wetland NB (recently identified as a jurisdictional wetland by the USACE)~~ would be required. Emergent wetlands (those dominated by herbaceous species) also could potentially be created in the area identified in Figure 4-1.

The regulatory agencies require post-mitigation monitoring for created and/or enhanced ~~of~~ wetlands. Created and/or enhanced forested wetlands usually require longer mitigation monitoring periods than emergent wetlands.

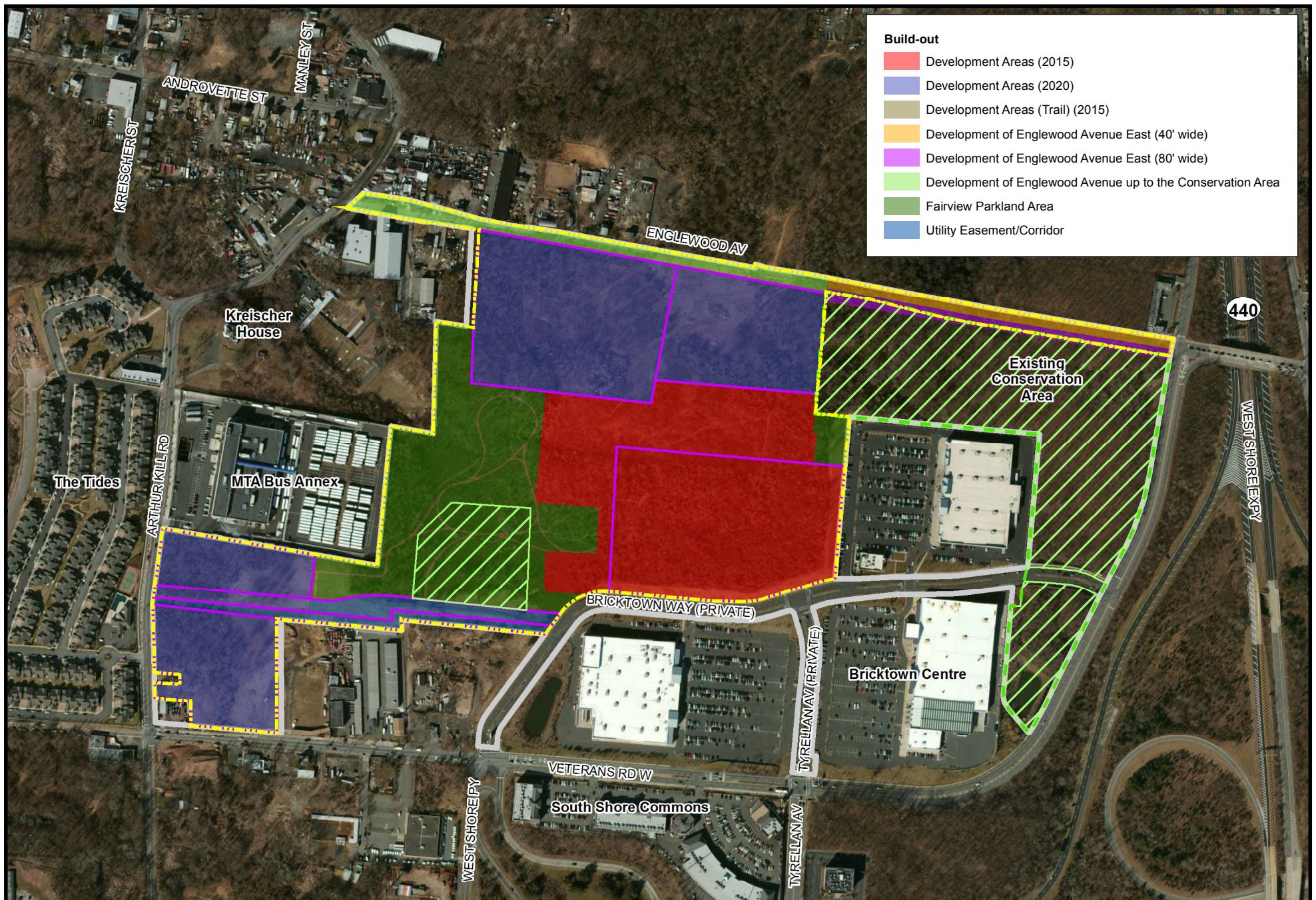
In order to increase the success of the mitigation for forested wetlands, planted trees should be at least 2-inch caliper in size and should use species native to southern Staten Island wetlands (e.g., black gum, swamp white oak, etc.). Also, the wetland mitigation plan should be designed by qualified parties. Prior to planting, the plant stock should be inspected by a qualified individual to ensure the plants are free of disease or injury. The planting of the trees should be overseen by individuals who are thoroughly knowledgeable in the planting of trees in wetlands.

While the location and width of its right-of-way is defined, the plans for Englewood Avenue within that area, especially between CPPSPP and the Conservation Area, are conceptual in nature and have not yet reached the design phase. As the design plans for the roadway advance in the future, it is anticipated that there will be opportunities to minimize impacts on these wetland resources. ~~Design measures that will be considered here include, but are not limited to, minimizing the disturbance footprint to the greatest extent practicable, using grates when possible to reduce shading, treatment of stormwater discharges, etc.~~Further development of these types of avoidance measures and updated natural resources surveys will be required by the applicable agencies during the actual planning, design and permitting process for this roadway. Minimizing impacts to natural resources will be explored in greater detail with the applicable agencies as part of the permitting process for Englewood Avenue.

The types of roadway design considerations that would likely be considered to reduce impacts from Englewood Avenue could include, but not be limited to the following:

##### **Roadway Design**





**AECOM**

- Project Area
- Development Area
- Conservation Area

**Legend**

- Site Boundary
- Area of Potential Wetland Enhancement and/or Creation\*

Source: Bing Aerial Map.

\*Consultation with involved regulatory agencies would need to be conducted to determine suitability of Conservation Area for wetland mitigation opportunities.

0 125 250 500  
Feet  
1 inch = 500 feet



Charleston Mixed-Use  
Development

**Area of Potential Wetland  
Creation and Enhancement**

**Figure 4-1**



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- Reduction in overall size of the roadway's travel lanes and other paved elements (e.g., sidewalks on only one side vs. two sides, no separate paved bicycle path, no parking lanes, narrow median). Some of these ideas were discussed in several alternatives in **Chapter 3**.
- Roadway design to bridge over wetland areas with a limited number of supports could minimize impacts to the wetlands and adjacent areas. This type of design would minimize the amount of fill material needed within the wetlands, minimize disruption of the wetland surface, maintain the drainage patterns of the wetland system, and maintain wildlife passage underneath the roadway, avoiding fragmentation of the existing wetland system.
- Design elements that would help maintain or enhance the vernal pool habitat that exists within Wetland B (north of Englewood Avenue) would have to be considered. Additionally, the design of the roadway could consider the possibility of enhancing this habitat by incorporating culverts or other measures to allow wetland connectivity between Wetlands B and C.
- Stormwater management measures to collect and treat stormwater runoff prior to downstream discharge could include vegetated drainage swales, detention/retention basins with forebays installed to maximize pollutant retention, biofiltration swales, and a variety of other best management practices.

##### **During Construction**

- Compliance with all regulatory requirements including approval of a soil erosion and sediment control plan to minimize erosion and siltation during construction would be required. Typical measures would include double silt fencing to protect the wetlands from downstream erosion during construction (to be inspected after every storm event), sediment traps, hay bales, check dams, eco-logs, and various other measures as dictated by the local soil conservation district permit requirements.
- For the construction of Englewood Avenue, installation of high visibility demarcation barriers such as snow fencing along the boundary of existing wetlands to avoid construction activities within wetland areas not covered by the future wetland permit that would need to be obtained for this project. Snow fencing would be regularly maintained during construction.
- In areas where access for construction equipment is needed, tracking pads could be installed to minimize the earth disturbance and compaction associated with use of this equipment.
- Compliance with all construction restrictions and permit conditions contained within the NYSDEC/USACE freshwater wetland permits that would ultimately be obtained for disturbance of wetlands in this area.

##### **Wetland Creation, Restoration or Enhancement**

- Where impacts to regulated wetlands cannot be avoided, wetland mitigation in the form of wetland creation, restoration or enhancement would be proposed and implemented. Such mitigation would be at a ratio acceptable both to the NYSDEC and USACE and would depend upon the type of mitigation (i.e. varying ratios for creation, restoration and enhancement). Mitigation would take place as close to the impact as possible, ideally within the same drainage area, and would consist, where possible, of creation of wetlands adjacent to the existing wetland system. Mitigation will be determined by the relevant agencies during the permitting process. After wetland mitigation construction has ceased, it is anticipated that the mitigation areas would be monitored for success for a five-year period; although, constructed forested wetlands may require a longer monitoring period.



### 4.3.2 Flora and Habitats

#### *Flora*

~~Based on New York City Local Law 3 of 2010, mitigation for requires trees on NYCDPR public property and mapped Right under the jurisdiction of Ways would be required. However, other city agencies also are anticipated the New York City Parks Department (NYCDPR) to adhere to Local Law 3 and require mitigation for be mitigated (replaced) if removed. As noted in **Chapter 2.8, Natural Resources**, approximately 208 trees on their property would be impacted by the development of Fairview Park. The total amount of mitigation required will be determined after an evaluation of each tree to be removed is performed. The location of the replacement trees will first be considered at the proposed Fairview Park site and then within the surrounding areas of Staten Island Community District 3.~~

#### *Habitats*

~~This section identifies general habitat enhancement recommendations and habitat enhancement opportunities for the area and the development of Englewood Avenue Development Area. These are not required mitigation measures but actions to be considered for various future aspects of the project going forward.~~

#### General Recommendations

- ~~• Hybrid and Rare Species Preservation – A tree survey was performed on site for trees over 6 inches; however, given the potential presence of rare and hybrid species on site, a tree inventory for smaller trees should be performed prior to construction. If rare or unique species are observed, consideration should be given to transplanting them from the build footprint to undeveloped areas on site. Also, seeds from these species should be collected and provided to appropriate parties (e.g., botanists from NYCDPR) for the regeneration of native species.~~
- ~~• Topsoil Seed Bank Retention – Due to the possibility of the soil retaining seeds from threatened and endangered species (e.g., bonesets), topsoil from the site should be retained for future work on site.~~
- CPPSPPA Bird Conservation Area (BCA) – As discussed in **Chapter 2.8**, the development of Englewood Avenue between CPPSPP and the Conservation Area from dirt path to paved road could reduce the co-mingling of some tree canopies, impacting the ability of some avifauna to travel between these two parcels, thereby adversely impacting the NYSDEC-designated BCA. However, the existing path does not appear to limit avifauna from flying from one parcel to the other and therefore, even though the NYCDPR Conservation Area is not part of the NYSDEC BCA, it serves a similar function. As such, it is proposed that he BCA could be extended to officially include the approximately 20-acre NYCDPR Conservation Area..
- Vernal Pool Habitat Preservation and/or Creation – Only Wetland B has been identified as a vernal pool habitat meeting all four criteria. Many of the small wetlands on site that will be lost due to construction are small isolated depressions that likely serve as vernal pool habitat only in the late winter and early spring. For any wetland habitats that do not occur within the build footprints, a vegetated buffer should remain in place around them. In undeveloped areas on site, especially wooded areas at the base of slopes, shallow depressions should be created, when possible, to recreate the small isolated wetlands that would be removed through the implementation of Retail Sites “A” and “B.” These areas should have a vegetated buffer around them. Also, during construction appropriate measures would be taken to ensure that existing vernal pools are not directly or indirectly impacted by construction activities.
- Habitat Bifurcation – Where the opportunity allows, preservation of contiguous habitats and open space should be pursued as part of the site design for the 2020 development sites.

- Invasive and Nuisance Species Removal - Restoration activities should include a program for the removal of invasive plants and nuisance species removal and the reintroduction of native plant species, where feasible. This should be targeted for recently disturbed habitats, especially along ~~the their edges of habitats~~. Often referred to as the “edge effect”, this is occurs when a portion of a habitat is removed and/or altered, and the edge of the original habitat is often subjected to a marked change in vegetation composition. Often, the change is attributed to an increase of invasive and nuisance species. ~~The removal of nuisance and invasive species should especially be targeted along Englewood Avenue, and habitats that have little disturbance, unlike the rest of the Development Area.~~

##### ***Development Areas (Excluding Englewood Avenue)***

- ~~Within the proposed parkland, the adoption~~The removal of best management practices for controlnuisance and management of non-native, invasive species wouldshould be requiredtargeted along the Englewood Avenue.
- Where the opportunity allows within the proposed park design, NYCDPR will remove invasive/nuisance species during the park’s development. Wherever possible, NYCDPR will also strive to minimize use native and noninvasive species in landscaping the park. Where the opportunity allows on Retail Site “A”, the Library, Retail Site “B”, the school, and the senior housing sites, the associated developers and/or responsible agencies will remove invasive/nuisance species and strive to use native and noninvasive species in the landscaping of their spread. sites and will share their planting lists with NYCDPR for their review and consultation.

##### ***Fauna***

###### ***Englewood Avenue***

Impacts within the build footprint should be minimized to the greatest extent practicable. Due to the likely difference in elevation between the proposed roadway and the existing dirt path ~~roadway~~ in the eastern portion of Englewood Avenue between Kent Street and Veterans Road West, the elevation of the new road surface would be at least several feet higher than the current dirt road. Underneath the road surface the use of culverts or other structures to allow for the passage of fauna under the roadway without contact with moving vehicles is advisable as part of the eventual design of this roadway-

<sup>±</sup> Wildlife atin the Charleston siteDevelopment Area consists of reptiles, amphibians, small (e.g., squirrel, vole, mouse etc.), medium (e.g., raccoon, skunk, rabbit, groundhog, and fox) and large (e.g., deer) sizesized mammals. The sizewidth of the new roadway would likely serve as impediment to travel for smaller fauna (reptiles, amphibians, small mammals). Deer and other larger fauna would be able to cross the road; however, their presence on a city street could present a danger for both deerthemselves and motorists. Given that the ~~proposed project~~Proposed Project will reduce available habitat, there is a strong need to maintain suitable travel ways for organisms between CPPSPP and the Conservation Area.

Research indicates that the most effective size for road crossing structures is highly species-dependent. Design is dependent upon the involved species’ ecological requirements, mobility, and general sensitivity. For underpasses, the size of the crossing limits the animal species that can use it and the amount of light in the crossing defines the ability of wildlife to see habitat on the other side of the underpass.

For example, a study of the underpasses in Canada’s Banff National Park (McDonald and St.Clair, 2004) found that certain species (typically smaller species) preferred more enclosed passageways as a means of protection against predation, while most predatory species may prefer more open crossings. Climatic conditions, such as light, moisture levels, and temperature are important for some species such as reptiles and amphibians. It is known that moisture levels can affect the movement of some amphibians, such as salamanders (Andrews et. al., 2006). Green frogs have been shown to prefer tunnels with the greatest light permeability (Woltz, et al., 2008). Additionally, undulates such as deer are sensitive to

visibility through crossing structures, preferring to enter those with an unobstructed view (Kintsch and Cramer, 2011).

~~Deer require the largest crossing structure, recommended as an underpass of the dimensions of a minimum width of 20 ft, with recommendations of 40+ ft and a minimum height of 10 ft, with a recommended height of 15 ft (FHWA, 2011). Additionally, the measure of “openness” has been used to describe and measure the stimulus of a given underpass by an approaching deer ( $\frac{Height \times Width}{Length}$ ). Suggested openness indices ranged from 0.6 to 1.5 among deer species, although use of these indices is not recommended due to the lack of critical evaluation (FHWA, 2011).~~

A solution to make crossings function for a variety of species is to make the crossings as large and open as is feasible, but provide plenty of cover for smaller animals in the form of vegetation and hollow logs or stumps. Light and vegetation, which affect moisture levels, can be introduced into an underpass through the use of grating or day lighting methods.

These and other conceptual design components to this segment of Englewood Avenue can be further developed as the plans for the roadway advance in the planning and design process, with substantial opportunities to minimize the roadway's habitat impacts. Any plan for underpasses, wildlife crossings, etc. would be performed in consultation with the appropriate regulatory agencies. Also, as stated earlier, a nuisance and invasive species removal program could be targeted along the edges of Englewood Avenue

### 4.3.3 Threatened and Endangered Species

This section identifies potential mitigation actions for possible impacts to threatened and endangered plant species, and particularly Torrey's ~~M~~mountain ~~M~~mint and fringed boneset<sup>1</sup>.

#### Torrey's Mountain Mint

As discussed in Section 2.8.5.1 of Chapter 2.8, there are two colonies of mountain mint in the Charleston area. One was identified in 2012 growing along the edge of an expanding wood line in the proposed parking lot on the southeast portion of Retail Site “A.” Below are three—Another mountain mint colony was previously identified in 2004 adjacent to Veterans Road West along the southern border of the Bricktown Centre retail complex.

As a result of the mitigation efforts for the Bricktown Centre project there are now additional mountain mint sites in Staten Island which have not yet been identified on NYNHP's website. Mitigation for the Bricktown Centre project included a preservation and propagation plan (the “Bricktown Plan”) implemented in 2006 by the City under the direction of NYCDPR's Natural Resources Group and NYCDPR's Greenbelt Native Plant Center (GNPC), with assistance from other expert ecologists. The Bricktown Plan included: (1) creation of the preserved area along Veterans Road West (just west of Tyrellan Avenue) to protect the existing mountain mint colony; (2) trans-location of stock, cuttings, and seeds from the Bricktown Centre colony to the GNPC for propagation; and (3) the establishment and monitoring of outplanting sites with in Staten Island.

Over 500 pots of greenhouse-grown Torrey's mountain mint plants were outplanted to approximately 15 sites in Staten Island.<sup>2</sup> Due to the sensitive nature of the locations of endangered plants and the potential for unauthorized takings and harm to the plants, the locations of the outplanting parcels have been

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<sup>1</sup> According to correspondence from NYSDEC dated August 22, 2013, the late-flowering boneset (*Eupatorium serotinum*) no longer appears on any of the lists of protected plants set forth in 6 NYCRR Part 193.3, and therefore has no regulatory status.

<sup>2</sup> Internal morphological research recently completed for the Greenbelt Native Plant Nursery suggests that the mountain mint within the Bricktown Centre preserve area, previously considered to be Torrey's mountain mint, may be Whorled mountain mint (*Pycnanthemum verticillatum*), which is also an endangered species. (Kelly/Native Plant Nursery, March 2013). The two plant species are closely related to one another. Accordingly, it is anticipated that similar methodologies would be utilized for preserving, cultivating or propagating either type of mint.

disclosed to NYSDEC but are not included in this analysis. Of the outplanting sites which showed “high” indications of success, as evaluated in subsequent studies, two sites were ranked amongst the highest success indicator sites, Outplanting Parcels A and B as previously identified in **Chapter 2.8, Figure 2.8.12**. From 2006 to 2011, 20 individual plants were established in Outplanting Parcel A and 72 individual plants were established in Outplanting Parcel B. The photos in **Figure 4-2** show the successfully propagated plants in the GNPC and in Outplanting Parcel A.

Given this success, there is a high probability that a similar propagation program can be implemented to mitigate the displacement of the Retail Site “A” mountain mint colony. Prior to their removal from Retail Site “A” the mountain mint plants will be identified in their growing season, and stock, cuttings, soil and seeds will be trans-located to the GNPC to propagate these plants at one or more of NYCDPR’s successful out-planting parcels and/or on other suitable NYCDPR-controlled sites. Funding for this mitigation will be facilitated by the developer(s) through provisions in the Contract of Sale between NYCEDC and the developer(s). Internal monitoring studies performed for the GNPC on the existing outplanting sites indicate that based on the success of Outplanting Parcels A and B other NYCDPR-owned mountain mint outplanting sites in fostering high survivorship, vigor, and apparent reproduction, that there is not a need for new outplanting sites.

#### **Bonesets**

As identified in **Chapter 2.8**, fringed boneset (*Eupatorium torreyanu*), a threatened species, was found scattered throughout approximately 22 acres of successional old fields, pastureland, and pathways within the Development Area. Old field habitat is a successional habitat that periodically arises in portions of the Development Area due to various disturbances such as human disturbance, pre-construction clearing, construction activities, brush fires etc. The development of Retail Site “A” and the recreational areas of the proposed Fairview Park by 2015 would remove approximately 2.2 acres or 10.3 percent of potential boneset habitat through habitat loss and/or direct removal of individual plants. It is not anticipated that this level of potential habitat loss and direct plant removal due to the Proposed Project in 2015 would pose a significant impact to these boneset species.

- ~~1) Soil Retention and Similar Habitat Development — Ecologists will identify locations in the westernmost portions of Fairview Park or in other suitable locations nearby with a growth habitat (e.g., shading, hydrology, etc.) similar to the area in Retail Site “A” where the Torrey’s Mountain Mint was observed. Prior to construction, one or more of these identified preservation areas, which are largely expected to remain vegetated in a natural state, would be set aside and isolated so that soils and existing vegetation are not disturbed. Top soil from the Retail Site “A” location where the species is currently located would be preserved and relocated within the identified preservation area(s), which would be monitored and maintained to ensure proper growing conditions for the species. For the boneset species, a similar program to protect and maintain on-site open field areas, within Fairview Park or elsewhere, of the type that presently provide a suitable habitat for the boneset species within the Development Area.~~
- ~~2) Transplant and Seed Propagation — Ecologists will engage with biologists/horticulturalists to assist with transplanting the species and collecting appropriate cutting and seed stock to grow Torrey’s Mountain Mint and bonesets at an appropriate facility (for instance, NYCDPR’s Greenbelt Native Plant Center has such capabilities). Once the species is grown, the respective developer or agency would consult with appropriate regulatory agencies for locations to plant the species. It is hoped that species could be grown at the ecologists’ facility, with the intention of transplanting those plants to appropriate habitats within Fairview Park or other locations as directed by the regulatory agency(s).~~
- ~~3) Advanced Species Search — Under this mitigation scenario, ecologists, as directed by regulatory agency(s), will survey publically owned parcels (up to 10 acres) to determine if other populations of Torrey’s Mountain Mint occur near the site. If observed, the species will be documented and location will be identified to the regulatory agency(s).~~

Photograph 1



Propagated Mountain Mint Stock  
in GNPC

Photograph 2



Propagated and Transplanted  
Mountain Mint in Outplanting  
Site A

Photograph 3



Propagated and Transplanted  
Mountain Mint in Outplanting  
Site A



The significance of the Proposed Project's impact on fringed boneset in 2020, however, depends on the amount of boneset habitat loss that would occur naturally in the absence of the Proposed Project. Observations of growth patterns within the Development Area indicate the potential for portions of the open field and pasture areas identified on site in 2012 to convert to habitats dominated by woody species. Comparisons by NYCDPR staff of conditions in 2012 and 2013 in formerly open field areas within the proposed Fairview Park showed a considerable succession in those areas of dense woody growth. (Personal communication, NYCDPR, August 2013). Therefore, by 2020, a reduction or alteration in the amount of available boneset habitat within the Development Area capable of supporting boneset is likely.

- When more detailed planning begins for each of the Proposed Project's 2020 development sites, updated field surveys will be performed to determine the extent to which bonesets are still present on these sites and the extent to which mitigation would be warranted would then be established.
- If these surveys determine that open field habitats are still present within the Development Area and that they would be displaced by the Proposed Project's continued development, a portion of these habitats or Fairview Park would be maintained as mitigation for the projected loss of these open field habitat areas. Up to 1 acre of potential boneset habitat could be actively maintained by NYCDPR for three years through annual control of woody vegetation within one of the non-recreational areas in the Fairview Park site, if fully funded by the 2020 development sites.

#### **Summary of Natural Resource Mitigation Measures**

All of the mitigation concepts presented in this section will require further consultation with an agreement from applicable regulatory agencies, including NYSDEC, USACE and NYCDPR, as applicable. These measures include the following by resource or habitat areas:

- **Wetlands**
  - Wetlands It is anticipated that approximately 0.07 acres of NYSDEC-regulated and USACE-jurisdictional wetlands and 0.9 acres of NYSDEC-regulated adjacent areas would require mitigation. The project would also impact an additional 0.4 acres of isolated (non-jurisdictional) wetlands. These impacts would not require mitigation. Regulated wetlands (including vernal pool habitat) impacted by the Proposed Project (Wetland C and regulated adjacent ~~areas~~ area of Wetlands B and C) would be mitigated as required by the USACE and NYSDEC, primarily associated with the development of Englewood Avenue in the vicinity of these wetlands.
  - Mitigation would likely not occur in either the CPPSPP or the Conservation Area, but some In addition to other nearby sites, areas within the 20-acre Conservation Area may provide wetland mitigation opportunities to offset the anticipated impacts to Wetlands B and C in 2020. Once design plans for Englewood Avenue are progressed to a sufficient level of detail, further ecological studies and consultation with involved regulatory agencies would need to be conducted to determine the suitability of the Conservation Area to provide mitigation opportunities in 2020. Additionally, potential areas may exist within the proposed Fairview Park section of the Development Area, especially near Wetland A. If the ~~utility/roadway easement corridor~~ Proposed Utility Access Corridor is developed, mitigation for impacts to ~~emergent wetlands~~ a USACE jurisdictional wetland in that area would likely be required due to displacement of Wetland NB.
  - Proper design of the proposed Englewood Avenue – its alignment, width and other design elements, ~~would be important~~ – is critical to avoiding and mitigating impacts to wetlands. As the roadway's design plans advance in the future, full consideration of avoidance and reduced-impact design options will be required by the permitting agencies, and there would be opportunities to minimize impacts on these wetland resources. Design measures could include, but not necessarily Measures during the design, construction, and long-term operation of this roadway would be limited to, minimizing the disturbance footprint required to

~~the greatest avoid or minimize impacts to the maximum extent practicable, using grates when possible to reduce shading, and treatment of stormwater discharges from the roadway..~~

- **Habitat and Flora and Fauna Preservation**

- General Recommendations

- ~~○ Hybrid and Rare Species Preservation – A tree inventory for smaller trees (less than 6" dbh) should be performed prior to construction, with consideration given to transplanting rare or unique species from the build footprint to undeveloped areas on site, with seeds from these species collected and provided to appropriate parties (e.g., botanists from NYCDPR).~~
    - ~~○ Topsoil Seed Bank Retention – (see the threatened and endangered species section below)~~
    - Vernal Pool Habitat Preservation and/or Creation - For any wetland habitats not within the build footprints, a vegetated buffer should remain in place around them. In undeveloped areas, especially wooded areas at the base of slopes, shallow depressions could recreate the small isolated wetlands to be removed through the implementation of Retail Sites "A" and "B." Appropriate measures should be taken during construction to ensure that existing vernal pool habitat is not directly or indirectly impacted by construction activities.
    - Invasive and Nuisance Species Removal – Restoration programs should include a program for the removal of invasive plants and nuisance species and the reintroduction of native plant species, especially in recently disturbed habitats and along the edges of habitats. Where possible, parcel development will include removal of nuisance and invasive species and inclusion of native and noninvasive species.
    - NYSDEC-designated CPPSPP BCA – The BCA could be extended to officially include the approximately 20-acre NYCDPR Conservation Area.

- Required Mitigation

- Englewood Avenue (portion between CPPSPP and Conservation Area) – the use of culverts or other structures underneath the road surface are recommended to allow for the passage of fauna under the roadway as part of the eventual design of this roadway. This would also maintain suitable travel ways for organisms between CPPSPP and the Conservation Area. Plans for underpasses, wildlife crossings, etc. would be designed in consultation with the appropriate regulatory agencies. A nuisance and invasive species removal program could be targeted along the edges of Englewood Avenue.
    - New York City Local Law 3 of 2010 requires trees in public property under the jurisdiction of the New York City Parks Department (NYCDPR) to be mitigated (replaced) if removed. As noted in **Chapter 2.8, Natural Resources**, approximately 208 trees would be impacted by the development of Fairview Park. The total amount of mitigation required will be determined after an evaluation of each tree to be removed is performed. The replacement trees will first be considered at the proposed Fairview Park site and then within the surrounding areas of Staten Island Community District 3.

- **Threatened and Endangered Species**

~~Potential mitigation measures to address potential impacts to threatened and endangered plant species, specifically Torrey's Mountain Mint (an endangered species on Retail Site "A") and two boneset species (one threatened, one endangered; found throughout open field areas throughout the Development Area) may include, but are not necessarily limited to the following:~~

- ~~○ Soil Retention and Similar Habitat Development:~~
    - ~~▪ Establish locations in the proposed Fairview Park or in other nearby locations with a growth habitat similar to the area on Retail Site "A" where the Torrey's Mountain Mint was observed,~~

- ~~with top soil from that area preserved and relocated within the identified preservation area(s). The area(s) would be monitored and maintained to ensure proper growing conditions for the species.~~
- ~~• Establish a program to protect and maintain on-site open field areas, primarily within the western portions of Fairview Park or in other suitable locations, of the type that presently provide habitat for boneset within the Development Area.~~
  - ~~○ Transplant and Seed Propagation — Transplanting the species and collecting appropriate cutting and seed stock to grow Torrey's Mountain Mint and bonesets at an appropriate facility (for instance, NYCDPR's Greenbelt Native Plant Center), and transplanting these plants to appropriate habitats within Fairview Park or other locations once propagated.~~
  - ~~○ Advanced Species Search — Ecologists would survey publically-owned parcels (up to 10 acres) to determine if other populations of Torrey's Mountain Mint occur near the site. If observed, the species will be documented and location will be identified to the regulatory agency(s).~~
  - **Torrey's mountain mint** – Given the success of the Bricktown Plan's propagation it is proposed that a similar propagation program be implemented to mitigate the displacement of the mountain mint colony identified on Retail Site "A." Trans-located stock, soil, cuttings, and seeds from the Retail Site "A" mountain mint colony would be used to propagate these plants at one or more of NYCDPR's existing outplanting parcels or on other suitable NYCDPR-controlled sites to support the continuation of this plant in the area.
  - **Boneset** – Updated field surveys will be performed in advance of the 2020 development sites' construction to determine the extent of fringed boneset present on these sites and the extent to which mitigation would be warranted. If these surveys determine that open field habitats are still present within the Development Area and that they would be displaced by the Proposed Project's continued development, a portion of these habitats, or suitable habitat in Fairview Park, would be maintained as mitigation for the projected loss of these open field habitat areas due to the Proposed Project's 2020 development sites.

### 4.4 TRANSPORTATION

This section describes the measures recommended at selected study area intersections to eliminate potential traffic impacts associated with the Proposed Project in the 2015 and 2020 ~~year's analyses~~ years analysis, as discussed in **Chapter 2.13**.

According to the thresholds established in the *CEQR Technical Manual*, the following situations represent significant traffic impacts for signalized intersections:

- 1) If a lane group under the With-Action condition is within LOS "A", "B" or "C" or marginally acceptable LOS "D" (average control delay less than or equal to 45.0 seconds/vehicle) the impact is not considered significant. However, if a lane group under the No-Action condition is within LOS "A", "B" or "C," then a deterioration under the With-Action condition to worse than mid-LOS "D" (delay greater than 45.0 seconds/vehicle) should be considered a significant impact.
- 2) For a lane group with LOS "D" under the No-Action condition, an increase in projected average control delay of 5.0 or more seconds should be considered significant if the With-Action delay exceeds mid-LOS "D" (delay greater than 45.0 seconds/vehicle).
- 3) For a lane group with LOS "E" under the No-Action condition, an increase in projected delay of 4.0 or more seconds should be considered significant.
- 4) For a lane group with LOS "F" under the No-Action condition, an increase in projected delay of 3.0 or more seconds should be considered significant.

For unsignalized intersections, the criteria above also apply. However, for a minor street at an unsignalized intersection to trigger significant impacts, 90 PCEs (passenger car equivalents) must be identified in the Future With-Action conditions in any peak hour.

The criteria described above ensure that the LOS for individual turning movements at each intersection does not degrade significantly under Future With-Action conditions.

### 4.4.1 Year 2015

The analyses in **Chapter 2.13** indicate that potential significant traffic impacts are projected to occur at the following intersections and traffic movements by time period in 2015:

***Allentown Lane-Veterans Road West/Arthur Kill Road:***

- Weekday PM peak hour (southbound approach)
- Saturday midday peak hour (southbound approach)

***Richmond Valley Road/Arthur Kill Road:***

- Weekday midday peak hour (southbound approach)
- Weekday PM peak hour (southbound approach)
- Saturday midday peak hour (southbound approach)

***Veterans Road West/Bricktown Way/Korean War Veterans Parkway westbound off-ramp:***

- Weekday midday peak hour (eastbound left-turn lane)
- Weekday PM peak hour (eastbound left-turn lane)
- Saturday midday peak hour (eastbound left-turn lane, ~~northbound approach~~, southbound through/right-turn lane)

***Veterans Road West/Tyrellan Avenue:***

- Weekday AM peak hour (northbound left-turn movements)
- Weekday midday peak hour (northbound left-turn movements, southbound approach)
- Weekday PM peak hour (northbound left-turn movements)
- Saturday midday peak hour (northbound left-turn movements, southbound approach).

***Boscombe Avenue/Outerbridge Crossing Ramps:***

- Weekday midday peak hour (westbound through/left-turn lane, westbound right-turn lane)
- Weekday PM peak hour (westbound right-turn lane, ~~southbound left-turn lane~~)
- Saturday midday peak hour (westbound through/left-turn lane, westbound right-turn lane)

***Boscombe Avenue/Tyrellan Avenue:***

- Weekday midday peak hour (southbound right-turn lane)
- Weekday PM peak hour (southbound right-turn lane)
- Saturday midday peak hour (southbound right-turn lane)

***Englewood Avenue/Veterans Road West:***

- Saturday midday peak hour (westbound left-turn lane).

***Englewood Avenue/Veterans Road East:***

- Saturday midday peak hour (eastbound through/left-turn lane)

***Veterans Road East-Drumgoole Road West/Bloomingtondale Road:***

- Weekday PM peak hour (northbound left-turn lane)
- Saturday midday peak hour (eastbound right-turn lane, northbound left-turn lane)

***Pleasant Plains Avenue-Amboy Road/Bloomingtondale Road:***

- Weekday AM peak hour (southbound approach)

Based on these potential traffic impacts, the following transportation improvements are recommended:

***Allentown Lane-Veterans Road West/Arthur Kill Road:***

- During the weekday PM peak hour, reallocate two seconds of green time from the east-west phase to the north-south phase.
- During the Saturday midday peak hour, reallocate three ~~two~~ seconds of green time from the east-west phase to the north-south phase.

***Richmond Valley Road/Arthur Kill Road:***

- Restripe the southbound approach to accommodate one 10-foot left-turn lane and one 10-foot through lane.

***Veterans Road West/Bricktown Way/Korean War Veterans Parkway westbound off-ramp:***

- During the weekday midday peak hour, reallocate five seconds of green time from the northbound phase, and one ~~two~~ seconds of green time from the southbound phase to the east-west phase.
- During the weekday PM peak hour, reallocate five seconds of green time from the northbound phase to the east-west phase.
- During the Saturday midday peak hour, modify the traffic signal phasing to create a leading eastbound phase and a leading northbound phase. Reallocate eleven seconds to the leading eastbound phase, 37 seconds to the east-west phase, 14 seconds to the leading northbound phase, and 28 seconds to the north-south phase. As part of this mitigation measure, upgraded traffic signal hardware will be required to accommodate the proposed phasing changes. The new hardware will require a more robust and flexible traffic signal controller (ASTC 12) that could accommodate multiple traffic timing and phasing plans, including protected left-turn arrows for the approaches requiring leading phases.

~~With this mitigation, potential significant traffic impacts are projected to remain at this intersection for the eastbound left-turn movement, the northbound approach, and the southbound through/right turn lane during the Saturday midday peak hour.~~

~~In addition, further mitigation measures could be provided at this location including the widening and restriping the northbound and eastbound approaches by approximately 10 feet to provide exclusive right turn lanes on both approaches. This proposed mitigation measure is considered a higher cost item as per guidance in the CEQR Technical Manual, and has the potential to fully mitigate the impacts of the proposed project at this intersection. Between the Draft and Final EIS further analysis will be conducted to explore the feasibility of this measure. In order to fully inform consideration of this mitigation measure, and among other things, further analysis will explore: ownership of the land proposed for use in widening the on-ramp, the potential for additional impacts resulting from this proposed measure, overall benefits to the larger traffic network, and cost of construction.~~

~~Furthermore, the New York State Department of Transportation (NYSDOT) has announced that it will implement improvements to the southbound on- and off-ramps on the West Shore Expressway ("WSE") between Bloomingdale Road and Englewood Avenue by 2015. By improving the connection between the southbound WSE and its adjacent service road (Veterans Road West), traffic heading south on the WSE could more easily access the major traffic generators along Veterans Road West (including the Bricktown Center). The projected resultant traffic shifts would reduce the volume of traffic added by the Proposed Project to this intersection, potentially reducing or eliminating the unmitigated traffic impacts noted above. The effects of these announced WSE ramp improvements at this and other study area intersection will be analyzed and presented in the FEIS.~~



### ***Veterans Road West/Tyrellan Avenue:***

- Modify the traffic signal phasing during the weekday AM peak hour to create a concurrent east-west phase, and allocate 54 seconds to the east-west phase and 36 seconds to the north-south phase.
- Modify the traffic signal phasing during the weekday midday, weekday PM, and Saturday midday peak hours to accommodate a concurrent east-west phase and a lagging northbound phase. As part of this mitigation measure, upgraded traffic signal hardware will be required to accommodate the proposed phasing changes. The new hardware will require a more robust and flexible traffic signal controller (ASTC 12) that could accommodate multiple traffic timing and phasing plans, including protected left-turn arrows for the approach requiring a lagging phase.
- During the weekday midday peak hour, reallocate 44 seconds to the east-west phase, 35 seconds to the north-south phase, and 11 seconds to the lagging northbound phase four seconds of green time from the east-west phase, and six seconds of green time from the north-south phase, to create a separate northbound lagging phase (10 seconds).
- During the weekday PM peak hour, reallocate 45 seconds to the east-west phase, 34 seconds to the north-south phase, and 11 seconds to the lagging northbound phase one second of green time from the east-west phase to the north-south phase.
- During the Saturday midday peak hour, reallocate 42 seconds to the east-west phase, 37 seconds to the north-south phase, and 11 seconds to the lagging northbound phase nine seconds of green time from the east-west phase, and one second of green time from the north-south phase, to create a separate northbound lagging phase (10 seconds).

### ***Boscombe Avenue/Outerbridge Crossing Ramps:***

- Widen the on-ramp to the eastbound Outerbridge Crossing to accommodate a second receiving lane with an appropriate transition taper. This mitigation measure is committed to by the City of New York and will be constructed pending further review and approval by NYCDOT and NYSDOT as described below.
- Modify the traffic signal hardware to provide for a westbound right-turn overlap phase, and a westbound lagging phase. As part of this mitigation measure, upgraded traffic signal hardware will be required to accommodate the proposed phasing change. The new hardware will require a more robust and flexible traffic signal controller (ASTC 12) that could accommodate multiple traffic timing and phasing plans, including a protected right-turn arrow for the westbound approach.
- During the weekday midday peak hour, reallocate four seconds of green time from the eastbound phase, 11 40 seconds of green time from the east-west phase, and two seconds of green time from the north-south phase to create a new westbound lagging phase (17 46 seconds total).
- During the weekday PM peak hour, reallocate two seconds of green time from the eastbound phase to one second of green time from the east-west phase to the north-south phase.
- During the Saturday midday peak hour, reallocate two one seconds of green time from the north-south phase to the east-west phase.

~~With the improvements described above in place, potential significant traffic impacts are projected to remain for westbound right turn movements at this intersection during the weekday midday and weekday PM peak hours.~~

~~In addition, a further mitigation measure could be provided at this location to include the widening and restriping of the on-ramp to the Outerbridge Crossing to accommodate two lanes. This additional higher cost mitigation measures could fully mitigate the impacts of the proposed project at this intersection. Between the Draft and Final EIS further analysis will be conducted to explore the feasibility of this measure. In order to fully inform consideration of this mitigation measure, and among other things, further analysis will determine if this measure would be feasible.~~

### ***Boscombe Avenue/Tyrellan Avenue:***

- Modify the traffic signal hardware to provide for a southbound right-turn overlap phase to operate concurrently with a new eastbound-only lagging phase. As part of this mitigation measure, upgraded traffic signal hardware will be required to accommodate the proposed phasing change. The new hardware will require a more robust and flexible traffic signal controller (ASTC 12) that could accommodate multiple traffic timing and phasing plans, including a protected left-turn arrow for the eastbound approach and a protected right-turn arrow for the southbound approach.
- During the weekday midday peak hour, reallocate 11 ~~seven~~ seconds of green time from the east-west phase to the eastbound-only lagging phase with a protected southbound right-turn overlap north-south phase.
- During the weekday PM peak hour, reallocate seven ~~four~~ seconds of green time from the east-west phase to the north-south phase.
- During the Saturday midday peak hour, reallocate 15 ~~44~~ seconds of green time from the east-west phase to the eastbound-only lagging phase with a protected southbound right-turn overlap.

### ***Englewood Avenue/Veterans Road West:***

- During the Saturday midday peak hour, reallocate one second of green time from the north-south phase to the east-west phase.

### ***Englewood Avenue/Veterans Road East:***

- During the Saturday midday peak hour, reallocate three seconds of green time from the northbound phase to the east-west phase.

### ***Veterans Road East-Drumgoole Road West/Bloomingdale Road:***

- During the weekday PM peak hour, reallocate one second of green time from the westbound phase to the north-south phase.
- During the Saturday midday peak hour, prohibit on-street parking on the west side of Bloomingdale Road between Veterans Road East and Churchill Avenue and restripe the southbound approach to accommodate one 12-foot through lane and one 12-foot through/right-turn lane.
- During the Saturday midday peak hour, reallocate two ~~three~~ seconds of green time from the eastbound phase, one second of green time from the westbound phase, and eight ~~five~~ seconds of green time from the north-south phase to create a northbound lagging phase with an eastbound right-turn overlap (11 ~~nine~~ seconds total).

### ***Pleasant Plains Avenue-Amboy Road/Bloomingdale Road:***

- During the weekday AM peak hour, reallocate one second of green time from the east-west phase to the north-south phase.

The improvement measures stated above are designed to accommodate the future traffic volumes projected to occur on the roadway network during critical periods of peak traffic activity under the future with the Proposed Project condition; specifically, during the peak 15-minute periods, by the 2015 year. The resulting year 2015 Mitigated With-Action condition operational performance measures with the improvement measures identified above are shown in **Table 4-2**.

### Potential Traffic Mitigation Measures due to Proposed West Shore Expressway Ramp Improvements

~~As discussed in Chapter 2-13, NYSDOT plans to improve the southbound West Shore Expressway (WSE) ramp system and adjacent intersections north of Englewood Avenue just north of the Project Area by the end of 2014. The impacts of these ramps on traffic conditions will be analyzed for the FEIS when sufficient program information is available. Until results from these studies are available, it is conservatively assumed that ramp-related increases in traffic volumes at the following three intersections would potentially worsen already identified significant traffic impacts and/or create additional significant impacts in one or more peak hour in 2015:~~

## 4.0 MITIGATION MEASURES

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- ~~Veterans Road West/Englewood Avenue (mitigation required in the Saturday peak hour in 2015 in the absence of these ramp improvements is shown above for this location).~~
- ~~Bricktown Way/Veterans Road West (no mitigation required in 2015 in the absence of these ramp improvements).~~
- ~~Arthur Kill Road/Bloomington Road (no impacts projected in 2015 in the absence of these ramp improvements).~~

~~Based on projected 2015 With-Action traffic conditions at these locations without the proposed ramps, it is projected that mitigation actions such as signal timing and phasing adjustments and traffic lane channelization would be sufficient to address any significant traffic impacts that would potentially occur at these locations due to these ramps. The traffic impacts in 2015 of these proposed ramps and the need for any new or additional mitigation will be assessed in the FEIS.~~

### Traffic Mitigation Monitoring Plan

~~After completion and occupation of the approximately 195,000 sq. ft. of proposed retail within Site "A," NYCEDC will conduct a traffic monitoring plan at the two intersections where significant unmitigable traffic impacts due to the Proposed Project are projected in 2015: (1) Boscombe Avenue/Outerbridge Crossing Ramps, and (2) Veterans Road West/Bricktown Way/Korean War Veterans Parkway westbound off-ramp. This monitoring plan will include a full traffic inventory at those two locations in the relevant peak traffic periods. Using the data, updated Level of Service (LOS) analyses for the location will be performed and the resultant volumes and LOS conditions will then be compared with the 2015 With-Action conditions projected in the FEIS. This comparison will demonstrate one of the following:~~

- ~~The mitigation measures included in the FEIS for these locations (or similar measures refined to reflect these updated traffic analyses) were found sufficient to reasonably mitigate the Proposed Project's traffic impacts. Under these findings, a similar mitigation monitoring plan would be carried out upon completion and occupation of the entire Proposed Project to confirm if further mitigation at one or both of these two locations would be warranted at that time.~~
- ~~The volumes and delays associated with the unmitigated traffic impact projected in the FEIS at the location was confirmed, and further mitigation to address the conditions would be identified. Under these findings, no further mitigation monitoring at these locations would be required.~~

~~NYCEDC would be responsible for all costs associated with the monitoring plan. Before commencing the monitoring plan, the NYCEDC will submit a scope of work to NYCDOT for review and approval and for review of the plan's results and recommendations.~~

### 4.4.2 Year 2020

The analyses in **Chapter 2.13** indicate that potential significant traffic impacts are projected to occur at the following intersections and traffic movements by time period in 2020:

#### ***Allentown Lane-Veterans Road West/Arthur Kill Road:***

- Weekday AM peak hour (southbound approach)
- Weekday midday peak hour (southbound approach)
- Weekday PM peak hour (southbound approach)
- Saturday midday peak hour (southbound approach)

#### ***Richmond Valley Road/Arthur Kill Road:***

- Weekday midday peak hour (southbound approach)
- Weekday PM peak hour (southbound approach)
- Saturday midday peak hour (southbound approach)

#### ***Veterans Road West/Bricktown Way/Korean War Veterans Parkway westbound off-ramp:***

- Weekday AM peak hour (westbound left-turn lane)
- Weekday midday peak hour (eastbound left-turn lane, westbound left-turn lane, northbound approach)

- Weekday PM peak hour (eastbound left-turn lane, eastbound through/right-turn lane northbound approach)
- Saturday midday peak hour (eastbound left-turn lane, eastbound through/right-turn lane, westbound left-turn lane, northbound approach, southbound through/right-turn lane)

***Veterans Road West/Tyrellan Avenue:***

- Weekday AM peak hour (northbound left-turn movements)
- Weekday midday peak hour (eastbound approach, northbound left-turn movements, southbound approach)
- Weekday PM peak hour (eastbound approach, northbound left-turn movements)
- Saturday midday peak hour (eastbound approach, westbound approach left-turn movements, northbound left-turn movements, southbound approach)

***Boscombe Avenue/Outerbridge Crossing Ramps:***

- Weekday AM peak hour (westbound right-turn lane)
- Weekday midday peak hour (westbound through/left-turn lane, westbound right-turn lane)
- Weekday PM peak hour (eastbound left-turn lane, westbound right-turn lane, southbound left-turn lane)
- Saturday midday peak hour (eastbound left-turn lane, westbound through/left-turn lane, westbound right-turn lane)

***Boscombe Avenue/Tyrellan Avenue:***

- Weekday midday peak hour (southbound right-turn lane)
- Weekday PM peak hour (southbound right-turn lane)
- Saturday midday peak hour (southbound right-turn lane)

***Englewood Avenue/Veterans Road West:***

- Weekday AM peak hour (westbound left-turn lane)
- Weekday midday peak hour (westbound left-turn lane)
- Weekday PM peak hour (westbound left-turn lane)
- Saturday midday peak hour (westbound left-turn lane)

***Englewood Avenue/Veterans Road East:***

- Weekday PM peak hour (eastbound through/left-turn lane)
- Saturday midday peak hour (eastbound through/left-turn lane)

***Veterans Road East-Drumgoole Road West/Bloomingdale Road:***

- Weekday AM peak hour (eastbound right-turn lane, northbound left-turn lane)
- Weekday midday peak hour (eastbound right-turn lane, northbound left-turn lane)
- Weekday PM peak hour (eastbound right-turn lane, northbound left-turn lane)
- Saturday midday peak hour (eastbound right-turn lane, northbound left-turn lane)

***Pleasant Plains Avenue-Amboy Road/Bloomingdale Road:***

- Weekday AM peak hour (southbound approach)
- Weekday PM peak hour (southbound approach)
- Saturday midday peak hour (southbound approach)

***Arthur Kill Road/Bloomingdale Road:***

- Weekday midday peak hour (westbound approach)
- Weekday PM peak hour (westbound approach, northbound approach)
- Saturday midday peak hour (westbound approach)

***Sharrotts Road/Arthur Kill Road:***

- Saturday midday peak hour (eastbound approach, westbound approach)

***Englewood Avenue/Arthur Kill Road:***

- Weekday AM peak hour (westbound approach)
- Weekday PM peak hour (westbound approach)

Based on these potential traffic impacts, the following transportation improvements are recommended:

### **Allentown Lane-Veterans Road West/Arthur Kill Road:**

- Restripe the southbound approach to accommodate one 10 foot exclusive left-turn lane and one 11-foot shared through/right-turn lane.
- Restripe the northbound approach to accommodate one 12 foot shared through/left-turn lane and one 12-foot exclusive right-turn lane.
- ~~During the weekday AM peak hour, reallocate one second of green time from the east-west phase to the north-south phase.~~

### **Richmond Valley Road/Arthur Kill Road:**

- Restripe the southbound approach to accommodate one 10-foot left-turn lane and one 10-foot through lane (same as in 2015).

### **Veterans Road West/Bricktown Way/Korean War Veterans Parkway westbound off-ramp:**

- Widen the northbound approach to accommodate an exclusive right-turn lane, and widen the eastbound approach to accommodate an exclusive right-turn lane. The City of New York is committed to building these two improvements. The need for these mitigation measures will be confirmed by a Traffic Mitigation Monitoring Plan to determine that they are warranted at the time of occupation of the 2020 Proposed Project, as discussed below, and requires review and approval from NYCDOT and NYSDOT as described below.
- ~~During the weekday AM peak hour, reallocate two seconds of green time from the southbound phase to the east-west phase.~~
- During the weekday midday peak hour, reallocate ~~eight~~ three seconds of green time from the southbound phase to the east-west phase, and three seconds of green time from the northbound phase to implement a concurrent east-west left-turn phase with a northbound right-turn overlap (11 seconds total).
- During the weekday PM peak hour, reallocate seven seconds of green time from the northbound phase to the east-west phase.
- During the Saturday midday peak hour, implement a concurrent east-west left-turn phase with a northbound right-turn overlap, as well as a concurrent north-south phase. Reallocate 11 seconds from the northbound phase to the concurrent east-west left-turn phase. Reallocate five seconds from the east-west phase and nine seconds from the southbound phase to the concurrent north-south phase (14 seconds total).
- As part of these mitigation measures, upgraded traffic signal hardware will be required to accommodate the proposed phasing changes. The new hardware will require a more robust and flexible traffic signal controller (ASTC 12) that could accommodate multiple traffic timing and phasing plans, including protected left-turn arrows for the approaches requiring leading and lagging phases.

~~With the improvements described above in place, potential significant traffic impacts at this intersection are projected to remain for:~~

- ~~Westbound left-turn movements during the weekday midday and Saturday midday peak hours;~~
- ~~The northbound approach during the weekday midday, weekday PM, and Saturday midday peak hours; and~~
- ~~Eastbound left-turn movements, and the southbound through/right-turn lane during the Saturday midday peak hour.~~

~~In addition, further mitigation measures could be provided at this location including the widening and restriping the northbound and eastbound approaches by approximately 10 feet to provide exclusive right turn lanes on both approaches. These additional higher cost mitigation measures could fully mitigate the impacts of the proposed project at this intersection. Between the Draft and Final EIS further analysis will be conducted to determine if these measures would be feasible.~~



Furthermore, as discussed above under Year 2015, improvements to the southbound on- and off-ramps on the WSE are projected to result in traffic shifts that would reduce the volume of traffic added by the Proposed Project to this intersection, potentially reducing or eliminating the unmitigated traffic impacts noted above. The effects of these announced WSE ramp improvements at this and other study area intersection will be analyzed and presented in the FEIS.

### ***Veterans Road West/Tyrellan Avenue:***

- Eliminate a portion of the raised median on the southbound and eastbound approaches to accommodate one exclusive left-turn lane on each approach.
- During the weekday AM peak hour, modify the traffic signal phasing to create a concurrent east-west phase, and allocate 53 seconds to the east-west phase and 37 seconds to the north-south phase.
- During the weekday midday, weekday PM, and Saturday midday peak hours, modify the traffic signal phasing to create a lagging westbound phase, and a lagging northbound phase. As part of this mitigation measure, upgraded traffic signal hardware will be required to accommodate the proposed phasing changes. The new hardware will require a more robust and flexible traffic signal controller (ASTC 12) that could accommodate multiple traffic timing and phasing plans, including protected left-turn arrows for the approaches requiring lagging phases.
- During the weekday midday peak hour, allocate 27 seconds to the east-west phase, 18 40 seconds to the westbound lagging phase, 16 seconds to the southbound leading phase, 32 47 seconds to the concurrent north-south phase, and 13 49 seconds to the lagging northbound phase.
- During the weekday PM peak hour, allocate 29 seconds to the east-west phase, 22 40 seconds to the westbound lagging phase, 16 seconds to the southbound leading phase, 27 47 seconds to the concurrent north-south phase, and 12 49 seconds to the lagging northbound phase.
- During the Saturday midday peak hour, allocate 31 seconds to the east-west phase, 11 seconds to the westbound lagging phase, 18 seconds to the southbound leading phase, 35 47 seconds to the concurrent north-south phase, and 13 46 seconds to the lagging northbound phase.

### ***Boscombe Avenue/Outerbridge Crossing Ramps:***

- Widen the on-ramp to the eastbound Outerbridge Crossing to accommodate a second receiving lane with an appropriate transition taper. The City of New York is committed to building this improvement. This mitigation measure requires review and approval from NYCDOT and NYSDOT as discussed below.
- Modify the traffic signal hardware to provide for a westbound right-turn overlap phase to operate concurrently with the north-south phase. As part of this mitigation measure, upgraded traffic signal hardware will be required to accommodate the proposed phasing change. The new hardware will require a more robust and flexible traffic signal controller (ASTC 12) that could accommodate multiple traffic timing and phasing plans, including a protected right-turn arrow for the westbound approach.
- During the weekday midday peak hour, reallocate one second of green time from the eastbound north-south phase to the east-west phase.
- During the weekday PM peak hour, reallocate five seconds of green time from the east-west phase to eastbound phase.
- During the Saturday midday peak hour, reallocate three two seconds of green time from the southbound phase and add one second to the eastbound phase and two seconds to the east-west phase.

~~With the improvements described above in place, potential significant traffic impacts at this intersection are projected to remain for:~~

- ~~▪ Westbound right-turn movements during the weekday AM, weekday midday, and weekday PM peak hours; and~~
- ~~▪ Eastbound left-turn and southbound left-turn movements during the weekday PM peak hour.~~

~~In addition, a further mitigation measure could be provided at this location to include the widening and restriping of the on-ramp to the Outerbridge Crossing to accommodate two lanes. This proposed mitigation measure is considered a higher cost item as per guidance in the CEQR Technical Manual, and has the potential to fully mitigate the impacts of the proposed project at this intersection. Between the Draft and Final EIS further analysis will be conducted to explore the feasibility of this measure. In order to fully inform consideration of this mitigation measure, and among other things, further analysis will explore: ownership of the land proposed for use in widening the on-ramp, the potential for additional impacts resulting from this proposed measure, overall benefits to the larger traffic network, and cost of construction.~~

### ***Boscombe Avenue/Tyrellan Avenue:***

- Modify the traffic signal hardware to provide for a southbound right-turn overlap phase to operate concurrently with a new eastbound-only lagging phase. As part of this mitigation measure, upgraded traffic signal hardware will be required to accommodate the proposed phasing change. The new hardware will require a more robust and flexible traffic signal controller (ASTC 12) that could accommodate multiple traffic timing and phasing plans, including a protected left-turn arrow for the eastbound approach and a protected right-turn arrow for the southbound approach.
- During the weekday midday peak hour, reallocate 17 seconds of green time from the east-west phase to the lagging eastbound phase with the southbound right-turn overlap.
- During the weekday PM peak hour, reallocate 16 seconds of green time from the east-west phase to the lagging eastbound phase with the southbound right-turn overlap.
- During the Saturday midday peak hour, reallocate 17 49 seconds of green time from the east-west phase to the lagging eastbound phase with the southbound right-turn overlap.

### ***Englewood Avenue/Veterans Road West:***

- During the weekday AM peak hour, reallocate five seconds of green time from the north-south phase to the east-west phase.
- During the weekday midday peak hour, reallocate four ~~second~~seconds of green time from the north-south phase to the east-west phase.
- During the weekday PM peak hour, reallocate two seconds of green time from the north-south phase to the east-west phase.
- During the Saturday midday peak hour, modify the traffic signal phasing to accommodate a lagging westbound phase. Reallocate 10 ~~six~~ seconds of green time from the north-south phase, plus one ~~six~~ seconds of green time from the east-west phase, to the lagging westbound phase (11 42 seconds total). As part of this mitigation measure, upgraded traffic signal hardware will be required to accommodate the proposed phasing change. The new hardware will require a more robust and flexible traffic signal controller (ASTC 12) that could accommodate multiple traffic timing and phasing plans, including a protected left-turn arrow for the westbound approach.

### ***Englewood Avenue/Veterans Road East:***

- During the weekday PM peak hour, reallocate two ~~one~~ seconds of green time from the northbound phase to the east-west phase.
- During the Saturday midday peak hour, reallocate five seconds of green time from the northbound phase to the east-west phase.

### ***Veterans Road East-Drumgoole Road West/Bloomingdale Road:***

- Prohibit on-street parking on the west side of Bloomingdale Road between Veterans Road East and Churchill Avenue, and restripe the southbound approach to accommodate one 12-foot through lane and one 12-foot through/right-turn lane.
- During the weekday AM peak hour, reallocate two seconds of green time from the westbound phase to the eastbound phase, ~~and reallocate 10 seconds from the north-south phase to create a northbound lagging phase with an eastbound right-turn overlap.~~
- During the weekday midday peak hour, reallocate two seconds of green time from the westbound phase to the eastbound phase.
- During the weekday PM peak hour, reallocate one second of green time from the westbound phase to the eastbound phase.
- During the Saturday midday peak hour, reallocate one second of green time from the westbound phase, plus three seconds of green time from the north-south phase, to the eastbound phase (four seconds total).

***Pleasant Plains Avenue-Amboy Road/Bloomingdale Road:***

- During the weekday AM peak hour, reallocate four ~~three~~ seconds of green time from the east-west phase to the north-south phase.
- During the weekday PM peak hour, reallocate one second of green time from the east-west phase to the north-south phase.
- During the Saturday midday peak hour, reallocate one second of green time from the east-west phase to the north-south phase.

***Arthur Kill Road/Bloomingdale Road:***

- Restripe the westbound approach to accommodate one 10 ~~44~~-foot exclusive left-turn lane and one 10~~44~~-foot exclusive through lane.
- During the weekday PM peak hour, reallocate 14 ~~43~~ seconds of green time from the east-west phase to create a an 11~~40~~-second lagging westbound phase, and add three seconds of green time to the northbound phase.
- During the Saturday midday peak hour, reallocate 18 ~~47~~ seconds of green time from the east-west phase to create a lagging westbound phase.
- As part of these mitigation measures, upgraded traffic signal hardware will be required to accommodate the proposed phasing change. The new hardware will require a more robust and flexible traffic signal controller (ASTC 12) that could accommodate multiple traffic timing and phasing plans, including a protected left-turn arrow for the westbound approach.

***Sharrotts Road/Arthur Kill Road:***

- ~~The Proposed Project is projected to result in a marginally unmitigable impact on the eastbound and westbound approaches at this stop-controlled intersection during the Saturday midday peak hour, according to CEQR criteria. However, the delays at this intersection are projected to exceed the CEQR threshold of mid-LOS "D" by only 5.0 seconds on the stop-controlled eastbound approach, and by only 0.3 seconds on the stop-controlled westbound approach, and only during the Saturday midday peak hour. Furthermore, all approaches at the intersection will operate under capacity with delays corresponding to LOS "D" or better which represents an acceptable operational level for an unsignalized intersection during all four peak hours analyzed. Therefore, no mitigation measures are proposed at this intersection for the potential significant traffic impact identified during the Saturday midday peak hour, and a marginally unmitigable impact will remain during that hour.~~

***Englewood Avenue/Arthur Kill Road:***

- Restripe the westbound approach to accommodate one exclusive left-turn lane and one exclusive right-turn lane.

## 4.0 MITIGATION MEASURES

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The improvement measures stated above are designed to accommodate the future traffic volumes projected to occur on the roadway network during critical periods of peak traffic activity under the future with the Proposed Project condition; specifically, during the peak 15-minute periods, by the 2020 year. The resulting year 2020 Mitigated With-Action condition operational performance measures with the improvement measures identified above are shown in **Table 4-3**.

### Potential Traffic Mitigation Measures due to Proposed West Shore Expressway Ramp Improvements

~~As discussed above under planned 2015 traffic mitigation measures, NYSDOT plans to improve the southbound West Shore Expressway (WSE) ramp system by the end of 2014, with the impacts of these ramps on traffic conditions to be analyzed for the FEIS. Until results from those studies are available, it is conservatively assumed that ramp-related increases in traffic volumes at the following three intersections would potentially worsen already identified significant traffic impacts and/or create additional significant impacts in one or more peak hour in 2020:~~

- ~~• Veterans Road West/Englewood Avenue (mitigation required in all four peak hours in 2020 in the absence of the ramp improvements is shown above for this location).~~
- ~~• Bricktown Way/Veterans Road West (mitigation required in 2020 in all four peak hours in 2020 in the absence of the ramp improvements is shown above for this location).~~
- ~~• Arthur Kill Road/Bloomingdale Road (mitigation required in 2020 in the Weekday AM and PM peak hours in the absence of the ramp improvements is shown above for this location).~~

~~Based on projected 2020 With-Action traffic conditions at these locations without the proposed ramps, it is projected that mitigation actions such as signal timing and phasing adjustments and traffic lane channelization would be sufficient to address any significant traffic impacts that would potentially occur at these locations due to these ramps. The traffic impacts in 2020 of these proposed ramps and the need for any new or additional mitigation will be assessed in the FEIS.~~

### Traffic Mitigation Monitoring Plan

~~Prior to completion of the 2020 of the entire Proposed Project, NYCEDC or a developer of a portion of the 2020 Proposed Project will conduct a traffic monitoring plan for these the intersections where of Veterans Road West/Bricktown Way/KWVP Off-Ramp. This study may occur after development of any initial component of the 2020 proposed project, but must be completed, along with any resulting mitigation measures, prior to the occupation of the final component of the 2020 Proposed Project.:~~

- ~~• Significant unmitigable traffic impacts due to the Proposed Project are projected under 2020 With-Action conditions — i.e., Boscombe Avenue/Outerbridge Crossing Ramps, and Veterans Road West/Bricktown Way/Korean War Veterans Parkway westbound off-ramp, and~~
- ~~• The results of the monitoring plan studies previously completed for these locations upon full occupancy of the retail on Site “A” in 2015 indicated that a follow-up monitoring assessment was necessary upon completion of the entire Proposed Project.~~

~~For the locations where this follow-up monitoring plan is warranted, the The results of the plan's updated traffic assessment would indicate the following:~~

- ~~• If the mitigation measures included in the FEIS for these locations (or similar measures refined to reflect the updated traffic analyses) upon completion of the entire Proposed Project would be sufficient to reasonably mitigate the Proposed Project's traffic impacts.~~
- ~~• If the volumes and delays associated with the unmitigated traffic impacts projected for 2020 in the FEIS were found to have actually occurred and the proposed further mitigation to address these newly measured conditions would be warranted required.~~

~~NYCEDC or a developer of a portion of the 2020 Proposed Project would be responsible for all costs associated with the monitoring plan. Before commencing the monitoring plan, the NYCEDC or a developer of a portion of the 2020 Proposed Project will submit a scope of work to NYCDOT for review and approval and for review of the plan's results and recommendations.~~

Each of the highway network-related improvements that involve the widening of streets or high-way facilities (such as components of the mitigation measures proposed for Boscombe Avenue/Outerbridge Crossing Ramps and Veterans Road West/Bricktown Way/Korean War Veterans Parkway westbound off-ramp) described in this chapter, beyond the operational improvements which are under NYCDOT jurisdiction, would require a collaborative review process between NYCDOT and the New York State Department of Transportation (NYSDOT). Final design for construction of those measures which do not fall under the jurisdiction of NYCDOT will be further reviewed by NYSDOT closer to the time of construction. These measures represent preferred improvements that would benefit the overall traffic network. If these mitigation measures are modified or rejected by NYCDOT or NYSDOT, significant adverse impacts identified above may be unmitigated.

### **Conclusion**

With the recommended transportation system improvement measures identified above in place, no significant adverse traffic impacts would occur as a result of the Proposed Project in the 2015 or 2020 analysis years, ~~with the exception of the following locations for the horizon years, movements/approaches, and peak hours noted:~~

#### ***~~Veterans Road West/Bricktown Way/Korean War Veterans Parkway westbound off-ramp:~~***

- ~~• In 2015, unmitigable potential significant traffic impacts are projected to remain for eastbound left turns, the northbound approach, and the southbound through/right turn lane during the Saturday midday peak hour.~~
- ~~• In 2020, unmitigable potential significant traffic impacts are projected to remain for westbound left turns during the weekday midday and Saturday midday peak hours, the northbound approach during the weekday midday, weekday PM, and Saturday midday peak hour, and eastbound left turns and southbound through/right turn lane during the Saturday midday peak hour.~~

#### ***~~Boscombe Avenue/Outerbridge Crossing Ramps:~~***

- ~~• In 2015, unmitigable potential significant traffic impacts are projected to remain for westbound right turns during the weekday midday and PM peak hours.~~
- ~~• In 2020, unmitigable significant traffic impacts are projected to remain for westbound right turns during the weekday AM, weekday midday, and weekday PM peak hours, and for eastbound left turns and southbound left turns during the weekday PM peak hour.~~

~~In addition, a further mitigation measure could be provided at this location to include the widening and restriping of the on-ramp to the Outerbridge Crossing to accommodate two lanes. This proposed mitigation measure is considered a higher cost item as per guidance in the CEQR Technical Manual, and has the potential to fully mitigate the impacts of the proposed project at this intersection. Between the Draft and Final EIS further analysis will be conducted to explore the feasibility of this measure to determine if this measure would be feasible. In order to fully inform consideration of this mitigation measure, and among other things, further analysis will explore: ownership of the land proposed for use in widening the on-ramp, the potential for additional impacts resulting from this proposed measure, overall benefits to the larger traffic network, and cost of construction.~~

#### ***~~Sharrotts Road/Arthur Kill Road:~~***

- ~~• In 2020, marginally unmitigable potential significant traffic impacts are projected to remain on the stop-controlled eastbound and westbound approaches during the Saturday midday peak hour.~~

## 4.5 GREENHOUSE GAS EMISSIONS



#### 4.0 MITIGATION MEASURES

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The developer of the retail buildings within Retail Site “A” have committed to the following actions to be consistent with City’s policy regarding GHG reduction, Local Law 22 of 2008:

- Design and construct to achieve a 10% reduction in energy performance, calculated in accordance with LEED Core and Shell, Energy and Atmosphere, Prerequisite 2, Option 1 (see [http://www.usgbc.org/sites/default/files/LEED2009RS\\_CS\\_04.01.13\\_current.pdf](http://www.usgbc.org/sites/default/files/LEED2009RS_CS_04.01.13_current.pdf)). Energy and Atmosphere Credit 1, Option 3 would be another approach to consider.
- Employ low flow fixtures, fittings and appliances, which are described in LEED Core and Shell, Water Efficiency, Prerequisite 1.

~~The elements of how the developer would meet these commitments and how compliance would be reported will be further developed and reported in the FEIS. This commitment would be required by provision of the contract sale between NYCEDC and the developer. The specifications cited are from the LEED “Core and Shell” certification program, which does not affect tenant fit-out (see <http://www.usgbc.org/leed/rating-systems/core-shell>).~~

Table 4-2  
Peak Hour Level-of-Service Analysis Results, Year 2015 Comparison of Future No-Action and Mitigated With-Action Traffic Conditions

Intersection	Approach	Movement	Weekday AM Peak Hour (8:00 to 9:00 AM)								Weekday Midday Peak Hour (12:00 to 1:00 PM)								Weekday PM Peak Hour (5:00 to 6:00 PM)								Saturday Midday Peak Hour (12:45 to 1:45 PM)							
			2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?	2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?	2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?	2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?
			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS		
SIGNALIZED INTERSECTIONS																																		
Sharrotts Road / Arthur Kill Road	EB	LTR	0.16	25.7	C	0.16	25.7	C	0.0		0.43	30.4	C	0.43	30.4	C	0.0		0.40	29.7	C	0.40	29.7	C	0.0		0.85	55.6	E	0.85	55.6	E	0.0	
	WB	LT	0.21	18.8	B	0.21	18.8	B	0.0		0.19	18.7	B	0.19	18.7	B	0.0		0.26	19.3	B	0.26	19.3	B	0.0		0.30	19.8	B	0.30	19.8	B	0.0	
	NB	LTR	0.40	15.4	B	0.41	15.6	B	0.2		0.47	16.1	B	0.51	16.9	B	0.8		0.49	16.4	B	0.53	17.1	B	0.7		0.38	14.8	B	0.43	15.5	B	0.7	
	SB	LTR	0.37	15.0	B	0.40	15.2	B	0.2		0.46	16.2	B	0.51	17.0	B	0.8		0.54	17.6	B	0.60	18.8	B	1.2		0.45	15.8	B	0.51	16.7	B	0.9	
	Overall		0.30	16.2	B	0.30	16.4	B	0.2		0.37	18.2	B	0.39	18.6	B	0.4		0.43	18.6	B	0.45	19.2	B	0.6		0.46	24.4	C	0.49	24.2	C	-0.2	
Allentown Lane-Veterans Rd West / Arthur Kill Road	EB	LTR	0.02	10.3	B	0.02	10.3	B	0.0		0.04	10.5	B	0.04	10.5	B	0.0		0.02	10.3	B	0.02	11.6	B	1.3		0.02	10.3	B	0.02	12.2	B	1.9	
	WB	LT	0.63	19.0	B	0.64	19.4	B	0.4		0.58	17.7	B	0.63	18.9	B	1.2		0.76	24.0	C	0.88	36.1	D	12.1		0.75	22.7	C	0.92	40.8	D	18.1	
		R	0.57	17.8	B	0.59	18.2	B	0.4		0.79	25.4	C	0.84	29.6	C	4.2		0.56	17.4	B	0.68	22.5	C	5.1		0.71	21.2	C	0.89	37.0	D	15.8	
	NB	LTR	0.69	19.2	B	0.71	19.8	B	0.6		0.59	16.9	B	0.63	17.8	B	0.9		0.62	17.4	B	0.61	15.7	B	-1.7		0.77	21.4	C	0.73	17.8	B	-3.6	
	SB	LTR	0.48	16.2	B	0.57	19.0	B	2.8		0.70	22.4	C	0.85	32.8	C	10.4		1.01	61.1	E	1.02	62.6	E	1.5		0.90	40.7	D	0.93	41.5	D	0.8	
Overall		0.66	18.3	B	0.67	19.2	B	0.9		0.74	20.5	C	0.84	24.7	C	4.2		0.88	31.8	C	0.96	35.5	D	3.7		0.83	25.8	C	0.92	32.7	C	6.9		
North Bridge Street / Arthur Kill Road	WB	LR	0.29	15.8	B	0.29	15.8	B	0.0		0.56	19.4	B	0.56	19.4	B	0.0		0.81	22.2	C	0.81	22.2	C	0.0		0.76	21.9	C	0.76	21.9	C	0.0	
	NB	T	0.49	11.6	B	0.51	11.7	B	0.1		0.43	10.7	B	0.46	11.0	B	0.3		0.45	11.0	B	0.47	11.3	B	0.3		0.55	12.1	B	0.58	12.7	B	0.6	
	SB	T	0.46	11.0	B	0.47	11.1	B	0.1		0.53	11.4	B	0.56	11.7	B	0.3		0.67	12.5	B	0.70	13.0	B	0.5		0.60	11.6	B	0.63	12.0	B	0.4	
	Overall		0.41	12.0	B	0.42	12.1	B	0.1		0.54	13.4	B	0.56	13.6	B	0.2		0.72	15.3	B	0.74	15.4	B	0.1		0.66	14.9	B	0.68	15.2	B	0.3	
Richmond Valley Road / Arthur Kill Road	WB	LR	0.54	24.2	C	0.54	24.2	C	0.0		0.84	39.1	D	0.84	39.1	D	0.0		0.83	37.5	D	0.83	37.5	D	0.0		0.86	41.0	D	0.86	41.0	D	0.0	
	NB	TR	0.64	11.1	B	0.65	11.4	B	0.3		0.51	9.5	A	0.54	9.8	A	0.3		0.61	10.6	B	0.63	11.0	B	0.4		0.63	10.9	B	0.66	11.5	B	0.6	
	SB	LT	0.60	11.4	B	-	-	-	-		1.04	50.1	D	-	-	-	-		1.22	112.4	F	-	-	-	-		1.19	102.0	F	-	-	-	-	
		L	-	-	-	0.35	9.8	A	-		-	-	-	0.58	11.9	B	-		-	-	-	0.50	8.5	A	-		-	-	-	0.55	10.3	B	-	
		T	-	-	-	0.40	8.4	A	-		-	-	-	0.55	9.3	A	-		-	-	-	0.86	12.4	B	-		-	-	-	0.77	11.7	B	-	
Overall		0.61	13.3	B	0.61	12.4	B	-0.9		0.98	33.7	C	0.66	15.8	B	-17.9		1.10	64.3	E	0.85	15.8	B	-48.5		1.08	57.6	E	0.80	16.5	B	-41.1		
Richmond Valley Road / Page Avenue	EB	LTR	0.31	22.9	C	0.31	22.9	C	0.0		0.76	34.1	C	0.76	34.1	C	0.0		0.61	27.5	C	0.61	27.5	C	0.0		0.62	27.5	C	0.62	27.5	C	0.0	
	WB	LTR	0.31	23.0	C	0.31	23.0	C	0.0		0.51	26.8	C	0.51	26.8	C	0.0		0.59	28.8	C	0.59	28.8	C	0.0		0.42	25.0	C	0.42	25.0	C	0.0	
	NB	L	0.14	10.6	B	0.14	10.6	B	0.0		0.29	12.7	B	0.31	13.0	B	0.3		0.24	12.2	B	0.25	12.4	B	0.2		0.50	16.0	B	0.53	16.8	B	0.8	
		TR	0.77	19.8	B	0.78	20.2	C	0.4		0.71	18.3	B	0.74	19.1	B	0.8		0.66	17.1	B	0.69	17.7	B	0.6		0.86	23.0	C	0.90	25.5	C	2.5	
	SB	LTR	0.48	14.2	B	0.50	14.5	B	0.3		0.70	19.3	B	0.74	20.8	C	1.5		0.77	21.6	C	0.81	23.7	C	2.1		0.62	16.4	B	0.68	17.9	B	1.5	
Overall		0.60	18.5	B	0.60	18.7	B	0.2		0.73	21.9	C	0.75	22.6	C	0.7		0.71	21.7	C	0.73	22.6	C	0.9		0.77	21.3	C	0.79	22.7	C	1.4		
South Bridge Street / Page Avenue-Boscombe Avenue	EB	L	0.46	25.8	C	0.46	25.8	C	0.0		0.49	26.4	C	0.49	26.4	C	0.0		0.60	28.9	C	0.60	28.9	C	0.0		0.66	30.8	C	0.66	30.8	C	0.0	
		R	0.12	10.9	B	0.12	10.9	B	0.0		0.15	11.2	B	0.15	11.3	B	0.1		0.15	12.2	B	0.15	12.4	B	0.2		0.09	10.7	B	0.09	10.9	B	0.2	
	NB	T	0.37	11.5	B	0.38	11.6	B	0.1		0.38	11.7	B	0.40	11.8	B	0.1		0.35	11.4	B	0.37	11.5	B	0.1		0.42	11.9	B	0.44	12.1	B	0.2	
	SB	T	0.23	10.4	B	0.23	10.5	B	0.1		0.30	11.0	B	0.31	11.2	B	0.2		0.35	11.5	B	0.37	11.7	B	0.2		0.35	11.6	B	0.37	11.7	B	0.1	
Overall		*	13.9	B	*	14.0	B	0.0		*	14.2	B	*	14.0	B	-0.2		*	15.2	B	*	15.2	B	0.0		*	15.5	B	*	15.5	B	0.0		
Veterans Road West / Bricktown Way-KWVP WB off-ramp	EB	L	0.29	25.0	C	0.43	28.7	C	3.7		0.69	45.0	D	0.81	47.8	D	2.8		0.66	38.0	D	0.78	40.6	D	2.6		0.92	81.3	F	0.76	30.7	C	-50.6	
		TR	0.54	27.3	C	0.54	27.3	C	0.0		0.66	30.4	C	0.55	23.3	C	-7.1		0.76	33.2	C	0.65	25.9	C	-7.3		0.83	36.7	D	0.58	18.9	B	-17.8	
	WB	L	0.97	81.9	F	0.97	81.9	F	0.0		1.28	188.6	F	0.90	58.6	E	-130.0		1.11	118.2	F	0.96	68.9	E	-49.3		2.19	588.8	F	0.90	56.3	E	-532.5	
		TR	0.54	26.2	C	0.54	26.2	C	0.0		0.61	27.4	C	0.51	21.6	C	-5.8		0.55	25.6	C	0.47	21.1	C	-4.5		0.69	28.3	C	0.65	26.0	C	-2.3	

4.0 MITIGATION MEASURES

Table 4-2 (cont'd)  
Peak Hour Level-of-Service Analysis Results, Year 2015 Comparison of Future No-Action and Mitigated With-Action Traffic Conditions

Intersection	Approach	Movement	Weekday AM Peak Hour (8:00 to 9:00 AM)								Weekday Midday Peak Hour (12:00 to 1:00 PM)								Weekday PM Peak Hour (5:00 to 6:00 PM)								Saturday Midday Peak Hour (12:45 to 1:45 PM)								
			2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?	2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?	2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?	2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?	
			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c
SIGNALIZED INTERSECTIONS																																			
Boscombe Avenue / Tyrellan Avenue	EB	DefL	0.47	16.8	B	0.50	17.4	B	0.6		0.64	20.9	C	0.65	21.5	C	0.6		0.59	19.1	B	0.77	30.6	C	11.5		0.74	24.0	C	0.73	24.7	C	0.7		
		TR	0.03	11.4	B	0.03	11.4	B	0.0		0.04	11.5	B	0.04	11.5	B	0.0		0.04	11.5	B	0.04	15.4	B	3.9		0.04	11.6	B	0.04	11.6	B	0.0		
	WB	LTR	0.10	11.9	B	0.10	11.9	B	0.0		0.08	11.8	B	0.10	17.1	B	5.3		0.05	11.6	B	0.05	15.5	B	3.9		0.06	11.7	B	0.08	19.4	B	7.7		
		LTR	0.07	17.4	B	0.07	17.4	B	0.0		-	-	-	-	-	-	-		0.01	16.9	B	0.01	12.9	B	-4.0		0.00	16.8	B	0.00	16.8	B	0.0		
	NB	DefL	-	-	-	-	-	-	-	-	0.01	16.9	B	0.01	16.9	B	0.0		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TR	-	-	-	-	-	-	-	-	0.01	16.9	B	0.01	16.9	B	0.0		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	SB	LT	0.10	17.8	B	0.10	17.8	B	0.0		0.14	18.3	B	0.14	18.3	B	0.0		0.12	18.0	B	0.10	13.7	B	-4.3		0.16	18.4	B	0.16	18.4	B	0.0		
		R	0.42	22.1	C	0.55	24.8	C	2.7		0.83	36.1	D	0.94	39.6	D	3.5		0.75	31.2	C	0.94	43.0	D	11.8		1.01	63.7	E	1.07	67.4	E	3.7		
Overall			0.45	17.5	B	0.52	18.9	B	1.4		0.72	25.6	C	0.94	29.5	C	3.9		0.66	23.3	C	0.86	34.7	C	11.4		0.86	40.2	D	1.04	46.4	D	6.2		
Bricktown Way / Veterans Road West	EB	L	0.14	15.3	B	0.21	15.9	B	0.6		0.30	16.9	B	0.49	19.7	B	2.8		0.30	16.8	B	0.49	19.7	B	2.9		0.51	19.6	B	0.77	27.1	C	7.5		
		R	0.00	14.0	B	0.00	14.0	B	0.0		0.04	14.4	B	0.04	14.4	B	0.0		0.04	14.4	B	0.04	14.4	B	0.0		0.06	14.5	B	0.06	14.5	B	0.0		
	NB	LT	0.07	7.3	A	0.07	7.3	A	0.0		0.15	7.8	A	0.15	7.8	A	0.0		0.18	7.9	A	0.18	7.9	A	0.0		0.19	8.0	A	0.20	8.1	A	0.1		
		TR	0.48	9.9	A	0.54	10.5	B	0.6		0.62	11.4	B	0.76	13.5	B	2.1		0.53	10.5	B	0.65	11.8	B	1.3		0.71	12.1	B	0.87	15.8	B	3.7		
	Overall			0.35	10.0	B	0.41	10.6	B	0.6		0.50	11.4	B	0.66	13.6	B	2.2		0.44	10.7	B	0.59	12.4	B	1.7		0.63	12.6	B	0.83	16.8	B	4.2	
Englewood Avenue / Veterans Road West	EB	TR	0.01	10.2	B	0.01	10.2	B	0.0		0.01	10.2	B	0.01	10.2	B	0.0		0.01	10.2	B	0.01	10.2	B	0.0		0.01	10.2	B	0.00	9.7	A	-0.5		
		L	0.43	14.6	B	0.44	14.9	B	0.3		0.47	15.2	B	0.50	15.7	B	0.5		0.42	14.4	B	0.45	14.9	B	0.5		0.93	39.4	D	0.96	42.7	D	3.3		
	WB	LT	0.45	15.0	B	0.46	15.3	B	0.3		0.49	15.7	B	0.52	16.2	B	0.5		0.44	14.9	B	0.47	15.4	B	0.5		0.33	13.3	B	0.33	12.7	B	-0.6		
		L	0.01	10.3	B	0.01	10.4	B	0.1		0.00	10.2	B	0.00	10.3	B	0.1		0.02	10.4	B	0.02	10.5	B	0.1		0.02	10.5	B	0.04	11.4	B	0.9		
	NB	R	0.18	9.2	A	0.21	9.3	A	0.1		0.39	10.7	B	0.49	11.7	B	1.0		0.44	11.1	B	0.54	12.5	B	1.4		0.57	13.0	B	0.71	16.5	C	3.5		
		LTR	0.24	11.6	B	0.28	11.9	B	0.3		0.28	11.9	B	0.37	12.6	B	0.7		0.29	11.9	B	0.37	12.6	B	0.7		0.32	12.2	B	0.46	14.0	B	1.8		
	Overall			*	12.5	B	*	12.7	B	0.2		*	12.9	B	*	13.4	B	0.5		*	12.5	B	*	13.2	B	0.8		*	22.8	C	*	24.3	C	1.5	
Englewood Avenue / Veterans Road East	EB	LT	0.30	15.7	B	0.34	16.0	B	0.3		0.55	19.6	B	0.65	21.9	C	2.3		0.71	24.6	C	0.81	30.2	C	5.6		1.02	64.5	E	1.04	63.7	E	-0.8		
		R	0.05	13.1	B	0.07	13.3	B	0.2		0.11	13.6	B	0.17	14.1	B	0.5		0.12	13.7	B	0.19	14.3	B	0.6		0.17	14.1	B	0.23	12.8	B	-1.3		
	WB	LTR	0.11	13.6	B	0.11	13.6	B	0.0		0.09	13.4	B	0.09	13.4	B	0.0		0.13	13.8	B	0.13	13.8	B	0.0		0.16	14.1	B	0.14	11.9	B	-2.2		
		LTR	0.26	9.4	A	0.27	9.5	A	0.1		0.25	9.3	A	0.26	9.4	A	0.1		0.25	9.3	A	0.26	9.4	A	0.1		0.33	9.9	A	0.39	12.1	B	2.2		
	Overall			0.28	11.1	B	0.30	11.3	B	0.2		0.37	13.0	B	0.42	14.2	B	1.2		0.44	15.2	B	0.49	17.7	B	2.5		0.62	30.8	C	0.70	32.3	C	1.5	
Englewood Avenue / Bloomingdale Road	EB	LR	0.15	17.5	B	0.20	18.0	B	0.5		0.35	19.9	B	0.51	22.6	C	2.7		0.31	19.3	B	0.45	21.4	C	2.1		0.48	21.9	C	0.67	26.8	C	4.9		
	NB	LT	0.39	8.3	A	0.39	8.3	A	0.0		0.31	7.6	A	0.31	7.6	A	0.0		0.50	9.2	A	0.50	9.2	A	0.0		0.40	8.3	A	0.40	8.3	A	0.0		
	SB	TR	0.52	9.4	A	0.52	9.4	A	0.0		0.34	7.7	A	0.34	7.7	A	0.0		0.48	9.0	A	0.48	9.0	A	0.0		0.39	8.2	A	0.39	8.2	A	0.0		
	Overall			0.40	9.5	A	0.42	9.7	A	0.2		0.34	9.9	A	0.40	11.3	B	1.4		0.44	10.3	B	0.48	11.1	B	0.8		0.42	10.9	B	0.48	13.0	B	2.1	
Sharrotts Road / Bloomingdale Road	EB	LR	0.30	16.2	B	0.30	16.2	B	0.0		0.27	15.9	B	0.27	15.9	B	0.0		0.49	18.7	B	0.49	18.7	B	0.0		0.47	18.4	B	0.47	18.4	B	0.0		
	NB	LT	0.58	13.3	B	0.61	13.7	B	0.4		0.51	12.1	B	0.59	13.5	B	1.4		0.61	13.4	B	0.69	15.1	B	1.7		0.61	13.4	B	0.73	16.5	B	3.1		
	SB	TR	0.50	11.8	B	0.54	12.4	B	0.6		0.42	10.8	B	0.51	11.8	B	1.0		0.58	12.7	B	0.66	14.2	B	1.5		0.57	12.6	B	0.68	14.8	B	2.2		
	Overall			0.47	13.1	B	0.48	13.5	B	0.4		0.42	12.1	B	0.47	13.0	B	0.9		0.56	14.2	B	0.61	15.4	B	1.2		0.55	14.1	B	0.62	16.0	B	1.9	
Veterans Road East-Drumgoole Road West / Bloomingdale Road	EB	L	0.02	22.7	C	0.02	22.7	C	0.0		0.05	23.1	C	0.05	23.1	C	0.0		0.02	22.7	C	0.02	22.7	C	0.0		0.12	23.7	C	0.16	26.2	C	2.5		
		R	0.33	27.5	C	0.38	28.6	C	1.1		0.60	34.2	C	0.78	44.9	D	10.7		0.55	32.3	C	0.70	39.2	D	6.9		0.76	41.5	D	0.48	20.4	C	-21.1		
	WB	LTR	0.67	21.0	C	0.67	21.0	C	0.0		0.69	21.2	C	0.69	21.2	C	0.0		0.84	23.6	C	0.89	26.5	C	2.9		0.90								

4.0 MITIGATION MEASURES

Table 4-2 (cont'd)  
Peak Hour Level-of-Service Analysis Results, Year 2015 Comparison of Future No-Action and Mitigated With-Action Traffic Conditions

Intersection	Approach	Movement	Weekday AM Peak Hour (8:00 to 9:00 AM)								Weekday Midday Peak Hour (12:00 to 1:00 PM)								Weekday PM Peak Hour (5:00 to 6:00 PM)								Saturday Midday Peak Hour (12:45 to 1:45 PM)										
			2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?	2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?	2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?	2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?			
			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS
UNSIGNALIZED INTERSECTIONS																																					
Englewood Avenue / Arthur Kill Road	WB	LR	0.05	10.5	B	0.05	10.7	B	0.2		0.13	13.6	B	0.14	14.4	B	0.8		0.16	13.6	B	0.17	14.4	B	0.8		0.06	11.3	B	0.07	11.9	B	0.6				
	SB	LT	0.02	7.9	A	0.02	8.0	A	0.1		0.02	8.1	A	0.02	8.2	A	0.1		0.01	8.1	A	0.01	8.1	A	0.0		0.01	7.9	A	0.01	8.0	A	0.1				
South Bridge Street / Arthur Kill Road	SB	LT	0.17	10.4	B	0.17	10.5	B	0.1		0.18	10.1	B	0.19	10.3	B	0.2		0.26	11.1	B	0.27	11.3	B	0.2		0.25	11.2	B	0.26	11.5	B	0.3				
Bricktown Way / Tyrellan Avenue	EB	LT	0.04	7.9	A	0.06	8.6	A	0.7		0.07	8.8	A	0.15	11.5	B	2.7		0.08	8.3	A	0.15	10.7	B	2.4		0.16	9.0	A	0.30	14.0	B	5.1				
		TR	0.07	7.7	A	0.09	8.3	A	0.6		0.12	8.8	A	0.24	11.9	B	3.0		0.12	8.2	A	0.22	10.9	B	2.7		0.21	9.1	A	0.40	15.2	C	6.1				
	WB	LT	0.09	8.2	A	0.11	8.6	A	0.5		0.28	10.0	B	0.38	13.5	B	3.5		0.33	10.5	B	0.43	14.2	B	3.7		0.32	10.7	B	0.48	17.2	C	6.5				
		TR	0.03	7.5	A	0.15	8.0	A	0.5		0.07	8.0	A	0.41	12.7	B	4.7		0.10	8.1	A	0.42	12.5	B	4.4		0.14	8.7	A	0.73	25.8	D	17.1				
	NB	LT	0.01	7.7	A	0.05	8.6	A	1.0		0.07	8.4	A	0.21	11.8	B	3.4		0.02	8.3	A	0.14	10.9	B	2.6		0.09	9.0	A	0.31	14.7	B	5.8				
		R	0.03	6.9	A	0.03	7.5	A	0.6		0.06	7.5	A	0.09	9.5	A	2.0		0.11	7.9	A	0.12	9.7	A	1.9		0.13	8.3	A	0.21	12.1	B	3.8				
	SB	LT	-	-	-	0.08	8.7	A	-		-	-	-	0.35	13.1	B	-		-	-	-	0.33	12.8	B	-		-	-	-	0.58	20.6	C	-				
		TR	-	-	-	0.06	8.0	A	-		-	-	-	0.29	11.5	B	-		-	-	-	0.27	11.4	B	-		-	-	-	0.48	16.6	C	-				
Sharrots Road / Veterans Road West	EB	TR	0.13	8.4	A	0.13	8.5	A	0.1		0.12	8.3	A	0.13	8.4	A	0.2		0.22	8.7	A	0.22	8.9	A	0.2		0.18	8.5	A	0.19	8.8	A	0.3				
	WB	LT	0.27	9.2	A	0.32	9.7	A	0.5		0.31	9.6	A	0.42	11.0	B	1.4		0.36	10.2	B	0.47	11.7	B	1.5		0.38	10.6	B	0.54	13.1	B	2.5				
		SB	LT	0.07	8.1	A	0.07	8.2	A	0.1		0.11	8.4	A	0.12	8.7	A	0.3		0.10	8.6	A	0.10	8.9	A	0.3		0.12	8.6	A	0.12	9.0	A	0.4			
			TR	0.09	7.9	A	0.09	8.0	A	0.1		0.09	8.0	A	0.09	8.2	A	0.3		0.10	8.3	A	0.10	8.5	A	0.3		0.12	8.4	A	0.13	8.8	A	0.4			
Sharrots Road / Veterans Road East	EB	LT	0.12	8.4	A	0.12	8.5	A	0.1		0.13	8.7	A	0.14	8.8	A	0.2		0.21	9.3	A	0.22	9.5	A	0.2		0.17	9.0	A	0.17	9.3	A	0.3				
	WB	TR	0.21	8.6	A	0.26	9.0	A	0.4		0.27	9.2	A	0.39	10.4	B	1.2		0.29	9.8	A	0.41	11.2	B	1.4		0.34	10.1	B	0.49	12.3	B	2.2				
		NB	LT	0.12	8.3	A	0.12	8.4	A	0.1		0.11	8.4	A	0.11	8.6	A	0.3		0.15	8.9	A	0.16	9.2	A	0.3		0.15	8.8	A	0.15	9.2	A	0.4			
			TR	0.10	7.6	A	0.10	7.7	A	0.1		0.15	8.0	A	0.16	8.3	A	0.3		0.23	8.7	A	0.24	9.1	A	0.4		0.24	8.8	A	0.26	9.3	A	0.5			

Notes:  
v/c = volume-to-capacity ratio; LOS = Level-of-Service  
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; SEB = Southeastbound  
L = Left-Turn; T = Through; R = Right-Turn;  
LT = Left-Turn/Through; TR = Through/Right-Turn; LR = Left-Turn/Right-Turn; LTR = Left-Turn/Through/Right-Turn  
Average Control Delay shown in units of seconds/vehicle  
- = No volumes for this approach or movement.

Table 4-3  
Peak Hour Level-of-Service Analysis Results, Year 2020 Comparison of Future No-Action and Mitigated With-Action Traffic Conditions

Intersection	Approach	Movement	Weekday AM Peak Hour (8:00 to 9:00 AM)								Weekday Midday Peak Hour (12:00 to 1:00 PM)								Weekday PM Peak Hour (5:00 to 6:00 PM)								Saturday Midday Peak Hour (12:45 to 1:45 PM)									
			2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?	2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?	2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?	2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?		
			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay
SIGNALIZED INTERSECTIONS																																				
Sharrotts Road / Arthur Kill Road	EB	LTR	0.17	26.0	C	0.17	26.0	C	0.0		0.45	31.0	C	0.45	31.0	C	0.0		0.41	30.0	C	0.41	30.0	C	0.0			0.88	59.8	E	0.88	59.8	E	0.0		
	WB	LTR	0.22	18.9	B	0.18	18.5	B	-0.4		0.20	18.7	B	0.18	18.5	B	-0.2		0.27	19.4	B	0.24	19.1	B	-0.3			0.31	19.9	B	0.28	19.6	B	-0.3		
	NB	LTR	0.43	15.9	B	0.50	16.9	B	1.0		0.50	16.7	B	0.56	17.8	B	1.1		0.54	17.3	B	0.60	18.5	B	1.2			0.43	15.4	B	0.50	16.5	B	1.1		
	SB	LTR	0.41	15.5	B	0.49	16.6	B	1.1		0.50	16.9	B	0.57	18.2	B	1.3		0.61	19.2	B	0.70	21.8	C	2.6			0.51	16.7	B	0.60	18.4	B	1.7		
	Overall		0.32	16.6	B	0.34	17.3	B	0.7		0.39	18.7	B	0.42	19.5	B	0.8		0.47	19.5	B	0.50	20.9	C	1.4			0.50	25.2	C	0.54	25.3	C	0.1		
Allentown Lane-Veterans Rd West / Arthur Kill Road	EB	LTR	0.02	10.3	B	0.02	10.3	B	0.0		0.04	10.5	B	0.04	10.5	B	0.0		0.02	10.4	B	0.02	10.4	B	0.0			0.02	10.4	B	0.02	10.4	B	0.0		
	WB	LT	0.67	20.5	C	0.69	21.1	C	0.6		0.64	19.2	B	0.69	20.8	C	1.6		0.86	31.7	C	0.92	38.6	D	6.9			0.85	28.9	C	0.91	35.7	D	6.8		
		R	0.61	18.7	B	0.51	16.3	B	-2.4		0.83	28.7	C	0.85	30.3	C	1.6		0.63	19.1	B	0.71	22.1	C	3.0			0.78	24.3	C	0.89	33.8	C	9.5		
	NB	LTR	0.76	21.6	C	-	-	-	-		0.65	18.2	B	-	-	-	-		0.70	19.5	B	-	-	-	-			0.86	27.2	C	-	-	-	-		
		LT	-	-	-	0.34	13.1	B	-		-	-	-	0.27	12.4	B	-		-	-	-	0.27	12.3	B	-			-	-	-	0.32	12.8	B	-		
	SB	R	-	-	-	0.60	17.4	B	-		-	-	-	0.51	15.8	B	-		-	-	-	0.57	16.8	B	-			-	-	-	0.72	20.6	C	-		
		LTR	0.63	21.4	C	-	-	-	-		0.82	30.4	C	-	-	-	-		1.22	133.7	F	-	-	-	-			1.15	111.0	F	-	-	-	-		
	TR	L	-	-	-	0.35	14.3	B	-		-	-	-	0.64	20.8	C	-		-	-	-	0.79	28.6	C	-			-	-	-	0.78	28.5	C	-		
		TR	-	-	-	0.29	12.7	B	-		-	-	-	0.32	12.9	B	-		-	-	-	0.43	14.3	B	-			-	-	-	0.34	13.2	B	-		
	Overall		0.72	20.6	C	0.64	16.5	B	-4.1		0.83	23.9	C	0.74	20.3	C	-3.6		1.04	55.1	E	0.85	23.9	C	-31.2			1.00	45.4	D	0.85	26.1	C	-19.3		
North Bridge Street / Arthur Kill Road	WB	LR	0.30	15.9	B	0.30	15.9	B	0.0		0.58	19.7	B	0.58	19.7	B	0.0		0.83	23.0	C	0.83	23.0	C	0.0			0.79	22.7	C	0.79	22.7	C	0.0		
	NB	T	0.54	12.2	B	0.62	13.4	B	1.2		0.47	11.2	B	0.51	11.7	B	0.5		0.50	11.6	B	0.55	12.3	B	0.7			0.62	13.2	B	0.68	14.5	B	1.3		
	SB	T	0.49	11.3	B	0.55	12.1	B	0.8		0.57	11.9	B	0.61	12.5	B	0.6		0.73	13.6	B	0.78	14.5	B	0.9			0.66	12.4	B	0.71	13.2	B	0.8		
	Overall		0.44	12.5	B	0.49	13.3	B	0.8		0.57	13.8	B	0.60	14.1	B	0.3		0.77	16.0	B	0.80	16.4	B	0.4			0.71	15.7	B	0.74	16.2	B	0.5		
Richmond Valley Road / Arthur Kill Road	WB	LR	0.61	26.2	C	0.68	28.8	C	2.6		0.91	47.6	D	0.91	48.8	D	1.2		0.92	49.0	D	0.94	52.6	D	3.6			0.96	56.6	E	0.97	59.4	E	2.8		
	NB	TR	0.67	11.7	B	0.71	12.6	B	0.9		0.53	9.8	A	0.57	10.3	B	0.5		0.65	11.3	B	0.68	12.0	B	0.7			0.67	11.6	B	0.72	12.7	B	1.1		
	SB	LT	0.68	13.6	B	-	-	-	-		1.17	99.8	F	-	-	-	-		1.46	220.9	F	-	-	-	-			1.45	216.3	F	-	-	-	-		
		L	-	-	-	0.52	14.0	B	-		-	-	-	0.68	14.7	B	-		-	-	-	0.65	10.4	B	-			-	-	-	0.73	14.6	B	-		
	TR	-	-	-	0.45	9.0	A	-		-	-	-	0.59	9.8	A	-		-	-	-	0.93	14.4	B	-			-	-	-	0.84	13.2	B	-			
	Overall		0.66	14.8	B	0.70	14.5	B	-0.3		1.09	57.8	E	0.75	18.6	B	-39.2		1.29	118.9	F	0.93	19.8	B	-99.1			1.29	112.8	F	0.88	21.1	C	-91.7		
Richmond Valley Road / Page Avenue	EB	LTR	0.34	23.3	C	0.38	23.9	C	0.6		0.83	38.9	D	0.83	39.1	D	0.2		0.71	30.6	C	0.72	30.7	C	0.1			0.74	31.3	C	0.74	31.5	C	0.2		
	WB	LTR	0.38	24.1	C	0.38	24.1	C	0.0		0.57	28.3	C	0.57	28.3	C	0.0		0.68	31.9	C	0.68	31.9	C	0.0			0.54	27.6	C	0.54	27.6	C	0.0		
	NB	L	0.18	11.0	B	0.25	11.8	B	0.8		0.36	13.9	B	0.38	14.4	B	0.5		0.35	14.3	B	0.39	15.2	B	0.9			0.65	20.6	C	0.71	23.6	C	3.0		
		TR	0.80	20.7	C	0.81	21.3	C	0.6		0.74	19.0	B	0.77	20.2	C	1.2		0.69	17.7	B	0.71	18.4	B	0.7			0.89	24.9	C	0.94	29.9	C	5.0		
	SB	LTR	0.55	15.6	B	0.57	16.1	B	0.5		0.79	23.5	C	0.86	27.9	C	4.4		0.89	29.8	C	0.95	38.0	-	-			0.81	23.6	C	0.91	32.1	C	8.5		
	Overall		0.63	19.5	B	0.65	20.0	B	0.5		0.81	24.5	C	0.85	26.3	C	1.8		0.82	25.9	C	0.86	29.0	C	3.1			0.83	25.4	C	0.86	30.1	C	4.7		
South Bridge Street / Page Avenue-Boscombe Avenue	EB	L	0.47	26.1	C	0.47	26.1	C	0.0		0.50	26.7	C	0.50	26.7	C	0.0		0.62	29.4	C	0.62	29.4	C	0.0			0.68	31.4	C	0.68	31.4	C	0.0		
	NB	R	0.12	11.0	B	0.12	11.1	B	0.1		0.16	11.4	B	0.16	11.6	B	0.2		0.16	12.6	B	0.17	12.8	B	0.2			0.10	11.0	B	0.10	11.2	B	0.2		
		T	0.40	11.8	B	0.40	11.8	B	0.0		0.40	11.9	B	0.42	12.1	B	0.2		0.38	11.7	B	0.40	11.8	B	0.1			0.45	12.2	B	0.47	12.5	B	0.3		
	SB	T	0.24	10.5	B	0.25	10.6	B	0.1		0.32	11.2	B	0.34	11.4	B	0.2		0.38	11.8	B	0.40	12.0	B	0.2			0.38	11.8	B	0.41	12.1	B	0.3		
	Overall		*	14.1	B	*	14.1	B	0.0		*	14.2	B	*	14.2	B	0.1		*	15.4	B	*	15.4	B	0.0			*	15.7	B	*	15.8	B	0.1		
Veterans Road West / Bricktown Way-KWVP WB off-ramp	EB	L	0.32	26.3	C	0.43	28.8	C	2.5		0.80	59.6	E	0.61	41.4	D	-18.2		0.79	51.9	D	0.88	54.2	D	2.3			1.23	186.6	F	0.65	42.3	D	-144.3		
		T	-	-	-	0.33	23.6	C	-4.0		-	-	-	0.77	40.0	D	9.1		-	-	-	0.51	21.4	C	-12.9			-	-	-	0.82	38.1	D	-0.2		
		R	-	-	-	0.30	23.5	C	-4.1		-	-	-	0.36	28.9	C	-2.0		-	-	-	0.30	18.6	B	-15.7			-	-	-	0.43	27.4	C	-10.9		
		TR	0.56	27.6	C	-	-	-	-		0.67	30.9	C	-	-	-	-		0.78	34.3	C	-	-													

4.0 MITIGATION MEASURES

Table 4-3 (cont'd)  
Peak Hour Level-of-Service Analysis Results, Year 2020 Comparison of Future No-Action and Mitigated With-Action Traffic Conditions

Intersection	Approach	Movement	Weekday AM Peak Hour (8:00 to 9:00 AM)								Weekday Midday Peak Hour (12:00 to 1:00 PM)								Weekday PM Peak Hour (5:00 to 6:00 PM)								Saturday Midday Peak Hour (12:45 to 1:45 PM)							
			2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?	2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?	2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?	2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?
			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS		
SIGNALIZED INTERSECTIONS																																		
Boscombe Avenue / Tyrellan Avenue	EB	DefL	0.53	18.0	B	0.57	18.9	B	0.9		0.71	23.0	C	0.70	23.5	C	0.5		0.67	21.3	C	0.68	22.2	C	0.9		0.83	29.7	C	0.84	31.1	C	1.4	
		TR	0.03	11.5	B	0.03	11.5	B	0.0		0.04	11.5	B	0.04	11.5	B	0.0		0.04	11.5	B	0.04	11.5	B	0.0		0.05	11.6	B	0.05	11.6	B	0.0	
	WB	LTR	0.10	12.0	B	0.10	12.0	B	0.0		0.09	11.9	B	0.13	21.1	C	9.2		0.05	11.6	B	0.07	19.9	B	8.3		0.06	11.7	B	0.09	20.8	C	9.1	
		LTR	0.07	17.4	B	0.07	17.4	B	0.0		-	-	-	-	-	-	-		0.01	16.9	B	0.01	16.9	B	0.0		0.00	16.8	B	0.00	16.8	B	0.0	
	NB	DefL	-	-	-	-	-	-	-		0.01	16.9	B	0.01	16.9	B	0.0		-	-	-	-	-	-	-		-	-	-	-	-	-	-	
		TR	-	-	-	-	-	-	-		0.01	16.9	B	0.01	16.9	B	0.0		-	-	-	-	-	-	-		-	-	-	-	-	-	-	
	SB	LT	0.10	17.8	B	0.10	17.8	B	-		0.14	18.3	B	0.14	18.3	B	0.0		0.12	18.1	B	0.12	18.1	B	0.0		0.17	18.5	B	0.17	18.5	B	0.0	
R		0.58	25.5	C	0.76	32.4	C	-		1.06	78.5	E	1.09	76.9	E	-1.6		1.09	89.9	F	1.12	86.3	F	-3.6		1.41	218.0	F	1.42	215.3	F	-2.7		
Overall			0.55	19.4	B	0.65	22.9	C	3.5		0.86	46.3	D	1.06	51.4	D	5.1		0.85	53.9	D	1.07	58.0	E	4.1		1.08	123.0	F	1.28	136.8	F	13.8	
Bricktown Way / Veterans Road West	EB	L	0.19	15.7	B	0.25	16.4	B	0.7		0.37	17.7	B	0.56	21.1	C	3.4		0.41	18.2	B	0.60	22.0	C	3.8		0.64	22.3	C	0.89	36.6	D	14.3	
		R	0.00	14.0	B	0.00	14.0	B	0.0		0.05	14.4	B	0.05	14.4	B	0.0		0.04	14.4	B	0.04	14.4	B	0.0		0.06	14.5	B	0.06	14.5	B	0.0	
	NB	LT	0.07	7.4	A	0.07	7.4	A	0.0		0.15	7.8	A	0.16	7.9	A	0.1		0.18	8.0	A	0.18	8.0	A	0.0		0.20	8.1	A	0.24	8.4	A	0.3	
		TR	0.51	10.3	B	0.54	10.5	B	0.2		0.66	11.9	B	0.79	14.3	B	2.4		0.58	11.0	B	0.70	12.7	B	1.7		0.80	13.7	B	0.98	24.8	C	11.1	
Overall			0.39	10.4	B	0.43	10.9	B	0.5		0.55	12.0	B	0.70	14.4	B	2.4		0.51	11.4	B	0.66	13.5	B	2.1		0.74	14.2	B	0.95	24.8	C	10.6	
Englewood Avenue / Veterans Road West	EB	TR	0.01	10.2	B	0.29	9.5	A	-0.7		0.01	10.2	B	0.17	9.1	A	-1.1		0.01	10.2	B	0.17	10.2	B	0.0		0.01	10.2	B	0.12	11.6	B	1.4	
		L	0.44	14.8	B	0.93	38.6	D	23.8		0.48	15.5	B	0.93	37.1	D	21.6		0.43	14.6	B	0.93	39.2	D	24.6		0.96	44.5	D	0.91	27.4	C	-17.1	
	WB	T	0.46	15.2	B	0.25	9.2	A	-6.0		0.50	15.9	B	0.09	8.6	A	-7.3		0.45	15.1	B	0.10	9.7	A	-5.4		0.34	13.4	B	0.09	5.6	A	-7.8	
		L	0.01	10.4	B	0.03	13.8	B	3.4		0.00	10.2	B	0.01	12.8	B	2.6		0.02	10.4	B	0.03	12.0	B	1.6		0.03	10.6	B	0.05	17.8	B	7.2	
	NB	R	0.21	9.3	A	0.32	11.7	B	2.4		0.43	11.1	B	0.56	13.1	B	2.0		0.51	11.9	B	0.66	15.8	C	3.9		0.65	14.6	B	0.84	24.8	C	10.2	
		LTR	0.26	11.8	B	0.49	17.0	B	5.2		0.30	12.1	B	0.53	16.8	B	4.7		0.32	12.2	B	0.49	15.0	B	2.8		0.39	12.8	B	0.95	38.9	D	26.1	
Overall			*	12.6	B	*	19.6	B	6.9		*	13.1	B	*	21.2	C	8.1		*	12.8	B	*	20.5	C	7.7		*	24.4	C	*	30.0	C	5.6	
Englewood Avenue / Veterans Road East	EB	LT	0.34	16.1	B	0.60	20.6	C	4.5		0.61	20.9	C	0.76	26.4	C	5.5		0.81	29.9	C	0.92	38.1	D	8.2		1.16	108.7	F	1.16	102.6	F	-6.1	
		R	0.05	13.1	B	0.30	15.6	B	2.5		0.12	13.7	B	0.22	14.6	B	0.9		0.13	13.8	B	0.24	13.5	B	-0.3		0.18	14.2	B	0.28	12.0	B	-2.2	
	WB	LTR	0.11	13.6	B	0.18	14.3	B	0.7		0.09	13.4	B	0.12	13.7	B	0.3		0.14	13.9	B	0.16	12.8	B	-1.1		0.17	14.1	B	0.18	11.0	B	-3.1	
		LTR	0.27	9.5	A	0.34	10.0	A	0.5		0.25	9.4	A	0.28	9.6	A	0.2		0.25	9.4	A	0.31	10.9	B	1.5		0.34	10.0	A	0.46	14.0	B	4.0	
Overall			0.30	11.3	B	0.45	13.7	B	2.4		0.40	13.6	B	0.48	16.1	B	2.5		0.49	17.7	B	0.59	21.7	C	4.0		0.68	49.9	D	0.82	49.8	D	-0.1	
Englewood Avenue / Bloomingdale Road	EB	LR	0.20	18.0	B	0.58	24.1	C	6.1		0.43	21.1	C	0.67	26.9	C	5.8		0.42	20.9	C	0.65	26.5	C	5.6		0.62	25.0	C	0.91	44.8	D	19.8	
	NB	LT	0.41	8.4	A	0.41	8.5	A	0.1		0.32	7.7	A	0.32	7.7	A	0.0		0.51	9.5	A	0.51	9.5	A	0.0		0.41	8.4	A	0.41	8.4	A	0.0	
	SB	TR	0.53	9.6	A	0.57	10.1	B	0.5		0.35	7.8	A	0.37	8.0	A	0.2		0.50	9.2	A	0.52	9.5	A	0.3		0.41	8.3	A	0.44	8.6	A	0.3	
Overall			0.43	9.9	A	0.57	12.5	B	2.6		0.38	10.5	B	0.47	13.3	B	2.8		0.48	11.0	B	0.56	13.0	B	2.0		0.48	12.2	B	0.59	19.6	B	7.4	
Sharrotts Road / Bloomingdale Road	EB	LR	0.30	16.3	B	0.30	16.3	B	0.0		0.28	16.0	B	0.28	16.0	B	0.0		0.50	18.9	B	0.50	18.9	B	0.0		0.48	18.5	B	0.48	18.5	B	0.0	
	NB	LT	0.63	14.2	B	0.81	20.3	C	6.1		0.57	13.0	B	0.69	15.7	B	2.7		0.69	15.1	B	0.83	20.2	C	5.1		0.71	15.9	B	0.96	35.8	D	19.9	
	SB	TR	0.56	12.7	B	0.69	15.4	B	2.7		0.48	11.4	B	0.59	13.1	B	1.7		0.66	14.3	B	0.78	18.0	B	3.7		0.66	14.3	B	0.83	20.1	C	5.8	
Overall			0.50	13.8	B	0.61	17.7	B	3.9		0.45	12.7	B	0.53	14.6	B	1.9		0.62	15.5	B	0.70	19.0	B	3.5		0.62	15.7	B	0.77	26.2	C	10.5	
Veterans Road East-Drumgoole Road West / Bloomingdale Road	EB	L	0.02	22.7	C	0.01	21.0	C	-1.7		0.06	23.1	C	0.05	21.3	C	-1.8		0.02	22.7	C	0.02	21.8	C	-0.9		0.12	23.7	C	0.08	19.9	B	-3.8	
		R	0.34	27.7	C	0.78	43.0	D	15.3		0.62	34.9	C	0.73	37.0	D	2.1		0.56	33.0	C	0.76	41.2	D	8.2		0.78	43.0	D	0.82	38.3	D	-4.7	
	WB	LTR	0.69	21.3	C	0.85	27.3	C	6.0		0.71	21.6	C	0.81	25.6	C	4.0		0.87	24.7	C	0.94	30.3	C										



4.0 MITIGATION MEASURES

Table 4-3 (cont'd)  
Peak Hour Level-of-Service Analysis Results, Year 2020 Comparison of Future No-Action and Mitigated With-Action Traffic Conditions

Intersection	Approach	Movement	Weekday AM Peak Hour (8:00 to 9:00 AM)								Weekday Midday Peak Hour (12:00 to 1:00 PM)								Weekday PM Peak Hour (5:00 to 6:00 PM)								Saturday Midday Peak Hour (12:45 to 1:45 PM)								
			2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?	2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?	2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?	2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?	
			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c
UNSIGNALIZED INTERSECTIONS																																			
Englewood Avenue / Arthur Kill Road	WB	LR	0.05	10.8	B	-	-	-	-		0.13	14.2	B	-	-	-	-		0.18	14.5	B	-	-	-	-	-		0.07	12.0	B	-	-	-	-	
		L	-	-	-	0.54	23.8	C	-		-	-	-	0.44	23.0	C	-		-	-	-	0.55	30.6	D	-		-	-	-	0.50	27.4	D	-		
		R	-	-	-	0.08	10.3	B	-		-	-	-	0.03	10.6	B	-		-	-	-	0.07	11.3	B	-		-	-	-	0.04	10.7	B	-		
	SB	LT	0.02	8.0	A	0.05	8.3	A	0.3		0.02	8.2	A	0.02	8.4	A	0.2		0.01	8.1	A	0.02	8.4	A	0.3		0.01	8.0	A	0.02	8.3	A	0.3		
South Bridge Street / Arthur Kill Road	SB	LT	0.18	10.8	B	0.19	11.3	B	0.5		0.20	10.4	B	0.20	10.7	B	0.3		0.29	11.6	B	0.30	12.0	B	0.4		0.27	11.8	B	0.29	12.4	B	0.6		
Bricktown Way / Tyrellan Avenue	EB	LT	0.05	8.0	A	0.08	8.7	A	0.7		0.10	9.1	A	0.19	11.9	B	2.8		0.12	8.7	A	0.21	11.6	B	2.9		0.22	9.6	A	0.40	16.1	C	6.5		
		TR	0.08	7.9	A	0.11	8.5	A	0.6		0.15	9.2	A	0.28	12.5	B	3.3		0.16	8.7	A	0.29	12.1	B	3.4		0.27	9.9	A	0.48	17.6	C	7.7		
	WB	LT	0.12	8.3	A	0.15	8.8	A	0.5		0.31	10.5	B	0.42	14.3	B	3.8		0.38	11.2	B	0.51	16.4	C	5.2		0.39	11.7	B	0.55	19.9	C	8.2		
		TR	0.06	7.7	A	0.18	8.3	A	0.6		0.10	8.2	A	0.45	13.5	B	5.3		0.14	8.5	A	0.49	14.4	B	5.9		0.20	9.3	A	0.77	29.8	D	20.5		
	NB	LT	0.02	7.8	A	0.05	8.8	A	1.0		0.07	8.6	A	0.22	12.1	B	3.5		0.03	8.5	A	0.15	11.4	B	2.9		0.10	9.4	A	0.32	15.5	C	6.2		
		R	0.03	7.0	A	0.03	7.7	A	0.7		0.06	7.7	A	0.09	9.8	A	2.1		0.11	8.2	A	0.16	10.6	B	2.4		0.14	8.7	A	0.23	12.7	B	4.0		
	SB	LT	-	-	-	0.07	8.8	A	-		-	-	-	0.33	13.2	B	-		-	-	-	0.35	13.7	B	-		-	-	-	0.60	22.3	C	-		
		TR	-	-	-	0.06	8.2	A	-		-	-	-	0.27	11.7	B	-		-	-	-	0.29	12.1	B	-		-	-	-	0.50	17.8	C	-		
Sharrots Road / Veterans Road West	EB	TR	0.14	8.5	A	0.14	8.7	A	0.2		0.13	8.4	A	0.13	8.6	A	0.2		0.23	8.9	A	0.24	9.2	A	0.3		0.19	8.8	A	0.20	9.1	A	0.3		
	WB	LT	0.33	9.8	A	0.44	11.1	B	1.3		0.37	10.3	B	0.52	12.5	B	2.2		0.46	11.5	B	0.60	14.6	B	3.1		0.50	12.4	B	0.69	17.7	C	5.4		
		LT	0.08	8.3	A	0.09	8.6	A	0.3		0.12	8.6	A	0.13	9.0	A	0.4		0.11	8.9	A	0.12	9.3	A	0.4		0.12	8.9	A	0.14	9.5	A	0.6		
	SB	TR	0.09	8.0	A	0.09	8.4	A	0.4		0.09	8.1	A	0.09	8.5	A	0.4		0.10	8.5	A	0.10	8.9	A	0.4		0.13	8.7	A	0.13	9.2	A	0.5		
Sharrots Road / Veterans Road East	EB	LT	0.12	8.6	A	0.13	8.7	A	0.1		0.14	8.8	A	0.14	9.0	A	0.2		0.23	9.6	A	0.24	9.9	A	0.3		0.18	9.3	A	0.19	9.7	A	0.4		
	WB	TR	0.27	9.1	A	0.37	10.2	B	1.1		0.33	9.8	A	0.48	11.7	B	1.9		0.39	11.0	B	0.55	13.7	B	2.7		0.45	11.7	B	0.65	16.3	C	4.7		
		LT	0.13	8.5	A	0.13	8.7	A	0.2		0.11	8.5	A	0.12	8.9	A	0.4		0.17	9.2	A	0.17	9.6	A	0.4		0.16	9.2	A	0.17	9.7	A	0.5		
	NB	TR	0.11	7.8	A	0.11	8.0	A	0.2		0.16	8.2	A	0.17	8.6	A	0.4		0.25	9.1	A	0.26	9.6	A	0.5		0.26	9.2	A	0.28	9.9	A	0.7		

Notes:  
v/c = volume-to-capacity ratio; LOS = Level-of-Service  
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; SEB = Southeastbound  
L = Left-Turn; T = Through; R = Right-Turn;  
LT = Left-Turn/Through; TR = Through/Right-Turn; LR = Left-Turn/Right-Turn; LTR = Left-Turn/Through/Right-Turn  
Average Control Delay shown in units of seconds/vehicle  
- = No volumes for this approach or movement.



Table 4-2  
Peak Hour Level-of-Service Analysis Results, Year 2015 Comparison of Future No-Action and Mitigated With-Action Traffic Conditions

Intersection	Approach	Movement	Weekday AM Peak Hour (8:00 to 9:00 AM)								Weekday Midday Peak Hour (12:00 to 1:00 PM)								Weekday PM Peak Hour (5:00 to 6:00 PM)								Saturday Midday Peak Hour (12:45 to 1:45 PM)											
			2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?	2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?	2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?												
			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS									
Signalized Intersections																																						
Allentown Lane-Veterans Rd West / Arthur Kill Road	EB	LTR	0.02	10.3	B	0.02	10.3	B	0.0				0.04	10.5	B	0.04	10.5	B	0.0				0.02	10.3	B	0.02	11.6	B	1.3		0.02	10.3	B	0.02	11.6	B	1.3	
	WB	LT	0.39	14.1	B	0.40	14.3	B	0.2				0.49	15.6	B	0.53	16.6	B	1.0				0.58	17.8	B	0.69	22.9	C	5.1		0.60	17.6	B	0.72	23.1	C	5.5	
		R	0.57	17.7	B	0.59	18.1	B	0.4				0.77	24.4	C	0.83	28.2	C	3.8				0.54	17.0	B	0.66	21.8	C	4.8		0.69	20.4	C	0.83	29.5	C	9.1	
	NB	LTR	0.68	18.9	B	0.70	19.5	B	0.6				0.56	16.4	B	0.61	17.2	B	0.8				0.60	17.0	B	0.59	15.3	B	-1.7		0.73	20.1	C	0.73	18.5	B	-1.6	
	SB	LTR	0.45	15.5	B	0.54	17.8	B	2.3				0.65	20.0	C	0.80	28.0	C	8.0				0.96	48.5	D	0.98	50.8	D	2.3		0.82	30.2	C	0.91	40.1	D	9.9	
	Overall		0.63	17.1	B	0.64	17.9	B	0.8				0.71	19.2	B	0.81	22.7	C	3.5				0.77	26.9	C	0.85	29.0	C	2.1		0.75	21.9	C	0.87	27.0	C	5.1	
North Bridge Street / Arthur Kill Road	WB	LR	0.47	18.1	B	0.47	18.1	B	0.0				0.62	20.6	C	0.62	20.6	C	0.0				0.91	28.0	C	0.91	28.0	C	0.0		0.86	25.8	C	0.86	25.8	C	0.0	
	NB	T	0.49	11.5	B	0.50	11.6	B	0.1				0.41	10.5	B	0.44	10.8	B	0.3				0.43	10.8	B	0.46	11.1	B	0.3		0.52	11.8	B	0.56	12.4	B	0.6	
	SB	T	0.33	9.7	A	0.34	9.7	A	0.0				0.48	10.8	B	0.50	11.1	B	0.3				0.58	11.4	B	0.60	11.7	B	0.3		0.52	10.8	B	0.55	11.2	B	0.4	
	Overall		0.48	12.8	B	0.49	12.9	B	0.1				0.53	13.8	B	0.55	13.9	B	0.1				0.71	17.5	B	0.73	17.5	B	0.0		0.66	16.4	B	0.68	16.5	B	0.1	
Richmond Valley Road / Arthur Kill Road	WB	LR	0.53	23.9	C	0.53	23.9	C	0.0				0.82	37.2	D	0.82	37.2	D	0.0				0.81	35.7	D	0.81	35.7	D	0.0		0.83	37.6	D	0.83	37.6	D	0.0	
	NB	TR	0.63	11.1	B	0.65	11.3	B	0.2				0.50	9.4	A	0.53	9.7	A	0.3				0.60	10.5	B	0.63	10.9	B	0.4		0.62	10.7	B	0.65	11.3	B	0.6	
	SB	LT	0.59	11.2	B	-	-	-	-				1.01	39.0	D	-	-	-	-				1.17	90.0	F	-	-	-	-		1.12	73.2	E	-	-	-	-	
		L	-	-	-	0.34	9.7	A	-				-	-	-	0.56	11.4	B	-				-	-	-	0.47	8.3	A	-		-	-	0.51	9.7	A	-		
		T	-	-	-	0.40	8.4	A	-				-	-	-	0.54	9.2	A	-				-	-	-	0.86	12.2	B	-		-	-	0.76	11.5	B	-		
	Overall		0.60	13.1	B	0.61	12.3	B	-0.8				0.95	28.3	C	0.64	15.3	B	-13.0				1.05	53.1	D	0.84	15.4	B	-37.7		1.03	43.8	D	0.78	15.7	B	-28.1	
Richmond Valley Road / Page Avenue	EB	LTR	0.31	22.8	C	0.31	22.8	C	0.0				0.73	32.8	C	0.73	32.8	C	0.0				0.59	27.0	C	0.59	27.0	C	0.0		0.58	26.8	C	0.58	26.8	C	0.0	
	WB	LTR	0.30	22.9	C	0.30	22.9	C	0.0				0.49	26.4	C	0.49	26.4	C	0.0				0.57	28.2	C	0.57	28.2	C	0.0		0.38	24.3	C	0.38	24.3	C	0.0	
	NB	L	0.14	10.5	B	0.14	10.5	B	0.0				0.26	12.3	B	0.27	12.5	B	0.2				0.21	11.7	B	0.21	11.9	B	0.2		0.46	15.1	B	0.48	15.6	B	0.5	
		TR	0.77	19.8	B	0.78	20.2	C	0.4				0.71	18.3	B	0.74	19.1	B	0.8				0.66	17.1	B	0.69	17.7	B	0.6		0.86	23.0	C	0.90	25.5	C	2.5	
	SB	LTR	0.48	14.1	B	0.49	14.3	B	0.2				0.67	18.4	B	0.71	19.7	B	1.3				0.74	20.4	C	0.78	22.2	C	1.8		0.56	15.2	B	0.62	16.3	B	1.1	
	Overall		0.59	18.5	B	0.60	18.7	B	0.2				0.72	21.3	C	0.74	22.0	C	0.7				0.68	21.1	C	0.71	21.9	C	0.8		0.75	20.7	C	0.78	22.0	C	1.3	
South Bridge Street / Page Avenue-Boscombe Avenue	EB	L	0.46	25.8	C	0.46	25.8	C	0.0				0.49	26.4	C	0.49	26.4	C	0.0				0.60	28.9	C	0.60	28.9	C	0.0		0.66	30.8	C	0.66	30.8	C	0.0	
	WB	R	0.12	10.9	B	0.12	10.9	B	0.0				0.15	11.1	B	0.15	11.2	B	0.1				0.15	12.1	B	0.15	12.3	B	0.2		0.09	10.7	B	0.09	10.8	B	0.1	
		T	0.37	11.5	B	0.38	11.6	B	0.1				0.38	11.6	B	0.39	11.8	B	0.2				0.38	11.4	B	0.38	11.5	B	0.1		0.41	11.9	B	0.43	12.0	B	0.1	
	SB	T	0.23	10.4	B	0.23	10.5	B	0.1				0.29	11.0	B	0.31	11.1	B	0.1				0.38	11.6	B	0.38	11.7	B	0.1		0.35	11.5	B	0.37	11.7	B	0.2	
Overall		*	13.9	B	*	14.0	B	0.0				*	14.0	B	*	14.0	B	0.0				*	15.2	B	15.2	B	0.0		*	15.5	B	*	15.5	B	0.0			
Veterans Road West / Bricktown Way-KWVP WB off-ramp	EB	L	0.21	22.9	C	0.31	24.7	C	1.8				0.52	31.8	C	0.76	43.9	F	12.0				0.47	28.4	C	0.47	28.4	C	7.4		0.53	31.3	C	0.95	72.6	E	41.3	yes
	WB	TR	0.50	26.5	C	0.50	26.5	C	0.0				0.50	26.6	C	0.47	24.6	C	-2.0				0.61	28.4	C	0.61	28.4	C	0.0		0.63	28.8	C	0.63	28.8	C	0.0	
		L	0.90	64.1	E	0.90	64.1	E	0.0				0.83	52.1	D	0.75	41.4	D	-10.7				1.11	118.2	F	1.11	118.2	F	0.0		1.24	167.2	F	1.24	167.2	F	0.0	
	NB	TR	0.40	24.1	C	0.40	24.1	C	0.0				0.50	25.4	C	0.47	23.6	C	-1.8				0.37	23.1	C	0.37	23.1	C	0.0		0.50	24.7	C	0.50	24.7	C	0.0	
		LTR	0.41	27.9	C	0.51	29.5	C	1.6				0.62	31.5	C	0.85	40.8	D	9.3				0.52	29.5	C	0.74	21.8	C	5.3		1.04	71.2	E	37.6	yes			
	SB	U-TURN	0.50	16.7	C	0.50	16.9	C	0.2				0.33	14.1	B	0.34	14.5	B	0.4				0.97	60.0	F	0.90	41.5	F	7.5		0.55	21.7	C	0.56	23.0	C	1.3	
		L	0.02	27.4	C	0.02	27.4	C	0.0				0.16	29.1	C	0.16	30.0	C	0.0				0.15	30.0	C	0.16	30.0	C	0.1		0.13	28.7	C	0.14	28.8	C	0.1	
	TR	0.20	29.7	C	0.28	31.1	C	1.4				0.28	30.3	C	0.39	39.0	D	9.0				0.26	30.5	C	0.52	31.8	D	5.3		0.61	37.8	D	0.92	62.9	E	25.1	yes	
Overall		*	29.1	C	*	29.5	C	0.5				*	29.4	C	32.0	32.0	D	3.0				*	31.1	D	31.5	D	13.4		*	45.4	D	*	60.9	E	15.5			
Veterans Road West / Tyrellan Avenue	EB	LTR	0.27	16.4	B	0.28	16.4	B	0.0				0.47	18.8	B	0.53	22.0	C																				

Table 4-2 (cont'd)  
Peak Hour Level-of-Service Analysis Results, Year 2015 Comparison of Future No-Action and Mitigated With-Action Traffic Conditions

Intersection	Approach	Movement	Weekday AM Peak Hour (8:00 to 9:00 AM)								Weekday Midday Peak Hour (12:00 to 1:00 PM)								Weekday PM Peak Hour (5:00 to 6:00 PM)								Saturday Midday Peak Hour (12:45 to 1:45 PM)								
			2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?	2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?	2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?	2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?	
			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c
SIGNALIZED INTERSECTIONS																																			
Bricktown Way / Veterans Road West	EB	L	0.14	15.3	B	0.21	15.9	B	0.6		0.30	16.9	B	0.49	19.7	B	2.8		0.30	16.8	B	0.49	19.7	B	2.9		0.51	19.6	B	0.77	27.1	C	7.5		
		R	0.00	14.0	B	0.00	14.0	B	0.0		0.04	14.4	B	0.04	14.4	B	0.0		0.04	14.4	B	0.04	14.4	B	0.0		0.06	14.5	B	0.06	14.5	B	0.0		
	NB	LT	0.07	7.3	A	0.07	7.3	A	0.0		0.14	7.7	A	0.14	7.7	A	0.0		0.17	7.9	A	0.17	7.9	A	0.0		0.17	7.9	A	0.18	7.9	A	0.0		
	SB	TR	0.34	8.9	A	0.37	9.1	A	0.2		0.48	9.9	A	0.55	10.6	B	0.7		0.37	9.1	A	0.43	9.6	A	0.5		0.56	10.4	B	0.65	11.4	B	1.0		
	Overall	0.27	9.2	A	0.31	9.7	A	0.5		0.41	10.4	B	0.53	11.8	B	1.4		0.34	10.0	A	0.46	11.2	B	1.2		0.54	11.6	B	0.69	14.3	B	2.7			
Englewood Avenue / Veterans Road West	EB	TR	0.01	10.2	B	0.01	10.2	B	0.0		0.01	10.2	B	0.01	10.2	B	0.0		0.01	10.2	B	0.01	10.2	B	0.0		0.01	10.2	B	0.00	9.7	A	-0.5		
		L	0.43	14.6	B	0.44	14.9	B	0.3		0.47	15.2	B	0.50	15.7	B	0.5		0.42	14.4	B	0.45	14.9	B	0.5		0.93	39.4	D	0.96	42.7	D	3.3		
	WB	LT	0.45	15.0	B	0.46	15.3	B	0.3		0.49	15.7	B	0.52	16.2	B	0.5		0.44	14.9	B	0.47	15.4	B	0.5		0.33	13.3	B	0.33	12.7	B	-0.6		
		L	0.01	10.3	B	0.01	10.3	B	0.0		0.00	10.2	B	0.00	10.2	B	0.0		0.01	10.3	B	0.01	10.3	B	0.0		0.02	10.3	B	0.02	11.0	B	0.7		
	NB	R	0.17	9.2	A	0.21	9.3	A	0.1		0.37	10.5	B	0.47	11.5	B	1.0		0.42	11.0	B	0.52	12.2	B	1.2		0.55	12.6	B	0.68	15.6	C	3.0		
		LTR	0.10	10.8	B	0.12	10.9	B	0.1		0.13	10.9	B	0.17	11.2	B	0.3		0.13	10.9	B	0.16	11.1	B	0.2		0.17	11.2	B	0.23	12.2	B	1.0		
Overall	*	12.6	B	*	12.7	B	0.1		*	12.9	B	*	13.3	B	0.4		*	12.4	B	*	12.9	B	0.6		*	11.5	B	*	24.5	C	*	26.0	C	1.5	
Englewood Avenue / Veterans Road East	EB	LT	0.29	15.5	B	0.33	15.9	B	0.4		0.52	19.0	B	0.62	21.2	C	2.2		0.68	23.5	C	0.79	28.3	C	4.8		0.98	53.0	D	1.00	52.9	D	-0.1		
		R	0.05	13.1	B	0.07	13.3	B	0.2		0.11	13.6	B	0.17	14.1	B	0.5		0.12	13.7	B	0.19	14.3	B	0.6		0.17	14.1	B	0.23	12.8	B	-1.3		
	WB	LTR	0.11	13.6	B	0.11	13.6	B	0.0		0.09	13.4	B	0.09	13.4	B	0.0		0.13	13.8	B	0.13	13.8	B	0.0		0.16	14.1	B	0.14	11.9	B	-2.2		
		LTR	0.26	9.4	A	0.27	9.5	A	0.1		0.25	9.3	A	0.26	9.4	A	0.1		0.25	9.3	A	0.26	9.4	A	0.1		0.33	9.9	A	0.39	12.1	B	2.2		
	Overall	0.27	11.0	B	0.29	11.2	B	0.2		0.36	12.7	B	0.41	13.8	B	1.1		0.43	14.6	B	0.48	16.8	B	2.2		0.60	25.9	C	0.68	27.6	C	1.7			
Englewood Avenue / Bloomingdale Road	EB	LR	0.14	17.4	B	0.19	17.9	B	0.5		0.31	19.3	B	0.47	21.1	C	2.4		0.27	16.3	B	0.41	20.7	C	1.9		0.43	20.9	C	0.62	25.0	C	4.1		
		LT	0.39	8.3	A	0.39	8.3	A	0.0		0.31	7.6	A	0.31	7.6	A	0.0		0.50	9.0	A	0.50	9.2	A	0.0		0.40	8.3	A	0.40	8.3	A	0.0		
	SB	TR	0.52	9.4	A	0.52	9.4	A	0.0		0.34	7.7	A	0.34	7.7	A	0.0		0.40	9.0	A	0.40	9.0	A	0.0		0.39	8.2	A	0.39	8.2	A	0.0		
		Overall	0.40	9.5	A	0.41	9.7	A	0.2		0.33	9.5	A	0.38	10.9	B	0.4		0.47	10.0	B	0.47	10.8	B	0.7		0.41	10.5	B	0.47	12.3	B	1.8		
Sharrotts Road / Bloomingdale Road	EB	LR	0.26	15.8	B	0.26	15.8	B	0.0		0.27	15.9	B	0.27	15.9	B	0.0		0.40	18.0	B	0.40	18.7	B	0.0		0.47	18.4	B	0.47	18.4	B	0.0		
		LT	0.52	12.2	B	0.55	12.6	B	0.4		0.49	11.8	B	0.57	13.1	B	1.3		0.59	13.0	B	0.67	14.6	B	1.6		0.58	12.9	B	0.68	15.2	B	2.3		
	NB	TR	0.44	11.0	B	0.48	11.5	B	0.5		0.40	10.5	B	0.48	11.5	B	1.0		0.55	12.4	B	0.63	13.8	B	1.4		0.54	12.1	B	0.65	14.0	B	1.9		
		Overall	0.42	12.2	B	0.43	12.5	B	0.3		0.40	11.9	B	0.45	12.7	B	0.8		0.55	13.9	B	0.60	15.0	B	1.1		0.53	13.7	B	0.60	15.2	B	1.5		
Veterans Road East-Drumgoole Road West / Bloomingdale Road	EB	L	0.02	22.7	C	0.02	22.7	C	0.0		0.05	23.0	C	0.05	23.1	C	0.0		0.05	22.7	C	0.05	22.7	C	0.0		0.12	23.7	C	0.19	27.8	C	4.1		
		R	0.33	27.5	C	0.38	28.6	C	1.1		0.60	30.0	C	0.78	44.9	D	10.7		0.40	32.3	C	0.40	39.2	D	6.9		0.76	41.5	D	0.58	25.0	C	-16.5		
	WB	LTR	0.67	21.0	C	0.67	21.0	C	0.0		0.69	21.9	C	0.65	21.0	C	0.0		0.60	22.6	C	0.60	22.6	C	2.9		0.90	26.0	C	0.96	31.9	C	5.9		
		L	0.38	23.8	C	0.52	30.3	C	6.5		0.40	21.9	C	0.63	32.0	C	0.4		0.40	28.0	C	0.40	44.0	D	18.3		0.58	30.9	C	0.35	22.0	C	-8.9		
	NB	T	0.36	16.8	B	0.36	16.8	B	0.0		0.31	16.1	B	0.31	16.0	B	0.0		0.40	16.4	B	0.38	15.6	B	-0.9		0.38	16.9	B	0.32	13.4	B	-3.5		
		SB	TR	0.95	30.5	C	0.95	30.5	C	0.0		0.60	19.8	B	0.60	19.8	B	0.0		0.83	28.6	C	0.79	25.3	C	-3.3		0.66	20.7	C	0.88	36.6	D	15.9	
Overall	0.74	24.1	C	0.74	24.4	C	0.3		0.63	21.4	C	0.67	23.3	C	1.9		0.78	24.8	C	0.81	25.3	C	2.0		0.77	25.2	C	0.85	29.6	C	4.4				
South Service Road-Drumgoole Road East / Bloomingdale Road	EB	LTR	0.15	16.8	B	0.15	16.8	B	0.0		0.09	16.2	B	0.09	16.2	B	0.0		0.12	16.5	B	0.12	16.5	B	0.0		0.19	17.2	B	0.19	17.2	B	0.0		
		LTR	0.38	8.8	A	0.40	9.0	A	0.2		0.41	9.1	A	0.45	9.5	A	0.4		0.42	9.1	A	0.45	9.5	A	0.4		0.46	9.6	A	0.51	10.2	B	0.6		
	SB	L	0.57	11.0	B	0.58	11.3	B	0.3		0.44	10.0	A	0.46	10.0	B	0.4		0.62	12.1	B	0.60	12.9	B	0.8		0.67	14.0	B	0.71	15.8	B	1.8		
		TR	0.65	11.2	B	0.66	11.4	B	0.2		0.48	9.6	A	0.51	9.0	B	0.3		0.40	9.0	B	0.62	10.9	B	0.4		0.53	9.9	A	0.58	10.4	B	0.5		
	Overall	0.48	10.8	B	0.49	11.0	B	0.2		0.35	9.7	A	0.37	10.0	B	0.4		0.40	10.0	B	0.47	11.2	B	0.5		0.51	11.2	B	0.54	12.0	B	0.8			
Pleasant Plains Avenue-Amboy Road / Bloomingdale Road	EB	LTR	0.09	14.7	B	0.09	15.3	B	0.6		0.06	14.4	B	0.06	14.4	B	0.0		0.09	14.7	B	0.09	14.7	B	0.0		0.06	14.4	B	0.06	14.4	B	0.0		
		L	0.34	18.1	B	0.35	18.8	B	0.7		0.56	21.9	C	0.60	21.9	C	0.0		0.50	21.4	C	0.53	21.4	C	0.0		0.54	21.6	C	0.54	21.6	C	0.0		
	WB	T	0.02	14.1	B	0.02	14.7	B	0.6		0.04	14.2	B	0.04	14.2	B	0.0		0.04	14.2	B	0.04	14.2	B	0.0		0.02	14.1	B	0.02	14.1	B	0.0		
		R	0.20	16.0	B	0.21	16.7	B	0.7		0.21	16.1	B	0.21	16.1	B	0.0		0.21	16.0	B	0.21	16.0	B	0.0		0.19	15.8	B	0.19	15.8	B	0.0		
	NB	LTR	0.48	19.7	B	0.49	19.2	B	-0.5		0.68																								

4.0 MITIGATION MEASURES

Table 4-2 (cont'd)  
Peak Hour Level-of-Service Analysis Results, Year 2015 Comparison of Future No-Action and Mitigated With-Action Traffic Conditions

Intersection	Approach	Movement	Weekday AM Peak Hour (8:00 to 9:00 AM)								Weekday Midday Peak Hour (12:00 to 1:00 PM)								Weekday PM Peak Hour (5:00 to 6:00 PM)								Saturday Midday Peak Hour (12:45 to 1:45 PM)							
			2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?	2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?	2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?	2015 No-Action			2015 Mitigated-Action			Change in Delay	Impact?
			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS		
UNSIGNALIZED INTERSECTIONS																																		
Sharrots Road / Arthur Kill Road	EB	LTR	0.06	13.3	B	0.06	13.6	B	0.3		0.21	14.6	B	0.22	14.7	C	1.1		0.25	18.2	C	0.27	20.1	C	1.9		0.46	20.1	C	0.51	23.6	C	3.5	
	WB	LTR	0.20	13.9	B	0.20	14.3	B	0.4		0.22	16.7	C	0.24	16.2	C	1.5		0.36	19.8	C	0.40	23.6	C	2.8		0.38	19.8	C	0.43	23.4	C	3.6	
	NB	LTR	0.02	7.9	A	0.02	8.0	A	0.1		0.03	7.9	A	0.03	8.0	A	0.1		0.03	8.0	A	0.03	8.0	A	0.1		0.01	7.8	A	0.01	8.0	A	0.2	
	SB	LTR	0.03	7.9	A	0.03	7.9	A	0.0		0.03	8.1	A	0.03	8.1	A	0.1		0.06	8.0	A	0.06	8.2	A	0.1		0.02	7.9	A	0.03	8.0	A	0.1	
Englewood Avenue / Arthur Kill Road	WB	LR	0.05	10.5	B	0.05	10.6	B	0.1		0.12	13.4	B	0.13	14.1	B	0.7		0.16	13.4	B	0.17	14.2	B	0.8		0.06	11.2	B	0.06	11.8	B	0.6	
	SB	LT	0.02	7.9	A	0.02	8.0	A	0.1		0.02	8.1	A	0.02	8.2	A	0.1		0.01	8.0	A	0.01	8.1	A	0.1		0.01	7.9	A	0.01	8.0	A	0.1	
South Bridge Street / Arthur Kill Road	SB	LT	0.17	10.4	B	0.17	10.5	B	0.1		0.18	10.0	B	0.19	10.2	B	0.2		0.26	11.0	B	0.26	11.1	B	0.1		0.24	11.0	B	0.25	11.3	B	0.3	
Bricktown Way / Tyrellan Avenue	EB	LT	0.04	7.9	A	0.12	9.2	A	1.3		0.07	8.8	A	0.35	14.3	B	5.5		0.08	8.3	A	0.33	12.9	B	4.7		0.16	9.0	A	0.60	21.7	C	12.8	
		TR	0.07	7.7	A	0.09	8.2	A	0.5		0.12	8.8	A	0.23	11.7	B	2.8		0.12	8.2	A	0.22	10.7	B	2.5		0.21	9.1	A	0.39	14.8	B	5.6	
	WB	LT	0.09	8.2	A	0.11	8.7	A	0.5		0.28	10.0	B	0.3	11.3	B	3.8		0.33	10.5	B	0.3	11.5	B	4.0		0.32	10.7	B	0.48	17.9	C	7.2	
		TR	0.03	7.5	A	0.10	7.8	A	0.3		0.07	7.4	A	0.2	11.0	B	3.0		0.10	8.1	A	0.9	11.0	B	2.9		0.14	8.7	A	0.49	16.9	C	8.1	
	NB	LT	0.01	7.7	A	0.05	8.6	A	1.0		0.07	7.4	A	0.2	10.0	B	3.0		0.14	8.1	A	0.9	11.0	B	2.7		0.09	9.0	A	0.31	14.9	B	5.9	
		R	0.03	6.9	A	0.03	7.5	A	0.6		0.06	7.5	A	0.09	9.6	A	2.1		0.11	7.9	A	0.12	9.8	A	2.0		0.13	8.3	A	0.21	12.2	B	3.9	
	SB	LT	-	-	-	0.08	8.7	A	-		-	-	-	0.35	13.3	B	-		-	-	-	0.34	13.0	B	-		-	-	-	0.58	21.0	C	-	
		TR	-	-	-	0.06	8.1	A	-		-	-	-	0.29	11.7	B	-		-	-	-	0.28	11.5	B	-		-	-	-	0.49	16.9	C	-	
Sharrots Road / Veterans Road West	EB	TR	0.12	8.3	A	0.12	8.4	A	0.1		0.12	8.2	A	0.12	8.4	A	0.2		0.21	8.6	A	0.22	8.8	A	0.2		0.18	8.5	A	0.19	8.7	A	0.2	
	WB	LT	0.24	8.9	A	0.29	9.4	A	0.4		0.27	9.0	A	0.09	10.0	B	1.1		0.32	9.0	A	0.43	11.2	B	1.4		0.34	10.1	B	0.49	12.2	B	2.1	
	SB	LT	0.07	8.0	A	0.07	8.1	A	0.1		0.11	8.0	A	0.12	8.0	A	0.1		0.10	8.5	A	0.10	8.8	A	0.3		0.11	8.5	A	0.12	8.9	A	0.4	
TR		0.09	7.8	A	0.09	7.9	A	0.1		0.09	7.8	A	0.09	8.1	A	0.1		0.10	8.2	A	0.10	8.4	A	0.3		0.12	8.3	A	0.12	8.7	A	0.4		
Sharrots Road / Veterans Road East	EB	LT	0.11	8.3	A	0.11	8.4	A	0.1		0.13	8.0	A	0.13	8.8	A	0.1		0.21	8.2	A	0.22	9.5	A	0.2		0.17	8.9	A	0.17	9.2	A	0.3	
	WB	TR	0.18	8.4	A	0.22	8.7	A	0.3		0.24	8.9	A	0.35	10.0	A	1.1		0.26	9.5	A	0.38	10.7	B	1.3		0.29	9.6	A	0.45	11.5	B	1.9	
	NB	LT	0.12	8.2	A	0.12	8.3	A	0.1		0.10	8.3	A	0.11	8.5	A	0.3		0.15	8.8	A	0.16	9.1	A	0.3		0.14	8.7	A	0.15	9.1	A	0.4	
		TR	0.09	7.5	A	0.09	7.6	A	0.1		0.15	7.9	A	0.16	8.2	A	0.3		0.23	8.6	A	0.24	9.0	A	0.4		0.24	8.7	A	0.25	9.2	A	0.5	

Notes:  
v/c = volume-to-capacity ratio; LOS = Level-of-Service  
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; SEB = Southeastbound  
L = Left-Turn; T = Through; R = Right-Turn;  
LT = Left-Turn/Through; TR = Through/Right-Turn; LR = Left-Turn/Right-Turn; LTR = Left-Turn/Through/Right-Turn  
Average Control Delay shown in units of seconds/vehicle  
- = No volumes for this approach or movement.

Table 4-3  
Peak Hour Level of Service Analysis Results, Year 2020 Comparison of Future No-Action and Mitigated With-Action Traffic Conditions

Intersection	Approach	Movement	Weekday AM Peak Hour (8:00 to 9:00 AM)										Weekday Midday Peak Hour (12:00 to 1:00 PM)										Weekday PM Peak Hour (5:00 to 6:00 PM)										Saturday Midday Peak Hour (12:45 to 1:45 PM)									
			2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?	2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?	2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?	2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?								
			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS					
SIGNALIZED INTERSECTIONS																																										
Allentown Lane-Veterans Rd West / Arthur Kill Road	EB	LTR	0.02	10.3	B	0.02	10.3	B	0.0		0.04	10.5	B	0.04	10.5	B	0.0		0.02	10.4	B	0.02	10.4	B	0.0		0.02	10.4	B	0.02	10.4	B	0.0									
	WB	LT	0.43	14.7	B	0.44	15.0	B	0.3		0.54	16.8	B	0.59	17.9	B	1.1		0.68	20.8	C	0.74	23.1	C	2.3		0.70	20.5	C	0.76	23.2	C	2.7		0.76	23.3	C	0.88	31.7	C	8.4	
		R	0.61	18.7	B	0.51	16.3	B	-2.4		0.82	27.6	C	0.84	29.1	C	1.5		0.61	18.7	B	0.70	21.5	C	2.8		0.76	23.3	C	0.88	31.7	C	8.4		0.83	24.9	C	-	-	-	-	
	NB	LTR	0.75	21.3	C	-	-	-	-		0.63	17.7	B	-	-	-	-		0.68	18.9	B	-	-	-	-		0.83	24.9	C	-	-	-	-		-	-	-	-	-			
		LT	-	-	-	0.34	13.1	B	-		-	-	-	0.27	12.4	B	-		-	-	-	0.27	12.3	B	-		-	-	-	0.33	12.8	B	-		-	-	-	-	-			
	R	-	-	-	0.59	17.3	B	-		-	-	-	0.49	15.4	B	-		-	-	-	0.55	16.4	B	-		-	-	-	-	0.69	19.4	B	-		-	-	-	-	-			
		LTR	0.60	20.1	C	-	-	-	-		0.78	26.7	C	-	-	-	-		1.16	113.5	F	-	-	-	-		1.07	81.6	F	-	-	-	-		-	-	-	-	-			
	SB	L	-	-	-	0.34	14.1	B	-		-	-	-	0.62	20.1	C	-		-	-	-	0.77	27.1	C	-		-	-	-	0.76	26.7	C	-		-	-	-	-	-			
		TR	-	-	-	0.29	12.7	B	-		-	-	-	0.32	13.0	B	-		-	-	-	0.43	14.4	B	-		-	-	-	0.34	13.2	B	-		-	-	-	-	-			
	Overall		0.68	19.2	B	0.55	15.0	B	-4.2		0.80	22.3	C	0.73	19.2	B	-3.1		0.92	47.8	D	0.75	19.7	B	-28.1		0.91	36.6	D	0.82	22.4	C	-14.2		-	-	-	-	-	-		
North Bridge Street / Arthur Kill Road	WB	LR	0.49	18.4	B	0.49	18.4	B	0.0		0.64	21.1	C	0.64	21.1	C	0.0		0.95	31.3	C	0.95	31.3	C	0.0		0.89	27.9	C	0.89	27.9	C	0.0		0.89	27.9	C	0.0				
	NB	T	0.54	12.1	B	0.61	13.4	B	1.3		0.45	11.0	B	0.49	11.5	B	0.5		0.49	11.5	B	0.54	12.1	B	0.6		0.59	12.9	B	0.66	14.0	B	1.1		0.58	11.5	B	0.63	12.1	B	0.6	
	SB	T	0.35	9.9	A	0.42	10.5	B	0.6		0.52	11.3	B	0.56	11.8	B	0.5		0.64	12.2	B	0.69	12.8	B	0.6		0.58	11.5	B	0.63	12.1	B	0.6		0.71	17.4	B	0.75	17.7	B	0.3	
	Overall		0.52	13.2	B	0.56	13.7	B	0.5		0.56	14.2	B	0.59	14.4	B	0.2		0.76	18.9	B	0.79	19.0	B	0.1		0.71	17.4	B	0.75	17.7	B	0.3		-	-	-	-	-	-		
Richmond Valley Road / Arthur Kill Road	WB	LR	0.61	26.1	C	0.67	28.6	C	2.5		0.89	45.0	D	0.90	46.4	D	1.4		0.91	46.6	D	0.93	49.9	D	3.3		0.93	51.2	D	0.94	53.1	D	1.9		0.67	11.5	B	0.72	12.6	B	1.1	
	NB	TR	0.67	11.7	B	0.71	12.6	B	0.9		0.53	9.7	A	0.57	10.3	B	0.6		0.64	11.2	B	0.68	11.9	B	0.7		0.67	11.5	B	0.72	12.6	B	1.1		1.38	184.7	F	-	-	-	-	-
		LT	0.68	13.5	B	-	-	-	-		1.14	87.9	F	-	-	-	-		1.42	202.6	F	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-			
	SB	L	-	-	-	0.52	13.9	B	-		-	-	-	0.65	13.8	B	-		-	-	-	0.63	10.1	B	-		-	-	-	0.69	13.4	B	-		-	-	-	-	-			
		T	-	-	-	0.45	8.9	A	-		-	-	-	0.58	9.7	A	-		-	-	-	0.92	14.3	B	-		-	-	-	0.83	12.9	B	-		-	-	-	-	-			
	Overall		0.66	14.7	B	0.70	14.4	B	-0.3		1.06	51.8	D	0.73	17.9	B	-33.9		1.26	109.7	F	0.93	19.2	B	-90.5		1.23	97.2	F	0.86	19.7	B	-77.5		-	-	-	-	-	-		
Richmond Valley Road / Page Avenue	EB	LTR	0.35	23.4	C	0.38	23.9	C	0.5		0.81	37.2	D	0.81	37.2	D	0.0		0.69	29.9	C	0.70	30.1	C	0.2		0.70	29.9	C	0.70	30.1	C	0.2		0.50	26.6	C	0.50	26.6	C	0.0	
	WB	LTR	0.38	24.1	C	0.38	24.1	C	0.0		0.55	27.9	C	0.55	27.9	C	0.0		0.66	31.1	C	0.66	31.1	C	0.0		0.50	26.6	C	0.50	26.6	C	0.0		0.60	18.8	B	0.65	21.1	C	2.3	
	NB	L	0.18	11.0	B	0.24	11.7	B	0.7		0.33	13.4	B	0.35	13.9	B	0.5		0.31	13.5	B	0.35	14.4	B	0.9		0.60	18.8	B	0.65	21.1	C	2.3		0.89	25.2	C	0.94	30.4	C	5.2	
		TR	0.80	20.8	C	0.82	21.5	C	0.7		0.78	19.1	C	0.82	20.3	C	1.8		0.69	17.8	B	0.72	18.8	B	1.0		0.89	25.2	C	0.94	30.4	C	5.2		0.77	21.3	C	0.86	27.3	C	6.0	
	SB	LTR	0.55	15.5	B	0.57	15.9	B	0.4		0.78	19.1	C	0.82	20.3	C	3.5		0.88	28.8	C	0.94	37.6	D	8.8		0.77	21.3	C	0.86	27.3	C	6.0		0.82	24.4	C	0.85	28.4	C	4.0	
	Overall		0.64	19.6	B	0.65	20.0	B	0.4		0.79	19.9	C	0.82	20.3	C	1.8		0.71	24.6	C	0.73	28.7	C	3.4		0.82	24.4	C	0.85	28.4	C	4.0		-	-	-	-	-	-		
South Bridge Street / Page Avenue-Boscombe Avenue	EB	L	0.47	26.1	C	0.47	26.1	C	0.0		0.50	27.7	C	0.52	26.7	C	0.0		0.62	29.4	C	0.62	29.4	C	0.0		0.68	31.5	C	0.68	31.5	C	0.0		0.10	10.9	B	0.10	11.1	B	0.2	
	NB	R	0.40	11.8	B	0.12	11.1	B	-0.7		0.16	11.3	B	0.17	11.5	B	0.2		0.05	12.5	B	0.16	12.8	B	0.3		0.10	10.9	B	0.10	11.1	B	0.2		0.44	12.2	B	0.47	12.4	B	0.2	
		T	0.12	11.0	B	0.40	11.8	B	0.8		0.16	11.8	B	0.17	11.5	B	0.2		0.05	12.5	B	0.16	12.8	B	0.3		0.44	12.2	B	0.47	12.4	B	0.2		0.38	11.8	B	0.40	12.0	B	0.2	
	SB	T	0.24	10.5	B	0.25	10.6	B	0.1		0.31	11.2	B	0.33	11.4	B	0.2		0.38	11.8	B	0.40	12.0	B	0.2		0.38	11.8	B	0.40	12.0	B	0.2		-	-	-	-	-	-		
	Overall		*	13.7	B	*	14.1	B	0.4		*	14.1	B	*	14.2	B	0.1		*	15.4	B	*	15.4	B	0.0		*	15.8	B	*	15.8	B	0.0		-	-	-	-	-	-		
Veterans Road West / Bricktown Way-KWVP WB off-ramp	EB	L	0.24	23.5	C	0.28	22.7	C	-0.8		0.60	36.3	D	0.76	43.4	D	7.1		0.52	29.7	C	0.77	42.0	D	12.3		0.66	39.5	D	1.18	147.3	F	107.8		yes							
		TR	0.53	26.9	C	0.54	25.8	C	-1.1		0.52	27.0	C	0.66	28.3	C	1.3		0.63	29.0	C	0.87	36.1	D	7.1		0.65	29.4	C	0.89	41.8	D	12.4		yes							
	WB	L	0.97	80.0	F	0.96	76.8	E	-3.2		0.90	62.9	E	1.16	141.8	F	78.9	yes	1.15	132.7	F	1.1	132.7	F	0.0		1.35	210.9	F	2.93	921.8	F	710.9		yes							
		LTR	0.44	24.7	C	0.36	22.3	C	-2.4		0.35	26.2	C	0.35	27.5	C	1.2		0.3	23.9	C	0.66	23.9	C	0.0		0.58	25.0	C	0.58	26.1	C	1.1		0.97	54.0	D	1.45	242.8	F	188.8	yes
	NB	U-TURN	0.54	30.0	C	0.69	33.4	C	3.4		0.65	35.5	D	0.71	42.0	F	56.2	yes	0.73	34.0	C	1.1	44.8	E	40.5	yes	0.97	54.0	D	1.45	242.8	F	188.8		yes							
		L	0.27	30.6	C	0.30	32.8	C	2.2		0.45																															

Table 4-3 (cont'd)  
Peak Hour Level of Service Analysis Results, Year 2020 Comparison of Future No-Action and Mitigated With-Action Traffic Conditions

Intersection	Approach	Movement	Weekday AM Peak Hour (8:00 to 9:00 AM)								Weekday Midday Peak Hour (12:00 to 1:00 PM)								Weekday PM Peak Hour (5:00 to 6:00 PM)								Saturday Midday Peak Hour (12:45 to 1:45 PM)								
			2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?	2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?	2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?	2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?	
			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c
SIGNALIZED INTERSECTIONS																																			
Bricktown Way / Veterans Road West	EB	L	0.19	15.7	B	0.25	16.4	B	0.7		0.37	17.8	B	0.56	21.1	C	3.3		0.41	18.3	B	0.60	22.1	C	3.8			0.64	22.4	C	0.90	37.0	D	14.6	
		R	0.00	14.0	B	0.00	14.0	B	0.0		0.05	14.4	B	0.05	14.4	B	0.0		0.04	14.4	B	0.04	14.4	B	0.0			0.06	14.5	B	0.06	14.5	B	0.0	
	NB	LT	0.07	7.3	A	0.07	7.3	A	0.0		0.14	7.7	A	0.15	7.8	A	0.1		0.17	7.9	A	0.17	7.9	A	0.0			0.18	8.0	A	0.19	8.0	A	0.0	
	SB	TR	0.38	9.1	A	0.37	9.1	A	0.0		0.52	10.2	B	0.56	10.7	B	0.5		0.42	9.5	A	0.46	9.9	A	0.4			0.62	11.0	B	0.69	11.9	B	0.9	
	Overall		0.31	9.6	A	0.32	9.9	A	0.3		0.46	10.9	B	0.56	12.2	B	1.3		0.41	10.6	B	0.52	12.2	B	1.6			0.63	12.8	B	0.77	17.3	B	4.5	
Englewood Avenue / Veterans Road West	EB	TR	0.01	10.2	B	0.29	9.5	A	-0.7		0.01	10.2	B	0.17	9.1	A	-1.1		0.01	10.2	B	0.17	10.2	B	0.0			0.01	10.2	B	0.15	15.2	B	5.0	
	WB	L	0.44	14.8	B	0.93	39.2	D	24.4		0.49	15.5	B	0.94	37.9	D	22.4		0.43	14.7	B	0.94	40.0	D	25.3			0.96	45.2	D	1.01	49.3	D	4.1	
		T	0.46	15.3	B	0.25	9.2	A	-6.1		0.51	16.0	B	0.09	8.6	A	-7.4		0.45	15.1	B	0.10	9.7	A	-5.4			0.34	13.4	B	0.10	7.6	A	-5.8	
	NB	L	0.01	10.3	B	0.01	13.5	B	3.2		0.00	10.2	B	0.00	12.7	B	2.5		0.01	10.3	B	0.02	11.6	B	1.3			0.02	10.4	B	0.03	14.4	B	4.0	
		R	0.20	9.3	A	0.32	12.1	B	2.8		0.41	10.9	B	0.57	13.8	B	2.9		0.49	11.7	B	0.67	16.6	C	4.9			0.63	14.1	B	0.86	27.3	D	13.2	
	SB	LTR	0.13	10.9	B	0.22	14.7	B	3.8		0.16	11.1	B	0.26	14.3	B	3.2		0.16	11.1	B	0.23	12.8	B	1.7			0.21	11.4	B	0.38	16.6	B	5.2	
	Overall		*	12.6	B	*	20.0	C	7.4		*	13.1	B	*	22.3	C	9.2		*	12.7	B	*	22.1	C	9.4			*	26.6	C	*	31.0	C	4.4	
Englewood Avenue / Veterans Road East	EB	LT	0.34	16.1	B	0.59	20.4	C	4.3		0.58	20.3	C	0.74	25.2	C	4.9		0.78	28.2	C	0.93	41.7	D	13.5			1.12	94.5	F	1.12	89.9	F	-4.6	
		R	0.05	13.1	B	0.30	15.6	B	2.5		0.2	13.7	B	0.22	14.6	B	0.9		0.13	13.8	B	0.25	14.2	B	0.4			0.18	14.2	B	0.28	12.0	B	-2.2	
	WB	LTR	0.11	13.6	B	0.18	14.3	B	0.7		0.09	14.4	B	0.12	13.7	B	0.3		0.14	13.8	B	0.17	13.5	B	-0.4			0.17	14.1	B	0.18	11.0	B	-3.1	
	NB	LTR	0.27	9.5	A	0.34	10.0	A	0.5		0.6	9.4	A	0.28	9.6	A	0.2		0.26	9.4	A	0.30	10.3	B	0.9			0.34	10.0	A	0.46	14.0	B	4.0	
	Overall		0.30	11.3	B	0.45	13.6	B	2.3		0.09	13.3	B	0.47	16.8	B	2.3		0.48	16.8	B	0.58	22.7	C	5.9			0.67	43.1	D	0.80	43.8	D	0.7	
Englewood Avenue / Bloomingdale Road	EB	LR	0.19	17.9	B	0.57	23.9	C	6.0		0.39	20.4	C	0.63	25.6	C	5.2		0.38	20.3	C	0.62	25.3	C	5.0			0.56	23.6	C	0.86	38.4	D	14.8	
	NB	LT	0.41	8.5	A	0.41	8.5	A	0.0		0.32	7.7	A	0.32	7.7	A	0.0		0.52	9.5	A	0.52	9.5	A	0.0			0.41	8.4	A	0.41	8.4	A	0.0	
	SB	TR	0.54	9.6	A	0.58	10.2	B	0.6		0.35	7.9	A	0.37	8.0	A	0.1		0.50	9.3	A	0.52	9.5	A	0.2			0.41	8.3	A	0.44	8.6	A	0.3	
	Overall		0.43	9.9	A	0.57	12.4	B	2.5		0.37	10.2	B	0.45	12.7	B	2.5		0.45	10.3	B	0.55	12.6	B	1.8			0.46	11.7	B	0.57	17.3	B	5.6	
Sharrotts Road / Bloomingdale Road	EB	LR	0.27	16.0	B	0.27	16.0	B	0.0		0.28	16.0	B	0.28	16.0	B	0.0		0.5	19.0	B	0.51	19.0	B	0.0			0.48	18.6	B	0.48	18.6	B	0.0	
	NB	LT	0.57	13.0	B	0.75	17.6	B	4.6		0.53	2.6	B	0.67	15.2	B	2.6		0.6	14.6	B	0.81	19.2	B	4.6			0.67	14.8	B	0.91	28.4	C	13.6	
	SB	TR	0.50	11.8	B	0.62	13.9	B	2.1		0.45	11.1	B	0.57	12.3	B	1.7		0.64	13.5	B	0.76	17.2	B	3.3			0.63	13.7	B	0.80	18.5	B	4.8	
	Overall		0.45	12.9	B	0.56	15.8	B	2.9		0.44	12.5	B	0.52	14.2	B	1.7		0.64	15.2	B	0.69	18.3	B	3.1			0.59	15.0	B	0.74	22.4	C	7.4	
Veterans Road East-Drumgoole Road West / Bloomingdale Road	EB	L	0.02	22.7	C	0.01	21.0	C	-1.7		0.06	23.1	C	0.05	21.3	C	-1.8		0.02	22.7	C	0.02	21.8	C	-0.9			0.12	23.7	C	0.08	19.9	B	-3.8	
		R	0.34	27.7	C	0.39	17.4	B	-10.3		0.63	35.3	D	0.74	37.5	D	2.2		0.57	33.1	C	0.76	41.5	D	8.4			0.79	43.3	D	0.83	38.6	D	-4.7	
	WB	LTR	0.69	21.4	C	0.85	27.5	C	6.1		0.71	21.7	C	0.81	25.7	C	4.0		0.88	25.0	C	0.95	31.1	C	6.1			0.94	28.7	C	1.01	41.2	D	12.5	
	NB	L	0.39	24.2	C	0.25	20.7	C	-3.5		0.44	23.7	C	0.44	20.2	C	-3.5		0.47	27.1	C	0.50	23.2	C	-3.9			0.64	36.4	D	0.76	39.6	D	3.2	
		T	0.39	17.2	B	0.39	17.2	B	0.0		0.32	16.3	B	0.32	16.3	B	0.0		0.37	16.7	B	0.37	16.7	B	0.0			0.40	17.2	B	0.47	20.5	C	3.3	
	SB	TR	0.99	36.5	D	0.98	38.1	D	1.6		0.62	28.3	C	0.37	15.9	B	-4.2		0.87	34.4	C	0.51	17.5	B	-13.9			0.69	21.4	C	0.48	19.1	B	-2.3	
	Overall		0.76	26.4	C	0.69	28.3	C	1.9		0.66	29.9	C	0.63	23.4	C	1.5		0.82	26.4	C	0.72	26.7	C	0.3			0.80	27.2	C	0.86	34.1	C	6.9	
South Service Road-Drumgoole Road East / Bloomingdale Road	EB	LTR	0.16	16.9	B	0.16	16.9	B	0.0		0.10	16.3	B	0.10	16.3	B	0.0		0.13	16.5	B	0.13	16.5	B	0.0			0.20	17.3	B	0.20	17.3	B	0.0	
	NB	LTR	0.41	9.2	A	0.47	9.8	A	0.6		0.43	9.3	A	0.49	10.0	A	0.7		0.44	9.4	A	0.50	10.1	B	0.7			0.49	9.9	A	0.56	11.0	B	1.1	
		L	0.61	11.9	B	0.83	19.5	B	7.6		0.47	10.4	B	0.52	11.5	B	1.1		0.66	13.1	B	0.74	15.7	B	2.6			0.71	15.6	B	0.82	21.3	C	5.7	
	SB	TR	0.67	11.6	B	0.72	12.6	B	1.0		0.50	9.8	A	0.55	10.4	B	0.6		0.62	11.0	B	0.68	11.8	B	0.8			0.56	10.2	B	0.63	11.1	B	0.9	
		Overall		0.50	11.3	B	0.60	13.8	B	2.5		0.37	10.0	A	0.40	10.7	B	0.7		0.48	11.2	B	0.53	12.3	B	1.1			0.54	11.8	B	0.61	13.7	B	1.9
Pleasant Plains Avenue-Amboy Road / Bloomingdale Road	EB	LTR	0.09	14.8	B	0.10	16.6	B	1.8		0.06	14.5	B	0.06	14.5	B	0.0		0.09	14.7	B	0.09	15.3	B	0.6			0.06	14.5	B	0.07	15.1	B	0.6	
	WB	L	0.36	18.2	B	0.39	20.7	C	2.5		0.58	22.4	C																						

Table 4-3 (cont'd)  
Peak Hour Level-of-Service Analysis Results, Year 2020 Comparison of Future No-Action and Mitigated With-Action Traffic Conditions

Intersection	Approach	Movement	Weekday AM Peak Hour (8:00 to 9:00 AM)								Weekday Midday Peak Hour (12:00 to 1:00 PM)								Weekday PM Peak Hour (5:00 to 6:00 PM)								Saturday Midday Peak Hour (12:45 to 1:45 PM)							
			2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?	2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?	2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?	2020 No-Action			2020 Mitigated-Action			Change in Delay	Impact?
			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS			v/c	Average Control Delay	LOS	v/c	Average Control Delay	LOS		
UNSIGNALIZED INTERSECTIONS																																		
Sharrots Road / Arthur Kill Road	EB	LTR	0.07	13.9	B	0.09	16.6	C	2.7		0.23	15.5	C	0.26	17.5	C	2.0		0.29	20.7	C	0.34	25.4	D	4.7		0.54	24.5	C	0.65	34.9	D	10.4	yes
	WB	LTR	0.22	14.9	B	0.22	16.9	C	2.0		0.24	18.1	C	0.24	19.5	C	1.4		0.42	24.7	C	0.43	28.2	D	3.5		0.45	24.2	C	0.50	30.2	D	6.0	yes
	NB	LTR	0.03	8.0	A	0.03	8.3	A	0.3		0.03	8.0	A	0.04	8.1	A	0.1		0.03	8.0	A	0.03	8.2	A	0.2		0.01	8.0	A	0.01	8.2	A	0.2	
	SB	LTR	0.03	7.9	A	0.03	8.0	A	0.1		0.03	8.1	A	0.03	8.3	A	0.2		0.06	8.2	A	0.06	8.4	A	0.2		0.03	8.0	A	0.03	8.1	A	0.1	
Englewood Avenue / Arthur Kill Road	WB	LR	0.05	10.8	B	-	-	-	-		0.13	14.0	B	-	-	-	-		0.17	14.3	B	-	-	-	-		0.40	19.1	C	-	-	-	-	
		L	-	-	-	0.63	33.9	D	-		-	-	-	0.45	23.2	C	-		-	-	-	0.57	32.8	D	-		-	-	-	0.50	27.7	D	-	
		R	-	-	-	0.08	10.3	B	-		-	-	-	0.09	10.6	B	-		-	-	-	0.07	11.3	B	-		-	-	-	0.04	10.6	B	-	
	SB	LT	0.02	8.0	A	0.11	8.5	A	0.5		0.02	8.2	A	0.03	8.4	A	0.2		0.04	8.1	A	0.04	8.5	A	0.4		0.01	8.0	A	0.03	8.3	A	0.3	
South Bridge Street / Arthur Kill Road	SB	LT	0.18	10.8	B	0.19	11.2	B	0.4		0.19	10.3	B	0.09	10.6	B	0.3		0.29	11.5	B	0.30	11.9	B	0.4		0.27	11.7	B	0.28	12.2	B	0.5	
Bricktown Way / Tyrellan Avenue	EB	LT	0.05	8.0	A	0.14	9.3	A	1.3		0.10	9.1	A	0.39	15.0	C	5.9		0.12	8.7	A	0.39	14.4	B	5.7		0.22	9.6	A	0.72	29.5	D	19.9	
		TR	0.08	7.9	A	0.11	8.4	A	0.5		0.15	9.2	A	0.27	12.3	B	3.1		0.16	8.7	A	0.29	11.9	B	3.2		0.27	9.9	A	0.48	17.5	C	7.6	
	WB	LT	0.12	8.3	A	0.14	8.9	A	0.6		0.32	10.5	B	0.42	14.7	B	4.2		0.39	11.3	B	0.52	16.8	C	5.6		0.39	11.8	B	0.60	22.3	C	10.5	
		TR	0.06	7.7	A	0.13	8.2	A	0.5		0.10	8.2	A	0.31	11.6	B	3.4		0.14	8.5	A	0.35	12.4	B	3.9		0.20	9.3	A	0.60	21.0	C	11.7	
	NB	LT	0.02	7.8	A	0.05	8.8	A	1.0		0.07	8.7	A	0.22	12.3	B	3.6		0.03	8.5	A	0.15	11.5	B	3.0		0.10	9.4	A	0.33	16.0	C	6.6	
		R	0.03	7.0	A	0.03	7.7	A	0.7		0.06	7.7	A	0.09	9.9	A	2.1		0.11	8.1	A	0.11	10.7	B	2.5		0.14	8.8	A	0.23	13.1	B	4.3	
	SB	LT	-	-	-	0.07	8.8	A	-		-	-	-	0.34	13.3	B	-		-	-	-	0.35	13.9	B	-		-	-	-	0.61	23.4	C	-	
		TR	-	-	-	0.06	8.2	A	-		-	-	-	0.28	11.8	B	-		-	-	-	0.29	11.8	B	-		-	-	-	0.51	18.5	C	-	
Sharrots Road / Veterans Road West	EB	TR	0.13	8.4	A	0.13	8.6	A	0.2		0.08	8.4	A	0.13	8.6	A	0.2		0.23	8.9	A	0.24	9.1	A	0.3		0.20	9.0	A	0.20	9.0	A	0.0	
	WB	LT	0.30	9.5	A	0.41	10.7	B	1.2		0.34	9.9	A	0.46	11.9	B	2.0		0.42	11.1	B	0.57	13.7	B	2.7		0.64	16.0	C	0.64	16.0	C	0.0	
	SB	LT	0.07	8.2	A	0.09	8.5	A	0.3		0.12	8.5	A	0.13	8.9	A	0.4		0.11	8.8	A	0.12	9.2	A	0.4		0.14	9.4	A	0.14	9.4	A	0.0	
		TR	0.09	8.0	A	0.09	8.3	A	0.3		0.09	8.1	A	0.09	8.4	A	0.4		0.11	8.5	A	0.10	8.9	A	0.4		0.13	9.1	A	0.13	9.1	A	0.0	
Sharrots Road / Veterans Road East	EB	LT	0.11	8.4	A	0.11	8.6	A	0.1		0.14	8.7	A	0.14	9.0	A	0.2		0.21	9.5	A	0.24	9.9	A	0.3		0.19	9.6	A	0.19	9.6	A	0.0	
	WB	TR	0.24	8.8	A	0.34	9.8	A	0.9		0.30	9.5	A	0.41	11.2	B	1.7		0.31	10.6	B	0.41	13.0	B	2.4		0.60	14.8	B	0.60	14.8	B	0.0	
	NB	LT	0.12	8.4	A	0.13	8.6	A	0.3		0.11	8.5	A	0.12	8.8	A	0.3		0.11	8.1	A	0.11	9.5	A	0.4		0.17	9.6	A	0.17	9.6	A	0.0	
		TR	0.10	7.6	A	0.10	7.9	A	0.2		0.16	8.1	A	0.17	8.5	A	0.4		0.24	9.6	A	0.26	9.5	A	0.5		0.28	9.8	A	0.28	9.8	A	0.0	

Notes:  
v/c = volume-to-capacity ratio; LOS = Level-of-Service  
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; SEB = Southeastbound  
L = Left-Turn; T = Through; R = Right-Turn;  
LT = Left-Turn/Through; TR = Through/Right-Turn; LR = Left-Turn/Right-Turn; LTR = Left-Turn/Through/Right-Turn  
Average Control Delay shown in units of seconds/vehicle  
- = No volumes for this approach or movement.