

# **RICHMONDTOWN ROADWAY IMPROVEMENT PROJECT**

New York City Department of Transportation  
CEQR# 03DOT014R

## **FINAL SCOPING MEMORANDUM**



**July 2004**

# Richmondtown Roadway Improvement Project Final Scoping Memorandum

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### A. OVERVIEW OF PUBLIC SCOPING PROCESS

Under Section 5-07 of the New York City Rules of Procedure, the lead agency for any project for which a Draft Environmental Impact Statement (DEIS) is to be prepared must conduct a public scoping process. To start that process, the lead agency (in this instance the New York City Department of Transportation -- NYCDOT) provides a Draft Scoping Memorandum which presents the actions being proposed, all topics to be addressed in the DEIS and the analysis methods to be used, the alternatives to be considered, and the governmental approvals required for the project to proceed.

After this Draft Scoping Memorandum is made available to the public, the lead agency holds a public scoping meeting where the public, community, business and other interest groups, interested and involved agencies and others receive more details regarding the proposed actions and the DEIS process, and have the opportunity to comment on these issues. This public scoping meeting was held on September 17, 2003 from 4 PM to 9 PM at the Church of St. Andrew's in Staten Island. Written and oral comments on the Draft Scoping Memorandum were provided by attendees at that meeting, and subsequently by mail, fax and email, until the meeting record was closed 20 days after the meeting.

Based on the comments received at that meeting and throughout the scoping process, NYCDOT has revised the document where warranted and is issuing this document as a Final Scoping Memorandum.

### B. PROJECT DESCRIPTION

#### 1. Project Purpose and Need

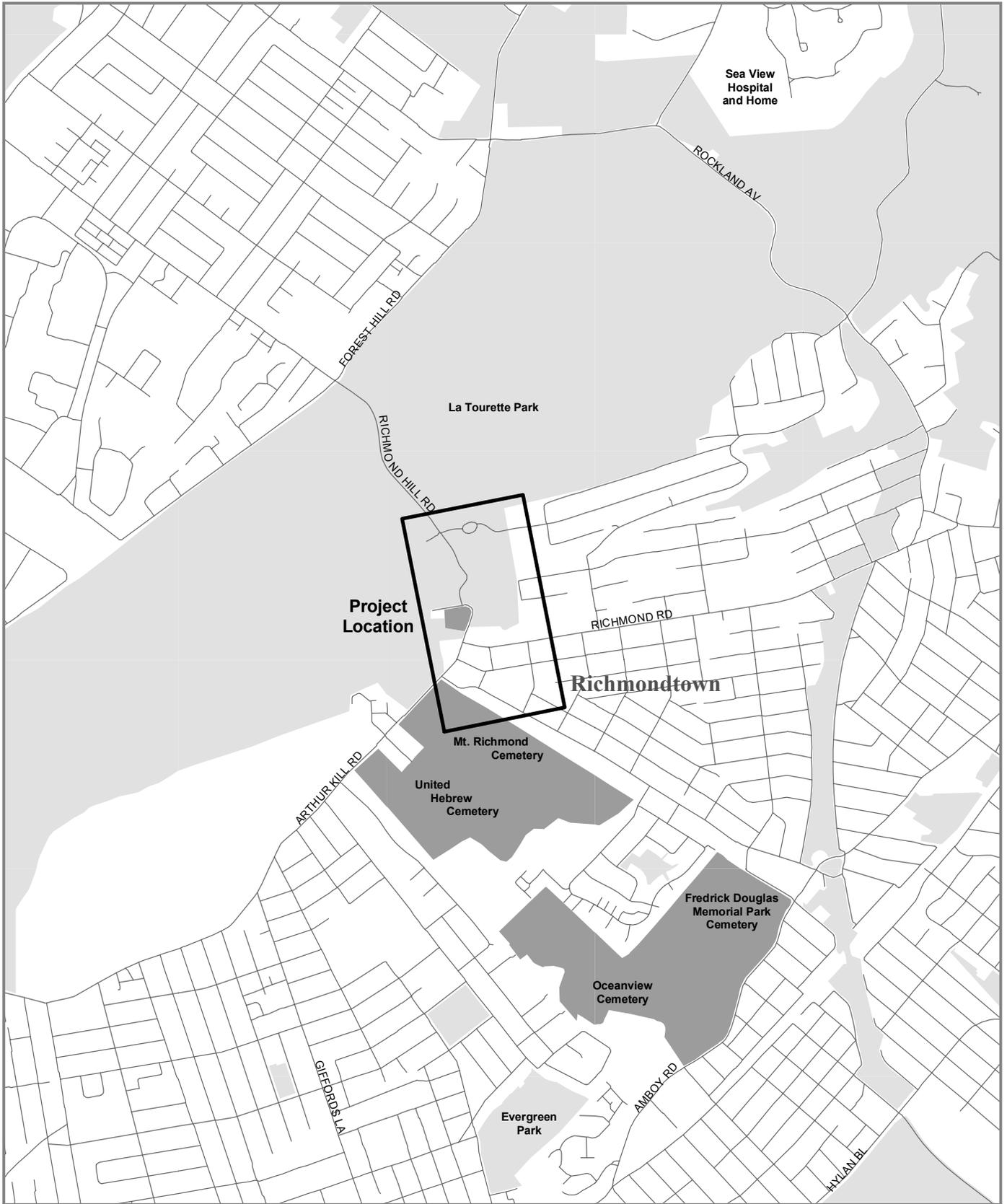
NYCDOT proposes to construct a new road network in Richmondtown, Staten Island near the Richmondtown Restoration in order to accomplish the following:

- eliminate unsafe roadway conditions along the Snake Hill Road portion of Richmond Hill Road between LaTourette Park and Richmond Road,
- improve the traffic flow at the Arthur Kill Road intersections with Clarke Avenue and Richmond Road, both of which are heavily congested in the peak traffic periods,
- limit the diversion of traffic onto low-volume residential streets in the community,
- improve pedestrian safety in the vicinity of St. Andrew's Church and within the Richmondtown Restoration, and
- develop improvement concepts that are sensitive to the character of the Richmondtown community.

The location of the proposed project is shown in Figure 1. The DEIS will include details on the design, dimensions and locations of proposed new roadways and related structures under each of the alternatives being considered. Further design information about project elements will be included in the set of drawings included as part of the project's Uniform Land Use Review Process (ULURP) application.

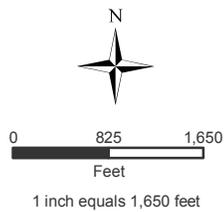
A total of five alternatives will be evaluated in the DEIS: the required No Build alternative and four "Build" alternatives. These are briefly described below and in more detail in Section 2.

- **No Build Alternative**, which would leave both the built roadway system and the official city map unchanged.



**LEGEND**

- Cemetery
- Parks



**Figure 1**  
**Project Location**

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- **Alternative 1: Roundabout Alternative** (see Figure 2), which would construct a new roundabout to the east of Helmsley Hall, with connections to Richmond Hill Road, Arthur Kill Road, and Richmond Road, closing Richmond Road between Arthur Kill Road and St. Patrick's Place. This alternative would also improve the Arthur Kill Road intersection with Clarke Avenue, and realign Clarke Avenue between Arthur Kill Road and St. Patrick's Place.
- **Alternative 2: Relocated Snake Hill Road Alternative** (see Figure 3), which like the Roundabout Alternative would include changes to the Snake Hill Road portion of Richmond Hill Road, improvements for pedestrians and motorists at intersections, and modifications to the mapped street system. However, Clarke Avenue between Arthur Kill Road and St. Patrick's Place would not be realigned under this alternative.
- **Alternative 3: Relocated Snake Hill Road-East Alternative** (see Figure 4), which would be identical to Alternative 2, except that Snake Hill Road would be relocated east of St. Andrew's Helmsley Hall. Like Alternative 2, Clarke Avenue between Arthur Kill Road and St. Patrick's Place would not be realigned under this alternative.
- **Alternative 4: Minimum/Maximum Alternative** (see Figure 5), which would have the same improvements within the Richmondtown Restoration area as Alternatives 2 and 3, but would make only incremental changes to the Snake Hill portion of Richmond Hill Road. Like Alternatives 2 and 3, Clarke Avenue between Arthur Kill Road and St. Patrick's Place would not be realigned under this alternative.

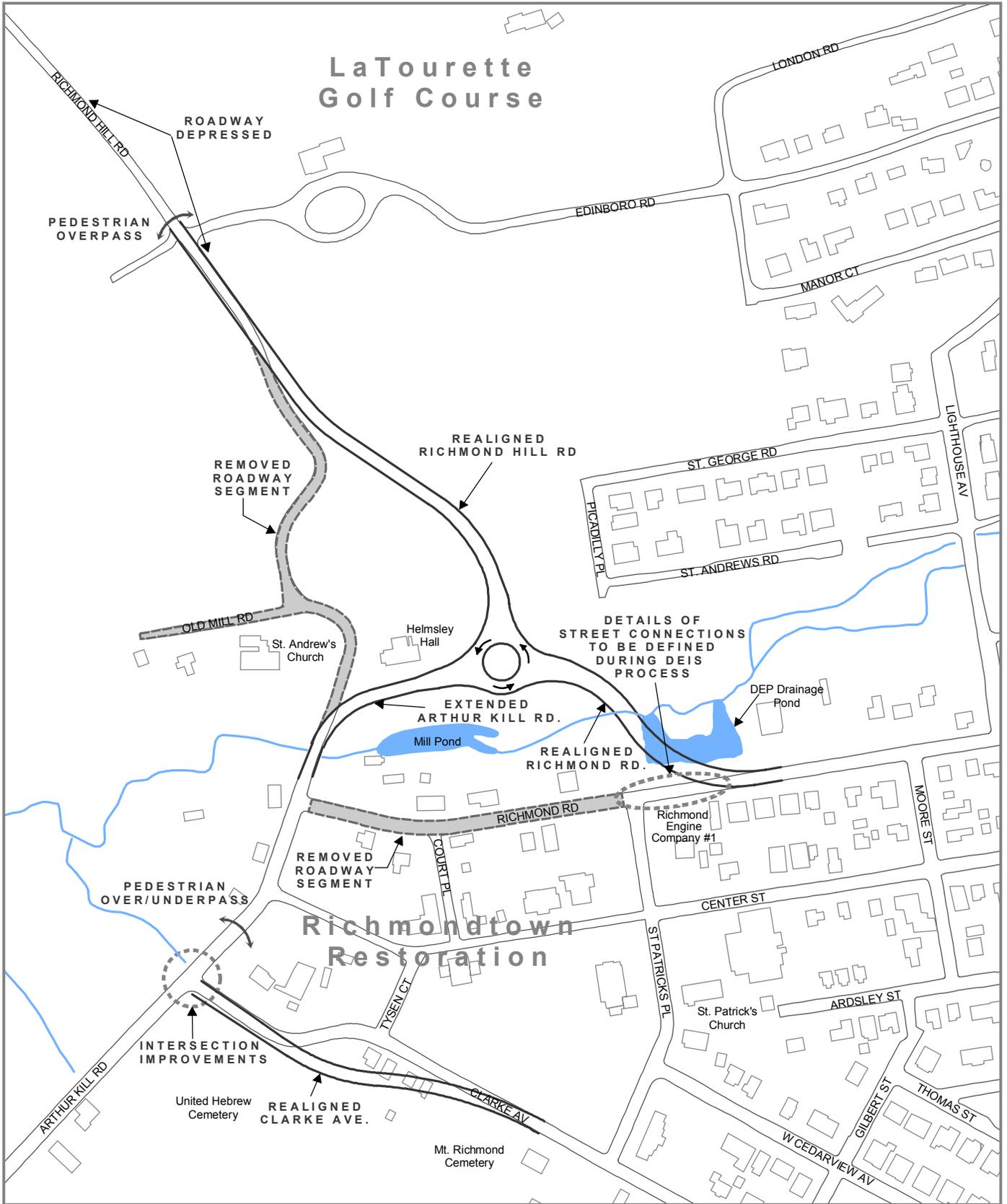
In many places the mapped street system in Richmondtown does not appropriately reflect the existing street system. Therefore, for each of the Build alternatives, the mapped street system within the project area would be modified to:

- delete any unbuilt but mapped roadway segments,
- map existing but unmapped streets that will remain,
- map any new or realigned streets constructed as part of the alternative, and
- better reflect the functionality of existing mapped streets (e.g. on the map, St. Patrick's Place will be narrowed to reflect its existing built condition).

Specific mapping changes associated with each alternative will be defined during the DEIS process. These changes to the mapped street system would be limited to the immediate project area, where modifications are proposed. Figure 6 shows the existing mapped street system and the limits of mapping actions to be taken as part of this project.

An additional alternative, which would relocate Richmond Hill Road to the west of St. Andrew's Church, was also identified during scoping, but will not be considered as a project alternative in this study. This concept was studied by NYCDOT as part of its Richmondtown roadway studies in the early 1990s and dropped from further consideration due to extensive complications associated with steep grades, wetlands, impacts on La Tourette Golf Course, and difficulties connecting the relocated Richmond Hill Road to the rest of the roadway network.

The DEIS will analyze the potential social, economic and environmental impacts associated with construction and maintenance of each project alternative. Each alternative will be considered to the same level of detail. See Section C for further discussion on the consideration of project alternatives in the DEIS.

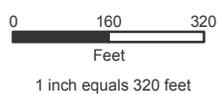


**La Tourette  
Golf Course**

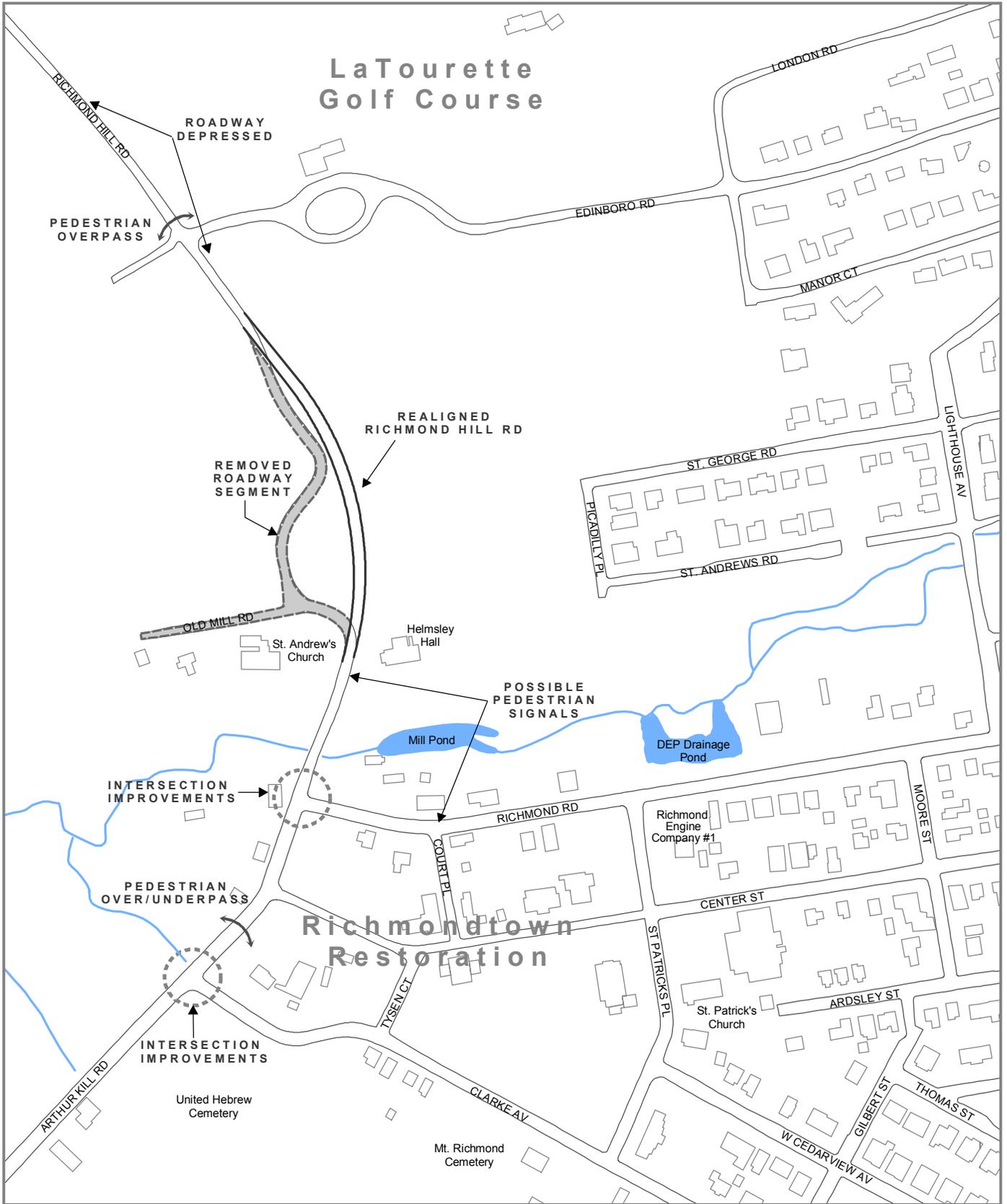
**Richmondtown  
Restoration**

**LEGEND**

- Creek
- Buildings

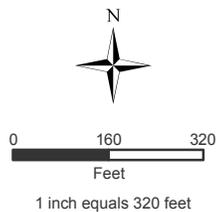


**Figure 2  
Roundabout Alternative**

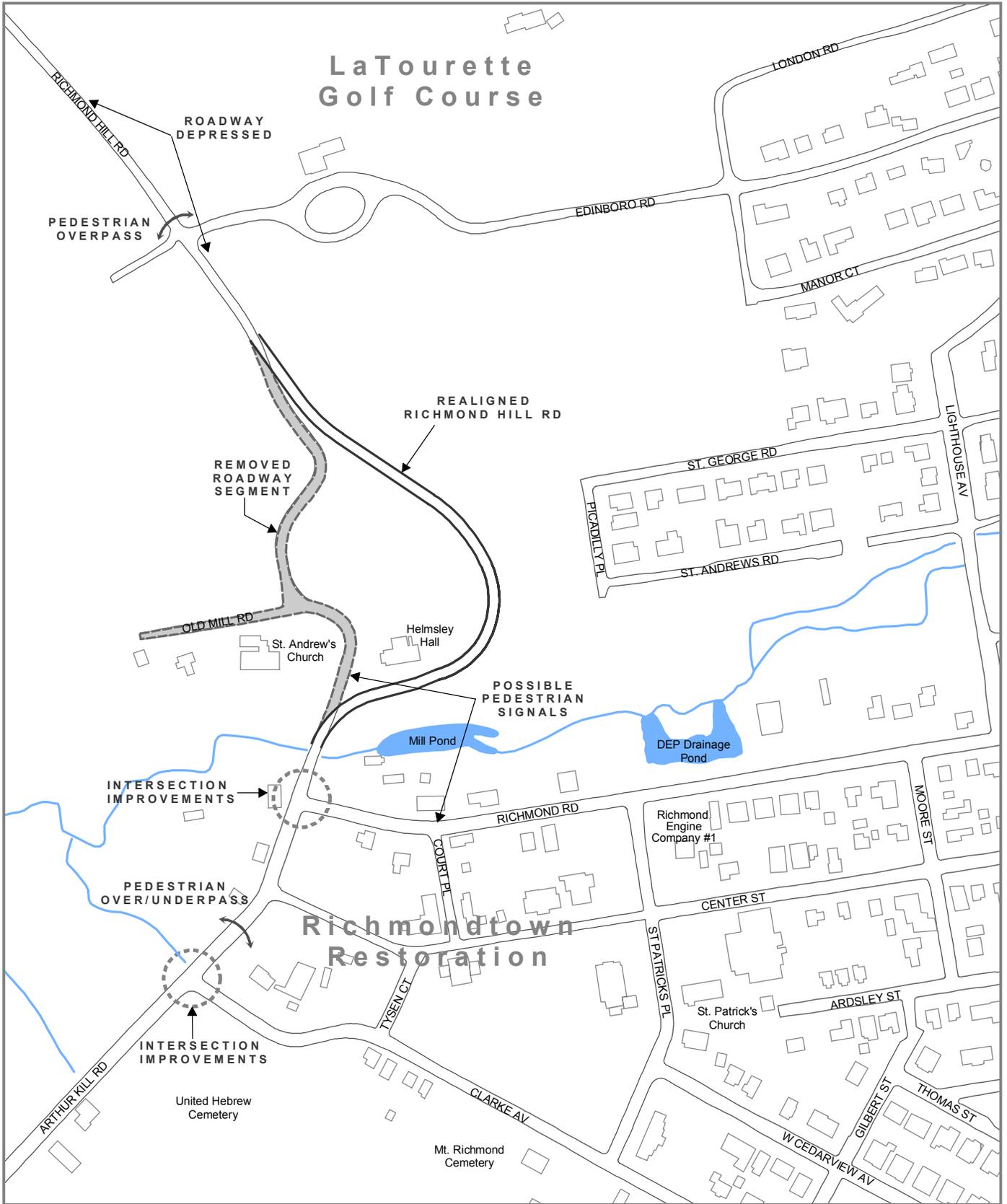


**LEGEND**

-  Creek
-  Buildings



**Figure 3**  
**Relocated Snake Hill Road**  
**Alternative**

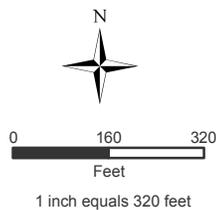


**La Tourette  
Golf Course**

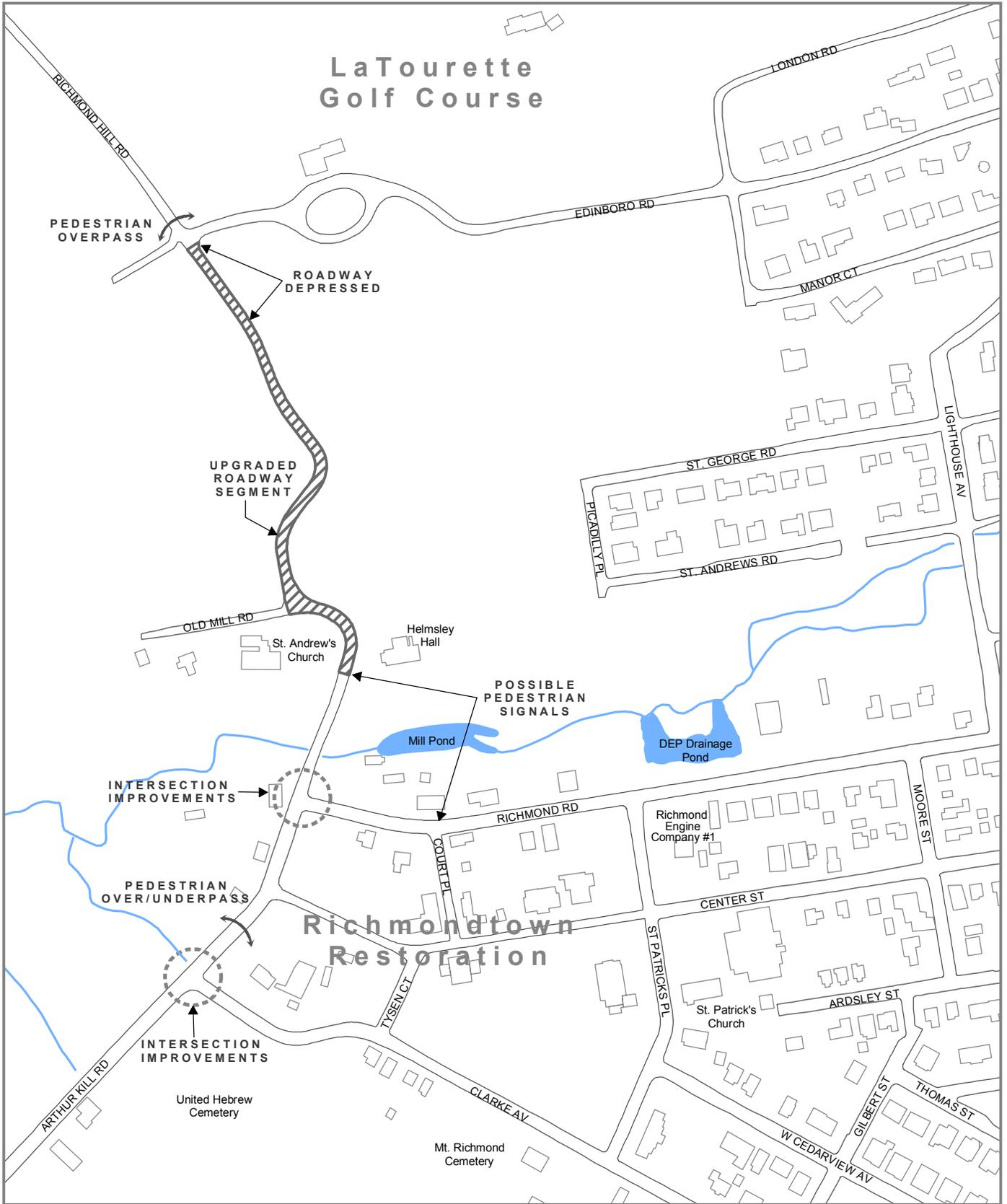
**Richmondtown  
Restoration**

**LEGEND**

-  Creek
-  Buildings



**Figure 4  
Relocated Snake Hill Road-East  
Alternative**



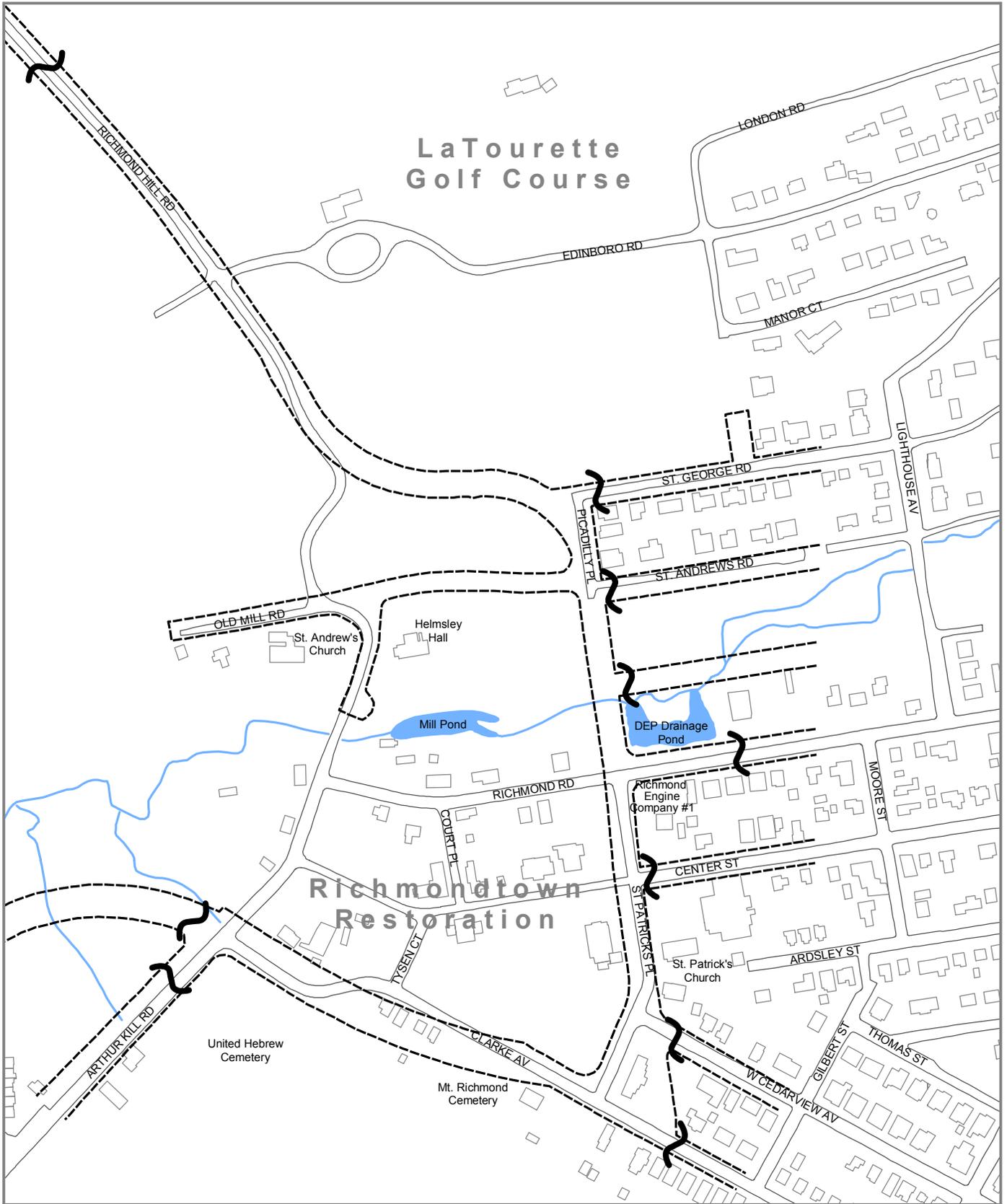
**LEGEND**

-  Creek
-  Buildings



0 160 320  
Feet  
1 inch equals 320 feet

**Figure 5**  
**Minimum/Maximum Alternative**



**LEGEND**

-  Creek
-  Buildings
-  Mapped Street System (approximate)
-  Approximate Limits of Mapping Actions



0 180 360  
Feet  
1 inch equals 360 feet

**Figure 6**  
**Mapped Street System and**  
**Approximate Limits of**  
**Mapping Action**

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**IMPROVEMENT PROJECT** 

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### 2. Physical Project Description

The following is a brief description of each of the alternatives identified during the scoping process to address traffic and safety problems in the Richmondtown area. The manner in which each alternative addresses common elements of the Richmondtown roadway network (e.g., Richmond Hill Road, Arthur Kill Road, key intersections, etc.) is presented for each alternative. The detailed engineering of any proposed changes – e.g., exact width of travel lanes, the presence and width of shoulders, radii of curves, length of turn lanes, width of sidewalks, etc. -- will be determined during the DEIS planning process.

#### a. **No Build Alternative**

The No Build Alternative, required under CEQR regulations, provides a baseline against which other alternatives are compared. As the name implies, this alternative would involve no changes to the existing roadway network in Richmondtown, and would leave the mapped street system unchanged (see Figure 6). This alternative does not, however, preclude NYCDOT from performing regular maintenance or carrying out safety or operational improvements, such as revised signage, traffic signals and similar improvements.

#### b. **Alternative 1: Roundabout Alternative**

- **Roadway Improvements:** The alignment and/or operations of the following roadway segments would be changed under the Roundabout Alternative.

- **Richmond Hill Road.** The Roundabout Alternative would replace the Arthur Kill Road - Richmond Road - Richmond Hill Road intersection with a three-legged roundabout that would connect to (1) a straightened and less steep Snake Hill Road segment, (2) a relocated Richmond Road (which would no longer pass through the Richmondtown Restoration), and (3) a relocated Arthur Kill Road-Richmond Hill Rd. (which would no longer pass through the middle of the St. Andrew's Church community). As shown in Figure 2, changes to the existing Richmond Hill Road would begin just north of the La Tourette Golf Course entrance, allowing the roadway to be lowered sufficiently to reduce the grade on the roadway as it heads down toward Richmondtown. The roadway would initially cut diagonally across the hillside before turning south to connect to the proposed roundabout. Like the rest of Richmond Hill Road, this new segment would have two lanes throughout, except at the approach to the roundabout, where it would widen to four lanes (two in each direction) to channelize traffic as it enters and leaves the roundabout. The existing Snake Hill Road segment of Richmond Hill Road would be removed from the local road system. It is likely that this roadway surface would be removed and the area replanted, although the actual treatment of this section would be defined further as the process proceeds. Also to be determined are the details of the connection to St. Andrew's Church and the location and layout of any parking that is displaced by the Arthur Kill Road approach to the roundabout.

- **Arthur Kill Road.** Arthur Kill Road presently ends at the three-way "T" intersection with Richmond Road and Richmond Hill Road. Under the Roundabout Alternative, as shown in Figure 2, Arthur Kill Road would continue north across the Town Bridge, and then turn eastward across the existing parking lot of St. Andrew's Church and connect to the proposed roundabout. This extended section of Arthur Kill Road would be two lanes, although the road would widen to four lanes (two in each direction) where it connects to the roundabout to channelize traffic as it enters and leaves the roundabout.

- **Richmond Road.** Richmond Road presently ends at the three-way "T" intersection with Arthur Kill Road and Richmond Hill Road noted above. Under the Roundabout

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Alternative, Richmond Road, east of its present intersection with St. Patrick's Place, would turn northward, extend across Richmond Creek and connect to the proposed roundabout. Like the rest of Richmond Road in this area, this relocated segment would have two lanes throughout, except at the approach to the roundabout, where it would widen to four lanes (two in each direction) to channelize traffic as it enters and leaves the roundabout. The closed portion of Richmond Road between St. Patrick's Place and Arthur Kill Road would no longer carry any traffic. The final treatment of that segment after its closure as a street will be better defined as the project proceeds. Changes to the Richmond Road – St. Patrick's Place intersection are discussed below.

- **Clarke Avenue Approach to Arthur Kill Road.** Under the Roundabout Alternative, Clarke Avenue from Arthur Kill Road to just west of St. Patrick's Place would be realigned to reduce the number of sharp curves and the steep grade in this section.
- **St. Patrick's Place.** Except at its intersection with Richmond Road, no changes are planned to St. Patrick's Place under any project alternative. However, this and all other Build alternatives will include reductions in the mapped width of St. Patrick's Place between Clarke Avenue and Richmond Road to more closely match its present pavement and sidewalk width.
- **Intersection Improvements.** The design and/or operation of the following intersections would be changed under the Roundabout Alternative:
  - **Arthur Kill Road - Richmond Road - Richmond Hill Road Intersection.** Under the Roundabout Alternative, with the relocation of Richmond Road west of St. Patrick's Place and the continuation of Arthur Kill Road northward to the proposed roundabout, there would no longer be a traffic intersection at this location.
  - **Clarke Avenue – Arthur Kill Road Intersection.** The geometry of this intersection under the Roundabout Alternative would be revised to create an improved, more traditional right-angle "T" intersection, and to shift the Clarke Avenue approach slightly south to create more space between the street and the parking lot at the intersection's northeast corner. . All three intersection approaches would be widened only as needed to allow for full through and turning lanes (where warranted based on the detailed traffic study) and improved turning radii.
  - **Richmond Road – St. Patrick's Place Intersection.** Under the Roundabout Alternative, turning Richmond Road north just east of St. Patrick's Place to connect to the proposed roundabout would change traffic operations at this location. The exact nature of the connection between St. Patrick's Place and the relocated Richmond Road will be determined during the DEIS process, in consultation with St. Patrick's Church, Historic Richmondtown and other members of the Community Advisory Committee (CAC), and other interested agencies and organizations.

The lowering of Richmond Hill Road near the entrance to LaTourette Golf Course would significantly change the entrance to the golf course. The geometry and traffic control at this driveway will be evaluated during the DEIS.

- **Pedestrian Circulation and Grade-Separated Crossings.** An improved pedestrian circulation system would be created throughout the project area under the Roundabout Alternative, with sidewalks added to many streets and signalized pedestrian crossings at all intersections. The exact location and design of these sidewalks and associated streetscape elements under these or

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any other alternative will be developed further as the project proceeds. The following two grade-separated pedestrian crossings would also be created under the Roundabout Alternative:

- **La Tourette Park Pedestrian Bridge.** As noted above, Richmond Hill Road would be lowered in the vicinity of the golf course to reduce the grade of the present Snake Hill Road segment. To provide safety for golfers at this key crossing, a pedestrian bridge would be built over the lowered Richmond Hill Road. The exact design of this crossing, and the associated changes to the streetscape of Richmond Hill Road and to the entryway and parking lot area of the golf course will be further developed as the project progresses.

Changes to the profile of Richmond Hill Road near the entrance to LaTourette Park may necessitate changes to the traffic controls at the La Tourette golf course driveway, which is currently controlled only by a stop sign for vehicles entering Richmond Hill Road. The need for, and the design of, any changes at this location will be determined during the DEIS process.

- **Arthur Kill Road Pedestrian Crossing.** To provide greater safety for employees and visitors of Historic Richmondtown as well as to area residents, a grade-separated pedestrian crossing (either a pedestrian bridge or an underpass) would be constructed in the Arthur Kill Road segment between Clarke Avenue and Richmond Road.

### c. **Alternative 2: Relocated Snake Hill Road Alternative**

- **Roadway Improvements:** The alignment and/or operations of the following roadway segments would be changed under the Relocated Snake Hill Road Alternative.

- **Richmond Hill Road.** As shown in Figure 3, changes to the existing Richmond Hill Road would begin just north of the La Tourette Golf Course entrance, allowing the roadway to be lowered sufficiently to reduce the grade on the roadway as it heads down toward Richmondtown. South of the entrance, where the roadway begins its steep descent, the roadway would be realigned to the east to reduce its curvature and grades before connecting back to its present alignment in front of St. Andrew's Church. Like the rest of Richmond Hill Road, this realigned segment would have one lane in each direction. The exact width of these lanes, and of the shoulders on both sides of the roadway, will be determined during the DEIS planning process.

- **Arthur Kill Road.** Arthur Kill Road presently ends at the three-way "T" intersection with Richmond Road and Richmond Hill Road. No changes in its alignment would occur under Alternative 2.

- **Richmond Road.** Richmond Road presently ends at the three-way "T" intersection with Arthur Kill Road and Richmond Hill Road noted above. Under Alternative 2, no changes in the alignment of this roadway would occur.

- **Clarke Avenue Approach to Arthur Kill Road.** Under Alternative 2, the alignment of Clarke Avenue from Arthur Kill Road to just west of St. Patrick's Place would remain unchanged.

- **St. Patrick's Place.** No physical changes to St. Patrick's Place are planned under this alternative. However, this and all other Build alternatives will include reductions in the mapped width of St. Patrick's Place between Clarke Avenue and Richmond Road to more closely match its present pavement and sidewalk width.

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- **Intersection Improvements.** The design and/or operation of the following intersections would be changed under this alternative:

- **Arthur Kill Road - Richmond Road - Richmond Hill Road Intersection.** All three intersection approaches would be widened only as needed to allow for full through and turning lanes and improved turning radii. Turning lanes will be installed where warranted, based on the detailed traffic study, and to the extent practicable given physical constraints (e.g. the Town Bridge).

- **Clarke Avenue – Arthur Kill Road Intersection.** The geometry of this intersection under this alternative would be revised to create an improved, more traditional right-angle “T” intersection, and to shift the Clarke Avenue approach slightly south to create more space between the street and the parking lot at the intersection’s northeast corner. All three intersection approaches would be widened only as needed to allow for full through and turning lanes (where warranted based on the detailed traffic study) and improved turning radii.

- **Richmond Road – St. Patrick’s Place Intersection.** No physical changes would occur at this intersection under this alternative.

The lowering of Richmond Hill Road near the entrance to LaTourette Golf Course would significantly change the entrance to the golf course. The geometry and traffic control at this driveway will be evaluated during the DEIS.

- **Pedestrian Circulation and Grade-Separated Crossings.** An improved pedestrian circulation system would be created throughout the project area under this alternative, with sidewalks added to many streets. The exact location and design of these sidewalks and associated streetscape elements under this or any other alternative will be developed further as the project proceeds. Two grade-separated pedestrian crossings would also be created under this alternative:

- **La Tourette Park Golf Cart Crossing.** As noted above, Richmond Hill Road would be lowered in the vicinity of the golf course to reduce the grade of the present Snake Hill Road segment. To provide safety for golfers at this key crossing, a golf cart crossing would be built over the lowered Richmond Hill Road. The exact design of this crossing, and the associated changes to the streetscape of Richmond Hill Road and to the entryway and parking lot area of the golf course will be further developed as the project progresses.

Changes to the profile of Richmond Hill Road near the entrance to LaTourette Park may necessitate changes to the traffic controls at the La Tourette golf course driveway, which is currently controlled only by a stop sign for vehicles entering Richmond Hill Road. The need for, and the design of, any changes at this location will be determined during the DEIS process.

- **Arthur Kill Road Pedestrian Crossing.** To provide greater safety for employees and visitors of Historic Richmondtown as well as to area residents, a grade-separated pedestrian crossing would be constructed in the Arthur Kill Road segment between Clarke Avenue and Richmond Road.

Manually-operated signalized pedestrian crossings on Richmond Road near Court Place and on Richmond Hill Road in front of St. Andrew’s Church are also proposed under this alternative. Sidewalks on one or both sides of Richmond Hill Road between Richmond Road and St. Andrew’s Church are also being considered. Further information about the type and location of the pedestrian

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improvements under this alternative and the feasibility of the proposed pedestrian controls will be defined during the DEIS planning process.

### d. **Alternative 3: Relocated Snake Hill Road-East Alternative**

- **Roadway Improvements:** The alignment and/or operations of the following roadway segments would be changed under the Relocated Snake Hill Road-East Alternative.

- **Richmond Hill Road.** As shown in Figure 4, changes to the existing Richmond Hill Road would begin just north of the La Tourette Golf Course entrance, allowing the roadway to be lowered sufficiently to reduce the grade on the roadway as it heads down toward Richmondtown. South of the entrance, where the roadway begins its steep descent, the roadway would be realigned to the east to reduce its curvature and grades. However, unlike Alternative 2, under this alternative Richmond Hill Road would extend to the east of and behind St. Andrew's Helmsley Hall, and then would turn back westward and extend through the St. Andrew's parking lot before connecting back to Richmond Hill Road just north of the Town Bridge near its intersection with Richmond Road. Like the rest of Richmond Hill Road, this realigned segment would have one lane in each direction. The exact width of these lanes, and of the shoulders on both sides of the roadway, will be determined during the DEIS planning process. Also to be determined are the details of the connection to St. Andrew's Church and the location and layout of any parking that is displaced by the relocated Richmond Hill Road.
- **Arthur Kill Road.** Arthur Kill Road presently ends at the three-way "T" intersection with Richmond Road and Richmond Hill Road. No changes in its alignment would occur under Alternative 3.
- **Richmond Road.** Richmond Road presently ends at the three-way "T" intersection with Arthur Kill Road and Richmond Hill Road. Alternative 3 would not change the alignment of this roadway.
- **Clarke Avenue Approach to Arthur Kill Road.** Under Alternative 3, the alignment of Clarke Avenue from Arthur Kill Road to just west of St. Patrick's Place would remain unchanged.
- **St. Patrick's Place.** No physical changes are planned to St. Patrick's Place under this alternative. However, this and all other Build alternatives will include reductions in the mapped width of St. Patrick's Place between Clarke Avenue and Richmond Road to more closely match its present pavement and sidewalk width.
- **Intersection Improvements.** The design and/or operation of the following intersections would be changed under this alternative:
  - **Arthur Kill Road - Richmond Road - Richmond Hill Road Intersection.** All three intersection approaches would be widened only as needed to allow for full through and turning lanes and improve turning radii. Turning lanes will be installed where warranted, based on the detailed traffic study, and to the extent practicable given physical constraints (e.g. the Town Bridge).
  - **Clarke Avenue – Arthur Kill Road Intersection.** The geometry of this intersection under this alternative would be revised to create an improved, more traditional right-angle "T" intersection, and to shift the Clarke Avenue approach slightly south to create more space between the street and the parking lot at the intersection's northeast corner. All three intersection approaches would be widened only as needed to allow for full through and

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turning lanes (where warranted based on the detailed traffic study) and improved turning radii.

- **Richmond Road – St. Patrick’s Place Intersection.** No physical changes would occur at this intersection under this alternative.

The lowering of Richmond Hill Road near the entrance to LaTourette Golf Course would significantly change the entrance to the golf course. The geometry and traffic control at this driveway will be evaluated during the DEIS.

- **Pedestrian Circulation and Grade-Separated Crossings.** An improved pedestrian circulation system would be created throughout the project area under this alternative, with sidewalks added to many streets. The exact location and design of these sidewalks and associated streetscape elements under this or any other alternative will be developed further as the project proceeds. Two grade-separated pedestrian crossings would also be created under this alternative:

- **La Tourette Golf Cart Crossing.** As noted above, Richmond Hill Road would be lowered in the vicinity of the golf course to reduce the grade of the present Snake Hill Road segment. To provide safety for golfers at this key crossing, some type of golf cart crossing would be built over the lowered Richmond Hill Road. The exact design of this crossing, and the associated changes to the streetscape of Richmond Hill Road and to the entryway and parking lot area of the golf course, will be further developed as the project progresses.

Changes to the profile of Richmond Hill Road near the entrance to LaTourette Park may necessitate changes to the traffic controls at the La Tourette golf course driveway, which is currently controlled only by a stop sign for vehicles entering Richmond Hill Road. The need for, and the design of, any changes at this location will be determined during the DEIS process.

- **Arthur Kill Road Pedestrian Crossing.** To provide greater safety for employees and visitors of Historic Richmondtown as well as to area residents, a grade-separated pedestrian crossing would be constructed in the Arthur Kill Road segment between Clarke Avenue and Richmond Road.

Manually-operated signalized pedestrian crossings on Richmond Road near Court Place and on Richmond Hill Road in front of St. Andrew’s Church are also proposed under this alternative. Sidewalks on one or both sides of Richmond Hill Road between Richmond Road and St. Andrew’s Church are also being considered. Further information about the type and location of the pedestrian improvements under this alternative and the feasibility of the proposed pedestrian controls will be defined during the DEIS planning process.

### e. **Alternative 4: Minimum/Maximum Alternative**

- **Roadway Improvements:** The alignment and/or operations of the following roadway segments would be changed under the Minimum/Maximum Alternative.

- **Richmond Hill Road.** As shown in Figure 5, under Alternative 4, this alternative will consider depressing Richmond Hill Road in the vicinity of the La Tourette Golf Course entrance to help reduce the grade on a portion of this roadway segment as it heads down toward Richmondtown. This alternative calls for the Snake Hill Road section to remain in its present alignment, with minor adjustments and improvements to improve traffic safety in this area, including enhanced pavement markings and signage, paved shoulders, and the installation of roadside safety barriers. The roadway would still follow its existing alignment adjacent to the St. Andrew’s Church and Helmsley Hall. Like the rest of Richmond Hill

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Road, this segment would continue to have one lane in each direction. The exact width of these lanes, and of the shoulders on both sides of the roadway, will be determined during the DEIS planning process.

- **Arthur Kill Road.** Arthur Kill Road presently ends at the three-way “T” intersection with Richmond Road and Richmond Hill Road. No changes in its alignment would occur under Alternative 4.
- **Richmond Road.** Richmond Road presently ends at the three-way “T” intersection with Arthur Kill Road and Richmond Hill Road. Under Alternative 4, no changes in the alignment of this roadway would occur.
- **Clarke Avenue Approach to Arthur Kill Road.** Under Alternative 4, the alignment of Clarke Avenue from Arthur Kill Road to just west of St. Patrick’s Place would remain unchanged.
- **St. Patrick’s Place.** No physical changes are planned to St. Patrick’s Place under this alternative. However, this and all other alternatives will include reductions in the mapped width of St. Patrick’s Place between Clarke Avenue and Richmond Road to more closely match its present pavement and sidewalk width.

The lowering of Richmond Hill Road near the entrance to LaTourette Golf Course would significantly change the entrance to the golf course. The geometry and traffic control at this driveway will be evaluated during the DEIS.

- **Intersection Improvements.** The design and/or operation of the following intersections would be changed under this alternative:
  - **Arthur Kill Road - Richmond Road - Richmond Hill Road Intersection.** All three intersection approaches would be widened only as needed to allow for full through and turning lanes and improve turning radii. Turning lanes will be installed where warranted, based on the detailed traffic study, and to the extent practicable given physical constraints (e.g. the Town Bridge).
  - **Clarke Avenue – Arthur Kill Road Intersection.** The geometry of this intersection under this alternative would be revised to create an improved, more traditional right-angle “T” intersection, and to shift the Clarke Avenue approach slightly south to create more space between the street and the parking lot at the intersection’s northeast corner. All three intersection approaches would be widened only as needed to allow for full through and turning lanes (where warranted based on the detailed traffic study) and improved turning radii.
  - **Richmond Road – St. Patrick’s Place Intersection.** No physical changes would occur at this intersection under this alternative.
- **Pedestrian Circulation and Grade-Separated Crossings.** An improved pedestrian circulation system would be created throughout the project area under this alternative, with sidewalks added to many streets. The exact location and design of these sidewalks and associated streetscape elements under this or any other alternative will be developed further as the project proceeds. Two grade-separated pedestrian crossings would also be created under this alternative:
  - **La Tourette Golf Cart Crossing.** As noted above, Richmond Hill Road would be lowered in the vicinity of the golf course to reduce the grade of the present Snake Hill Road segment. To provide safety for golfers at this key crossing, a golf cart crossing would be

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built over the lowered Richmond Hill Road. The exact design of this crossing, and the associated changes to the streetscape of Richmond Hill Road and to the entryway and parking lot area of the golf course, will be further developed as the project progresses.

Changes to the profile of Richmond Hill Road near the entrance to LaTourette Park may necessitate changes to the traffic controls at the La Tourette golf course driveway, which is currently controlled only by a stop sign for vehicles entering Richmond Hill Road. The need for, and the design of, any changes at this location will be determined during the DEIS process.

- **Arthur Kill Road Pedestrian Crossing.** To provide greater safety for employees and visitors of Historic Richmondtown as well as to area residents, a grade-separated pedestrian crossing would be constructed in the Arthur Kill Road segment between Clarke Avenue and Richmond Road.

Manually-operated signalized pedestrian crossings on Richmond Road near Court Place and on Richmond Hill Road in front of St. Andrew's Church are also proposed under this alternative. Sidewalks on one or both sides of Richmond Hill Road between Richmond Road and St. Andrew's Church are also being considered. Further information about the type and location of the pedestrian improvements under this alternative and the feasibility of the proposed pedestrian controls will be defined during the DEIS planning process.

### **3. Public Actions Required**

The following actions would be required under most of the proposed alternatives outlined above to construct the proposed road alignments and to eliminate public vehicular use of targeted road segments:

- The project would entail the transfer of property between the New York City Department of Parks & Recreation (NYCDPR) and NYCDOT. The Roundabout alternative may also involve the transfer of property between the New York City Department of Environmental Protection (NYCDEP) and NYCDOT, as NYCDEP has various Bluebelt properties north of the St. Patrick's Place/Richmond Road intersection that these alternatives may extend through.
- Although the total amount of mapped parkland would likely increase under each of the four alternatives, approval by the New York State legislature still will be required for the divestiture of parkland. Details on these mapped parkland changes will be provided in the DEIS.
- The City Map would be changed to reflect the mapping of some new street rights of way (ROW), including maintenance easements adjacent to proposed bridge structures, while much of the existing ROW in the area would be demapped.
- The Official Drainage Plan of the City of New York would require modification due to the City Map change.
- City Planning Commission approval is required for most actions taken within the NA-1 Special Area Natural District. If the approval of more than one city agency is needed, a joint determination of whether the project meets the goals and purposes of the Special Natural Area District is required.
- The Special South Richmond Development Area (SRD) zoning applies to the portion of the project site south of Clarke Avenue. These regulations focus on controls over topographic

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modification, tree preservation and planting, as well as special landscape and buffer provisions. Special permits may be issued for modifications in the district under limited conditions, but in all cases the intent is to preserve and protect the natural features of the areas.

- An Art Commission review and approval is required for changes in City-owned properties that are related to art, architecture, landscape architecture and street furniture. Review of the streetscape and surrounding landscaping would therefore be required.
- Up to four existing City-owned single-family homes along the south side of Clarke Avenue would be removed under Alternative 1 (Roundabout) to accommodate the realignment of Clarke Avenue.
- Prior to construction, approval from the New York State Department of Environmental Conservation (NYSDEC) would be required for any construction within the mapped wetland areas along Richmond Creek. These approvals would definitely be required for the Roundabout alternative but may not be required under the other alternatives.

### **C. DEIS SECTIONS AND TECHNICAL STUDIES**

The sections and technical studies to be included in the DEIS are described below. Where it has been determined that technical analyses are not required, a rationale for these decisions is provided, consistent with the CEQR Technical Manual (October 2001) procedures. The following full technical analyses are to be included in the DEIS for each of the project alternatives, including the No Build Alternative:

- Land Use and Zoning Impacts
- Socioeconomic Conditions
- Community Facilities and Services
- Open Space and Recreational Facilities
- Shadows
- Historic and Archaeological Resources
- Urban Design/Visual Character
- Neighborhood Character
- Natural Resources
- Hazardous Materials
- Coastal Zone Policy Analysis
- Infrastructure
- Solid Waste and Sanitary Services
- Energy
- Traffic and Transportation
- Air Quality
- Noise
- Construction Period Impacts

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- Public Health
- Alternatives
- Mitigation Measures
- Growth-Inducing Aspects of Proposed Action
- Irreversible and Irrecoverable Commitment of Resources

The following is a brief review of the contents of the DEIS and the types of analyses to be performed in its preparation.

### 1. **Executive Summary**

The Executive Summary will briefly describe the proposed action, predicted significant environmental impacts and associated mitigation measures, analyzed alternatives to the proposed action, and the required public approvals and permits necessary for the project to proceed.

### 2. **Proposed Action**

This section will present the project's background, purpose, public needs and benefits, and the approvals required. The role of the CEQR and ULURP processes in the public's consideration of the project alternatives will also be described. Text, tables and graphics will be presented to provide a thorough understanding of the proposed roadway improvements, with sufficient detail to allow the reviewer to understand the DEIS's assessment of the project's potential impacts.

### 3. **Land Use & Zoning Impacts**

#### a. **Land Use and Zoning**

This section would analyze the effects of the proposed action on surrounding residential areas, Historic Richmondtown, religious, public park and other uses. Existing zoning in the area will be presented, with any recent or proposed zoning changes highlighted. Potential impacts of the introduction of new roads and of the closure of some existing road segments to vehicular traffic on land uses in the study area and in surrounding areas will be discussed. The potential impacts upon real estate values within the study area will also be evaluated.

#### b. **Public Policy**

The New York City Landmarks Law protects fourteen of the structures and a cemetery within the Richmondtown Restoration, as well as St. Patrick's Roman Catholic Church and the Church of St. Andrew's, two other study area structures which are adjacent to but not within the Richmondtown Restoration. Potential construction impacts to historic structures are discussed under the Historic/Archeological Resources Section. Each of the Build Alternatives would likely involve construction in direct proximity to a number of City landmarks. The potential impact of the proposed project on these buildings will be assessed in consultation with the New York City Landmarks Preservation Commission (NYCLPC).

### 4. **Socioeconomic Conditions**

As the proposed traffic improvement project is not expected to have any impact on socioeconomic conditions as defined in Section 3B of the CEQR Technical Manual, no analyses will be included in the DEIS.

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### **5. Community Facilities and Services**

As the proposed traffic improvement project is not expected to have any impact on community facilities and services as defined in Section 3C of the CEQR Technical Manual, no analyses will be included in the DEIS. The only exception to this will be an assessment of the impact of roadway improvements on response times for emergency services and school bus routes, both of which will be included in the Traffic and Transportation section of the DEIS.

### **6. Open Space and Recreational Facilities**

This section will assess whether the proposed action would have any direct or indirect impacts on La Tourette Park and other open spaces in the area. As with community facilities, the proposed action is not expected to impact the demand for such facilities. However, the project will result in changes in the mapping of parkland in the study area. This section will therefore identify all locations where public parkland is created or removed by the mapping of the new roadway system, and the resulting overall net change in parkland. Potential impacts on the usefulness or accessibility of existing park areas (e.g., changes to the vehicular entrance to the golf course) or any new park or recreational areas created by the proposed action will also be identified. No quantitative open space analyses as defined in Section 3D of the CEQR Technical Manual will be completed.

### **7. Shadows**

The proposed action would not result in the creation of any structures 50' tall or higher, and no shadow studies are therefore projected to be required. The potential effects of roadway-related shadows on wetland areas along Richmond Creek will be covered in the assessment on aquatic ecology.

### **8. Historic and Archaeological Resources**

The Richmondtown Restoration was established in 1956 as a cooperative venture of the Staten Island Historical Society and the New York City Department of Cultural Affairs. It has evolved from a single salvaged historic structure, the Voorlezer House, to a 100-acre complex with 24 historic structures and various program and maintenance buildings. The village's history is interpreted through exhibits in its museum, as well as through costumed interpreters in period buildings and live demonstrations. NYCDPR owns the property that comprises the Richmondtown Restoration.

Within the Restoration, fourteen of the structures and a cemetery have been designated as New York City Landmarks. The Voorlezer House is a City Landmark and is also listed on the National Historic Register. Two other study area structures which are adjacent to, but not within, the Richmondtown Restoration area have been designated as City Landmarks: St. Patrick's Roman Catholic Church (1862) and St. Andrew's Episcopal Church (1872). Other New York City Landmarks in the vicinity include the Crimson Beech-Cass House at 48 Manor Court, the David LaTourette House within LaTourette Park (both the Beech-Cass and La Tourette Houses are also listed on the National Register), the Gustave Mayor House at 2475 Richmond Road and the Staten Island Lighthouse on Edinboro Road.

The following work tasks will be completed in this area:

- A brief history of the Richmondtown area will be provided to serve as a context for understanding the resources and assessing potential impacts.
- The study areas where the proposed actions may potentially affect historic resources will be identified by block and lot, and located on a Sanborn or equivalent map. For architectural resources, the study area will include the area within a 400' radius of the project area.

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- Designated architectural resources within the study area will be identified and described in text and photos. Any resources that are potentially eligible for LPC designation and listed on the State/National Registers (S/NR) will be identified and described.
- Future conditions in the absence of the proposed project, including the likely effect of other planned projects on the historic architectural resources of the study area, will be described according to the CEQR Technical Manual, Chapter 2, “Future Without the Proposed Action (No Action Condition): Baseline Condition(s) for Impact Analysis,” Section C.400, page 2-6.
- The potential impacts of the proposed action on LPC and S/NR listed and eligible historic architectural resources will be assessed according to the CEQR Technical Manual, Chapter 3, Section F.420, page 3F-14.
- Mitigation proposals, including construction protection plans, will be discussed according to the CEQR Technical Manual, Chapter 3, Section F.520, page 3F-17, and Chapter 1, Section B.241.5, page 1-10.

The proposed project would occur in the midst of an historic and archaeologically important setting. The project team will work closely with NYCLPC to confirm important resources in the areas potentially disturbed or otherwise impacted by the proposed action. Stage 1A archaeological studies performed as part of the previous CEQR process (in 1995) will be reviewed and updated as needed, along with NYCLPC’s An Archaeological Planning Model of Richmondtown Restoration, Staten Island, New York (March 1989), which identified areas of archaeological sensitivity within the Restoration. Only limited additional sub-surface studies in the project area are envisioned at this time.

A detailed analysis of potential impacts on sensitive areas will be carried out by a qualified archeologist and presented in the DEIS. In consultation with the staff of NYCLPC and the Richmondtown Restoration, the potential for impacts on these resources will be established and mitigation plans (e.g., subsurface testing and documentation and recovery of any found artifacts) will be developed as needed.

Extensive coordination with NYCLPC, Historic Richmondtown, St. Andrew’s Church, St. Patrick’s Church, local civic organizations, and others will be necessary to refine the project, including such elements as lighting, street furniture, paving treatments, landscaping, etc. The results of these efforts will be reflected in this section of the DEIS.

### **9. Urban Design/Visual Character**

The urban design of an area is defined by its physical character – its buildings, streetscapes, arrangement and design of streets, etc. An area’s visual resources are its important view corridors or vistas and natural or built features. Under Section 3G of the CEQR Technical Manual, a proposed project has the potential for significant urban design or visual impacts if it would introduce buildings or structures of substantially different height, bulk, size, use or arrangement than those in the surrounding area, or would change block form, demap an active street, or make major changes in pedestrian or other streetscape elements. The proposed project would result in major changes in the local street system, and thereby has the potential to substantially change aspects of the area’s urban design and visual character.

This section will define the existing design and visual character through text and graphic display. In key areas, photomontage methods will be used to simulate views from key locations in the area under existing and proposed conditions. Areas where potentially significant changes would occur will be identified, along with measures to mitigate the effect of those changes. Alternatives to those

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aspects of the proposed design that might reduce the project's effects on urban design or visual character will also be assessed.

### **10. Neighborhood Character**

Neighborhood character, under CEQR procedures, is essentially defined by the results of numerous other DEIS sections which present existing local conditions that can define an area's character – traffic patterns and volumes, noise and air quality, land uses, building scale and massing, historic properties, open space and visual resources. Under Section 3H of the CEQR Technical Manual, the proposed project could potentially result in changes in a number of these character-defining factors, including potential impacts in the areas of traffic, noise, and historic and visual resources. This section will define the existing character of the area based on these parameters, and assess the extent to which the proposed project would alter that character by changes in local conditions. The major elements likely to be of specific importance for this project are the introduction of roadways into the areas between Richmond Creek and La Tourette Golf Course, major changes in the overall St. Andrew's Church "campus," the elimination of roadway segments within Richmondtown, the re-alignment of Clarke Avenue and associated streetscape improvements along that road and along Arthur Kill Road, and numerous other public area changes likely to be included as part of this project.

### **11. Natural Resources**

The project site is within a Special Natural Area District, as established under the New York City Zoning Resolution Article X Special Purpose District. Chapter 5. The Special Natural Area District 1 was established to preserve and protect existing natural features including geologic features, the steep hillsides, existing natural topography, topsoil, ponds, streams, wetlands, and plant and animal habitats. In addition, the City is implementing a major stream protection program along portions of Richmond Creek to improve water quality. This Bluebelt Program combined the purchase of undeveloped land along both sides of the creek and the implementation of an extensive sewer main installation program within the study area.

The project area includes a number of important natural resources, including Richmond Creek and its adjacent mapped wetland areas, the tidal wetland areas further to the west, and extensive wooded areas. These conditions are supported by the area's inclusion within a Special Natural Area District -- a designation within the City's Zoning Resolution intended to protect the natural characteristics of areas considered to have unique natural features. A number of ecological studies were completed in connection with the original CEQR process in the 1990s, including both wetland and upland surveys, along with assessments of the potential impacts of the proposed "Loop" roadway plans. These studies were completed over 10 years ago and need to be updated. More recently, NYCDEP completed extensive ecological studies in the project area in connection with the Bluebelt Stormwater Drainage project. Information from those studies will be reviewed for applicability and relevance.

The following tasks will be completed, consistent with the procedures outlined in the CEQR Technical Manual:

- Update the previously completed aquatic and terrestrial ecology surveys performed in the study area, including field surveys and literature review as needed.
- Establish the changes planned in the Richmond Creek area by NYCDEP, including all stormwater management "best practices measures" (BPM) to be taken and the ability of the planned drainage system to handle runoff from the new roadway segments. NYCDEP's

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planned BPM may be sufficient to handle roadway runoff, or additional measures may be needed, possibly in other areas along Richmond Creek.

- Assess the natural areas and habitats to be directly impacted by construction of each project alternative, both temporary and long-term impacts, and identify measures to mitigate such impacts.
- Determine the extent to which mapped wetland areas would be impacted by construction activities or would be replaced by paved or landscaped areas under various project alternatives.
- Identify the approximate number and type of trees (greater than 4" diameter at 4.5' above the ground) to be removed due to construction of the proposed project alternatives, and the proposed replanting efforts to mitigate this loss.
- Identify any opportunities to create new natural areas or features.
- Calculate the volume of stormwater runoff from proposed roadways and surrounding permeable landscaped areas using New York State DEC approved models, and use the Toler Predictive Method to estimate potential contamination from pavement deicing chemicals and their impact on surface and groundwater. The central focus of this analysis will be the potential impacts on Mill Pond, Richmond Creek and its surrounding wetlands, and the methods to be used to limit the impacts of stormwater flows and related roadway chemicals on those areas. The selection of modeling procedures will be refined and/or expanded in consultation with New York City DEP, which is performing similar studies in connection with its Richmond Creek watershed program. Should impacts be identified, a set of Best Management Practices (BMP's) to improve the quality of runoff before release to the stream will be developed in consultation with NYCDEP. System type(s) and their maintenance requirements will also be addressed. A conceptual erosion and sedimentation control plan to minimize construction impacts will be developed.

These studies will be coordinated with both NYCDEP and NYSDEC as needed to ensure the adequacy of the studies being proposed.

### **12. Hazardous Materials**

Under Section 3J of the CEQR Technical Manual, the proposed project is not projected to result in significant impacts related to hazardous materials, as no elevated levels of such materials exist on site, the project would not increase pathways to exposure to such materials, and the project would not introduce processes or activities that might result in human exposure to such materials. This last issue (human exposure) will be confirmed by a Phase 1 Environmental Audit to be completed for those areas to be physically disturbed by the proposed project alternatives. This study would be completed in accordance with the American Society for the Testing of Materials (ASTM) protocol for Phase I Report (ASTM E-1527 Section 6) and provided to NYCDEP for review.

### **13. Coastal Zone Policy Analysis**

The proposed project site is located within the City's Coastal Zone, as defined in the New York City Local Waterfront Revitalization Program (WRP). This section will demonstrate the extent to which the proposed project would be consistent with New York City's 12 coastal zone policies and New York State's 44 policies that are relevant to this project.

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### **14. Infrastructure**

Under Section 3L of the CEQR Technical Manual, a proposed project has the potential for significant impacts on key infrastructure systems if it would generate an exceptionally large demand for water or sanitary sewage services, is located in areas at the ends of the City's water distribution system, or would result in any industrial effluent or stormwater runoff potentially requiring pre-treatment.

The construction of extensive new roadway surfaces associated with the proposed realignment of Richmond Hill, Richmond and Arthur Kill Roads and the proposed roundabout will generate stormwater runoff. NYCDEP's Richmond Creek Drainage Plan, a key element of the Bluebelt drainage system in Staten Island, is proposing a broad range of stormwater management systems within and near Richmondtown, which would likely handle much of the stormwater from the proposed roadways. Some runoff could also be handled by other types of roadside systems to be developed as the roadway's design progressed. This section will present all existing infrastructure in the area – water, sanitary and stormwater sewage, private utilities – and the extent to which the proposed project would impact these systems. This includes the potential need to relocate or otherwise impact utility lines (e.g., the sanitary sewage force main under Richmond Road) and the ability of the existing systems (particularly the stormwater system) to handle the additional loads placed on them by the proposed project and its alternatives.

### **15. Solid Waste and Sanitary Services**

Under Section 3M of the CEQR Technical Manual, the proposed project would not result in significant impacts on solid waste facilities or sanitary services. No analyses are projected to be included in this section of the DEIS.

### **16. Energy**

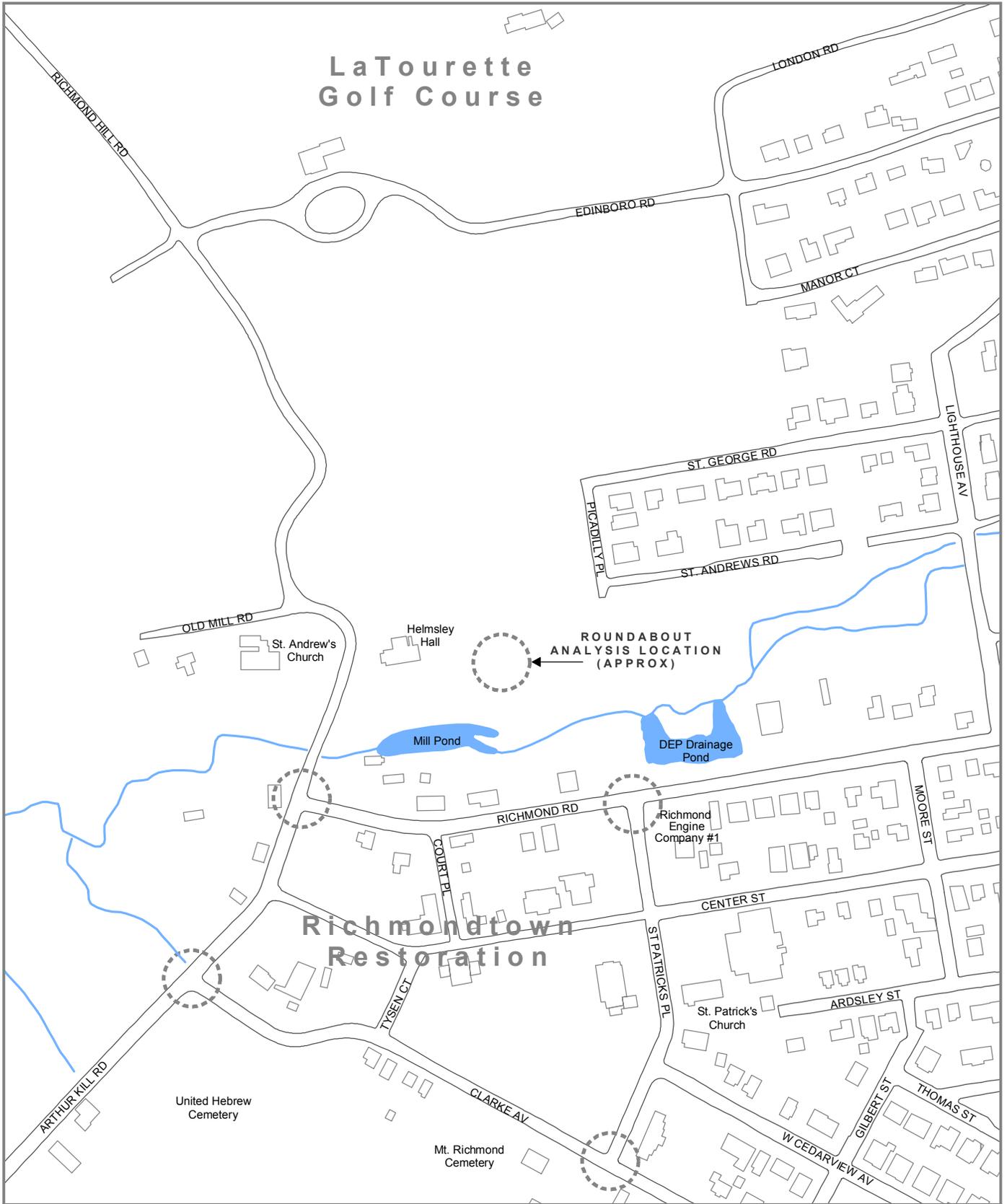
Under Section 3N of the CEQR Technical Manual, the proposed project would not result in significant energy impacts, as defined in that section. The extent to which the proposed project would reduce traffic delays and stoppages, and the resultant effect on vehicles' energy use, will be briefly addressed.

### **17. Traffic and Transportation**

Issues in this section include potential impacts on traffic operations, parking conditions, pedestrian flows and transit operations. The proposed project is intended to substantially improve traffic operations and safety and provide a safer pedestrian network. The realignment of Richmond Road may also impact NYCT buses that travel through Richmondtown. Access to various off-street parking areas, including St. Andrew's and St. Patrick's Churches and the Richmondtown Restoration, may also be affected.

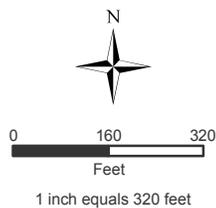
This section will establish the existing traffic, pedestrian, parking and transit networks in the area. The traffic study area (see Figure 7) will include the following key intersections:

- Arthur Kill Road at Clarke Avenue,
- Arthur Kill Road at Richmond Road,
- Richmond Road at St. Patrick's Place,
- Clarke Avenue at St. Patrick's Place, and
- The proposed roundabout (Under Roundabout Alternative).



**LEGEND**

-  Creek
-  Buildings
-  Traffic Analysis Location



**Figure 7**  
**Traffic Analysis Locations**

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Additional analysis locations will be added where warranted under CEQR guidelines if initial traffic studies indicate the potential for significant traffic impacts under any of the proposed project alternatives. Updated traffic data will be collected for the study area, using a combination of manual counts at each intersection and ATR machine counts on Richmond Road and Arthur Kill Road.

Traffic volumes, classifications and speeds, along with information about existing roadway geometry and on- and off-street parking will be updated in the field for all required locations using procedures consistent with Section 3O of the CEQR Technical Manual. Similar information will be obtained for the existing pedestrian network and transit operations (including school buses), consistent with Section 3P of the Manual. Level of Service (LOS) analysis will then be performed for AM and PM periods on weekdays using the Highway Capacity Software (HCS) version approved by NYCDOT at that time. These analyses will be performed for Existing (2004) conditions, Future No Build and Build conditions for each of the project alternatives. Areas with potential significant impacts as per Section 3O of the CEQR Technical Manual will be identified and measures to mitigate those impacts proposed and their effectiveness assessed.

A separate methodology will be developed for the roundabout, consistent with (a) NYSDOT's Roundabout Interim Requirements and Guidance (June 2000), (b) RODEL Interactive Roundabout Design Software (September 2002) as revised for use in New York State, and (c) applicable FHWA guidelines. Roundabout analysis procedures will be fully confirmed with NYCDOT prior to their application.

### **18. Air Quality**

Under Section 3Q of the CEQR Technical Manual, the only potential for significant air quality impacts involve generating a substantial number of vehicular trips in a new area due to the realignment of Arthur Kill, Richmond Hill and Richmond Roads. A microscale mobile source air quality dispersion analyses will be completed to assess the potential for exceedances of air quality standards (CO and PM<sub>10</sub> and PM<sub>2.5</sub>) in areas adjacent to the proposed new roadway segments, particularly near the proposed roundabout. These analyses will be carried out according to procedures presented in Section 3Q.321 of the CEQR Technical Manual, and NYCDEP's Interim Guidance for PM<sub>2.5</sub> Analysis. No stationary source analysis will be required. The air quality analysis protocol will be submitted to NYCDEP for review and approval.

### **19. Noise**

The proposed project, by realigning roadways, would divert traffic away from certain areas while introducing traffic to others. As this would involve "new or significant changes in roadway or street geometry..." as defined in Section 3R.332 of the CEQR Technical Manual, a detailed noise analysis will be performed, including the use of the TNM noise assessment model. These studies will include a noise monitoring program consistent with Section 3R.331 of the Technical Manual, focusing on areas next to roadways to be added or eliminated – e.g., along Richmond Road between St. Patrick's Place and Arthur Kill Road, and in the areas adjacent to the relocated Arthur Kill, Richmond and Richmond Hill Road segments, including the proposed roundabout. The sensitive locations closest to these new roadways – St. Andrew's Church, the Richmond Creek pond area, and the nearby Lighthouse Hill residential area, will be the primary focus of these studies. Where necessary, measures to mitigate traffic-related noise impacts will be identified and their effectiveness assessed using the TNM analysis. If potential significant noise impacts are predicted for peak hours, the potential for similar impacts in off-peak hours will also be analyzed. In addition, the potential for increased vibration, during construction or long-term, to impact sensitive historic structures in the area will be assessed for each of the proposed alternatives.

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### **20. Construction Period Impacts**

Under Section 3S of the CEQR Technical Manual, the aspects of the proposed project's construction that would be addressed in this section would be those related to (a) traffic diversion, including potential traffic, noise or air quality impacts, (b) construction related impacts on park areas, historic properties (Richmondtown Restoration, St. Andrew's and St. Patrick's Churches, LaTourette Golf Course), and residences, and (c) soil erosion and siltation connected with construction in presently wooded areas along and north of Richmond Creek. A soil and sedimentation control plan will be included in the DEIS. Where potential impacts are identified, measures to mitigate those impacts would be identified and their effectiveness assessed.

### **21. Public Health**

Consistent with Section 3T of the CEQR Technical Manual, the potential for the proposed project to result in any significant public health impacts will be assessed. These will include potential impacts associated with potential air quality, noise, hazardous material contamination, or other impacts as defined in that section. Significant adverse impacts, if any, will be listed in this section, along with appropriate mitigation plans or options.

### **22. Alternatives**

The potential for impacts under each of the areas of analysis outlined above will be assessed for future No Build conditions and for each of the Build alternatives. As noted in Section B of this scoping memorandum, four Build alternatives have been identified, based on comments received during the DEIS public scoping process.

The Alternatives section of the DEIS will include a detailed description of each alternative including preliminary cost estimates, and a summary of the relative impacts of all alternatives presented in text and tabular formats for ease of comparison.

### **23. Mitigation Measures**

In this section, all measures proposed and analyzed within the DEIS are summarized, including their effectiveness, methods of financing their construction and maintenance costs and any required approvals.

### **24. Growth-Inducing Aspects of Proposed Action**

The extent to which the proposed project would sufficiently expand roadway capacity to result in substantial new growth in the area will be assessed in this section.

### **25. Irreversible and Irretrievable Commitment of Resources**

The irreversible commitment of both man-made and natural resources under the proposed project, and the potential for trade-offs between short-term vs. long-term gains or losses will be assessed in this section.