

3. Environmental Consequences

3.1. INTRODUCTION

Environmental consequences, as described here, are those “effects” and “impacts” that may reasonably be expected with implementation of the proposed GCL. Consideration is given specifically to whether and how the operation or construction of the proposed GCL may result in changes (or “effects”) to its context of natural, human, and man-made environs and whether the value of such resources may be substantially diminished as a result. Effects are determined and described, in general, by comparing the conditions anticipated in the future when with the proposed project is expected to be fully operational (the future with the GCL) to the conditions in the future were the project not implemented (No-Action conditions), thus resulting in a description of “change” attributable to the proposed project.

Such effects, or changes to the environment, are then considered in terms of whether they might be expected to be permanent (typically associated with the long-term presence of infrastructure and long-term operations of the proposed GCL) or temporary (typically associated with construction-period activities and lasting no more than, and often much less than, the duration of the construction period). It is worth noting, that construction-period activities, even if they themselves might be temporary, may result in permanent effects as well as temporary effects. Finally, the degree and extent to which notable aspects of the natural, man-made, and human environs, as outlined in EO215, might be changed, is reflected in terms of “significance,” i.e., a “significant” impact to a resource is one where a change to a resource so diminishes its function, utility, or value that it warrants consideration of mitigation to avoid or protect that particular resource against a change of that magnitude. Where significant impacts are predicted, mitigation is proposed or, in certain cases, assumed to be developed as the project advances.

Descriptions of the analyses supporting the determination of environmental consequences are outlined in sections 3.2, “Natural Resources,” 3.3, “Man-Made Resources,” and 3.4, “Human Resources.” The consequences to environmental features anticipated to result from the temporary construction of the GCL are discussed in Section 3.5, “Construction Impacts.” The potential for adverse impacts resulting from the cumulative impact of individual effects to multiple environmental resources is presented in Section 3.6, “Cumulative Effects.” Lastly, the partial and full acquisition of properties to accommodate the physical features and construction activities of the proposed project is discussed further in Section 3.7, “Acquisitions.”

3.2. NATURAL RESOURCES

3.2.1. Principal Conclusions

- **Geological and Soil Characteristics** – Approximately 63.74 acres of potential acid-producing soil (APS) would be disturbed during construction, and approximately 4.6 acres of farmland soils used for agricultural purposes would be affected by the proposed Glassboro-Camden Line (GCL); the

significance of these disturbances will be determined in coordination with the New Jersey Department of Environmental Protection (NJDEP).

- **Land Form and Hydrological Features** – The proposed GCL would require new or widened rail bridge structures across three streams, impacting approximately 0.46 acres of tidally-influenced waters. While the proposed GCL would minimally encroach onto flood hazard areas and riparian zones on regulated waters, it would potentially impact several wetland areas, which are described in detail below.
- **Biological Resources** – Impacts to plant communities total approximately 67.6 acres, including forest, agriculture, and old field communities. The proposed GCL would result in the loss of approximately 1.59 acres of forested habitat within the Wenonah Ravine Natural Heritage Priority Site, which includes habitat for several listed species. Three Federally-listed species and six State-listed threatened and endangered species may be affected by the proposed GCL as a result of loss or alteration to documented or suitable habitat.

3.2.2. Geological and Soil Characteristics

3.2.2.1. Acid-Producing Soils

Most of the proposed GCL corridor within Camden County and the northern portion of Gloucester County lies within APS formations. Approximately 63.74 acres of potential APS would be disturbed during construction. The significance of this disturbance will be determined during coordination with NJDEP.

3.2.2.2. Farmland Soils

Important farmlands soils occur within the limit of disturbance (LOD), including soils that have been classified as prime, unique, or of statewide importance according to the USDA, Natural Resources Conservation Service (NRCS).

The proposed Mantua Boulevard Station would permanently affect one active farmland parcel—Block 170, Lots 3 and 3.01, in Mantua Township. The construction of the station would affect approximately 4.41 acres of farmland due to the change in land use from agriculture use to rail/transportation. The significance of this disturbance will be determined during coordination with NJDEP.

3.2.3. Land Form and Hydrological Features

3.2.3.1. Surface Waters

The proposed GCL would cross several streams in the proposed GCL corridor. Three of these watercourses (Newton Creek, Little Timber Creek, and Big Timber Creek) will involve new or widened rail bridge structures. Approximately 0.46 acre of water area will be impacted by the new/expanded bridge structures over Newton Creek (0.29 acres), Little Timber Creek (0.07 acres), and Big Timber Creek (0.10 acres). As these waters are tidally influenced, the proposed crossings will require issuance of a Waterfront Development permit from NJDEP Division of Land Resource Protection, as well as a Section 404/Section 10 Permit from the Philadelphia District Corps of Engineers.

No significant impacts to the remaining surface waters in the proposed GCL corridor are anticipated, as the use of existing railbed is proposed and no in-water work would occur. Stormwater runoff from existing and proposed impervious surfaces is not anticipated to increase. Any incremental increase of impervious surfaces could result in the requirement to provide stormwater management facilities (pre-treatment of runoff) as part of NJDEP Waterfront Development Permits, Freshwater Wetlands Permits, and/or Flood Hazard Area Permits.

3.2.3.2. Wetlands and Transition Areas

The proposed GCL would require the disturbance to several wetland areas identified and delineated in the proposed GCL corridor. The anticipated wetland disturbances would involve 1.12 acres of coastal wetlands, 1.83 acres of forested freshwater wetlands, 0.66 acre of non-tidal drainage ditches, and 0.05 acre of State open waters spread out over the 18-mile GCL corridor, as detailed in Table 3.2-1, "Wetlands Potentially Affected by the Proposed GCL."

Table 3.2-1: Wetlands Potentially Affected by the Proposed GCL

Resource	Field ID	Habitat Type	Proposed Disturbance	Location
1	WGC-C/WCC-A	Coastal Wetland at Newton Creek	0.73 acres	City of Camden City of Gloucester City
2	WCC-B	Non-Tidal Drainage Ditch	0.17 acres	City of Camden
3	WGC-A/WBL-C	Coastal Wetland at Little Timber Creek	0.07 acres	City of Gloucester City Borough of Brooklawn
4	WGC-B	Coastal Wetland at Little Timber Creek	0.03 acres	City of Gloucester City
5	WWV-A/WBL-A	Coastal Wetland at Big Timber Creek	0.29 acres	Borough of Westville Borough of Brooklawn
9	WWY-A	Freshwater Wetland (Forested)	0.06 acres	City of Woodbury
10	WWH-A	Freshwater Wetland (Forested)	1.22 acres	Borough of Woodbury Heights
11	WWH-B	Non-Tidal Drainage Ditch	0.07 acres	Borough of Woodbury Heights
12	WDP-A	Freshwater Wetland (Forested)	0.17 acres	Township of Deptford
16	WMT-G/WWN-A	Freshwater Wetland (Forested)	0.05 acres	Borough of Wenonah Township of Mantua
17	WWN-B	Freshwater Wetland (Forested)	0.16 acres	Borough of Wenonah
19	WMT-F	Freshwater Wetland (Forested)	0.14 acres	Township of Mantua
20	WMT-A	Freshwater Wetland (Forested)	0.01 acres	Township of Mantua
21	WMT-B	Freshwater Wetland (Forested)	0.004 acres	Township of Mantua
23	WMT-D	Freshwater Wetland (Forested)	0.002 acres	Township of Mantua
27	WPT-B	Freshwater Wetland (Forested)	0.01 acres	Borough of Pitman
28	WGO-A	State Open Water	0.05 acres	Borough of Glassboro
29	WGO-B	Non-Tidal Drainage Ditch	0.42 acres	Borough of Glassboro
		Total Wetland Impacts	3.66 acres	

The coastal wetlands disturbances will require issuance of a NJDEP Coastal Wetlands Permit. All freshwater wetlands disturbances will require issuance of a NJDEP Freshwater Wetlands Individual Permit as the cumulative freshwater wetland disturbance would not qualify for any of the available General Permits. The Freshwater Wetlands Individual Permit will require the design of the project to either avoid or minimize wetland impacts to the extent feasible. A detailed Alternatives Analysis (AA) will also be

required to demonstrate that the alternative chosen minimizes impacts and that no other alternatives avoid or minimize wetland impacts further. Freshwater wetland transition area (buffer) impacts would also be included in the Individual Permit.

3.2.3.3. Flood Hazard Areas

The proposed GCL would minimally encroach into flood hazard areas related to the 100-year storm, as well as riparian zones on regulated waters. For the most part, the GCL would utilize existing rail bed and where crossing streams, the GCL would be constructed on a new or expanded bridge structure. These encroachments are anticipated to include minor disturbances for bridge abutments and piers and minimal fill for widening. These activities would require issuance of a Flood Hazard Area permit from NJDEP.

3.2.4. **Biological Resources**

For the purposes of evaluating the impact to natural resources, the LOD for the proposed GCL includes impacts attributed to permanent improvements such as the construction of new track, bridge structures, stations, and Vehicle Maintenance Facilities (VMFs), as well as additional temporary impacts areas associated with construction-related activities. The total LOD for the proposed GCL, excluding the existing track and ballast, accounts for approximately 195 acres.

The LOD includes the following temporary and permanent impact areas:

- Toe of slope of the ballast or fill used to support the new track or outer limit of retaining walls used to minimize fill
- Limit of any permanent structure used to carry new track over streams, roadways, or other features
- Limit of grading to accommodate new stations and VMFs including parking lots, platforms, buildings and other site improvements
- Other construction-related activities, including construction access and staging areas

Impacts to natural resources from implementation of the proposed GCL would include permanent and temporary disturbance to soil and vegetation resulting in the loss, alteration, or degradation of wildlife habitat and plant communities. While efforts have already been made to minimize impacts through design and mitigation measures, the significance of any impacts identified in this report cannot be determined until consultation with the regulating agency is conducted.

Appendix 1-A, "Natural Resources Impact Locations," maps contained in Attachment 1, "Natural Resources Technical Report," show locations where impacts to natural resources from the proposed GCL are anticipated, including impacts to sensitive plant communities and habitat for Federal- and State-listed species.

Stream crossing and storm water management plans will be developed during preliminary engineering as agency consultation continues, throughout which the impacts will be identified with appropriate mitigation.

3.2.4.1. Plant Communities

Within the 195-acre proposed GCL LOD, impacts to plant communities account for approximately 67.6 acres (Table 3.2-2, “Impacts to Plant Communities from the Implementation of the Proposed GCL”).

Table 3.2-2: Impacts to Plant Communities from the Implementation of the Proposed GCL

Plant Community Type	Total Impact Area (Acres)
Deciduous Forest	41.86
Mixed Forest	12.57
Forested Wetlands	1.83
Old Field	1.91
Agriculture	4.41
Total Plant Community Impact	67.58

Source: GCL Project Team LOD and Plant Communities GIS Files, 2017

Forest

Implementation of the proposed GCL would result in the loss of 61.3 acres of forest. Forest that would be affected by the proposed GCL consists of deciduous forest, mixed deciduous/evergreen forest, and deciduous forested wetlands. Most forest impacts would occur immediately adjacent to the existing rail corridor.

Most impacts to forest attributed to the proposed GCL would be to predominantly secondary growth forest that occurs immediately adjacent to previously developed areas. However, construction activities primarily associated with the crossing of Mantua Creek drainage would affect mature forest.

The following seven of the 14 proposed stations would affect forest communities: the South Camden, Crown Point Road, Red Bank Avenue, Woodbury Heights, Wenonah, Mantua Boulevard, and Mantua-Pitman stations. In addition, the two proposed VMFs in Woodbury Heights and Glassboro would also affect forest, accounting for approximately 10 percent of the total forest impacts attributed to the proposed GCL.

Agriculture

The proposed Mantua Boulevard Station would permanently affect one ~~active~~ farmland parcel—Block 170, Lots 3 and 3.01, in Mantua Township. The implementation of the station would affect approximately 4.41 acres of farmland due to the change in land use from agriculture use to rail/transportation.

Old Field

The GCL would affect 1.91 acres of old-field plant communities. Most of this impact area is located within an old-field community adjacent to the Glassboro VMF. Smaller impact areas to old-field communities exist in fragmented patches adjacent to the existing rail right-of-way (ROW).

3.2.4.2. Unique and Significant Natural Areas

The proposed GCL would traverse the Wenonah Ravine Natural Heritage Priority Site in Wenonah Borough and Mantua Township. This site includes habitat for several listed species, including known occurrences

of the State-endangered shingle oak. The proposed GCL would result in the loss of approximately 1.59 acres of forested habitat within the Wenonah Ravine site (see Appendix 1-A, “Natural Resources Impact Locations,” of Attachment 1, “Natural Resources Technical Report”).

Two other Natural Heritage Priority Sites—including the Mantua Natural Heritage Priority Site and Aura Natural Heritage Priority Sites—are located outside of the LOD and would not be affected by the proposed GCL.

In addition, documented vernal habitat mapped by NJDEP along the Chestnut Branch of Mantua Creek and potential vernal habitat mapped near tributaries to Still Run, Mantua Creek, Woodbury Creek, and Big Timber Creek are all outside of the LOD and would not be affected by the proposed GCL.

3.2.4.3. Threatened and Endangered Species

Federally-Listed Species

Habitat for Federally-listed threatened and endangered species occurs within the LOD of the proposed GCL. Six Federally-listed species were identified as potentially occurring within or adjacent to the project area. The three Federally-listed threatened and endangered species listed in Table 3.2-3, “Federally-Listed Species Not Affected by the Proposed GCL,” would not be affected by the proposed GCL due to an absence of suitable habitat within the proposed GCL LOD.

Table 3.2-3: Federally-Listed Species Not Affected by the Proposed GCL

Common Name (<i>Latin Name</i>)	Federal Status
Swamp Pink (<i>Helonias bullata</i>)	Threatened
Bog Turtle (<i>Clemmys muhlenbergii</i>)	Threatened
Red Knot (<i>Calidris canutus rufa</i>)	Threatened

Source: U.S. Fish and Wildlife Service (USFWS) IPaC - Information, Planning, and Conservation System (<http://ecos.fws.gov/ipac/>); NJDEP Bureau of Non-game species, Landscape proposed rail corridor Data and New Jersey Natural Heritage Program Correspondence, December 5, 2017

Three Federally-listed species may be affected by the proposed GCL as a result of loss or alteration to documented or suitable habitat (Table 3.2-4, “Federally-Listed Species Potentially Affected by the Proposed GCL”). Appendix 1-A, “Natural Resources Impact Locations,” of Attachment 1, “Natural Resources Technical Report,” includes the location of impacts to threatened and endangered species habitat.

Table 3.2-4: Federally-Listed Species Potentially Affected by the Proposed GCL

Common Name (<i>Latin Name</i>)	Federal Status
Northern Long-Eared Bat (<i>Myotis septentrionalis</i>)	Threatened
Atlantic Sturgeon (<i>Acipenser oxyrinchus</i>)	Endangered
Shortnose sturgeon (<i>Acipenser brevirostrum</i>)	Endangered

Source: USFWS IPaC - Information, Planning, and Conservation System (<http://ecos.fws.gov/ipac/>); NJDEP Bureau of Non-game species, Landscape rail corridor Data and New Jersey Natural Heritage Program Correspondence, December 5, 2017

Northern Long-Eared Bat (*Myotis septentrionalis*)

Forested areas throughout the rail corridor provide habitat for the northern long-eared bat. Approximately 61.3 acres of forest would be affected by the proposed GCL. While there are no known maternity or hibernacula sites documented within Camden or Gloucester counties, surveys conducted in the summer of 2017 confirmed northern long ear bats occur within the natural resources study area in several locations. Measures should be taken to minimize tree clearing when the bat species may be present within the project area. The significance of this impact will be determined during agency coordination, and mitigation will be developed as appropriate.

Shortnose Sturgeon (*Acipenser brevirostrum*) and Atlantic Sturgeon (*Acipenser oxyrinchus*)

Documented habitat for Shortnose Sturgeon and Atlantic Sturgeon exists within the Big Timber Creek, Little Timber Creek, and Newton Creek. To avoid adverse impacts to these species, bridge design should avoid impeding the passage of fish within the waterway and in-water work during spawning periods should be avoided. In addition, noise resulting from in-water construction activities, such as pile driving, could cause both behavioral and physiological effects to these species. The significance of this impact will be determined during agency coordination, and mitigation will be developed as appropriate.

State-Listed Species

Of the 13 State-listed threatened and endangered species that may occur within and adjacent to the project area, seven species would not be affected by the proposed GCL due to the absence of suitable habitat within the project LOD (Table 3.2-5, "State-Listed Threatened and Endangered Species Not Affected by the Proposed GCL").

However, documented and suitable habitat for six State-listed threatened and endangered species would be affected by the proposed GCL (Table 3.2-6, "State-Listed Threatened and Endangered Species Potentially Affected by the Proposed GCL"). Appendix 1-A, "Natural Resources Impact Locations," of Attachment 1, "Natural Resources Technical Report," includes the location of impacts to threatened and endangered species habitat.

Table 3.2-5: State-Listed Threatened and Endangered Species Not Affected by the Proposed GCL

Type	Common Name	Scientific Name	State Status
Plants	Pale Indian Plantain	<i>Arnoglossum atrilicifolium</i>	Endangered
	Putty Root	<i>Aplectrum hyemale</i>	Endangered
	Hairy Wood-Rush	<i>Luzula acuminata</i> var. <i>acuminata</i>	Endangered
	Broad-leaf Ironweed	<i>Vernonia glauca</i>	Endangered
Freshwater Mussels	Eastern Pondmussel	<i>Ligumia nasuta</i>	Threatened
	Tidewater Mucket	<i>Leptodea ochrcea</i>	Threatened
	Yellow Lampmussel	<i>Lampsilis cariosa</i>	Threatened

Source: NJDEP Bureau of Non-game species, Landscape Project Data and New Jersey Natural Heritage Program Correspondence, December 5, 2017.

Table 3.2-6: State-Listed Threatened and Endangered Species Potentially Affected by the Proposed GCL

Type	Common Name	Scientific Name	State Status
Birds	American Kestrel	Flaco sparverius	Threatened
	Bald Eagle	Haliaeetus leucocephalus	Endangered (Breeding)
			Threatened (Non-Breeding)
	Peregrine Falcon	Falco peregrinus	Endangered
	Barred Owl	Strix varia	Threatened
Red-Shouldered Hawk	Buteo lineatus	Endangered	
Plants	Shingle Oak	Quercus imbricaria	Endangered

Source: NJDEP Bureau of Non-game species, Landscape Project Data and New Jersey Natural Heritage Program Correspondence, December 5, 2017.

American Kestrel

Suitable breeding habitat for the American kestrel would be affected by the proposed GCL. The habitat consists of old-field communities located along the GCL within the proposed Glassboro VMF. The implementation of the proposed GCL would disturb approximately 1.91 acres of suitable breeding habitat. Measures can be taken to provide alternative nesting structures for this species within the proposed GCL corridor. The significance of this impact will be determined during agency coordination, and mitigation will be developed as appropriate.

Bald Eagle

There is no record of nesting habitat occurring within the proposed GCL LOD; however, potential wintering and foraging habitat for the bald eagle is associated with Newton Creek, Little Timber Creek, Big Timber Creek, Woodbury Creek, and Mantua Creek. Approximately 3.63 acres of bald eagle foraging habitat occurs within the proposed GCL LOD. However, impacts would primarily be limited to temporary disturbance to over-wintering birds during construction near Little Timber and Big Timber Creeks. The significance of this impact will be determined during agency coordination, and mitigation will be developed as appropriate.

Peregrine Falcon

A documented peregrine falcon nest exists on the Walt Whitman Bridge located approximately ½ mile to the west of the proposed GCL. The project is not anticipated to adversely affect this species.

Barred Owl and Red-Shouldered Hawk

The barred owl and red-shouldered hawk have similar habitat requirements, preferring larger expanses of mature forested habitat. Suitable forested habitat for these species occur within the proposed GCL primarily associated with forested drainage areas of the Mantua Creek and Chestnut Branch. The implementation of the proposed GCL would clear approximately 11.21 acres of suitable breeding and nesting habitat for these species. Measures should be taken to minimize tree clearing when these species may be present within the project area. The significance of this impact will be determined during agency coordination, and mitigation will be developed as appropriate.

Shingle Oak

The proposed GCL would traverse the Wenonah Ravine Natural Heritage Priority Site where two State-endangered shingle oaks have been documented in the immediate vicinity of the proposed GCL. Based

on the 2014 survey, one 16.5-inch diameter at breast height shingle oak was within the proposed GCL clearing limit adjacent to the western side of the track. However, a supplemental survey conducted in October 2020 has determined that the shingle oak may no longer be present at this location. Potential impacts to the species will be determined after the resurvey and during agency coordination, and mitigation will be developed as appropriate.

3.3. MAN-MADE RESOURCES

3.3.1. Principal Conclusions

- **Land Use and Zoning** – The proposed GCL would alter existing land uses at several proposed station locations throughout the corridor and in the City of Camden and Glassboro Borough, where full and partial parcel acquisitions would be undertaken to accommodate new alignment. However, use of the existing Conrail ROW and the location of the new section of alignment along I-676 in Camden by the proposed GCL would minimize property acquisition and displacements. Given that the proposed alignment is primarily located on or along existing railroad rights-of-way, the proposed project would not substantially change the current land uses within the land use and zoning study area.
- **Hazardous Materials** – There are 380 known or potential environmental areas of concern (AOCs) within 300 feet of the LOD, many of which are at the outer boundaries of the 300-foot radius and most likely would not be impacted by or during implementation of the proposed GCL. However, thirty-four sites were identified on or adjacent to the proposed LOD and may be impacted by construction efforts. These sites would require further investigation prior to construction in order to confirm contamination would not be encountered.
- **Transportation** – Most GCL-related impacts would be localized on the streets, at-grade crossings, and selected signalized intersections adjacent to or in the immediate proximity of the proposed GCL. Major roadways that parallel the proposed GCL would see reductions in traffic volumes, while at-grade crossings could potentially have significant impacts on the roadway network adjacent to the proposed GCL. Further, although approximately 376 existing public and private parking spaces would be displaced by the proposed GCL, the project area would experience a net increase in parking spaces. Non-motorized travel options—walking and cycling—would be viable at the large majority of the proposed stations and are further discussed below. The proposed GCL would generate approximately 11,000 new transit trips daily, and existing freight operations would be unaffected.

3.3.2. Land Use and Zoning

The proposed GCL would link activity centers, including downtown Camden, Rutgers—Camden, Cooper Hospital, and Rowan University; employment destinations, including Inspira Health Network, Holt Logistics, and South Jersey Port Corporation properties; established residential areas; and areas identified by New Jersey Department of Community Affairs (NJDCA) as being in need of redevelopment or rehabilitation throughout the 11 land use and zoning study area municipalities. Existing land uses within ½ mile of the proposed alignment, proposed VMFs, and station areas have been evaluated to identify local

context and baseline conditions for the corridor. The analysis of existing land uses was developed using 2015 land use classification data from the Delaware Valley Regional Planning Commission (DVRPC) and 2016 Google Earth imagery. Land use and zoning information was updated in 2020 through online research and field observation.

The GCL would alter existing land uses at several proposed station locations throughout the corridor and in the City of Camden and Glassboro Borough, where full and partial parcel acquisitions would be undertaken to accommodate new alignment. Land use changes at the corridor and station area levels are described below. Potential positive impacts within the proposed station areas include increased access to public transportation, supporting redevelopment opportunities, and the improved integration of transportation and land by developing transit-oriented development (TOD) on underutilized land.

3.3.2.1. Corridor

The proposed 18-mile GCL would operate between Glassboro and Camden within the ROW of an existing Conrail freight alignment, the former Pennsylvania-Reading Seashore Line. The northernmost segment in Camden would follow a new ROW adjacent to I-676 before entering an on-street alignment to reach the Walter Rand Transportation Center (WRTC), where riders could transfer to the Port Authority Transit Corporation (PATCO) Speedline (Broadway Station), the New Jersey Transit (NJ TRANSIT) River LINE, several NJ TRANSIT bus routes, and Greyhound Bus service.

Use of the existing Conrail ROW by the proposed GCL would minimize property acquisition and displacements from Camden to Glassboro. The location of the new section of alignment along I-676 in Camden would result in few property acquisitions and displacements. Within ½ mile of the proposed GCL alignment, there are established communities throughout the corridor. These communities consist of primarily residential and commercial land uses. The proposed GCL alignment through these established communities would encourage growth and economic development consistent with the long-term planning goals at local, State, and regional levels. Given that the proposed alignment is primarily located on or along existing railroad ROW, the proposed project would not substantially change the current land uses within the land use and zoning study area.

Within Gloucester County, as the GCL travels north along the existing Conrail alignment from the proposed station location in Glassboro, direct land use impacts would be limited to the proposed station locations or VMFs.

3.3.2.2. Station Areas

The proposed stations would have beneficial land use and connectivity effects because they support existing transit patrons, attract new transit users, and can serve as a stimulus for future development.

Walter Rand Transportation Center

The existing WRTC facility provides connections to the PATCO Speedline and NJ TRANSIT River LINE. The addition of GCL service at WRTC would have no impact on the existing station area with respect to land use, zoning, parking, or displacements. The GCL Project Team reviewed development potential within the vicinity of the proposed station using DVRPC projections (forecast year 2045) and TOD estimates developed through a review of existing vacant or underutilized properties. A 2017 Delaware River Port Authority (DRPA) report outlines a plan for improvements to WRTC intended to facilitate TOD, improving transit service and passenger convenience. The plan includes a new and redesigned bus terminal, multi-

story development featuring street-level retail, and attractive sidewalk amenities to transform the pedestrian experience. For the City of Camden, DVRPC municipal-wide projections indicate 10.1 percent growth in employment and 2.7 percent growth in population. While redevelopment of properties is anticipated near WRTC, no specific properties were highlighted for TOD.

The existing WRTC facility provides connections to the PATCO Speedline and NJ TRANSIT River LINE. The addition of GCL service at WRTC would have no impact on the existing station area with respect to land use, zoning, or parking. In order to accommodate the proposed station platforms for the GCL, a full acquisition of a commercial parcel at 525 Martin Luther King Boulevard would be necessary, resulting in the displacement of a vacant CVS pharmacy branch. A description of these impacts and proposed mitigation measures is presented in Attachment 12, "Acquisitions and Displacements Technical Report."

Cooper Hospital Station

The GCL Project Team reviewed development potential within the vicinity of the proposed station using DVRPC projections (forecast year 2045) and TOD estimates developed through a review of existing vacant or underutilized properties. For the City of Camden, DVRPC municipal-wide projections indicate 10.1 percent growth in employment and 2.7 percent growth in population. While redevelopment of properties is anticipated near the proposed Cooper Hospital Station, no specific properties were highlighted for TOD.

The proposed Cooper Hospital Station would be located between Haddon Avenue and Pine Street in the City of Camden. The station is anticipated to have a single center platform and would provide access to the Cooper University Hospital complex. The station area would be on an embankment structure built adjacent to the I-676 ROW. A "park-and-ride" facility is not proposed at this location, thus there are no anticipated impacts to existing parking, and no displacements would occur. Impacts to Triangle Park, constructed in 2011, related to the proposed elevated structure are anticipated. A description of these impacts and proposed mitigation measures is presented in Attachment 9, "Parklands Technical Report."

While the area west of the station area is currently zoned for residential use, the surrounding properties are ancillary uses for Cooper Hospital. While this may require a rezoning of the station area, the station would be compatible with adjacent land uses, including those associated with Cooper Hospital to the west and I-676 to the east. Therefore, the proposed station would have no significant impact on existing land uses. Employees of Cooper University Hospital and residents to the south, as well as major employers east of I-676 (NJ TRANSIT, Campbell's Soup) would benefit from increased transit access and mobility.

South Camden Station

The GCL Project Team reviewed development potential within the vicinity of the proposed station using DVRPC projections (forecast year 2045) and TOD estimates developed through a review of existing vacant or underutilized properties. For the City of Camden, DVRPC municipal-wide projections indicate 10.1 percent growth in employment and 2.7 percent growth in population. While redevelopment of properties is anticipated near the proposed South Camden Station, no specific properties were highlighted for TOD.

The proposed South Camden Station would be located adjacent to I-676 and east of South 6th Street. The elevated station would include a single center platform with access to Ferry Avenue to the south and Carl Miller Boulevard to the north. The station area would be built within an existing ROW. Therefore, there are no anticipated impacts to existing parking, and no displacements are anticipated.

The station is compatible with adjacent land uses, including numerous vacant parcels to the west and I-676 to the east, therefore the proposed station would have no significant impact on existing land uses. Residents of the Waterfront South and Centerville neighborhoods would benefit from increased transit access and mobility.

Gloucester City Station

The GCL Project Team reviewed development potential within the vicinity of the proposed station using DVRPC municipal-wide projections (forecast year 2045) and TOD estimates developed through a review of existing vacant or underutilized properties. For Gloucester City, DVRPC projections indicate 34.7 percent growth in employment and a 0.1 percent decline in population. Further, TOD estimates completed as part of this effort indicated several TOD-eligible properties located near the proposed Gloucester City Station.

The proposed Gloucester City Station would be located between Market Street and Cumberland Street. The at-grade station would include a single center platform, providing connections to adjacent land uses. The station area would be built within an existing ROW. The proposed station is expected to create parking demand and to impact 41 local parking spaces, public and private. The proposed project plans to construct 70 local surface parking spaces to meet demand and to offset the anticipated parking impact. There are no anticipated impacts to land uses, and no displacements would occur.

The station is generally compatible with surrounding land uses and is in an area appropriate for commercial development. Accommodations for adjacent residential properties along Cumberland Street may require additional consideration during station design. Gloucester City residents and visitors to the Gloucester City Historic District would benefit from increased transit access and mobility.

Crown Point Road Station

The GCL Project Team reviewed development potential within the vicinity of the proposed station using DVRPC projections (forecast year 2045) and TOD estimates developed through a review of existing vacant or underutilized properties. For Gloucester City, DVRPC municipal-wide projections indicate 16.0 percent growth in employment and 14.0 percent growth in population. Further, TOD estimates completed as part of this effort indicated several TOD-eligible properties located near the proposed Crown Point Road Station.

The proposed Crown Point Road Station would be located between New Jersey Route 45 and Broadway near Willow Drive. The at-grade station would include a single center platform with access to the adjacent potential transit-supportive development and residential areas to the east and west. The station area is not expected to impact existing land uses. The proposed station is expected to create parking demand and to impact 49 private parking spaces. The proposed project plans to construct 330 surface parking spaces by 2040 to meet demand and to offset the anticipated parking impact. However, the proposed surface parking lot would be located on several vacant and underutilized parcels and use of these parcels would require acquisition. There are no expected impacts to land uses, and no displacements would occur.

The station is compatible with surrounding land uses and is in an area appropriate for commercial development. Westville residents, located to the east of the proposed station, would benefit from increased transit access and mobility.

Red Bank Avenue Station

The GCL Project Team reviewed development potential within the vicinity of the proposed station using DVRPC projections (forecast year 2045) and TOD estimates developed through a review of existing vacant or underutilized properties. For Woodbury, DVRPC municipal-wide projections indicate 0.8 percent growth in employment and 4.4 percent growth in population. Further, TOD estimates completed as part of this effort indicated several TOD-eligible properties located near the proposed Red Bank Avenue Station.

The proposed Red Bank Avenue Station would be located north of Red Bank Avenue west of Evergreen Avenue. The above-grade station would include a single center platform with access to existing commercial areas along Red Bank Avenue. The proposed station is expected to generate demand for parking but is not expected to impact local parking spaces (public and private). The proposed project plans to meet demand by providing 500 surface parking spaces by 2040 as a part of municipal redevelopment master plans that address shared parking facilities. There are no expected impacts to land uses, and no displacements would occur.

The station is compatible with surrounding land uses and is in an area appropriate for commercial development. Existing businesses along Red Bank Avenue and Woodbury residents to the north would benefit from increased transit access, which could strengthen this area as a location for commercial activity.

Woodbury Station

The GCL Project Team reviewed development potential within the vicinity of the proposed station using DVRPC projections (forecast year 2045) and TOD estimates developed through a review of existing vacant or underutilized properties. For Woodbury, DVRPC municipal-wide projections indicate 0.8 percent growth in employment and 4.4 percent growth in population. Further, TOD estimates completed as part of this effort indicated several TOD-eligible properties located near the proposed Woodbury Station.

The proposed Woodbury Station would be located adjacent to Green Avenue and south of Cooper Street. The at-grade station would include a single center platform with connections to existing uses along Green Avenue and Railroad Avenue. The proposed station is expected to generate parking demand and to impact 110 local public parking spaces. It is anticipated that a 1,200 parking space garage would be built by 2040 as a part of municipal redevelopment master plans that address shared parking facilities. There are no expected impacts to existing land use, and no displacements would occur.

The station is compatible with surrounding land uses and is in an area appropriate for commercial development. Woodbury residents to the north and west of the proposed station would benefit from increased transit access, which could strengthen this area as a location for commercial activity.

Woodbury Heights Station

The GCL Project Team reviewed development potential within the vicinity of the proposed station using DVRPC projections (forecast year 2045) and TOD estimates developed through a review of existing vacant or underutilized properties. For Woodbury Heights Borough, DVRPC municipal-wide projections indicate 1.9 percent growth in employment and 7.6 percent growth in population. While redevelopment of properties is anticipated near the proposed Woodbury Heights Station, no specific properties were highlighted for TOD.

The proposed Woodbury Heights Station would be located along West Jersey Avenue near Elm and Oak Avenues. The at-grade station would include two side platforms with access to existing residential areas to the west and potential transit-supportive developments to the east. The proposed station is expected to generate additional parking demand and to impact ten local private parking spaces. To mitigate this impact, the proposed project plans to provide 50 surface parking spaces by 2040 to meet demand and offset the anticipated parking impact as a part of municipal redevelopment master plans that address shared parking facilities. There are no significant impacts to land uses, and no displacements would occur. The station area is zoned residential, which means that a rezoning would likely be necessary.

Residents of Woodbury Heights to the east and west, as well as Deptford Township residents to the west, would benefit from increased transit access which would also strengthen the vacant areas east of the station area.

Wenonah Station

The GCL Project Team reviewed development potential within the vicinity of the proposed station using DVRPC projections (forecast year 2045) and TOD estimates developed through a review of existing vacant or underutilized properties. For Wenonah Borough, DVRPC municipal-wide projections indicate 14.6 percent growth in employment and 14.8 percent growth in population. While redevelopment of properties may occur near the proposed Wenonah Station, no specific properties were highlighted for TOD.

The proposed Wenonah Station would be located adjacent to North West and North East Avenues and north of Mantua Avenue. The at-grade station would include two side platforms. The proposed station is expected to affect 11 local public parking spaces, which would be removed with the construction of the proposed station area. ~~While no mitigation measures are proposed as a part of the GCL,~~ It is assumed that on street parking would continue to be allowed on East Avenue where the 11 existing head-in parking spaces currently are, resulting in a ~~negligent~~ negligible impact to parking in the area. Parking surveys would be conducted as part of preliminary engineering, and mitigation (e.g., creation of new parking spaces) would be developed as necessary. For more information on parking and traffic impacts, see Attachment 5, "Traffic Analysis Technical Report." There are no anticipated impacts to land uses and no displacements would occur.

Residents of Wenonah would benefit from increased transit access, especially residents within walking distance of the station area.

Mantua Boulevard Station

The GCL Project Team reviewed development potential within the vicinity of the proposed station using DVRPC projections (forecast year 2045) and TOD estimates developed through a review of existing vacant or underutilized properties. For Mantua Township, DVRPC municipal-wide projections indicate 57.4 percent growth in employment and 44.3 percent growth in population. While redevelopment of properties is anticipated near the proposed Mantua Boulevard Station, no specific properties were highlighted for TOD.

The proposed Mantua Boulevard Station would be located along Mantua Boulevard (CR 676). The at-grade station is anticipated to have two side platforms and would be built within an existing ROW. The station area is in an area zoned for Light Industrial development. The proposed project is anticipated to construct 700 surface parking spaces by 2040 to meet projected demand. However, the proposed surface parking lot would be located on a vacant parcel and use of the parcel would require acquisition. There

are no anticipated impacts to existing parking or land uses and no displacements would occur. Proximate residential areas east of the proposed station would be considered during station design.

Residents of Mantua Township would benefit from the proposed station that is anticipated to provide increased transit access.

Sewell Station

The GCL Project Team reviewed development potential within the vicinity of the proposed station using DVRPC projections (forecast year 2045) and TOD estimates developed through a review of existing vacant or underutilized properties. For Mantua Township, DVRPC municipal-wide projections indicate 57.4 percent growth in employment and 44.3 percent growth in population. Further, TOD estimates completed as part of this effort indicated several TOD-eligible properties located near the proposed Sewell Station.

The proposed Sewell Station would be located adjacent to West Atlantic and Atlantic Avenues, north of Center Street. The at-grade station would include two side platforms and would be in the Sewell portion of Mantua Township. The station area would be built within existing ROW; there are no anticipated impacts to existing parking, and no displacements would occur. Most of the proposed station area is zoned residential, with a small area to the east of the proposed station zoned as neighborhood commercial. A rezoning of the station area would be required unless it is permitted as a conditional use. The station area is north of an area zoned for commercial development. The proposed station area would not have an impact on existing land uses.

Residents of Sewell would benefit from a proposed station that is anticipated to provide increased transit access for many residents, as well as potential commercial development south of the proposed station.

Mantua-Pitman Station

The GCL Project Team reviewed development potential within the vicinity of the proposed station using DVRPC projections (forecast year 2045) and TOD estimates developed through a review of existing vacant or underutilized properties. For Mantua Township, DVRPC municipal-wide projections indicate 57.4 percent growth in employment and 44.3 percent growth in population. Further, TOD estimates completed as part of this effort indicated several TOD-eligible properties located near the proposed Mantua-Pitman Station.

The proposed Mantua-Pitman Station would be located on Lambs Road east of New Jersey Route 55 and south of Woodbury-Glassboro Road (CR 553). The at-grade station would include two side platforms. The station area would be built within existing ROW in an area zoned for industrial uses. The proposed project is anticipated to construct 1,200 garage parking spaces by 2040 to meet projected demand. However, the proposed parking garage would be located on a vacant parcel and use of the parcel would require acquisition. There are no anticipated impacts to existing parking or land uses, and no displacements would occur. Residents of Mantua Township, Pitman Borough, and Washington Township would benefit from the proposed station that is anticipated to provide increased transit access.

Pitman Station

The GCL Project Team reviewed development potential within the vicinity of the proposed station using DVRPC projections (forecast year 2045) and TOD estimates developed through a review of existing vacant

or underutilized properties. For Pitman Borough, DVRPC municipal-wide projections indicate 17.3 percent growth in employment and 11.4 percent growth in population. Further, TOD estimates completed as part of this effort indicated several TOD-eligible properties located near the proposed Pitman Station.

The proposed Pitman Station would be located adjacent to Commerce Avenue between Pitman and East Holly Avenues. The at-grade station would include two side platforms and is generally centrally located within Pitman Borough. The station area would be built within an existing ROW. The proposed station would have a significant impact on parking with the removal of 110 local private and public parking spaces within the station area. Parking surveys would be conducted as part of preliminary engineering, and mitigation (e.g., creation of new parking spaces) would be developed as necessary. There are no impacts to land uses, and no displacements would occur. ~~however, displacement associated with the acquisition of a single parcel adjacent to the station area would be necessary.~~

The station would be compatible with surrounding land uses and is located in an area appropriate for commercial development. Therefore, there are no impacts to existing zoning. Pitman residents and visitors would benefit from increased transit access and mobility, as well as potential commercial developments located in the vicinity of the station area.

Rowan University Station

The GCL Project Team reviewed development potential within the vicinity of the proposed station using DVRPC projections (forecast year 2045) and TOD estimates developed through a review of existing vacant or underutilized properties. For Glassboro Borough, DVRPC municipal-wide projections indicate 41.1 percent growth in employment and 31.6 percent growth in population. While redevelopment of properties is anticipated near the proposed Rowan University Station, no specific properties were highlighted for TOD.

The proposed Rowan University Station would be located on the southwestern corner of the campus of Rowan University next to the intersection of Girard Road and U.S. Route 322. The at-grade station would include two side platforms. The station area would be built within existing ROW. The proposed station would impact parking through the removal of three local private parking spaces within the station area. ~~While no mitigation measures are proposed as a part of the GCL,~~ It is assumed that the remainder of existing parking at this location would sufficiently serve Rowan University, resulting in a ~~negligent~~ negligible impact to parking in the area. Parking surveys would be conducted as part of preliminary engineering, and mitigation (e.g., creation of new parking spaces) would be developed as necessary. For more information on parking and traffic impacts, see Attachment 5, "Traffic Analysis Technical Report." There would be no impacts to existing land uses, and no displacements would occur.

The station would be compatible with surrounding land uses. Rowan University students and employees would benefit from increased transit access.

Glassboro Station

The GCL Project Team reviewed development potential within the vicinity of the proposed station using DVRPC projections (forecast year 2045) and TOD estimates developed through a review of existing vacant or underutilized properties. For Glassboro Borough, DVRPC municipal-wide projections indicate 41.1 percent growth in employment and 31.6 percent growth in population. While redevelopment of properties is anticipated near the proposed Rowan University Station, no specific properties were highlighted for TOD. Further, TOD estimates completed as part of this effort indicated several TOD-eligible properties located near the proposed Glassboro Station.

The proposed Glassboro Station would be located between South Main and Academy Streets, south of High Street. The at-grade station would include two side platforms and is in downtown Glassboro. The station area would be built within existing ROW. The proposed station would generate demand and impact 25 local private parking spaces located within the land use and zoning study area. It is anticipated that a 1,000 parking space garage would be constructed by 2040 to meet projected demand as a part of municipal redevelopment master plans that address shared parking facilities. There would be no impacts to existing land uses. Multiple displacements are anticipated at this proposed station location, including whole or partial displacements of several parcels. The station area is mostly zoned residential, which would require rezoning. However, the station area is also located in a redevelopment area, indicating the potential for reuse in the proposed station area and, therefore, there are no adverse impacts to existing land uses.

3.3.2.3. Vehicle Maintenance Facilities

Woodbury Heights Borough

The proposed VMF would be located on a former light industrial site bounded by Chestnut Avenue to the south, Academy Avenue to the east, the proposed GCL alignment to the west, and a currently vacant wooded area to the north.

The Woodbury Heights VMF area is zoned Residential-Age Restricted; therefore, a rezoning would be necessary, given that the only permitted use in this zone is multi-family age-restricted residential units. Land use and zoning impacts could arise with the proposed GCL, but these would be avoided and/or mitigated through rezoning and also facility design, including appropriate mitigation of ambient noise emitted from the facility. Use of this property as a VMF would require acquisition of the parcel. There are no displacements associated with the VMF, as the parcel is currently vacant.

Glassboro Borough

The GCL Project Team reviewed development potential within the vicinity of the proposed station using DVRPC projections (forecast year 2045) and TOD estimates developed through a review of existing vacant or underutilized properties. For Glassboro Borough, DVRPC municipal-wide projections indicate 41.1 percent growth in employment and 31.6 percent growth in population. While redevelopment of properties is anticipated near the proposed Rowan University Station, no specific properties were highlighted for TOD. Further, TOD estimates completed as part of this effort indicated several TOD-eligible properties located near the proposed Glassboro Station.

The proposed VMF would be located on Sewell Street, on the current location of the Route 55 Industrial Center. The Glassboro VMF area is zoned Industrial and, therefore, there are no impacts to zoning. There are land use impacts given the proximity of residential areas to the east of the proposed VMF. However, these would be mitigated in the design of the facility, including appropriate mitigation of ambient noise emitted from the facility. Use of this property as a VMF would require acquisition and displacement of several parcels. For additional information on property impacts, refer to Attachment 12, "Acquisitions and Displacements Technical Report."

3.3.3. Hazardous Materials

Based on the findings of the Environmental Data Resources, Inc. (EDR) report and NJDEP databases, there are 380 AOCs within 300 feet of the LOD. Many of these sites are at the outer boundaries of the 300-foot radius and most likely would not be impacted by or during construction of the proposed GCL. However, 34 sites were identified on or adjacent to the proposed LOD and may be impacted by construction efforts. These sites were cross-referenced with the information provided from the environmental databases. Table 1, "Known or Potential Contaminated Sites Expected to be Impacted by the Proposed Alignment," in Attachment 4, "Hazardous Materials Technical Report," lists the sites within the LOD and identifies the site address and rationale for listing the AOC as having the potential to be impacted by construction. The 34 sites listed would require further investigation prior to construction in order to confirm contamination would not be encountered. An Open Public Records Act (OPRA) request may be submitted to NJDEP for the sites that may be impacted during construction efforts. The information gathered during OPRA file review would provide a better understanding of the sites and whether sampling or further investigation would be necessary prior to construction. Appendix 4-A, "Complete Table of Known or Potential Contaminated Sites Expected to be Impacted by the Proposed Alignment," of Attachment 4, "Hazardous Materials Technical Report," includes all 380 sites identified in the database searches within the 300-foot radius of the LOD.

There are five Classification Exception Areas (CEAs), ten active Known Contaminated Site List (KCSL) sites, though two are pending assignment of Licensed Site Remediation Professionals (LSRPs), one Deed Notice, and 31 EDR identified sites that overlap with the LOD and may be impacted by construction efforts. The sites identified in Table 4-1 in Attachment 4, "Hazardous Materials Technical Report," do not include all sites within or adjacent to the LOD, rather only those that have the potential to be impacted by construction. Further investigation of these sites would be necessary in order to understand the depth of contamination and the contaminants of concern to make certain contamination is not encountered, or that mitigation measures are in place.

Additionally, the proposed GCL would be assigned as a Linear Construction Project (LCP) in accordance with NJDEP Linear Construction Technical Guidance (dated January 2012) by completing the Initial LCP Notification Form and assigning a LSRP for the project. The LSRP would make sure the proposed project would be compliant with NJDEP's SRRA, N.J.S.A. 58:10C-1 et seq. requirements, including the TRSR N.J.A.C. 7:26E. A Materials Management Plan (MMP) would be prepared to handle contaminated media during construction and site restoration to prevent exposure to remaining contamination. After construction, the LSRP would submit a final report to NJDEP within 180 days of construction completion to document that the rules and guidance were followed.

3.3.4. Transportation

3.3.4.1. Traffic

Projected traffic in the future with the GCL is higher than in the No-Action Scenario at the northern end of the alignment (from Camden to Gloucester City) and at the southern end of the alignment (from Pitman and Glassboro). However, projected traffic in the future with the GCL is lower than in the No-Action Scenario from Westville to Sewell because of the assumed number of drivers switching to the proposed GCL. The future year growth factors to be used in the 2025 and 2040 Build analyses are presented in Table 3.3-1, "A.M./P.M. Future-Year Growth Factors (Growth from 2017)." Additional information regarding the development of the future year traffic volumes can be found in Section 7.4, "Modeling Results," of

Attachment 5, “Traffic Analysis Technical Report.” These two factors result in changes, as defined in Section 7.2, “Operational Modeling,” of Attachment 5, “Traffic Analysis Technical Report,” to the operations of roadway intersections. Information on forecasted ridership on existing services and the GCL can be found in Attachment 6, “Transit Analysis Technical Report.”

Table 3.3-1: A.M./P.M. Future-Year Growth Factors (Growth from 2017)

Modeling District	2025 Build		2040 Build	
	A.M.	P.M.	A.M.	P.M.
Camden	1.067	1.070	1.147	1.139
South Camden	1.053	1.042	1.100	1.080
Gloucester City	1.031	1.041	1.100	1.103
Westville	1.004	1.016	1.045	1.059
Woodbury	1.062	1.051	1.088	1.074
Woodbury Heights	1.006	0.999	1.025	1.016
Wenonah	0.859	0.930	0.872	0.941
Pitman	0.931	0.975	0.943	0.987
Glassboro	0.989	0.999	1.001	1.010

Source: DVRPC’s Glassboro-Camden Line Regional Model, 2017; STOPS Model, 2018

Intersection Analysis

The Level-of-Service (LOS) intersection results for the future with the GCL are presented in Table 3.3-2, “Future Year 2025 GCL Overall Intersection Results,” and in Table 3.3-3, “Future Year 2040 GCL Overall Intersection Results.” Due to the reduction in traffic for the future with the GCL noted above, roadway and intersection delays with the GCL are generally lower compared to the No-Action condition at locations where no new trips would be generated by GCL stations and parking facilities; they are generally higher compared to the No-Action condition at locations where new drive access trips would be anticipated as a direct result of the proposed GCL parking facilities. However, several locations experienced negative traffic growth in the future with the GCL but also generate traffic due to parking facility activity. Further, optimization of traffic signal timing splits was included as part of the analysis and is reflected in the results.

The intersection of Broadway Boulevard and Delsea Drive (New Jersey 47) in Westville would continue, as shown in the No-Action results, to operate at a LOS F during the A.M. peak hour for the year 2025 as well as 2040, primarily due to the northbound right-turn movement where a queue persists throughout most of the peak hour. The intersection of East Barber Avenue and South Evergreen Avenue in Woodbury operates at a LOS E for the 2025 A.M. peak, LOS F in the 2025 P.M. peak, and LOS E in the 2040 P.M. peak. High demand exists for the eastbound, northbound, and southbound approaches relative to the available lane use, resulting in volumes exceeding capacity and substantial delay. In the 2040 A.M. condition, although the overall intersection operates at acceptable LOS D, high demand exists for the westbound and northbound approaches. The intersection of Cooper Street and S. Evergreen Avenue in Woodbury operates at LOS E in the 2025 P.M. peak, primarily due to high demand and LOS E for the eastbound and southbound approaches. The LOS at the intersection of Mullica Hill Road (U.S. 322) and Bowe Boulevard in Glassboro operates at LOS F during both peak hours in the No-Action condition and future with the GCL in 2025 and 2040, due in large part to the growth proposed at Rowan University. The eastbound approach is still particularly sensitive to traffic growth, as noted above. All other intersections operate with acceptable LOS D or better in both A.M. and P.M. peaks in 2025 and 2040.

Table 3.3-2: Future Year 2025 GCL Overall Intersection Results

Intersection Municipality	A.M. Peak Hour			P.M. Peak Hour		
	Volume	LOS	Delay (sec)	Volume	LOS	Delay (sec)
Haddon Avenue and Cooper Plaza Camden	1,246	B	15.0	1,429	B	18.6
Broadway and Ferry Avenue-Jasper Street South Camden	502	B	14.6	769	B	18.0
N Broadway at Hudson Street Gloucester City	268	B	19.4	328	C	20.1
S. Broadway (CR 551) at Monmouth Street Gloucester City	630	B	19.3	626	B	17.3
Market Street (CR 537 S) at S. Broadway (CR551) Gloucester City	1,168	C	24.3	959	C	25.9
S. Broadway (CR 551) at Koehler Street Gloucester City	252	B	11.5	496	B	12.9
Broadway Boulevard (CR 551) at Delsea Drive (New Jersey 47) Westville	1,756	F	248.6	1,763	B	12.9
Broadway Boulevard (CR 551) at E. Olive Street Westville	854	B	15.7	984	B	15.1
N. Broad Street at Edith Avenue Woodbury	959	A	3.6	1,330	A	6.2
E. Red Bank Avenue at N. Evergreen Avenue (CR 650) Woodbury	1,739	C	22.3	2,414	E	56.6
E. Red Bank Avenue at N. Broad Street (New Jersey 45) Woodbury	2,443	D	35.1	2,386	C	28.8
Cooper Street (CR 534) at S. Broad Street (New Jersey 45) Woodbury	2,251	D	41.1	2,313	D	42.6
Cooper Street (CR 534) at S. Evergreen Avenue (CR 553) Woodbury	1,767	B	18.4	2,637	E	57.2
S. Broad Street (New Jersey 45) at E. Barber Avenue Woodbury	1,141	D	37.1	2,066	D	37.8
E. Barber Avenue at S. Evergreen Avenue (CR 553) Woodbury	1,964	E	79.3	2,334	F	131.8
Mantua Boulevard (CR 676) at Center Street Sewell	1543	B	13.5	1,935	B	19.4
Tylers Mill Road at Glassboro Road Mantua	2,538	C	33.8	2,694	C	25.0
Lambs Road at Main Street Mantua	765	B	14.8	1,069	B	13.8
Woodbury Glassboro Road and Lambs Road Mantua	2,127	C	34.3	2,601	C	32.6
Broadway Boulevard (CR 551) at Holly Avenue Pitman	682	B	15.3	1,056	B	17.7
Pitman Avenue (CR 639) at S. Broadway (CR 553A) Pitman	460	A	6.3	666	A	9.1
Bowe Boulevard at Carpenter Street (CR 682) Glassboro	1,503	B	16.5	1,842	B	15.8
Mullica Hill Road (U.S. 322) at Bowe Boulevard Glassboro	1,983	F	114.3	2,452	F	118.9

Table 3.3-2: Future Year 2025 GCL Overall Intersection Results (Continued)

Intersection Municipality	A.M. Peak Hour			P.M. Peak Hour		
	Volume	LOS	Delay (sec)	Volume	LOS	Delay (sec)
Delsea Drive (New Jersey 47) at High Street (U.S. 322) Glassboro	1,733	C	27.4	2,345	C	29.7
High Street E. at S. Main Street (CR 553) Glassboro	1,557	C	21.6	1,976	D	38.8
Master Street and Ferry Avenue South Camden	490	A	Unsig.	573	A	Unsig.
Broadway Boulevard (CR 551) at Duncan Avenue Westville	610	A	Unsig.	636	A	Unsig.
N. Broad Street at Park Avenue Woodbury	1,395	A	Unsig.	1,705	A	Unsig.
E. Barber Avenue at Railroad Avenue Woodbury	801	A	Unsig.	935	B	Unsig.
Cooper Street (CR 534) at Railroad Avenue Woodbury	750	A	Unsig.	1,429	A	Unsig.
Elm Avenue (CR 652) at W. Jersey Avenue Woodbury Heights	892	B	Unsig.	978	C	Unsig.
N. East Avenue at E. Mantua Avenue (CR 632) Wenonah	896	A	Unsig.	842	A	Unsig.
Atlantic Avenue at Center Street Mantua	641	A	Unsig.	1,047	A	Unsig.
Tylers Mill Road at Main Street Mantua	553	A	Unsig.	888	A	Unsig.
S. Broadway (CR 551) at Laurel Avenue Pitman	481	A	Unsig.	777	A	Unsig.
Bowe Boulevard at N. Campus Drive Glassboro	1,096	A	Unsig.	1,547	A	Unsig.
Ellis Street at Sewell Street Glassboro	635	A	Unsig.	762	A	Unsig.
High Street at Academy Street Glassboro	743	A	Unsig.	646	A	Unsig.
Main Street at Union Street/Church Street Glassboro	719	B	Unsig.	823	B	Unsig.

Source: GCL Team Traffic Analysis, 2018

Table 3.3-3: Future Year 2040 GCL Overall Intersection Results

Intersection Municipality	A.M. Peak Hour			P.M. Peak Hour		
	Volume	LOS	Delay (sec)	Volume	LOS	Delay (sec)
Haddon Avenue and Cooper Plaza Camden	1,259	B	15.1	1,443	C	23.5
Broadway and Ferry Avenue-Jasper Street South Camden	514	B	14.7	777	B	18.1
N Broadway at Hudson Street Gloucester City	270	B	19.4	331	C	20.1
S. Broadway (CR 551) at Monmouth Street Gloucester City	639	B	19.6	633	B	17.4
Market Street (CR 537 S) at S. Broadway (CR551) Gloucester City	1,184	C	24.6	971	C	26.1
S. Broadway (CR 551) at Koehler Street Gloucester City	256	B	11.5	502	B	12.8
Broadway Boulevard (CR 551) at Delsea Drive (New Jersey 47) Westville	1,800	F	177.0	1,791	B	13.0
Broadway Boulevard (CR 551) at E. Olive Street Westville	871	B	15.9	999	B	15.6
N. Broad Street at Edith Avenue Woodbury	983	A	3.6	1,357	A	6.2
E. Red Bank Avenue at N. Evergreen Avenue (CR 650) Woodbury	1,780	C	22.8	2,468	E	47.8
E. Red Bank Avenue at N. Broad Street (New Jersey 45) Woodbury	2,505	D	36.9	2,441	C	30.3
Cooper Street (CR 534) at S. Broad Street (New Jersey 45) Woodbury	2,289	D	41.6	2,368	D	42.5
Cooper Street (CR 534) at S. Evergreen Avenue (CR 553) Woodbury	1,785	B	19.0	2,699	D	53.7
S. Broad Street (New Jersey 45) at E. Barber Avenue Woodbury	1,164	D	40.4	2,110	D	38.4
E. Barber Avenue at S. Evergreen Avenue (CR 553) Woodbury	2,014	D	52.9	2,386	E	64.1
Mantua Boulevard (CR 676) at Center Street Sewell	1,645	B	14.5	2,051	C	21.6
Tylers Mill Road at Glassboro Road Mantua	2,653	D	38.2	2,798	C	27.9
Lambs Road at Main Street Mantua	797	B	15.0	1,108	B	13.9
Woodbury Glassboro Road and Lambs Road Mantua	2,184	D	35.5	2,703	C	32.4
Broadway Boulevard (CR 551) at Holly Avenue Pitman	713	B	15.4	1,094	B	18.0
Pitman Avenue (CR 639) at S. Broadway (CR 553A) Pitman	507	A	7.1	690	A	9.1
Bowe Boulevard at Carpenter Street (CR 682) Glassboro	1,613	B	17.9	1,962	B	19.7
Mullica Hill Road (U.S. 322) at Bowe Boulevard Glassboro	2,130	F	102.4	2,611	F	87.1
Delsea Drive (New Jersey 47) at High Street (U.S. 322) Glassboro	1,866	C	29.0	2,494	C	34.5

Table 3.3-3: Future Year 2040 GCL Overall Intersection Results (Continued)

Intersection Municipality	A.M. Peak Hour			P.M. Peak Hour		
	Volume	LOS	Delay (sec)	Volume	LOS	Delay (sec)
High Street E. at S. Main Street (CR 553) Glassboro	1,677	C	24.8	2,102	D	49.9
Master Street and Ferry Avenue South Camden	564	A	Unsig.	583	A	Unsig.
Broadway Boulevard (CR 551) at Duncan Avenue Westville	624	A	Unsig.	643	A	Unsig.
N. Broad Street at Park Avenue Woodbury	1,429	B	Unsig.	1,742	A	Unsig.
E. Barber Avenue at Railroad Avenue Woodbury	820	A	Unsig.	956	B	Unsig.
Cooper Street (CR 534) at Railroad Avenue Woodbury	776	A	Unsig.	1,466	A	Unsig.
Elm Avenue (CR 652) at W. Jersey Avenue Woodbury Heights	930	B	Unsig.	1,022	B	Unsig.
N. East Avenue at E. Mantua Avenue (CR 632) Wenonah	953	A	Unsig.	891	A	Unsig.
Atlantic Avenue at Center Street Mantua	686	A	Unsig.	1,110	A	Unsig.
Tylers Mill Road at Main Street Mantua	577	A	Unsig.	920	A	Unsig.
S. Broadway (CR 551) at Laurel Avenue Pitman	622	A	Unsig.	805	A	Unsig.
Bowe Boulevard at N. Campus Drive Glassboro	1,178	A	Unsig.	1,647	A	Unsig.
Ellis Street at Sewell Street Glassboro	683	A	Unsig.	812	A	Unsig.
High Street at Academy Street Glassboro	798	A	Unsig.	688	A	Unsig.
Main Street at Union Street/Church Street Glassboro	773	B	Unsig.	875	C	Unsig.

Source: GCL Team Traffic Analysis, 2018

For the WRTC VISSIM analysis area, LOS results are reported by approach for the three signalized intersections along MLK Boulevard, as shown in Table 3.3-4, “2025 GCL VISSIM Results at MLK Boulevard Intersections,” and Table 3.3-5, “2040 GCL VISSIM Results at MLK Boulevard Intersections.” Several movements at these intersections would operate with unacceptable LOS of E or F.

Table 3.3-4: 2025 GCL VISSIM Results at MLK Boulevard Intersections

Intersection	Approach	A.M. Peak Hour			P.M. Peak Hour		
		Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS
Haddon Ave	EB	464	27.1	C	923	24.9	C
	SB	398	65.9	E	579	57.7	E
	WB	1,080	72	E	410	36.4	D
	NB	507	68.1	E	672	48	D
	Total	2,449	61.7	E	2,584	40.1	D
Cooper Hospital Driveway/ S. 6 th Street	NB	158	80.8	F	154	75.1	E
	EB	331	5.9	A	855	6.2	A
	WB	930	36.9	D	426	25.8	C
	Total	1,419	34.6	C	1,435	19.4	B
Broadway	NB	217	18.7	B	250	20.4	C
	EB	304	11	B	795	13.7	B
	SB	250	24.7	C	309	26.7	C
	WB	697	40.8	D	322	42.7	D
	Total	1,468	28.6	C	1,676	22.7	C

Source: GCL Project Team, Traffic Analysis, 2018

Table 3.3-5: 2040 GCL VISSIM Results at MLK Boulevard Intersections

Intersection	Approach	A.M. Peak Hour			P.M. Peak Hour		
		Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS
Haddon Avenue	EB	497	26.2	C	950	23.2	C
	SB	406	60.4	E	585	57.7	E
	WB	1,164	60.3	E	415	35.9	D
	NB	516	59.3	E	680	52.4	D
	Total	2,583	53.6	D	2,630	40.4	D
Cooper Hospital Driveway/ S. 6 th Street	NB	160	79.3	E	156	77.6	E
	EB	353	5.1	A	864	6	A
	WB	997	36.1	D	430	23	C
	Total	1,510	33.4	C	1,450	18.7	B
Broadway	NB	221	18.4	B	254	20	B
	EB	308	11.3	B	804	14.2	B
	SB	255	25.5	C	312	27	C
	WB	759	46.8	D	324	48	D
	Total	1,543	32.1	C	1,694	23.9	C

Source: GCL Project Team Traffic Analysis, 2018

Grade Crossings

The proposed GCL operations include up to 16 trains per hour (eight per direction) during the peak hour, with trains running continuously from 5:00 A.M. to 12:00 A.M. The GCL Project Team estimates that delays at-grade crossings resulting from GCL service will range between 40 and 80 seconds for each train movement and corresponding gate activation. The variance is based on factors including, but not limited to, anticipated operating speed, time required for raising/lowering crossing gates, and proximity to stations.

Table 3.3-6, "Traffic Impacts At-Grade Crossings with the GCL 2025," and Table 3.3-7, "Traffic Impacts At-Grade Crossings with the GCL 2040," present the anticipated 2025 and 2040 LOS, respectively, at at-grade crossings in the future with the GCL. The at-grade crossings listed are those identified as "high impact" in Table 9, "Grade Crossing Inventory and Screening," in Attachment 5, "Traffic Analysis Technical Report." Also included with the LOS results are the expected traffic volume at the approach with the highest traffic volume; anticipated vehicle delay (in seconds); and maximum anticipated queue length (feet). At-grade crossing delays vary widely along the GCL corridor due to train blockage time, roadway traffic volume, and other factors that may reduce roadway capacity, such as heavy pedestrian crossing activity. These at-grade crossings would effectively be new traffic control devices, and delay is measured in seconds. Any comparison to existing LOS must consider that there is no light rail service currently.

The results of the analysis reveal that there would be minor delays throughout the corridor, with most at-grade crossings operating at LOS A or LOS B with delays up to 21 seconds per vehicle. The grade crossing at Bowe Boulevard in Glassboro would operate at LOS B with an approximate 18.5 second delay per vehicle in the A.M. period of the 2025 future with the GCL, which decreases to just under 12 seconds in 2040. The most significant delays would be at the Mullica Hill Road (U.S. 322) grade crossing in Glassboro, which would operate at LOS E with approximately 72.5 seconds of delay per vehicle in the P.M. peak hour of the 2040 future with the GCL. This delay is largely due to a high volume of traffic leaving Rowan University. Queues over one-quarter mile could result at both crossings.

Impacts at grade crossings may be mitigated through several potential countermeasures. To a small degree, adaptations in driver behavior may reduce delay if drivers seek alternative routes, such as those in Woodbury, where nearby parallel routes feature grade separation. The analysis of anticipated impacts also conservatively estimates train schedules with no overlapping northbound and southbound movements. Where the GCL movements coincide, roadway blockage time may be overestimated by this analysis. At locations where queuing is expected to result in an impact at nearby intersections, potential mitigation measures that could reduce delays at impacted at-grade crossings include: installing "Do Not Block the Box" signing and pavement markings to encourage motorists to keep intersections clear; and physical roadway improvements where extensive queuing and delays are expected, such as U.S. 322 near Bowe Boulevard. All grade crossings would be upgraded with four point gates and signal equipment to optimize traffic flow.

Table 3.3-6: Traffic Impacts At-Grade Crossings with the GCL 2025

Roadway Name Closest Station	A.M. Peak Hour				P.M. Peak Hour			
	Volume	Delay (sec)	Max Queue (ft)	LOS	Volume	Delay (sec)	Max Queue (ft)	LOS
Market Street Gloucester City	182	6.73	83	A	241	6.42	122	A
Olive Street Crown Point Road	219	6.35	110	A	241	6.46	121	A
Cooper Street Woodbury	851	20.27	1,217	C	714	16.75	538	B
E. Barber Avenue Woodbury	200	6.67	88	A	311	6.44	104	A
Elm Avenue Woodbury	361	7.50	177	A	442	7.03	171	A
Maple Street Wenonah	359	6.48	182	A	350	6.98	202	A
Mantua Avenue Wenonah	395	7.38	293	A	396	7.32	165	A
Center Street Mantua	460	6.54	207	A	534	6.50	201	A
Lambs Road Mantua - Pitman	314	7.48	150	A	377	6.71	191	A
Pitman Avenue Pitman	72	10.13	56	B	146	10.73	103	B
S. Broadway Pitman	273	7.09	144	A	440	6.13	241	A
Carpenter Street Glassboro	577	9.23	530	A	600	8.86	481	A
Bowe Boulevard Glassboro	643	11.96	749	B	622	10.78	502	B
Mullica Hill Road Glassboro	426	18.04	493	B	522	43.97	925	D
Ellis Street Glassboro	226	6.67	112	A	282	6.28	134	A
South Main Street Glassboro	332	6.99	165	A	361	7.06	128	A

Source: GCL Project Team Grade Crossing Analysis, 2018

Table 3.3-7: Traffic Impacts At-Grade Crossings with the GCL 2040

Roadway Name Closest Station	A.M. Peak Hour				P.M. Peak Hour			
	Volume	Delay (sec)	Max Queue (ft)	LOS	Volume	Delay (sec)	Max Queue (ft)	LOS
Market Street Gloucester City	185	6.74	85	A	244	6.44	124	A
Olive Street Crown Point Road	225	6.37	114	A	248	6.48	125	A
Cooper Street Woodbury	867	20.64	1,270	C	727	16.99	556	B
E. Barber Avenue Woodbury	205	6.69	90	A	318	6.47	107	A
Elm Avenue Woodbury	370	7.55	183	A	452	7.08	175	A
Maple Street Wenonah	383	6.55	198	A	371	7.08	219	A
Mantua Avenue Wenonah	435	7.66	341	A	433	7.53	185	A
Center Street Mantua	491	6.71	227	A	566	6.68	218	A
Lambs Road Mantua - Pitman	334	7.59	162	A	393	6.80	202	A
Pitman Avenue Pitman	77	10.16	60	B	154	10.78	109	B
S. Broadway Pitman	285	7.16	152	A	456	6.21	253	A
Carpenter Street Glassboro	621	9.79	616	A	639	9.30	544	A
Bowe Boulevard Glassboro	716	18.40	1,357	B	685	11.84	629	B
Mullica Hill Road Glassboro	475	25.52	754	C	574	72.47	1,798	E
Ellis Street Glassboro	251	6.76	128	A	311	6.41	151	A
South Main Street Glassboro	360	7.14	183	A	390	7.23	143	A

Source: GCL Project Team Grade Crossing Analysis, 2018

Roadway Impacts

Anticipated direct impacts to roadways as a result of the proposed GCL vary by type of facility. The GCL traffic analysis anticipates that most proposed GCL-related impacts would be localized on the streets, at-grade crossings, and selected signalized intersections adjacent to or in the immediate proximity of the proposed GCL. Direct impacts from the proposed GCL on the roadway network can be categorized as follows:

- Impacts based on the need for a physical closure or permanent blockage of roadways or streets due to location of GCL alignment
- Impacts based on deteriorating LOS at intersections adjacent to the GCL alignment, attributable to increased traffic volumes due to dedicated GCL parking facilities (the pattern of drive-access trips is shown in Appendix 5-E, "Synchro Results," of Attachment 5, "Traffic Analysis Technical Report")

- Impacts based on increased train volume from GCL operations at existing at-grade crossings where effective capacity of roadways is reduced and queuing and delays would result

Each of these potential impacts were analyzed using different methodologies described in more detail in the Attachment 5, "Traffic Analysis Technical Report." This section focuses on the comparison of the results of the No-Action and GCL scenarios in order to identify impacts. All roadway impacts are shown in Table 3.3-8, "Local Station Area Roadway Impacts."

Table 3.3-8: Local Station Area Roadway Impacts

	Location	GCL Roadway Impact (2040 No-Action vs. 2040 Build)	Peak Hour Impact
1	Haddon Avenue at MLK Boulevard, Camden	Southbound left-turn movement drops from LOS D to LOS E.	A.M.
		Southbound right-turn movement drops from LOS C to LOS E.	A.M.
		Westbound left-turn movement drops from LOS C to LOS F.	A.M.
		Northbound left-turn movement drops from LOS D to LOS F.	A.M.
		Northbound through movement drops from LOS D to LOS E.	A.M.
		Eastbound left-turn movement drops from LOS D to LOS F.	P.M.
		Southbound left-turn movement drops from LOS D to LOS E.	P.M.
		Southbound through movement drops from LOS D to LOS E.	P.M.
		Southbound right-turn movement drops from LOS C to LOS E.	P.M.
		Westbound left-turn movement drops from LOS C to LOS F.	P.M.
		Westbound right-turn movement drops from LOS C to LOS E.	P.M.
		Northbound left-turn movement drops from LOS D to LOS E.	P.M.
Northbound through movement drops from LOS D to LOS E.	P.M.		
2	6 th Street/ Garage at MLK Boulevard, Camden	Northbound right-turn movement drops from LOS C to LOS E.	A.M.
		Westbound left-turn movement drops from LOS C to LOS E.	A.M.
		Westbound right-turn movement drops from LOS C to LOS E.	A.M.
		Northbound right-turn movement drops from LOS D to LOS E.	P.M.
3	Broadway at MLK Boulevard, Camden	Westbound right-turn movement drops from LOS C to LOS F.	A.M.
		Westbound right-turn movement drops from LOS C to LOS F.	P.M.
4	South Railroad Avenue, Gloucester City	Proposed LOD encroaches on roadway.	A.M./P.M.
5	Woodbine Avenue, Westville	Proposed alignment encroaches on roadway causing it to be narrowed from 24-feet to approximately 22-feet in width.	A.M./P.M.
6	Olive Street Grade Crossing, Westville	Propagating eastbound queue approaching crossing would extend through intersection at Olive Street/New Jersey 45	A.M./P.M.
7	Green Avenue, Woodbury	Proposed alignment encroaches on one-way Green Avenue causing it to narrow from 17-feet to approximately 13-feet.	A.M./P.M.
8	E. Red Bank Avenue at N. Evergreen Avenue, Woodbury	Overall LOS drops from D to E.	P.M.
9	Mullica Hill Road (U.S. 322) Grade Crossing, Glassboro	LOS E on the westbound approach	P.M.
10	Bowe Boulevard Grade Crossing, Glassboro	Propagating northbound queue approaching crossing would extend through intersection at U.S. 322/Bowe Boulevard	A.M.
11	Zane Street, Glassboro	Proposed alignment would make this roadway a dead-end or cul-de-sac.	A.M./P.M.
12	Wilmer Street at Main Street, Glassboro	Proposed new station access point will change a 3-legged intersection to 4-legged, resulting in new turning movements.	A.M./P.M.

Source: GCL Team Traffic Analysis, 2018

Additional impacts to local streets near the proposed GCL include reduction of lanes widths, slight relocation of roadways, and full closures of one-way streets affecting local circulation patterns and are described further in Section 12.1, “Walter Rand Transportation Center,” through Section 12.9, “Glassboro,” of Attachment 5, “Traffic Analysis Technical Report.”

Highway Impacts

Major roadways that parallel the GCL, such as I-295, I-676, and New Jersey 55, would see reductions in traffic volumes based on projections by DVRPC’s Glassboro-Camden Line Regional Model and the GCL Project Team. Vehicle miles traveled (VMT) would be reduced by approximately two percent in both the A.M. and P.M. peak hours in build-years 2025 and 2040 and would not result in impacts to the highways. Reductions in overall VMT traveled can be seen in Appendix 5-A, “DVRPC and STOPS Model Information,” of Attachment 5, “Traffic Analysis Technical Report.”

At-Grade Crossing Impacts

At-grade crossings could potentially have significant impacts on the roadway network adjacent to the GCL. In the portion of the GCL alignment that assumes the construction of additional rail trackage, the ROW width will expand, resulting in a wider roadway at-grade crossing. In many cases, this would result in the relocation of existing gates and flashers. At some locations, the existing gates and flashers are outdated and will need to be upgraded or replaced.

There are signalized intersections adjacent to the proposed GCL alignment in numerous locations (particularly in Gloucester City). Twelve of the intersections chosen for the at-grade crossing analysis are signalized and adjacent to the alignment. Design standards and regulations may require that these signalized intersections be coordinated with GCL light rail track signal equipment. In selected locations, the GCL signal pre-emption priority may be given to the GCL light rail vehicles to provide smooth and continuous train operations.

3.3.4.2. Parking

GCL Parking Demand

Of the fourteen proposed GCL stations, nine will be served by existing or proposed parking facilities (structures or surface parking lots). Parking facilities (surface lots) will be ~~are proposed to be~~ constructed at eight ~~six~~ stations as part of the proposed GCL (South Camden, Gloucester City, Crown Point Road, Woodbury Heights, Mantua Boulevard, and Mantua-Pitman). Two stations (Woodbury and Glassboro) will be served by existing municipal parking structures, and one station (Red Bank Avenue) will be served by an existing municipal parking lot. (Mantua-Pitman Station will be served by a parking lot constructed as part of the GCL, which if and as demand calls for, may be developed in the future as a parking structure.) In sum, of the 14 proposed GCL stations, resulting in approximately 2,685 new parking spaces being available in 2025 and 4,310 spaces in 2040 would be available for GCL use. The type and size of proposed GCL parking facilities are provided in more detail in Section 11.2, “Parking,” of Attachment 5, “Traffic Analysis Technical Report.” Peak-hour trips generated by each station have been estimated from ridership data generated by the STOPS Model.

Parking Impacts

The parking analysis also focuses on impacts to existing parking facilities within the proposed LOD provided in ~~December 2017~~ 2019. Property surveys and detailed engineering drawings should be prepared in order to determine a more accurate parking impact assessment. This preliminary determination indicates that approximately 376 existing public and private parking spaces would be displaced by the proposed GCL, as described in Section 11.2, "Parking," of Attachment 5, "Traffic Analysis Technical Report." With the proposed 2,685 spaces and 4,310 spaces in years 2025 and 2040, respectively, this yields a net parking increase of approximately 2,309 spaces and 3,934 spaces in the project area, respectively. The parking impacts were not divided into Americans with Disabilities Act (ADA) accessible and non-ADA accessible spaces, but this should also be considered during future development phases of the project.

3.3.4.3. Pedestrian and Bicycle Access

Pedestrian Facilities

The GCL Project Team evaluated the accommodations for pedestrians at each proposed station. The evaluation included a review of presence of sidewalks, crosswalks, and pedestrian signals along roadways and at intersections approaching or in the vicinity of station areas. The facility inventory also included an identification of locations where specific needs were apparent to improve accessibility and safety for pedestrians traveling to/from the station areas. The results of the pedestrian facility inventory and identified needs are detailed in Table 3.3-9, "Pedestrian Facility Summary."

Table 3.3-9: Pedestrian Facility Summary

Station	Route	Sidewalk	Identified Needs
WRTC	Federal Street	Y	
	Broadway	Y	
	MLK Boulevard	Y	Improve crosswalk striping/visibility at 5 th Street
	S. 5 th Street	Y	
	West Street/N. 5 th Street	Y	
Cooper Hospital	Newton Avenue	Y	
	S. 9 th Street	Y	Mark new crosswalk on north leg at Line Street with traffic calming measures. Re-install marked crosswalk on west leg of intersection at Trenton Avenue
	Haddon Avenue	Y	
South Camden	Carl Miller Boulevard	Y	
	Ferry Avenue	Y	
Gloucester City	W. Railroad Avenue	Y	
	S. Fillmore Street	Y	
	Market Street	Y	
	Cumberland Street	Y	
	Champion Road	Y	
	Monmouth Street	Y	
	S. Railroad Avenue	Y	

Table 3.3-9: Pedestrian Facility Summary (Continued)

Station	Route	Sidewalk	Identified Needs
Crown Point Road	Broadway	Y	Install new marked crossing at Willow Street with traffic calming measures. Construct traffic calming measures at existing crossings at Birch Avenue and at Woodbine Avenue
Red Bank Avenue	Red Bank Avenue	Y	
Woodbury	Green Avenue	Y	
	Railroad Avenue	Y	
	Laurel Street	Y	
	Cooper Street	Y	
Woodbury Heights	W. Jersey Avenue	Y	Install new traffic calming measures at Central Avenue.
	Elm Avenue	Y	
	Central Avenue	Y	
Wenonah	N. West Avenue	Y (SB only)	
	N. East Avenue	Y (NB only)	
	E. Mantua Avenue	Y	
	W. Mantua Avenue	Y	
	E. Poplar Street	Y	
	W. Poplar Street	Y	
Mantua Boulevard	Mantua Boulevard	N	
Sewell	Center Street	Y	Construct traffic calming measures at existing crossings. Reduce curb radii where possible. Construct new sidewalk on north side of road between W. Atlantic Avenue and existing sidewalk west of intersection. Install new advance and at-crossing pedestrian warning signs in both directions.
	E. Atlantic Avenue	N	Construct new sidewalk on east side of road to the north of Center Street to connect to existing sidewalk at Essex Avenue Construct new sidewalk to connect existing termini north and south of Sussex Avenue
	W. Atlantic Avenue	N	Construct new sidewalk north of Center Street along west side of road to connect to existing sidewalk, and extend sidewalk to Cumberland Avenue.
Mantua – Pitman	Lambs Road	N	
Pitman	Pitman Avenue	Y	
	E. Holly Avenue	Y	
	W. Holly Avenue	Y	
	Commerce Avenue	Y	
	Simpson Avenue	Y	
Rowan University	U.S. 322	Y (WB only)	Install new crosswalk on west leg of intersection at Girard Avenue N. with traffic calming measures. Install marked crossing with traffic calming measures at Rowan University Townhomes (approx. 380' east of grade crossing).
Glassboro	Academy Street S.	Y	
	S. Main Street	Y	Install marked crossing at Wilmer Street with traffic calming measures.

Source: GCL Project Team Pedestrian Facility Analysis, 2018

Most roadways and intersections adjacent to or approaching station areas have appropriate pedestrian accommodations. Except for Sewell Station, “walk-up” stations generally provide some level of pedestrian accommodation or can be improved through the installation of sidewalk, striping of crosswalks (with associated traffic control devices), or installation of pedestrian signals where necessary.

Bicycle Facilities

Study area roadways within ¼ mile of each proposed station area were analyzed using the Bicycle Level of Traffic Stress (LTS) method as discussed in Section 11.3.1, “Bicycle Facilities,” of Attachment 5, “Traffic Analysis Technical Report.” The proposed GCL strives to encourage the use of non-motorized travel options to access the proposed stations. Existing and proposed multi-use trail investments within the study area include the following (per DVRPC⁷):

- **MLK Boulevard Waterfront Connection** – Existing on-road bicycle lanes along MLK Boulevard between Riverside Drive and Haddon Avenue. This facility is located nearly adjacent to the proposed WRTC station.
- **Cooper River Trail South (Pine Street Bike Lanes)** – Existing on-road bicycle lanes along Pine Street east of Haddon Avenue in the vicinity of the proposed Cooper Hospital Station. A proposed connection to this facility exists along Haddon Avenue and Mount Ephraim Avenue (Camden Greenways) as well.
- **New Jersey 45 Bicycle Lanes** – Existing reconfiguration of New Jersey 45 in Woodbury, employing a “road diet” to include bicycle lanes approaching the intersection with Red Bank Avenue and extending south through downtown Woodbury. This facility is located near the proposed Woodbury and Red Bank Avenue stations.
- **Camden/Gloucester County Light Rail with Trail** – Planned regional off-road trail adjacent to the GCL alignment from Camden south to Glassboro.
- **Dinosaur Trail** – An initial segment of this trail is currently in the “pipeline” (active planning/design), extending north from the vicinity of the proposed Rowan University Station north/northwest to New Jersey 55 near the Pitman Golf Course. Additional phases of this project include connections north to Blackwood.
- **Monroe Township Bicycle Path** – Existing off-road path between Delsea Drive (New Jersey 47) and Blue Bell Road. An extension of this existing facility is proposed west from Delsea Drive into Glassboro, terminating along Sewell Street at the Bridgeton Secondary near the proposed Glassboro Maintenance Facility.
- **Bridgeton Secondary** – Off-road trail currently in planning – provides a direct link into Glassboro, connecting to the proposed Camden/Gloucester County Light Rail.

3.3.4.4. Transit

The following sections present the changes to the transit network in the region that would result from the introduction of the proposed GCL, and the forecasted transit ridership in the corridor in both the No-Action scenario and the Future Year with GCL scenario. An analysis of transit service is provided in Attachment 6, “Transit Analysis Technical Report.”

⁷ <https://www.dvrpc.org/webmaps/thecircuit/>

Transit Ridership

Table 3.3-10, “Projected Transit Services Daily Boardings – The Proposed GCL (2040),” summarizes the ridership levels for the GCL corridor projected by the ridership model in the Future Year with GCL, compared to the No-Action ridership results described above.

Table 3.3-10: Projected Transit Services Daily Boardings – The Proposed GCL (2040)

System / Routes		2040 Daily Boardings		Percent Change
		No-Action	Build	
NJT	Corridor Buses	10,864	11,751	8%
	Regional Buses	72,428	72,446	0%
	Bus Total	83,292	84,197	1%
	River LINE	9,941	10,340	4%
PATCO	Speedline	36,532	37,377	2%
GCL		--	16,336	--

Source: GCL Project Team, 2020

NJ TRANSIT buses paralleling the GCL corridor would see the largest increase in ridership due to the introduction of the GCL and the encouragement of transfers between routes, while the remaining NJ TRANSIT buses would see no growth or loss in ridership due to the GCL.

Both PATCO and River LINE would see small increases in total daily ridership following the introduction of the GCL; however, these ridership gains primarily represent GCL riders transferring to the existing services. Comparing the approximately 4,100 daily transfers between GCL and PATCO to the increase in ridership of 800 daily trips on PATCO between the No-Action and the proposed GCL indicates that roughly 3,300 current daily PATCO trips will become GCL-only trips in the Build scenario. Table 3.3-11, “Projected Daily Transfers to/from GCL – The Proposed GCL (2040),” summarizes the forecast number of transfers between the proposed GCL and existing routes.

Table 3.3-11: Projected Daily Transfers to/from GCL – The Proposed GCL (2040)

System / Routes		Transfers to/from GCL
NJT	Bus Total	2,520
	River LINE	242
PATCO	Speedline	4,144
Total		6,906

Source: GCL Project Team, 2020

The STOPS model also provided ridership results in terms of total linked trips, that is, counting trips linked by a transfer as one trip. According to this analysis, the Build Scenario would generate approximately 11,000 new transit trips daily, with the remaining GCL trips representing existing transit riders of PATCO, River LINE, and the bus network.

Rail Freight Operations

The proposed GCL alignment primarily follows the existing Conrail ROW between Camden and Glassboro. Between Morgan Boulevard in Camden (where the GCL aerial alignment would merge with the Conrail ROW) and Woodbury, the GCL alignment would consist of two new tracks alongside the existing Conrail track. South of Woodbury, one new GCL track would be constructed alongside the existing Conrail track. The southbound GCL track (new center track) would be separated from the Conrail track at a 17-foot track center.

Under this configuration, existing freight operations would be unaffected. The GCL has been conceptually designed to provide space between the GCL and Conrail tracks to allow for a potential future second track as freight traffic increases. Consideration will be given during future phases of operations planning to develop strategies that will allow for track sharing both north and south of Woodbury to accommodate potential increases in freight traffic.

3.4. HUMAN RESOURCES

3.4.1. Principal Conclusions

- **Cultural Resources** – Continued ongoing consultation with New Jersey Historic Preservation Office (NJ HPO) is necessary to determine impacts to both historic architectural and archaeological resources. Should the effect analysis or Phase IB archaeological surveys result in the project having an adverse effect on one or more historic properties or eligible archaeological sites, a Memorandum of Agreement (MOA) will need to be prepared to outline minimization and mitigation measures.
- **Socioeconomic Conditions** – Implementation of the proposed GCL would result in significant, positive development and redevelopment effects in land use throughout the 18-mile corridor and, therefore, would not result in any impacts to socioeconomic conditions. As discussed further below, a total of ~~71~~ ⁷⁴ parcels along the alignment or proposed station and VMF sites would be fully or partially ~~acquisition~~ acquired due to implementation of the GCL, resulting in the relocation of businesses and employees. However, the construction and operations and maintenance (O&M) efforts necessitated by the proposed GCL would support jobs and employment compensation, the details of which are described below.
- **Neighborhood Character** – Given that the proposed GCL would run within an existing rail corridor, the proposed project would not physically divide neighborhoods, reduce access to, or disrupt the cohesion of existing communities. The proposed alignment would also not be likely to alter neighborhood boundaries or the setting in which these neighborhoods exist, and access to neighborhoods would not be severed. However, noise and vibration impacts would occur in some areas.
- **Environmental Justice** – Impacts to communities of concern are minimal compared with the proposed GCL's benefits to the larger environmental justice populations, including increased accessibility, a new mode choice, and reduced travel times along the corridor. While the impacts described below do represent impacts on communities of concern, including low-income, minority, and transit-dependent populations, they do not represent a disproportionate impact in

these communities. Therefore, it can be determined that no potential for disproportionately high environmental justice impacts would result from the proposed GCL.

- **Community Facilities** – Approximately 164 community facilities have been identified within the GCL corridor, the majority of which would experience a positive impact that increased access to transit and transportation choices would offer. As discussed below, the Bethlehem United Church of Christ (Glassboro) would experience potentially negative impacts from the proposed project in terms of a full acquisition of a parcel on this existing church site. Further, it is not anticipated that the proposed GCL would cause an increase or decrease in the demand for local law enforcement services.
- **Safety and Security** –The proposed GCL is not anticipated to cause a change in demand for local law enforcement services. Further, NJ TRANSIT and DRPA would use a combination of design, public education, and operations measures to lower the potential for crime and to minimize potential conflicts among trains, people, and other vehicles.
- **Parklands** – Although the project remained within the existing rail ROW whenever possible, the proposed GCL would directly affect 10 parkland resources, all of which are encumbered by Green Acres' restrictions and compensation requirements and are described in detail below. Steps were taken to minimize the anticipated effects, such as altering drainage, retaining, and fill plans to minimize encroachment on parkland resources. Overall, the GCL is expected to improve access to parkland resources and multi-use trails, particularly for zero-car households.
- **Aesthetic Features** – Existing passenger railway near the WRTC and elevated I-676 highway infrastructure comprise the proposed GCL's northern end, and historic railway corridor its southern end; therefore, the proposed GCL would introduce no new corridor element to the aesthetic features study area. No significant adverse effects to the aesthetic character of the landscape would be associated with proposed stations, with the exception of Wenonah Station and Pitman Station. Views to these two proposed stations from adjacent streetscapes and neighboring residential properties may be increased, which may result in an adverse effect to the aesthetic character of the residential streetscapes in the immediate vicinity of the proposed station. Further, the addition of new rail maintenance facility infrastructure, equipment, and rail cars to the Woodbury VMF site would constitute a change in the overall aesthetic character of the property that would result in a significant and adverse change to the landscape.
- **Air Quality** – The proposed GCL is predicted to slightly increase regional pollutant burdens, ~~including a slight increase in~~ which would have a negligible effect on greenhouse gas (GHG) emissions. The GCL is predicted to generally produce no meaningful regional mobile source air toxics (MSAT) effects; the proposed GCL would reduce regional VMT and would utilize light diesel multiple unit (DMU) trainsets, which emit fewer pollutants than the typically used heavy DMU trainsets. The proposed GCL is not predicted to cause or exacerbate a violation of the National Ambient Air Quality Standards (NAAQS) for carbon oxides (CO_x), nitrogen oxides (NO_x), or particulate matter (PM). However, the Glassboro VMF could have the potential for harmful emissions associated with spray painting, so it is recommended that the spray booths should be located as far away from residential land uses as possible.
- **Noise and Vibration** – Severe noise exposure is expected to be experienced at 177 single family residential dwellings; moderate noise exposure is projected to occur at 577 single-family residential dwellings. Further, moderate noise impacts at residential properties adjacent to the proposed vehicle maintenance and storage facilities are expected to occur at each of the two

proposed Vehicle Maintenance Facilities located in the communities of Woodbury Heights and Glassboro.

3.4.2. Cultural Resources

3.4.2.1. Ongoing Consultation

Architectural Resources

Upon review of the intensive-level forms, the NJ HPO requested a complete cultural resources report accompanied by the area of potential effects (APE) maps and figures. The purpose of this Historic Architecture Intensive-Level Survey Report will be to summarize the results of all intensive-level surveys (individual properties and historic districts/streetscapes).

An assessment of the project's potential impacts to all National Register-listed and eligible properties will be required in a Determination of Effects Report after NJ HPO concurrence with the results of the intensive-level surveys and once ~~the project designs have progressed far enough to have approximate ROW acquisitions and temporary construction easements~~ the number of ROW acquisitions and temporary construction easements have been further refined. The impacts to all historic properties will be assessed within the same report. Additional information is provided in Attachment 7, "Cultural Resources Technical Report."

Archaeological Resources

Test Areas (TAs) 1 through 3 in Camden and TA 12 in Glassboro Borough are each eligible for deferred Phase IB testing due to access, safety, or hazardous waste issues. At TA 1, a Phase IB field survey is recommended provided the demolition of the two-story rowhouses originally on the site did not severely affect the subterranean deposits on the block. A combination of mechanically excavated trenches and strategically placed shovel test pits (STPs) would provide an adequate testing strategy at this location. TA 2 is comprised of a corridor that passes through former residential blocks, the demolition of which and successive highway construction may have left large quantities of debris overlying the potentially intact surfaces. Therefore, systematic mechanical trenching followed by STP excavation of potential intact surfaces is the recommended Phase IB method throughout TA 2. Testing at TA 3 may also be problematic due to hazardous waste issues related to the former hosiery manufacturing business that occupied the site—particularly at the location of the dye house, which appears to have been covered by asbestos. Similar to portions of TA 2, it is recommended that a Phase IB survey include mechanical trenching followed by STP excavation of intact surfaces if present. Finally, as TA 12 was a former rail yard, the potential of archaeological resource and hazardous materials contamination is present. Before TA 12 can undergo Phase IB investigation that will include systematic shovel testing at standard intervals, data from an assessment of the presence of hazardous materials must be provided.

Depending on the results of the Phase IB archaeological survey, additional studies may be required. If the Phase IB survey identifies archaeological site(s) that warrant additional work, Phase II Archaeological Evaluation Survey investigations would be required. Should a Phase II survey result in the project having an adverse effect on one or more eligible archaeological sites, a MOA would need to be prepared to outline minimization and mitigation measures. Per the MOA, all mitigation stipulations would be required to be completed within an agreed-upon period of time.

3.4.2.2. Potential Cultural Resources Effects and Mitigation

Should the effect analysis result in the project having an adverse effect on one or more historic properties, a MOA will need to be prepared to outline minimization and mitigation measures. Per the MOA, all mitigation stipulations will have to be completed within an agreed-upon period of time.

3.4.3. Socioeconomic Conditions

The proposed GCL would provide an additional transportation service to the residents, employees, and visitors along the 18-mile transit corridor from Camden to Glassboro. The proposed GCL offers several potential benefits including increased connectivity, mobility, and expanded transportation mode choice. Redevelopment, an important theme identified in many of the Master Plans of the municipalities within the proposed GCL corridor, could also be an outcome of this investment.

Other development projects in the socioeconomics study area are not anticipated to have a significant impact on population, households, or employment, and are not expected to result in adverse impacts to economic output, jobs creation, or income.

3.4.3.1. Population, Households and Employment

Traffic Analysis Zone (TAZ) data from DVRPC's model output was used to generate the proposed GCL projections. Table 3.4-1, "Projected Population, Household, and Employment within Proposed Station Areas and Vehicle Maintenance Facility Sites, 2040," provides the 2040 projections for population, households, and employment for the WRTC Station area, 14 proposed station areas and two proposed VMF site locations. In general, the proposed station areas in Gloucester County are projected to experience a greater increase in population, households, and employment than the station areas in Camden County. The proposed Sewell and Glassboro Station areas are projected to experience the greatest increase in population at 39.1 percent and 31.3 percent, respectively. This significant population growth at Glassboro is likely due to plans for expansion of the University. The Sewell Station area is also projected to experience the greatest increase in households (39.1 percent). The Mantua Boulevard Station is projected to experience the greatest increase in employment (111.1 percent). Household and employment projections for the Glassboro Station area also indicate considerable growth with an increase of 31.7 percent and 35.8 percent, respectively.

The implementation of the proposed GCL would not have a significant effect on population, household, and employment within the proposed station and VMF areas before 2040. The impact of the proposed GCL on population, household, and employment would likely be realized beyond 2040.

Table 3.4-1: Projected Population, Household and Employment within Proposed Station Areas and Vehicle Maintenance Facility Sites, 2040

Proposed Station & VMF Area (½-mile radius)	2040 Population	Percentage Change from 2015	2040 Households	Percentage Change from 2015	2040 Employment	Percentage Change from 2015
WRTC (existing station)	19,945	2.4%	6,371	2.4%	29,434	2.4%
Cooper Hospital	17,506	2.4%	5,113	0.0%	21,792	0.0%
South Camden	14,917	2.4%	5,326	2.4%	9,519	2.4%
Gloucester City	15,869	0.6%	5,591	0.6%	6,410	0.6%

Table 3.4-1: Projected Population, Household and Employment within Proposed Station Areas and Vehicle Maintenance Facility Sites, 2040 (Continued)

Proposed Station & VMF Area (½-mile radius)	2040 Population	Percentage Change from 2015	2040 Households	Percentage Change from 2015	2040 Employment	Percentage Change from 2015
Crown Point Road	12,519	10.0%	4,884	10.1%	4,308	10.1%
Red Bank Avenue	19,454	12.1%	7,737	12.0%	11,790	12.0%
Woodbury	14,849	8.1%	6,242	8.4%	11,122	8.4%
Woodbury Heights and VMF Site #10	9,246	12.3%	3,448	12.5%	2,722	12.5%
Wenonah	17,075	13.4%	6,152	13.5%	4,094	13.5%
Mantua Boulevard	11,498	20.8%	4,051	21.0%	2,697	21.0%
Sewell	6,783	24.7%	2,425	25.1%	2,580	25.1%
Mantua-Pitman	6,986	39.1%	2,421	39.1%	2,782	39.1%
Pitman	14,625	19.7%	5,555	19.1%	5,889	19.1%
Rowan University	9,791	10.0%	3,729	10.0%	2,908	10.0%
Glassboro	14,596	27.9%	4,224	27.9%	6,879	27.9%
VMF Site #1	14,460	31.3%	4,163	31.7%	7,042	31.7%
VMF Site #2	12,321	31.9%	3,291	32.8%	5,826	32.8%

Source: DVRPC (VISSIM Model) Traffic Analysis Zone (TAZ) projections for proposed station areas, 2017

3.4.3.2. Development and Redevelopment

Implementation of the proposed GCL would result in significant, positive development and redevelopment impacts in land use throughout the 18 mile corridor. Significant and positive effects from development and redevelopment would not result in any impacts to socioeconomic conditions. This development activity would most likely be focused near the proposed transit station sites. Several established communities along the proposed alignment have redevelopment plans and/or future land use policies in place to promote new economic development, and in some instances specifically encourage transit-supportive land uses. The proposed GCL would encourage growth and economic development consistent with these local plans and policies. One specific example of potential future transit-supportive development is located in Woodbury. The City's Master Plan identifies a future transit village near and within the proposed Woodbury Station area. Section 1, "Land Use, Public Policy, and Zoning," of Attachment 3, "Man-Made Resources Technical Report," identifies additional potential transit-supportive development areas within the proposed station areas.

3.4.3.3. Economic Output, Jobs Creation and Income

Input-output (I/O) modeling was used to estimate the total economic effect of the proposed GCL. I/O analysis examines relationships within an economy, both between businesses, as well as between businesses and consumers. The analysis captures consumptive market transactions and estimates the resulting "indirect" and "induced" economic effects. (Please refer to Attachment 3, "Man-Made Resources Technical Report," for a discussion of the I/O modeling for the proposed GCL.)

Regional economic analysis and I/O models produce quantitative estimates of the magnitude of regional economic activity resulting from a specified change in the regional economy. I/O models rely on multipliers that mathematically represent the relationship between the initial change in one sector of the economy and the effect of that change on economic output, income, or employment in other regional industries.

This regional economic analysis utilizes RIMS II multipliers, an I/O model developed and maintained by the U.S. Bureau of Economic Analysis (BEA). The RIMS II multipliers are widely used across the United States by government and private entities to prepare location-specific economic impact analysis.

Regional economic analysis provides a means of estimating the significance of economic activity in a regional economy by quantifying contributions to output and employment. Because industries in a geographic area are interdependent, the total economic contribution of any one specific project will be larger than its individual (direct) effect on regional output and employment, a concept referred to as the “multiplier” effect. Industries in a geographic region are interdependent in the sense that they both purchase output from and supply input to other industries in the region.

The economic impact analysis for the proposed GCL does not take into account geographical purchasing coefficients as the anticipated financing structure is unknown at the time of publication. As such, this early analysis should be considered hypothetical and for illustrative purposes includes total economic impacts of project construction and O&M without factoring in the location of purchasing or production. For example, the manufacturing of vehicles has been included in the analysis even though a considerable proportion of these expenditures would occur outside of the Metropolitan Statistical Area (MSA) capture area.

Project Construction

Construction of the proposed GCL and its employees would be a source of economic stimulus within the Philadelphia-Camden-Wilmington MSA. The construction project would purchase inputs to production from other businesses, supporting jobs and employee compensation. Demand that is met by suppliers would further stimulate the economy by supporting additional jobs and creating additional new demand for raw inputs. The employees of the project would spend their income on local retail purchases, housing, and other services. These expenditures support regional jobs in the associated industries.

Construction of the proposed GCL is expected to provide a significant one-time direct benefit to the regional economy. In addition to temporarily supporting local construction labor, the project is expected to require regionally supplied construction materials. Specifically, it is anticipated that development and construction of the transportation project itself would generate total *direct spending* of approximately \$1.40 billion, as shown in Table 3.4-2, “Capital Expenditures – Proposed Light Rail Transit Alternative.” Direct construction-related expenditures are expected to constitute approximately \$839 million, or 60 percent, of the project budget. Professional services would account for \$248 million, or 18 percent, of the budget. The purchase of rail vehicles would cost approximately \$264 million, or 19 percent, of the total budget. In order to conduct the economic impact analysis to estimate the multiplier effects of this direct spending, the budget line items were translated to corresponding BEA RIMS II sector classifications.

Table 3.4-2: Capital Expenditures – Proposed Light Rail Transit Alternative

Industry Description	BEA RIMS II Sector Classification	Cost	% of Total Budget
Construction	Construction	\$839,981,000	60%
Guideway & Track Elements	Construction	\$318,564,000	23%
Stations, Stops, Terminals, Intermodal	Construction	\$64,444,000	5%
Support Facilities	Construction	\$200,297,000	14%
Site Work & Special Conditions	Construction	\$142,790,000	10%

Table 3.4-2: Capital Expenditures – Proposed Light Rail Transit Alternative (Continued)

Industry Description	BEA RIMS II Sector Classification	Cost	% of Total Budget
Systems	Construction	\$113,886,000	8%
Vehicles	Railroad rolling stock manufacturing	\$263,970,000	19%
Professional Services	Professional, scientific, and technical services	\$248,380,000	18%
Contingency: Construction	Construction	\$41,999,000	3%
Contingency: Vehicles	Railroad rolling stock manufacturing	\$5,279,400	0.4%
Contingency: Professional Services	Professional, scientific, and technical services	\$4,967,600	0.4%
Total*		\$1,404,577,000	100%
Note: <i>* The estimated cost presented here does not include the cost of proposed Conrail improvements, outlined in Section 1.5.1, "Conrail Improvements."</i>			

Based on the anticipated multiplier effects for the various industry sectors affected by the project, Table 3.4-3, "Regional Economic Impacts of Construction – the GCL (2018\$)," presents the estimated total regional economic impacts in 2018 constant dollars (sum of direct, indirect, and induced impacts) resulting from construction of the GCL.

Table 3.4-3: Regional Economic Impacts of Construction – the GCL (2018\$)

Expenditure Type	Regional Expenditures	Employment Impacts	Wage Impacts	Output Impacts
Construction	\$881,980,000	10,425	\$557,852,350	\$1,812,557,091
Other Transportation Equipment Manufacturing	\$269,249,400	1,943	\$111,819,276	\$538,848,824
Professional, Scientific, and Technical Services	\$253,347,600	3,283	\$195,407,004	\$549,409,605
Total Regional Impact	\$1,404,577,000	15,650	\$865,078,630	\$2,900,815,520

Construction of the project is estimated to have a *total one-time regional impact* of approximately \$2.9 billion. The regional economic impact represents revenue generated by direct regional spending, indirect spending by suppliers, and induced impacts from employee expenditures in the Philadelphia-Camden-Wilmington MSA regional economy. The construction phase of the proposed GCL is projected to support full-time equivalent construction and ancillary employment of approximately 15,560 jobs with total associated wages of approximately \$865 million.

Project Operations and Maintenance

The project would also create jobs and output from O&M expenditures. O&M expenditures include, but are not limited to, the expenses associated with general maintenance and administration, fare inspectors, insurance, fuel, purchased transportation, vehicle and non-vehicle maintenance, and operations. O&M

expenditures and the anticipated impact of those expenditures will be determined in the subsequent design phase of the project.

Direct spending in O&M for the proposed GCL is estimated at approximately \$27 million annually (see Table 3.4-4, “Regional Economic Impacts of Annual O&M Costs – the GCL (2018\$)”). Applying the anticipated multiplier effects for the transit and ground passenger transportation industry category to these expenditures results in a total annual regional impact of approximately \$60 million. The O&M expenditures are projected to support total annual employment of approximately 651 jobs related to the operations of the proposed GCL with total associated wages of approximately \$20 million.

Table 3.4-4: Regional Economic Impacts of Annual O&M Costs – the GCL (2018\$)

	Regional Expenditures	Employment Impacts	Wages Impacts	Output Impacts
Transit and ground passenger transportation	\$27,070,879	651	\$20,258,913	\$60,511,884

Source: GCL Project Team, U.S. Bureau of Economic Analysis

3.4.4. Neighborhood Character

Given that the proposed GCL would run within an existing rail corridor, the proposed project would not physically divide neighborhoods, reduce access to, or disrupt the cohesion of existing communities. The alignment would also not be likely to alter neighborhood boundaries or the setting in which these neighborhoods exist. In addition, access to neighborhoods would not be severed. However, noise and vibration impacts would occur in some areas.

The proposed GCL makes use of an active rail corridor. While the commercial areas along the rail corridor are within the boundaries of specific neighborhoods, these commercial areas are typically not part of the core residential part of the neighborhood. As a result, an impact to a non-residential use within a neighborhood would not be considered an impact to the entire neighborhood.

3.4.4.1. Travel Patterns and Accessibility

Given the use of the existing rail corridor, overall negative impacts to automobile travel patterns and accessibility are not anticipated within these neighborhoods. The proposed project would not sever or divide any streets within the corridor, as the majority of the proposed project would be constructed along existing railway and roadway.

The proposed project would be both at-grade and grade-separated along the corridor to eliminate most conflicts between vehicular traffic and the proposed GCL. In addition, new signals and the addition of turn lanes would also help to alleviate vehicular traffic conflicts resulting from the proposed project. There are locations where the proposed project would cross streets and require motorists to wait for the light rail traffic to pass. Some of these locations already experience wait times for vehicles due to the existing railway traffic. Increased wait times at these locations are not expected to negatively affect vehicular travel patterns or accessibility within the corridor. As a result, accessibility for vehicles within the corridor is not anticipated to change significantly in the future with the GCL.

Generally, accessibility for transit patrons, bicyclists, and pedestrians within the GCL corridor would be positively affected by the proposed project. The proposed GCL would provide another mode of

transportation for residents and provide a more efficient option to automobile and bus travel. In addition, the frequency at which transit would be provided within this corridor would also increase with the proposed project. Pedestrian improvements (sidewalks, crossings, etc.) are also proposed, including bicycle parking spaces at stations.

There is potential for transit patrons to utilize neighborhood streets for parking. This potential exists at “walk-up” stations where park-and-ride lots would not exist, as well as at park-and-ride stations where dedicated parking could overflow. Overflow parking in neighborhoods would affect available on-street parking in neighborhoods, as well as introduce additional traffic.

3.4.4.2. Displacements and Relocations

Property acquisitions would be required for development of the proposed GCL. Acquisitions would primarily be required for development of the station areas with parking facilities. Development of the proposed GCL would require the ~~full and partial~~ acquisition of approximately ~~211~~ ~~182~~ parcels across Camden and Gloucester counties, including ~~39~~ ~~50~~ full, ~~32~~ ~~24~~ partial, and ~~140~~ ~~108~~ *de minimis* acquisitions. The full acquisition of ~~39~~ ~~50~~ parcels is anticipated to result in significant adverse impacts to ~~nine~~ ~~17~~ commercial and 13 residential parcels. These full acquisitions would, in turn, generate the displacement of an estimated ~~nine~~ ~~25~~ businesses and ~~20~~ ~~41~~ residents living within ~~eight~~ ~~17~~ single- or multi-family residential properties. The other ~~27~~ ~~20~~ parcels that would be fully acquired feature a range of uses but are not actively used for commercial or residential purposes. Therefore, no significant impacts would result on these ~~27~~ ~~20~~ parcels because acquiring them would not result in the displacement of businesses or residents. Relocation assistance would be provided, and property owners would be fairly compensated according to Federal, State, and local laws. Specific details on guidelines for these relocations and compensation are included in Attachment 12, “Acquisitions and Displacements Technical Report.”

3.4.4.3. Noise and Vibration

As part of the Noise and Vibration Impact Analysis, noise monitoring was conducted at noise-sensitive receptors within the neighborhoods immediately adjacent to the proposed alignment. A noise and vibration impact assessment was conducted and is described in Attachment 11, “Noise and Vibration Technical Report.” While individual noise and vibration impacts may occur at various sites along the proposed GCL corridor, those individual impacts do not necessarily constitute an impact on the overall neighborhood. The results of the noise and vibration assessment indicates that corridor-wide, a total of 815 dwellings (equivalent single-family units) are projected to experience impacts; these consist of 577 moderate impacts and 188 severe impacts from daily GCL operations. In addition, 50 dwellings will experience moderate noise impacts associated with VMF site activities. However, no peak hour noise impacts are expected to occur from daily traffic movement entering and departing the major parking facilities proposed along the corridor. Noise mitigation measures consists of undercar sound absorption treatment, rail car vehicle skirts, and track lubrication to mitigate wheel squeal on tight curves. These abatement measures are expected to eliminate noise impacts at 16 out of 21 impacted properties. The remaining noise impacts are all attributable to horn noise soundings. Ground vibration generated through proposed GCL operations would not exceed Federal Transit Administration (FTA) impact thresholds during daily service operations. Therefore, no vibration-related mitigation measures would be required.

3.4.4.4. Visual and Aesthetics

The proposed GCL would introduce a new visual element within or adjacent to many neighborhoods. However, concern for visual/aesthetic impacts is not as acute because of the existing industrial context of the existing rail corridor. Also, existing land uses (office buildings, historic warehouses, etc.) in many cases screen residential areas from the proposed alignment. In addition, individual visual and aesthetic impacts may occur at various sites along the proposed GCL corridor. However, those individual impacts do not necessarily constitute an effect on the overall visual and aesthetic quality of the neighborhood. The proposed GCL would represent an increase in the amount of rail infrastructure on the ground and some removal of vegetation; however, there would be no effect to the aesthetic character of the aesthetic features study area.

The proposed project would comprise elevated rail alongside the elevated I-676 highway infrastructure that visually defines the project area between approximately Haddon Avenue and Holtec Boulevard in the City of Camden. As a result of its position alongside the existing I-676, the proposed project in this portion of the project area would be visible from areas west, where the most sensitive viewer groups include residents, shoppers in local commercial areas, and visitors to parklands. Though a strong feature in the landscape, views of it do not imbue surrounding neighborhoods with a particular character and the proposed project would only block views of I-676 from areas west, and introduce similar views of new transportation infrastructure that would be adjacent to the existing I-676 and similar in form and character. As such, the overall change likely would be perceptible to viewers west of the project area, but it would not result in a significant change to the project area or surrounding landscape they experience.

New track would be constructed in an area where track does not currently exist, on the southern end of the corridor in the Borough of Glassboro and also extending west from the existing corridor to create a wye connection to the proposed new Glassboro VMF site outside the existing and historic rail corridors. Given that no rail currently exists in this location, the new rail would appear as a new feature within the defined landscape corridor, and it would be visible from adjacent properties. The introduction of the track bed and new rail, itself, would result in physical changes limited to the project area. The most distinctive change would be the removal of vegetation as part of grading for new embankment, approximately centrally within the historic rail corridor. Therefore, the removal of vegetation within the project area would alter the character of this historic railway corridor, but it would not alter the character of adjacent residential area. Views that currently exist toward the historic railway corridor would not be affected, though the altered appearance of the project area, both as a result of vegetation removal and the introduction of new trackbed and rail would be perceptible to surrounding residents and parkland visitors. Visibility of these low-magnitude changes to the defining aesthetic character of this landscape within the project area (LOD) would not be expected to be visible from areas beyond immediately adjacent properties. Therefore, these effects would be of low magnitude, and would not in themselves alter the visual character of the surrounding neighborhood.

Proposed infrastructure and changes to visual environs due to station development would result in no significant impact at 12 of the 14 proposed stations. The introduction of new landscaping would also improve visual environs at several stations. In some instances, the proposed GCL would change the existing visual context of neighborhoods. Around Wenonah Station and Pitman Station, visual impacts may result insofar as the character of the streetscapes immediately surrounding the stations may be altered by replacing mature trees (currently occupying proposed station sites) with new landscaping. Wenonah Elementary School open space and Wenonah Park afford distant, indirect (oblique), and partial views of the proposed Wenonah Station site, limited by existing intervening structures and trees. Ballard Park offers similarly indirect (oblique) and partial views of the proposed Pitman Station site, also limited

by existing intervening structures and trees. The removal of mature trees and their replacement with younger trees may require several years to fulfill an effective replacement strategy, insofar as surrounding residents may be accustomed to views of larger trees, and station site landscape design would employ strategies at creating visual buffers between the station areas and surrounding residential properties. Detailed assessments of impacts to visual environs are provided in Section 3.4.9, "Aesthetic Features."

The Glassboro VMF would represent a substantial area of new track and rail infrastructure where none currently exists or has existed. The introduction of this new infrastructure would be visible from the Glassboro Sports Complex, thus altering the visual character. The construction of the proposed VMF would convert a warehouse/manufacturing facility to a rail maintenance facility storing rail cars and equipment. As such, the overall aesthetic character of the property would not change substantially and thus would result in no adverse significant impacts.

Potential effects to visual resources were also assessed. In total, 36 parklands were identified as having views of the project area where new rail would be introduced, and 12 parklands would have views of proposed stations. As the proposed GCL would primarily be constructed alongside existing rail and transportation infrastructure, the introduction of new rail infrastructure would not alter views from visual resources and thus would not result in any significant adverse impacts. Further, the introduction of new stations is not likely to substantially alter views from visual resources. Three parks would have indirect views of these new station areas however none of these parklands derive their essential visual character from views toward the project area, and activities within these parks are oriented inwardly within the parks. Therefore, the proposed project would result in no significant adverse impacts to parkland visual resources as a result of proposed station development.

3.4.4.5. Neighborhood Assessments

Generally, the proposed GCL would be located along an existing rail corridor. Where the proposed GCL would introduce new rail infrastructure where none currently exists, it would be operating on an elevated viaduct structure adjacent to I-676, or along former rail corridor. As a result, the proposed GCL would not create a new physical barrier to neighborhood residents or physically divide neighborhoods.

An assessment of each neighborhood was undertaken with regards to effects of the proposed GCL on travel patterns and accessibility, displacements and relocations, noise and vibration, visual and aesthetics, and cohesion. The following summarizes the assessment of impacts to neighborhoods that would be affected by the proposed GCL. Neighborhoods that would experience no impacts are not included in this discussion.

Central Business District

The proposed GCL would begin in Camden City at the WRTC, utilizing existing NJ TRANSIT River LINE tracks. At approximately Haddon Avenue, the proposed GCL alignment would be elevated onto a viaduct structure that would run parallel to the existing elevated I-676 structure. The proposed GCL would utilize the existing WRTC and introduce a new station at Cooper Hospital, adjacent to the Camden County Police Department building and the Camden County Community Affairs Department building.

In Camden's Central Business District, the proposed GCL would be surrounded primarily by commercial land uses that are set back approximately 100-150 feet from the rail ROW. As the proposed GCL nears Cooper Hospital, it would be approximately 35 feet from Cooper Hospital alongside I-676. Before reaching Cooper Hospital, the land uses east of the track become more residential.

One property in Camden City's Central Business District would have to be acquired to accommodate the GCL. 525 Martin Luther King Boulevard is a 55,815 square foot parcel that formerly contained a CVS pharmacy and is currently vacant.

Additionally, as part of the Noise and Vibration Impact Analysis, it was determined that the proposed GCL would result in moderate noise impacts at 30 residential units in the Central Business District.

Lanning Square

The proposed GCL would operate on an elevated viaduct structure adjacent to I-676 through Lanning Square. Land uses in the vicinity of the Cooper Hospital Station are generally residential. While Cooper Hospital would be as close as 40 feet away from the GCL corridor, residential homes are set back 50-75 feet away from the station and down the corridor. The Lanning Square neighborhood is on the west side of the GCL corridor.

Bergen Square

The proposed GCL would operate within existing Conrail ROW through Bergen Square. There would be no stops in Bergen Square. Community facilities adjacent to the proposed GCL corridor include Whittier Elementary School, Bethel Deliverance Church, and Kaighn Avenue Baptist Church.

The proposed GCL extends past Lanning Square into Bergen Square east of the tracks as it rises onto I-676. The proposed corridor passes mostly residential housing which comes within 50-100 feet of the tracks.

The proposed GCL would require full acquisition of five residential multi-family properties and two vacant properties in Bergen Square. Acquisition of these properties would result in one business impacted and three employees displaced, as well as two residences impacted, and 2.55 residents displaced.

Additionally, as determined in the Noise and Vibration Impact Analysis, moderate noise impacts would occur at 51 residential units in Bergen Square.

Waterfront South

The proposed GCL would continue on the elevated viaduct structure as it passes along the eastern edge of the Waterfront South neighborhood. The proposed South Camden Station would be located within the Waterfront South neighborhood and directly adjacent to the Centerville neighborhood. The closest community facilities include Grace Baptist Church and Memorial Park.

As the proposed GCL passes along the eastern edge of the neighborhood, the proposed GCL would pass within 75 feet of commercial uses and within 75-100 feet of residential uses.

It is expected that the GCL would require full acquisition of one vacant property ~~three properties~~ in Camden City's Waterfront South neighborhood. ~~Full acquisitions would include two residential multi-family properties and one vacant property. It is estimated that these acquisitions would affect two residences and displace approximately 2.5 residents.~~

Gloucester City

The proposed GCL would be located within the existing Conrail ROW through Gloucester City operating at-grade directly adjacent to the existing tracks. A proposed GCL station (Gloucester City Station) would be constructed between Cumberland and Market Streets.

As the proposed GCL would be located within existing Conrail ROW, it would not create a new physical barrier to Gloucester City or physically divide the neighborhood. Therefore, neighborhood cohesion would not be altered by the proposed GCL.

A total of ~~39~~ 36 parcels in Gloucester City would be affected by the proposed GCL. These include nine commercial, four manufacturing, 12 ~~15~~ multi-family residential, 10 single-family residential, and one vacant property. Of these, full acquisitions would result in the displacement of two businesses ~~and six residences~~, affecting approximately 20-38 employees ~~and 15 residents~~. It is estimated that full acquisitions would not result in the displacement of residences in Gloucester City.

Additionally, as determined in the Noise and Vibration Impact Analysis, moderate noise impacts would occur around 56 S. Railroad Avenue and Thompson Street/Lane Avenue Park, affecting 34 residential units in Gloucester City. No noise impacts would occur at Gloucester Public Library.

Implementation of the proposed GCL would have impacts on travel patterns. In Gloucester City, the location of LOD line encroaches the roadway of S. Railroad Avenue, requiring it to be narrowed from a two-way to a one-way road northbound. At-grade crossings at Market Street would be installed, causing minor delays. Due to the reduction of traffic as a result of the proposed GCL, delays and traffic volume are slightly lower in the A.M./P.M. peak hours at the intersections of N. Broadway and Hudson Street, S. Broadway and Monmouth Street, Market Street and S. Broadway, and S. Broadway and Koehler Street. N. Broadway and Hudson Street will experience a decrease in LOS from B to C. A proposed GCL surface parking facility at Gloucester City station will result in 160 new parking spots.

Brooklawn

The proposed GCL would be located within the existing Conrail ROW through Brooklawn. There would be no proposed GCL station within the neighborhood; however, tracks would run next to the Brooklawn American Legion/Senior Citizen Center.

Residential uses, primarily along New Broadway, Old Broadway, Marne Road, and N. Wilson Avenue where homes are situated parallel to existing Conrail track on both sides, are less than 75 feet away from the proposed project. Commercial uses are found on New Broadway on the south side of town past Marne Road, and on the west side of the corridor, about 50 feet away from the tracks.

A total of five parcels in Brooklawn would be affected by the proposed GCL. One full acquisition would be required. No displacements or impacts to businesses or residents are anticipated in Brooklawn.

Westville

The proposed GCL would be located within the existing Conrail ROW through Westville. The proposed Crown Point Road Station would be located on Broadway and Willow Drive across from the Westville U.S. Post Office. The proposed GCL would be located to the west of Westville Fire Department.

All residential and commercial uses near the Crown Point Road Station are about 75 feet apart on the east side of the proposed GCL. Development on the east side of the proposed GCL corridor is closer in

proximity than the west, as the tracks run parallel with Route 45 and Route 130. Land uses north and south of the proposed station are mostly commercial, while development towards the center between Olive and Pine streets is more residential. Commercial land uses are much closer in proximity, getting as close as 20 feet away from the proposed GCL. Multi-family residences are located approximately 50 feet away on the north and south ends of the proposed station site.

A total of 27 parcels in Westville would be affected by the proposed GCL. Five of these properties, all of which are located along Broadway, would be fully acquired for the implementation of the proposed GCL. One business would be affected, resulting in the displacement of approximately 10 employees.

Additionally, as determined in the Noise and Vibration Impact Analysis, moderate noise impacts would occur at 75 residential units in Westville.

The proposed Crown Point Road Station, which is a center island station, would encroach onto Woodbine Avenue, requiring the width of the road to be decreased from 24 feet to 22 feet. At-grade crossings at E. Olive Street and Broadway would be installed, causing minor delays. The propagating eastbound queue approaching the Olive Street Grade Crossing would extend through intersection at Olive Street and New Jersey Route 45, which requires coordination of traffic signal with grade crossing equipment. Broadway and Delsea Drive will experience an increase in LOS from F to B. A proposed GCL surface parking facility at Crown Point Road Station would result in 325 new parking spots. 26 parking spots would be lost at 1060 Broadway, 368 Broadway, and at the parking lot adjacent to the vacant properties between 368-300 Broadway.

Woodbury

The proposed GCL would be located within the Conrail ROW through Woodbury. Two stations would be constructed in Woodbury, Red Bank Avenue Station, adjacent to the Gloucester YMCA, and Woodbury Station, parallel to St. Patrick's Church on Green Avenue.

Commercial uses are located on both sides of Red Bank Station, approximately 100-150 feet away from the tracks. Across the lake, land use is mostly residential and is setback approximately 75 feet away from track on both sides.

At Woodbury Station, a large multi-family residence is about 150 feet away and east of the tracks. Homes on the west are slightly closer at 125 feet to the tracks, where the proposed Woodbury Station will be built. Further down the tracks are slightly closer to homes at 100 feet before entering Woodbury Heights.

A total of 14 parcels in Woodbury would be affected by the proposed GCL. Two commercial properties would require full acquisition. A total of three businesses would be affected, one of which is a construction yard. This would result in the displacement of 11 employees.

Additionally, as determined in the Noise and Vibration Impact Analysis, moderate noise impacts would affect 68 residential units.

Green Avenue, a 17-foot-wide one-way southbound street, overlaps with the proposed GCL alignment and would be required to be reduced to 13 feet. This would be sufficient for access to the Woodbury Mews senior-care facility, however, the passenger loading zone would be displaced. Impacts to at-grade crossings on Cooper Street and E. Barber Avenue would result in minor delays. E Red Bank Avenue and N. Broad Street would experience a decrease in LOS from D to C. Increases in LOS would occur at the intersections of E. Barber Avenue and S. Evergreen Avenue (E to F), E. Barber Avenue and Railroad Avenue (A to B), Cooper Street and S. Evergreen Avenue (B to E), and E. Red Bank Avenue and N. Evergreen Avenue

(C to E). Woodbury would lose 125 parking spots in lots adjacent to Green Avenue and Laurel Street, as well as Railroad Avenue.

Woodbury Heights

The proposed GCL would be located within the Conrail ROW through Woodbury Heights. The proposed Woodbury Heights Station would be constructed on W Jersey Avenue from Elm Avenue to Central Avenue. Woodbury Heights Fire Department is located adjacent to the track on Elm Avenue to the east.

North of the proposed Woodbury Heights Station, the proposed GCL passes through a commercial area and is approximately 50 feet apart from these facilities. After crossing the New Jersey Turnpike, land use is generally residential, with single-family residential on the west side and commercial uses on the east. Residences are more than 125 feet apart from the tracks until passing the maintenance facility where houses to the east border the tracks by about 30 feet separated by brush. On the east side, track is located just beyond the backyards of the adjacent neighborhood.

Three parcels in Woodbury Heights would be affected by the proposed GCL. One of these properties, a vacant 17.5-acre parcel, would require full acquisition to accommodate parking, access, and landscaping.

Additionally, as determined in the Noise and Vibration Impact Analysis, the VMF in Woodbury Heights would have moderate noise impacts, while remaining below the 72 VdB impact threshold. Further refinement during future project phases may alter noise exposure levels later in the project. Comparing existing noise conditions against anticipated project-related noise, it was determined that moderate impacts would also occur at Veterans' Park, with severe impacts occurring at 348 East-West Jersey Avenue, affecting a total of 90 residential units in Woodbury Heights.

At-grade crossings on Elm Avenue would be installed, causing minor delays. Due to the reduction of traffic as a result of the proposed GCL, delays and traffic volume are slightly lower in the A.M./P.M. peak hours at the intersection of Elm Avenue and W Jersey Avenue, which would experience a decrease in LOS from B to C. A proposed GCL surface parking facility at the Woodbury Heights Station would result in 25 new parking spots. Ten parking spots would be affected in order to accommodate the proposed GCL alignment.

Wenonah

The proposed GCL would be located in the Conrail ROW through Wenonah. The proposed Wenonah Station would be constructed adjacent to N. West Avenue and N. East Avenue from approximately E Poplar Street to W Mantua Avenue. The tracks run through the center of town along the U.S. Post Office and Wenonah Police Department on S. West Avenue as well as Wenonah Elementary School on N. East Avenue.

On both sides of the proposed GCL alignment, the land use is predominantly residential. Single-family residences run parallel with tracks along S West Avenue and N. East Avenue, setback a little under 100 feet from the tracks. Town facilities, such as the County Clerk's Office, are directly next to the tracks.

Two parcels in Wenonah would be affected by GCL. No properties would require full acquisition.

Additionally, as determined in the Noise and Vibration Impact Analysis, moderate noise impacts would occur at 64 residential units.

The proposed Wenonah Station would affect parking along N. West Avenue and N. East Avenue immediately adjacent to the station; however, the station would not encroach on roadway lanes, and as

such, would have no effect on street circulation. At-grade crossings at Maple Street, Mantua Avenue, and Willow Street would be installed, causing minor delays. Delays and traffic volume would be slightly higher in the A.M./P.M. peak hours at the intersection of N. East Avenue and E. Mantua Avenue, which would experience a slight increase in peak traffic volume. Due to construction, 11 parking spots would be lost at the surface lot adjacent to East Avenue.

Sewell

The proposed GCL would be located within the Conrail ROW through Sewell. The proposed Sewell Station would be constructed on Atlantic Avenue between Center Street and Essex Street. The U.S. Post Office in Sewell is east of the station on Center Street.

Coming from Mantua Boulevard into Sewell, residential use is mainly on the east side over 100 feet away while commercial is on the west at least 150 feet away until reaching the baseball fields. Running through the center of Sewell, the tracks are surrounded by residential, single family uses, about 100 feet on each side as well. Before crossing Route 55, the proposed GCL would pass through southern Sewell between backyards of houses set about 50 feet away from the track.

One commercial property would require full acquisition in Sewell. The property appears to be vacant and is not anticipated to result in any displaced businesses or residences.

Additionally, as determined in the Noise and Vibration Impact Analysis, moderate noise impacts would occur at 92 residential units in Sewell.

Pitman

The proposed GCL would be located within the Conrail ROW through Pitman. The proposed Pitman Station would be located in the center of town adjacent to Simpson Avenue. The Pitman Boro Municipal building is adjacent to the tracks/station on S. Broadway.

The proposed GCL would pass mostly residential, single-family homes in the north of Pitman, about 75 feet away from homes on the west side of the tracks. Homes to the east are a little further as their backyards border the rails until reaching the proposed Pitman Station site, which is surrounded by commercial land use approximately 100 feet away on both sides. As tracks depart the town, the track is surrounded by single-family homes on both sides which are approximately 90 feet from the tracks until the track runs through Cedar Avenue.

~~One commercial parcel in Pitman would require full acquisition. A total of two parcels in Pitman would be affected by the proposed GCL. Both parcels are commercial and would require full acquisition. The Bank of Gloucester County on Ballard Avenue is the only business that would be directly affected; however, the commercial The parcel, located on Commerce Avenue, would be used as overflow parking for a nearby auto body shop and may require the business to be relocated. Overall, the proposed GCL would affect two businesses.~~

Additionally, as determined in the Noise and Vibration Impact Analysis, moderate noise impacts would affect 50 residential units.

Parking along W. Jersey Avenue would be affected by the proposed GCL's double-track alignment, but street functionality and circulation would not be affected. At-grade crossings at Pitman Avenue and S. Broadway would be installed, causing minor delays. Delays and traffic volume are slightly higher in the A.M./P.M. peak hours at the intersections of Broadway & Holly Avenue and Pitman Avenue & S. Broadway,

which would experience a slight increase but would not change LOS. Due to construction, 110 parking spots would be lost along W. Jersey Avenue and the vacant surface lot on Commerce Avenue.

Pitman Station would consist of two outside platforms surrounded by landscaping consistent with the railway corridor. Existing trees and vegetation would be replaced in the area proposed for new station development, with new trees and vegetation being planted in their place to make sure the station contributes positively to the adjacent properties. However, views to the station may be increased as a result of tree removal, diminishing the visual “buffer” enjoyed by current residents to the west which will expose their rear yards and the rail corridor. The proposed landscaping would enhance the appearance of the station area and integrate it with the surrounding neighborhood while buffering views of the rail corridor. Therefore, no significant effects to the aesthetic character of the station will occur.

Glassboro

The proposed GCL would be located within the Conrail ROW as well as two historic rail corridors (one going to the proposed Glassboro VMF, and the other to the Glassboro Station) through Glassboro. Two stations, Rowan University Station and Glassboro Station, would be located in Glassboro. The track runs through Glassboro High School as well as Bethlehem United Church of Christ and Faith Fellowship Church.

The proposed GCL would first run through Glassboro High School and then into downtown Glassboro where Rowan University is located. Running through residential neighborhoods, the track would be surrounded by both single and multi-family residences as it runs parallel down Girard Road N/S. The distance between tracks and homes ranges from less than 60 feet to a little more than 100 feet away between the Rowan University Station and the Glassboro Station.

A total of 55 parcels in Glassboro would be affected by the proposed GCL. Sixteen of these properties would require full acquisition. The parcels that would need to be acquired include one community service, seven manufacturing, seven single-family, and one wooded. Overall, the proposed GCL would affect one business, six residences, and displace an estimated 30 employees and 15 residents.

Additionally, as determined in the Noise and Vibration Impact Analysis, the VMF in Glassboro would have moderate noise impacts while remaining below the 72 VdB impact threshold. Further refinement during future project phases may alter noise exposure levels later in the project. These moderate impacts would affect 70 residential units. Severe noise impacts would affect 123 residential units in Glassboro.

Implementation of the proposed GCL through Glassboro would have numerous impacts on travel patterns. At the proposed Rowan University Station, Mullica Hill Road would face major delays, reducing roadway capacity and contribute to increasing delays, with its westbound LOS dropping to E. Potential mitigation includes widening Mullica Hill Road to a three-lane roadway, with two lanes westbound and one eastbound. Bowe Boulevard would cause a propagation of cars northbound which would extend through Mullica Hill Road and Bowe Boulevard. Potential mitigation includes widening Bowe Boulevard to a three-lane roadway, with two lanes northbound and one lane southbound. This would allow both the A.M. and P.M. peak delays to reduce greatly, changing LOS from F to E.

The proposed Glassboro Station would also generate impacts. Zane Street coincides with a portion of the proposed double track GCL alignment and should be terminated as a dead end at the Conrail ROW. The proposed Glassboro Station would include a new roadway for vehicular station access that extends from Wilmer Street and Main Street east to Academy Street. The proposed extension is a two-way road and may potentially warrant a signal at Wilmer Street and Main Street. The proposed Wilmer Street Extension could act as a shorter route for traffic along Main Street or Wilmer Street, which would reduce traffic volumes at the signalized intersection of Main Street and High Street but could potentially increase traffic

along the stop-controlled approach on Academy Street at High Street. It is recommended that Glassboro installs marked crossing at Wilmer Street with traffic calming measures.

Grade crossings within Glassboro are located at Carpenter Street, Bowe Boulevard, Mullica Hill Road, and S Main Street. It is recommended that Glassboro install a new crosswalk on west leg of intersection on Girard Avenue North with traffic calming measures at Rowan University Townhomes about 380 feet east of the grade crossing. After construction of the proposed GCL, the crossing at S. Main Street would decrease from LOS C to D. Implementation of the proposed GCL would result in the loss of three parking spots in a Rowan University lot and 23 parking spots at 137 S. Main Street, 102 S. Main Street, and 38 S. Main Street.

The Rowan University Station would consist of two outside platforms surrounded by extensive landscaping and consistent with the railway corridor landscape, which would not be visible from adjacent parking areas. The proposed landscaping would enhance the station area, integrating it with the strip of naturalized area bordering the tracks and buffering views between the proposed GCL corridor to the east and west. No significant effects to the aesthetic character would be associated with this station.

The Glassboro Station would consist of two outside platforms, new to the historic railway corridor landscape. Parking spots would be introduced at the end of the station area and the proposed landscaping would enhance the appearance of the station area, integrating it with the surrounding neighborhood. No significant effects to the aesthetic character of the landscape would be associated with this station.

3.4.5. Environmental Justice

After identifying the minority and low-income communities, shown on Figures 2-25a-e, “Potential Environmental Justice Communities,” the potential for environmental benefits and disproportionate or adverse impacts of the proposed GCL on minority and low-income neighborhoods was determined. The impact assessment results from each of the major technical areas were analyzed to determine whether significant impacts would disproportionately occur mostly within communities of concern. The potential for impacts is expressed quantitatively or with the following qualitative terms:

- **No impact:** This category applies if the proposed GCL is not expected to result in impacts on existing conditions. Positive impacts, such as improved access to neighborhoods and community facilities, may also occur and are represented as no impact. Also included in this category are impacts to individual residential properties that would not result in an impact to the collective neighborhood.
- **Potential impact:** This category applies if the proposed GCL may result in a minimal or moderate impact. Minimal impacts include changes from the existing conditions that typically would not need mitigation; moderate impacts include changes from existing conditions that could be addressed through mitigation.
- **Potentially significant impact:** This category applies if the proposed GCL would likely result in substantial changes that represent an “adverse impact” to the activities relating to a community of concern. In some cases, the impacts might not be fully addressed through the proposed mitigation.

The key criteria for environmental justice analyses is whether or not adverse impacts identified in each of the environmental analysis categories are disproportionate within communities of concern. In other words, would the impacts within a minority or low-income community be appreciably more severe or

greater in magnitude than those that would be experienced in non-minority or non-low-income communities.

3.4.5.1. Summary

Impacts to communities of concern with regards to travel patterns and accessibility, displacement and relocations, community services and facilities, neighborhoods, and noise and vibration are outlined below. These impacts are minimal compared with the proposed GCL’s benefits to the larger environmental justice populations, including increased accessibility, a new mode choice, and reduced travel times along the corridor. While these do represent impacts on communities of concern, including low-income, minority, and transit-dependent populations, they do not represent a disproportionate impact in these communities. Therefore, it can be determined that no potential for disproportionately high environmental justice impacts would result from the proposed GCL. For more information, see Table 3.4-5, “Potential Impacts to Communities of Concern and Transit-Dependent Populations in the GCL Corridor,” and Table 3.4-6, “List of Potential Impacts Corridor-Wide Impacts.”

As described within the respective sections of Chapter 3, “Environmental Consequences,” the proposed GCL would be expected to result in adverse impacts (e.g., transportation, acquisitions, community facilities, neighborhood character, and noise and vibration), all of which would be avoided or mitigated. Any such impacts that would occur within or near potential environmental justice communities would not represent a disproportionate burden on these communities, i.e., the impacts within a minority or low-income community would not be appreciably more severe or greater in magnitude than those that would be experienced in non-minority or non-low-income communities.

~~The identified adverse impacts are capable of being mitigated and are expected to be reduced significantly with appropriate measures. These measures are outlined in Section 4, “Avoidance Measures and Mitigation,” of Attachment 3, “Man-Made Resources Technical Report.”~~

Table 3.4-5: Potential Impacts to Communities of Concern and Transit-Dependent Populations in the GCL Corridor

Census Tracts	Associated Neighborhood	Associated Municipality	Communities of Concern		Large Concentration of Transit-Dependent			Significant Impacts	Less Than Significant Impacts *
			Minorities	Low-Income	Elderly	Youth	Zero-Car		
6007	Cooper Point	City of Camden	●	●		●	●	20401, 20402, 20403, 30701	
6008	Pyne Point		●	●			●		
6103	Cooper Grant/Central Water Front		●	●			●		
6104	Central Business District/Lanning Square		●	●			●		
6002	Gateway		●	●			●		
6004	Bergen Square		●	●		●	●		
6014	Parkside		●	●			●		
6016	Liberty Park		●	●		●	●		
6015	Whitman Park		●	●			●		
6018	Waterfront South		●	●			●		

Table 3.4-5: Potential Impacts to Communities of Concern and Transit-Dependent Populations in the GCL Corridor (Continued)

Census Tracts	Associated Neighborhood	Associated Municipality	Communities of Concern		Large Concentration of Transit-Dependent			Significant Impacts	Less Than Significant Impacts *
			Minorities	Low-Income	Elderly	Youth	Zero-Car		
6017	Centerville	City of Camden	●	●		●	●	20401, 20402, 20403, 30701	
6019	Morgan Village		●	●			●		
6020	Fairview		●	●		●	●		
6110	Gloucester City	City of Gloucester		●			●	20404, 30703	20414, 30702
6051									
6052									
6053	Brooklawn	Borough of Brooklawn							
6070	Western Bellmawr	Borough of Bellmawr		●					
5001	Westville	Borough of Westville		●				20406	
5002.01	Verga	West Deptford Township							
5010.01	Woodbury	City of Woodbury						20408	30704, 30705
5010.02			●	●			●		
5010.03				●					
5009	Woodbury Heights	Borough of Woodbury Heights						30808, 31005	20107, 30706, 30707
5011.07	Oak Valley	Deptford Township							30710
5011.06	Jericho		●						
5008	Wenonah	Borough of Wenonah						30804	
5007.02	Sewell	Mantua Township							
5013.01	Pitman	Borough of Pitman						30806	
5013.02									
5013.03				●					
5014.02	Glassboro	Borough of Glassboro		●				20409, 20410, 20412, 20413, 31005	20108, 30712, 30713, 30903
5014.03									
5014.04				●					
5014.06				●					
<p>Notes: <i>* In addition to the significant impacts listed above (all fully mitigated), additional mitigation/avoidance measures will be considered for certain less than significant impacts. Please refer to Chapter 4, "Avoidance Measures and Mitigation."</i></p> <p><i>Natural Resources impacts to be determined in consultation with NJDEP, please refer to Section 3.2, "Natural Resources." Hazardous Materials impacts to be determined in consultation with NJDEP, please refer to Section 3.3.3, "Hazardous Materials." Cultural Resources impacts to be determined in consultation with NJ HPO, please refer to Section 3.4.2, "Cultural Resources"; see also Section 3.4.9.6, "Potential Effects to Visual Resources – Historic and Cultural Resources," for potential visual effects that may be associated with the Glassboro Vehicle Maintenance Facility, pending consultation with NJ HPO.</i></p>									

Source: GCL Project Team, 2020; American Community Survey, 2014-2018.

Table 3.4-6: List of Potential Corridor-Wide Impacts

ID	Impact	Significant Adverse Impact
10101	Acid Producing Soils	No impact currently determined
10201	Surface Waters	No
10220	Flood Hazard Areas	No impact currently determined
10301	Plant Communities - Forest	No impact currently determined
10302	Plant Communities - Agriculture	No impact currently determined
10303	Plant Communities - Old Field	No impact currently determined
10305	Threatened and Endangered Species - Federally-Listed Species - Northern Long Eared Bat	No impact currently determined
10306	Threatened and Endangered Species - Federally-Listed Species - Atlantic Sturgeon and Shortnose Sturgeon	No impact currently determined
10308	Threatened and Endangered Species - State-Listed Species - Bald Eagle	No impact currently determined
10309	Threatened and Endangered Species - State-Listed Species - Barred Owl and Red Shouldered Hawk	No impact currently determined
30601	No Impacts to local law enforcement services	No
30602	No impacts related to station platforms and park-and-ride facilities	No
30603	No impacts related to rail safety	No
30604	No impacts related to vehicular, bicycle, and pedestrian safety	No
30605	No impacts related to operational provisions for safety and security	No
30606	No impacts related to training and education provisions for safety and security	No
31001	Severe noise impacts at 3 monitoring sites (177 dwellings)	Yes
31002	Moderate Noise impacts at 11 monitoring sites (577 dwellings)	Yes

Source: GCL Project Team, 2020.

3.4.5.2. Travel Patterns and Accessibility

With respect to transit service, the proposed GCL would provide a significant level of benefits for environmental justice populations, particularly the transit-dependent. The proposed GCL would utilize an exclusive guideway that would provide increased reliability, increased service frequencies, and significant travel time savings over the No-Action condition. There would be an increase in transit accessibility as well as mobility to origins and destinations throughout the entire NJ TRANSIT system. Improved access to employment centers along the proposed GCL light rail service and within the project corridor would result.

However, negative impacts to local streets near the GCL include reduction of lanes widths, slight relocation of roadways, and full closures of one-way streets affecting local circulation patterns; street circulation patterns would be most heavily affected in Gloucester City. At-grade crossings could potentially have significant impacts on the roadway network adjacent to the proposed GCL. In addition, public and private parking spaces may be lost. In total, approximately 233 public parking spaces and approximately 132 private parking spaces are anticipated to be lost.

The proposed GCL would also have at-grade crossings at 39 public roadways and one private driveway location. These roadway modifications would change travel patterns for both drivers and pedestrians; however, they would provide a safer environment. A screening process was applied to analyze the 39 proposed GCL at-grade crossings to identify locations with the highest potential impact on vehicular traffic. Sixteen locations were identified as having high potential impacts. Eight of these intersections are located in communities of concern:

- Olive Street, Westville
- Cooper Street, Woodbury
- East Barber Avenue, Woodbury
- Carpenter Street, Pitman/Glassboro
- Bowe Boulevard, Glassboro
- Mullica Hill Road, Glassboro
- Ellis Street, Glassboro
- South Main Street, Glassboro

In addition, the GCL Project Team analyzed transportation conditions at the key intersections and roadways adjacent to or within proximity of proposed station areas. These are locations that are typically impacted by the initiation of light rail service, as the roadways and bicycle and pedestrian facilities are most directly impacted by passenger flows to and from stations. In other instances, the proposed GCL operations would result in delays related to grade crossing protections such as gates and flashers. Intersections that exhibit high levels of delay and congestion in future-year projections are analyzed to determine the most likely cause of the congestion. In some locations, a queue of left-turning vehicles would exceed the length of the storage turning lane, or the current number of lanes would not provide the roadway capacity required to accommodate projected future roadway volumes.

It was found that roadway and intersection delays with the proposed GCL are generally lower compared to the No-Action condition at locations where no new trips would be generated by proposed GCL stations and parking facilities. This is due in part to the modal shift from car trips to transit trips in the future with the proposed GCL. Further, optimization of traffic signal timing splits was included as part of the analysis and is reflected in the results. Roadway and intersection delays with the proposed GCL are generally higher compared to the No-Action condition at locations where new drive access trips would be anticipated as a direct result of the proposed GCL parking facilities. However, several locations experienced negative traffic growth in the future with the proposed GCL but also generate traffic due to parking facility activity. Of the 41 intersections analyzed, the majority would experience improvements or no change in future Level-of-Service (LOS) with the introduction of the proposed GCL. Those located in communities of concern experiencing an increase in LOS include:

- Broadway Boulevard (CR 551) at Delsea Drive (New Jersey 47) (Westville): F to B
- E. Red Bank Avenue at N. Broad Street (New Jersey 45) (Woodbury): D to C

Those intersections experiencing a decrease in LOS and located in communities of concern include:

- E. Red Bank Avenue at N. Evergreen Avenue (CR 650) (Woodbury): C to E
- Cooper Street (CR 534) at S. Evergreen Avenue (CR 553) (Woodbury): B to E
- E. Barber Avenue at S. Evergreen Avenue (CR 553) (Woodbury): E to F

- High Street E. at S. Main Street (CR 553) (Glassboro): C to D
- E. Barber Avenue at Railroad Avenue (Woodbury): A to B

Those with projected decreases to LOS E or F and are thus considered significant and adverse. These four intersections would also experience a decreased LOS under the No-Action condition. However, these adverse impacts are not disproportionate within communities of concern.

Pedestrian and bicycle accessibility would improve under the proposed GCL. These benefits would be realized throughout the proposed GCL corridor, including in communities of concern.

3.4.5.3. Displacements and Relocations

Overall, impacts resulting from acquisitions and displacements would not be adverse or disproportionate among minority and low-income communities in the future with the proposed GCL. Of the ~~39~~ 46 full property acquisitions expected with the GCL corridor, ~~35~~ 41 are located within communities of concern. Of these, ~~nine~~ 10 are commercial, ~~one~~ 1 is community service, ~~seven~~ 7 are manufacturing, ~~one~~ 1 is parking, ~~12~~ 17 are residential, ~~four~~ 4 are vacant land, and ~~one~~ 1 is wooded land. These acquisitions will impact ~~nine~~ 10 businesses, displace approximately ~~92~~ 84 ~~to~~ 120 employees, and impact ~~eight~~ 15 residences. These full acquisitions are potentially significant, and therefore adverse, but not disproportionate within communities of concern.

The GCL would require partial acquisition or de minimis acquisition of approximately ~~172~~ 170 parcels. Of these, 27 partial acquisitions and ~~104~~ 123 de minimis acquisitions would occur in communities of concern. There is no evidence that the impact would be disproportionate.

3.4.5.4. Community Services and Facilities

As stated in Section 3.5.3.3, “Community Services and Social Service Providers,” in Attachment 3, “Man-Made Resources Tech Report,” in the future with the proposed GCL, one community facility (Bethlehem United Church of Christ) located within a community of concern (Glassboro) would experience impacts relating to direct acquisition of 10 parking spaces, which may impact activities and ADA ramp usage at the back of the church. The church itself would not be displaced, and no physical alteration to the building would occur. This impact would not be considered adverse or disproportionate.

3.4.5.5. Neighborhoods

The proposed GCL would not adversely or disproportionately affect neighborhoods with high concentrations of minority or low-income residents within the proposed project corridor. While some impacts would occur to specific properties, none of these impacts would collectively affect a neighborhood. The improved access to transit and increased mobility to other destinations in the region would result in a positive impact to these communities of concern and transit-dependent populations.

3.4.5.6. Noise and Vibration

Of 27 representative locations used as receptor sites, moderate noise impacts are likely to occur at 13 representative locations within communities of concern as a result of the proposed GCL activities and severe noise impacts are likely to occur at two representative locations within communities of concern. The severe impacts are anticipated at Zane Street in Glassboro and at Rowan University’s Girard House.

The severe noise impact at these locations would be considered adverse; however, no disproportionate impacts are anticipated.

In addition, moderate noise impacts at residential properties adjacent to the proposed VMFs are expected to occur at each of the two proposed VMFs located in the communities of Woodbury Heights and Glassboro, with Glassboro considered a community of concern. Further refinement of the maintenance facility activities at the two proposed VMFs would occur during a future project phase at which more details related to the location, types, and duration of various maintenance activities would be developed. These changes may alter noise exposure levels.

Mitigation for these impacts from noise exposure would be determined during final design and it is likely that the impacts can be successfully mitigated. Upon estimating future project noise exposure levels with mitigation measures, the GCL Project Team found that severe noise impacts at receptor sites would be eliminated, but moderate noise impacts would remain at four receptor sites within communities of concern, in Gloucester City and Glassboro. The remaining moderate noise impacts would all be caused by noise generated from horn soundings.

Vibration levels during daily service operations at all receptor sites were found to be below the FTA Impact Threshold.

3.4.6. Community Facilities

The development of transit projects (specifically rail) have the potential to delay law enforcement and emergency services when these vehicles are required to wait for the light rail to cross an intersection. Several police and fire stations, as well as two medical facilities, are located within the GCL corridor. The proposed GCL will be designed in a manner that would not compromise the access to roads, buildings, neighborhoods, or the railway in the event of an emergency.

It is not anticipated that the proposed GCL would cause an increase or decrease in the demand for local law enforcement services. NJ TRANSIT and/or DRPA would be responsible for providing transit police on GCL vehicles and at station areas. In addition to patrolling vehicles and stations along the proposed GCL, law enforcement at all proposed stations would be provided. Additional safety and security measures are described in Section 3.4.7, "Safety and Security."

Approximately 164 community facilities have been identified within the GCL corridor including approximately 91 religious/faith-based facilities, 36 schools, seven fire stations, six libraries, nine police stations, two medical facilities, and one YMCA. The majority of these facilities would experience a positive impact that increased access to transit and transportation choices would offer.

One community facility, Bethlehem United Church of Christ (Glassboro), would experience potentially negative impacts from the proposed project in terms of a full acquisition of a parcel on this existing church site. In the portion abutting County Road 553, this parcel backs up to Bethlehem United Church of Christ's primary building. Acquisition of this parcel would directly eliminate 10 parking spaces for that use and may potentially impact pick-up/drop-off activities and use of the ADA ramp that leads to the back of the church. The church itself would not be displaced and no physical alteration to the building would occur. This impact would not be considered adverse or disproportionate.

3.4.7. Safety and Security

Both NJ TRANSIT and DRPA consider safety and security management an integral part of their mission for developing and operating an effective light rail system. Construction and operation of the proposed GCL would bring with it the potential for conflicts with automobiles and pedestrians. Safety and security planning strive to avoid these conflicts and ensure ~~insure~~ the safety of transit patrons and the public at or near station areas. In addition, public involvement efforts have highlighted public concern for potential criminal activity on transit vehicles and/or near to transit stations. This too is a consideration in the development of the proposed GCL. NJ TRANSIT and DRPA use a combination of design, public education, and operations measures to lower the potential for crime and to minimize potential conflicts among trains, people, and other vehicles.

3.4.7.1. Local Law Enforcement Services

It is not anticipated that the proposed GCL would cause an increase or decrease in the demand for local law enforcement services. NJ TRANSIT and/or DRPA would be responsible for providing transit police on GCL vehicles and at station areas. In addition to patrolling vehicles and stations along the proposed GCL, emergency response at all proposed stations would be provided.

In using Crime Prevention Through Environmental Design (CPTED) concepts, NJ TRANSIT and/or DRPA are committed to deterring criminal activity at the proposed stations and along the proposed GCL corridor. According to these concepts, station areas should be easily accessible to law enforcement personnel and should maximize opportunities for natural surveillance.

The design elements of the proposed light rail and the procedures of the NJ TRANSIT and DRPA indicate that proactive measures are being taken to provide safe and secure transit operations. The proposed light rail would provide a center of activity at the transit stations that would provide the opportunity for increased pedestrian traffic and more natural surveillance of the transit facilities and the surrounding community, resulting in a positive impact on safety and security within the communities. No long-term negative impact on safety and security, or law enforcement services, would be anticipated.

3.4.7.2. Design Elements to Provide Safe Operations

Station Platform and Park-and-Ride Facilities

The station platforms are being designed using CPTED design principles to increase natural surveillance opportunities. Close circuit televisions (CCTV) cameras would be placed on every platform and within park-and-ride facilities and monitored by Transit Police and NJ TRANSIT and/or DRPA Operations personnel. Blue light emergency phones would be available at regular intervals at park-and-ride locations. The ticket vending machines would contain Passenger Assistance Telephones that would link to the central control center. Transit Police would provide roving patrols along the corridor, at stations, and at the proposed park-and-ride facilities. Transit Police would also monitor proof of payment. Intercoms on transit vehicles would be used to make emergency announcements. Each station platform would be equipped with a public notification system to inform transit users of emergency procedures. Safety elements that would be put in place for multi-use paths and access to the station and park-and-ride lots would include transition walkways; blue light emergency phones; limited entry and exit points; and provisions for persons with disabilities.

Rail Safety

Most of the proposed alignment would operate within the existing Conrail ROW. The design includes separation of the existing freight tracks and the proposed light rail tracks in Camden, with dedicated light rail tracks for GCL trains. Freight traffic and the GCL light rail are also separated in the same ROW north of Woodbury. Fencing would be placed between the existing freight and proposed light rail tracks at designated locations, specifically, the proposed stations. There would be sufficient separation of at least 17 feet (typically 25 feet or more) between the existing freight tracks and the proposed light rail tracks to provide for safe operation of both corridors and for the safety of maintenance-of-way personnel. South of Woodbury and through the remainder of the proposed GCL corridor, freight and light rail would share tracks with temporal separation; freight trains would be limited to operating on one track in the evening and on two tracks during overnight hours in this portion of the corridor. A signaling system solution would be implemented to “lock out” portions of the corridor for freight or passenger service and prevent trains from one service (freight or passenger) from interacting with the other; similar solutions have been implemented on the NJ TRANSIT River LINE. An intrusion detection system will also be used to alert authorities in the event of a derailment of either a light rail vehicle or freight train.

Gates with an active warning system would be used at all grade crossings. As required by the Federal Railroad Administration (FRA), horns would be used to alert motorists, pedestrians, and bicyclists that a train is approaching the crossing.

The Federal requirement that train horns be sounded at every grade crossing in or near communities has sparked a number of questions with regard to the establishment of quiet zones. A quiet zone, designated by the FRA, is a section of a rail line where alternative safety measures have been put in place waiving the requirement that locomotives blow their horns when approaching grade crossings. This does not preclude the use of horns at times when safety dictates their use. Under the rule, the entity with jurisdiction over the road that crosses the tracks must apply for the quiet zone. To obtain a quiet zone designation, the applicant typically bears the cost of improvements to the crossing that make the crossing at least as safe as it would be if locomotives continued to sound their horns. Improvements vary by crossing; they can include physical barriers (four quadrant gates, median barriers) and/or alternative safety measures (programmed enforcement, public education). Per FRA guidance, quiet zones cannot be included as part of the proposed GCL because individual jurisdictions must apply to FRA directly for a quiet zone designation; however, Quiet zones are not proposed as part of the GCL, but at-grade crossings are being designed with four quadrant gates, providing the opportunity for jurisdictional entities to apply for a quiet zone if so desired.

Vehicular, Bicycle, and Pedestrian Safety

Provisions would be made to minimize conflicts between trains and automobiles, bicyclists, and pedestrians. Rail crossings would be limited to dedicated locations and clearly marked with signage. Rail crossing gates would be used to stop vehicles at the railroad tracks and the gates would include an active warning system that would alert authorities of any interference with the gates. Bicycle and pedestrian crossings (including walkways and crosswalk signal boxes) would be provided at rail crossings. Pedestrian and bicycle crossings would also be provided between the park-and-ride facilities and the station platforms. Fencing would be placed along the edge of retaining walls and in designated locations to deter pedestrian intrusion in the rail ROW. Locations for fencing will be identified during preliminary engineering in coordination with the transit operator’s risk management and safety departments following completion of the preliminary hazard assessments.

Operational Provisions for Safety and Security

NJ TRANSIT and DRPA oversee the security operations of their transit facilities and vehicles and manage the safety review of all plans for capital improvements such as light rail. NJ TRANSIT and DRPA also oversee the safety certification process with the Federal Transit Administration (FTA), New Jersey State Safety Oversight (NJSSO) and ~~ensure~~ insure that the design criteria for proposed projects address the requirements of the Project Management Plan (PMP) and Safety and Security Management Plan (SSMP). Responsibilities also include the application of the design criteria during the design and construction phases of the proposed project.

NJ TRANSIT and DRPA are actively engaged in efforts to improve and reduce security threats to transit patrons and employees. Both agencies operate under a set of Standard Operating Procedures that are updated on an annual basis. All NJ TRANSIT and DPRA employees are identified with badges that provide access to the NJ TRANSIT and DRPA facilities in which they work.

Training and Education Provisions for Safety and Security

NJ TRANSIT and DRPA engage in activities to promote rail safety and public awareness. They frequently partner with New Jersey Operation Lifesaver (NJOL) which is a nonprofit, public safety education and awareness organization dedicated to reducing collisions, fatalities, and injuries at highway-rail crossings and trespassing on or near railroad tracks. NJOL promotes rail safety through public awareness campaigns and education initiatives, including presentations to schools, driver education classes, community events, law enforcement officers, and emergency responders.

The proposed GCL is also not anticipated to cause an increase or decrease in the demand for local emergency response services. The proposed GCL would be designed in a manner that would not compromise the access to roads, buildings, neighborhoods, or the railway in the event of an emergency.

With respect to emergency responder training, NJ TRANSIT has partnered with the New Jersey Emergency Preparedness Association and others to provide a rail safety course to emergency responders. The course addresses the importance of safety awareness, rail equipment with which first responders should be familiar, station hazards, train emergency shutdown procedures, emergency brakes, emergency door release handles, trap doors, and emergency window operations. Additionally, the New Jersey Emergency Medical Services (EMS) Task Force has developed a Passenger Rail Security Plan that provides for first responders and EMS personnel the actions to take during a railway incident.

Refer to Attachment 8, "Safety and Security Technical Report," for additional information.

3.4.8. Parklands

Throughout the planning process for the proposed GCL, opportunities to avoid and to minimize effects were actively considered. For example, the proposed project remained within the existing rail ROW whenever possible. However, there are instances throughout the parklands study area where the GCL is expected to impact parkland resources. In these cases, steps were taken to minimize the anticipated effects, such as altering drainage, retaining, and fill plans to minimize encroachment on parkland resources. Overall, the GCL is expected to improve access to parkland resources and multi-use trails, particularly for zero-car households.

Based on preliminary project plans, the permanent features of the proposed GCL would directly affect 10 parkland resources: Triangle Park in the City of Camden, Sherman Neighborhood Play Lot and Thompson

Street, and Lane Avenue Park in the City of Gloucester, Green Street Play Area and Woodbury Lake Park in the City of Woodbury, Veterans’ Park and Woodbury Heights Elementary School in Woodbury Heights Borough, Mantua Creek Trail in Deptford Township, and Glassboro High School and Glassboro Sports Complex in Glassboro Borough. As a result of previous decisions made by the local government units that own these parkland resources, all 10 of the impacted resources are encumbered by Green Acres’ restrictions and compensation requirements.

An area-based summary of the project’s anticipated direct impacts to these resources, as well as the Green Acres classification for the proposed disposals or diversions (i.e., major or minor) that would result from the project’s conversion of a portion of these parkland resources to a use other than recreation or conservation purposes, is provided in Table 3.4-7, “Anticipated Direct Impacts to Parks, Recreational Facilities, and Open Space Resources Resulting from the Introduction of Proposed Features.” Details regarding the nature and level of significance of the GCL’s anticipated direct impacts to each of these resources are presented individually below.

It should be noted that, although there is a 100-foot segment of the Mantua Creek Trail within Deptford Township that intersects with the proposed GCL’s permanent LOD, the multi-use trail currently travels beneath an existing rail bridge over Mantua Creek which is proposed to be widened to accommodate the GCL’s two track alignment. Given that trail users would not be precluded from using the existing underpass once construction of the GCL is completed, this would not constitute a significant adverse impact. More details regarding the lack of significant adverse impacts to the Mantua Creek Trail are provided below in subsection “Mantua Creek Trail – Deptford Township (Trail ID D).”

All other parkland resources and multi-use trails identified in Table 2.4-6, “Parks, Recreational Facilities, and Open Space Resources Located Within the GCL Study Area,” and Table 2.4-7, “Multi-Use Trail Resources Located Within the GCL Study Area,” would not be directly affected by the permanent features of the proposed GCL. It should be noted that temporary constructions activities would result in additional effects to parkland resources. Construction-related effects as well as the combined effects resulting from the construction and permanent operation of the proposed GCL are described in section 3.5.3, “Parklands.”

Table 3.4-7: Anticipated Direct Impacts to Parks, Recreational Facilities, and Open Space Resources Resulting from the Introduction of Proposed Features

ID	Open Space Name	Municipality	Impacts Associated with likely Acquisition/Direct Use (Acres) ¹	Percentage of Resource Impacted	NJDEP Green Acres Encumbered Impact Classification ²
5	Triangle Park	Camden City	0.17	93.6%	Major
15	Sherman Neighborhood Play Lot	Gloucester City	0.02	3.9%	Minor
19	Thompson Street & Lane Avenue Park	Gloucester City	0.07	14.0%	Major
51	Green Street Play Area	Woodbury City	< 0.01	0.7%	Minor
55	Woodbury Lake Park	Woodbury City	0.01	< 0.1%	Minor

Table 3.4-7: Anticipated Direct Impacts to Parks, Recreational Facilities, and Open Space Resources Resulting from the Introduction of Proposed Features (Continued)

ID	Open Space Name	Municipality	Impacts Associated with likely Acquisition/Direct Use (Acres)	Percentage of Resource Impacted	NJDEP Green Acres Encumbered Impact Classification ²
62	Veterans' Park	Borough of Woodbury Heights	< 0.01	< 0.1%	Minor
63	Woodbury Heights Elementary School	Borough of Woodbury Heights	< 0.01	< 0.1%	Minor
92	Glassboro High School	Borough of Glassboro	< 0.01	< 0.1%	Minor
93	Glassboro Sports Complex	Borough of Glassboro	0.02	0.1%	Minor
D	Mantua Creek Trail	Deptford Township	0.00	0.0%	No Impact
<p>Notes:</p> <p>¹ This table presents the direct effects to parklands resulting from the permanent features of the proposed GCL. Construction effects to parklands are presented in Table 3.5-1, "Anticipated Incremental Construction Impacts to Parks, Recreational Facilities, and Open Space Resources," and the combined impacts of construction and permanent features of the proposed GCL are presented in Table 3.5-2, "Anticipated Direct Impacts to Parks, Recreational Facilities, and Open Space Resources (Total Impacts)."</p> <p>² The Green Acres classifications for major or minor disposals or diversions are strictly based on the amount of area of a given parkland resource that would be impacted by the project, regardless of whether the project would ultimately interfere with the use of or access to the resource. Therefore, the major and minor designations shown above do not reflect the nature and level of significance of the impacts that the GCL would have on these parkland resources. As previously noted, a discussion of the nature and significance of the GCL's anticipated direct impacts to each of these parkland resources is provided below.</p>					

In addition to the existing open spaces described in Table 2.4-6, "Parks, Recreational Facilities, and Open Spaces Resources Located Within the GCL Study Area," and Table 2.4-7, "Multi-Use Trail Resources Located Within the GCL Study Area," several proposed multi-use trail investments are planned within close proximity to the proposed GCL, as described previously in Section 2.4.8., "Parklands," including: Camden/Gloucester County Light Rail with Trail, Dinosaur Trail, Monroe Township Bicycle Path, and Bridgeton Secondary off-road trail. The GCL Project Team will coordinate with the appropriate jurisdictions as the design of the proposed GCL and the contemplated trails are advanced in order to minimize the potential for adverse effects on planned trails.

3.4.8.1. Direct Impacts

Triangle Park – City of Camden (Park ID 5)

As indicated in Table 3.4-7, "Anticipated Direct Impacts to Parks, Recreational Facilities, and Open Space Resources Resulting from the Introduction of Proposed Features," and shown on Figure 3-1, "Direct Impacts to Triangle Park," the proposed alignment for the GCL would cross through Triangle Park on an elevated structure and the proposed Cooper Hospital Station would be placed directly above Triangle Park. As this resource is located within the City of Camden, which has accepted Green Acres funding for some of its parkland resources, this resource is encumbered by Green Acres' restrictions and compensation requirements.

Approximately 0.17 acres of the 0.18-acre park (93.6 percent) would be directly affected by the placement of structures, including support piers, a potential staircase and elevator that may be constructed for vertical access to the proposed Cooper Hospital Station, and the overhead structure carrying the proposed GCL alignment above the park. As the proposed station would be situated above this resource, all 14 trees within the park would likely be removed. The park, recently created through a deal between Cooper Hospital and the City of Camden, is a passive open space resource. The long-term operation of the GCL, particularly the need for passengers to directly traverse through Triangle Park en route to/from the proposed Cooper Hospital Station, would interfere with the park's use as a passive recreation facility. Therefore, it is anticipated that the GCL would require the full acquisition of the parcel and result in the closure of Triangle Park. The two art panels located near the southern vertex of the Triangle Park, which are depicted on Figure 3-2, "Art Panels at the Southern End of Triangle Park," would need to be removed and stored during construction to avoid potential damage and would need to be repositioned in the area, possibly at the Cooper Hospital Station, once all construction activities are completed.

Sherman Neighborhood Play Lot – City of Gloucester (Park ID 15)

The proposed GCL would pass immediately to the east of Sherman Neighborhood Play lot. As this resource is located within the City of Gloucester, which has accepted Green Acres funding for some of its parkland resources, this resource is encumbered by Green Acres' restrictions and compensation requirements.

As shown on Figure 3-3, "Direct impacts to Sherman Neighborhood Play Lot," a permanent acquisition of approximately 0.02 acres of the 0.53-acre park (3.9 percent) would be required to accommodate a portion of the proposed alignment. It is anticipated that a small area of shrubs would need to be permanently removed or relocated as a part of this acquisition. The area of shrubs that would be removed is a part of a larger cluster of shrubs which partially obscures the existing Conrail freight track from view from the park. The removal of shrubs would not substantially diminish or change the view from the park, and the area impacted does not contain recreational facilities. As such, there would be no direct impact to the use of the park. Therefore, the proposed GCL is not anticipated to result in any significant adverse impacts to Sherman Neighborhood Play Lot.

Thompson Street and Lane Avenue Park – City of Gloucester (Park ID 19)

The proposed GCL would pass immediately to the west of Thompson Street and Lane Avenue Park. As this resource is located within the City of Gloucester, which has accepted Green Acres funding for some of its parkland resources, this resource is encumbered by Green Acres' restrictions and compensation requirements.

As shown on Figure 3-4, "Direct Impacts to Thompson Street and Lane Avenue Park," a permanent acquisition of approximately 0.07 acres of the 0.50-acre park property (14.0 percent) would be required to house a portion of the proposed GCL alignment, as well as grade crossing protection equipment where Lane Avenue/Koehler Street crosses the proposed rail alignment. The western half of the semi-circular walkway located at the southern end of the park would need to be adjusted to accommodate the new grade crossing protection equipment. In addition, it is anticipated that the two clusters of trees along the western border of the park would need to be permanently removed to accommodate the proposed GCL alignment and grade crossing protection equipment.

Although the GCL is anticipated to result in minor adverse impacts (i.e., removal of two clusters of trees and the need to reconstruct a portion of the southern walkway and playground fence) and the Green Acres program would classify the effect as "major" based strictly on the proportion of the park affected,

there would be no permanent interference with the use of or access to the park and none of the playground equipment or fencing would need to be permanently relocated. Therefore, the proposed GCL is not anticipated to result in any significant adverse impacts to Thompson Street and Lane Avenue Park.

Green Street Play Area – City of Woodbury (Park ID 51)

The proposed GCL would pass immediately to the west of Green Street Play Area. As this resource is located within the City of Woodbury, which has accepted Green Acres funding for some of its parkland resources, this resource is encumbered by Green Acres' restrictions and compensation requirements.

As shown on Figure 3-5, "Direct impacts to Green Street Play Area," a permanent acquisition of approximately less than 0.01 acres of the 0.10-acre park property (0.7 percent) would be required to accommodate a portion of the proposed alignment. This would impact a small sliver of the park, and would not affect any park equipment/facilities, fencing, trees or landscaping, nor would it diminish the value of the park. For these reasons, the proposed GCL would not result in a significant adverse impact to the Green Street Play Area.

Woodbury Lake Park – City of Woodbury (Park ID 55)

The proposed alignment for the GCL would pass immediately to the west of Woodbury Lake Park. As this resource is located within the City of Woodbury, which has accepted Green Acres funding for some of its parkland resources, this resource is encumbered by Green Acres' restrictions and compensation requirements.

As shown on Figure 3-6, "Direct Impacts to Woodbury Lake Park," a permanent acquisition of approximately 0.01 acre of the 31.52-acre park property (less than 0.1 percent) would be required to accommodate a widened bridge capable of supporting a double-track alignment. While Woodbury Lake Park consists of a total of 18 parcels, only one of these parcels would be directly impacted. However, this parcel is not accessible from the public ROW and roughly half of its total area is occupied by Woodbury Lake. One tree within this parcel would need to be removed to accommodate the structures supporting the proposed bridge. Given that the remainder of Woodbury Lake Park would not be directly impacted, there would be no permanent interference with or impact to the use of the park.

Veterans' Park – Borough of Woodbury Heights (Park ID 62)

The proposed alignment for the GCL would pass immediately to the east of Veterans' Park. As this resource is located within the Borough of Woodbury Heights, which has accepted Green Acres funding for some of its parkland resources, this resource is encumbered by Green Acres' restrictions and compensation requirements.

As shown on Figure 3-7, "Direct Impacts to Veterans' Park," a permanent acquisition of less than 0.01 acre of the 0.77-acre park property (less than 0.1 percent) would be required to accommodate the proposed GCL alignment and grade crossing protection where the proposed alignment intersects with Elm Avenue. In addition to an approximately 35-foot wide strip of well-manicured grass-covered area, which acts as a buffer between the rail ROW and the park, there are various elements of this resource, including brick-paved walkways, monumental structures, and a set of gates running parallel to Elm Avenue near the roadway's northern sidewalks, that extend well beyond the parcel's eastern limits.

The proposed alignment would occupy the majority of the grass-covered strip that lies between the brick-paved walkways and the rail ROW, effectively eliminating the existing buffer that serves to separate the park from the rail traffic. In addition, the proposed alignment would occupy a portion of the brick-paved area in the southern half of the resource that surrounds a tree. The proposed alignment would also intersect with the western gate near the intersection of Elm Avenue and W. Jersey Avenue. The section of brick-paved walkway and the western gate would need to be modified to accommodate the proposed GCL alignment. A sliver of the brick-paved walkway that connects with the northern sidewalks along Elm Avenue would be impacted by the installation of grade crossing protection equipment. One tree that lies at the northern edge of the park (beyond the parcel limits) would need to be removed to accommodate the proposed alignment.

Although direct impacts to portions of the brick-paved walkways and the western gate parallel to Elm Avenue would be expected, as well as the incorporation of the majority of the grass-covered strip, the primary features that define this resource (i.e., the monumental structures that pay tribute to active and fallen U.S. soldiers and the brick-paved walkways that lead from those features to the sidewalks along Elm Avenue and W. Jersey Avenue) would not be directly impacted by the proposed GCL. Therefore, no significant adverse impacts to the use of or access to this parkland resource are anticipated.

Woodbury Heights Elementary School – Borough of Woodbury Heights (Park ID 63)

The proposed GCL would pass immediately to the west of Woodbury Heights Elementary School and would be buffered from the school by a dense, undisturbed swath of existing trees that currently spans approximately 225 feet, effectively separating the school grounds from the existing rail ROW. As this resource is located within the Borough of Woodbury Heights, which has accepted Green Acres funding for some of its parkland resources, this resource is encumbered by Green Acres' restrictions and compensation requirements.

As shown on Figure 3-8, "Direct Impacts to Woodbury Heights Elementary School," a permanent easement of less than 0.01 acre of the 9.23-acre park property (less than 0.1 percent) would be required to accommodate the beginning of the approach that provides access to the proposed Woodbury Heights VMF. However, there would be no direct impact to the use of Woodbury Heights Elementary School and its associated recreational facilities. One tree within the impacted area that borders the rail ROW would need to be removed.

Although the proposed GCL is anticipated to result in minor adverse impacts (i.e., removal of one tree), there would be no permanent interference with the use of or access to the school and none of the playground equipment or fencing would need to be permanently relocated. Therefore, the proposed GCL is not anticipated to result in any significant adverse impacts to Woodbury Heights Elementary School.

Mantua Creek Trail – Deptford Township (Trail ID D)

The Mantua Creek Trail is a 1.15 mile multi-use trail that traverses portions of Wenonah Borough, Mantua Township, and Deptford Township and directly connects with the Monongahela Brook Trail (Trail ID E) in Wenonah Borough to the east. The trail directly crosses the proposed GCL alignment in Deptford Township as shown on Figure 3-11, "Mantua Creek Trail." To avoid conflicts between trail users and rail traffic, the portion of the trail located within Deptford Township currently begins at an elevation that is similar to that of the rail tracks, runs north-south roughly parallel to the tracks while gradually sloping down toward Mantua Creek, bends east-west at Mantua Creek to pass beneath the bridge that carries rail traffic over Mantua Creek, and then returns to a north-south orientation gradually sloping upwards to

return to an elevation similar to that of the rail tracks. The horseshoe configuration of the trail near Mantua Creek within Deptford Township is situated on a parcel that is privately-owned by Conrail. As part of the proposed GCL, the existing rail bridge over Mantua Creek is proposed to be widened to accommodate two sets of rail tracks.

Despite the fact that a larger portion of the trail would be situated beneath the rail bridge with the proposed GCL, the long-term operation of the GCL would not result in any permanent interference with the use of or access to the multi-use trail once constructed because trail users would be able to use the same underpass beneath a widened rail bridge. Therefore, the proposed GCL is not anticipated to result in any significant adverse impacts to the Mantua Creek Trail.

Glassboro High School – Borough of Glassboro (Park ID 92)

The proposed GCL would pass immediately to the west of Glassboro High School. As this resource is located within the Borough of Glassboro, which has accepted Green Acres funding for some of its parkland resources, this resource is encumbered by Green Acres' restrictions and compensation requirements.

As shown on Figure 3-13, "Direct Impacts to Glassboro High School," less than 0.01 acre of the 35.35-acre open space (less than 0.1 percent) would be acquired to accommodate the drainage and rail bed widening for the project. The impacted area is not occupied by any recreational facilities and lies near the southern edge of the school property beyond the running track. Thus, there would be no direct impact to the use of Glassboro High School and its associated recreational facilities. One tree within the impacted area would need to be removed.

Although the GCL is anticipated to result in minor adverse impacts (i.e., removal of one tree), there would be no permanent interference with the use of or access to the school or its recreational facilities and none of the recreational facilities would need to be permanently relocated. Therefore, the proposed GCL is not anticipated to result in any significant adverse impacts to Glassboro High School.

Glassboro Sports Complex – Borough of Glassboro (Park ID 93)

The proposed GCL would pass immediately to the east of Glassboro Sports Complex. As this resource is located within the Borough of Glassboro, which has accepted Green Acres funding for some of its parkland resources, this resource is encumbered by Green Acres' restrictions and compensation requirements.

As shown on Figure 3-14, "Direct Impacts to Glassboro Sports Complex," 0.02 acre of the 18.21-acre park property (0.1 percent) would be acquired to accommodate the GCL alignment. The impacted area is not occupied by any recreational facilities and lies near the eastern edge of the park property. Thus, there would be no direct impact to the use of the Glassboro Sports Complex and its associated recreational facilities. No trees, facilities, equipment, or fencing would have to be removed or modified to accommodate proposed GCL features or construction activities at this location.

Although the GCL is anticipated to result in minor adverse impacts, there would be no permanent interference with the use of or access to the school or its recreational facilities and none of the recreational facilities would need to be permanently relocated. Therefore, the proposed GCL is not anticipated to result in any significant adverse impacts to the Glassboro Sports Complex.

3.4.8.2. Total Parklands Impacts

For the total impacts associated with the proposed GCL, including both operational impacts and construction-related impacts, see Section 3.5.3.2, “Total Impacts to Parklands.”

3.4.9. **Aesthetic Features**

A typical rail project could involve the introduction of a new horizontal, linear element (the railway corridor) traversing the landscape, thereby potentially altering the pattern of development and subsequently the appearance of the landscape. A typical rail project could introduce vertical or aerial elements that are visible from surrounding areas, and it could also cause removal of vertical elements that currently buffer views of the project area (buildings, vegetation, etc.). Direct effects to surrounding properties, including property acquisitions, are of particular interest, especially where property acquisitions or similar direct effects may be associated with visual resources, such as parklands.

Impacts to aesthetic features involve two criteria to be considered in determining the significance of the effect of a proposed project: context and intensity. “Context” is the affected environment in which the proposed project would occur; the visual impact assessment considers context in terms of type, quality, and sensitivity of a visual resource; the location and physical extent of effect; and the duration of effect. “Intensity” refers to the magnitude of potential adverse effect.

Certain aspects of the proposed project would not be anticipated to result in substantial impacts to the character of the landscape. Such low-magnitude project-induced effects for a typical rail project could include the introduction of new rail within an existing horizontal corridor, defined by an existing rail line, highway, or other, similarly linear infrastructure; the removal of vegetation within the ROW; and non-extensive modification of landscape form, such as by extending existing rail bed and embankments within a rail corridor. Aspects of the proposed project associated with the introduction of the rail, for reasons outlined above, would be expected to result in no impacts or low-magnitude impacts.

In addition, project elements that may require more individualized consideration of potential effects due to uniqueness, variety, or site differences, such as the VMF sites or proposed stations, which would differ from one another in terms of designs and environs, are also considered in the following. For these components of the proposed project, their locations in the landscape are assessed, together with the associated “viewer groups” that may be affected.

3.4.9.1. Proposed Track (Rail and Trackbed)

The project area comprises a linear assemblage of visually apparent corridors within the existing landscape, including a freight corridor for most of the project area. Existing passenger railway near the WRTC and elevated I-676 highway infrastructure comprise its northern end, and historic railway corridor its southern end. Therefore, the proposed project would introduce no substantial length of new corridor element to the aesthetic features study area. Visible changes to the project area resulting from the introduction of the rail in the aesthetic features study area are described as follows:

Where Existing Rail Defines the Project Area

No new rail would be introduced at the northern end of the GCL corridor; rather, existing rail would be utilized to connect the WRTC to the beginning of new track at approximately Haddon Avenue. Conditions

between WRTC and Haddon Avenue in the future with the proposed GCL would resemble existing conditions with respect to aesthetics.

The introduction of new rail infrastructure alongside areas of existing Conrail tracks (between approximately Holtec Boulevard in the City of Camden and Wilmer Street in the Borough of Glassboro) would represent an increase in the amount of rail infrastructure on the ground.

The introduction of the track bed and new rail, itself, would result in physical changes limited to the project area. The most distinctive change would be the removal of vegetation as part of grading for new embankment along the eastern side of the existing Conrail tracks, and where new ditches would be constructed. Because this portion of the project area (LOD) is generally limited to the existing Conrail ROW, vegetation is primarily herbaceous perennials, such as grasses, rather than trees. Some trees may be removed from within the ROW; such trees are likely to be successional growth or encroachment that would typically be removed as part of routine rail maintenance, thereby maintaining the character of the rail corridor. Such changes would be consistent with the existing character of the corridor. To the extent that such changes to the project area may be perceptible to residents or nearby parkland visitors (these being the only viewer groups in the aesthetic features study area potentially sensitive to such changes in these areas), the removal of vegetation within the project area would result in no effect to the aesthetic character of the project area or aesthetic features study area, as such changes would not significantly affect their enjoyment of surrounding areas.

There is limited potential for removal of vegetation within several feet outside the Conrail ROW, such as where necessary to construct bridges or embankments in the vicinity of water bodies. As such, the project area landscape unit (Railway) may be expanded slightly into adjacent natural or naturalized areas. Given that such changes would be consistent with the existing character of the corridor, these instances of vegetation removal within the immediate vicinity of the Conrail tracks to facilitate the construction of new rail infrastructure would not be significant or adverse.

Grade crossing gates would be installed along at-grade crossings along the Conrail freight corridor. These safety devices would be intentionally visible, though characteristic of roadway safety devices along a typical rail corridor in this region. Though these structures may reinforce the character of the rail and roadway within the landscape to a minor extent, they would not be expected to alter the landscape character of the aesthetic features study area in a significant way.

Where Existing Highway Infrastructure Defines the Project Area

The proposed project would comprise elevated rail alongside the elevated I-676 highway infrastructure that visually defines the project area between approximate Haddon Avenue and Holtec Boulevard in the City of Camden.

The proposed project would be constructed adjacent to the west side of the elevated I-676 and to a similar height (approximately 20-24 feet above ground-level). Bridges would be placed at locations where they cross urban roadways; these crossings are already crossed by similar bridges for the I-676 at the same locations. Retained fill would require extension westward of the existing embankment associated with I-676, along the west side of the highway.

As a result of its position alongside the existing I-676, the proposed project in this portion of the project area would be visible from areas west, where the most sensitive viewer groups include residents, shoppers in local commercial areas, and visitors to parklands. Current eastward views toward the project area are dominated by the elevated I-676. Though a strong feature in the landscape, views of it do not imbue surrounding neighborhoods with a particular character (as would views of a famous water crossing

bridge structure, for example). The proposed project would largely block views of I-676 from areas west, and introduce similar views of new transportation infrastructure that would be adjacent to the existing I-676 and similar in form and character. As such, the overall change likely would be perceptible to viewers west of the project area, but it would not result in a significant change to the project area or surrounding landscape they experience.

The proposed project would be visible from I-676, and to the extent that the proposed project would be somewhat taller than the existing I-676 roadway, it would block westward views of the aesthetic features study area that are currently available from the I-676 southbound lane. As discussed previously, however, drivers on I-676 would be expected to maintain focused attention on safe driving, particularly at highway speeds. Moreover, although the proposed project and associated change in view would be highly perceptible to drivers on I-676, the views affected are not considered sensitive. The proposed elevated railway would be designed to provide appropriate light shielding to protect nighttime highway drivers from train lighting, particularly with regard to potential lights from northbound trains directed toward (southbound) drivers on I-676. Therefore, potential impacts would be avoided, and no significant adverse impact would be associated with changed views from I-676 as a result of the proposed project.

Where Historic Rail Corridor Defines the Project Area

New track would be constructed in an area where track does not currently exist, on the southern end of the corridor in the Borough of Glassboro, south of Wilmer Street, and also extending west from the existing corridor between University Road and Ellis Street to create a wye connection to the proposed new Glassboro VMF site outside the existing and historic rail corridors.

Given that no rail currently exists in this location, the new rail would appear as a new feature within the defined landscape corridor, and it would be visible from adjacent properties. The introduction of the track bed and new rail, itself, would result in physical changes limited to the project area. The most distinctive change would be the removal of vegetation as part of grading for new embankment, approximately centrally within the former rail corridor. Because the project area (LOD) is contained within the historic rail corridor, which feature no improvements or encroachments, vegetation to be removed would primarily comprise herbaceous perennials, such as grasses, and a few trees. Some trees may be removed from within the ROW; such trees are likely to be successional growth or encroachment that would typically be removed as part of routine rail maintenance, thereby maintaining the character of the rail corridor. Therefore, the removal of vegetation within the project area would alter the character of this historic railway corridor, but it would not alter the character of adjacent residential area nor the broader landscape in a significant way.

Views that currently exist toward the historic railway corridor would not be affected, though the altered appearance of the project area, both as a result of vegetation removal and the introduction of new trackbed and rail would be perceptible to surrounding residents and parkland visitors. Visibility of these low-magnitude changes to the defining aesthetic character of this landscape within the project area (LOD) would not be expected to be visible from areas beyond immediately adjacent properties. Therefore, these effects would be of low magnitude, and would not in themselves alter the visual character of the surrounding neighborhood. The proposed Glassboro Station and the proposed Glassboro VMF, respectively, which would be constructed in the vicinity of this historic railway corridor are discussed in Section 3.4.9.2, "Proposed Stations," and Section 3.4.9.3, "Proposed Vehicle Maintenance Facilities," respectively.

As described previously, the project area comprising a historic railway corridor, including the wye that would connect to the proposed Glassboro VMF, is adjacent to several multi-use trails and a recreational

open space. While the contribution of the recreational open space to the character of the aesthetic features study area landscape would not be affected by changes within the project area, the changes to the project area would be visible from the park. The potential effects associated with this park and multi-use trails are discussed in Section 3.4.9.5, "Potential Effects to Visual Resources - Parklands."

3.4.9.2. Proposed Stations

The proposed project would introduce new passenger stations throughout the project area. Due to likely stylistic differences in station design, and differences in their respective site environs, the visible changes to the landscape that would be associated with the introduction of stations in the project area would be more perceptible than the introduction of new rail (discussed previously). Therefore, they are considered discretely in this visual impact assessment. The proposed stations are described below, together with viewer groups and potential effects to the aesthetic character of the landscape.

The existing WRTC would be retrofitted with new platforms, to replace existing passenger rail platform, in order to accommodate light-rail service. This modification to the existing station would represent no substantial change visible from areas outside the existing station area within the project area. Though visible to passengers utilizing WRTC, the modifications to the existing station would be consistent with the existing station and rail corridor. Therefore, no significant adverse effects to the aesthetic character of the landscape would be associated with this station.

Cooper Hospital Station

Cooper Hospital Station would consist of a center platform between Haddon Avenue and Pine Street, adjacent to a parking lot and in the immediate vicinity of a parking garage. Given the built-up context of the aesthetic features study area at this location, the station would be visible only from immediately adjacent properties. Views of the station area, as experienced by hospital staff, clients, and visitors would not be substantially changed with the introduction of the platforms and minor landscaping comprising the proposed Cooper Hospital Station. The utilitarian character of rail platforms would be consistent with the existing parking and streetscape elements, though the landscaping that would be provided as part of the station development would represent an improvement to the streetscape. In particular, the proposed landscaping along the existing western platform would enhance its appearance and integrate it with hospital property to the west. Therefore, no significant adverse effects to the aesthetic character of the landscape would be associated with this station, and minor improvements to the visual environs may result.

South Camden Station

South Camden Station would consist of a center platform between the tracks. It would be elevated, like the rail in this area, and situated between the new rail on the west and the existing I-676 on the east. It would include an elevated walkway over minor landscaping, connecting the station to Van Hook Street to the north and Ferry Avenue to the south. The position of the station between the existing I-676 infrastructure and the proposed rail, ~~ensures~~ insures that the single platform would not represent a substantial change to the surrounding landscape. As currently designed, the South Camden Station would include a parking area in place of a landscaped parcel. Given the position of the parking area within this built-up landscape, the loss of existing landscaping would be visible from the immediate vicinity, but its removal and replacement with a landscaped parking lot would not be of a magnitude that would affect the character of the surrounding landscape, which is currently dominated by the adjacent I-676

infrastructure. Therefore, no significant adverse effects to the aesthetic character of the landscape would be associated with this station.

Gloucester City Station

Gloucester City Station would consist of a center platform and sidewalk. Situated between the proposed tracks, this platform would be consistent with the railway corridor landscape. Though visible from locations in the immediate vicinity, it would not represent a change in aesthetic character of the landscape. Therefore, no significant adverse effects to the aesthetic character of the landscape would be associated with this station.

Crown Point Road Station

Crown Point Road Station would consist of a center platform, sidewalk, and parking. Situated between the proposed tracks, this platform would be consistent with the railway corridor landscape. Though visible from locations in the immediate vicinity, it would not represent a change in the aesthetic character of the landscape. The parking area would be situated east of the tracks in an area currently featuring parking. As such, the parking lot would not represent a change in aesthetic character of the landscape, and no significant adverse effects to the aesthetic character of the landscape would be associated with this station.

Red Bank Avenue Station

Red Bank Avenue Station would consist of a single side platform, sidewalk, and parking. Situated adjacent to the proposed tracks, this platform would be consistent with the railway corridor landscape. Though visible from locations in the immediate vicinity, it would not represent a change in aesthetic character of the landscape. Therefore, no significant adverse effects to the aesthetic character of the landscape would be associated with this station.

Woodbury Station

Woodbury Station would consist of a single side platform, sidewalk, and landscaping, along an existing parking area. Situated adjacent to the proposed tracks, this platform would be consistent with the railway corridor landscape. Though visible from locations in the immediate vicinity, it would not represent a change in aesthetic character of the landscape. Further, the proposed landscaping along the existing parking area would further enhance its appearance and integrate it with the surrounding residential neighborhood to the west, also further buffering existing views between this residential area and the rail corridor. Therefore, no significant adverse effects to the aesthetic character of the landscape would be associated with this station, and improvements to the visual environs would be expected.

Woodbury Heights Station

Woodbury Heights Station would consist of two side platforms, sidewalk, landscaping, and parking. Situated between the proposed tracks, this platform would be consistent with the railway corridor landscape. Though visible from locations in the immediate vicinity, it would not represent a change in aesthetic character of the landscape. The parking area would be situated west of the tracks. The proposed landscaping along the parking area and western edge of the tracks in the station area would enhance its

appearance and integrate it with the surrounding residential neighborhood to the west, also further buffering existing views between this residential area and the rail corridor. Therefore, no significant adverse effects to the aesthetic character of the landscape would be associated with this station, and improvements to the visual environs would be expected.

Wenonah Station

Wenonah Station would consist of two outside platforms surrounded by extensive landscaping. These platforms would be consistent with the railway corridor landscape. The mature trees within the rail ROW along North East Avenue and North West Avenue would be removed in the area proposed for the new station development, and new trees and vegetation would be planted assure the station area continues to contribute positively to the immediately adjacent streetscape. This change in landscaping may be pronounced and visible to routine viewers, but it would be limited to views from adjacent streetscapes. Such a change is not inherently adverse or significant, depending on the viewer groups present and their likely sensitivity to such a change.

However, visibility to the proposed station area from adjacent streetscapes and neighboring residential properties may be increased with the removal of existing large, mature trees. Further, it is reasonable to assume that it may take some years, potentially decades, for new landscaping to mature to a point resembling existing conditions. As such, the views of mature trees to which neighboring residents have become accustomed, and which they may appreciate as part of their neighborhood identity, would no longer be in place. Therefore, this removal of mature trees may result in an adverse effect to the aesthetic character of the residential streetscapes (North East Avenue and North West Avenue) in the immediate vicinity of the proposed station. Throughout preliminary engineering, the GCL team will work with municipalities to devise appropriate landscaping strategies with public input to make sure that the change is mitigated to the extent possible.

Mantua Boulevard Station

Mantua Boulevard Station would consist of two side platforms, sidewalk, and landscaping immediately adjacent to the west side of the tracks in the vicinity of the station, and it would also include a new parking lot west of the station, which would feature internal and perimeter landscaping. Due to the surrounding topography, the station platforms and infrastructure would be largely obscured from the west of the proposed alignment, but visible from the east of the alignment on Mantua Boulevard and Cape May Avenue. Though visible from locations to the east, the station platform would not represent a change in aesthetic character of the landscape of the rail corridor. Further, the proposed landscaping along the existing parking area would further enhance its appearance and integrate it with the neighboring commercial uses. Therefore, no significant adverse effects to the aesthetic character of the landscape would be associated with this station, and improvements to the visual environs would be expected.

Sewell Station

Sewell Station would consist of two side platforms surrounded by extensive landscaping. These platforms would be consistent with the railway corridor landscape, though with the landscaping in place may not be visible from the residential areas to the west of the station. The proposed landscaping would enhance the appearance of the station area and integrate it with the surrounding residential development to the east and west, buffering existing views between this residential area and the rail corridor. It would create a focal point of the station area when viewed from Essex Avenue east of the station. Therefore, no

significant adverse effects to the aesthetic character of the landscape would be associated with this station, and improvements to the visual environs would be expected.

Mantua-Pitman Station

Mantua-Pitman Station would consist of two side platforms surrounded by landscaping. Additionally, a new parking lot and parking garage featuring internal and perimeter landscaping would be constructed to the east of the proposed station, fronting Lambs Road and Columbia Drive. The station platforms would be consistent with the railway corridor landscape, though with the landscaping in place may not be visible from the areas to the east and west of the station. The proposed landscaping would enhance the appearance of the station area and integrate it with the surrounding areas to the east and west.

The parking lot and garage would be constructed on land that is currently wooded and adjacent to an existing parking for a manufacturing building. Their construction would involve the removal of this wooded area and the addition of new paved area, sidewalks, structures, and landscaping. This infrastructure would represent a change from existing conditions to routine viewers, including drivers on Lambs Road, and workers at the neighboring manufacturing site. This new infrastructure, while visible, would not represent a substantial or adverse change to the visual character of the area as it would be adjacent compatible railway corridor landscape, and parking and manufacturing uses. Further, viewer groups at this location, including workers at the manufacturing site and drivers on Lambs Road, would not be considered sensitive given the attention required for the work at hand, and for driving on Lambs Road. Therefore, no significant adverse effects to the aesthetic character of the landscape would be associated with this station.

Pitman Station

Pitman Station would consist of two side platforms surrounded by extensive landscaping. These platforms would be consistent with the railway corridor landscape, though with the landscaping in place may not be visible from the nearby commercial and residential areas.

The mature trees within the rail ROW would be removed in the area proposed for the new station development, and new trees and vegetation would be planted to make sure that the station area continues to contribute positively to the immediately adjacent properties to the west and the primarily commercial Commerce Avenue streetscape to the east. This change in landscaping may be pronounced and visible to routine viewers, but it would be limited to views from adjacent Commerce Avenue streetscapes and from residential rear yards to the west. Such a change is not inherently adverse or significant, depending on the viewer groups present and their likely sensitivity to such a change.

However, views to the proposed station area from adjacent streetscapes and neighboring residential properties may be increased with the removal of existing large, mature trees. Further, it is reasonable to assume that it may take some years for new landscaping to mature to a point resembling existing conditions. As such, the views of mature trees to which neighboring residents have become accustomed, and which they may appreciate as part of their neighborhood identity, would no longer be in place. Therefore, this removal of mature trees may result in an adverse effect, though not a significant one, to the aesthetic character of the Commerce Avenue streetscape. These potential effects would be limited in physical extent, but could potentially result in significant adverse effects on the visual quality of the environs enjoyed by the nearby residents, in particular; the removal of mature trees would potentially diminish the visual “buffer” enjoyed currently by residential properties west of the proposed station area (facing onto Simpson Avenue), thus increasing visibility between some rear yards and the rail corridor.

As design progresses, the GCL team will work with municipalities to devise appropriate landscaping strategies with public input to make sure that the change is mitigated to the extent possible. The proposed landscaping would enhance the appearance of the station area and integrate it with the surrounding neighborhood, buffering existing views between the rail corridor and areas east and west. Therefore, no significant adverse effects to the aesthetic character of the landscape would be associated with this station, and improvements to the visual environs would be expected.

Rowan University Station

Rowan University Station would consist of two side platforms surrounded by extensive landscaping. These platforms would be consistent with the railway corridor landscape, though with the landscaping in place may not be visible from the existing adjacent parking areas. The proposed landscaping would enhance the appearance of the station area and integrate it with the existing strip of naturalized area that borders the tracks at this location, further buffering existing views between the rail corridor and areas east and west. Therefore, no significant adverse effects to the aesthetic character of the landscape would be associated with this station, and improvements to the visual environs would be expected.

Glassboro Station

Glassboro Station would consist of two outside platforms. These platforms would be new to the former railway corridor landscape, though their placement would not require changes outside the corridor. Parking spots would be introduced at the end of the station area. The proposed landscaping would enhance the appearance of the station area and integrate it with the surrounding neighborhood. Therefore, no significant adverse effects to the aesthetic character of the landscape would be associated with this station, and improvements to the visual environs would be expected.

3.4.9.3. Proposed Vehicle Maintenance Facilities

Glassboro Vehicle Maintenance Facility

The Glassboro VMF would represent a 38.49-acre area of new track and rail infrastructure where none currently exists or has existed. However, the site proposed for the Glassboro VMF is currently occupied by a manufacturing use, with outdoor equipment and materials storage, truck parking, and large-footprint buildings. It is surrounded by natural or naturalized area on two sides, thus precluding views of the proposed VMF from areas south and east. To the west is natural or naturalized area as well as another light manufacturing (warehouse) facility. Workers at this property to the north would not be a viewer group considered sensitive to changes in the surrounding landscape, particularly a portion of the landscape already characterized by manufacturing uses and given their attention to the work at hand and matters of safety.

A recreational open space, Glassboro Sports Complex, is located adjacent to the north side of the Glassboro VMF site. Although the content of the VMF site, as visible from the Glassboro Sports Complex, would be changed from a warehouse/manufacturing facility, to a rail maintenance facility storing rail cars and equipment, the overall aesthetic character of the property would not change substantially to affect a significant and adverse change to the aesthetic features study area landscape. Further, as discussed below, Glassboro Sports Complex facilities nearest the proposed VMF site are active use areas (softball fields and basketball courts), which are not oriented with views toward the VMF site. Therefore, the

parkland visitors, the only viewer groups in the immediate vicinity of the VMF with likely sensitivity to landscape changes resulting from the VMF, would not be expected to experience the introduction of the VMF as a significant change to the aesthetic character of the aesthetic features study area landscape. (See Section 3.4.9.5, “Potential Effects to Visual Resources – Parklands,” for a discussion of direct effects to parklands and associated impacts to visual resources)

Woodbury Vehicle Maintenance Facility

The Woodbury VMF would represent a 21.25-acre area of new track and rail infrastructure where none currently exists or has existed. The site proposed for the Woodbury Heights VMF, however, is currently vacant land largely cleared of trees and foliage. This site was previously a manufacturing site, occupied by an Anderson Door factory, from which all that remains is a concrete foundation. As such, the introduction of rail maintenance facility infrastructure would not be inconsistent with the historic aesthetic character of this site. While the site is surrounded by trees on all sides, and a wooden fence on the eastern edge, adjacent residential land uses on Chestnut Avenue and Academy Avenue would likely still have a partially obscured view of the proposed VMF sites. In particular, residences on Academy Avenue are oriented with views of the proposed facility. While residents in the immediate vicinity of the proposed Woodbury Heights VMF would likely have partially obscured views of the VMF, no parks, cultural resources, or other visually sensitive resources are located in the vicinity of the site, and no other viewer groups would experience a notable change to the visual environs at this location. As such the proposed Woodbury VMF would not result in a significant adverse impact to aesthetic character. Measures intended to further mitigate this significant adverse impact would be developed as a part of preliminary engineering efforts in coordination with the Borough of Woodbury Heights as appropriate.

3.4.9.4. Proposed Roadway Improvements and Utility Relocations

The proposed project includes improvements to roadways in several locations (Cooper Street, Tylers Mill Road, Joseph L. Bowe Boulevard, and Mullica Hill Road). To the extent possible the improvements would occur within the existing road ROWs. Where road improvements may entail widening or shifting of existing roads, there would be no overall effect to the landscape, but there may be localized effects to visual quality as a result of minor property acquisitions or effects to landscaping.

3.4.9.5. Potential Effects to Visual Resources - Parklands

Potential Effects Associated with the Introduction of Rail

As described previously, 36 parklands were identified as having views of the project area where new rail would be introduced. Because the introduction of rail, as discussed previously, would result in minimal changes to the project area, with no significant effects to the aesthetic conditions, views toward the project area would not be affected by the introduction of rail except where direct impacts to parklands are anticipated.

Potential Effects Associated with the Introduction of Stations

As described previously, 12 parks have views of proposed Gloucester City, Crown Point Road, Red Bank Avenue, Woodbury, Wenonah, Pitman, and Rowan University station locations. Because the introduction

of these stations generally, as discussed previously, would result in no impacts to the aesthetic conditions, there would be limited potential to affect the visual quality of parklands with views toward them.

As noted in previous discussions of Wenonah Station and Pitman Station, visual impacts may result insofar as the character of the streetscapes immediately surrounding the stations may be altered by replacing mature trees (currently occupying proposed station sites) with new landscaping. Wenonah Elementary School open space and Wenonah Park afford distant, indirect (oblique) and partial views of the proposed Wenonah Station site, limited by existing intervening structures and trees. Ballard Park offers similarly indirect (oblique) and partial views of the proposed Pitman Station site, also limited by existing intervening structures and trees. In these three instances, to the extent that trees would be removed and replaced, this change in nearby proposed station site conditions may be perceptible from perimeters of these parkland resources. However, none of these parklands derives its essential visual character from views toward to the project area, and activities within these parks are primarily oriented inwardly within the parks. Therefore, the proposed project would result in no significant adverse effects to parkland visual resources as a result of proposed station development.

Potential Effects Associated with the Introduction of the Vehicle Maintenance Facilities

As described previously, the Glassboro Sports Complex would have direct views of the proposed Glassboro VMF. The Glassboro Sports Complex is an active use parkland resource that does not derive its identity from the surrounding landscape. The sports facilities nearest the proposed VMF site include softball fields and basketball courts, which are not oriented with views toward the VMF site. Moreover, spectator views are not oriented toward the VMF site. Given these park visitors' low sensitivity to changes in the surrounding landscape (as described previously), the proposed Glassboro VMF would not be expected to result in significant or adverse effects to this parkland visual resource.

3.4.9.6. Potential Effects to Visual Resources - Historic and Cultural Resources

None of the extant historic properties or those recommended as being potentially eligible for listing in the National Register maintain views toward the project area that do not already include rail activity and infrastructure (or in the City of Camden, substantial transportation infrastructure associated with I-676). Moreover, many of these historic resources relate to the historic passenger rail that once operated in the corridor, or otherwise represent the development patterns and architectural styles of portions of communities that historically developed around the historic passenger rail and its stations. Therefore, the proposed GCL would not alter the visual context of historic architectural visual resources in a manner that is detrimental to their value as historic resources. However, ongoing consultation with NJ HPO will ascertain the extent to which changes in the environs of historic resources may result in effects, and mitigation measures will be developed, as appropriate in consultation with NJ HPO (please refer to Section 3.4.2, "Cultural Resources").

3.4.10. Air Quality

3.4.10.1. Regional Analysis

A regional, or mesoscale, analysis of a project determines a project's overall impact on regional air quality levels. As described in Attachment 10, "Air Quality Technical Report," a regional analysis was performed for the project using the latest version of the EPA's Motor Vehicle Emission Simulator (MOVES) emissions

program, MOVES2014a, to determine roadway emissions and project specific emission rates for the Stadler light DMU, 450 kilowatt (kW) engine, the proposed transit engine for the project. MOVES2014a incorporates project-generated VMT as well as specific MOVES input factors, such as inspection and maintenance programs, fleet mix, and speed profiles, for the traffic network being analyzed. MOVES input factors were obtained from the DVRPC for both Camden and Gloucester counties.

The emission burden analysis of a project determines the daily “pollutant burden” levels for the proposed GCL, as well as the No-Action condition, in order to provide a basis of comparison for regional emissions of each of the criteria pollutants under the proposed GCL. The emission burdens (in metric tons) for the proposed GCL, as well as the No-Action condition, are presented in Table 3.4-8, “2040 Daily Weekday Regional Emission Burden Assessment (Metric Tons).”

Table 3.4-8: 2040 Daily Weekday Regional Emission Burden Assessment (Metric Tons)

Condition	Hydrocarbons (HC)	Nitrogen Oxides (NO _x)	Carbon Monoxide (CO)	Particulate Matter (PM ₁₀)	Particulate Matter (PM _{2.5})
No-Action Condition	0.042	0.244	1.79	0.01	0.01
The GCL	0.046	0.249	1.84	0.01	0.01

Note: Emission Burdens have been rounded

Source: MOVES2014a emission factors input files, DVRPC, MOVES emission factor program Environmental Protection Agency, 2018

As shown in Table 3.4-8, “2040 Daily Weekday Regional Emission Burden Assessment (Metric Tons),” the proposed GCL is predicted to slightly increase regional pollutant burdens as compared to the No-Action condition.

3.4.10.2. Mobile Source Air Toxics Analysis

The U.S. Environmental Protection Agency (EPA) is the lead Federal agency for administering the Clean Air Act (CAA) and has certain responsibilities regarding the health effects of MSATs. The EPA issued a final rule on Control of Emissions of Hazardous Air Pollutants from Mobile Sources (66 *Federal Register* 17229, March 29, 2001). This rule was issued under the authority in Section 202 of the CAA. In its rule, the EPA examined the impacts of existing and newly promulgated mobile source control programs including: its reformulated gasoline program; its national low emission vehicle standards; its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements; and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel requirements. Future emissions likely would be lower than present levels as a result of the EPA’s national control programs that are projected to reduce MSAT emission by 91 percent from 2010 to 2050, even if VMT increases by 45 percent.

On February 9, 2007, and under authority of CAA Section 202(l), the EPA signed a Final Rule - Control of Hazardous Air Pollutants from Mobile Sources (*Federal Register*, Vol. 72, No. 37, page 8,430, February 26, 2007), which sets standards to control MSATs from motor vehicles. Under this rule, the EPA is setting standards on fuel composition, vehicle exhaust emissions, and evaporative losses from portable containers. The new standards are estimated to reduce total emissions of MSATs by 330,000 tons in 2030, including 61,000 tons of benzene. Concurrently, total emissions of Volatile Organic Compounds (VOCs) will be reduced by over 1.1 million tons in 2030 as a result of adopting these standards.

On February 3, 2006, the Federal Highway Administration (FHWA) released Interim Guidance on Air Toxic Analysis in National Environmental Policy Act (NEPA) Documents (FHWA 2006a). This guidance was superseded on October 18, 2016 by FHWA’s Updated Interim Guidance Update on Air Toxic Analysis in

NEPA Documents.⁸ FHWA guidance is being referenced as FTA does not have their own specific guidance regarding MSAT in NEPA documentation. The purpose of FHWA's guidance is to advise on when and how to analyze MSATs in the NEPA environmental review process for highways. This guidance is considered interim because MSAT science is still evolving. As the science progresses, FHWA will update the guidance.

A quantitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The quantitative assessment presented is derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives*. The FHWA's Interim Guidance groups projects into the following tiered categories:

- Tier 1: No analysis for projects without potential for meaningful MSAT effects
- Tier 2: Qualitative analysis for projects with low potential MSAT effects
- Tier 3: Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects

Based on the FHWA's recommended tiering approach, the proposed GCL falls within the Tier 2 approach (i.e., for projects with a low potential for MSAT effects). The amount of MSATs emitted would be proportional to the VMT, assuming the vehicle mix does not change. Predicted regional VMT estimates indicate that the GCL would reduce regional VMT by approximately two percent. Further, the project would utilize light DMU trainsets, which emit fewer pollutants than the typically used heavy DMU trainsets. As such, the project is predicted to generally produce no meaningful regional MSAT effects.

3.4.10.3. Microscale CO Analysis

The ~~most recent version of the~~ EPA Motor Vehicle Emission Simulator (MOVES2014a) and the CAL3QHC (Version 2.0) air quality dispersion model were used to estimate existing, future No-Action and the future GCL CO levels at selected locations in the project area.

Mobile source models are the basic analytical tools used to estimate CO concentrations expected under given traffic, roadway geometry, and meteorological conditions. The mathematical expressions and formulations that comprise the various models attempt to describe an extremely complex physical phenomenon as closely as possible. The dispersion modeling program used in this project for estimating pollutant concentrations near roadway intersections is the CAL3QHC (Version 2.0) dispersion model developed by EPA and first released in 1992.

CAL3QHC is a Gaussian model recommended in the EPA's Guidelines for Modeling Carbon Monoxide from Roadway Intersections. Gaussian models assume that the dispersion of pollutants downwind of a pollution source follow a normal distribution from the center of the pollution source.

Different emission rates occur when vehicles are stopped (i.e., idling), accelerating, decelerating, and moving at different average speeds. CAL3QHC simplifies these different emission rates into two components:

- Emissions when vehicles are stopped (i.e., idling) during the red phase of a signalized intersection
- Emissions when vehicles are in motion during the green phase of a signalized intersection

⁸ https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/

The CAL3QHC (Version 2.0) air quality dispersion model has undergone extensive testing by EPA and has been found to provide reliable estimates of inert (i.e., nonreactive) pollutant concentrations resulting from motor vehicle emissions. A complete description of the model is provided in the User's Guide to CAL3QHC (Version 2.0): *A Modeling Methodology for Predicting Pollutant Concentrations near Roadway Intersections* (Revised 1995).

The transport and concentration of pollutants emitted from motor vehicles are influenced by three principal meteorological factors: wind direction, wind speed, and the atmosphere's profile. The values for these parameters were chosen to maximize pollutant concentrations at each prediction site. That is, to establish a conservative, reasonable worst-case scenario. The following values were used for these parameters:

- **Wind Direction** – Maximum CO concentrations normally are found when the wind is assumed to blow parallel to a roadway adjacent to the receptor location. At complex intersections, it is difficult to predict which wind angle will result in maximum concentrations. Therefore, the approximate wind angle that would result in maximum pollutant concentrations at each receptor location was used in the analysis. All wind angles from 0 to 360 degrees (in 5-degree increments) were considered.
- **Wind Speed** – The CO concentrations are greatest at low wind speeds. A conservative wind speed of one meter per second (2.2 miles per hour) was used to predict CO concentrations during peak traffic periods.
- **Profile of the Atmosphere** – A “mixing” height (the height in the atmosphere to which pollutants rise) of 1,000 meters, and neutral atmospheric stability (stability class D) conditions were used in estimating microscale CO concentrations.

The CO levels estimated by the model are the maximum concentrations which could be expected to occur at each air quality receptor site analyzed, given the assumed simultaneous occurrence of a number of worst-case conditions: peak-hour traffic conditions, conservative vehicular operating conditions, low wind speed, low atmospheric temperature, neutral atmospheric conditions, and maximizing wind direction.

Microscale modeling is used to predict CO concentrations resulting from emissions due to motor vehicles using roadways immediately adjacent to the locations at which predictions are being made. A CO background level must be added to this value to account for CO entering the area from other sources upwind of the receptors. Background levels for this analysis were obtained from the Camden County monitoring sites, which are the closest CO monitoring locations to the project area. The background values used for the 1-hour and 8-hour CO levels, 1.9 parts per million (ppm) and 1.5 ppm, respectively, are the maximum of the 2nd highest levels from the past three years of data (2014–2016) at these locations. These values were conservatively used as the background for all CO modeling analyses. Future CO background levels are anticipated to be lower than existing levels due to mandated emission source reductions.

Traffic data for the air quality analysis were derived from traffic counts and other information developed as part of the Traffic Analysis Report. Output from the “Synchro8” signal timing traffic model was used to obtain signal timing parameters.

Emission factors were developed using the latest version of the EPA's MOVES program, MOVES2014a. MOVES2014a is the EPA's state-of-the-art tool for estimating emissions from highway vehicles. The model is based on analyses of millions of emission test results and considerable advances in the EPA's understanding of vehicle emissions. Compared to previous tools, MOVES2014a incorporates the latest

emissions data, more sophisticated calculation algorithms, increased user flexibility, new software design, and substantial new capabilities.

Screening Evaluation

A screening evaluation was performed on the 37 intersections identified in the project area as the most congested and most affected by the proposed GCL (Table 3.4-9, "The GCL Intersection Screening"). As referenced in EPA's "Using MOVES in Project-Level Carbon Monoxide Analyses," the screening evaluation criteria recommended in EPA's "Guideline for Modeling Carbon Monoxide from Roadway Intersections" was utilized. Sites fail the screening evaluation if (1) the LOS decreases to D or below in the GCL scenario compared to the No-Action scenario, or (2) if the delay and/or volume increase from the No-Action scenario to the GCL scenario along with a LOS OF D or below. The LOS describes the quality of traffic operating conditions, ranging from A to F, and it is measured as the duration of delay that a driver experiences at a given intersection. LOS A represents free-flow movement of traffic and minimal delays to motorists. LOS F generally indicates severely congested conditions with excessive delays to motorists. Intermediate grades of B, C, D, and E reflect incremental increases in congestion. Out of the 37 intersections, the following two intersections were chosen for detailed analysis due to poor LOS, high volumes, proximity to sensitive receptors and geographical representation:

- **Broadway Boulevard (551) at Delsea Drive (47)** – this intersection has the highest delay under the GCL and is LOS F under A.M. No-Action and the GCL conditions, with an increase in volume from the No-Action condition to the GCL condition.
- **Cooper Street (CR 534) at South Evergreen Avenue (CR 553)** – this intersection is LOS D and has the second-highest volume and third-highest delay under the P.M. GCL conditions, with a worsening in delay from the No-Action to the GCL condition.

Table 3.4-9: The GCL Intersection Screening

#	Intersection	2040 No-Action						2040 The GCL					
		AM			PM			AM			PM		
		LOS	Delay	Volume	LOS	Delay	Volume	LOS	Delay	Volume	LOS	Delay	Volume
1	Martin Luther King Boulevard at South 6 th Street	A	7.8	1,466	B	10.4	1,446	A	7.8	1,467	A	7.2	1,460
2	Martin Luther King Boulevard at Haddon Avenue	D	42.8	2,624	D	36.5	2,647	C	29.9	2,586	C	27.4	2,683
3	Martin Luther King Boulevard at Broadway	C	20.8	1,571	B	19.0	1,715	B	13.7	1,543	B	16.9	1,694
4	N Broadway at Hudson Street	B	19.6	325	C	20.2	359	B	19.4	282	C	20.1	338
5	S Broadway (551) at Monmouth Street	B	19.7	734	B	17.7	803	B	19.3	639	B	17.4	633
6	Market Street (537 S) at South Broadway (551)	C	28.9	1,360	C	26.9	1,032	C	24.6	1,184	C	26.1	971
7	S Broadway (551) at Koehler Street	B	11.7	293	B	12.9	533	B	11.5	256	B	12.8	502
8	Broadway Boulevard (551) at Delsea Drive (47)	F	185.8	1,780	B	12.5	1,791	F	177.0	1,800	B	13.0	1,791
9	Broadway Boulevard (551) at E. Olive Street	B	16.1	884	B	15.3	1,013	B	15.9	871	B	15.2	999
10	N. Broad Street at Edith Avenue	A	3.6	945	A	6.1	1,312	A	3.6	974	A	6.2	1,357
11	E Red Bank Avenue at N Evergreen Avenue (650)	C	22.1	1,723	D	40.9	2,380	C	22.8	1,780	D	47.8	2,468
12	E Red Bank Avenue at N Broad Street (Rte 45)	C	35.6	2,456	C	29.9	2,422	D	36.9	2,505	C	30.1	2,441
13	Cooper Street (CR 534) at S Broad Street (Rte 45)	D	43.4	2,289	D	42.2	2,367	D	41.6	2,288	D	48.7	2,368
14	Cooper Street (CR 534) at S Evergreen Avenue (553)	B	19.1	1,687	D	48.7	2,551	B	19.0	1,785	D	53.7	2,699
15	S Broad Street (Rte 45) at E Barber Avenue	C	29.0	1,124	C	34.0	2,029	D	40.4	1,164	D	38.4	2,110
16	East Barber Avenue at S Evergreen Avenue (553)	E	58.3	2,026	E	70.0	2,413	D	52.9	2,014	E	64.1	2,386
17	Mantua Boulevard (676) at Center Street	B	14.9	1,675	C	22.5	2,046	B	14.5	1,645	C	22.6	2,051
18	Tylers Mill Road at Glassboro Road	E	41.0	2,667	C	27.9	2,821	D	38.2	2,653	C	27.5	2,798
19	Lambs Road at Main Street	B	15.0	795	B	13.9	1,094	B	15.0	797	B	13.9	1,108
20	Broadway Boulevard (551) at Holly Avenue	B	15.4	710	B	17.8	1,080	B	15.4	713	B	18.0	1,094
21	Pitman Avenue (639) at S Broadway (553A)	A	6.9	488	A	9.2	702	A	7.1	507	A	9.2	690
22	Bowe Boulevard at Carpenter Street (682)	B	18.3	1,645	B	16.6	1,998	B	17.9	1,613	B	16.4	1,962
23	Mullica Hill Road (Rte 322) at Bowe Boulevard	F	119.1	2,212	F	105.0	2,705	E	61.5	2,130	E	66.8	2,611
24	Delsea Drive (Rte 47) at High Street (322)	C	29.9	1,969	C	32.2	2,539	C	29.0	1,866	C	34.5	2,494
25	High Street E at S Main Street (Rte 553)	C	25.6	1,669	D	40.1	2,117	C	24.8	1,677	D	50.3	2,102
26	Broadway Boulevard (551) at Duncan Avenue	A	Unsig.	578	A	Unsig.	614	A	Unsig.	624	A	Unsig.	643
27	N. Broad Street at Park Avenue	B	Unsig.	1,386	C	Unsig.	1,683	B	Unsig.	1,429	C	Unsig.	1,742
28	East Barber Avenue at Railroad Avenue	B	Unsig.	830	C	Unsig.	969	A	Unsig.	832	B	Unsig.	956
29	Cooper Street (CR 534) at Railroad Avenue	A	Unsig.	733	B	Unsig.	1,358	A	Unsig.	776	C	Unsig.	1,466
30	Elm Avenue (652) at W Jersey Avenue	B	Unsig.	860	B	Unsig.	961	B	Unsig.	930	C	Unsig.	1,022
31	N East Avenue at E Mantua Avenue (632)	A	Unsig.	649	A	Unsig.	764	A	Unsig.	1,555	A	Unsig.	891
32	Atlantic Avenue at Center Street	A	Unsig.	682	A	Unsig.	1,072	A	Unsig.	686	A	Unsig.	1,110

Table 3.4-9: The GCL Intersection Screening (Continued)

#	Intersection	2040 No-Action						2040 The GCL					
		AM			PM			AM			PM		
		LOS	Delay	Volume	LOS	Delay	Volume	LOS	Delay	Volume	LOS	Delay	Volume
33	Tylers Mill Road at Main Street	A	Unsig.	576	B	Unsig.	909	A	Unsig.	576	B	Unsig.	920
34	S Broadway (551) at Laurel Avenue	A	Unsig.	495	A	Unsig.	790	A	Unsig.	622	A	Unsig.	805
35	Ellis Street at Sewell Street	A	Unsig.	697	A	Unsig.	827	A	Unsig.	683	A	Unsig.	812
36	High Street at Academy Street	A	Unsig.	794	A	Unsig.	700	A	Unsig.	796	A	Unsig.	688
37	Main Street at Union Street & Church Street	A	Unsig.	720	B	Unsig.	853	A	Unsig.	773	A	Unsig.	875

Source: GCL Project Team, Traffic Analysis Report 2018

Table 3.4-10, “Traffic Impacts At-Grade Crossings 2040 The GCL,” summarizes the results of the GCL Project Team analysis of anticipated traffic impacts at-grade crossings. The results identify the peak-hour volume on the highest-volume roadway approach direction only, anticipated vehicle delay, and anticipated LOS for the at-grade crossings with the highest potential impacts. Roadway at-grade crossing delays in the GCL corridor vary widely due to train blockage time, roadway traffic volume, and estimated reductions in roadway capacity due to factors that include heavy pedestrian crossing activity. As shown in Table 3.4-10, “Traffic Impacts At-Grade Crossings 2040 The GCL,” the majority of at-grade crossings would operate at LOS A or B, with a couple operating at LOS C. There is one crossing that would operate at LOS E under P.M. peak conditions. The volumes at this crossing, however, are significantly lower (approximately 500-600 for the peak hour) than those for the selected intersections for detailed analysis (approximately 2,000 for the peak hour). As such, potential impacts at these roadway crossings are expected to be lower than those identified for the intersections selected for detailed analysis.

Table 3.4-10: Traffic Impacts At-Grade Crossings 2040 The GCL

Location Name	A.M. Peak Hour			P.M. Peak Hour		
	Volume	Delay	LOS	Volume	Delay	LOS
South Main Street, Glassboro, New Jersey	360	7.14	A	390	7.23	A
Ellis Street, Glassboro, New Jersey	251	6.76	A	311	6.41	A
Route 322 Mullica Hill Road, Glassboro, New Jersey	475	25.52	C	574	72.47	E
Bowe Boulevard, Glassboro, New Jersey	716	18.40	B	685	11.84	B
Carpenter Street Glassboro, New Jersey	621	9.79	A	639	9.30	A
S. Broadway, Pitman, New Jersey	285	7.16	A	456	6.21	A
Pitman Avenue, Pitman, New Jersey	77	10.16	B	154	10.78	B
Lambs Road, Pitman, New Jersey	334	7.59	A	393	6.80	A
Center Street, Mantua, New Jersey	491	6.71	A	566	6.68	A
Mantua Avenue, Wenonah, New Jersey	435	7.66	A	433	7.53	A
Maple Street, Wenonah, New Jersey	383	6.55	A	371	7.08	A
Elm Avenue, Woodbury, New Jersey	370	7.55	A	452	7.08	A
E. Barber Avenue, Woodbury, New Jersey	205	6.69	A	318	6.47	A
Cooper Street, Woodbury, New Jersey	867	20.64	C	727	16.99	B
Olive Street, Westville, New Jersey	225	6.37	A	248	6.48	A
Market Street, Gloucester, New Jersey	185	6.74	A	244	6.44	A

Source: GCL Project Team Grade Crossing Analysis, 2018

Of the fourteen proposed GCL stations, nine will be served by existing or proposed parking facilities (structures or surface parking lots). Parking facilities (surface lots) will be constructed are proposed at eight six stations as part of the proposed GCL (South Camden, Gloucester City, Crown Point Road, Woodbury Heights, Mantua Boulevard, and Mantua-Pitman). Two stations (Woodbury and Glassboro) will be served by existing municipal parking structures, and one station (Red Bank Avenue) will be served by an existing municipal parking lot. (Mantua-Pitman Station will be served by a parking lot constructed as part of the GCL, which if and as demand calls for, may be developed in the future as a parking structure.) In sum, resulting in approximately 4,310 5,275 new parking spaces would be available for GCL use in 2040. The type and size of proposed GCL parking facilities are shown in Table 3.4-11, “Proposed GCL Parking Facilities.” Parking facilities identified as “GCL” would be constructed for the proposed GCL. Facilities identified as “Shared” are either existing or planned as part of municipal redevelopment master plans. Peak-hour trips generated by each station have been estimated from ridership data generated by the DVRPC Glassboro-Camden Line Regional Model. Trips to and from GCL parking facilities were distributed onto roadways adjacent to proposed parking facilities and used to determine parking impacts. The results of the parking analysis have been incorporated into the traffic analysis results for the 2040 Build

conditions. As such, the intersection screening analysis presented in Table 3.4-9, “The GCL Intersection Screening,” includes the additional traffic generated from parking facilities associated with the project. Therefore, the intersections selected for detailed analysis represent those locations with the biggest impact from project-generated traffic associated with parking facilities. Furthermore, the emissions from vehicles cold starting at nearby stations have been added into the analysis for the intersections, where applicable.

Table 3.4-11: Proposed GCL Parking Facilities

Station	Facility Type	2040 Parking	Exclusive (GCL) vs. Shared
South Camden	Surface	100 200	GCL
Gloucester City	Surface	160 70	GCL
Crown Point Road	Surface	325 330	GCL
Red Bank Avenue	Surface	500	Shared
Woodbury	Garage	1,200	Shared
Woodbury Heights	Surface	25 50	GCL
Mantua Boulevard	Surface	300 700	GCL
Mantua-Pitman	Garage	1,200 1,225	GCL
Glassboro	Garage	500 1,000	Shared
Total		4,310 5,275	

Source: GCL Team Analysis, 2018

3.4.10.4. Analysis Results

Maximum one-hour and eight-hour CO levels were predicted for the existing year (2017), opening year (2025) and design year (2040) at the two intersections selected for analysis. Maximum one-hour CO concentrations are shown in Table 3.4-12, “Predicted Worst-Case One-Hour CO Concentrations (ppm).” Maximum eight-hour CO concentrations are shown in Table 3.4-13, “Predicted Worst-Case Eight-Hour CO Concentrations (ppm).” The CO levels estimated by the model are the maximum concentrations that could be expected to occur at each air quality receptor site analyzed. This assumes simultaneous occurrence of a number of worst-case conditions: peak-hour traffic conditions, conservative vehicular operating conditions, low wind speed, low atmospheric temperature, neutral atmospheric conditions, and maximizing wind direction.

Table 3.4-12: Predicted Worst-Case One-Hour CO Concentrations (ppm)

Intersection	2017		2025				2040			
	Existing		No-Action		The GCL		No-Action		The GCL	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Broadway Boulevard (551) at Delsea Drive (47)	2.4	2.2	2.2	2.1	2.1	2.2	2.0	1.9	2.0	1.9
Cooper Street (CR 534) at South Evergreen Avenue (CR 553)	2.2	2.3	2.0	2.2	2.1	2.1	1.9	1.9	1.9	2.0
Notes:										
<i>Concentrations = modeled results + 1-hour CO background.</i>										
<i>1-hour CO background = 1.9 ppm; 1-hour CO standard = 35 ppm.</i>										
<i>Abbreviations: A.M. = morning; P.M. = evening; ppm = parts per million.</i>										

Source: GCL Project Team, 2018

Table 3.4-13: Predicted Worst-Case Eight-Hour CO Concentrations (ppm)

Intersection	2017	2025		2040	
	Existing	No-Action	The GCL	No-Action	The GCL
Broadway Boulevard (551) at Delsea Drive (47)	1.9	1.7	1.7	1.6	1.6
Cooper Street (CR 534) at South Evergreen Avenue (CR 553)	1.8	1.7	1.6	1.5	1.6
Notes: <i>Concentrations = (modeled results x persistence factor [0.7]) + 8-hour CO background.</i> <i>8-hour CO background = 1.5 ppm; 8-hour CO standard = 9 ppm.</i> <i>Abbreviations: ppm = parts per million.</i>					

Source: GCL Project Team, 2018

Based on the eight-hour values presented in Table 3.4-13, “Predicted Worst-Case Eight-Hour CO Concentrations (ppm),” the GCL is predicted to have slightly lower CO levels in 2025 at both intersections evaluated, when compared to the No-Action condition. The GCL is predicted to have no effect on CO levels in 2040, when compared to the No-Action condition. No violations of the NAAQS are predicted for any of the future analysis years.

In summary, a microscale CO analysis was conducted to determine if the GCL has the potential to cause or exacerbate a violation of the applicable CO standards. The result of this analysis, which was conducted following the EPA’s Guideline for Modeling Carbon Monoxide from Roadway Intersections, is that the GCL is not predicted to cause or exacerbate a violation of the NAAQS for CO.

3.4.10.5. PM_{2.5} Analysis

The project is located in New Jersey’s Camden and Gloucester Counties – both of which are classified as maintenance areas for the 24-hour standards for PM_{2.5}. As such, according to the EPA’s November 2015 guidance, *Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas*, the project would require a quantitative P.M. analysis if it is deemed to be a “Project of Air Quality Concern.”

Projects that require a quantitative PM_{2.5} or PM₁₀ hot-spot analysis, as defined in Section 93.123(b)(1) of the conformity rule, include:

- new highway projects that have a significant number of diesel vehicles, and expanded highway projects that have a significant increase in the number of diesel vehicles;
- projects affecting intersections that are at LOS D, E, or F with a significant number of diesel vehicles, or those that would change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;
- new bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;
- expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and
- projects in or affecting locations, areas, or categories of sites which are identified in the PM_{2.5} or PM₁₀ applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

Some examples of projects of local air quality concern that would be covered by 40 CFR 93.123(b)(1)(i) and (ii) are:

- a project on a new highway or expressway that serves a significant volume of diesel truck traffic, such as facilities with greater than 125,000 annual average daily traffic and eight percent or more of such annual average daily traffic is diesel truck traffic;
- new exit ramps and other highway facility improvements to connect a highway or expressway to a major freight, bus, or intermodal terminal;
- expansion of an existing highway or other facility that affects a congested intersection (operated at LOS D, E, or F) that has a significant increase in the number of diesel trucks; and,
- similar highway projects that involve a significant increase in the number of diesel transit buses and/or diesel trucks.

Some examples of projects of local air quality concern that would be covered by 40 CFR 93.123(b)(1)(iii) and (iv) are:

- a major new bus or intermodal terminal that is considered to be a “regionally significant project” under 40 CFR 93.1012; and,
- an existing bus or intermodal terminal that has a large vehicle fleet where the number of diesel buses increases by 50 percent or more, as measured by bus arrivals.

Monitored Data

According to the latest monitored data for the project area (Table 2.4-10, “Ambient Air Quality Monitoring Data 2014-2016”), the past three years of data do not show any exceedances of the PM_{2.5} annual or 24-hour NAAQS.

Traffic

According to the regional traffic analysis, the project is expected to reduce regional VMT in 2040 by approximately two percent, due to mode shift from autos to the GCL. Furthermore, the project would not affect diesel truck traffic on roadways in the region.

According to the local traffic analysis (Table 3.4-9, “The GCL Intersection Screening”), in the A.M. peak period, six of the 37 intersections analyzed would experience an improvement in LOS with the project, while two intersections would experience a deterioration in LOS. 29 intersections would experience no change in LOS with the project in the A.M. peak period. In the P.M. peak period, five of the 37 intersections analyzed would experience an improvement in LOS with the project, while three intersections would experience a deterioration in LOS. 29 intersections would experience no change in LOS with the project in the P.M. peak period.

As shown in the tables, the project ~~will be improving or having~~ would improve or have no effect on LOS at most intersections in the project area, while only several intersections would experience a deterioration in LOS. Of the intersections that experience a deterioration in LOS, none would be LOS E or below under Build conditions. In addition, there would be no significant changes to bus service in the project area. Therefore, any deterioration in LOS would generally be due to the overall increase in volume rather than a significant increase in diesel vehicles.

Train Operations

The project would utilize light DMUs, as opposed to typically used heavy DMUs. Due to better fuel efficiency compared to heavy DMUs, light DMUs would use less energy and, therefore, emit fewer pollutants than the typically used heavy DMUs.

The project anticipates the use of Stadler GTW light DMUs with diesel engines. The Stadler GTW 2/6 and 2/8 articulated railcars use two 450 kW (600 horsepower) engines per vehicle, providing 100 percent redundancy for traction power and other critical systems. According to Stadler, the GCL could potentially use an even smaller, lighter and more efficient vehicle than the Stadler 2/6 and 2/8; but for the purpose of this report, it is assumed that the project would use the Stadler GTW.

Table 3.4-14, “Tier 4 Exhaust Emission Standards After 2014 Model Year (g/kW-hr),” presents the EPA’s regulations on the maximum amount of emissions an off-road engine can emit for both the project’s vehicles (Stadler light DMU) and the heavier DMUs typically used (many other DMUs on the U.S. market use multiple 625 kW engines). The EPA regulations require the exhaust emissions to meet these EPA Tier 4 final requirements for model year 2015 and beyond. It should be noted that, the smaller the engine (horsepower) used, the more stringent the EPA standards become (on a per horsepower basis). Typical DMUs are heavier with larger engines, and are therefore allowed to produce more pollution on a per horsepower basis.

Table 3.4-14: Tier 4 Exhaust Emission Standards After 2014 Model Year (g/kW-hr)

Manufacturer	Engine Power	Pollutant				
		CO	NMHC	NMHC+NO _x	NO _x	PM
Stadler’s light DMU 450 kw	130 ≤ kW ≤ 560 (175 ≤ hp ≤ 750)	3.5	0.19	—	0.4	0.02
Typical Heavy DMU 625 kw	560 ≤ kW (750 ≤ hp)	3.5	0.19	—	3.5	0.04

Source: U.S. Government Printing Office,
https://www.ecfr.gov/cgi-bin/text-idx?SID=5bd49186c6de428e7d6446a56baab96c&mc=true&node=pt40.36.1039&rgn=div5#se40.36.1039_1101

An analysis of the potential impacts associated with train operations was conducted using EPA’s AERSCREEN model (see Section 4.7, “Train Operations,” of Attachment 10, “Air Quality Technical Report”). The modeling assumed worst-case conditions, including the slowest speeds, closest receptors, full conversion of NO_x to NO₂ and maximum number of train passbys. Based on this analysis, predicted worst-case PM_{2.5} train emissions would not exceed the applicable NAAQS (Table 3.4-15, “Predicted Worst-Case Train PM_{2.5} Concentrations”).

Table 3.4-15: Predicted Worst-Case Train PM_{2.5} Concentrations

Pollutant	Averaging Time	Predicted Concentration*	Applicable NAAQS
PM _{2.5}	24-hour	29 µg/m ³	35 µg/m ³
Notes: *Concentrations include maximum background levels from Table 2.4-10, “Ambient Air Quality Monitoring Data 2014-2016” µg/m ³ = micrograms per cubic meter			

Source: GCL Project Team, 2018

Interagency Consultation

As described in this report, the project is expected to utilize trains meeting the highest level of emission controls as required by the EPA, and is not predicted to cause a violation of the applicable PM_{2.5} NAAQs. The project would reduce regional roadway VMT and not increase diesel bus service. NJ TRANSIT anticipates operating a similar bus network, level and span of service during the anticipated construction phase and operations phase for the proposed GCL.

The above project-related data (traffic and train operations) was presented to the Interagency Working Group to assist with the decision as to whether the proposed GCL would be considered a “Project of Air Quality Concern.” On March 21, 2014, the Interagency Working Group came to the conclusion that the proposed GCL is not a “Project of Air Quality Concern.” Following the revised traffic analysis of May 2014, this decision was confirmed by the Interagency Working Group in June 2014. Following further traffic revisions in March 2018, this decision was again confirmed by the Interagency Working Group on March 30, 2018. As such, no further analysis is required.

3.4.10.6. Greenhouse Gas Analysis

The implementation of the proposed GCL would lead to a modal shift from single occupancy vehicles to public transit resulting in a reduction in vehicle miles travelled (VMT) and reduced GHG emissions from automobile traffic. Table 3.4-16, “2040 Daily Greenhouse Gas Emission Burdens (Metric Tons),” presents the total GHG emission burdens for the No-Action condition and the future with the proposed GCL in 2040, which includes both the reduction in GHG emissions from reduced car travel as well as the additional emissions from the operation of the proposed GCL itself. As shown in the table, the GCL is predicted to slightly increase GHG emissions, as compared to the No-Action condition; however, this increase would have a negligible effect on GHG emissions, and is not expected to result in any significant adverse impacts. It should also be noted that this analysis conservatively assumed that GCL vehicles would be powered by standard diesel, which is a high emission fuel type. Cleaner burning fuel options are available, and could be explored during project implementation, which would further reduce GHG emissions with the proposed GCL in operation.

Table 3.4-16: 2040 Daily Greenhouse Gas Emission Burdens (Metric Tons)

Alternative	Carbon Dioxide Equivalents (CO ₂ e)
No-Action	739
The GCL	744
% Change from No-Action	1%

Source: GCL Project Team, 2018

Train Operations

An analysis of the potential impacts associated with train operations was conducted using EPA’s AERSCREEN model. The AERSCREEN model estimates worst-case pollutant concentrations for a single source, such as train passbys, at a particular location. The modeling assumed worst-case conditions, including the slowest speeds, closest receptors, full conversion of NO_x to NO₂ and maximum number of train passbys. According to the analysis, predicted worst-case train emissions would not exceed the applicable NAAQS (Table 3.4-17, “Predicted Worst-Case Train Passby Emissions).”

Table 3.4-17: Predicted Worst-Case Train Passby Emissions

Pollutant	Averaging Time	Predicted Concentration*	Applicable NAAQS
CO	1-hour	2 ppm	35 ppm
PM _{2.5}	24-hour	29 µg/m ³	35 µg/m ³
NO ₂	1-hour	81 ppb	100 ppb

Notes:
**Concentrations include maximum background levels from Table 2.4-10, "Ambient Air Quality Monitoring Data 2014-2016"*
ppm = parts per million; ppb = parts per billion; µg/m³ = micrograms per cubic meter

Source: GCL Project Team, 2018

Maintenance Facilities

The proposed GCL assumes two separate VMFs to store and service the anticipated 18-vehicle fleet. The Woodbury Heights VMF, in the middle of the line in Woodbury Heights (Figure 1-11, "Woodbury Heights Vehicle Maintenance Facility"), would function as a light-maintenance location and would host activities such as inspection, cleaning, fueling and overnight storage. The Glassboro VMF, at the end of the line in Glassboro (Figure 1-10, "Glassboro Vehicle Maintenance Facility"), would operate as a full-service maintenance and vehicle storage facility. The Glassboro VMF would host activities such as periodic vehicle inspections; exterior vehicle washing; wheel truing and sanding; truck repair and truck change-out; painting and body work; maintenance of way staging; electronic component repair; and mechanical component repair. A complete list of the activities associated with each of the VMFs is shown in Table 3.4-18, "Activities at Vehicle Maintenance Facilities."

Table 3.4-18: Activities at Vehicle Maintenance Facilities

Activity	Glassboro VMF	Woodbury Heights VMF
Vehicle Storage	X	X
Daily Vehicle Inspections	X	X
Periodic (Bi-weekly, Monthly, etc.) Vehicle Inspections	X	
Vehicle Interior Cleaning	X	X
Vehicle Exterior Cleaning (Car Washer)	X	
Diesel Fueling	X	X
Wheel Truing / Sanding	X	
Truck Repair / Change-out	X	
Painting / Body Work	X	
Maintenance of Way staging	X	
Electronic component repair	X	
Milling / Welding / Mechanical component repair	X	

Source: GCL Project Team, 2018

Most activities at the VMF would occur between 5 A.M. and 7 P.M. Approximately half of the fleet would be fueled each day, primarily between 7 P.M. and midnight. Some rail car preventive maintenance and inspection work would also be done in evening hours. By midnight, the activities would drop off significantly and would primarily focus on cleaning of the vehicles and preparing for the start of the next service day.

During the overnight storage period, trains in both proposed VMF sites would be shut down. During cold weather, trains would be plugged into ground power systems so they would not be running all night. Each train would be started approximately 15-30 minutes before pull out. As such, the trains would not be idling for extensive periods of time at the VMF locations.

The Glassboro VMF could have the potential for harmful emissions associated with spray painting. At this point, the details of the spray booths (location, size, duration of use) are unknown. However, because the Glassboro VMF is located adjacent (less than 100 feet) to residential land uses, the spray booths should be located as far away from these residential land uses as possible (i.e., in the center of the facility) in order to avoid the potential for air quality impacts and health hazards from spray paint operations.

3.4.11. Noise and Vibration

3.4.11.1. Transit Service Operations

Project-related noise exposure was estimated for each of the 27 representative sites, as described in Section 4.1, “Existing Noise Environment,” of Attachment 11, “Noise and Vibration Technical Report,” that would be exposed to noise generated from the daily service operations along the GCL alignment. Future GCL noise exposure level estimates were determined in accordance with the FTA calculation methodologies and procedures using the “general assessment” guidelines described in Chapter 6 of the FTA Manual. The FTA noise calculation process considers such factors as distance between the proposed GCL alignment/VMF sites and noise-sensitive areas, type of track, track grade, train length, train travel speed, and service frequencies (headways). In addition, the total noise exposure at a particular receptor included the noise contribution generated from the soundings of train horns, bells, or other onboard warning devices at certain at-grade crossings (areas where the train and street traffic intersect). The analysis assumed that the device or bell would be activated within approximately 15 seconds of a train approaching a station or grade crossing. Noise exposure estimates were determined based on the proposed *GCL Preferred Alternative Service Plan* shown in Table 3.4-19, “The GCL Operating Service Plan.”

Table 3.4-19: The GCL Operating Service Plan

Time of Day ¹	Headway (Minutes)	No. of Trips/Hour	Total Number of Trips
5 A.M. to 6 A.M.	15	4	4
6 A.M. to 7 A.M.	10	6	6
7 A.M. to 9 A.M.	7.5	8	16
9 A.M. to 4 P.M.	15	4	28
4 P.M. to 7 P.M.	7.5	8	24
7 P.M. to 10 P.M.	15	4	12
10 P.M. to 1 A.M.	30	2	6
1 A.M. to 2 A.M.	60	1	1
Total Number of Trips			97
Notes:			
1 The proposed GCL would not operate between the hours of 2 A.M. and 5 A.M.			

Source: GCL Project Team, January 2018

3.4.11.2. Noise Exposure from Future Transit Operations

The predicted sound levels from daily transit operations of the proposed GCL are summarized in Table 3.4-20, “Comparison of Projected Transit Noise Exposure Levels and FTA Impact Criteria, for Proposed GCL Transit Service Operations (with Wheel Squeal and Horn Soundings),” for each of the representative noise receptor locations identified along the GCL alignment. The predicted sound levels were compared to the existing sound levels at each location to determine if the future operational noise exposure would result in either an FTA-based Moderate Impact or Severe Impact condition. The noise

exposure calculations assumed that the proposed GCL would consist of a two-car diesel light rail vehicle (DLRV) train generating a sound exposure level (SEL) of 85 dBA. While this SEL assumption is not inclusive of horn sounding at-grade crossings, the final noise exposure results do include additional noise exposure calculations to account for both horn and wheel squeal noise from the operation of the proposed DLRV.

Table 3.4-20: Comparison of Projected Transit Noise Exposure Levels and FTA Impact Criteria, for Proposed GCL Transit Service Operations (with Wheel Squeal and Horn Soundings)

Site #	Receptor Site Description	FTA Land Use Category	Average Centerline Receptor to Track Distance	Existing Noise Level	FTA Impact Threshold Levels		Horn Soundings	Projected Noise Exposure from GCL Operations	Number of Equivalent Residential Units Impacted	FTA Impact Determination
					Moderate	Severe				
					Feet	Ldn (dBA)	Ldn (dBA)	Ldn (dBA)		
M01	Cooper Hospital and 501A Haddon Avenue, Camden	2	100	79	66–75	>75	N/A	67 ¹	30	Moderate Impact
M02	911 South 9 th Street, Camden	2	115	71	66–70	>70	N/A	66	51	Moderate Impact
M03	56 S. Railroad Avenue, Gloucester City	2	65	76	66–74	>74	70	71	34	Moderate Impact
M04	5 ½ Railroad Lane, Westville	2	75	65	61–65	>65	N/A	64	75	Moderate Impact
M05	800 Gateway Boulevard, Westville	2	140	79	66–75	>75	61	64	0	No Impact
M06	926 Washington Avenue, Woodbury	2	75	77	66–74	>74	64	67	68	Moderate Impact
M07	93 Wallace Street, Woodbury	2	155	70	65–69	>69	N/A	61	0	No Impact
M08	348 East-West Jersey Avenue, Woodbury Heights	2	85	58	57–62	>62	N/A	63	65	Severe Impact
M09	1 Cedar Street, Wenonah	2	140	62	59–64	>64	N/A	61	64	Moderate Impact

Table 3.4-20: Comparison of Projected Transit Noise Exposure Levels and FTA Impact Criteria, for Proposed GCL Transit Service Operations (with Wheel Squeal and Horn Soundings) (Continued)

Site #	Receptor Site Description	FTA Land Use Category	Average Centerline Receptor to Track Distance	Existing Noise Level	FTA Impact Threshold Levels		Horn Soundings	Projected Noise Exposure from GCL Operations	Number of Equivalent Residential Units Impacted	FTA Impact Determination
					Moderate	Severe				
					Feet	Ldn (dBA)	Ldn (dBA)	Ldn (dBA)		
M10	870 East Atlantic Avenue, Sewell	2	70	69	64–69	>69	N/A	64	92	Moderate Impact
M11	304 Montgomery Avenue, Pitman	2	85	67	63–67	>67	61	65	50	Moderate Impact
M12	827 West Jersey Avenue, Pitman	2	110	69	64–69	>69	N/A	62	0	No Impact
M13	43 Zane Street, Glassboro	2	90	69	64–69	>69	68	79 ¹	40	Severe Impact
M14	11 Church Street, Glassboro	2	490	65	61–66	>66	64	65 ¹	45	Moderate Impact
M15	Girard House #14, Rowan University, Glassboro	2	45	69	64–69	>69	66	69	83	Severe Impact
M16	Stewart Park, Measurement collected at nearby residences at 168 Laurel Street, Woodbury	2	105	65	61–66	>66	N/A	62	26	Moderate Impact
M17	816 Essex Street, Gloucester City	2	150	65	61–66	>66	N/A	61	42	Moderate Impact
Y01	560 Chestnut Street near East-West Jersey Avenue, Woodbury Heights.	2	310	60	58–63	>63	N/A	60	8	Moderate Impact
Y02	601 Park Avenue, Woodbury Heights	2	210	54	55–61	>61	N/A	55	17	Moderate Impact

Table 3.4-20: Comparison of Projected Transit Noise Exposure Levels and FTA Impact Criteria, for Proposed GCL Transit Service Operations (with Wheel Squeal and Horn Soundings) (Continued)

Site #	Receptor Site Description	FTA Land Use Category	Average Centerline Receptor to Track Distance	Existing Noise Level	FTA Impact Threshold Levels		Horn Soundings	Projected Noise Exposure from GCL Operations	Number of Equivalent Residential Units Impacted	FTA Impact Determination
					Moderate	Severe				
					Feet	Ldn (dBA)				
Y03	39 Sewell Street near Highland Avenue, Glassboro	2	280	63	60–65	>65	60	65 ¹	14	Moderate Impact
Y04	530 Ellis Street, Glassboro	2	450	65	61–65	>65	59	61 ¹	11	Moderate Impact
PK01	Gloucester City Public Library, Gloucester	3	54	64 ¹	66–70 ¹	>70 ¹	N/A	63 ²	NA	No Impact
PK02	Thompson Street and Lane Avenue Park, Gloucester	3	40	59 ¹	63–68 ¹	>68 ¹	N/A	65 ²	NA	Moderate Impact
PK03	Green Street Playground, Woodbury	3	56	60 ¹	63–68 ¹	>68 ¹	N/A	65 ²	NA	Moderate Impact
PK04	Veterans' Park, Woodbury Heights	3	45	57 ¹	62–67 ¹	>67 ¹	N/A	66 ²	NA	Moderate Impact
PK05	Ballard Park, Pitman	3	107	59 ¹	63–68 ¹	>68 ¹	N/A	62 ²	NA	No Impact
PK06	Bowe Park, Glassboro	3	92	67 ¹	68–72 ¹	>72 ¹	N/A	61 ²	NA	No Impact

Notes:

¹ Calculation includes noise exposure from wheel squeal at receptor sites M1, M13, M14 and Y3 and Y4 where tight curved tracks are proposed.

² Peak-hour L_{eq} (1hr) dBA noise levels.

Source: GCL Project Team, January 2018.

Moderate to Severe noise exposure at a total of 754 single-family residential dwellings is projected to occur throughout the GCL corridor from daily service operations or from proposed VMF sites and maintenance activities. The analysis concluded that Severe noise exposure is expected to be experienced adjacent to three representative receptor sites – M8, M13 and M15 – consisting of 177 equivalent single family residential dwellings. In addition, Moderate noise exposure is projected to occur at 11 residential areas, represented by receptor sites M01 (Cooper Hospital and adjacent residences), M02, M03, M04, M06, M09, M10, M11, M14, M16, and M17, comprising 577 single-family residential dwellings. For locations representative of FTA Category 3 land uses, Moderate daytime peak-hour noise impacts are

expected to occur at three community parks: Thompson Street Park (PK02) in Gloucester City, Green Street Playground in Woodbury, and Veterans' Park (PK04) in Pitman.

Moderate noise impacts at residential properties adjacent to the proposed vehicle maintenance and storage facilities are expected to occur at each of the two proposed VMF sites located in the communities of Woodbury Heights and Glassboro. The representative receptor sites near the proposed VMF site in Woodbury Heights are depicted in Table 3.4-21, "Comparison of Projected Noise Exposure Levels with Mitigation Measures and the FTA Impact Criteria, for Proposed GCL Service Operations (with Horn Soundings)," as Y01 and Y02, and those near the proposed VMF site in Glassboro are identified as receptor sites Y03 and Y04 in Table 3.4-21, "Comparison of Projected Noise Exposure Levels with Mitigation Measures and the FTA Impact Criteria, for Proposed GCL Service Operations (with Horn Soundings)." The analysis findings indicate that approximately 50 single family residential dwellings are expected to experience moderate noise exposure levels from maintenance activities. Further refinement of the maintenance facility activities at the two proposed VMF sites would occur during a future project phase at which more details related to the location, types, and duration of various maintenance activities would be developed. These changes may alter noise exposure levels reported at the 25 residential properties represented by sites Y01, Y02, Y03, and Y04.

Section 4.4.6, "Noise and Vibration," discusses proposed measures to mitigate impacts resulting from the proposed GCL service.

3.4.11.3. Noise Exposure from "Park-and-Ride" Peak-Hour Traffic

Throughout the proposed GCL study area, changes in the projected peak travel time traffic volumes near proposed GCL parking facilities would not significantly alter traffic patterns in the study area. Analysis of traffic volume movements on roadways leading to the proposed parking lots would yield maximum noise level variations in the range of plus or minus one decibel at residential properties located within 1,500 feet of the parking facilities. Noise level changes of one decibel or less are below the threshold level of human hearing perceptibility and would be below New Jersey Department of Transportation (NJDOT) noise criteria requiring documentation.

Table 3.4-21: Comparison of Projected Noise Exposure Levels with Mitigation Measures¹ and the FTA Impact Criteria, for Proposed GCL Service Operations (with Horn Soundings)

Site #	Receptor Site Description	FTA Land Use Category	Average Centerline Receptor to Track Distance Feet	Unmitigated Projected Noise Exposure from GCL Operations Ldn (dBA)	FTA Impact Threshold Levels		Mitigated Projected Noise Exposure from GCL Operations Ldn (dBA)	FTA Impact Determination with Mitigation ²
					Moderate	Severe		
					Ldn (dBA)	Ldn (dBA)		
M01	Cooper Hospital and 501A Haddon Avenue, Camden	2	100	67	66-75	>75	60	No Impact
M02	911 South 9 th Street, Camden	2	115	66	66-70	>70	59	No Impact
M03 ¹	56 S. Railroad Avenue, Gloucester City	2	65	71	66-74	>74	71	Moderate Impact
M04	5 ½ Railroad Lane, Westville	2	75	64	61-65	>65	57	No Impact
M05 ¹	800 Gateway Boulevard, Westville	2	140	64	66-75	>75	62	No Impact

Table 3.4-21: Comparison of Projected Noise Exposure Levels with Mitigation Measures¹ and the FTA Impact Criteria, for Proposed GCL Service Operations (with Horn Soundings) (Continued)

Site #	Receptor Site Description	FTA Land Use Category	Average Centerline Receptor to Track Distance	Unmitigated Projected Noise Exposure from GCL Operations	FTA Impact Threshold Levels		Mitigated Projected Noise Exposure from GCL Operations	FTA Impact Determination with Mitigation ²
					Moderate	Severe		
			Feet	Ldn (dBA)	Ldn (dBA)	Ldn (dBA)	Ldn (dBA)	
M06 ¹	926 Washington Avenue, Woodbury	2	75	67	66-74	>74	65	No Impact
M07	93 Wallace Street, Woodbury	2	155	61	65-69	>69	54	No Impact
M08	348 East-West Jersey Avenue, Woodbury Heights	2	85	63	57-62	>62	56	No Impact
M09	1 Cedar Street, Wenonah	2	140	61	59-64	>64	54	No Impact
M10	870 East Atlantic Avenue, Sewell	2	70	64	64-69	>69	57	No Impact
M11 ¹	304 Montgomery Avenue, Pitman	2	85	65	63-67	>67	63	Moderate Impact
M12	827 West Jersey Avenue, Pitman	2	110	62	64-69	>69	55	No Impact
M13 ¹	43 Zane Street, Glassboro	2	90	79	64-69	>69	68	Moderate Impact
M14 ¹	11 Church Street, Glassboro	2	490	65	61-66	>66	64	Moderate Impact
M15 ¹	Girard House #14, Rowan University, Glassboro	2	45	69	64-69	>69	67	Moderate Impact
M16	Stewart Park, Measurement collected at nearby residences at 168 Laurel Street, Woodbury	2	105	62	61-66	>66	55	No Impact
M17	816 Essex Street, Gloucester City	2	150	61	61-66	>66	54	No Impact
Y01	560 Chestnut Street near East-West Jersey Avenue	2	310	60	55-61	>61	51	No Impact
Y02	601 Park Avenue	2	210	55	53-59	>59	47	No Impact
Y03 ¹	39 Sewell Street near Highland Avenue	2	280	65	57-62	>62	56	No Impact
Y04 ¹	530 Ellis Street	2	450	61	59-64	>64	52	No Impact
PK01	Gloucester City Public Library, Gloucester	3	54	64 ³	66-70 ³	>70 ³	56 ³	No Impact
PK02	Thompson Street and Lane Avenue Park, Gloucester	3	40	59 ³	63-68 ³	>68 ³	58 ³	No Impact
PK03	Green Street Playground, Woodbury	3	56	60 ³	63-68 ³	>68 ³	58 ³	No Impact
PK04	Veterans' Park, Woodbury Heights	3	45	57 ³	62-67 ³	>67 ³	59 ³	No Impact
PK05	Ballard Park, Pitman	3	107	59 ²	63-68 ³	>68 ³	55 ³	No Impact
PK06	Bowe Park, Glassboro	3	92	67 ²	68-72 ³	>72 ³	54 ³	No Impact

Notes:¹ Receptors affected by horn noise soundings.² Noise Mitigation considered, which would address operational noise (not horn noise), consists of undercar sound absorption and shielding, rail car vehicle skirts and wheel-rail lubrication in areas where tight curved tracks are proposed (M1, M13, M14, Y03 and Y04).³ Peak-hour L_{eq} (1hr) dBA noise levels.

Source: GCL Project Team, January 2018

3.5. CONSTRUCTION IMPACTS

3.5.1. Principal Conclusions

- **Transportation** – In the City of Camden, existing River LINE service would be disrupted during construction of tracks at various locations discussed further below; the WRTC would also be impacted by the addition of a third track. Temporary construction impacts to existing bus service in the study area would be relatively minimal. Temporary lane closures and road closures would be required during construction primarily in Camden and at locations along the line where grade crossing improvements and roadway modifications are required. Additionally, some parking spaces within the GCL corridor—primarily in locations where parking is adjacent to, or already encroaches on, Conrail right-of-way—would be temporarily unavailable during construction. The primary effects to pedestrian facilities are in the vicinity of stations where construction of station infrastructure would require portions of existing sidewalks to be temporarily closed or removed.
- **Parklands** – All ten of the parklands impacted by the proposed physical elements of the GCL would also be impacted by construction activities, and an additional three parkland resources would be impacted only by construction activities for a total of 13 impacted parkland resources. In general, construction impacts would be temporary, and affected parklands would be restored to pre-construction conditions; however, as discussed below, in some cases preconstruction conditions would not be able to be fully restored due to the removal or modification of mature landscaping, trees, or park features/facilities.
- **Air Quality** – Construction-related effects of the proposed GCL would be limited to temporarily increased fugitive dust and mobile source emissions during construction, which are described in detail below. Further, State and local regulations regarding dust control and other air quality emission reduction controls would be followed.
- **Noise** – As discussed below, instantaneous noise levels during construction are difficult to predict. However, track-related construction would move continuously along the corridor and, therefore, the duration of exposure to track-construction-related noise at any one property would be limited.
- **Vibration** – Though the overall length of construction for the proposed GCL is expected to be approximately 36 months, it is anticipated that disturbances at most individual vibration sensitive receptor locations would likely last for a substantially shorter period of time. The duration of potential exposure to construction-related vibration at any one property would be limited, especially with the use of equipment such as air compressors, rubber-wheeled vehicles, hydraulic loaders, and other light equipment.

3.5.2. Transportation

In addition to the impacts resulting from the permanent features of the proposed GCL to transportation that would affect roadways, transit, parking facilities and circulation patterns, there may be temporary transportation impacts related to construction. The majority of the GCL construction would take place in, or immediately adjacent to, the railroad ROW with some construction or traffic mitigation efforts extending to adjacent streets.

The staging of construction would require planning and coordination to minimize traffic detours while maintaining adequate traffic flow capacity. Maintaining business access and safe passage of materials and equipment throughout the construction areas would be priorities for the contractor. Temporary lane closures and road closures would be required during construction primarily in the City of Camden and at locations along the line where grade crossing improvements and roadway modifications are required. The Operating Agency or Authority and their contractors would coordinate with NJDOT, NJ TRANSIT, New Jersey Turnpike Authority (NJTA), Camden County, Gloucester County, and local municipalities to maintain safe traffic operations along the corridor.

Construction in or adjacent to railroad ROW would also require planning and coordination with Conrail. Track construction and staging plans would be developed to maintain freight track operations throughout construction. Construction within the railroad ROW would be subject to the control of railroad flagmen as required by the freight railroads.

3.5.2.1. Public Transportation

Potential temporary impacts to local bus services during construction of the GCL could include the narrowing of roadway travel lanes, temporary lane closures roadway speed reductions, shifting or consolidation of bus stop locations or detours, and temporary closures at grade crossings.

In the City of Camden, existing River LINE service would be disrupted during construction of tracks at the grade crossings of Haddon Avenue, the entrance to the 6th Street parking garage and Broadway where the GCL tracks would meet and share the River LINE tracks. The addition of a third track would also result in impacts to the WRTC, which would disrupt use of the station platform and track on either end of the station. These disruptions would require careful coordination with River LINE operations in order to minimize the disruption. Given the existing light rail schedule, nighttime construction would likely be preferred for locations within the City of Camden. Construction in this area could potentially disrupt NJ TRANSIT bus operations to and from the WRTC, warranting further coordination.

In general, temporary construction impacts to existing bus service in the study area would be relatively minimal. In a few locations, such as Woodbury and Glassboro, expansion of grade crossings may require temporary detours for the bus service. Consideration should be given to accelerate construction at these critical grade crossings and to minimize disruptions to the regularly scheduled bus transit services.

3.5.2.2. Roadway Traffic

Construction of the GCL would temporarily interfere with the normal traffic flow, causing some lanes and streets to be closed to vehicles for various durations. The longest construction duration would likely take place in the City of Camden with the construction of the proposed GCL elevated station at Cooper Hospital and adjacent aerial track structures. This structure would potentially result in impacts to roadway operations at Martin Luther King Boulevard at the southbound I-676 on ramp, Newton Avenue, Haddon Avenue, and 9th Street. Additional bridge structures for the elevated segment to South Camden would affect movement on Chestnut Street, Sycamore Street, 8th Street, Kaighns Avenue, Atlantic Avenue, Carl Miller Boulevard (aka Van Hook Street), Ferry Avenue, Chelton Avenue, and Morgan Boulevard. Efforts would be made to minimize disruptions through partial and nighttime closures. Several of the above roadways offer parallel movements so that construction can be staged to maintain circulation.

The existing railroad ROW varies in width, providing varying space for the placement of the new infrastructure. For much of the alignment, the available space would not be adequate to accommodate

construction equipment and materials within the railroad ROW. Some roadways would be temporarily closed for utility relocation, guideway and station construction, and laying of rail track. This condition is most likely in towns with roadways adjacent to both sides of the existing track alignment, such as Gloucester City, Woodbury, Wenonah, Sewell, and Pitman.

In Gloucester City, track construction would temporarily affect traffic movements on Railroad Street and Railroad Avenue, as well as intersecting cross streets. Construction staging and maintenance of traffic plans would need to capture limited circulation and access options throughout Gloucester City, including the limitations imposed by one-way streets.

The reconstruction/expansion of the railroad bridge over U.S. Route 130 in the Brooklawn/Westville area would affect traffic movements. To minimize disruption, weekend and nighttime closures may be preferable to full temporary closure of this critical roadway.

In Woodbury, the reconstruction/expansion of the railroad bridge over Red Bank Avenue, as well as the widening of this roadway and installation of sidewalks on the south side, would disrupt traffic movements. Nighttime work could be a preferred option at this location as detour options are limited and the roadway is too narrow for narrowing traffic lanes.

Another temporary traffic effect along the entire GCL corridor would be at grade crossings where new tracks would widen the crossing. Installation of new tracks, reconstruction of existing crossings and relocation of gate and flasher infrastructure and equipment would require closure for a period varying from one or two days to two or three weeks. During this time, detours would be established, where feasible, to provide drivers with alternate routes and minimize disruptions. Additional consideration would be given to the construction schedule to confirm that adjacent grade crossings are not under construction at the same time. For some GCL stations, the street area within and alongside the station areas would be used for construction activities. Construction equipment, material deliveries, and other construction-related traffic would affect the movement of residents and businesses in those areas.

The construction of the proposed Gloucester City Station and adjacent track would result in impacts to traffic movements to Bergen Street and to the Gloucester City Library. Construction would need to be staged to maintain access either from the north (Paul Street/Hudson Street) or from the south (Monmouth Street) during station construction.

The construction of the Woodbury Station at Cooper Street would result in impacts to traffic movements on Green Avenue and may require temporary closure of a portion of Green Avenue adjacent to the proposed station platform. Alternative access from East Barber Avenue would need to be provided during construction.

3.5.2.3. Parking

Some parking spaces within the GCL corridor would be temporarily unavailable during construction. These spaces are primarily in locations where parking is adjacent to, or already encroaches on, Conrail ROW. The spaces would likely be used for construction staging, materials storage, or construction vehicle parking. It is anticipated that these parking spaces would only be affected for a portion of the construction period, rather than the entire duration of the construction period. Construction of the proposed GCL may result in impacts to on-street parking at the following locations:

- In the City of Camden, on-street parking on those roadways, which cross, or are adjacent to, the elevated guideway may be affected during construction.

- In Woodbury Heights, parking on the west side of the municipal building immediately adjacent to the tracks may be temporarily unavailable during track work.
- The construction of the Wenonah Station would temporarily eliminate parking on North West Avenue and North East Avenue adjacent to the station.
- In Pitman, parking on Ballard Avenue south of Pitman Avenue and adjacent to the tracks may be temporarily unavailable during track work.

3.5.2.4. Pedestrian and Bicycle Facilities

The primary effects to pedestrian facilities are in the vicinity of stations where construction of station infrastructure including new or improved bicycle and pedestrian facilities would require portions of existing sidewalks to be temporarily closed or removed. Similarly, the widening and reconstruction of grade crossings would require modifications to existing sidewalks at, and adjacent to, the crossings. To the maximum extent possible, pedestrian movement at these locations would be preserved by sequencing local construction in a way that avoids closing multiple sidewalks at the same time or by providing temporary pedestrian paths.

In addition to sidewalks in station areas and at roadway grade crossings, impacts would occur at specific facilities, including a pedestrian track crossing in Woodlawn, which would require temporary closure during track construction, as well as proposed trail facilities in Glassboro. The latter are assumed to be in place prior to construction of the GCL and would be adjacent to a portion of the GCL spur to Downtown Glassboro and adjacent to the tracks that lead to the Glassboro VMF. During track construction these trail facilities would need to be closed and users redirected along local roadways.

3.5.2.5. Railroad Facilities and Operations

During construction of the proposed GCL, the Operating Agency or Authority, and their contractors would require access to Conrail property and would perform activities in proximity to their freight operations. The Operating Agency or Authority would coordinate with Conrail regarding the nature and extent of construction activities affecting Conrail property. The Operating Agency or Authority and their contractors would comply with Conrail access, safety, and operational requirements during project construction. This would include, but would not be limited to, securing appropriate easements and agreements.

3.5.3. Parklands

In addition to the impacts to parklands that would result from the introduction of the physical elements of the proposed GCL, described in Section 3.4.8, "Parklands," additional impacts to parkland resources would result from temporary construction activities. Impacts related to the construction of the proposed GCL would include the entirety of the area that would be occupied by the proposed features of the GCL, as well as additional space beyond the limit of proposed features needed for construction lay down areas, equipment, and access. This section of the report will first quantify and discuss just the impacts beyond those associated with the permanent features of the GCL discussed in Section 3.4.8, "Parklands," resulting from the construction of the proposed GCL. Following this, the total impact to parklands, including the area to be occupied permanently by the proposed features, and temporarily by construction activities, will be detailed.

3.5.3.1. Incremental Construction Impacts to Parkland Resources

Incremental construction impacts refer to the additional impact resulting from temporary construction activities to parkland resources, beyond those impacts identified in Section 3.4.8, “Parklands,” which would result from the introduction of the physical elements of the proposed project. As the construction LOD would extend at least as far as the limit of proposed features, all ten of the parklands impacted by the proposed physical elements of the GCL would also be impacted by construction activities. An additional three parkland resources – Wenonah Lake and Cedar Field in the Borough of Wenonah, and Bowe Park in the Borough of Glassboro – would be impacted only by construction activities for a total of 13 impacted parkland resources. Eleven of the 13 parkland resources impacted by construction activities are encumbered by Green Acres’ restrictions and compensation requirements. Two parkland resources, Wenonah Lake and Cedar Field, are located in the Borough of Wenonah, which has not accepted Green Acres’ funding and, as such, are not subject to Green Acres’ requirements. The parkland resources that would potentially be impacted by construction activities related to the proposed GCL are identified in Table 3.5-1, “Anticipated Incremental Construction Impacts to Parks, Recreational Facilities, and Open Space Resources.”

Table 3.5-1: Anticipated Incremental Construction Impacts to Parks, Recreational Facilities, and Open Space Resources

ID	Resource Name	Municipality	Associated with Construction ¹ Activities Alone (Acres)
5	Triangle Park	Camden City	< 0.01
15	Sherman Neighborhood Play Lot	Gloucester City	< 0.01
19	Thompson Street & Lane Avenue Park	Gloucester City	0.06
51	Green Street Play Area	Woodbury City	0.02
55	Woodbury Lake Park	Woodbury City	< 0.01
62	Veterans’ Park	Borough of Woodbury Heights	< 0.01
63	Woodbury Heights Elementary School	Borough of Woodbury Heights	< 0.01
70	Wenonah Lake	Borough of Wenonah	0.02
75	Cedar Field	Borough of Wenonah	< 0.01
91	Bowe Park	Borough of Glassboro	0.40
92	Glassboro High School	Borough of Glassboro	0.20
93	Glassboro Sports Complex	Borough of Glassboro	0.08
D	Mantua Creek Trail	Deptford Township	0.06 miles ²

Note:
¹ This table presents the effects that would result from the construction of the proposed GCL. The effects resulting from the permanent features of the proposed GCL are presented in Table 3.4-7, “Anticipated Direct Impacts to Parks, Recreational Facilities, and Open Space Resources Resulting from the Introduction of Proposed Features,” and the combined effects of the construction and permanent features of the proposed GCL are presented in Table 3.5-2, “Anticipated Direct Impacts to Parks, Recreational Facilities, and Open Space Resources (Total Impacts).”
² As Mantua Creek Trail is a path rather than an open space area, the length of the trail affected is a more accurately quantifies the size of the impact for this resource.

Triangle Park – City of Camden (Park ID 5)

In addition to the impacts anticipated from the proposed permanent features of the GCL, less than 0.01 acres of Triangle Park would be affected by construction activities. This marginal incremental effect would not result in any additional impacts to specific facilities, landscaping, or park elements than were previously discussed in Section 3.4.8, “Parklands.”

Sherman Neighborhood Play Lot – City of Gloucester (Park ID 15)

In addition to the impacts anticipated from the proposed permanent features of the GCL, less than 0.01 acres of Sherman Neighborhood Play Lot would be affected by construction activities. This marginal incremental effect would not result in any additional impacts to specific facilities, landscaping, or park elements than were previously discussed in Section 3.4.8, “Parklands.”

Thompson Street and Lane Avenue Park – City of Gloucester (Park ID 19)

Construction activities are anticipated to affect an additional 0.06 acres of Thompson Street and Lane Avenue Park. No additional trees, landscaping, or park facilities would be impacted by construction activities, however a portion of fencing enclosing playground equipment may be temporarily removed and replaced subsequent to the completion of the proposed GCL.

Green Street Play Area – City of Woodbury (Park ID 51)

In addition to the impacts anticipated from the proposed permanent features of the GCL, approximately 0.02 acres of Green Street Play Area would be affected during the construction of the proposed project. The construction LOD would affect a portion of fencing enclosing playground equipment; however, this fencing would be replaced in its current location following the completion of the proposed GCL.

Woodbury Lake Park – City of Woodbury (Park ID 55)

In addition to the impacts anticipated from the proposed permanent features of the GCL, less than 0.01 acres of Woodbury Lake Park would be affected by construction activities. This marginal incremental effect would not result in any additional impacts to specific facilities, landscaping, or park elements than were previously discussed in Section 3.4.8, “Parklands.”

Veterans’ Park – Borough of Woodbury Heights (Park ID 62)

In addition to the impacts anticipated from the proposed permanent features of the GCL, less than 0.01 acres of Veterans’ Park would be affected by construction activities. This additional area would marginally increase the anticipated impact to the affected elements of this resource discussed in Section 3.4.8, “Parklands,” including brick-paved walkways, monumental structures, and a set of gates, however no additional elements of Veterans’ park would be impacted by construction activities.

Woodbury Heights Elementary School – Borough of Woodbury Heights (Park ID 63)

In addition to the impacts anticipated from the proposed permanent features of the GCL, less than 0.01 acres of Woodbury Heights Elementary School would be affected by construction activities. This marginal incremental effect would not result in any additional impacts to specific facilities, landscaping, or park elements than were previously discussed in Section 3.4.8, “Parklands.”

Wenonah Lake – Borough of Wenonah (Park ID 70)

Construction activities are anticipated to affect approximately 0.02 acre of the 65.78-acre Wenonah Lake park property (less than 0.1 percent). One tree currently located on the park property would have to be removed as part of the construction of the proposed GCL. This tree is a part of a large wooded area and would not affect the use or value of the Wenonah Lake open space.

Cedar Field – Borough of Wenonah (Park ID 75)

Construction activities are anticipated to affect less than 0.01 acre of the 3.37-acre Cedar Field park property (less than 0.1 percent). No trees, facilities, equipment, or fencing would have to be removed or modified to accommodate the GCL construction activities at this location.

Mantua Creek Trail – Deptford Township (Trail ID D)

Construction activities are anticipated to affect a 0.06-mile segment of the trail (5.0 percent of the trail's total length). However, construction-related activities along this segment of the trail would only temporarily affect the use of the trail, and no permanent impacts are anticipated.

Bowe Park – Borough of Glassboro (Park ID 91)

Construction activities are anticipated to affect approximately 0.40 acre of the 26.23-acre park property (1.5 percent). The permanent features of the proposed GCL would not affect Bowe Park. No trees, facilities, equipment, or fencing would have to be removed or modified to accommodate the GCL construction activities at this location.

Glassboro High School – Borough of Glassboro (Park ID 92)

Construction activities are anticipated to affect approximately 0.20 acre of the 35.35-acre Glassboro High School park property. One tree within the impacted area would need to be removed. The impacted area is not occupied by any recreational facilities and lies near the southern edge of the school property beyond the running track.

Glassboro Sports Complex – Borough of Glassboro (Park ID 93)

Construction activities are anticipated to affect approximately 0.08 acre of the Glassboro Sports Complex property. The impacted area is not occupied by any recreational facilities and lies near the eastern edge of the park property. No trees, facilities, equipment, or fencing would have to be removed or modified to accommodate proposed GCL features or construction activities at this location.

3.5.3.2. Total Impacts to Parklands

In general, construction impacts would be temporary, and affected parklands would be restored to pre-construction conditions. However, as discussed in Section 3.5.3.1, "Incremental Construction Impacts to Parkland Resources," in some cases preconstruction conditions would not be able to be fully restored due to the removal or modification of mature landscaping, trees, or park features/facilities. As such, in the

interest of presenting a conservative analysis, permanent impacts resulting from the introduction of proposed physical elements of the GCL, as well as construction-related impacts, are considered together in determining the potential significance of anticipated impacts to parkland resources.

An area-based summary of the project's anticipated direct impacts to these resources, as well as the Green Acres classification for the proposed disposals or diversions (i.e., major or minor) that would result from the project's conversion of a portion of these parkland resources to a use other than recreation or conservation purposes, is provided in Table 3.5-2, "Anticipated Direct Impacts to Parks, Recreational Facilities, and Open Space Resources (Total Impacts)." Details regarding the nature and level of significance of the GCL's anticipated total impacts to each of these resources are presented individually below.

All other parkland resources and multi-use trails identified in Table 2.4-6, "Parks, Recreational Facilities, and Open Space Resources Located Within the GCL Study Area," and Table 2.4-7, "Multi-Use Trail Resources Located Within the GCL Study Area," would not be directly affected by the GCL.

Table 3.5-2: Anticipated Direct Impacts to Parks, Recreational Facilities, and Open Space Resources (Total Impacts)

ID	Resource Name	Municipality	Permanent Impacts				
			Associated with likely Acquisition /Direct Use (Acres)	Associated with Construction ¹ Activities Alone (Acres)	Total Impact (Acres) ²	Percentage of Resource Impacted	NJDEP Green Acres Encumbered Impact Classification ³
5	Triangle Park	Camden City	0.17	< 0.01	0.17	95.5%	Major
15	Sherman Neighborhood Play Lot	Gloucester City	0.02	< 0.01	0.02	4.4%	Minor
19	Thompson Street & Lane Avenue Park	Gloucester City	0.07	0.06	0.13	25.5%	Major
51	Green Street Play Area	Woodbury City	< 0.01	0.02	0.02	21.4%	Major
55	Woodbury Lake Park	Woodbury City	0.01	< 0.01	0.02	0.1%	Minor
62	Veterans' Park	Borough of Woodbury Heights	< 0.01	< 0.01	< 0.01	0.5%	Minor
63	Woodbury Heights Elementary School	Borough of Woodbury Heights	< 0.01	< 0.01	0.01	0.1%	Minor
70	Wenonah Lake	Borough of Wenonah	0.00	0.02	0.02	< 0.1%	NA ⁴
75	Cedar Field	Borough of Wenonah	0.00	< 0.01	< 0.01	< 0.1%	NA ⁴
91	Bowe Park	Borough of Glassboro	0.00	0.40	0.40	1.5%	Minor
92	Glassboro High School	Borough of Glassboro	< 0.01	0.20	0.20	0.6%	Minor

Table 3.5-2: Anticipated Direct Impacts to Parks, Recreational Facilities, and Open Space Resources (Total Impacts) (Continued)

ID	Resource Name	Municipality	Permanent Impacts				
			Associated with likely Acquisition /Direct Use (Acres)	Associated with Construction ¹ Activities Alone (Acres)	Total Impact (Acres) ²	Percentage of Resource Impacted	NJDEP Green Acres Encumbered Impact Classification ³
93	Glassboro Sports Complex	Borough of Glassboro	0.02	0.08	0.10	0.6%	Minor
D	Mantua Creek Trail	Deptford Township	0.00	0.06 miles ⁵	0.06 miles ⁵	NA	NA

Notes:

¹ In addition to parkland impacts related to permanent features of the proposed GCL (i.e., specifically related to potential acquisition and direct use of property that would make it unavailable for future use as parkland), the potential impacts associated with construction period activities have also been assessed (based on the LOD during the construction period). While these construction period impacts would likely be temporary are considered herein as potentially permanent for the purposes of being conservative.

² This table presents the total effects to parklands resulting from the proposed GCL. Effects resulting from the construction and permanent features of the proposed GCL are presented discretely in tables 3.5-1, “Anticipated Incremental Construction Impacts to Parks, Recreational Facilities, and Open Space Resources,” and 3.4-7, “Anticipated Direct Impacts to Parks, Recreational Facilities, and Open Space Resources Resulting from the Introduction of Proposed Features,” respectively.

³ The Green Acres classifications for major or minor disposals or diversions are strictly based on the amount of area of a given parkland resource that would be impacted by the project, regardless of whether the project would ultimately interfere with the use of or access to the resource. Therefore, the major and minor designations shown above do not reflect the nature and level of significance of the impacts that the GCL would have on these parkland resources. As previously noted, a discussion of the nature and significance of the GCL’s anticipated direct impacts to each of these parkland resources is provided in Section 3.4.8.1, “Direct Impacts.”

⁴ The Green Acres classifications only apply to parks encumbered by Green Acres regulations. Parklands located in municipalities that have not accepted funding from the Green Acres Program are not subject to its requirements. Wenonah Borough has not accepted funding from the Green Acres Program, and as such Wenonah Lake is not subject to Green Acres requirements.

Source: New Jersey Department of Environmental Protection - Green Acres Program; Camden County Tax Assessor; Gloucester County Tax Assessor; GCL Project Team, 2020.

Triangle Park – City of Camden (Park ID 5)

As indicated in Table 3.5-2, “Anticipated Direct Impacts to Parks, Recreational Facilities, and Open Space Resources (Total Impacts),” and shown on Figure 3-1, “Direct Impacts to Triangle Park,” the proposed alignment for the GCL would cross through Triangle Park on an elevated structure and the proposed Cooper Hospital Station would be placed directly above Triangle Park. As this resource is located within the City of Camden, which has accepted Green Acres funding for some of its parkland resources, this resource is encumbered by Green Acres’ restrictions and compensation requirements.

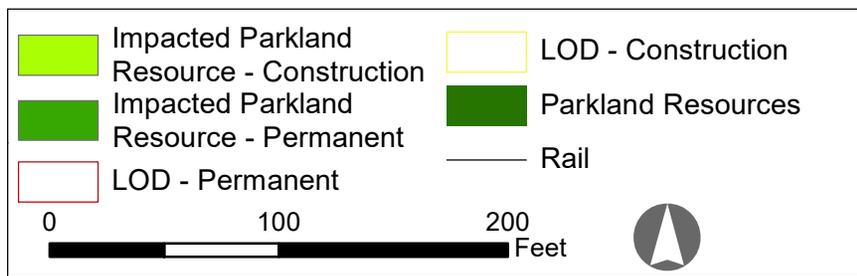
Approximately 0.17 acres of the park would be directly affected by the placement of structures, including support piers, a potential staircase and elevator that may be constructed for vertical access to the proposed Cooper Hospital Station, and the overhead structure carrying the proposed alignment above the park. Additionally, less than 0.01 acres would be affected by construction activities. As such a total of 0.17 acres of the 0.18-acre park (95.5 percent) would be affected by the proposed project. As the proposed station would be situated above this resource, all 14 trees within the park would likely be removed. The park, recently created through a deal between Cooper Hospital and the City of Camden, is a passive open space resource. The long-term operation of the GCL, particularly the need for passengers to directly traverse through Triangle Park en route to/from the proposed Cooper Hospital Station, would interfere with the park’s use as a passive recreation facility. Therefore, it is anticipated that the GCL would require the full acquisition of the parcel and result in the closure of Triangle Park. The two art panels located near the southern vertex of the Triangle Park, which are depicted on Figure 3-2, “Art Panels at the

Southern End of Triangle Park,” would need to be removed and stored during construction to avoid potential damage and would need to be repositioned in the area, possibly at the Cooper Hospital Station, once all construction activities are completed.

As the proposed GCL would occupy the majority of Triangle Park and interfere with its use as a passive recreation facility, the project is anticipated to result in a significant adverse impact due to the closure of this parkland resource. Thus, the project sponsor prior to construction of the proposed GCL would be required to undertake actions that mitigate this significant adverse impact.



Figure 3-1: Direct Impacts to Triangle Park



Source: DVRPC; US Census Bureau; New Jersey Green Acres; NJGIN.



Source: Google Street View,
August 2017

Figure3-2: Art Panels at the Southern
End of Triangle Park



Sherman Neighborhood Play Lot – City of Gloucester (Park ID 15)

The proposed GCL would pass immediately to the east of Sherman Neighborhood Play lot. As this resource is located within the City of Gloucester, which has accepted Green Acres funding for some of its parkland resources, this resource is encumbered by Green Acres' restrictions and compensation requirements.

As shown on Figure 3-3, "Direct impacts to Sherman Neighborhood Play Lot," a permanent acquisition of approximately 0.02 acres would be required to accommodate a portion of the proposed alignment. Additionally, less than 0.01 acres of Sherman Neighborhood Play Lot would be affected during the construction of the proposed project. As such, the proposed GCL would require a permanent acquisition of approximately 0.02 acres of the 0.53-acre park (4.4 percent). It is anticipated that a small area of shrubs would need to be permanently removed or relocated as a part of this acquisition. The area of shrubs that would be removed is a part of a larger cluster of shrubs which partially obscures the existing Conrail freight track from view from the park. The removal of shrubs would not substantially diminish or change the view from the park, and the area affected does not contain recreational facilities. As such, there would be no direct impact to the use of the park. Therefore, the GCL is not anticipated to result in any significant adverse impacts to Sherman Neighborhood Play Lot.

Thompson Street and Lane Avenue Park – City of Gloucester (Park ID 19)

The proposed GCL would pass immediately to the west of Thompson Street and Lane Avenue Park. As this resource is located within the City of Gloucester, which has accepted Green Acres funding for some of its parkland resources, this resource is encumbered by Green Acres' restrictions and compensation requirements.

As shown on Figure 3-4, "Direct Impacts to Thompson Street and Lane Avenue Park," a permanent acquisition of approximately 0.07 acres of the 0.50-acre park property would be required to house a portion of the proposed alignment, as well as grade crossing protection equipment where Lane Avenue/Koehler Street crosses the proposed rail alignment. The western half of the semi-circular walkway located at the southern end of the park would need to be adjusted to accommodate the new grade crossing protection equipment. In addition, it is anticipated that the two clusters of trees along the western border of the park would need to be permanently removed to accommodate the proposed alignment and grade crossing protection equipment.

Construction activities are also anticipated to affect an additional 0.06 acres of the park. No additional trees, landscaping, or park facilities would be affected by construction activities, however, a portion of fencing enclosing playground equipment may be temporarily removed and replaced subsequent to the completion of the proposed GCL. In total, the proposed GCL would affect 0.13 acres of the 0.50-acre park (25.5 percent).

Although the GCL is anticipated to result in minor adverse impacts (i.e., removal of two clusters of trees and the need to reconstruct a portion of the southern walkway and playground fence) and the Green Acres program would classify the impact as "major" based strictly on the proportion of the park affected, there would be no permanent interference with the use of or access to the park and none of the playground equipment or fencing would need to be permanently relocated (fencing would be temporarily moved during construction, and then would be replaced in its current location in the operational condition). Therefore, the GCL is not anticipated to result in any significant adverse impacts to Thompson Street and Lane Avenue Park.

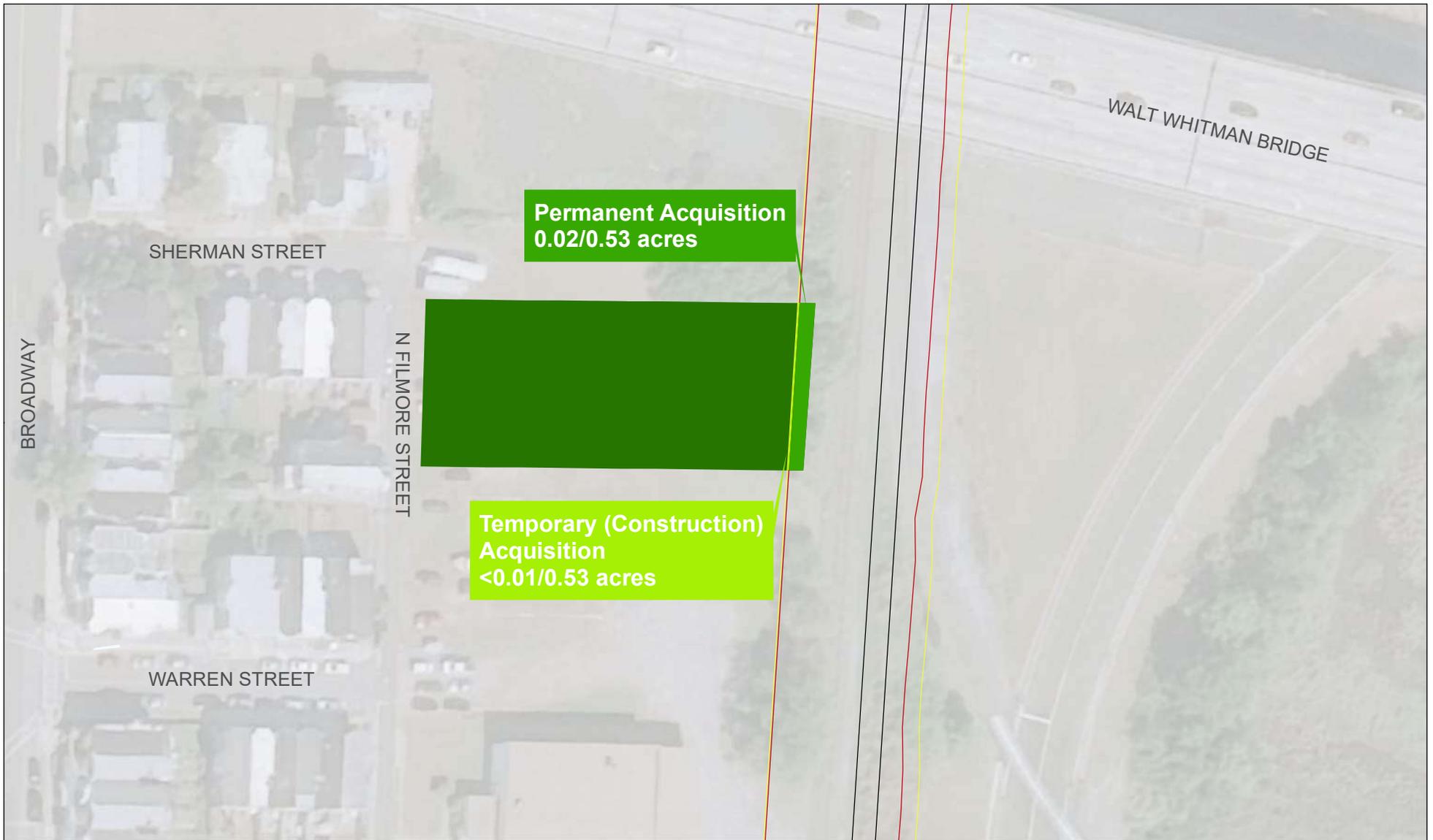
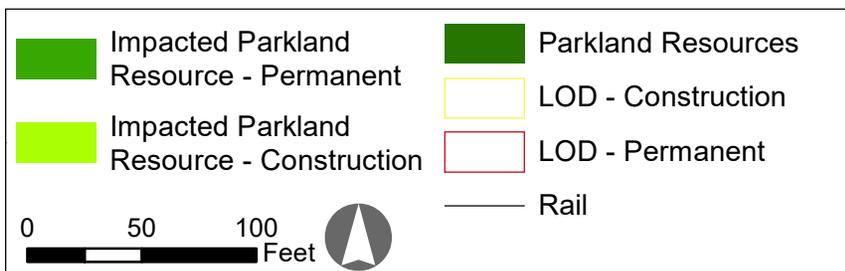


Figure 3-3: Direct Impacts to Sherman Neighborhood Play Lot



Source: DVRPC; US Census Bureau; New Jersey Green Acres; NJGIN.

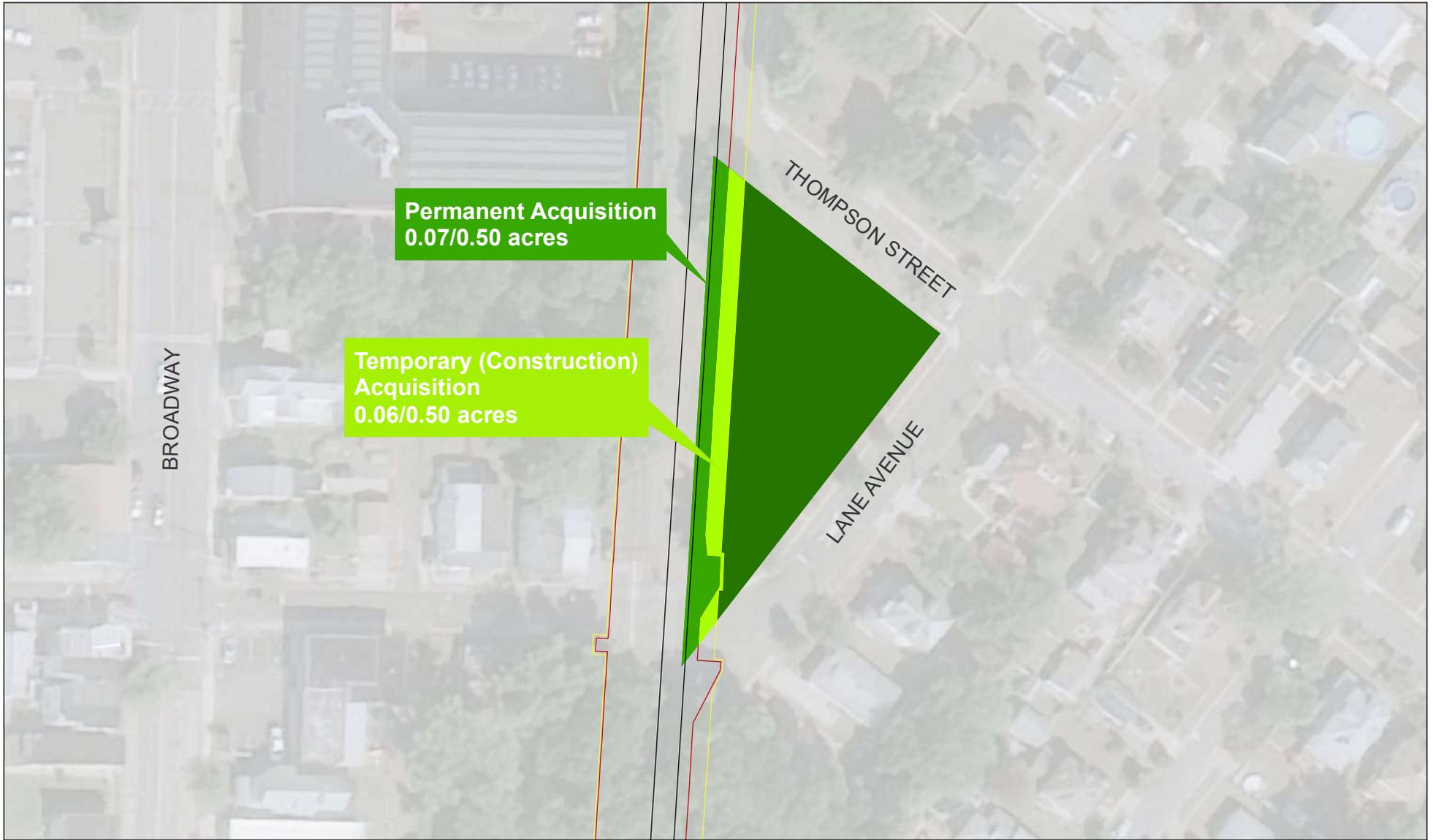
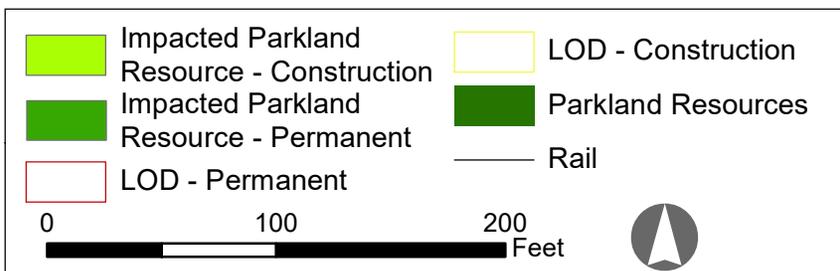


Figure 3-4: Direct Impacts to Thompson Street and Lane Avenue Park



Source: DVRPC; US Census Bureau; New Jersey Green Acres; NJGIN.

Green Street Play Area – City of Woodbury (Park ID 51)

The proposed GCL would pass immediately to the west of Green Street Play Area. As this resource is located within the City of Woodbury, which has accepted Green Acres funding for some of its parkland resources, this resource is encumbered by Green Acres' restrictions and compensation requirements.

As shown on Figure 3-5, "Direct impacts to Green Street Play Area," a permanent acquisition of approximately less than 0.01 acres would be required to accommodate a portion of the proposed alignment. This would affect a small sliver of the park, and would not affect any park equipment/facilities, fencing, trees or landscaping. Additionally, approximately 0.02 acres of Green Street Play Area would be affected during the construction of the proposed project. The construction LOD would affect a portion of fencing enclosing playground equipment; however, this fencing would be replaced in its current location following the completion of the proposed GCL.

As such, the proposed GCL would affect a total of approximately 0.02 acres of the 0.10-acre park (25.5 percent). Although this constitutes a Green Acres Major Impact based solely on the portion of the park affected, this conservative estimate of the affected parkland area includes the impact due to temporary construction activities. It is anticipated that the portion of the existing fencing that would need to be removed to accommodate construction activities would be replaced in its current location following the completion of the proposed GCL. The permanent impact to the Green Street Play Area as a result of the proposed GCL would not affect any park equipment/facilities, fencing, trees, or landscaping, nor would it diminish the value of the park. For these reasons, the GCL would not result in a significant adverse impact to the Green Street Play Area.

Woodbury Lake Park – City of Woodbury (Park ID 55)

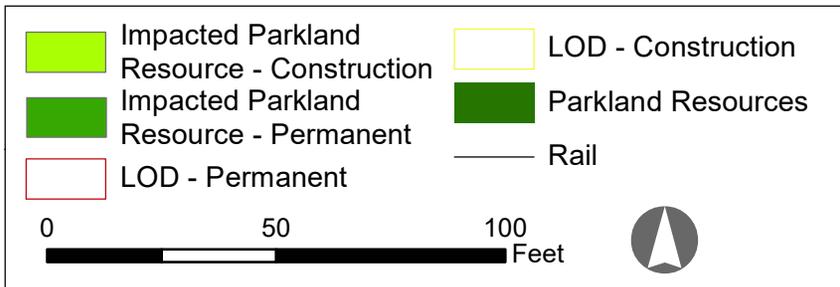
The proposed alignment for the GCL would pass immediately to the west of Woodbury Lake Park. As this resource is located within the City of Woodbury, which has accepted Green Acres funding for some of its parkland resources, this resource is encumbered by Green Acres' restrictions and compensation requirements.

As shown on Figure 3-6, "Direct Impacts to Woodbury Lake Park," a permanent acquisition of approximately 0.01 acre would be required to accommodate a widened bridge capable of supporting a double-track alignment. Additionally, less than 0.01 acre would be affected due to construction activities. In total, 0.02 acre of the 31.52-acre park property (0.1 percent) would be affected by the proposed GCL.

While Woodbury Lake Park consists of a total of 18 parcels, only one of these parcels would be directly affected. However, this parcel is not accessible from the public ROW and roughly half of its total area is occupied by Woodbury Lake. One tree within this parcel would need to be removed to accommodate the structures supporting the proposed bridge. Given that the remainder of Woodbury Lake Park would not be directly affected, there would be no permanent interference with or impact to the use of the park.



Figure 3-5: Direct Impacts to Green Street Play Area



Source: DVRPC; US Census Bureau; New Jersey Green Acres; NJGIN.

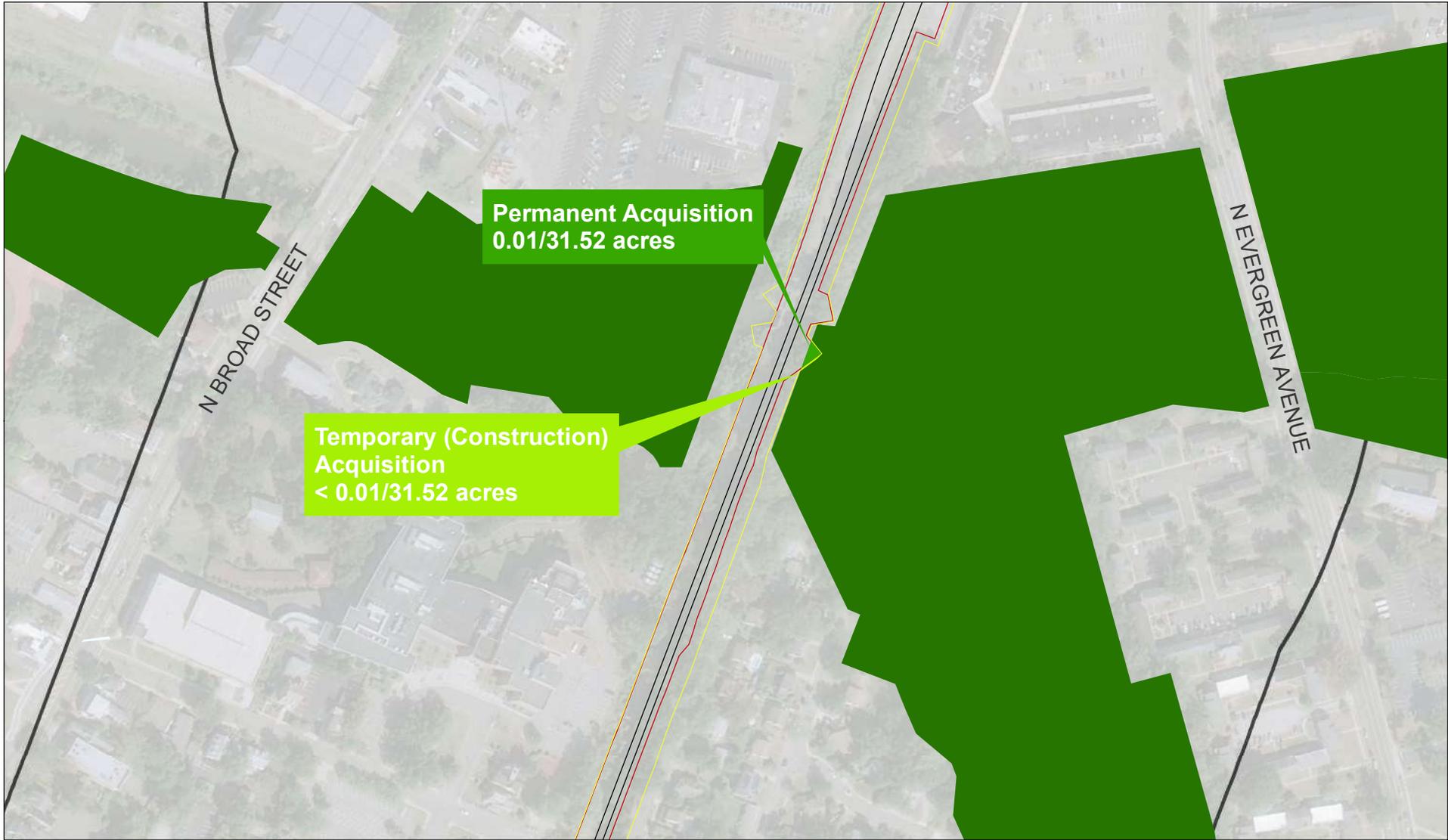
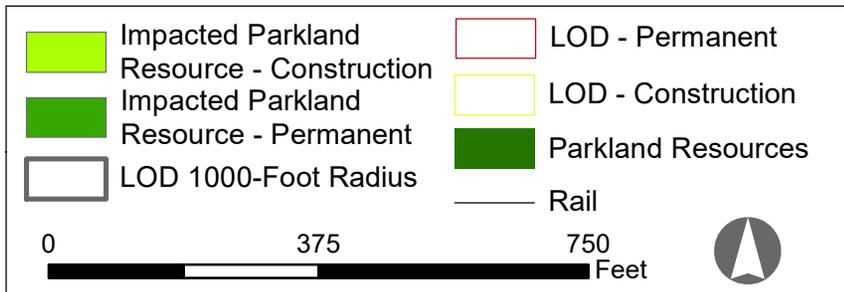


Figure 3-6: Direct Impacts to Woodbury Lake Park



Source: DVRPC; US Census Bureau; New Jersey Green Acres; NJGIN.

Veterans' Park – Borough of Woodbury Heights (Park ID 62)

The proposed alignment for the GCL would pass immediately to the east of Veterans' Park. As this resource is located within the Borough of Woodbury Heights, which has accepted Green Acres funding for some of its parkland resources, this resource is encumbered by Green Acres' restrictions and compensation requirements.

As shown on Figure 3-7, "Direct Impacts to Veterans' Park," a permanent acquisition of less than 0.01 acres would be required to accommodate the proposed rail alignment and grade crossing protection where the proposed alignment intersects with Elm Avenue. Construction activities are anticipated to extend marginally beyond the limit of permanent features of the GCL at this location, resulting in an additional affected area of less than 0.01 acres. Combined, the temporary (construction) and permanent (operational) LOD would affect less than 0.01 acres of the 0.77-acre park property (0.5 percent). However, the area-based impact calculations understate the direct impacts that would occur due to the way in which the parcel boundaries for this resource are defined.

In addition to an approximately 35-foot wide strip of well-manicured grass-covered area, which acts as a buffer between the rail ROW and the park, there are various elements of this resource, including brick-paved walkways, monumental structures, and a set of gates running parallel to Elm Avenue near the roadway's northern sidewalks, that extend well beyond the parcel's eastern limits.

The proposed alignment would occupy the majority of the grass-covered strip that lies between the brick-paved walkways and the rail ROW, effectively eliminating the existing buffer that serves to separate the park from the rail traffic. In addition, the proposed alignment would occupy a portion of the brick-paved area in the southern half of the resource that surrounds a tree. The proposed alignment would also intersect with the western gate near the intersection of Elm Avenue and W. Jersey Avenue. The section of brick-paved walkway and the western gate would need to be modified to accommodate the proposed GCL alignment. A sliver of the brick-paved walkway that connects with the northern sidewalks along Elm Avenue would be affected by the installation of grade crossing protection equipment. One tree that lies at the northern edge of the park (beyond the parcel limits) would need to be removed to accommodate the proposed alignment.

Although direct impacts to portions of the brick-paved walkways and the western gate parallel to Elm Avenue would be expected, as well as the incorporation of the majority of the grass-covered strip, the primary features that define this resource (i.e., the monumental structures that pay tribute to active and fallen U.S. soldiers and the brick-paved walkways that lead from those features to the sidewalks along Elm Avenue and W. Jersey Avenue) would not be directly impacted by the GCL. Therefore, no significant adverse impacts to the use of or access to this parkland resource are anticipated.

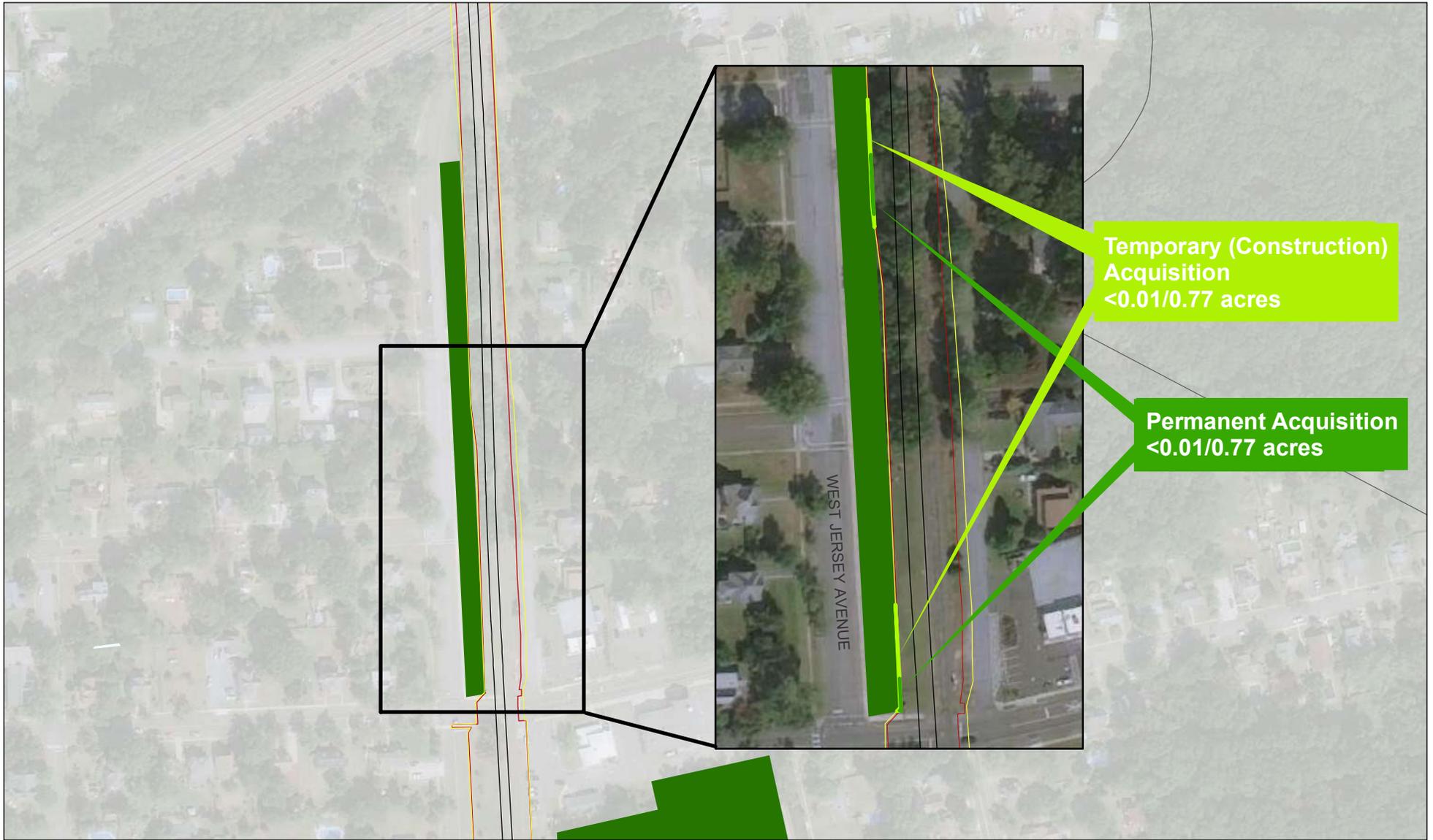
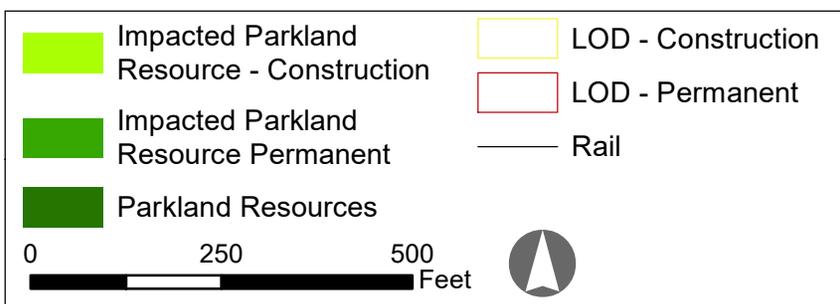


Figure 3-7: Direct Impacts to Veterans' Park



Source: DVRPC; US Census Bureau; New Jersey Green Acres; NJGIN.

Woodbury Heights Elementary School – Borough of Woodbury Heights (Park ID 63)

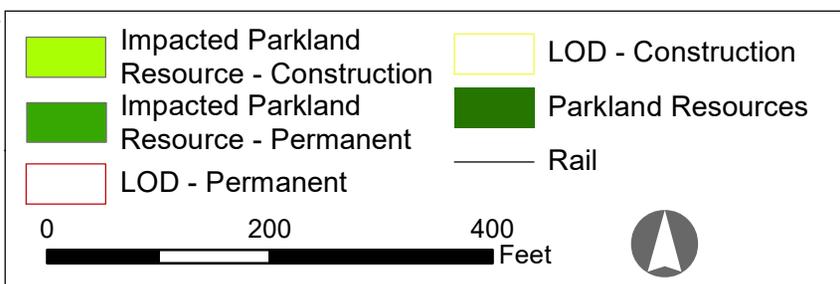
The proposed GCL would pass immediately to the west of Woodbury Heights Elementary School and would be buffered from the school by a dense, undisturbed swath of existing trees that currently spans approximately 225 feet, effectively separating the school grounds from the existing rail ROW. As this resource is located within the Borough of Woodbury Heights, which has accepted Green Acres funding for some of its parkland resources, this resource is encumbered by Green Acres' restrictions and compensation requirements.

As shown on Figure 3-8, "Direct Impacts to Woodbury Heights Elementary School," a permanent easement of less than 0.01 acre of the 9.23 acre park property (0.1 percent) would be required to accommodate the beginning of the approach that provides access to the proposed Woodbury Heights VMF. The construction LOD would extend marginally beyond this, affecting less than 0.01 acre in addition to the permanent impact. However, there would be no direct impact to the use of Woodbury Heights Elementary School and its associated recreational facilities. One tree within the impacted area that borders the rail ROW would need to be removed.

Although the GCL is anticipated to result in minor adverse impacts (i.e., removal of one tree), there would be no permanent interference with the use of or access to the school and none of the playground equipment or fencing would need to be permanently relocated. Therefore, the GCL is not anticipated to result in any significant adverse impacts to Woodbury Heights Elementary School.



Figure 3-8: Direct Impacts to Woodbury Heights Elementary School



Source: DVRPC; US Census Bureau; New Jersey Green Acres; NJGIN.

Wenonah Lake – Borough of Wenonah (Park ID 70)

The proposed GCL would pass immediately to the east of Wenonah Lake. This resource is located within the Borough of Wenonah which has not accepted Green Acres funding. As such, Wenonah Lake is not encumbered by Green Acres' restrictions and compensation requirements.

As shown on Figure 3-9, "Direct Impacts to Wenonah Lake," a temporary easement of 0.02 acre of the 65.78-acre park property (less than 0.1 percent) would be required to accommodate construction activities. The permanent features of the proposed GCL would not affect Wenonah Lake. One tree currently located on the park property would have to be removed as part of the construction of the proposed GCL. This tree is a part of a large wooded area and would not affect the use or value of the Wenonah Lake open space.

Although the GCL is anticipated to result in minor adverse impacts (i.e., removal of one tree), there would be no permanent interference with the use of or access to the open space. Therefore, the GCL is not anticipated to result in any significant adverse impacts to Wenonah Lake.

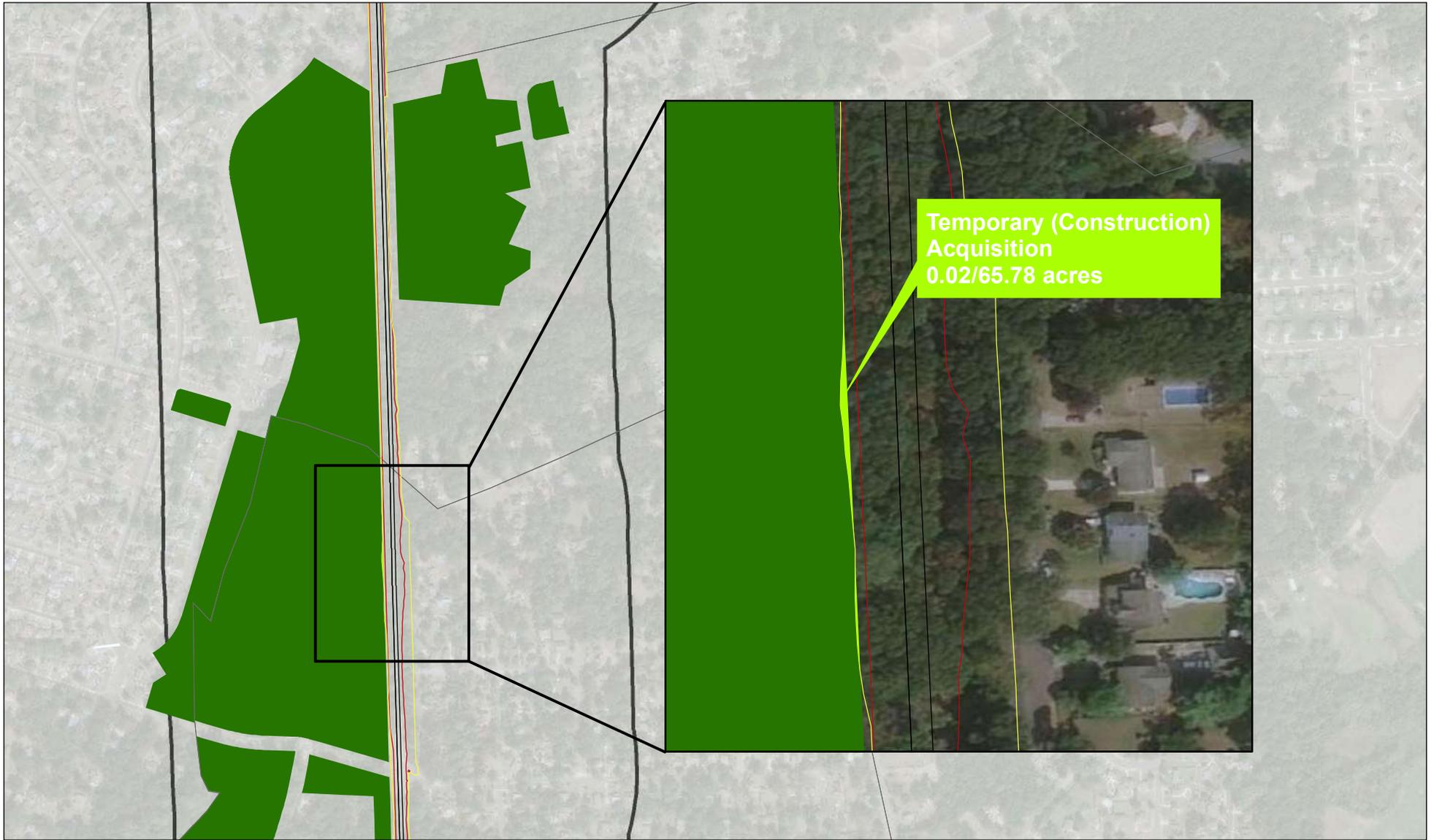
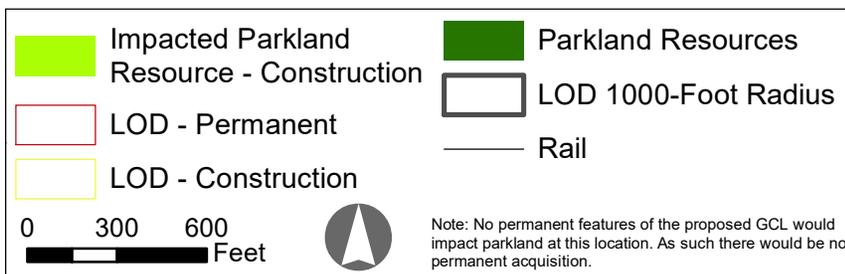


Figure 3-9: Direct Impacts to Wenonah Lake



Source: DVRPC; US Census Bureau; New Jersey Green Acres; NJGIN.

Cedar Field – Borough of Wenonah (Park ID 75)

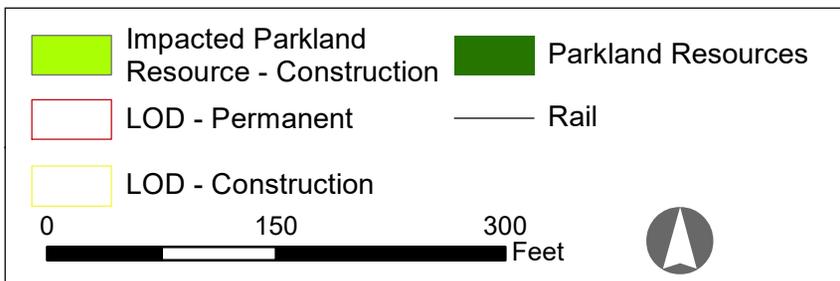
The proposed GCL would pass immediately to the west of Cedar Field. This resource is located within the Borough of Wenonah which has not accepted Green Acres funding. As such, Cedar Field is not encumbered by Green Acres' restrictions and compensation requirements.

As shown on Figure 3-10, "Direct Impacts to Cedar Field," a temporary easement of less than 0.01 acre of the 3.37-acre park property (less than 0.1 percent) would be required to accommodate construction activities. The permanent features of the proposed GCL would not affect Cedar Field. No trees, facilities, equipment, or fencing would have to be removed or modified to accommodate the GCL construction activities at this location.

The GCL would not result in any interference with the use of or access to the open space. Therefore, the GCL is not anticipated to result in any significant adverse impacts to Cedar Field.



Figure 3-10: Direct Impacts to Cedar Field



Source: DVRPC; US Census Bureau; New Jersey Green Acres; NJGIN.

Mantua Creek Trail – Deptford Township (Trail ID D)

The Mantua Creek Trail is a 1.15 mile multi-use trail that traverses portions of Wenonah Borough, Mantua Township, and Deptford Township and directly connects with the Monongahela Brook Trail (Trail ID E) in Wenonah Borough to the east. To avoid conflicts between trail users and rail traffic, the portion of the trail located within Deptford Township currently begins at an elevation that is similar to that of the rail tracks, runs north-south roughly parallel to the tracks while gradually sloping down toward Mantua Creek, bends east-west at Mantua Creek to pass beneath the bridge that carries rail traffic over Mantua Creek, and then returns to a north-south orientation gradually sloping upwards to return to an elevation similar to that of the rail tracks. The horseshoe configuration of the trail near Mantua Creek within Deptford Township is situated on a parcel that is privately-owned by Conrail. As part of the GCL, the existing rail bridge over Mantua Creek is proposed to be widened to accommodate two sets of rail tracks.

As shown on Figure 3-11, “Mantua Creek Trail,” as the trail passes beneath the existing rail bridge within Deptford Township on the Conrail-owned parcel, there is a 0.06 mile segment of the trail (five percent of the trail’s total length) that would overlap with the GCL’s permanent and temporary LODs. It is anticipated that the proposed bridge widening and the long-term operation of the GCL would increase the length of the trail situated beneath the bridge from an existing length of approximately 20 feet to a future length of approximately 40 feet.

Despite the fact that a larger portion of the trail would be situated beneath the rail bridge with the proposed GCL, the long-term operation of the GCL would not result in any permanent interference with the use of or access to the multi-use trail once constructed because trail users would be able to use the same underpass beneath a widened rail bridge. Therefore, the GCL is not anticipated to result in any significant adverse impacts to the Mantua Creek Trail.

However, construction-related activities along the 0.06 mile segment of the trail would temporarily affect the use of the trail. As noted in Table 2.4-7, “Multi-Use Trail Resources Located Within the GCL Study Area,” the Wenonah Environmental Commission, as the owner of the trail system, is charged with maintaining this and the other trails within the parklands study area.

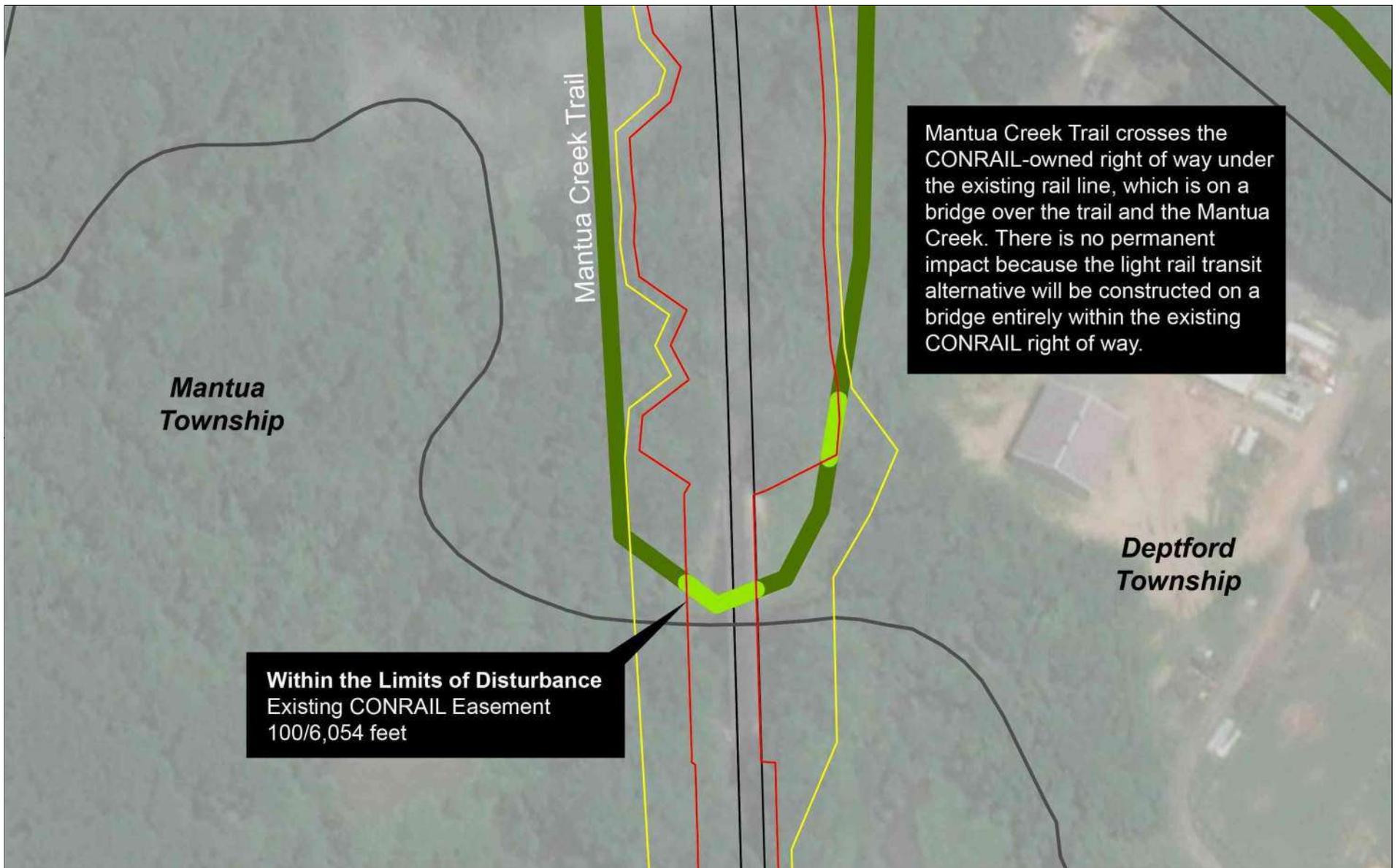
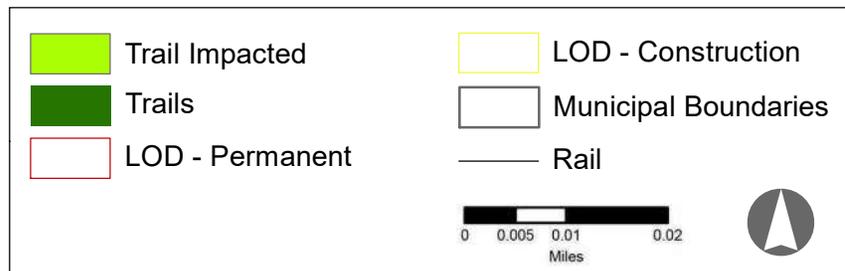


Figure 3-11: Mantua Creek Trail



Source: DVRPC; US Census Bureau; New Jersey Green Acres; NJGIN

Bowe Park – Borough of Glassboro (Park ID 91)

The proposed GCL would pass immediately to the east of Bowe Park. As this resource is located within the Borough of Glassboro which has accepted Green Acres funding for some of its parkland resources, this resource is encumbered by Green Acres' restrictions and compensation requirements.

As shown on Figure 3-12, "Direct Impacts to Bowe Park," a temporary easement of less than 0.40 acre of the 26.23-acre park property (1.5 percent) would be required to accommodate construction activities. The permanent features of the proposed GCL would not affect Bowe Park. No trees, facilities, equipment, or fencing would have to be removed or modified to accommodate the GCL construction activities at this location.

The GCL would not result in any interference with the use of or access to the open space. Therefore, the GCL is not anticipated to result in any significant adverse impacts to Bowe Park.

Glassboro High School – Borough of Glassboro (Park ID 92)

The proposed GCL would pass immediately to the west of Glassboro High School. As this resource is located within the Borough of Glassboro, which has accepted Green Acres funding for some of its parkland resources, this resource is encumbered by Green Acres' restrictions and compensation requirements.

As shown on Figure 3-13, "Direct Impacts to Glassboro High School," less than 0.01 acre would be acquired to accommodate the drainage and rail bed widening for the project. Additionally, temporary construction activities would affect 0.20 acre of Glassboro High School resulting in a total affected area of approximately 0.20 acre of the 35.35-acre park (0.56 percent). The affected area is not occupied by any recreational facilities and lies near the southern edge of the school property beyond the running track. Thus, there would be no direct impact to the use of Glassboro High School and its associated recreational facilities. One tree within the affected area would need to be removed.

Although the GCL is anticipated to result in minor adverse impacts (i.e., removal of one tree), there would be no permanent interference with the use of or access to the school or its recreational facilities and none of the recreational facilities would need to be permanently relocated. Therefore, the GCL is not anticipated to result in any significant adverse impacts to Glassboro High School.

Glassboro Sports Complex – Borough of Glassboro (Park ID 93)

The proposed GCL would pass immediately to the east of Glassboro Sports Complex. As this resource is located within the Borough of Glassboro, which has accepted Green Acres funding for some of its parkland resources, this resource is encumbered by Green Acres' restrictions and compensation requirements.

As shown on Figure 3-14, "Direct Impacts to Glassboro Sports Complex," 0.02 acre would be acquired to accommodate the GCL alignment. Additionally, temporary construction activities would affect 0.08 acre of the Glassboro Sports Complex, resulting in a total affected area of approximately 0.10 acre of the 16.21-acre park (0.56 percent). The affected area is not occupied by any recreational facilities and lies near the eastern edge of the park property. Thus, there would be no direct impact to the use of the Glassboro Sports Complex and its associated recreational facilities. No trees, facilities, equipment, or fencing would have to be removed or modified to accommodate proposed GCL features or construction activities at this location.

Although the GCL is anticipated to result in minor adverse impacts, there would be no permanent interference with the use of or access to the school or its recreational facilities and none of the

recreational facilities would need to be permanently relocated. Therefore, the GCL is not anticipated to result in any significant adverse impacts to the Glassboro Sports Complex.

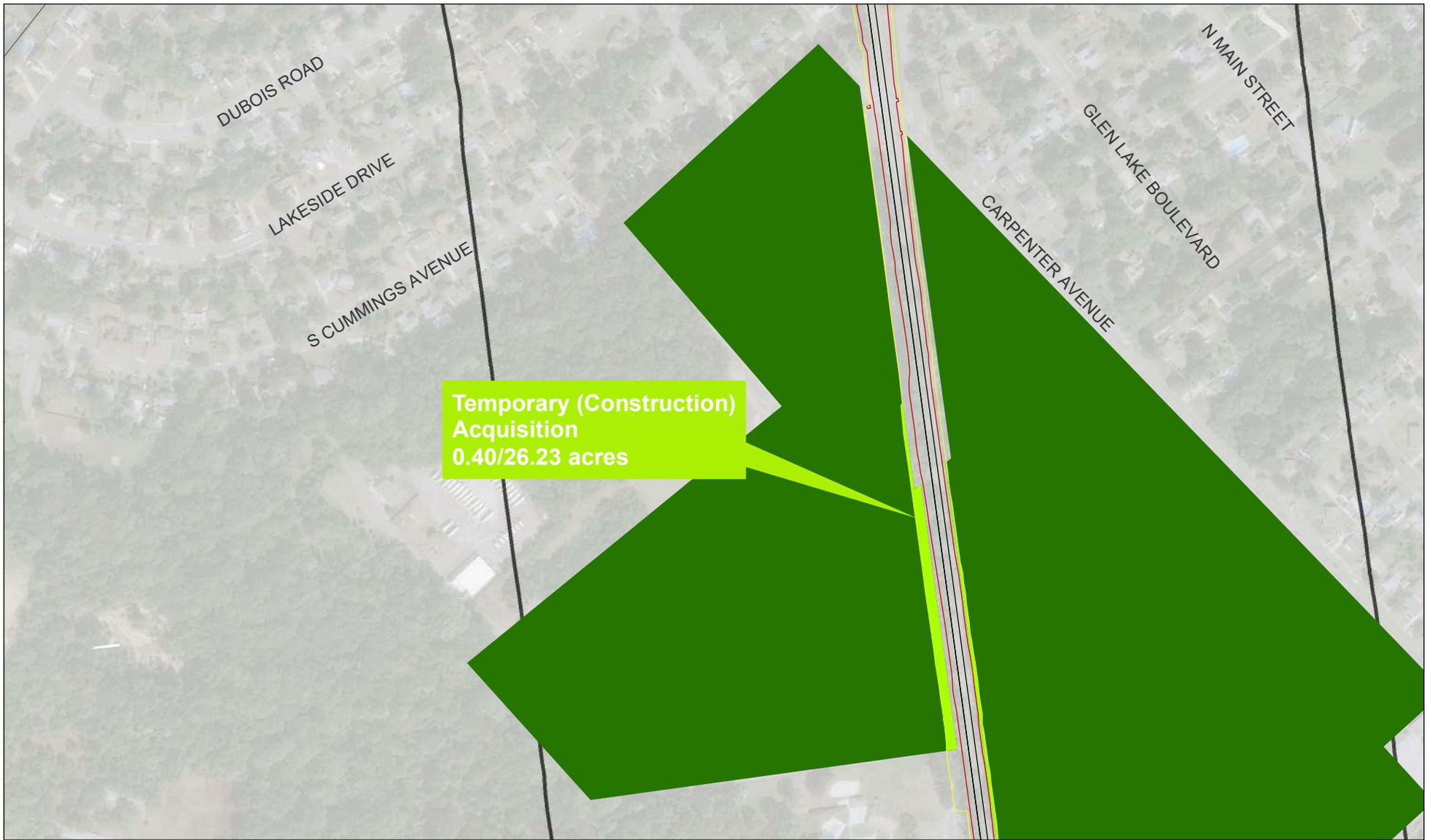


Figure 3-12: Direct Impacts to Bowe Park



Source: DVRPC; US Census Bureau; New Jersey Green Acres; NJGIN.

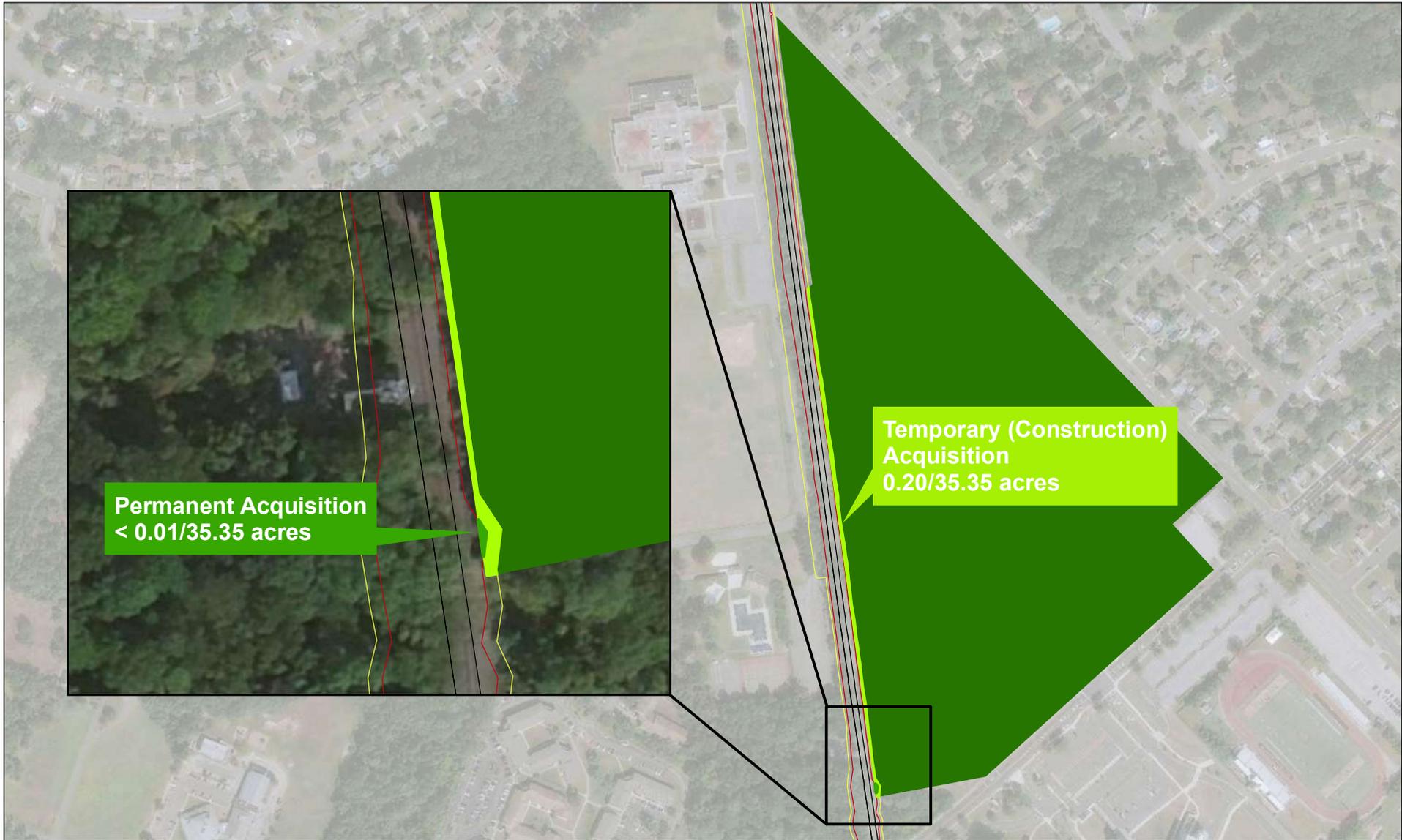
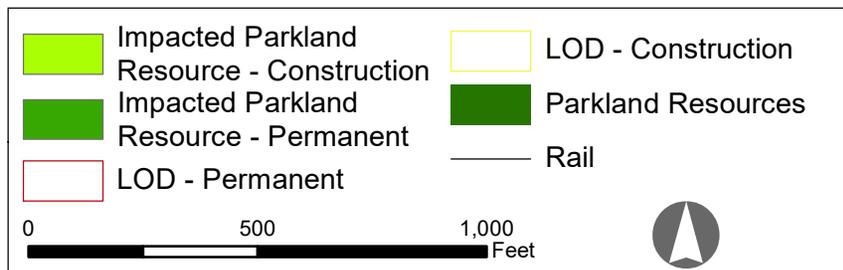


Figure 3-13: Direct Impacts to Glassboro High School



Source: DVRPC; US Census Bureau; New Jersey Green Acres; NJGIN.

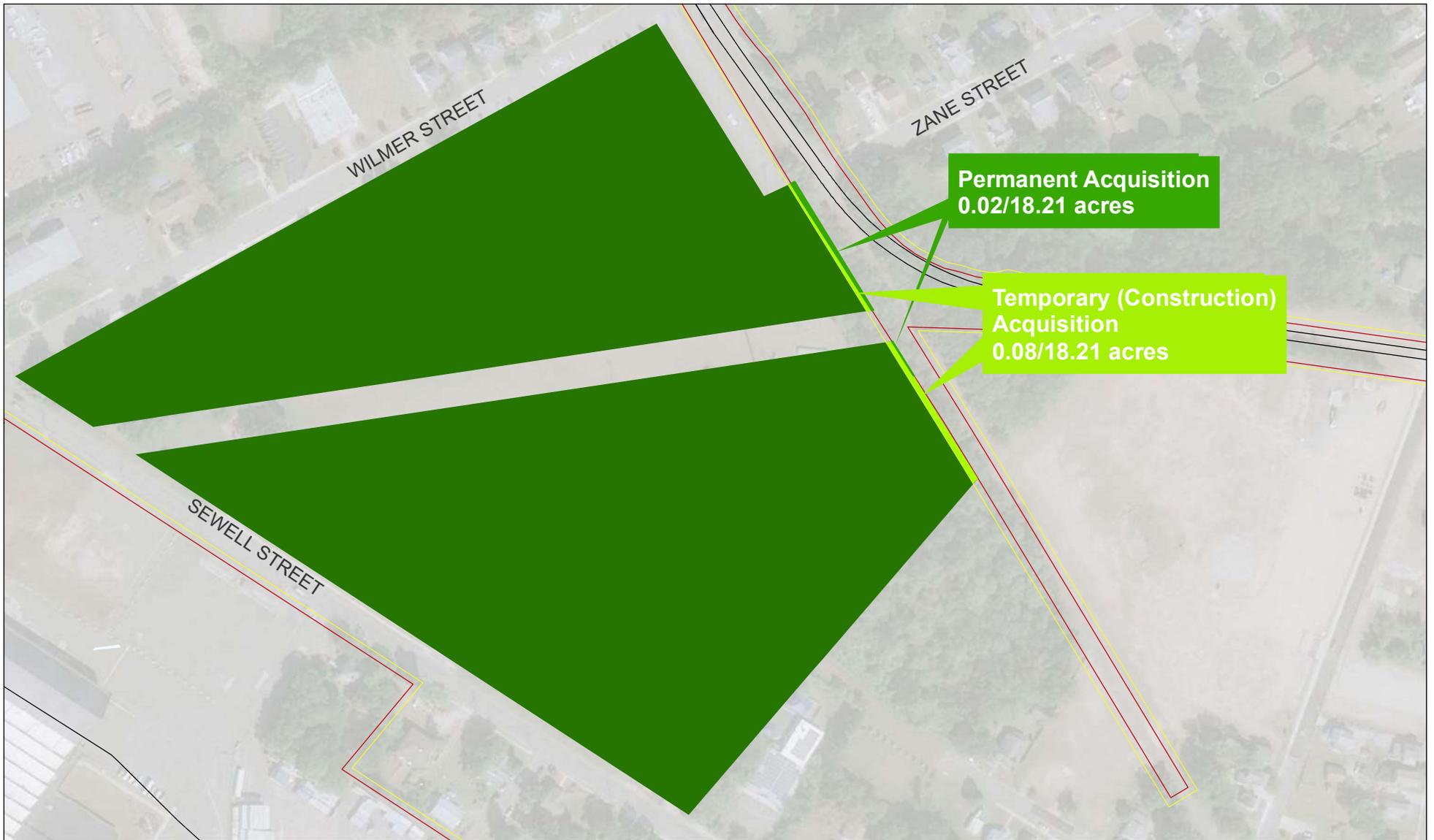


Figure 3-14: Direct Impacts to Glassboro Sports Complex



Source: DVRPC; US Census Bureau; New Jersey Green Acres; NJGIN.

3.5.4. Air Quality

In general, construction-related effects of the project would be limited to temporarily increased fugitive dust and mobile source emissions during construction. State and local regulations regarding dust control and other air quality emission reduction controls should be followed. Specifically, heavy duty equipment used for construction would be required to adhere to No Idling regulations, including not idling for more than 15 minutes above 25 degrees Fahrenheit. Any and all light duty vehicles on the premises during construction would not idle for more than three minutes. Heavy duty equipment used for construction and demolition would be required to minimize idling whenever possible. As air emissions from construction would be insignificant, all medium- and heavy-duty equipment used for construction would be required to meet the EPA Tier 4 non-road emission standards and would use Ultra Low Sulfur Diesel (ULSD) fluid when applicable.

3.5.4.1. Fugitive Dust Emissions

Fugitive dust is airborne particulate matter, generally of a relatively large particulate size. Construction-related fugitive dust would be generated by haul trucks, concrete trucks, delivery trucks, and earth-moving vehicles operating around the construction sites. This fugitive dust would be caused by particulate matter that is re-suspended ("kicked up") by vehicle movement over paved and unpaved roads, dirt tracked onto paved surfaces from unpaved areas at access points, and material blown from uncovered haul trucks.

Generally, the distance that particles drift from their source depends on their size, the emission height, and the wind speed. Small particles (30 to 100 micron range) can travel several hundred feet before settling to the ground. Most fugitive dust, however, is comprised of relatively large particles (that is, particles greater than 100 microns in diameter). These particles are responsible for the reduced visibility often associated with this type of construction. Given their relatively large size, these particles tend to settle within 20 to 30 feet of their source.

To minimize the amount of construction dust generated, the guidelines below are recommended:

- Site Preparation
 - Minimize land disturbance
 - Use watering trucks to minimize dust
 - Cover trucks when hauling dirt
 - Stabilize the surface of dirt piles if they are not removed immediately
 - Use windbreaks to prevent accidental dust pollution
 - Limit vehicular paths and stabilize temporary roads
 - Pave all unpaved construction roads and parking areas to road grade for a length no less than 50 feet from where such roads and parking areas exit the construction site to prevent dirt from washing onto paved roadways
- Construction
 - Cover trucks when transferring materials
 - Use dust suppressants on unpaved traveled paths
 - Minimize unnecessary vehicular and machinery activities

- Minimize dirt track-out by washing or cleaning trucks before leaving the construction site. An alternative to this strategy is to pave a few hundred feet of the exit road just before entering the public road.
- Post-Construction
 - Re-vegetate any disturbed land not used
 - Remove unused material
 - Remove dirt piles
 - Re-vegetate all vehicular paths created during construction to avoid future off-road vehicular activities

3.5.4.2. Mobile Source Emissions

Because CO emissions from motor vehicles generally increase with decreasing vehicle speed, disruption of traffic during construction (such as a temporary reduction of roadway capacity and increased queue lengths) could result in temporary, elevated concentrations of CO. To minimize the amount of emissions generated, every effort should be made during construction to limit disruption to traffic, especially during peak travel hours.

3.5.4.3. Conclusions

The purpose and need of the proposed project focuses on meeting the current and future regional transportation needs of the area. The project is currently included in the DVRPC Transportation Improvements Program (TIP) as the Second Phase of River LINE Light Rail Transit (LRT)/PATCO Extension, under Transit Rail Initiatives, DB# T300. The proposed project is not predicted to cause or exacerbate a violation of the NAAQS, nor increase MSAT levels above existing levels. The proposed project is predicted to slightly increase regional emission burdens; as an approved project on the TIP, however, the project emissions are incorporated into the overall plan for the area to meet ambient air quality standards. The Interagency Working Group concluded that the proposed GCL is not a “Project of Air Quality Concern” with regards to PM_{2.5}. As such, no further analysis of PM_{2.5} impacts is required.

Construction-related effects of the proposed GCL would be limited to temporarily increased fugitive dust and mobile source emissions during construction. State and local regulations regarding dust control and other air quality emission reduction controls should be followed.

3.5.5. Noise

Instantaneous noise levels during construction are difficult to predict, and they vary depending upon the type and duration of construction activity and the number and types of equipment used during each stage of work. However, the average noise levels produced by different phases of construction are well documented. More importantly, the location of sensitive receptors in relation to the construction activity, and the duration of construction activities, affect the potential for noise impact. Track-related construction would move continuously along the corridor; therefore, the duration of exposure to track-construction-related noise at any one property would be limited.

Some specialized construction work does have a greater potential to create noise impacts. This includes the following types of work:

- Pile driving.
- Heavy equipment use for the construction of retaining walls, bridges, and elevated structure segments.
- Noise associated with other fixed location activities, such as construction laydown areas.

However, noise from these activities would only impact noise-sensitive receptors located near these specific types of work, and would not affect the entire length of the proposed GCL alignment.

3.5.6. Vibration

Though the overall length of construction for the proposed GCL is expected to be approximately 36 months, it is anticipated that disturbances at most individual vibration sensitive receptor locations would likely last for a substantially shorter period of time. Track-related construction would shift continuously along the corridor; therefore, the duration of potential exposure to construction-related vibration at any one property would be limited. In addition, the potential for vibration impacts is even lower for construction activities that use equipment, such as air compressors, rubber-wheeled vehicles, hydraulic loaders, and other light equipment. For these locations, heavy construction, if required, would occur for relatively short periods of time and is not anticipated to result in prolonged annoyance to nearby sensitive receptors.

3.6. CUMULATIVE EFFECTS

This section addresses the cumulative effects associated with the proposed GCL. For the purpose of this analysis, cumulative effects are defined as those that could result from the proposed project, plus any foreseeable actions in the same timeframe in the same areas.

The cumulative effects study area is defined as any census tract partially or wholly within a ½ mile of the proposed GCL. The 2010 U.S. census tract boundaries were used. After identifying the cumulative effects study area, the potential for environmental benefits and disproportionate or adverse impacts of the proposed GCL on each community within the GCL corridor was determined. The potential for effects is expressed quantitatively or with the following qualitative terms:

- **No impact** – This category applies if the proposed GCL is not expected to result in effects on existing conditions. Positive effects, such as improved access to neighborhoods and community facilities, may also occur and are represented as no impact. Also included in this category are effects to individual residential properties that would not result in an impact to the collective neighborhood.
- **Potential less than significant impact** – This category applies if the proposed GCL may result in a minimal or moderate effect. Minimal effects include changes from the existing conditions that typically would not need mitigation; moderate effects include changes from existing conditions that could be addressed through mitigation.

- Potentially significant impact** – This category applies if the proposed GCL would likely result in substantial changes that represent an “adverse impact” to a community or area.

The key criteria for cumulative effects analyses is whether or not adverse impacts identified in each of the environmental analysis categories, plus any foreseeable actions in the same timeframe in the same areas, would be appreciably more severe or greater in magnitude.

Impacts to communities in the GCL corridor are outlined in Table 3.6-1, “Potential Impacts to Communities in the GCL Corridor.” While the proposed GCL may result in adverse effects, it is expected that these effects would be mitigated, and would not outweigh ~~These impacts are minimal compared with the proposed GCL’s benefits to populations within the GCL corridor, including increased accessibility, a new mode choice, and reduced travel times. Proposed mitigation measures are outlined in Chapter 4, “Avoidance Measures and Mitigation.” While these do represent potentially adverse impacts in and of themselves,~~ The combination of them identified adverse effects taken together would not comprise a new or distinct effect. Therefore, it can be determined that no potential for cumulative effects would result from the proposed GCL.

~~The identified adverse impacts are expected to be fully mitigated. Mitigation and avoidance measures are outlined in Section 4, “Avoidance Measures and Mitigation.”~~

Table 3.6-1: Potential Impacts to Communities in the GCL Corridor

Census Tracts	Associated Neighborhood	Associated Municipality	Significant Impacts*	Less Than Significant Impacts**
6007	Cooper Point	City of Camden	20401, 20402, 20403, 30701	No impacts
6008	Pyne Point			
6103	Cooper Grant/ Central Water Front			
6104	Central Business District/Lanning Square			
6002	Gateway			
6004	Bergen Square			
6014	Parkside			
6016	Liberty Park			
6015	Whitman Park			
6018	Waterfront South			
6017	Centerville			
6019	Morgan Village			
6020	Fairview			
6110	Gloucester City	City of Gloucester	20404, 30703	20414, 30702
6051				
6052				
6053	Brooklawn	Borough of Brooklawn	No impacts	

Table 3.6-1: Potential Impacts to Communities in the GCL Corridor (Continued)

Census Tracts	Associated Neighborhood	Associated Municipality	Significant Impacts*	Less Than Significant Impacts**
6070	Western Bellmawr	Borough of Bellmawr	No impacts	
5001	Westville	Borough of Westville	20406	No impacts
5002.01	Verga	West Deptford Township	No impacts	
5010.01	Woodbury	City of Woodbury	20408	30704, 30705
5010.02				
5010.03				
5009	Woodbury Heights	Borough of Woodbury Heights	30808, 31005	20107, 30706, 30707
5011.07	Oak Valley	Deptford Township		30710
5011.06	Jericho			
5008	Wenonah	Borough of Wenonah	30804	No impacts
5007.02	Sewell	Mantua Township	No impacts	
5013.01	Pitman	Borough of Pitman	30806	No impacts
5013.02				
5013.03				
5014.02	Glassboro	Borough of Glassboro	20409, 20410, 20412, 20413, 31005	20108, 30712, 30713, 30903
5014.03				
5014.04				
5014.06				
Notes:				
* All significant impacts would be fully mitigated. Please refer to Chapter 4, "Avoidance Measures and Mitigation."				
** In addition to the significant impacts listed above (all fully mitigated), additional mitigation/avoidance measures would be considered for certain less than significant impacts. Please refer to Chapter 4, "Avoidance Measures and Mitigation."				
For Natural Resources effects to be determined in consultation with NJDEP, please refer to Section 3.2, "Natural Resources." For Hazardous Materials effects to be determined in consultation with NJDEP, please refer to Section 3.3.3, "Hazardous Materials." For Cultural Resources effects to be determined in consultation with NJ HPO, please refer to Section 3.4.2, "Cultural Resources"; see also Section 3.4.9.6, "Potential Effects to Visual Resources – Historic and Cultural Resources," for potential visual effects that may be associated with the Glassboro Vehicle Maintenance Facility, pending consultation with NJ HPO.				

Source: GCL Project Team, 2020, American Community Survey, 2014-2018.

In addition to the potential impacts to communities discussed above, the Environmental Impact Statement (EIS) has also identified a potential corridor-wide impacts. The following potential corridor-wide impacts identified in the EIS would be fully mitigated and would not result in significant adverse impacts:

- 10201 – Surface Waters
- 30601 – No effects to local law enforcement services

- 30602 – No effects related to station platforms and park-and-ride facilities
- 30603 – No effects related to rail safety
- 30604 – No effects related to vehicular, bicycle, and pedestrian safety
- 30605 – No effects related to operational provisions for safety and security
- 30606 – No effects related to training and education provisions for safety and security

There is potential for significant adverse corridor-wide impacts for severe and moderate noise impacts at 14 monitoring sites, as follows:

- 31001 – Severe noise effects at three monitoring sites (177 dwellings)
- 31002 – Moderate noise effects at 11 monitoring sites (577 dwellings)

In addition, the potential for corridor-wide impacts for the following impact assessment categories will be determined once the currently ongoing agency consultation is completed:

- 10101 – Acid-Producing Soils
- 10220 – Flood Hazard Areas
- 10301 – Plant Communities – Forest
- 10302 – Plant Communities – Agriculture
- 10303 – Plant Communities – Old Field
- 10305 – Threatened and Endangered Species – Federally-Listed Species – Northern Long-Eared Bat
- 10306 – Threatened and Endangered Species – Federally-Listed Species –Atlantic Sturgeon and Shortnose Sturgeon
- 10308 – Threatened and Endangered Species – State-Listed Species – Bald Eagle
- 10309 – Threatened and Endangered Species – State-Listed Species – Barred Owl and Red-Shouldered Hawk

In addition to the significant impacts discussed above, additional mitigation/avoidance measures would be considered for certain less than significant impacts identified. Please refer to Chapter 4, "Avoidance Measures and Mitigation," for further information.

For Natural Resources effects to be determined in consultation with NJDEP, please refer to Section 3.2, "Natural Resources." For Hazardous Materials effects to be determined in consultation with NJDEP, please refer to Section 3.3.3, "Hazardous Materials." For Cultural Resources effects to be determined in consultation with NJ HPO, please refer to Section 3.4.2, "Cultural Resources"; see also Section 3.4.9.6, "Potential Effects to Visual Resources – Historic and Cultural Resources," for potential visual effects that may be associated with the Glassboro Vehicle Maintenance Facility, pending consultation with NJ HPO.

3.7. ACQUISITIONS

In addition to the impacts described previously in this chapter, the following acquisitions detailed in table 3.7-1, "Acquisitions," are anticipated to be necessary for the proposed GCL. The analysis presented in Attachment 12, "Acquisitions and Displacements Technical Report," represents a reasonably conservative "hard look" at potential impacts related to potential property acquisitions and displacements that could result from these acquisitions. At present, no determination of impact significance (magnitude) related to acquisitions is provided. It is assumed that the project sponsor prior to construction of the proposed GCL would continue to develop design refinements that would minimize property acquisitions and relocations to the extent practicable. For acquisitions and displacements that cannot be avoided, the project sponsor prior to the construction of the proposed GCL would identify and provide the appropriate payment, compensation, and/or relocation for acquired properties. See Attachment 12, "Acquisitions and Displacements Technical Report," for further information.

Table 3.7-1: Acquisitions

Parcel Pin	County	Municipality	Current Land Use ⁹	Acquisition Type	Total Parcel Area (sf)	Property Area/Percentage Considered for Analysis Purpose ¹⁰			
						Permanent Impact – Area (sf)	Permanent Impact - Percentage	Temporary Impact – Area (sf)	Temporary Impact - Percentage
0408_1443_1	Camden	Camden City	Parking: Community Services	Partial	22,303	4,061	18.2%	6,123	27.5%
0408_1443_2	Camden	Camden City	Community Services	Partial	100,745	1,721	1.7%	4,999	5.0%
0408_1443_6	Camden	Camden City	Community Services	Partial	60,429	256	0.4%	1,480	2.4%
0408_175_12.01	Camden	Camden City	Vacant	Full	45,392	7,870	17.3%	9,035	19.9%
0408_386_106	Camden	Camden City	Residential: Multi-Family	Full	1,456	659	45.2%	1,261	86.6%
0408_386_107	Camden	Camden City	Residential: Multi-Family	Full	1,179	634	53.7%	1,075	91.2%
0408_386_109	Camden	Camden City	Vacant	Full	1,623	1,039	64.0%	1,623	100.0%
0408_386_110	Camden	Camden City	Residential: Multi-Family	Full	2,021	201	9.9%	1,122	55.5%
0408_386_91	Camden	Camden City	Residential: Multi-Family	Full	1,497	431	28.8%	1,416	94.6%
0408_392_32	Camden	Camden City	Vacant	Full	4,893	3,107	63.5%	4,375	89.4%
0408_392_34	Camden	Camden City	Vacant	Partial	9,984	296	3.0%	1,358	13.6%
0408_404_90	Camden	Camden City	Residential: Multi-Family	Full	14,302	2,750	19.2%	4,705	32.9%
0408_470_11	Camden	Camden City	Residential: Multi-Family	<i>De Minimis</i>	1,396	229	16.4%	299	21.4%
0408_470_12	Camden	Camden City	Residential: Multi-Family	<i>De Minimis</i>	1,396	232	16.6%	302	21.6%
0408_470_13	Camden	Camden City	Residential: Multi-Family	<i>De Minimis</i>	1,998	335	16.8%	436	21.8%
0408_470_14	Camden	Camden City	Residential: Multi-Family	<i>De Minimis</i>	1,994	339	17.0%	440	22.0%
0408_470_15	Camden	Camden City	Residential: Multi-Family	<i>De Minimis</i>	1,994	344	17.3%	444	22.3%
0408_470_16	Camden	Camden City	Residential: Multi-Family	<i>De Minimis</i>	1,994	349	17.5%	449	22.5%
0408_470_17	Camden	Camden City	Residential: Multi-Family	<i>De Minimis</i>	1,994	354	17.7%	454	22.8%
0408_470_18	Camden	Camden City	Vacant	<i>De Minimis</i>	2,025	358	17.7%	458	22.6%
0408_470_22	Camden	Camden City	Residential: Multi-Family	<i>De Minimis</i>	2,660		0.0%	1	0.0%
0408_470_26	Camden	Camden City	Vacant	Full	54,922	36,494	66.4%	38,594	70.3%
0408_470_61	Camden	Camden City	Residential: Multi-Family	<i>De Minimis</i>	1,338	128	9.6%	272	20.3%
0408_470_8	Camden	Camden City	Residential: Multi-Family	<i>De Minimis</i>	1,994	315	15.8%	415	20.8%
0408_470_9	Camden	Camden City	Residential: Multi-Family	<i>De Minimis</i>	1,994	320	16.1%	420	21.1%

⁹ Land use classifications were determined by overlaying the DVRPC's Land Use shapefile with the parcels shapefiles provided by Camden and Gloucester counties.

¹⁰ Estimated limits of disturbance that could result with construction or operation of the proposed GCL are based on conceptual design parameters that represent a reasonably conservative basis for conducting environmental analysis; a greater area/percentage of property was considered and evaluated as part of the analysis than would likely be affected (Refer to columns "Acquisition Type," and "Permanent Impact Type(s)," for anticipated types and magnitudes of effects).

Table 3.7-1: Acquisitions (Continued)

Parcel Pin	County	Municipality	Current Land Use	Acquisition Type	Total Parcel Area (sf)	Property Area/Percentage Considered for Analysis Purpose			
						Permanent Impact – Area (sf)	Permanent Impact - Percentage	Temporary Impact – Area (sf)	Temporary Impact - Percentage
0408_477_21	Camden	Camden City	Residential: Multi-Family	<i>De Minimis</i>	1,321		0.0%	9	0.6%
0408_477_42	Camden	Camden City	Residential: Multi-Family	Full	340	27	7.9%	56	16.4%
0408_489_55	Camden	Camden City	Residential: Multi-Family	Full	3,378	9	0.3%	38	1.1%
0408_641_16	Camden	Camden City	Utility	<i>De Minimis</i>	656,632	479	0.1%	1,539	0.2%
0408_641_3	Camden	Camden City	Utility	<i>De Minimis</i>	168,881	11,412	6.8%	17,142	10.2%
0414_136.02_56	Camden	Gloucester City	Commercial	Partial	11,001	1,912	17.4%	2,178	19.8%
0414_136.02_61	Camden	Gloucester City	Commercial	Full	2,206	2,113	95.8%	2,174	98.5%
0414_136.02_62	Camden	Gloucester City	Commercial	Partial	18,563	2,474	13.3%	2,643	14.2%
0414_138.03_1	Camden	Gloucester City	Commercial	<i>De Minimis</i>	58,893	19	0.0%	52	0.1%
0414_147.01_3	Camden	Gloucester City	Commercial	Full	7,676	835	10.9%	963	12.5%
0414_147_2	Camden	Gloucester City	Commercial	Partial	2,997	1,033	34.5%	1,128	37.6%
0414_160_32	Camden	Gloucester City	Commercial	<i>De Minimis</i>	887	0	0.0%	2	0.2%
0414_161.01_15	Camden	Gloucester City	Residential: Multi-Family	Partial	1,164	452	38.8%	507	43.6%
0414_161.01_16	Camden	Gloucester City	Residential: Multi-Family	Partial	1,121	192	17.1%	222	19.8%
0414_161.01_17	Camden	Gloucester City	Residential: Multi-Family	<i>De Minimis</i>	1,169	9	0.8%	15	1.3%
0414_161.01_23	Camden	Gloucester City	Residential: Multi-Family	Partial	1,319	522	39.6%	607	46.0%
0414_173_13	Camden	Gloucester City	Residential: Multi-Family	Partial	1,850	351	19.0%	442	23.9%
0414_173_8	Camden	Gloucester City	Residential: Multi-Family	Partial	1,537	482	31.4%	584	38.0%
0414_177_15	Camden	Gloucester City	Residential: Multi-Family	Partial	2,699	264	9.8%	364	13.5%
0414_177_8	Camden	Gloucester City	Residential: Multi-Family	Partial	2,232	188	8.4%	293	13.1%
0414_182_13	Camden	Gloucester City	Residential: Multi-Family	Partial	9,498	128	1.3%	238	2.5%
0414_182_5	Camden	Gloucester City	Residential: Multi-Family	Partial	8,476	166	2.0%	297	3.5%
0414_187_17	Camden	Gloucester City	Residential: Multi-Family	Full	1,079	58	5.4%	98	9.1%
0414_187_18	Camden	Gloucester City	Residential: Multi-Family	Partial	1,690	121	7.2%	208	12.3%
0414_187_9	Camden	Gloucester City	Residential: Multi-Family	Full	2,392	170	7.1%	282	11.8%
0414_192_13	Camden	Gloucester City	Residential: Multi-Family	<i>De Minimis</i>	4,775	236	4.9%	334	7.0%
0414_192_9.02	Camden	Gloucester City	Residential: Multi-Family	Full	1,461	336	23.0%	436	29.9%
0414_197_16	Camden	Gloucester City	Manufacturing	<i>De Minimis</i>	10,213	486	4.8%	586	5.7%
0414_197_6	Camden	Gloucester City	Manufacturing	<i>De Minimis</i>	10,687	566	5.3%	666	6.2%
0414_202_1	Camden	Gloucester City	Manufacturing	<i>De Minimis</i>	21,881	766	3.5%	866	4.0%
0414_202_11	Camden	Gloucester City	Manufacturing	<i>De Minimis</i>	21,284	694	3.3%	796	3.7%
0414_206_1	Camden	Gloucester City	Vacant	<i>De Minimis</i>	45,718	1,866	4.1%	2,067	4.5%

Table 3.7-1: Acquisitions (Continued)

Parcel Pin	County	Municipality	Current Land Use	Acquisition Type	Total Parcel Area (sf)	Property Area/Percentage Considered for Analysis Purpose			
						Permanent Impact – Area (sf)	Permanent Impact - Percentage	Temporary Impact – Area (sf)	Temporary Impact - Percentage
0414_211_1	Camden	Gloucester City	Commercial	Partial	830,308	9,945	1.2%	10,882	1.3%
0414_212_1	Camden	Gloucester City	Commercial	Partial	719,562	26,951	3.7%	43,059	6.0%
0414_213.03_1	Camden	Gloucester City	Residential: Single-Family	<i>De Minimis</i>	14,048	2,038	14.5%	4,120	29.3%
0414_213.03_12	Camden	Gloucester City	Residential: Single-Family	<i>De Minimis</i>	8,548	498	5.8%	1,023	12.0%
0414_213.03_13	Camden	Gloucester City	Residential: Single-Family	<i>De Minimis</i>	7,610	529	7.0%	1,091	14.3%
0414_213.03_14	Camden	Gloucester City	Residential: Single-Family	<i>De Minimis</i>	6,316	534	8.5%	1,109	17.6%
0414_213.03_15	Camden	Gloucester City	Residential: Single-Family	<i>De Minimis</i>	9,893	1,781	18.0%	3,540	35.8%
0414_218_11.01	Camden	Gloucester City	Residential: Single-Family	<i>De Minimis</i>	4,315	167	3.9%	565	13.1%
0414_218_12	Camden	Gloucester City	Residential: Single-Family	Partial	6,575	1,294	19.7%	2,692	40.9%
0414_218_16	Camden	Gloucester City	Residential: Single-Family	<i>De Minimis</i>	15,801	1,419	9.0%	3,140	19.9%
0414_219.01_1	Camden	Gloucester City	Residential: Single-Family	<i>De Minimis</i>	26,425	123	0.5%	439	1.7%
0414_219.01_1.01	Camden	Gloucester City	Residential: Single-Family	<i>De Minimis</i>	15,248	2,849	18.7%	5,112	33.5%
0407_112_1	Camden	Brooklawn Borough	Commercial	Partial	2,006	53	2.7%	128	6.4%
0407_114_1	Camden	Brooklawn Borough	Community Services	Partial	54,644	9,122	16.7%	16,139	29.5%
0407_17_1	Camden	Brooklawn Borough	Residential: Multi-Family	<i>De Minimis</i>	8,036	65	0.8%	97	1.2%
0407_18_17	Camden	Brooklawn Borough	Residential: Single-Family	<i>De Minimis</i>	11,793	711	6.0%	1,716	14.6%
0407_18_21	Camden	Brooklawn Borough	Recreation	Full	9,626	3,300	34.3%	6,287	65.3%
0821_18_7	Gloucester	Westville Borough	Residential: Single-Family	<i>De Minimis</i>	10,644	31	0.3%	965	9.1%
0821_18_8	Gloucester	Westville Borough	Residential: Single-Family	<i>De Minimis</i>	10,574	303	2.9%	2,378	22.5%
0821_47_35	Gloucester	Westville Borough	Residential: Single-Family	<i>De Minimis</i>	14,889	18	0.1%	518	3.5%
0821_47_36	Gloucester	Westville Borough	Residential: Single-Family	<i>De Minimis</i>	14,927	4	0.0%	936	6.3%
0821_47_37	Gloucester	Westville Borough	Residential: Single-Family	<i>De Minimis</i>	14,966	83	0.6%	1,084	7.2%
0821_47_38	Gloucester	Westville Borough	Residential: Single-Family	<i>De Minimis</i>	15,004	229	1.5%	1,230	8.2%
0821_47_39	Gloucester	Westville Borough	Residential: Single-Family	<i>De Minimis</i>	15,043	387	2.6%	1,389	9.2%
0821_47_40	Gloucester	Westville Borough	Residential: Single-Family	<i>De Minimis</i>	15,082	545	3.6%	1,546	10.3%
0821_47_41	Gloucester	Westville Borough	Residential: Single-Family	<i>De Minimis</i>	15,120	680	4.5%	1,681	11.1%
0821_47_42	Gloucester	Westville Borough	Parking: Multi-Family	<i>De Minimis</i>	38,092	2,679	7.0%	6,386	16.8%
0821_47_44	Gloucester	Westville Borough	Parking: Multi-Family	Full	7,500	816	10.9%	2,119	28.3%
0821_47_45	Gloucester	Westville Borough	Commercial	Full	30,587	30,165	98.6%	30,587	100.0%
0821_47_46	Gloucester	Westville Borough	Commercial	Full	30,741	30,741	100.0%	30,741	100.0%
0821_47_47	Gloucester	Westville Borough	Commercial	Full	17,486	17,486	100.0%	17,486	100.0%

Table 3.7-1: Acquisitions (Continued)

Parcel Pin	County	Municipality	Current Land Use	Acquisition Type	Total Parcel Area (sf)	Property Area/Percentage Considered for Analysis Purpose			
						Permanent Impact – Area (sf)	Permanent Impact - Percentage	Temporary Impact – Area (sf)	Temporary Impact - Percentage
0821_47_48	Gloucester	Westville Borough	Parking: Commercial	<i>De Minimis</i>	57,114	4,461	7.8%	9,523	16.7%
0821_47_49	Gloucester	Westville Borough	Commercial	Full	58,740	58,162	99.0%	58,740	100.0%
0821_73_10	Gloucester	Westville Borough	Residential: Single-Family	<i>De Minimis</i>	16,811	357	2.1%	977	5.8%
0821_73_11	Gloucester	Westville Borough	Residential: Single-Family	<i>De Minimis</i>	10,823	233	2.2%	614	5.7%
0821_73_11.01	Gloucester	Westville Borough	Residential: Single-Family	<i>De Minimis</i>	5,805	251	4.3%	619	10.7%
0821_73_13	Gloucester	Westville Borough	Commercial	<i>De Minimis</i>	13,482	335	2.5%	463	3.4%
0821_73_14	Gloucester	Westville Borough	Commercial	<i>De Minimis</i>	15,923	404	2.5%	406	2.6%
0821_73_15	Gloucester	Westville Borough	Residential: Single-Family	<i>De Minimis</i>	7,633	190	2.5%	470	6.2%
0821_73_16	Gloucester	Westville Borough	Residential: Single-Family	<i>De Minimis</i>	9,801	255	2.6%	615	6.3%
0821_73_6	Gloucester	Westville Borough	Manufacturing	<i>De Minimis</i>	32,947	435	1.3%	1,503	4.6%
0821_73_7	Gloucester	Westville Borough	Residential: Single-Family	<i>De Minimis</i>	21,876	469	2.1%	1,269	5.8%
0821_73_8	Gloucester	Westville Borough	Residential: Single-Family	<i>De Minimis</i>	6,549	151	2.3%	391	6.0%
0821_73_9	Gloucester	Westville Borough	Residential: Single-Family	<i>De Minimis</i>	13,588	321	2.4%	821	6.0%
0802_602_24	Gloucester	Deptford Township	Residential: Single-Family	<i>De Minimis</i>	21,466		0.0%	29	0.1%
0802_602_25	Gloucester	Deptford Township	Residential: Single-Family	<i>De Minimis</i>	21,532	32	0.1%	106	0.5%
0802_602_26	Gloucester	Deptford Township	Residential: Single-Family	<i>De Minimis</i>	21,597	129	0.6%	184	0.9%
0802_602_27	Gloucester	Deptford Township	Residential: Single-Family	<i>De Minimis</i>	22,406	215	1.0%	250	1.1%
0802_602_28	Gloucester	Deptford Township	Residential: Single-Family	<i>De Minimis</i>	27,383	229	0.8%	243	0.9%
0802_602_3	Gloucester	Deptford Township	Residential: Single-Family	<i>De Minimis</i>	17,381	569	3.3%	569	3.3%
0802_602_9	Gloucester	Deptford Township	Residential: Single-Family	<i>De Minimis</i>	25,046	297	1.2%	299	1.2%
0802_63_1	Gloucester	Deptford Township	Commercial	<i>De Minimis</i>	66,038	460	0.7%	3,195	4.8%
0802_63_2	Gloucester	Deptford Township	Commercial	<i>De Minimis</i>	161,260	112	0.1%	5,640	3.5%
0802_63_3	Gloucester	Deptford Township	Commercial	<i>De Minimis</i>	25,401	250	1.0%	1,344	5.3%
0802_64_1	Gloucester	Deptford Township	Commercial	<i>De Minimis</i>	35,233	553	1.6%	2,049	5.8%
0802_64_3	Gloucester	Deptford Township	Commercial	<i>De Minimis</i>	43,154	1,182	2.7%	1,867	4.3%
0802_64_4	Gloucester	Deptford Township	Commercial	<i>De Minimis</i>	47,925	939	2.0%	2,843	5.9%
0802_64_5	Gloucester	Deptford Township	Commercial	<i>De Minimis</i>	19,361	309	1.6%	1,429	7.4%
0802_65_1	Gloucester	Deptford Township	Commercial	<i>De Minimis</i>	33,422	23	0.1%	1,362	4.1%
0802_65_6	Gloucester	Deptford Township	Commercial	<i>De Minimis</i>	35,033	4,026	11.5%	11,718	33.4%
0802_66_2	Gloucester	Deptford Township	Commercial	<i>De Minimis</i>	11,278	496	4.4%	1,613	14.3%
0802_66_3	Gloucester	Deptford Township	Commercial	<i>De Minimis</i>	7,734	4	0.0%	399	5.2%
0802_66_4	Gloucester	Deptford Township	Commercial	<i>De Minimis</i>	14,899	58	0.4%	861	5.8%

Table 3.7-1: Acquisitions (Continued)

Parcel Pin	County	Municipality	Current Land Use	Acquisition Type	Total Parcel Area (sf)	Property Area/Percentage Considered for Analysis Purpose			
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0802_66_5	Gloucester	Deptford Township	Commercial	<i>De Minimis</i>	14,073	18	0.1%	698	5.0%
0822_109.01_22	Gloucester	Woodbury City	Residential: Single-Family	<i>De Minimis</i>	12,034	489	4.1%	715	5.9%
0822_124_6	Gloucester	Woodbury City	Commercial	<i>De Minimis</i>	8,216	25	0.3%	332	4.0%
0822_136_1	Gloucester	Woodbury City	Commercial	<i>De Minimis</i>	10,783	1,162	10.8%	1,686	15.6%
0822_136_1.01	Gloucester	Woodbury City	Commercial	<i>De Minimis</i>	44,062	5,111	11.6%	9,809	22.3%
0822_136_3	Gloucester	Woodbury City	Commercial	<i>De Minimis</i>	10,230	1,089	10.6%	1,606	15.7%
0822_136_5	Gloucester	Woodbury City	Commercial	Partial	8,440	1,158	13.7%	1,754	20.8%
0822_136_6	Gloucester	Woodbury City	Commercial	<i>De Minimis</i>	11,736	1,005	8.6%	1,521	13.0%
0822_136_7	Gloucester	Woodbury City	Commercial	<i>De Minimis</i>	11,284	1,065	9.4%	1,594	14.1%
0822_140_1	Gloucester	Woodbury City	Commercial	Full	21,197	4,487	21.2%	9,110	43.0%
0822_140_2.03	Gloucester	Woodbury City	Commercial	<i>De Minimis</i>	181,751	2,076	1.1%	7,865	4.3%
0822_140_7	Gloucester	Woodbury City	Commercial	Partial	25,984	1,591	6.1%	4,977	19.2%
0822_142_9	Gloucester	Woodbury City	Community Services	Partial	225,805	372	0.2%	825	0.4%
0822_150.02_2	Gloucester	Woodbury City	Commercial	Full	16,988	2,028	11.9%	4,866	28.6%
0822_150.02_8	Gloucester	Woodbury City	Residential: Single-Family	<i>De Minimis</i>	5,500		0.0%	5	0.1%
0823_39_3	Gloucester	Woodbury Heights Borough	Commercial	Partial	57,367	2,641	4.6%	3,838	6.7%
0823_39_6	Gloucester	Woodbury Heights Borough	Commercial	<i>De Minimis</i>	15,809	707	4.5%	1,130	7.1%
0823_80_1	Gloucester	Woodbury Heights Borough	Residential: Single-Family	Full	761,395	758,827	99.7%	761,387	100.0%
0819_75_3	Gloucester	Wenonah Borough	Wooded	<i>De Minimis</i>	5,750	21	0.4%	923	16.0%
0819_75_7.06	Gloucester	Wenonah Borough	Residential: Single-Family	<i>De Minimis</i>	29,025	177	0.6%	928	3.2%
0810_170_3_QFA RM	Gloucester	Mantua Township	Agriculture	Partial	1,120,380	165,461	14.8%	194,703	17.4%
0810_179_2	Gloucester	Mantua Township	Agriculture	<i>De Minimis</i>	159,145	966	0.6%	5,452	3.4%
0810_234_10	Gloucester	Mantua Township	Residential: Single-Family	<i>De Minimis</i>	11,250		0.0%	607	5.4%
0810_234_11	Gloucester	Mantua Township	Residential: Single-Family	<i>De Minimis</i>	11,250		0.0%	596	5.3%
0810_234_12	Gloucester	Mantua Township	Residential: Single-Family	<i>De Minimis</i>	11,289		0.0%	557	4.9%
0810_234_7	Gloucester	Mantua Township	Residential: Single-Family	<i>De Minimis</i>	11,250		0.0%	597	5.3%
0810_234_8	Gloucester	Mantua Township	Residential: Single-Family	<i>De Minimis</i>	11,250		0.0%	633	5.6%
0810_234_9	Gloucester	Mantua Township	Residential: Single-Family	<i>De Minimis</i>	11,250		0.0%	619	5.5%
0810_250_4.02	Gloucester	Mantua Township	Manufacturing	Full	537,904	261,029	48.5%	277,201	51.5%
0810_251.09_19	Gloucester	Mantua Township	Residential: Single-Family	<i>De Minimis</i>	221,649	5,616	2.5%	9,373	4.2%

Table 3.7-1: Acquisitions (Continued)

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0810_251.09_20	Gloucester	Mantua Township	Wooded	Full	36,376	28,729	79.0%	31,283	86.0%
0810_251.09_4.01	Gloucester	Mantua Township	Wooded	<i>De Minimis</i>	18,663	1,886	10.1%	2,702	14.5%
0810_251.15_4.01	Gloucester	Mantua Township	Commercial	<i>De Minimis</i>	132,082	612	0.5%	2,702	2.0%
0810_253.01_20	Gloucester	Mantua Township	Utility	<i>De Minimis</i>	1,147,630	6,439	0.6%	18,436	1.6%
0810_278.01_4.01	Gloucester	Mantua Township	Commercial	<u>Partial Full</u>	14,560	6,406	44.0%	<u>7,666</u> 14,523	<u>52.8</u> 99.8 %
0815_100_2	Gloucester	Pitman Borough	Commercial	<i>De Minimis</i>	73,684	1,798	2.4%	5,398	7.3%
0815_193_19_QF ARM	Gloucester	Pitman Borough	Residential: Single-Family	<i>De Minimis</i>	1,381,990	6,210	0.4%	12,858	0.9%
0815_75_10	Gloucester	Pitman Borough	Commercial	<i>De Minimis</i>	6,093	408	6.7%	1,545	25.4%
0815_76_2	Gloucester	Pitman Borough	Commercial	<i>De Minimis</i>	7,635	24	0.3%	243	3.2%
0815_76_3	Gloucester	Pitman Borough	Commercial	Full	7,480	6,839	91.4%	7,442	99.5%
0815_82.01_2	Gloucester	Pitman Borough	Commercial	<u>De Minimis Full</u>	13,198	3,112	23.6%	4,177	31.6%
0806_155_1	Gloucester	Glassboro Borough	Manufacturing	Full	290,549	280,691	96.6%	288,525	99.3%
0806_362.02_77	Gloucester	Glassboro Borough	Parking: Multi-Family	<i>De Minimis</i>	218,310	2,098	1.0%	5,373	2.5%
0806_362_6	Gloucester	Glassboro Borough	Commercial	<i>De Minimis</i>	776,243	938	0.1%	2,945	0.4%
0806_362_9.02	Gloucester	Glassboro Borough	Parking: Recreation	<i>De Minimis</i>	437,167	601	0.1%	5,938	1.4%
0806_363_1	Gloucester	Glassboro Borough	Commercial	Partial	29,116	1,991	6.8%	4,512	15.5%
0806_44_10	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	13,549	198	1.5%	724	5.3%
0806_44_11	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	16,607	226	1.4%	868	5.2%
0806_44_12	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	15,120	285	1.9%	929	6.1%
0806_44_13	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	8,748	366	4.2%	699	8.0%
0806_44_14	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	8,293	363	4.4%	696	8.4%
0806_44_15	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	11,331	400	3.5%	780	6.9%
0806_44_15.01	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	8,285	391	4.7%	757	9.1%
0806_44_16	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	9,937	453	4.6%	892	9.0%
0806_44_16.01	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	12,673	488	3.9%	961	7.6%
0806_44_17	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	20,809	1,145	5.5%	2,044	9.8%
0806_44_18	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	11,038	1,336	12.1%	2,029	18.4%
0806_44_22	Gloucester	Glassboro Borough	Residential: Single-Family	Full	8,272	4,246	51.3%	5,282	63.8%
0806_44_22.02	Gloucester	Glassboro Borough	Residential: Single-Family	Full	2,530	964	38.1%	1,373	54.3%

Table 3.7-1: Acquisitions (Continued)

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0806_44_27	Gloucester	Glassboro Borough	Community Services	<i>De Minimis</i>	29,057	116	0.4%	435	1.5%
0806_44_4	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	26,474	67	0.3%	496	1.9%
0806_44_6	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	16,465	320	1.9%	1,003	6.1%
0806_44_7	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	15,691	265	1.7%	861	5.5%
0806_44_8	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	15,651	258	1.6%	869	5.6%
0806_44_9	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	13,394	203	1.5%	715	5.3%
0806_45_1	Gloucester	Glassboro Borough	Community Services	Full	104,161	45,399	43.6%	55,722	53.5%
0806_45_1.01	Gloucester	Glassboro Borough	Community Services	Partial	23,274	2,815	12.1%	3,804	16.3%
0806_45_11.01	Gloucester	Glassboro Borough	Parking: Community Services	<i>De Minimis</i>	13,259	126	0.9%	805	6.1%
0806_45_17	Gloucester	Glassboro Borough	Residential: Single-Family	Full	17,882	2,804	15.7%	5,127	28.7%
0806_45_18	Gloucester	Glassboro Borough	Residential: Single-Family	Full	13,113	5,820	44.4%	9,210	70.2%
0806_45_18.01	Gloucester	Glassboro Borough	Residential: Single-Family	Full	4,773	2,279	47.8%	3,146	65.9%
0806_45_19	Gloucester	Glassboro Borough	Residential: Single-Family	Full	16,735	3,672	21.9%	5,144	30.7%
0806_45_41	Gloucester	Glassboro Borough	Parking: Community Services	<i>De Minimis</i>	15,393	551	3.6%	2,512	16.3%
0806_46_1	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	18,984	41	0.2%	420	2.2%
0806_47_1	Gloucester	Glassboro Borough	Community Services	Partial	13,552	1,613	11.9%	2,261	16.7%
0806_59.01_2.04	Gloucester	Glassboro Borough	Manufacturing	<i>De Minimis</i>	6,487	143	2.2%	2,376	36.6%
0806_59.01_3	Gloucester	Glassboro Borough	Manufacturing	Full	24,771	23,422	94.6%	24,637	99.5%
0806_59.01_4	Gloucester	Glassboro Borough	Manufacturing	Full	112,289	111,954	99.7%	112,289	100.0%
0806_59.01_5	Gloucester	Glassboro Borough	Manufacturing	Full	145,820	144,071	98.8%	145,750	100.0%
0806_59.01_6	Gloucester	Glassboro Borough	Manufacturing	Full	840,467	834,559	99.3%	839,793	99.9%
0806_59.01_7	Gloucester	Glassboro Borough	Manufacturing	Full	40,446	38,752	95.8%	40,446	100.0%
0806_59.01_8	Gloucester	Glassboro Borough	Manufacturing	Full	52,438	51,531	98.3%	52,286	99.7%
0806_59_14	Gloucester	Glassboro Borough	Residential: Single-Family	Full	33,545	32,595	97.2%	33,545	100.0%
0806_59_15	Gloucester	Glassboro Borough	Wooded	Full	82,146	82,146	100.0%	82,146	100.0%
0806_61_1.01	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	5,649	158	2.8%	727	12.9%
0806_61_2	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	10,833	244	2.2%	1,086	10.0%
0806_61_3	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	8,795	135	1.5%	697	7.9%
0806_61_4	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	10,053	113	1.1%	675	6.7%
0806_61_6	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	80,091	239	0.3%	3,380	4.2%

Table 3.7-1: Acquisitions (Continued)

Parcel Pin	County	Municipality	Current Land Use	Acquisition Type	Total Parcel Area (sf)	<u>Property Area/Percentage Considered for Analysis Purpose</u>			
						Permanent Impact – Area (sf)	Permanent Impact - Percentage	Temporary Impact – Area (sf)	Temporary Impact - Percentage
0806_62_5	Gloucester	Glassboro Borough	Vacant	<i>De Minimis</i>	200,344	1,951	1.0%	4,334	2.2%
0806_63_10.01	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	28,833	202	0.7%	489	1.7%
0806_63_10.02	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	37,180	142	0.4%	562	1.5%
0806_63_9	Gloucester	Glassboro Borough	Vacant	Partial	25,158	5,623	22.4%	10,209	40.6%
0806_67_7	Gloucester	Glassboro Borough	Commercial	<i>De Minimis</i>	485,783	4,478	0.9%	6,934	1.4%
0806_68_1	Gloucester	Glassboro Borough	Agriculture	<i>De Minimis</i>	63,780	180	0.3%	4,448	7.0%
0806_68_14.02	Gloucester	Glassboro Borough	Residential: Single-Family	<i>De Minimis</i>	11,748	562	4.8%	1,796	15.3%