

4. Avoidance Measures and Mitigation

4.1. INTRODUCTION

This chapter describes the Avoidance and Mitigation measures that have been incorporated and/or would be implemented as part of the proposed Glassboro-Camden Line (GCL) in order to minimize or eliminate potential adverse impacts to the extent practicable. Table 4-1, "Significant Adverse Impacts," summarizes all of the significant adverse impacts that were identified in Chapter 3, "Environmental Consequences." All potential impacts are anticipated to be fully mitigated, as described in this chapter. Table 4-2, "Potential for Impacts to Be Determined Through Ongoing Agency Consultation," summarizes those technical areas for which agency consultation remains ongoing; it is assumed that any potential significant adverse impacts that could be identified through this ongoing consultation would be fully mitigated in accordance with agency guidance, as described in this chapter.

Table 4-1: Significant Adverse Impacts

Category	Subcategory	ID	Impact	Location/ Responsibility
Man-Made Resources	Transportation	20301	Traffic - Roadway impact at Haddon Avenue at MLK Boulevard	City of Camden
		20302	Traffic - Roadway impact at 6 th Street/ Garage at MLK Boulevard	City of Camden
		20303	Traffic - Roadway impact Broadway at MLK Boulevard	City of Camden
		20304	Traffic - Roadway impact at South Railroad Avenue	City of Gloucester
		20305	Traffic - Roadway impact at Olive Street Grade Crossing	Borough of Westville
		20306	Traffic - Roadway impact at E. Red Bank Avenue at N. Evergreen Avenue	City of Woodbury
		20307	Traffic - Roadway impact at Mullica Hill Road (U.S. 322) Grade Crossing	Borough of Glassboro
		20308	Traffic - Roadway impact at Bowe Boulevard Grade Crossing	Borough of Glassboro
		20309	Traffic - Roadway impact at Wilmer Street at Main Street	Borough of Glassboro
		20310	Traffic - Roadway impact at Academy Street at High Street	Borough of Glassboro
Human Resources	Parklands*	30701	Triangle Park	City of Camden
		30703	Thompson Street & Lane Avenue Park	City of Gloucester
	Aesthetic Features	30801	Impact to Aesthetic Features at Wenonah Station	Borough of Wenonah
		30802	Impact to Aesthetic Feature at Pitman Station	Borough of Pitman
		30803	Impact to Aesthetic Feature at Woodbury Heights VMF	Borough of Woodbury Heights
	Noise and Vibration	31001	Severe noise impacts at 3 monitoring sites (177 dwellings)	Corridor-wide
		31002	Moderate Noise impacts at 11 monitoring sites (577 dwellings)	Corridor-wide
		31003	Moderate Noise impacts at 50 dwellings due to maintenance facility activities	Borough of Woodbury Heights and Borough of Glassboro
	Construction Impacts*	Construction Air Quality	40101	Fugitive dust impact
40102			Mobile source emissions impact	Corridor-wide
Construction Noise and Vibration		40201	Potential noise impact to sensitive receptors	Corridor-wide
		40202	Potential vibration impact to sensitive receptors	Corridor-wide
Note: <i>*Parkland impacts and mitigation are considered by combining construction period effects with effects that are attributable to permanent features; please refer to Section 4.5, "Construction Impacts," for information about avoidance/mitigation measures for construction impacts.</i>				

Source: GCL Project Team, 2020.

Table 4-2: Potential for Impacts to Be Determined Through Ongoing Agency Consultation

Category	Subcategory	ID	Impact	Location/Responsibility
Natural Resources	Geological and Soil Characteristics	10101	Acid-Producing Soils	Corridor-wide
		10102	Farmland Soils	Township of Mantua
	Land Form and Hydrological Features	10202	Coastal Wetland at Newton Creek (WGC-C/WCC-A)	City of Camden/City of Gloucester
		10203	Non-Tidal Drainage Ditch (WCC-B)	City of Camden
		10204	Coastal Wetland at Little Timber Creek (WGC-A/WBL-C)	City of Gloucester/Borough of Brooklawn
		10205	Coastal Wetland at Little Timber Creek (WGC-B)	City of Gloucester
		10206	Coastal Wetland at Big Timber Creek (WWV-A/WBL-A)	Borough of Westville/Borough of Brooklawn
		10207	Freshwater Wetland (Forested) (WWY-A)	City of Woodbury
		10208	Freshwater Wetland (Forested) (WWH-A)	Borough of Woodbury Heights
		10209	Non-Tidal Drainage Ditch (WWH-B)	Borough of Woodbury Heights
		10210	Freshwater Wetland (Forested) (WDP-A)	Township of Deptford
		10211	Freshwater Wetland (Forested) (WMT-G/WWN-A)	Borough of Wenonah/Township of Mantua
		10212	Freshwater Wetland (Forested) (WWN-B)	Borough of Wenonah
		10213	Freshwater Wetland (Forested) (WMT-F)	Township of Mantua
		10214	Freshwater Wetland (Forested) (WMT-A)	Township of Mantua
		10215	Freshwater Wetland (Forested) (WMT-B)	Township of Mantua
		10216	Freshwater Wetland (Forested) (WMT-D)	Township of Mantua
		10217	Freshwater Wetland (Forested) (WPT-B)	Borough of Pitman
		10218	State Open Water (WGO-A)	Borough of Glassboro
		10219	Non-Tidal Drainage Ditch (WGO-B)	Borough of Glassboro
	10220	Flood Hazard Areas	Corridor-wide	
	Biological Resources	10301	Plant Communities - Forest	Corridor-wide
10302		Plant Communities - Agriculture	Corridor-wide	
10303		Plant Communities - Old Field	Corridor-wide	
10304		Unique and Significant Natural Areas	Borough of Wenonah and Township of Mantua	
10305		Threatened and Endangered Species - Federally-Listed Species - Northern Long Eared Bat	Corridor-wide	
10306		Threatened and Endangered Species - Federally-Listed Species - Atlantic Sturgeon and Shortnose Sturgeon	Corridor-wide (Big Timber Creek, Little Timber Creek, and Newtown Creek)	

Table 4-2: Potential for Impacts to Be Determined Through Ongoing Agency Consultation (Continued)

Category	Subcategory	ID	Impact	Location/Responsibility
Natural Resources	Biological Resources	10307	Threatened and Endangered Species - State-Listed Species - American Kestrel	Borough of Glassboro
		10308	Threatened and Endangered Species - State-Listed Species - Bald Eagle	Corridor-wide (Newton Creek, Little Timber Creek, Big Timber Creek, Woodbury Creek, and Mantua Creek)
		10309	Threatened and Endangered Species - State-Listed Species - Barred Owl and Red Shouldered Hawk	Corridor-wide (Mantua Creek and Chestnut Branch)
		10310	Threatened and Endangered Species - State-Listed Species - Shingle Oak	Borough of Wenonah
Man-Made Resources	Hazardous Materials	20201	Potential impacts due to construction to 34 sites that might contain hazardous materials	City of Gloucester, Borough of Pitman, Borough of Westville, West Deptford, Borough of Westville, Woodbury, Borough of Woodbury Heights, Borough of Wenonah, Township of Mantua, and Borough of Glassboro
	Transportation		Proposed new station access point at Wilmer Street and Main Street in the Borough of Glassboro will change a 3-legged intersection to 4-legged, resulting in new turning movements.	Borough of Glassboro
Human Resources	Cultural Resources	30101	Architectural Resources - Noreg Village Historic District (Brooklawn Borough, Camden County; Eligible)	Borough of Brooklawn
		30102	Architectural Resources - Cooper Plaza Historic District (Camden City, Camden County; Eligible)	City of Camden
		30103	Architectural Resources - Cooper Plaza Historic District Extension (Camden City, Camden County; Eligible)	City of Camden
		30104	Architectural Resources - South Camden Historic District (Camden City, Camden County; Listed)	City of Camden
		30105	Government Finance and Tax Sources	City of Camden
		30106	Architectural Resources - Millville & Glassboro Railroad Historic District (Glassboro Borough, Gloucester County to Millville City, Cumberland County; Eligible)	Borough of Glassboro
		30107	Architectural Resources - New Jersey State Teachers College at Glassboro Historic District (Glassboro Borough, Gloucester County; Eligible)	Borough of Glassboro
		30108	Architectural Resources - Wenonah Historic District (Wenonah Borough, Gloucester County; Eligible)	Borough of Wenonah
		30109	Architectural Resources - Newton Historic District (Woodbury City, Gloucester County; Listed)	City of Woodbury
		30110	Architectural Resources - Woodbury Historic District (Woodbury City, Gloucester County; Eligible)	City of Woodbury
		30111	Architectural Resources - Green Era Historic District (Woodbury City, Gloucester County; Listed)	City of Woodbury

Table 4-2: Potential for Impacts to Be Determined Through Ongoing Agency Consultation (Continued)

Category	Subcategory	ID	Impact	Location/Responsibility
Human Resources	Cultural Resources	30112	Architectural Resources - 85 Aberdeen Place, Woodbury	City of Woodbury
		30113	Architectural Resources - 86 Aberdeen Place, Woodbury	City of Woodbury
		30114	Architectural Resources - 77 East Centre Street, Woodbury	City of Woodbury
		30115	Architectural Resources - 78 East Centre Street, Woodbury	City of Woodbury
		30116	Architectural Resources - 7 N Evergreen, Woodbury	City of Woodbury
		30117	Architectural Resources - Brooklawn Traffic Circle (Brooklawn Borough, Camden County; Eligible)	Borough of Brooklawn
		30118	Architectural Resources - South Jersey Gas, Electric & Traction Company Building (Camden City, Camden County; Listed)	City of Camden
		30119	Architectural Resources - Bartholomew Roman Catholic Church (Camden City, Camden County; Eligible)	City of Camden
		30120	Architectural Resources - Glassboro Train Station (Glassboro Borough, Gloucester County; Eligible)	Borough of Glassboro
		30121	Architectural Resources - Jesse Chew House (Mantua Township, Gloucester County; Listed)	Township of Mantua
		30122	Architectural Resources - Wenonah Train Station (Wenonah Borough, Gloucester County; Eligible)	Borough of Wenonah
		30123	Architectural Resources - John G. Whittier School, 740 Chestnut Street, Camden	City of Camden
		30124	Architectural Resources - Owens Illinois Glass Company, 70 Sewell Street, Glassboro	Borough of Glassboro
		30125	Architectural Resources - J.R. Quigley Company Office and Store, 811 Market Street, Gloucester	City of Gloucester
		30126	Architectural Resources - Sewell Train Station, 782 Atlantic Avenue, Sewell (Mantua Township)	Township of Mantua
		30127	Architectural Resources - 856 Main Street, Sewell (Mantua Township)	Township of Mantua
		30128	Architectural Resources - 400 North Woodbury Road, Pitman	Borough of Pitman
		30129	Archaeological Resources - Test Area 1	City of Camden
		30130	Archaeological Resources - Test Area 2	City of Camden
		30131	Archaeological Resources - Test Area 3	City of Camden
		30132	Archaeological Resources - Test Area 4	City of Camden
		30133	Archaeological Resources - Test Area 5	Borough of Westville
		30134	Archaeological Resources - Test Area 6	Borough of Woodbury Heights
		30135	Archaeological Resources - Test Area 7	Borough of Wenonah
		30136	Archaeological Resources - Test Area 8	Township of Mantua
		30137	Archaeological Resources - Test Area 9	Township of Mantua
		30138	Archaeological Resources - Test Area 10	Township of Mantua
		30139	Archaeological Resources - Test Area 11	Borough of Glassboro
		30140	Archaeological Resources - Test Area 12	Borough of Glassboro

Table 4-2: Potential for Impacts to Be Determined Through Ongoing Agency Consultation (Continued)

Category	Subcategory	ID	Impact	Location/Responsibility
Human Resources	Cultural Resources	30141	Archaeological Resources - Test Area 13	Borough of Glassboro
		30142	Archaeological Resources - Test Area 14	Borough of Glassboro
		30143	Archaeological Resources - Test Area 15	City of Woodbury
		30144	Archaeological Resources - Test Area 16	City of Woodbury
		30145	Archaeological Resources - Test Area 17	Township of Mantua
		30146	Archaeological Resources - Test Area 18	City of Camden
		30147	Archaeological Resources - Test Area 19	City of Woodbury
	Aesthetic Features	30804	Impact to Visual Resource (Historic and Cultural Resources) - Glassboro VMF Site	Borough of Glassboro

Source: GCL Project Team, 2020.

4.2. NATURAL RESOURCES (ID 10101 – ID 10310)

4.2.1. Best Management Practices and Avoidance/Mitigation Measures

Please refer to Section 3.2, “Natural Resources,” and Attachment 1, “Natural Resources Technical Report,” for additional information about impacts to natural resources. The following best management practices (BMPs) and avoidance/mitigation measures can be implemented to minimize or eliminate impacts to natural resources:

Minimize Site Disturbance

- Reduce clearing of vegetation within habitat of a Federally or State-listed species and Natural Heritage Priority Site;
- Locate staging and stockpiling areas outside of sensitive habitat areas; and
- Implement appropriate BMPs such as exclusion fencing to exclude construction access beyond designated limit of disturbance (LOD).

Restore Temporary Impact Areas

- Re-vegetate temporary impact areas using native species;
- Develop and implement a reforestation plan; and
- Provide alternative nest structures for affected species such as the American kestrel.

Seasonal Restrictions on Construction Activities

- To avoid impacts to Atlantic and Shortnose Sturgeon and other anadromous fish species, all in-water work should be avoided between March 1 and June 30. In addition, measures to abate

underwater noise caused by in-water pile driving activities, such as the use of cushions and/or bubble curtains, should be considered; and

- To avoid impacts to the barred owl and the red-shouldered hawk and other migratory birds, tree clearing should be avoided from March 15 through August 15.
 - To provide protection for the northern long-eared bat, tree clearing should be avoided from April 1 through August 31.

Soil Erosion and Sediment Control

- Implement appropriate soils erosion and sediment control measures;
- Implement appropriate storm water management measures; and
- Conduct testing to determine the extent of acid-producing soils (APS) within the LOD prior to land clearing or grading activities. Minimize exposure of APSs to the maximum extent practicable during construction. Develop and implement an APS management plan to contain and remediate APS soils exposed during all stages of construction.

4.3. MAN-MADE RESOURCES

4.3.1. Land Use and Zoning

Please refer to Section 3.3.2, “Land Use and Zoning,” and Attachment 3, “Man-Made Resources Technical Report,” for additional information about potential impacts to land use and zoning. As a result of the proposed GCL, zoning changes would be required for specific station areas. None of the changes described would significantly modify the overall land use composition of the proposed GCL corridor. However, as indicated within each station area discussion, stations will be designed with consideration given to maintaining or improving, as appropriate and practical, the relationships between station sites and their respective surrounding land uses.

4.3.2. Hazardous Materials (ID 20201)

Please refer to Section 3.3.3, “Hazardous Materials,” and Attachment 3, “Man-Made Resources Technical Report,” for additional information about hazardous materials impacts. The proposed GCL would be considered a Linear Construction Project (LCP) in accordance with New Jersey Department of Environmental Protection (NJDEP) Linear Construction Technical Guidance (dated January 2012) and would be assigned a Licensed Site Remediation Professional (LSRP) for the project. The LSRP would make sure that the proposed project would be compliant with NJDEP’s Site Remediation Reform Act (SRRRA), N.J.S.A. 58:10C-1 et seq. requirements, including the Technical Requirements for Site Remediation (TRSR) found at N.J.A.C. 7:26E. A Materials Management Plan (MMP) would be prepared to handle contaminated media during construction, site restoration to prevent exposure to remaining contamination and, after construction, the LSRP would submit a final report to NJDEP within 180 days of completion to document that the rules and guidance were followed.

4.3.3. Transportation (ID 20301 – ID 20310)

Please refer to Section 3.3.4, “Transportation,” Attachment 5, “Traffic Analysis Technical Report,” and Attachment 6, “Transit Analysis Technical Report,” for additional information about transportation impacts.

4.3.3.1. Local Station Area Roadway Proposed Mitigation Measures

Direct impacts that would result 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 Level-of-Service (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”).
- Impacts based on increased train volume from the proposed 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 Section 7, “Traffic Analysis Methodology,” of Attachment 5, “Traffic Analysis Technical Report,” (e.g., LOS degrades from B or better to D or worse, LOS degrades from D to E, LOS degrades from E to F, or delay increases significantly while already at LOS F). Results of various traffic analyses under Existing, future No-Action, and future with the GCL conditions were presented in Section 8, Existing Conditions Summary,” Section 9, “Future Year No-Action Condition Summary,” and Section 10, “Future Year with the GCL Summary,” of Attachment 5, “Traffic Analysis Technical Report,” respectively. This section focuses on the comparison of the results of the No-Action condition and the 2040 future with the GCL in order to identify impacts. All roadway impacts are shown in Table 4.3-1, “Roadway Impacts and Proposed Mitigation Measures,” along with proposed mitigation measures. Traffic analyses incorporating these mitigation measures were performed, and a discussion of resulting measures-of-effectiveness (MOEs) are presented in Section 12.10, “Results of Mitigation,” of Attachment 5, “Traffic Analysis Technical Report.”

Table 4.3-1: Roadway Impacts and Proposed Mitigation Measures

	Location	GCL Roadway Impact (2040 No-Action vs. 2040 Build)	Peak Hour Impact	Proposed Mitigation
1	Haddon Avenue at MLK Boulevard, Camden	Southbound left-turn movement drops from LOS D to LOS E.	A.M.	<p>Create two eastbound left-turn lanes. Allow southbound right turn during the eastbound left turn.</p> <p>Adjust GCL preemption dwelling phase: EB/WB thru→WB LT/thru, followed by EB/WB thru</p> <p>Maintain background cycle throughout GCL preemption.</p> <p>Adjust signal timing.</p> <p>Allow westbound right turn after pedestrian phase.</p> <p>Add westbound channelized right turn to allow right during NB/SB phase.</p> <p>Restripe the northbound approach for continuous exclusive right-turn lane.</p> <p>Remove westbound bike lane.</p>
		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.	<p>Adjust cycle length.</p> <p>Adjust the signal timing.</p> <p>Adjust the westbound right-turn GCL preemption existing phase.</p> <p>Provide exclusive westbound right-turn lane.</p> <p>Maintain two westbound through lanes with exclusive left-turn lane.</p> <p>Reconfigure the NB/SB pedestrian crosswalk to have a two-stage pedestrian phase, so westbound right turn is allowed during the northbound right turn and westbound left turn phase.</p> <p>Remove westbound bike lane.</p>
		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.	

Table 4.3-1: Roadway Impacts and Proposed Mitigation Measures (Continued)

	Location	GCL Roadway Impact (2040 No-Action vs. 2040 Build)	Peak Hour Impact	Proposed Mitigation
3	Broadway at MLK Boulevard, Camden	Westbound right-turn movement drops from LOS C to LOS F.	A.M.	Provide two dedicated westbound thru lanes.
		Westbound right-turn movement drops from LOS C to LOS F.	P.M.	Provide a dedicated right-turn lane for bus use only. Channelize westbound right turn lane to allow westbound right turns during the NB/SB phase. Remove east side NB/SB pedestrian crosswalk and pedestrian signal. Remove westbound bike lane.
4	South Railroad Avenue, Gloucester City	Proposed LOD encroaches on roadway.	A.M./ P.M.	Change two-way roadway operation to one-way travel northbound.
5	Olive Street Grade Crossing, Westville	Propagating eastbound queue approaching crossing would extend through intersection at Olive Street/New Jersey 45	A.M./ P.M.	Coordinate intersection traffic signal with grade crossing equipment.
6	E. Red Bank Avenue at N. Evergreen Avenue, Woodbury	Overall LOS drops from D to E.	P.M.	Signal optimization.
7	Mullica Hill Road (U.S. 322) Grade Crossing, Glassboro	LOS E on the westbound approach	P.M.	Widen U.S. 322 to be a three-lane roadway, with two lanes westbound and one lane eastbound.
8	Bowe Boulevard Grade Crossing, Glassboro	Propagating northbound queue approaching crossing would extend through intersection at U.S. 322/Bowe Boulevard	A.M.	Widen Bowe Boulevard to be a three- lane roadway, with two lanes northbound and one lane southbound.

Source: GCL Team Traffic Analysis, 2018

Walter Rand Transportation Center

The signalized intersections adjacent to the Walter Rand Transportation Center (WRTC) would be heavily affected by the increase in light rail transit traffic. The traffic signals presently operate with pre-emption priority for the NJ TRANSIT River Line light rail transit (LRT) service. The addition of 16 peak-hour LRT trips from the proposed GCL would result in extensive queuing and delay along MLK Boulevard without mitigation strategies.

A redesign of the WRTC bus terminal is currently being studied by New Jersey Transit (NJ TRANSIT). A comprehensive redesign concept was proposed in December 2017 in the *Economic Development and Professional Architectural Design Services for the Walter Rand Transportation Center Final Report*¹¹ published by Camden County. This future project, which is not part of the proposed GCL, may impact bus traffic in the area, especially the bus driveway that crosses the River LINE tracks. Candidate potential mitigation strategies for three key intersections along MLK Boulevard are included below.

Haddon Avenue at MLK Boulevard

Presently, westbound traffic in the A.M. peak hour generates significant queuing, which is projected to increase with additional light rail transit movements. More specifically, additional light rail transit activity resulting from anticipated GCL operations would create expanded impacts to westbound drivers seeking to turn right onto Haddon Avenue from MLK Boulevard. The westbound left-turn movement from MLK Boulevard onto Haddon Avenue also operates with poor LOS presently, and the LOS is projected to degrade further with future traffic growth. Proposed mitigation measures could include the following:

- Increasing the effective green time for the westbound leading left-turn phase;
- Abandoning background cycle length and coordination and instead allowing the pre-emption exit phases to vary between the southbound left-turn movement, northbound through movement, and eastbound left-turn movement;
- Allowing the southbound right-turn movement as an overlap during the eastbound left-turn phase;
- Restriping one eastbound through lane to provide a second left-turn lane;
- Reassigning one northbound through lane as a northbound right-turn lane with channelization;
- Restriping all northbound approach lanes from four 13-foot lanes to five 10.5-foot lanes in order to add a northbound right-turn lane with channelization;
- Providing a westbound channelized right-turn lane, allowing this movement to process more vehicles during the northbound through phase; and
- Considering prohibition of the eastbound left-turn movement and detouring traffic via Washington Street, 7th Street, and Haddon Avenue.

6th Street/Garage Access at MLK Boulevard

To accommodate a new bike lane along MLK Boulevard, the dedicated westbound right-turn lane – which had a dedicated signal phase – was converted to a shared through and right-turn lane. The right-turn

¹¹ <https://www.camdencounty.com/wp-content/uploads/2018/01/WRTC-Final-Report-rev.2-12-2-17.pdf>

signal phase still operates in this new configuration. This lane configuration is not typical because a vehicle waiting to turn right when a train is passing has no protection from through traffic.

The proposed GCL is anticipated to cause blockages that are three times longer than the existing condition for westbound drivers turning right (during peak hour), causing the intersection to operate poorly. Proposed mitigation measures at this intersection include the following:

- Reconfiguring the pedestrian crosswalk to cross westbound MLK Boulevard west of the garage entrance, thereby eliminating the conflict between westbound right turns and pedestrians;
- ~~Reconfiguring the pedestrian crosswalk to cross westbound MLK Boulevard west of the garage entrance, thereby eliminating the conflict between westbound right turns and pedestrians;~~
- Providing a dedicated westbound right-turn lane to access the garage. This would require removing a portion of the bike lane along westbound MLK Boulevard;
- Changing signal pre-emption to exit to the westbound left-turn/overlapping northbound right-turn phase;
- Removing or restriping the bike lane as shared roadway space to provide a protected westbound right-turn lane;
- Allowing the westbound right-turn movement to proceed during the northbound right-turn phase (except when pre-empted by light rail movements); and
- Shortening the cycle length from 90 seconds to 60 seconds and allowing excess eastbound and westbound capacity to go to the westbound left-turn and northbound right-turn movements.

Broadway at MLK Boulevard

Currently, the westbound right-turn movement functions poorly due to high volumes of buses and pedestrians, and conflicts with the River LINE. With the proposed GCL, the number of pedestrians and the number light rail trains would increase, resulting in further delays for the westbound right-turn movement. Potential mitigation measures at this intersection include the following:

- Removing a portion of the bike lane to provide an exclusive westbound right-turn lane;
- Striping a channelized westbound right-turn lane and allowing the turn movement to proceed simultaneously with the northbound through movement;
- Designating the westbound right-turn lane as bus-only; and
- Removing the crosswalk on the east side of the intersection and directing pedestrians to cross MLK Boulevard on the west side of the intersection.

Gloucester City

The Gloucester City Station location would be located adjacent to a storage facility between Cumberland Street and Market Street. Due to the track alignment just north of the station, South Railroad Avenue will have to be narrowed between Cumberland Street and Little Somerset Street, requiring it to become a one-way road northbound.

Crown Point Road

Olive Street Grade Crossing

While the Olive Street at-grade crossing is projected to have acceptable LOS, the maximum propagating queue during the A.M. and P.M. peaks eastbound along Olive Street would extend through the signalized New Jersey 45/Olive Street intersection. The signal should be adjusted and coordinated with the at-grade crossing equipment.

Mantua-Pitman

The proposed Mantua-Pitman Station includes a new surface parking lot and new parking structure that will provide 1,225 new parking spaces for GCL riders. This is expected to generate 1,100 drive trips each day by 2040. All adverse impacts to operations at key signalized intersections can be mitigated with signal timing optimization.

Rowan University

Mullica Hill Road (U.S. 322) Grade Crossing

U.S. 322 provides access through Glassboro, and local access to Rowan University. Currently, the roadway operates poorly – particularly the westbound approach in the P.M. peak hour. The proposed GCL would result in blockages, which would reduce roadway capacity and contribute to increased delays. Queues are expected to extend through the signal at South Campus Drive. Potential mitigation includes adding an additional westbound through lane to U.S. 322. This additional lane would begin at a point east of the proposed GCL crossing and continue through the intersection with Bowe Boulevard, after which U.S. 322 would revert to a single westbound lane.

Although the intersection of U.S. 322 and Bowe Boulevard does not meet the threshold for significant impacts, providing a second westbound through lane that extends from the grade crossing through the intersection will coincidentally improve operations. A.M. peak delay under 2040 build conditions would be reduced from approximately 102 seconds to approximately 62 seconds (change in LOS from F to E). P.M. peak delay would be reduced from approximately 87 seconds to approximately 67 seconds (change in LOS from F to E).

Bowe Boulevard Grade Crossing

While the LOS is acceptable at this at-grade crossing, the maximum propagating queue northbound during the A.M. peak would extend through the U.S. 322/Bowe Boulevard intersection. Bowe Boulevard should be widened to provide two northbound through lanes approaching and through the grade crossing, and the right-most lane would drop at the downstream driveway.

Glassboro

The planned expansion at Rowan University is expected to generate high levels of growth through the design year (2040), as reflected in DVRPC's growth factors (see Table 3.3-1, "A.M./P.M. Future-Year Growth Factors (Growth from 2017)"). Potential plans for redevelopment around the proposed Glassboro Station were not considered during this traffic analysis and should be analyzed in a separate effort.

Wilmer Street at Main Street

The proposed Glassboro Station includes a new roadway for vehicular station access that extends from Wilmer and Main Street east to Academy Street. The proposed extension is a two-way road and may potentially warrant a signal at Wilmer and Main Street. Signalization could be warranted if new and diverted traffic volumes prove sufficient. As the project advances to preliminary engineering, plans would continue to be refined and it is expected that any such impacts would be fully mitigatable.

Wilmer Street Extension

The proposed Wilmer Street Extension could act as a shorter route for traffic along Main Street or Wilmer Street destined for residences or businesses along Academy Street. This 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. Signalization may be justified if new and diverted traffic volumes meet certain requirements.

4.3.3.2. Results of Mitigation

Proposed mitigation strategies include a variety of improvements, such as signal timing adjustments and intersection relocations. Mitigation would be required where the LOS between the 2040 No-Action condition and the 2040 future with the GCL meets thresholds for significant impacts, as defined in Section 7, "Traffic Analysis Methodology," of Attachment 5, "Traffic Analysis Technical Report." No intersections outside of Camden meet this threshold except for the intersection of E. Red Bank Avenue and N. Evergreen Avenue in Woodbury, where LOS drops from D to E during the 2040 PM peak. As discussed in Section 12, "Local Station Area Roadway Impacts and Proposed Mitigations," of Attachment 5, "Traffic Analysis Technical Report," the increase in overall intersection delay at this location is seven seconds, and the change in LOS is due to the future No-Action delay being close to the threshold between LOS D and LOS E. As a result, no mitigation beyond signal timing optimization at this intersection is recommended.

All three signalized intersections in Camden, which are included in the VISSIM analysis area, are complex due to existing signal pre-emption for the River LINE. Potential impacts at intersections outside of the VISSIM analysis area were often mitigated with signal optimization; however, this was not possible and ineffective at the three signalized Camden intersections, particularly during proposed peak-hour GCL service. The westbound right-turn movement at the MLK Boulevard intersections with Haddon Avenue and with Broadway would operate with unacceptable LOS. In addition, in order to operate both the existing River LINE and the proposed GCL through the VISSIM analysis area, changes to the signal timing and pre-emption cycles are needed. The mitigation strategies described in Section 12, "Local Station Area Roadway Impacts and Proposed Mitigations," of Attachment 5, "Traffic Analysis Technical Report," generate a LOS of D or better for all approaches, as shown in Table 4.3-2, "2025 GCL Build VISSIM Results at MLK Boulevard Intersections with Mitigation Measures," and Table 4.3-3, "2040 GCL Build VISSIM Results at MLK Boulevard Intersections with Mitigation Measures."

Table 4.3-2: 2025 GCL Build VISSIM Results at MLK Boulevard Intersections with Mitigation Measures

Intersection	Approach	AM Peak Hour			PM Peak Hour		
		Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS
Haddon Avenue	EB	468	29.3	C	979	23.7	C
	SB	403	46.9	D	587	47.6	D
	WB	1,156	21.6	C	402	19.2	B
	NB	505	37	D	676	24.7	C
	Total	2,532	30.1	C	2,644	28.6	C
Cooper Hospital Driveway/ S. 6 th Street	NB	160	37	D	155	39.1	D
	EB	325	7.2	A	850	7.5	A
	WB	995	14	B	441	12.8	B
	Total	1,480	15	B	1,446	12.5	B
Broadway	NB	218	15.9	B	252	17.4	B
	EB	302	12.9	B	789	16.5	B
	SB	253	18.6	B	311	17.2	B
	WB	746	12.4	B	325	16.6	B
	Total	1,519	14	B	1,677	16.8	B

Source: GCL Project Team, Traffic Analysis, 2018

Table 4.3-3: 2040 GCL Build VISSIM Results at MLK Boulevard Intersections with Mitigation Measures

Intersection	Approach	AM Peak Hour			PM Peak Hour		
		Volume	Delay (sec)	LOS	Volume	Delay (sec)	LOS
Haddon Avenue	EB	491	31.2	C	997	21.9	C
	SB	409	48.1	D	595	46.9	D
	WB	1,176	22.5	C	407	18.7	B
	NB	510	30.9	C	684	23.8	C
	Total	2,586	29.9	C	2,683	27.4	C
Cooper Hospital Driveway/ S. 6 th Street	NB	162	31.2	C	157	39.3	D
	EB	350	7.1	A	858	7.3	A
	WB	1,013	14.9	B	444	12.7	B
	Total	1,525	14.8	B	1,459	12.4	B
Broadway	NB	222	16.1	B	256	18.4	B
	EB	306	13.3	B	797	16.6	B
	SB	257	18.5	B	315	17.6	B
	WB	758	11.5	B	326	15.9	B
	Total	1,543	13.7	B	1,694	16.9	B

Source: GCL Project Team Traffic Analysis, 2018

4.3.3.3. Impacts to Transit Services and Mitigation

The only transit service in the region that would be expected to experience a major change in ridership patterns and passenger crowding following the introduction of the proposed GCL would be the Port Authority Transit Corporation (PATCO) Speedline. All other transit services would be expected to see modest changes in transit ridership, but no major impacts to service.

PATCO Speedline

In the 2040 future with the proposed GCL, PATCO is forecast to carry 37,400 daily trips, an increase of approximately 1,000 trips over the No-Action condition. However, as there are approximately 4,100 transfers forecasted between the proposed GCL and PATCO in 2040, a shift of roughly 3,100 trips from PATCO to GCL is expected with the introduction of the proposed GCL. This reflects the shift to GCL of some park-and-ride travelers who drive to PATCO today.

Applying ridership distribution factors based on actual PATCO boardings during 2017, it is estimated that A.M. peak hour ridership on PATCO would be 6,600 in the No-Action condition and 6,800 in the 2040 future with the proposed GCL. Although this represents an absolute increase in ridership of 200 passengers, there would be a total of 600 passengers transferring from the GCL to PATCO in the future with the proposed GCL (estimated at 600 in the A.M. peak hour): 6,200 PATCO-only trips and 600 GCL-PATCO trips in the A.M. peak hour.

Assuming that 85 percent of PATCO-only trips (based on PATCO boardings from 2017) and 100 percent of GCL transfers (making a very conservative assumption) are crossing the Benjamin Franklin Bridge, we can estimate that 5,900 PATCO trips will travel into Philadelphia during the A.M. peak hour.

To comfortably accommodate these riders, the PATCO system would have to provide capacity for approximately 6,300 passengers per hour, using a peak hour factor of 0.93 (based on actual PATCO boardings data from 2017) to account for variations in passenger crowding during the peak hour. At current PATCO service levels (12 trains per hour), there is sufficient capacity for approximately 5,500 seated passengers per hour; thus, roughly 800 riders per hour (16 percent of riders) would be required to stand in the 2040 future with the proposed GCL— a loading factor of 1.15. Applying this analysis to current PATCO ridership, we estimate that on average during the peak hour today, the loading factor would 1.08 with eight percent of riders standing.

Several possible strategies exist for accommodating this increased ridership over the Benjamin Franklin Bridge:

- It could be assumed that current PATCO levels can accommodate the additional ridership with some additional standing and potential crowding on trains. Such an approach would require a more detailed analysis based on current ridership levels and capacity.
- PATCO trains could be lengthened to eight cars; this would bring passenger loading densities below current levels even with the introduction of GCL riders.
- PATCO train frequencies could be increased to accommodate more riders. Moving from 12 to 15 trains per hour over the Benjamin Franklin Bridge would bring passenger loading densities below current levels even with the introduction of GCL riders. The theoretical maximum frequency of the PATCO system is 20 trains per hour; however, the current ability of the system to accommodate more frequent service would need to be studied.

4.4. HUMAN RESOURCES

4.4.1. Cultural Resources (ID 30101 – ID 30147)

Please refer to Section 3.4.2, “Cultural Resources,” and Attachment 7, “Cultural Resources Technical Report,” for additional information about cultural resources impacts. Should the effect analysis result in the project having an adverse effect on one or more historic properties, a Memorandum of Agreement (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.

4.4.2. Safety and Security

Please refer to Section 3.4.7, “Safety and Security,” and Attachment 8, “Safety and Security Technical Report,” for additional information about safety and security impacts. Safety and security plans, programs, and measures will be developed for the proposed GCL as the project moves into preliminary engineering and Final Design phases. Safety and security programs and measures will be incorporated into the proposed GCL and would be comparable to those of NJ TRANSIT and Delaware River Port Authority’s (DRPA) existing programs. These programs and measures are designed to adapt and respond to public concerns and questions regarding safety issues related to specific conditions that may occur throughout the system, including issues identified in public comments.

As it has during the development of the Environmental Impact Statement (EIS), final design and operations planning for the project will continue to allow NJ TRANSIT and DRPA to develop and refine specific safety and security measures in consultation with the public and the corridor jurisdictions. Potential measures to address safety and security concerns along the GCL alignment include increasing the number of education programs at schools and community events, installing bilingual “No Trespassing” signs, and installing ROW fencing at key locations.

Additionally, NJ TRANSIT and DRPA will be required by the Federal Transit Administration (FTA) to prepare a Safety and Security Management Plan. This plan will define the safety and security activities and methods for identifying, evaluating, and resolving potential safety hazards and security vulnerabilities.

The aforementioned design elements will be included in the project design to provide for safe and secure operations of the proposed GCL. NJ TRANSIT and DRPA will also continue their public outreach regarding driver and pedestrian safety within the project corridor to minimize potential for conflicts that could occur.

4.4.2.1. Local Law Enforcement

As it has during the development of the EIS, final design and operations planning for the project will continue to allow NJ TRANSIT and DRPA to develop and refine specific safety and security measures in consultation with the public and the corridor jurisdictions. Potential measures to address safety and security concerns along the GCL alignment include increasing the number of education programs at schools and community events, installing bilingual “No Trespassing” signs and installing ROW fencing at key locations.

Additionally, NJ TRANSIT and DRPA will be required by FTA to prepare a Safety and Security Management Plan. This plan will define the safety and security activities and methods for identifying, evaluating, and resolving potential safety hazards and security vulnerabilities.

4.4.2.2. Station Platforms and Park-and-Ride Facilities

The station platforms are being designed using Crime Prevention Through Environmental Design (CPTED) design principles to increase natural surveillance opportunities. Closed Circuit Television (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.

4.4.2.3. Rail Safety

Most of the proposed alignment would operate within the existing Conrail right-of-way. 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 right-of-way north of Woodbury. Fencing would be placed between the existing freight and proposed light rail tracks at designated locations, specifically, the proposed stations. There will 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 through the remainder of the 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.

4.4.2.4. Vehicular, Bicycle, and Pedestrian Safety

Provisions would be made to minimize conflicts between trains and automobiles, bicyclists, and pedestrians as follows. 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.

4.4.2.5. 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 FTA and 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 DRPA employees are identified with badges that provide access to the NJ TRANSIT and DRPA facilities in which they work.

4.4.2.6. Training and Education Provisions for Safety and Security

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.

4.4.3. **Parklands (ID 30701 & ID 30703)**

Please refer to Section 3.4.8, “Parklands,” and Attachment 9, “Parklands Technical Report,” for additional information about parklands impacts. Coordination has been initiated with municipalities regarding the anticipated long-term effects to parkland resources. As the project advances, agreed-upon measures to minimize harm to parkland resources would be developed in consultation with these municipalities.

4.4.3.1. Parklands Mitigation/Green Acres Coordination

The remainder of this section details the Green Acres compensation requirements that would be triggered by the change in the direct use of a portion of these resources from their current function as public spaces for recreation and/or conservation (except for Wenonah Lake, Park ID 70, Cedar Field, Park ID 75, and Mantua Creek Trail, Trail ID D, which are not subject to Green Acres).

Triangle Park- City of Camden (Park ID 5)

Given that more than ten percent of the parkland parcel would be directly affected by the proposed GCL, the planned change in the use of this parcel would constitute a major disposal or diversion under the Green Acres regulations.

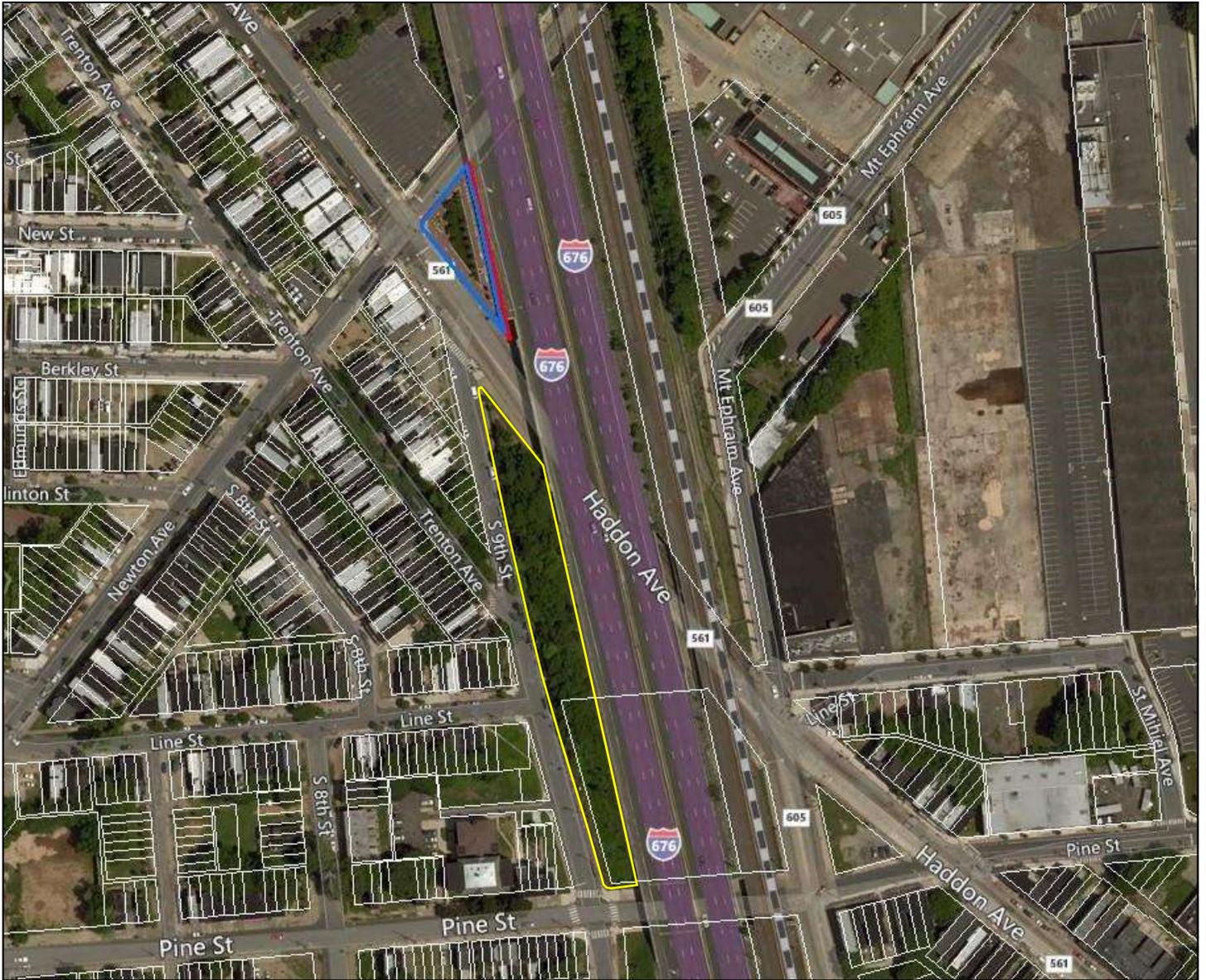
As the project would operate above the resource, negotiating a permanent easement over the property would be the most logical legal mechanism to secure the proposed change in its use. In addition to replacing all trees that would be affected by the project, the project sponsor prior to construction of the proposed GCL would need to coordinate with the park’s owner (City of Camden), which would serve as

the applicant to Green Acres, to propose compensation in the form of replacement land, monetary compensation, or a combination of the two as detailed in the “Surface Easement Over or Through Parkland” row of Table 1, “Green Acres’ Minimum Compensation Requirements for Major Disposals and Diversions of Encumbered Parkland Resources,” in Attachment 9, “Parklands Technical Report.”

As the intended use of the park (i.e., passive recreation) would be fully compromised once the proposed GCL and its associated Cooper Hospital Station are in operation, the project sponsor would need to identify candidate replacement land nearby that could house a permanently relocated Triangle Park. The project sponsor prior to construction of the proposed GCL would also be responsible for providing the park’s owner, the City of Camden, with a level of compensation necessary to facilitate both the acquisition of the new site and either the physical relocation of the elements that constitute Triangle Park to the new site or the development of new features that functionally transform the new site into a public park.

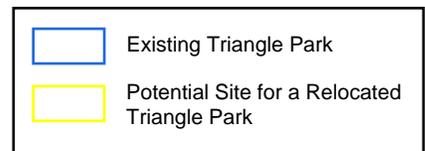
Pending further consultation with the City of Camden and New Jersey Department of Transportation (NJDOT), a replacement park could be developed at a proximate site on the opposite (south) side of Haddon Avenue to serve as mitigation for the anticipated closure of Triangle Park.

Triangle Park, which is depicted in blue and red on Figure 4-1, “Potential Site for A Permanently Relocated Triangle Park,” is currently bounded to the north by Newton Avenue, to the east by I-676, and by Haddon Avenue to the south and west. The new site, which is depicted in yellow on Figure 4-1, “Potential Site for A Permanently Relocated Triangle Park,” would be located directly south of the existing area and bounded by Haddon Avenue to the north, I-676 to the east, Pine Street to the south, and S. 9th Street to the west. The proposed site is located in an un-platted area that, given its proximity to I-676, is presumed to be under the control of the NJDOT. The proposed 0.80-acre site offers the potential for an expanded recreational footprint in an adjacent area with similar aesthetic characteristics, as the existing Triangle Park totals 0.18 acres. The two art panels could potentially be reinstalled either within the new park site or at the proposed Cooper Hospital Station once construction is completed.



Source: US Census Bureau, Camden County Board of Assessors, GCL Project Team, 2020

Figure 4-1: Potential Site for a Permanently Relocated Triangle Park



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

Given that the proposed project would have a public benefit, less than five percent of the parkland parcel would be directly affected by the proposed GCL, no significant adverse impacts to the intended use of the resource are anticipated, and no significant adverse impacts to the natural resources within the parcel or in the surrounding areas would occur under the project, the proposed change in the use of this parcel would constitute a minor disposal or diversion under the Green Acres regulations.

The project sponsor prior to construction of the proposed GCL would need to coordinate with the City of Gloucester, which would serve as the applicant to Green Acres, to secure the proposed change in the resource's use. The project sponsor prior to construction of the proposed GCL would also need to weigh the monetary and transactions costs and benefits associated with using any one of the three legal mechanisms to secure the proposed change in the resource's use.

In terms of Green Acres' compensation requirements, negotiating a permanent easement would result in the applicant (and thereby the project sponsor prior to the construction of the proposed GCL) contributing a minimum of \$2,500 to the Green Acres program. Negotiating a sale of a portion of the parcel would result in the applicant (and thereby the project sponsor prior to construction of the proposed GCL) contributing a minimum of \$5,000 to the Green Acres program as compensation. Based on the Green Acres regulations, neither of these legal mechanisms would trigger the need to replace any trees directly affected by the project.

Negotiating a lease or use agreement for a portion of the parcel would require that the Green Acres Program review the proposed compensation to the City of Gloucester, as the owner and applicant, and approve it as fair and appropriate. In addition, a lease or use agreement would require that the applicant and, by extension, the project sponsor prior to construction of the proposed GCL compensate for impacts to all trees that would be directly affected by the project. Finally, the City of Gloucester, as the applicant, would be required to use all the proceeds from the compensation provided to support operating, maintenance, or capital expenses for the City's funded parkland or overall recreation program.

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

Given that more than ten percent of the parkland parcel would be directly affected by the proposed GCL, the proposed change in the use of this parcel would constitute a major disposal or diversion under the Green Acres regulations.

The project would operate at a similar elevation to this recreational facility. While negotiating a permanent easement through the property may be the most logical legal mechanism to secure the proposed change in its use, other mechanisms (e.g., granting of a lease or use agreement for other than recreation and conservation purposes for a term that exceeds two years or the transfer or sale of a fee simple interest in the property) may also be considered. Regardless of the mechanism chosen, the project sponsor prior to construction of the proposed GCL would be required to replace all trees that would be directly affected by the project. In addition, the project sponsor prior to construction of the proposed GCL would need to coordinate with the City of Gloucester, which would serve as the applicant to Green Acres, to propose compensation in the form of replacement land, monetary compensation, or a combination of the two as outlined in either the "Surface Easement Over or Through Parkland" or "Diversion or Disposals" row of Table 1, "Green Acres' Minimum Compensation Requirements for Major Disposals and Diversions of Encumbered Parkland Resources," in Attachment 9, "Parklands Technical Report," depending on the legal mechanism used.

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

Given that more than ten percent of the parkland parcel would be directly affected by the proposed GCL, the proposed change in the use of this parcel would constitute a major disposal or diversion under the Green Acres regulations.

The project would operate at a similar elevation to this recreational facility. While negotiating a permanent easement through the property may be the most logical legal mechanism to secure the proposed change in its use, other mechanisms (e.g., granting of a lease or use agreement for other than recreation and conservation purposes for a term that exceeds two years or the transfer or sale of a fee simple interest in the property) may also be considered. Regardless of the mechanism chosen, the project sponsor prior to construction of the proposed GCL would be required to replace all fencing that would be directly affected by the project. In addition, the project sponsor prior to construction of the proposed GCL would need to coordinate with the City of Woodbury, which would serve as the applicant to Green Acres, to propose compensation in the form of replacement land, monetary compensation, or a combination of the two as outlined in either the “Surface Easement Over or Through Parkland” or “Diversions or Disposals” row of Table 1, “Green Acres’ Minimum Compensation Requirements for Major Disposals and Diversions of Encumbered Parkland Resources,” of Attachment 9, “Parklands Technical Report,” depending on the legal mechanism used.

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

Given the proposed project would have a public benefit, less than five percent of the parkland parcel would be directly affected by the proposed GCL, no significant adverse impacts to the intended use of the resource are anticipated, and no significant adverse impacts to the natural resources within the parcel or in the surrounding areas would occur under the project, the proposed change in the use of this parcel would constitute a minor disposal or diversion under the Green Acres regulations.

The project sponsor prior to construction of the proposed GCL would need to coordinate with the City of Woodbury, which would serve as the applicant to Green Acres, to secure the proposed change in the resource’s use. The project sponsor prior to construction of the proposed GCL would also need to weigh the monetary and transactions costs and benefits associated with using any one of the three legal mechanisms to secure the proposed change in the resource’s use.

In terms of Green Acres’ compensation requirements, negotiating a permanent easement would result in the applicant (and thereby the project sponsor prior to construction of the proposed GCL) contributing a minimum of \$2,500 to the Green Acres program. Negotiating a sale of a portion of the parcel would result in the applicant (and thereby the project sponsor prior to construction of the proposed GCL) contributing a minimum of \$5,000 to the Green Acres program as compensation. Based on the Green Acres regulations, neither of these legal mechanisms would trigger the need to replace any trees directly affected by the project.

Negotiating a lease or use agreement for a portion of the parcel would require that the Green Acres Program review the proposed compensation to the City of Woodbury, as the owner and applicant, and approve it as fair and appropriate. In addition, a lease or use agreement would require that the applicant and, by extension, the project sponsor prior to construction of the proposed GCL compensate for impacts to all trees that would be directly affected by the project. Finally, the City of Woodbury, as the applicant, would be required to use all the proceeds from the compensation provided to support operating, maintenance, or capital expenses for the City’s funded parkland or overall recreation program.

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

Similar to the discussion above regarding Woodbury Lake Park (City of Woodbury), the proposed change in the use of a portion of Veterans' Park would constitute a minor disposal or diversion under the Green Acres regulations. While portions of the brick-paved walkways, western gate, and grass-covered buffer would be directly affected, no significant adverse impacts to the resource would be anticipated.

The project sponsor prior to construction of the proposed GCL would need to coordinate with the Borough of Woodbury Heights, which would serve as the applicant to Green Acres, to secure the proposed change in the resource's use.

The project sponsor prior to construction of the proposed GCL would also need to weigh the monetary and transactions costs and benefits associated with using any one of the three legal mechanisms to secure the proposed change in the resource's use. Given that the direct impacts to Veterans' Park meet the same regulatory thresholds as those anticipated for Woodbury Lake Park, the same compensation requirements outlined above regarding Woodbury Lake Park (City of Woodbury) would apply.

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

Like the discussion presented above regarding Woodbury Lake Park (City of Woodbury), the proposed change in the use of a portion of Woodbury Heights Elementary School would constitute a minor disposal or diversion under the Green Acres regulations.

The project sponsor prior to construction of the proposed GCL would need to coordinate with the Borough of Woodbury Heights, which would serve as the applicant to Green Acres, to secure the proposed change in the resource's use.

The project sponsor prior to construction of the proposed GCL would also need to weigh the monetary and transactions costs and benefits associated with using any one of the three legal mechanisms to secure the proposed change in the resource's use. Given that the direct impacts to Woodbury Heights Elementary School meet the same regulatory thresholds as those anticipated for Woodbury Lake Park, the same compensation requirements outlined above regarding Woodbury Lake Park (City of Woodbury) would apply.

Wenonah Lake – Borough of Wenonah (Park ID 70)

Construction activities would affect 0.02 acres of the 65.78-acre Wenonah Lake, which is not under the jurisdiction of Green Acres. 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 open space. Therefore, the GCL is not anticipated to result in any significant adverse impacts to Wenonah Lake; potential mitigation and/or remediation measures will be explored with the Borough of Wenonah as part of preliminary engineering efforts.

Cedar Field – Borough of Wenonah (Park ID 75)

Construction activities would affect 0.01 acres of the 3.37-acre Cedar Field, which is not under the jurisdiction of Green Acres. The proposed 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; potential mitigation and/or remediation measures will be explored with the Borough of Wenonah as part of preliminary engineering efforts.

Mantua Creek Trail – Deptford Township/Wenonah Environmental Commission (Trail ID D)

The segment of the Mantua Creek Trail that intersects with the profile of the proposed GCL passes beneath the rail ROW that would be used by the project. Therefore, no direct impacts to this recreational facility are anticipated. In addition, the segment that lies beneath the rail ROW is situated on property that is privately-owned by Conrail and has never been subject to an encumbrance by the Green Acres Program. Therefore, this recreational facility is not encumbered by Green Acres’ restrictions and compensation requirements and no compensation would be required.

Bowe Park – Borough of Glassboro (Park ID 91)

No permanent features of the proposed GCL would affect 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. 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; potential mitigation and/or remediation measures will be explored with the Borough of Glassboro as part of preliminary engineering efforts.

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

Similar to the discussion presented above regarding Woodbury Lake Park (City of Woodbury), the proposed change in the use of a portion of Glassboro High School would constitute a minor disposal or diversion under the Green Acres regulations.

The project sponsor prior to construction of the proposed GCL would need to coordinate with the Borough of Glassboro, which would serve as the applicant to Green Acres, to secure the proposed change in the resource’s use.

The project sponsor prior to construction of the proposed GCL would also need to weigh the monetary and transactions costs and benefits associated with using any one of the three legal mechanisms to secure the proposed change in the resource’s use. Given that the direct impacts to Glassboro High School meet the same regulatory thresholds as those anticipated for Woodbury Lake Park, the same compensation requirements outlined above regarding Woodbury Lake Park (City of Woodbury) would apply.

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

Similar to the discussion presented above regarding Woodbury Lake Park (City of Woodbury), the proposed change in the use of a portion of Glassboro High School would constitute a minor disposal or diversion under the Green Acres regulations.

The project sponsor prior to construction of the proposed GCL would need to coordinate with the Borough of Glassboro, which would serve as the applicant to Green Acres, to secure the proposed change in the resource’s use.

The project sponsor prior to construction of the proposed GCL would also need to weigh the monetary and transactions costs and benefits associated with using any one of the three legal mechanisms to secure the proposed change in the resource's use. Given that the direct impacts to Glassboro High School meet the same regulatory thresholds as those anticipated for Woodbury Lake Park, the same compensation requirements outlined above regarding Woodbury Lake Park (City of Woodbury) would apply.

4.4.4. Aesthetic Features (ID 30801 – ID 30804)

Please refer to Section 3.3.9, "Aesthetic Features," for additional information about parklands impacts. As described previously, the GCL Project Team will work with municipalities to make sure that the anticipated removal of mature trees in the vicinity of Wenonah Station and Pitman Station would be mitigated through careful landscaping of station sites. While it is noted that 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, station site landscape design would employ strategies at creating visual buffers between the station areas and surrounding residential properties.

Further, as part of ongoing design and engineering efforts, the GCL Project Team will work with municipalities to make sure that appropriate mitigation measures are employed to minimize adverse impacts to aesthetic features in the vicinity of the Woodbury Heights Vehicle Maintenance Facility (VMF). While views of this site would be partially obscured by existing trees and fencing, further mitigation and design measures will be coordinated with the Borough of Woodbury Heights so that visual impacts at this location can be mitigated to the extent practicable.

4.4.5. Air Quality

Please refer to Section 3.4.10, "Air Quality," and Attachment 10, "Air Quality Technical Report," for additional information about air quality impacts.

4.4.5.1. Glassboro VMF Site

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.

4.4.6. Noise and Vibration

Please refer to Section 3.4.11, "Noise and Vibration," and Attachment 11, "Noise and Vibration Technical Report," for additional information about noise and vibration impacts.

4.4.6.1. Noise Mitigation

Project-related noise impacts require mitigation to provide an adequate level of relief for residents, employees, and visitors within the proposed GCL corridor. Based on the initial noise impact findings of Moderate and Severe noise impacts, FTA requires that noise reduction measures be identified to either

eliminate or significantly reduce noise generated from a proposed GCL. Mitigation of noise impacts from transit operations involves treatment at the three principal components of the noise generation problem: at the noise source; along the source to receiver propagation path; or at the receptor (noise-sensitive area). For the proposed GCL, mitigation measures at the noise source (i.e., the trains) provide the best system-wide solution for abating noise from daily transit operations; this is because these measures would avoid the ROW area, would be effective throughout the corridor, and would not cause disruption to the daily activities of people working and living adjacent to the proposed GCL alignment. Mitigation measures for the proposed project require all the following recommended actions:

- Specifying that the trains chosen to run on the GCL corridor be designed to support wheel skirts on the outside body of the train. The Stadler GTW transit vehicles currently operating on NJ TRANSIT's River LINE employ wheel skirts. FTA guidelines indicate that wheel skirts can provide noise reduction up to a range of six to 10 decibels. More recent studies¹² suggest that up to three or four decibels of noise reduction is more achievable. The present analysis took a conservative approach and assumed that a four-decibel noise reduction could be achieved using vehicle skirts that contain a sound absorptive material coating on the interior surface.
- Specifying undercar design modifications that provide shielding and acoustical absorption treatment to the train vehicles' undercar components to reduce propulsion noise. The present analysis conservatively assumes that a three-decibel noise reduction could be achieved using undercar shielding and acoustical absorption treatment.
- In areas of sharp turns, specifying onboard automated wheel-rail friction modification systems that would eliminate or significantly reduce wheel-squeal noise to a level where it would no longer cause an annoyance. Wheel-squeal generation is a dominant noise source from service operations in the Glassboro area, particularly on track segments leading to the Glassboro VMF adjacent to receptor sites M13 and M14. Wheel-squeal generation is caused by friction when the trains negotiate sharp turns on tracks with a "tight-radius curve" (for diesel multiple units (DMUs) and diesel light rail vehicles (DLRVs), typically a radius of curvature of less than 1,000 feet).
- Maintaining the present design of the GCL track system to FTA Class 4 standards. Maintenance of the track would be required to maintain the Class 4 standard, and it would apply to both the future GCL service as well as freight movements along the GCL corridor.

A summary of future project noise exposure levels with the mitigation measures described above is provided in Table 3.4-21, "Comparison of Projected Noise Exposure Levels with Mitigation Measures and the FTA Impact Criteria, for the Proposed GCL Service Operations (with Horn Soundings)." The findings indicate that noise exposure in the FTA severe range projected at receptor sites M8, M13, and M14 would be eliminated. However, moderate noise exposure would remain at receptor sites M03, M11, M13, M14, and M15, represented by 252 equivalent single-family residential dwellings. Approximately 69 percent (563 dwellings) of all impacts would be eliminated by the proposed mitigation measures. The 31 percent remaining moderate noise impacts are all caused by noise generated from horn soundings. The recommended abatement measures do not include the implementation of "quiet zones" at public roadway/railroad crossings, which would likely eliminate all the moderate noise impacts reported at these remaining properties. Locations where wheel-rail lubrication is necessary to eliminate wheel-squeal noise generated by tight curved tracks include M1, M13, M14, Y03, and Y04.

¹² Honolulu High-Capacity Transit Corridor Project. Final Environmental Impact Statement, Addendum 01 to the Noise and Vibration Technical Report, prepared by Parsons Brinckerhoff (June 1, 2010)

If local governments file for quiet zone approval at public roadway/rail crossings, further refinement to the noise exposure from daily transit operations would be evaluated in future project phases. The operation of quiet zones at public roadway/rail crossings would likely result in the elimination of all the remaining moderate noise exposure impacts reported in Table 3.4-21, "Comparison of Projected Noise Exposure Levels with Mitigation Measures and the FTA Impact Criteria, for the Proposed GCL Service Operations (with Horn Soundings)."

Analysis of Potential Transit Operations-Related Ground-Borne Vibration

Project-related vibration levels were estimated for each of the 27 representative sites previously described in Chapter 2, "Environment Prior to Implementation of the Project." Vibration level estimates were completed in accordance with the FTA calculation methodologies and procedures using the "General Vibration Assessment" guidelines described in Chapter 10 of the *Transit Noise and Vibration Impact Assessment* (May 2006). The FTA vibration calculation process considers distance to the transit alignment, type of track, train speed, and ground-borne propagation effects (such as coupling to building foundations and amplification due to resonance of floors, walls and ceilings). Estimated vibration levels in the future with the proposed GCL service plan operations are summarized in Table 4.4-1, "Comparison of Projected Transit Vibration Levels and FTA Impact Criteria, for the Proposed GCL Transit Service Operations." Vibration levels throughout the GCL corridor, including those near the proposed vehicle storage and maintenance facilities (receptor sites Y01 through Y04), were found to remain below the FTA 72 vibration decibels (VdB) impact threshold for the FTA Category 2 land use category in a "frequent event" transit corridor (i.e., a corridor having 70 or more transit pass-by events per day).

Maximum vibration levels in the 70 to 71 VdB range were found to occur at receptor sites M03, M06, M10, and M15. Because vibration levels at these four receptor sites are just slightly below the 72 VdB impact criteria, there remains the possibility that trains operating at greater travel speeds (e.g., greater than 42 MPH, which was assumed for this analysis) could potentially result in a vibration impact in these areas.

Table 4.4-1: Comparison of Projected Transit Vibration Levels and FTA Impact Criteria, for the Proposed GCL Transit Service Operations

Site #	Receptor Site Description	FTA Land Use Category	Average Centerline Receptor to Track Distance	Train Travel Speed in Receptor Area	FTA Impact Threshold (VdB)	Estimated Vibration Levels	FTA Vibration Impact (Yes/No)
			Feet	(mph)		(VdB re: 1 μ -inch)	
M01	Cooper Hospital and 501A Haddon Avenue, Camden	2	100	17	72	44	No
M02	911 South 9 th Street, Camden	2	115	34	72	55	No
M03	56 S. Railroad Avenue, Gloucester City	2	65	42	72	71	No
M04	5 ½ Railroad Lane, Westville	2	75	42	72	69	No
M05	800 Gateway Boulevard, Westville	2	140	43	72	62	No
M06	926 Washington Avenue, Woodbury	2	75	43	72	70	No
M07	93 Wallace Street, Woodbury	2	155	38	72	62	No
M08	348 East-West Jersey Avenue, Woodbury Heights	2	85	38	72	67	No
M09	1 Cedar Street, Wenonah	2	140	35	72	62	No
M10	870 East Atlantic Avenue, Sewell	2	70	38	72	70	No
M11	304 Montgomery Avenue, Pitman	2	85	37	72	67	No
M12	827 West Jersey Avenue, Pitman	2	110	37	72	65	No
M13	43 Zane Street, Glassboro	2	90	30	72	65	No
M14	11 Church Street, Glassboro	2	490	30	72	52	No
M15	Girard House #14, Rowan University, Glassboro	2	45	30	72	70	No
M16	Stewart Park, Measurement collected at nearby 168 Laurel Street, Woodbury	2	105	29	72	64	No
M17	816 Essex Street, Gloucester City	2	150	29	72	63	No
Y01	560 Chestnut Street	2	155	10	72	62	No
Y02	601 Park Avenue	2	590	10	72	54	No
Y03	39 Sewell Street	2	1,000	10	72	52	No
Y04	530 Ellis Street	2	1,725	10	72	52	No
PK01	Gloucester City Library, Gloucester City	3	54	41	75	71	No
PK02	Thompson Street and Lane Avenue Park, Gloucester City	3	40	42	75	73	No
PK03	Green Street Playground, Woodbury	3	56	43	75	71	No
PK04	Veterans' Park, Woodbury Heights	3	45	40	75	72	No
PK05	Ballard Park, Pitman	3	107	39	75	65	No
PK06	Bowe Park, Glassboro, Glassboro	3	92	39	75	66	No

Source: GCL Project Team, January 2018

Of the FTA Category 3 sites near the proposed alignment, the Gloucester City Public Library may be the most vibration-sensitive location. Vibration levels at the library are expected to reach 71 VdB; this is sufficiently below the 75 VdB impact criteria and, therefore, is not of concern under the presently planned operating conditions.

4.4.6.2. Vibration Mitigation Measures

Estimated vibration levels from GCL operations were projected to be below the FTA 72 VdB impact threshold at all locations throughout the corridor; therefore, no vibration mitigation measures are necessary for operations. However, vibration levels were projected ~~to be close to approach~~ the 72 VdB impact threshold level at sites M03 (56 South Railroad Avenue, Gloucester City); M06 (926 Washington Avenue, Woodbury); M10 (870 East Atlantic Avenue, Sewell); and M15 (Girard House #14, Rowan University, Glassboro). As the proposed GCL advances, vibration impacts at these sites could warrant additional evaluation and require a “Detailed Vibration Impact Analysis,” consistent with the requirements identified in the FTA Manual, to determine if a vibration impact would occur. If an impact remains likely, then vibration mitigation would be considered. For example, the installation of ballast mats below the track ballast layer could provide anywhere from five VdB to 10 VdB vibration reduction at certain frequencies. This type of mitigation would likely provide that vibration generated from trains traveling at higher travel speeds would not exceed the FTA impact criteria.

4.5. CONSTRUCTION IMPACTS

4.5.1. Transportation

4.5.1.1. Public Transportation

The temporary impacts to local bus, WRTC, or River LINE services anticipated as a result of construction, described in section 3.5.2.1, “Public Transportation,” would require coordination with the service operators to minimize any disruption to service. Nighttime construction would be recommended for construction within the City of Camden that may result in impacts to the light rail service. The temporary construction impacts to bus service in the study area would be expected to 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 transit crossings and to minimize disruptions to the regularly scheduled bus transit services.

4.5.1.2. Roadway Traffic

Construction of the proposed GCL would temporarily interfere with the normal traffic flow, causing some lanes and streets to be closed to vehicles for various durations. Specific closures and impacts that have been identified are discussed in more detail in Section 3.5.1.2, “Roadway Traffic.” To minimize roadway traffic disruptions, weekend and nighttime closures may be preferable to full temporary closure at critical locations. Detours would be established where feasible to provide drivers with alternate routes and minimize the disruption. Additional consideration would be given to the construction schedule to confirm

that adjacent grade crossings are not under construction at the same time. Construction would be staged to maintain access throughout the area.

4.5.1.3. Parking

Some parking spaces or loading zones within the GCL corridor are expected to be temporarily unavailable during construction. It is anticipated that these parking spaces would only be affected for a portion of the construction period, rather than the entire duration of construction. The Operating Agency or Authority would work with stakeholders and local businesses affected by the temporary loss of parking spaces, loading zones, or access to loading zones to identify alternate or temporary facilities and accommodations.

4.5.1.4. Pedestrian and Bicycle Facilities

Construction of the proposed GCL would temporarily disrupt the use of bicycle and pedestrian facilities and activities. Mitigation for these disruptions could include temporary sidewalk detours and alternate bike routes. A Maintenance and Protection of Traffic Plan would be developed prior to construction and would address detours and temporary connections to maintain continuity of bicycle and pedestrian facilities during construction activities. Pedestrian movements and access to adjacent properties would be maintained. In locations where it is not possible to maintain pedestrian circulations, alternate detour routing with appropriate signage would be designated.

4.5.2. **Air Quality (ID 40101 & ID 40102)**

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.

4.5.2.1. Fugitive Dust

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; and

- 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; and
 - 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; and
 - Re-vegetate all vehicular paths created during construction to avoid future off-road vehicular activities.

4.5.2.2. Mobile Source Emissions

Because carbon monoxide (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.

4.5.3. Noise and Vibration (ID 40201 & ID 40202)

4.5.3.1. Noise Sensitive Receptors

As part of the proposed GCL, performance standards would be established for construction equipment to reduce noise associated with the construction activities. The proposed GCL would comply with local noise ordinances, in accordance with its own performance standards, which would include, but not necessarily be limited to, the following:

- Conduct construction activities during the daytime whenever possible;
- Conduct truck loading, unloading, and hauling operations in a manner that minimizes noise;
- Route construction equipment and other vehicles carrying soil, concrete, or other materials over routes that would cause the least disturbance to residents;
- Locate stationary equipment away from residential areas to the extent reasonably feasible within the site/staging area;

- Employ the best available control technologies to limit excessive noise when working near residences;
- Adequately notify the public in advance of construction operations and schedules, such as via construction-alert publications; and
- Set up a Noise Complaint Hotline to handle complaints quickly.

4.5.3.2. Vibration Sensitive Receptors

Performance standards would also be established for construction equipment to reduce vibration associated with the construction activities. Control measures would be implemented to reduce or eliminate, to the extent feasible, the potential for vibration-related impacts to humans and damage to buildings. It is expected that a vibration mitigation plan would be prepared when more details regarding construction operations are known, and it may include the following measures:

- Periods of pile driving should be limited to acceptable hours, as defined in the New Jersey State Code. When practical, schedule pile driving activities during hours that would least affect residents at sensitive receptors. For example, pile driving near a residential area can be scheduled to occur primarily during business hours on weekdays, when most people would be at work;
- Construction staging and supply areas should be selected in a manner to limit, to the greatest extent practicable, the number of impact locations along the proposed alignment, and to minimize intrusion of normal daily activities to adjacent residential communities and businesses;
- To the extent possible, earth-moving equipment should be operated far from vibration-sensitive receptors;
- Where possible, the use of vibratory rollers should be limited near vibration-sensitive receptors;
- Heavy trucks and construction equipment movements should avoid sensitive receptors when possible, and attempts would be made to use roadways with fewer residents and sensitive structures; and
- Where practicable, use smaller-sized bulldozers or backhoes.

4.6. ACQUISITIONS

Property acquisition was avoided to the extent possible in the development and refinement of the proposed GCL. It is anticipated that the project sponsor prior to the construction of the proposed GCL would be responsible for providing payment, compensation, and/or relocation for affected properties as applicable. The project sponsor prior to the construction of the proposed GCL would also consult with the affected property owners in order to develop recommended design refinements to the extent practicable to avoid full acquisitions that would result in displacements and relocations. For displacements that cannot be avoided, the project sponsors would provide relocation assistance in accordance with the legal and regulatory frameworks outlined in Section 3, "Legal and Regulatory Framework," of Attachment 12, "Acquisitions and Displacements Technical Report."