Executive Summary
River Road/Hudson Waterfront Corridor Strategy: A Phase Two Study

June 2013

Prepared for:

Bergen County, New Jersey

North Jersey Transportation Planning Authority

Prepared by:

THE Louis Berger Group, INC.

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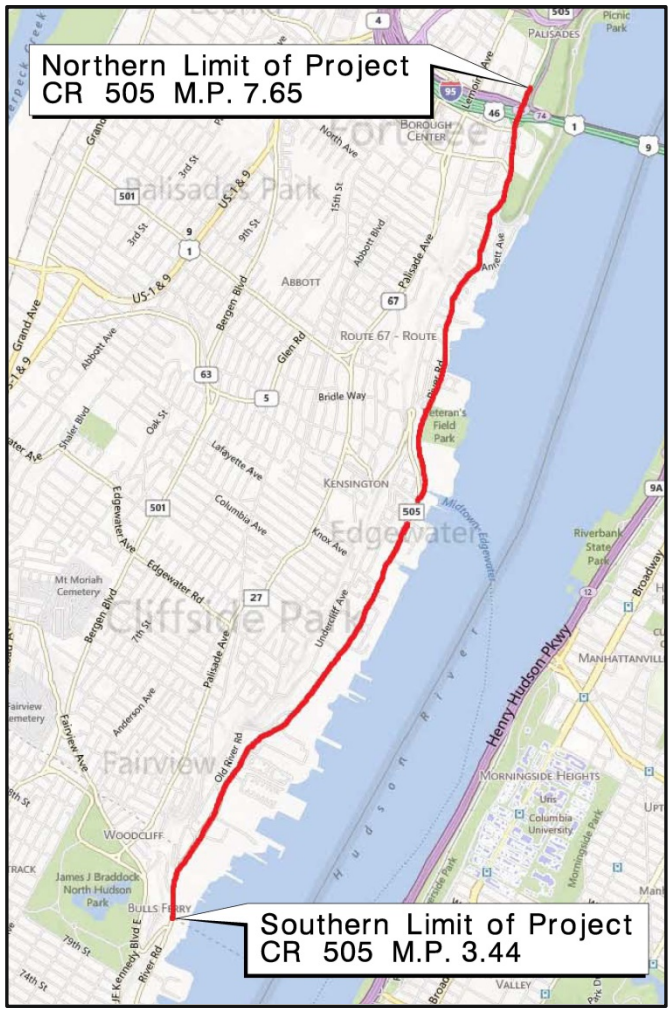
The Hudson River waterfront in Bergen County is among the most densely populated landscapes in the entire state of New Jersey. This unique landscape is a narrow strip sandwiched between the Hudson River to the east and the Palisades to the west. The corridor represents a critical link for Bergen County and other North Jersey residents accessing job centers in New York City, Jersey City, and the region at large. Therefore, this study is to promote regional and multi-jurisdictional strategies to better accommodate pedestrians, bicyclists and transit riders in the River Road corridor. While improvements to River Road have been made incrementally by Bergen County over the years, this study is to provide the opportunity to view the corridor as a whole, addressing issues and recommending improvements necessary to sustain current and future development. This study has examined access and safety with respect to transit services, as well as continuity and connectivity for pedestrians and bicyclists.



Project Area

This Study is Federally-funded through the North Jersey Transportation Planning Authority (NJTPA), the Metropolitan Planning Organization (MPO) for the 13-county northern and central New Jersey region, of which Bergen County is a part. The study project area is located along an approximately 4-mile stretch of County Route 505 (River Road) from Edgewater's boundary with Hudson County in the south (Milepost 3.44) to Sylvan Street in the Borough of Fort Lee (Milepost 7.65). This technical study planned and developed improvements to mobility, accessibility, safety, and quality-of-life along the River Road Corridor in the Boroughs of Edgewater and Fort Lee, Bergen County, New Jersey. This effort built upon the recommendations and established momentum put forth in the previous technical study effort, entitled *The River Road/Hudson Waterfront Circulation Study*, which took a broader-brush approach in looking at overall corridor operations, issues, and opportunities in both Hudson and Bergen Counties. This second phase of the study focused on the River Road corridor within Bergen County and concentrated on developing a series of improvements and complimentary mobility strategies for pedestrians, bicyclists, and transit riders within the corridor.

1.1 Public Outreach and Interagency Coordination

The intent of this early public involvement and coordination was to commit to a continuous and comprehensive Community Involvement process to inform and involve stakeholders in the process and provide the opportunity for frequent and meaningful public feedback, and to coordinate the public activities through the early planning process. A series of project team meetings and conference calls were held to discuss logistics and details in preparation for, and facilitation of, upcoming Technical Advisory Committee, Public Information Center, and NJ TRANSIT meetings to assist in the development of a shared vision for the future of the River Road Corridor, in general.

The project team developed a user-friendly website that is hosted on Bergen County's Department of Planning & Economic Development website (http://www.co.bergen.nj.us/index.aspx?nid=752). The website was designed to have a similar look as the website developed for the first phase of the study and features simple-to-use navigation to share information about the project with the County staff, project stakeholders, and the general public.

During the project development process, a series of Technical Advisory Committee (TAC) meetings were held at critical milestones throughout the project's development.

During the project development process, a series of Technical Advisory Committee (TAC) meetings were held at critical milestones throughout the project's development. The responsibilities of the TAC included: providing feedback to the project team; identifying stakeholders, community groups and partners associated with community outreach to participate in various public outreach activities; develop, guide and participate in community involvement activities; and guide the development and direction of the project.

Technical Advisory Committee (TAC) members included the following:

- Bergen County
  - Department of Planning and Economic Development
  - Engineering Department
- North Jersey Transportation Planning Authority
- Edgewater Borough
  - Public Officials
  - Department of Public Works
  - Engineers
  - Police Department
  - Shade Tree Board
- Fort Lee Borough
  - Public Officials
  - Engineers
  - Police Department
  - Regional Chamber
- NJ TRANSIT
- New York Waterway
- Port Authority of New York and New Jersey
- Meadowlink
- Hudson River Waterfront Conservancy
- Rutgers Voorhees Transportation Center
- East Coast Greenway Alliance
- New Jersey Sierra Club
- New Jersey Bike & Walk Coalition
- Bicycle Touring Group of North Jersey

The members of the TAC provided historic and local knowledge and the vision necessary to comprehensively address the needs of the study areas. The Technical Advisory Committee convened two (2) times during the project in the Meeting Room of the Edgewater Community Center. These meetings occurred prior to the public meetings to ensure local officials were briefed on the project prior to the public having access to the information. Appendix A of the Final Report provides minutes of the Technical Advisory Committee meetings.

As noted above, the Technical Advisory Committee included members from the Borough of Edgewater. The project team made a separate presentation of the study and proposed improvements to the Borough of Edgewater's Mayor and Council on Monday, April 1, 2013. The Borough of Edgewater expressed concerns with some of the recommendations in the proposed plan. Their concerns are articulated in Resolution 2013-11, which was adopted by the Mayor and Council on April 15, 2013 and is included in Appendix A of the Final Report.

The goal of all project-related public outreach was to engage a broad representation of the public in the project process, and provide opportunities to ensure a diversity of ideas and viewpoints are incorporated into discussions of mobility and safety issues. The public outreach communications utilized print and electronic media, including a project website, municipal websites, flyers, press releases, and a project email list in order to build awareness about the project, solicit feedback about community preferences and generate public attendance at public meetings. The purpose of the public information meetings was to seek input, present concept improvements and recommendations and address concerns of the local residents in a public forum. These meetings provided an opportunity for stakeholders and residents to provide input and share comments regarding the existing problems and issues within the corridor and the various conceptual

improvements that were considered during the project. Two (2) Public Information Centers were held in the Meeting Room of the Edgewater Community Center.

In addition to NJ TRANSIT employees participating in the Technical Advisory Committee Meetings, two (2) meetings were held at the NJ TRANSIT offices in Newark, New Jersey. The first meeting was held on Friday, July 13, 2012. The purpose of this meeting was to discuss the NJ TRANSIT issues and needs throughout the study corridor. Minutes of the meeting are included in Appendix A of the Final Report.

As a part of the public outreach efforts for this study, an online survey was developed to solicit public input about the existing issues and concerns throughout the River Road corridor and to gather information about the current use of the corridor. Survey questions included topics regarding general travel, walking, transit, and bicycling. A link to the survey was added to the project website, as well as the websites of Edgewater Borough, Fort Lee Borough, Bergen County, and the NJTPA. Notification of the survey was sent to a project email list, and the newspaper The Record published an article about the project on their website, www.northjersey.com, including a link to the project website and the online survey. Participants were encouraged to include contact information with the purpose of being informed on future public meetings.

1.2 Existing Conditions

Within the study area, River Road is classified as Bergen County Route 505, and its functional class is an Urban Minor Arterial south of State Route 5 and Urban Principal Arterial north of State Route 5. Principal Arterials are, by definition, classified as serving primarily mobility needs, regional travel, and providing a moderate degree of land access, with a minor arterial characterized as carrying more of a mix of local and regional volumes than a principal arterial and providing a higher degree of local access. Within the study area, River Road is primarily a two, four or five lane cross-section with several variations of lane configurations to accommodate various turning movements at intersections and driveways. Shoulder widths vary from zero to fourteen feet. A portion of the study area includes a painted median, and a short section in the vicinity of Gorge Road has a raised median curb. The speed limit within the study area is 35 miles per hour throughout. As reported in the Phase 1 study, the average daily traffic on River Road ranges from approximately 37,000 vehicles north of Old River Road, to 34,000 vehicles south of Bulls Ferry Road, and 25,000 vehicles north of North Street.

As part of the project, the project team completed field survey and mapping efforts. As part of this work, mapping was completed with the use of high level fixed wing mapping at a scale of 1”=20’ completed in AutoCAD across a bandwidth of 300 feet. A digital terrain model was developed allowing cross sections and profiles of the existing alignments to be taken at proposed locations allowing accurate assessments of all alternatives developed. Utilizing GPS, a control monument network tied to the NAD 83 and NAVD 88 coordinate systems was established through the project corridor. These control monuments were used for tying the mapping with all its features into the project coordinate system as well as being used to tie down the existing roadway baseline.

1.3 Environmental Screening

The environmental screening was based upon a review of GIS-based environmental mapping and database information available from the New Jersey Department of Environmental Protection. GIS environmental constraints maps were prepared and relevant constraints and environmentally sensitive areas are outlined in section 4.2. The GIS Environmental Constraints Maps are included in Appendix D of the Final Report. It should be noted that the screening is preliminary in nature. As more detailed plans/layouts are developed in a further phase, more in-depth and detailed environmental investigations will be necessary to more definitively determine the need for environmental permits and whether or not conceptual designs that are advanced meet permitting criteria. Said future investigations may require more detailed, field based investigations in the vicinity of proposed improvements.

1.4 Pedestrian Facilities

The condition of pedestrian facilities varies throughout the study area. While existing sidewalk conditions are generally good, a number of gaps in the network were identified. Primarily in the southern section several worn paths indicating unmet pedestrian demand were observed, while in the northern section it was not uncommon to spot a pedestrian walking along the side of the road. There are significant portions of sidewalk within the corridor that do not meet the guidelines set forth by the Americans with Disabilities Act (ADA) and the Public Right-of-Way Accessibility Guidelines (PROWAG). These cases range from overgrown shrubbery to crumbled sidewalk and missing handicap curb ramps.

River Road is a heavily travelled corridor with many attractions on both the northbound and southbound sides of the roadway; however, crossing River Road on foot is difficult throughout the study area due to missing sidewalks, the width of the road, substandard curb ramps and sidewalks, short crossing signals (which can be seen in section 1.8) and a lack of safe crossings.

There is a total of 13,100 linear feet of sidewalk that is either missing or in poor condition. Sidewalk was deemed substandard if it did not meet ADA and PROWAG design guidelines. These requirements state that a path of travel includes an unobstructed way of pedestrian passage. These pathways are required to have a minimum width of 60 inches to allow for two streams of traffic; however, sidewalk with a width of less than 60 inches is acceptable as long as there is a passing space greater than 60 inches at an interval of no more than 200 feet. The sidewalks are also required to have a minimum of 36 inches to travel around obstructions such as utility poles or fire hydrants. The Project team declared sidewalk to be in poor condition if it was excessively cracked, crumbled or displayed areas of ponding.

Throughout the study area there is a total of 8,000 feet of gaps in the existing sidewalk on both the east (northbound) and west (southbound) sides of River Road as shown on the Existing Conditions Pedestrian Facilities Maps, found in Appendix H of the Final Report. In the southern section of the study area there is the largest running gap in the sidewalk, 2,000 feet, between Thompson Lane and Old River Road (at the Edgewater Commons). Pedestrians were observed traversing through knee-high grass and walking through nearby parking lots in order to safely travel to a point where they could cross River Road. This segment of missing sidewalk has become a worn path utilized by pedestrians to access transit stops and shops along River Road.

1.5 Transit Facilities

Numerous transit routes are available within the River Road study area. Available transit includes bus and ferry, providing access to and from local destinations within New Jersey and regional destinations in Manhattan. Operators within the study area include NJ TRANSIT, New York Waterway (NY Waterway), and private shuttle buses. NJ TRANSIT has six (6) Bus Routes, 156, 158, 159, 188, 751, and 755, that service the corridor as well as its surrounding areas. The corridor has high ridership. NJ TRANSIT provided ridership numbers which can be seen in Section 4.7 of this report and Appendix J of the Final Report. Further, several shuttle routes are available to individual residential and commercial developments. Transit access, including transit routes, ferry terminal locations, bus stops, and shuttle connections are detailed in Appendix I of the Final Report.

One ferry terminal is located within the study area. The Edgewater Ferry Landing terminal, owned and operated by NY Waterway, provides service to the Midtown/West 39th Street terminal in Manhattan. An additional ferry terminal, Port Imperial/Weehawken, is located south of the study area in the Township of Weehawken, Hudson County. This ferry terminal is also owned and operated by NY Waterway and provides service to the Midtown/West 39th Street terminal in Manhattan, as well as two other terminals in Manhattan, the Pier 11/Wall Street terminal and the World Financial Center terminal.

1.6 Bicycle Facilities

There are numerous constraints to bicycling along the River Road corridor that are evident throughout the corridor or unique to specific target areas. There are intersection crossing issues, land development constraints, steep slopes, and bicycle disconnects. Constraints are usually conditions that pose a hurdle to attaining a desired goal – but often they provide opportunities for overall improvement. Some of the major bicycle travel constraints include:

- Lack of consistent shoulder or lane widths reduces predictability
- Lack of designated on-road bicycle facilities forces many to ride on the sidewalk
- Lack of bicycle loop detectors in the pavement inhibit bicycle traffic from following traffic signals
- Numerous right and left turn lanes conflicts

1.7 Conceptual Improvements

The purpose of this study is to improve overall corridor safety and mobility for non-motorized modes of travel, and enhance the livability and economic vitality of the corridor. Corridor-wide improvement concepts were developed to address the safety and mobility issues identified based on information gathered from the first phase of this study, field

investigations conducted by the project team, crash data, and public concerns and suggestions received through the project's community outreach.

The proposed corridor-wide improvement concepts have been organized in to long-term, mid-term, and short-term recommendations. The long-term recommendations were designed to best encompass the vision of the corridor that would accommodate pedestrians, bicyclists, and transit users. The recommendations in the long-term concept are anticipated to take more than 5 years to construct, and the pedestrian, transit, and bicycle improvements may include some roadway widening, right-of-way acquisitions, and drainage and utility impacts, but they do not include any impacts to existing buildings. The recommendations in the mid-term concept have a construction time frame of 3 to 5 years. These improvements could be made as part of future repaving along the corridor, and may require some right-of-way acquisitions. The recommendations in the short-term concept have a construction time frame of less than 3 years. These improvements would provide some "quick fixes" to some of the identified problems within the corridor.

Long-term Concept

The long-term concept for the River Road corridor includes improvements to bicycle, pedestrian, and transit facilities that best encompass the long-term vision of the corridor. These improvements are shown on the Long-Term Improvement Concept Plans, located in Appendix L of the Final Report. Below is a summary of these improvements:

- Reduce the travel lanes to 11-foot lanes, which will be striped with high visibility reflective markings, to accommodate both on-road and off-road bicycle facilities.
- Build an off-road shared use path along the east side (northbound) side of River Road. The 10-foot path should be continuous and separated by a 6-foot vegetative buffer or a 2-foot barrier. Install yield priority signs along the shared use path to reinforce that bicycle traffic must yield to pedestrians.
- On the west side (southbound) of River Road create a connected system of pedestrian facilities throughout the corridor by installing a 5-foot sidewalk where it is missing or is physically deficient.
- Install a 5-foot bike lane along both sides of River Road. The bike lane will be continuous and paired with a designated painted buffer space separating the bicycle lane from the adjacent motor vehicle travel lane. For most of the corridor the buffer is 2-foot wide with limited exceptions. Buffers appeal to a wider cross-section of bicycle users because they provide greater shy distance between motor vehicles and bicyclists. In addition, buffers provide space for bicyclists to pass another bicyclist without encroaching into the adjacent vehicle travel lane.
- Install ADA compliant curb ramps and detectable warning surfaces at locations where they are missing or substandard. This improvement is also part of the mid-term and short-term concepts.
- Install pedestrian hybrid beacons at five (5) locations within the corridor to provide safe crossings for pedestrians, which is also part of the mid-term concept.
- Adjust pedestrian crossing times at signalized intersections in order to provide adequate time for pedestrians to cross the roadway, which is also part of the mid-term and short-term concepts.
- Where necessary, replace pedestrian signal heads with a countdown display pedestrian signal head to help pedestrians assess how much time they have to finish crossing the street, which is also part of the mid-term and short-term concepts
- Consolidate and/or eliminate bus stops to provide shorter bus trips due to less stops; and therefore less dwell time, higher speeds, and decreased travel time.
- Install a series of bus stop alternatives that provide bus bays at bus stops throughout the corridor; and therefore, a protected area for both the transit users and the stopped bus away from the travel lane, providing safe access for the transit users and reduce delay to vehicles traveling on River Road. These alternatives are also part of the mid-term concept.
- Install ADA compliant bus shelters at existing bus stops, which is also part of the mid-term and short-term concepts.

- Install intersection crossing markings to guide bicyclists on a safe and direct path through intersections, including driveways, which is also part of the mid-term concept.
- Install “through bike lanes” where there are bike lanes and right-turn only lanes at intersections to assist bicyclists to correctly position themselves to avoid conflicts with turning vehicles.
- Install colorized advance bicycle boxes at high conflict locations especially where there are frequent bicycle left-turns and/or motorist right-turns. This is also part of the mid-term concept.
- Install shared lane markings along the corridor. Frequent, visible placement of markings is essential. Along River Road they should be placed every 50-100 feet. While generally not a preferred treatment on higher volume streets, shared lane markings help to reinforce the legitimacy of bicycle traffic on the street and recommend proper bicyclist positioning. Because shared lane markings do not designate a particular part of the roadways for the exclusive use of bicycles they are not considered a facility type. Rather, a shared lane marking is a pavement marking that is used to support a complete bikeway network.

Mid-term Concept

The mid-term concept for the River Road corridor includes the following improvements. These improvements listed below are in addition to the improvements noted above in the long-term concept section that are also part of the mid-term concept.

- On both sides of River Road create a connected system of pedestrian facilities throughout the corridor by installing a 5’ sidewalk where it is missing or is physically deficient. This is also included as part of the short-term concept.
- Install 5-foot bike lanes where there is sufficient right-of-way; sharrows should be utilized where there is insufficient space for bike lanes.
- Install "through bicycle lanes" where there are bike lanes and right-turn only lanes at intersections in order to assist bicyclists to correctly position themselves to avoid conflicts with turning vehicles. Where there isn't room for a through bicycle lane, a combined bicycle lane/turn lane should be considered, especially along the southern four-lane portion of the corridor.
- Provide bicycle detection at all signalized intersections.
- Install wayfinding signs to key destinations with the direction, distance, destination and riding time for bicyclists from current location including connections to the Hudson River Waterfront Walkway.
- Enhance gateway treatments such as welcome signs and landscaping at the northern entrance of the corridor near Bruce Reynolds Boulevard, at State Route 5 and the southern border of the county near Churchill Road.

Short-term Concept

The short-term concept for the River Road corridor includes the following improvements. These improvements listed below are in addition to the improvements noted above in the long-term concept and mid-term concept sections that are also part of short-term concept.

- Install shared lane markings along the corridor. Frequent, visible placement of markings is essential. Along River Road they should be placed every 50-100 feet. While generally not a preferred treatment on higher volume streets, shared lane markings help to reinforce the legitimacy of bicycle traffic on the street and recommend proper bicyclist positioning. The shared lane marking is not a facility type, it is a pavement marking.
- Install “MAY USE FULL LANE” signs (R4-11) along the northern 4-lane segment of the corridor where no bicycle lanes or adjacent shoulders usable by bicyclists are present and lane widths are <14'.
- Install bicycle “WRONG WAY” signs and “RIDE WITH TRAFFIC” plaques (R5-1b, R9-3CP) back-to-back with other signs to minimize visibility to other traffic where wrong-way riding by bicyclists is frequently observed.
- Create secure and safe bicycle parking at key bicycling destinations (or starting points) including schools, shopping centers, recreational facilities, public buildings, and parks throughout the corridor.

- Provide and promote bicycle parking, showering and clothes changing facilities at worksites, transportation terminals, and other destinations.
- Conduct a feasibility study to determine a suitable location to install a bicycle repair station for commuters and residents to ride their bikes to the ferry terminal with secure, sheltered parking.
- An unsignalized mid-block crosswalk will be striped at Maple Street and pedestrians will be directed with signage to cross at this location and at Central Avenue, north of Henry Hudson Drive.

1.8 Concept Improvement Components

Following is a description of specific components that are part of the long-term improvements concept, as shown in the Long-Term Improvement Concept Plans, located in the Appendix L of the Final Report. The description below highlights where these improvement concepts can be "scaled back" to facilitate installation and minimize impacts.

1.8.1 Pedestrian Hybrid Beacons

There are several areas where it is difficult for pedestrians to cross River Road due to the absence of a safe crossing, either a traffic signal with crosswalks or a mid-block crosswalk. In order to provide safe crossings for pedestrians throughout the corridor, the project team reviewed the location of existing NJ TRANSIT bus and NY Waterway ferry shuttle stops and ridership data, the distances between existing signalized intersections with safe crossings, the pedestrian crash data from the corridor, and land uses in the area. This information led to the recommendation of installing five (5) pedestrian hybrid beacons within the corridor to provide safe crossings for pedestrians. More specifically, these locations were selected for a combination of reasons including proximity to an existing bus stop, distance from a signalized intersection, high bus and shuttle ridership, and nearby land uses.

The locations of the proposed pedestrian hybrid beacons are listed below and are shown on the Long-Term Improvement Concept Plans. These locations will include the installation of signage and marked crosswalks with the pedestrian hybrid beacon.

- Milepost 5.25 at Garden Place
- Milepost 5.82 at the Admiral's Walk Driveway
- Milepost 6.28 at North Street
- Milepost 6.84 at Maple Street
- Milepost 7.15, 325 feet north of Henry Hudson Drive

The installation of the pedestrian hybrid beacons is part of both of the long-term and mid-term improvements. The hybrid beacons are not included as part of the short-term improvements, but due to the existing wide pavement at Maple Street (Milepost 6.84), it is proposed to have an unsignalized mid-block crosswalk as part of the short-term improvement concept.

1.8.2 Traffic Signal Timing Revisions

Pedestrian crossing times at the 13 signalized intersections within the study area were reviewed. Based on this review, it was found that pedestrian crossing times at only two of the signalized intersections meet the current standards of the 2009 Manual on Uniform Traffic Control (MUTCD) for all pedestrian crossings at the intersection. The following intersections require adjusted pedestrian timings in order to comply with the MUTCD, 2009 Edition and provide adequate time for pedestrians to cross the roadway safely. Unless otherwise noted below, Bergen County maintains jurisdiction of these traffic signals.

- River Road & Old River Road / Unilever Driveway
- River Road & Gorge Road / City Place
- River Road & Thompson Lane
- River Road & Edgewater Commons / Old River Road
- River Road & Archer Street
- River Road & Hilliard Avenue

- River Road & Dempsey Avenue
- River Road & NJ Route 5 (NJDOT jurisdiction)
- River Road & Glenwood Avenue
- River Road & Orchard Street (Borough of Edgewater jurisdiction)
- Hudson Terrace & Bruce Reynolds Boulevard (Port Authority jurisdiction)

These signal timing improvements are part of the short-term improvements and will be carried through to the mid-term and long-term improvements.

1.8.3 Replacement of Pedestrian Signal Heads

Of the 13 traffic signals within the corridor 11 were noted to have pedestrian signal heads that do not have a countdown display. Based on this review, it is recommended that the pedestrian signal heads at the following intersections be replaced with pedestrian signal heads with a countdown display, as recommended by New Jersey Department of Transportation and in compliance with the 2009 MUTCD standards. Unless otherwise noted below, Bergen County maintains jurisdiction of these traffic signals.

- River Road & Old River Road / Unilever Driveway
- River Road & Gorge Road / City Place
- River Road & Thompson Lane
- River Road & Edgewater Commons / Old River Road
- River Road & Archer Street
- River Road & Hilliard Avenue
- River Road & Dempsey Avenue
- River Road & NJ Route 5 (NJDOT jurisdiction)
- River Road & Glenwood Avenue
- River Road & Orchard Street (Borough of Edgewater jurisdiction)

The countdown display helps pedestrians assess how much time they have to finish crossing the street. These improvements are part of the short-term improvements and will be carried through to the mid-term and long-term improvements. These improvements can also be made at the same time as the traffic signal timing revisions.

Additionally, it was noted during the field survey that the intersection of River Road and Central Avenue is currently operating in flashing mode. The pedestrian signal heads at the intersection have a countdown display, but were dark and not operational. It is recommended that the pedestrian signal heads, push buttons, and associated signs should be covered while this traffic signal is operating in flashing mode. It is assumed that the pedestrian signal heads will be operational when the traffic signal is in full operation.

1.8.4 Consolidation and Elimination of Bus Stops

The Project team reviewed the location of the existing bus stops within the corridor and compared the locations with the NJ TRANSIT bus ridership data and the existing condition information gathered during the field inventory. Each bus stop location was reviewed for three criteria: the absence of a safe crossing, low ridership, or proximity to another existing bus stop. According to the Transit Cooperative Research Program (TCRP) Report 19, “Guidelines for the Location and Design of Bus Stops,” the bus stop spacing for urban areas range from 500 to 1200 feet, and the typical spacing is 750 feet. Based on this review, there are some bus stop locations within the corridor that are proposed to be either eliminated or consolidated as part of the mid-term and long-term improvements. The disadvantage to the elimination or relocation of these stops would be that the stops are farther apart requiring longer walking distances, but the advantage would be shorter bus trips due to less stops; and therefore less dwell time and higher speeds. In addition to shorter bus rides, traffic flow throughout the corridor would improve with the elimination or consolidation of stops and consolidated stops would enable the provisions of more amenities and safety features.

1.8.5 Bus Bays

In addition to the long-term corridor-wide concepts that have been developed, a series of bus stop alternatives have been developed with the help of NJ TRANSIT that provide bus bays at bus stops throughout the corridor. The locations of these stops are detailed below in Table 1-1. These locations were selected because of ridership of they were locations that had few physical constraints. As shown in the Bus Stop Alternative Plans included in Appendix M of the Final Report, the specifics of each transit alternative vary, but they each provide a bus bay and waiting area. The layout as shown on the plans has been developed with the New Jersey Department of Transportation (NJDOT) bus turnout design criteria.

Table 1-1
Bus Stop Alternatives

Existing Bus Stop Location	Direction of Travel	Bus Stop Alternative
Old River Road (Edgewater Borough Hall)	NB	A
Thompson Lane	NB	B
Edgewater Commons (Old River Road)	SB	C
Archer Street (1325' S) (Old River Road)	NB	D
North Street	NB	E
	SB	
Orchard Street	SB	F
Burdette Court relocated to Henry Hudson Drive	NB	G

*See Appendix M for Bus Stop Alternative Plans

The transit aspects of the recommendations were worked together with NJ TRANSIT. The bus bays have been recommended because they will provide a protected area for both the transit users and the stopped bus away from the travel lane. This will provide safe access for the transit users and reduce delay to vehicles traveling on River Road. The bus stop alternatives are part of the mid-term and long-term improvement concepts. They were designed to be stand-alone, so they can be constructed independently from one another.

1.8.6 Bus Shelters

As explained in the Existing Conditions section, there are 20 existing bus stops that do not have a bus shelter. According to the TCRP Report 19, "Guidelines for the Location and Design of Bus Stops," it is suggested to install a shelter in an urban location where there are at a minimum 50 to 100 boardings per day. Based on this guideline, the following bus stops meet the criteria for the installation of a shelter:

- Old River Road (Edgewater Borough Hall), Southbound
- City Place (Gorge Road), Northbound
- Thompson Lane (352'S) (Waterford Towers), Southbound
- Thompson Lane (1360'N) (Edgewater Commons South), Northbound
- Russel Avenue, Northbound
- Dempsey Avenue, Southbound
- NJ Route 5 (444'N) (Admiral's Walk Condominiums), Northbound
- Glenwood Avenue (845'S) (Veterans Park), Southbound
- North Street, Southbound

Some of these bus stop locations are recommended to be consolidated or eliminated. These potential improvements should be considered before shelters are installed at these locations.

1.8.7 Bicycle Facilities

In addition to traditional solutions to bicycle travel within the corridor such as bike lanes, shared lane markings, share the road signs, innovative approaches and state-of-the-practice designs were examined. Most of the design treatments are in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), the American Association of State Highway

and Transportation Officials (AASHTO), and New Jersey Department of Transportation's *Bicycle Compatible Roadways and Bikeways and Pedestrian Compatible Planning and Design Guidelines*.

1.8.8 Additional Improvement Concepts

In addition to providing improved bicycle, pedestrian, and transit accommodations along River Road and including intersection treatments it would be desirable to explore opportunities to provide access to River Road from neighborhoods to the west of River Road including those on the "bluff" above River Road. This effort could be initiated by completing a feasibility study of improvements to the roadways intersecting River Road with a special consideration of constructing a "funicular" or inclined plane that could be used to portage bicycles and pedestrians from elevated neighborhoods to lower elevated locations that could accommodate travel by bicycle, including accessing River Road. This recommendation was made in the Phase I Study Report and should be explored as a long term solution for making these important neighborhood connections to the River Road Corridor.

Another option for encouraging bicyclists who access and travel along River Road's steep inclines could be the installation of a bicycle lift or CYCLOCABLE®. This type of lift is a fully automatic, electrically powered facility, installed just below the ground that allows cyclists to be towed up the incline. Such a facility can play an important role in providing mobility options for senior cyclists, or those that find themselves challenged by River Road's steep incline.

1.9 Bicycle Access to/from the George Washington Bridge (GWB) – Conceptual Design Recommendations

Concept level plans were developed for three target area locations near the George Washington Bridge. The locations were chosen based on public and stakeholder input. The concept plans illustrate the existing deficiencies and highlight the proposed conceptual solutions and ideas that would improve bicycle safety and accessibility. The concept plans are located in Appendix N of the Final Report and are described below:

1.9.1 Concept 1: Crossing Hudson Terrace to access GWB Walkways

- **Short-Term Recommendation**

Stripe a high visibility crosswalk and bicycle specific crossing treatments ("crossbike") across Hudson Terrace at the GWB south walkway and a high visibility crosswalk across Hudson Terrace at the existing traffic signal adjacent to the north walkway access. Stripe crosswalks across the maintenance access roads on/off the GWB.

- **Mid-Term Recommendation**

Install a hybrid beacon, also known as a High-intensity Activated CrossWalK (HAWK) signal, at the Hudson Terrace intersection with the GWB south walkway. This will work in conjunction with the existing traffic light at the ramp from the GWB westbound at Hudson Terrace. The signal will provide gaps in the Hudson Terrace motor vehicle traffic when actuated, allowing the pedestrian and bicycle traffic to cross to roadway safely.

1.9.2 Concept 2: Shared Use Path along the Eastern Side of Hudson Terrace between Fort Lee Historic Park and GWB North Walkway

- **Concept 2a: Shared Use Path along Hudson Terrace between Fort Lee Historic Park and GWB South Walkway**

Construct a shared use path along the eastern side of Hudson Terrace between the entrance of Fort Lee Historic Park and the GWB south walkway. This will require earthwork under the Palisades Interstate Parkway entrance ramp to the GWB. Constructing this path will provide a continuous off-road connection between the GWB south walkway and the existing path along Hudson Terrace that extends south to Henry Hudson Drive.

- **Concept 2b: Shared Use Path along Hudson Terrace between GWB South Walkway and GWB North Walkway**

Construct a shared use path along the eastern side of Hudson Terrace between the GWB south walkway and the GWB north walkway by installing a physical barrier and adding additional curb width.

1.9.3 Concept 3: Bike Lanes along Hudson Terrace between GWB and Sylvan Street

Stripe and sign bicycle lanes along both sides of Hudson Terrace between the GWB and Sylvan Street, preserving the on street parking where possible. This will target the high crash intersections of Hudson Terrace at both Merkle Street and Sylvan Street, increasing visibility and expectation of potential conflict.

Note: The conceptual recommendations described above and located in Appendix N of the Final Report are based on limited qualitative assessments. Prior to advancing the Concept Plan recommendations, further data collection, analysis and survey should be completed to fully assess the impacts of the proposed recommendations. Additionally, early coordination and continued communication with agencies having jurisdiction over the roadway or facilities in question should be initiated to confirm the feasibility of the recommended improvements.

1.10 Transit Oriented Development (TOD)

A transit-friendly River Road is more accommodating of pedestrians, bicycles, and bus riders and creates an opportunity for development and land uses that improve mobility and quality of life corridor-wide. Appling the concepts of TOD to the River Road corridor can help by reducing conflicting traffic movements into/out of driveways and may help to reduce congestion of River Road. For the purpose of this investigation, TOD (transit-oriented development) refers to land use and site design practices designed to encourage investment in making more walkable, transit accessible, connected, mixed-use places along the River Road Corridor. Current development patterns along the corridor require people to get into their car for every trip, but by encouraging people to drive less, TOD could result in reducing congestion along River Road through lower travel demand and a reduction in conflicting traffic patterns. The goal is to develop new connections and retrofit existing land uses. A proposed technique would be to build residential housing above commercial retail spaces. This would benefit both commercial and residential land uses.

TOD typically integrates a mix of uses and civic spaces with an efficient and heavily utilized transportation system. The type of uses found in TOD are retail, which is often located on the ground floor and set right up against the street to enhance the pedestrian experience, and residential or office above in mid to high rise buildings. TOD encourages walking and transit use. Accommodation of the car is considered but not a primary factor. Because TOD's are mixed use, parking ratios can be lowered by allowing the different types of uses to share parking. The high density development often makes parking garages feasible.

To understand whether a parcel could be redeveloped requires more than evaluating it to see if it fits the typical TOD characteristics. It requires looking at other information about the existing site. Particular attention needs to be paid to whether an existing parcel is in an economic position to be redeveloped, and whether it is sized and located in such a way that it can achieve the above principles when developed. The first step in finding the locations most suited for TOD is to create a list of criteria by which to evaluate the parcels in the study area. Below are the criteria based upon the TOD elements described above. These were generated specifically for this project and the conditions found along the corridor. Each is ranked on a four-point scale (0-3), and each explicitly states what is required to earn the associated score. The study area is then divided into sub-areas for evaluation. These sub-areas were derived primarily by studying individual parcels. However, where parcel size is very small, such as in single family detached housing, sub-areas where consolidated into a whole of similar type. Totaling the score for each area will reveal which locations are best suited for TOD development.

The result of this evaluation shows that three of the areas with the most potential to be redeveloped as TODs are the proposed development areas of Hudson Lights, The Center at Fort Lee and Edgewater Harbor. Thus, it is no wonder that these parcels already have substantial development proposed. Other parcels within the study area also have potential for redevelopment, including the movie theater near the south end of the study area, Edgewater Commons, Market Place and the Ferry Terminal and surrounding parcels.

Although the ranking criteria were not expanded to look at *existing* sites for their potential to be retrofitted, it should be noted that elements of TOD can be incorporated into these types of sites without being triggered by wholesale redevelopment. For instance, new walkways, trails and streets that connect development sites, parking lots and transit stops increase the opportunity for travel that is not by car and that is accomplished without utilizing River Road. It may also be possible to build within existing developments; locating new buildings, parking structures, pedestrian and bicycle connections and open spaces that incorporate the existing buildings into a holistic TOD approach. Integrating TOD practices into transit operations and land use regulation will enable developers, designers, and property managers to create places that are more walkable/bikeable and transit accessible.

1.11 Implementation Matrix

Utilizing information obtained during the evaluation of existing infrastructure, discussions with the Technical Advisory Committee and feedback from community outreach, an Action Implementation Menu was developed of recommended solutions to consider for the corridor. This menu of "actions" is intended to guide Edgewater, Fort Lee and Bergen County in developing a prioritized implementation strategy for improving the pedestrian, transit, and bicycle conditions along the corridor. The matrix is categorized into 5 categories: Engineering, Education and Enforcement, Regulatory and Maintenance, Evaluation, Maintenance and Regulatory. All of the "actions" are corridor wide except for some of the Engineering recommendations. All actions are further supplemented by three factors: **Responsibility**, **Timeframe**, and **Cost**.

Responsibility identifies the agency charged with the responsibility for leading implementation of the proposed action item.

Timeframe identifies the required amount of time to capture the full benefit of the recommendation, including development and implementation.

- Short-Term (1-3 years)
  - Improvements can be made with minor improvements to the corridor. Would include signing and striping changes. These changes could be made with minimal design effort and would provide "quick-fixes" to identified problems.
- Mid-Term (3-5 years)
  - Improvements can be made as part of future repaving. Would include signing and striping changes. All striping to be high visibility reflective markings
- Long-Term (5+ years)
  - Changes may include roadway widening, easements, right of way acquisitions, drainage and utility impacts, etc.

The **Cost** estimate includes the relative cost of implementing the strategy (low, medium, high). Any cost noted is an estimate and will vary depending on the type of materials, phasing, etc.

- Low (under $2,000)
- Medium ($2,000 - $10,000)
- High (over $10,000)

The matrix also includes recommendations from the three bicycle concepts addressing access to the George Washington Bridge. The action items included in the concepts will have the most impact if done together. However, implementation can be done in phases.

1.12 Summary

The recommendations outline physical and programmatic actions that will help the corridor become more pedestrian and bicycle-friendly including education, enforcement, evaluation, maintenance and regulatory actions the County and Boroughs can implement to improve conditions. Recommendations also include broader regional connectivity of the nearby Hudson River Waterfront Walkway, access to the George Washington Bridge, and Palisades Interstate Park as

well as links to Hudson County, ferry service to New York City and transit to other parts of the area. As presented in this report, existing connections are missing or deficient in a number of locations within the study corridor. This report has provided the groundwork for making such improvements as well as provided an overall time frame of when the improvements can and should be made. With the construction of the noted improvements, the River Road corridor will provide a continuous pedestrian and bicycle connection from the Hudson County boundary line to the George Washington Bridge, providing users a safe and accessible passage for the length of the corridor.