

RISER ROAD EXTENSION FOR ENHANCED THOROUGHFARE & RESILIENCY

FEASIBILITY ANALYSIS

Little Ferry, NJ



March 2015

Clarke Caton Hintz



Architecture

Planning

Landscape Architecture

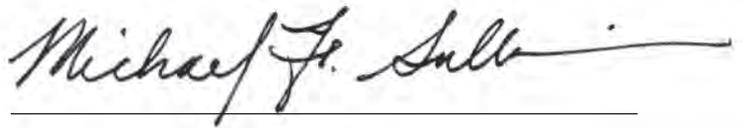
RISER ROAD EXTENSION FEASIBILITY ANALYSIS

Borough of Little Ferry,
Bergen County, New Jersey

Prepared for:
The Borough of Little Ferry

March 2015

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INTRODUCTION

This Report analyzes the feasibility of extending Riser Road south to Redneck Avenue at or near the intersection of Redneck Avenue (County Route S43) and Union Avenue. Riser Road is a local road in the northwest corner of the Borough with a length of approximately 860 feet. The road intersects with US Route 46 and runs southwest along the Little Ferry/Teterboro municipal boundary.

This potential extension would be an alternative route for trucks seeking the industrial complex south of Little Ferry in Moonachie, Carlstadt, South Hackensack, and East Rutherford. The road extension would also improve accessibility of Riser Road businesses and will therefore enhance the viability of this commercial and industrial district. Currently, trucks traveling along US Route 46 who wish to access the industrial complex to the south must use either State Route 17, located just outside the Borough to the west, or Liberty Street, located in the center of Little Ferry. Use of Liberty Street is particularly problematic since truck traffic must traverse through the Borough's downtown and residential neighborhoods. Both scenarios put additional truck traffic on Route 46, an already busy highway commercial corridor, and those trucks using Liberty Street negatively impact quality of life in Little Ferry through their traffic, noise and pollution. Additionally, an extended Riser Road could serve as an alternative evacuation route.



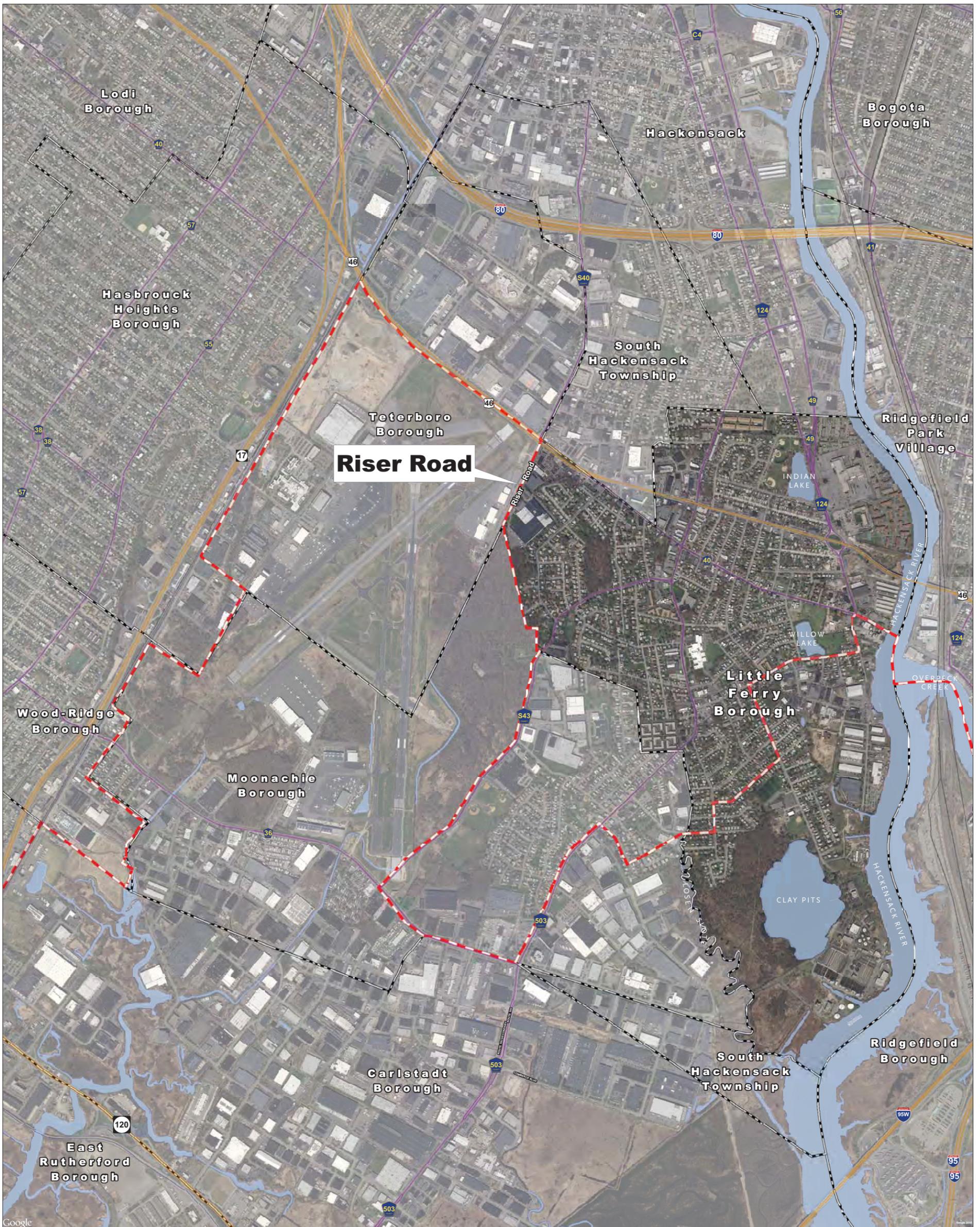
Riser Road intersection with Route 46



Riser Road, facing south



Riser Road, facing north



Parcel Source: NJGIN Tax Parcels for Bergen County 2014
 Aerial Source: 2012 High Resolution Orthophotography, NAD83 NJ State Plane Feet, MrSID Tiles
 Published by NJ Office of Information Technology (NJGIT), Office of Geographic Information Systems (OGIS) 3/2013

RISER ROAD EXTENSION FEASIBILITY STUDY

Regional Context

Little Ferry Borough, Bergen County, NJ February 2015

Legend

- | | |
|-------------------|----------------------|
| Route Type | Meadowlands Boundary |
| Major Roads | Municipal Boundaries |
| County Roads | Water |
| Minor Roads | |
| railway | |

0 300 600 1,200 1,800 2,400 Feet



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RISER ROAD FEASIBILITY STUDY

Aerial Photo

Little Ferry Borough, Bergen County, NJ February 2015

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AREA CIRCULATION

Riser Road, a public right of way, extends southwest from US Route 46 along the Little Ferry / Teterboro municipal boundary for approximately 860 feet. The road terminates at the driveway of Block 70, Lots 12 and 13, a 12.47 acre industrial property owned by LPF Meadowlands LLC. The Riser Road cartway is 24 feet and the right-of-way ranges from 30 to 35 feet. Commercial and industrial businesses are located on the east side of the road and the East Riser Ditch is located along the western side of the road. Fred Wehran Drive is located on the other side of the East Riser Ditch and runs parallel to Riser Road.

US Route 46 is the primary east-west road in Little Ferry and is located in the northern portion of the Borough. The busy highway commercial corridor provides access to Interstate 80 via Route 17 west of Little Ferry and direct access to the New Jersey Turnpike and the George Washington Bridge east of Little Ferry. Route 46 west features two median-separated left turn lanes for accessing Fred Wehran Drive or Riser Road. Two small bridges cross the East Riser Ditch and connect Riser Road with Fred Wehran Drive. One bridge has a 5 ton weight limit and prohibits trucks. The other bridge is one-way from Riser Road to Fred Wehran Drive and, given its narrow width, may have a weight limit and may prohibit trucks.¹ Just past the southernmost bridge on Fred Wehran Drive is a security stop with no gates blocking access. All of the access points into the airport, excluding the Aviation Hall of Fame & Museum of New Jersey located at the end of the street, are gated at their entrance from Fred Wehran Drive.

Liberty Street (County Route 503) and Redneck Avenue (County Route S43) are the Borough's primary north-south routes. While they intersect at approximately the center of the Borough, they individually provide access to the industrial complex to the south, as well as the Meadowlands Sports Complex further south. Liberty Street and Redneck Avenue both have 10 ton weight limits.²

The region's primary north-south routes are Route 17, located just under one mile west of Riser Road, and the New Jersey Turnpike, located just under two miles east of Riser Road. In addition to



Riser Road, facing south



Fred Wehran Drive, facing south



Route 46, facing west

¹ Google Street View October 2013 Images

² Google Street View October 2013 Images

providing access to points north and south in the region, Route 17 provides access to the industrial complex to the south in Moonachie, Carlstadt, South Hackensack, and East Rutherford.

Fred Wehran Drive, which has a signalized intersection with Route 46, has a cartway ranging from 24 feet to 27 feet.³ Franklin Street runs from Main Street (County Route 40 II) to Redneck Avenue. This residential street has a 29 foot cartway⁴ and approximately 50 foot right-of-way.⁵ All through traffic is prohibited on Franklin Street in order to prevent it from being used as a shortcut between Route 46 and Redneck Avenue.⁶ Two cul-de-sacs extending from Franklin Street, Kleber Place and Sieler Court, also provide access to additional residences in the study area.

The county routes in and around the study area have various widths and speed limits. Redneck Avenue has a 24 foot cartway through-out, a 30 mph speed limit in the residential area between Liberty Street and Union Avenue, and a 40 mph speed limit south of Union Avenue. Its right-of-way ranges from approximately 37 feet to approximately 52 feet. Main Street has a 30-33 foot cartway, 30 mph speed limit, and approximately 60 foot right-of-way. Liberty Street has a 30-35 foot cartway, 30 mph speed limit, and approximately 45 to approximately 55 foot right-of-way.^{7,8}

The only New Jersey Department of Transportation (NJDOT) traffic count within the study area is on Redneck Avenue just south of Oxford Drive. The August 2012 weekday count calculated an annual average daily traffic volume of 7,371.⁹

This year, NJDOT is reconfiguring Route 46 to permit easier truck turns onto Liberty Street by increasing the distance between curbs at the intersection and increasing the length of the turn lane from westbound Route 46 onto Liberty Street. This will likely increase traffic along Liberty Street and Redneck Avenue, including truck traffic.

³ Estimate measured using aerial images and spatial mapping

⁴ 2010 NJDOT Straight Line Diagrams

⁵ Estimate measured using aerial images and spatial mapping

⁶ Google Street View October 2013 Image

⁷ All County road cartways from 2010 NJDOT Straight Line Diagrams.

⁸ ROWs are estimates measured using aerial images and spatial mapping

⁹ NJDOT Daily Volume Report from 08/13/2012 through 08/17/2012, site 1202123

LAND USE POLICY & ZONING

The study area comprises a mix of industrial, commercial, open space and residential land uses. Properties along Riser Road are used for industrial manufacturing and distribution, with the exception of a car dealership at the corner of Riser Road and Route 46. The area along Franklin Street, west of Liberty Street and north of Union Avenue is almost entirely comprised of single-family residences. Redneck Avenue south of Union Avenue consists of industrial uses. West of the Franklin Street neighborhood and Redneck Avenue are wooded wetlands and Teterboro Airport. Liberty Street and Main Street feature mixes of commercial and residential properties, while Route 46 is entirely highway-oriented commercial.

The residences along and in proximity to Franklin Street are zoned R-A (One Family Residential). The commercial and industrial area at the southeast intersection quadrant of Riser Road and Route 46 is zoned B-H (Highway and Regional Business). The remaining lots on the east side of Riser Road are zoned I-L (Light Industrial). A small I-L district is also located along Redneck Avenue just north of its intersection with Union Avenue.¹⁰

The East Riser Ditch, which has a width of approximately 30-35 feet,¹¹ separates Fred Wehran Drive and continues along a small access road within the airport.

The 2013 Reexamination Report recommended an extension of Riser Road from Route 46 to Redneck Avenue. As stated in the following excerpt, the purpose of the extension is to reduce congestion. Specifically,

The 1995 and 2003 Reexamination Reports recommended construction of a by-pass road for industrial traffic by extending Riser Road from its intersection with Route 46 to Redneck Avenue along the municipal boundary. This road would redistribute traffic loads, in particular truck traffic, from Route 46 and thus lessen congestion. The Riser Road connector has not been constructed to date. However, the recommendation for the Riser Road extension remains relevant as a goal to al-



Industrial use along Riser Road



Industrial use along Redneck Avenue



East Riser Ditch



Liberty Street

¹⁰ Little Ferry 2014 Zoning Map

¹¹ Estimate measured using aerial images and spatial mapping

*leviate vehicular congestion.*¹²

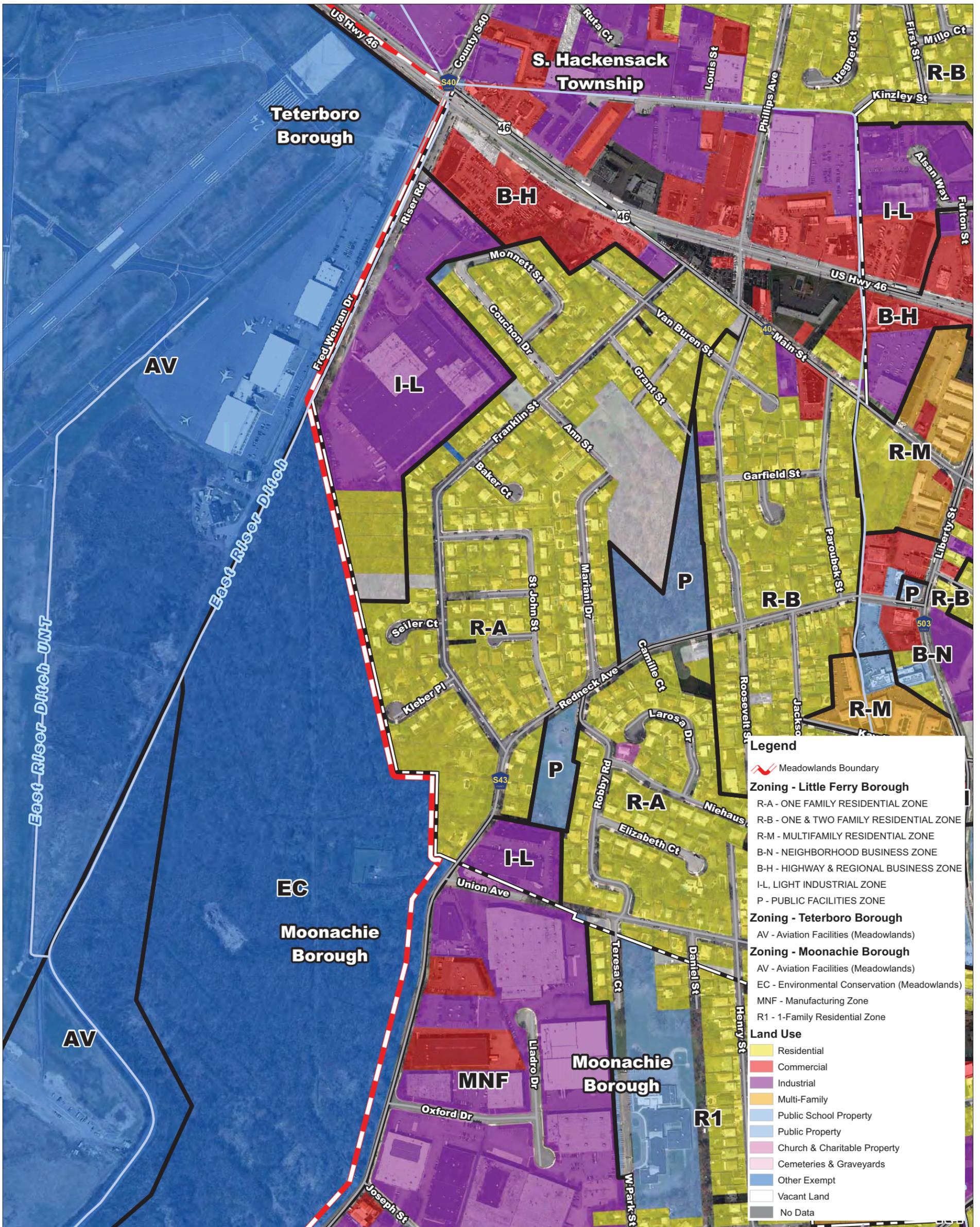
The New Jersey Meadowlands Commission (NJMC) has jurisdiction over the majority of land west and south of Riser Road and outside of Little Ferry. Except Teterboro Airport, land in the study area under NJMC jurisdiction is undeveloped and consists of wetlands.

These land uses west of Riser Road are consistent with the Land Use Plan in the NJMC 2004 Master Plan, with airport activities in and around Teterboro Airport and wetlands to the east around the East Riser Ditch that comprise one portion of the Teterboro Woods. The NJMC has limited control over Teterboro Airport due to its ownership by the Port Authority of New York and New Jersey (Port Authority).¹³ Notwithstanding, Teterboro Airport is within the NJMC's Aviation Facilities zone. The undeveloped portion of the study area under the jurisdiction of NJMC is within the Environmental Conservation zone.

The Bergen County Master Plan was last updated in 1969, so its goals and recommendations have little pertinence to the study area. There are no County improvement plans or policies that are relevant to this analysis.

¹² Little Ferry 2013 Master Plan Reexamination Report. p. 17

¹³ NJMC 2004 Master Plan. p. 184



Parcel Source: NJGIN Tax Parcels for Bergen County 2014
 Aerial Source: 2012 High Resolution Orthophotography, NAD83 NJ State Plane Feet, MrSID Tiles
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0 75 150 300 450 600 Feet



RISER ROAD EXTENSION FEASIBILITY STUDY

Existing Land Use & Zoning

Little Ferry Borough, Bergen County, NJ February 2015

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ENVIRONMENTAL CONDITIONS

The environmental conditions in the study area are composed of the East Riser Ditch and wetlands in and adjacent to Teterboro Woods. Nearly all of the undeveloped land between East Riser Ditch and the Little Ferry Boundary consists of wetlands. Wetlands also extend into the rear yards of some home with frontage on Franklin Street. An approximately 350 foot wide area along the east side of East Riser Ditch has confirmed occurrences of State Threatened species (LDNR rank 3).¹⁴ Accordingly, NJDEP classifies this area of wetlands as an Exceptional Resource Value and the area is subject to heightened regulation. NJDEP considers the remainder of the wetlands in this area an Intermediate Resource Value and subject to standard wetland regulation.¹⁵

Heavy rain causes the East Riser Ditch to flood two to three times per year. The Borough's 2014 Strategic Recovery Planning Report, which it prepared in response to significant flooding from Superstorm Sandy, proposed several recommendations related to the East Riser Ditch to improve the Borough's flood and stormwater infrastructure:¹⁶

- *Piping a ditch along Route 46 eastbound and connecting it to the East Riser Ditch. This will slow the velocity of water flowing into the already overloaded East Riser Ditch. It is a Federal Aviation Administration and Port Authority proposal.*
- *Use riprap and/or a vertical hydraulic barrier to prevent stream bank erosion.*
- *Remove sediment from the bottom of ditches and consider deepening and/or widening them.*

The preliminary Federal Emergency Management Administration (FEMA) Flood Insurance Rate Map (FIRM) shows nearly the entire study area in the AE zone of the 100 year Special Flood Hazard Area with a base flood elevation (BFE) of 8 feet. The only parts of the study area not in a flood zone are along Redneck Avenue, the southern block of Franklin Street, and Kleber Place.¹⁷



East Riser Ditch



East Riser Ditch, including an outfall

¹⁴ NJDEP Species Based Habitat, Piedmont Plains Region. 2012.

¹⁵ NJAC 7:7A: Freshwater Wetlands Protection Act Rules.

¹⁶ 2014 Little Ferry Strategic Recovery Planning Report. p. 13-14.

¹⁷ 2013 FEMA Preliminary Flood Insurance Rate Map.

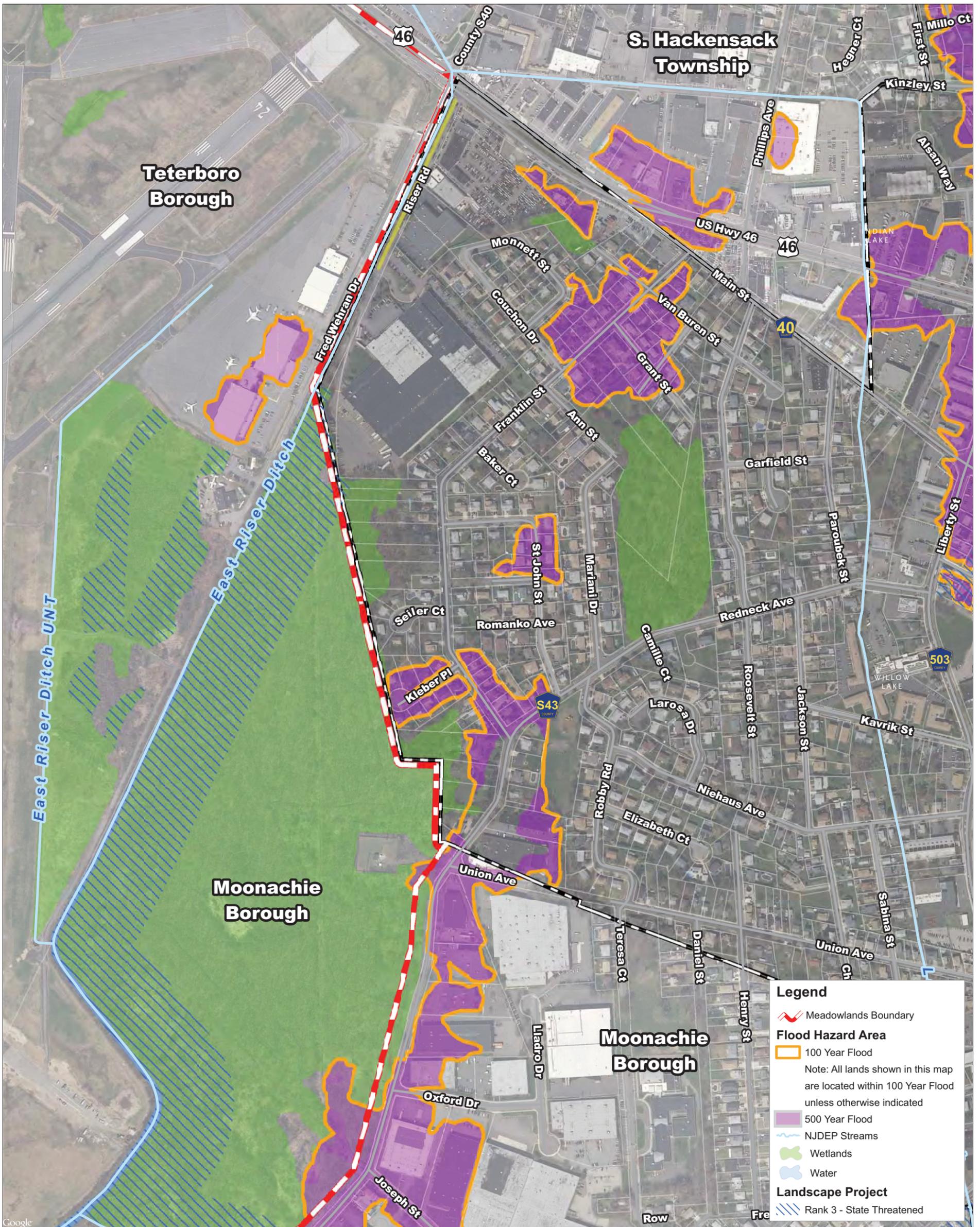
The elevation of land where the road extension may occur ranges from 4 feet to 6 feet with the exception of the area in proximity to the intersection of Redneck Avenue and Union Avenue, where the elevation is 7 feet to 8 feet. Given the elevation of land in this area and the base flood elevation of 8 feet, an extension of Riser Road would need to be elevated a minimum of 4 feet in some areas in order to avoid flooding during a 100-year flood.

General sea level rise poses an additional threat to Little Ferry. The National Oceanic and Atmospheric Administration collaborated with scientists, FEMA, the Army Corps of Engineers, United States Global Change Research Program, and White House Council on Environmental Quality to produce maps of four scenarios of sea level rise by 2050 and 2100 using FEMA's special flood hazard data. These four scenarios are categorized as Lowest, Intermediate-Low, Intermediate-High and Highest and each is expressed as an increase in the base flood elevation, beyond the current 8 foot designation.¹⁸ The four scenarios can be summarized as follows.

Sea Level Rise Scenarios		
Scenario	Scenario Basis	Base Flood Elevation Change
Lowest	Historic rates of observed sea level change	2050: +0.3 feet 2100: +0.7 feet
Intermediate-Low	Projected ocean warming	2050: +0.7 feet 2100: +1.6 feet
Intermediate-High	Projected ocean warming and recent ice sheet loss	2050: +1.3 feet 2100: +3.9 feet
Highest	Ocean warming and the maximum plausible contribution of ice sheet loss and glacial melting	2050: +2.0 feet 2100: +6.6 feet

¹⁸ NOAA, FEMA, USACE, USGCRP, and CEQ. Scenarios from Global Sea Level Rise Scenarios for the United States National Climate Assessment. Published: December 6, 2012. Maps available at: <http://geoplatform.maps.arcgis.com/home/item.html?id=296of1e066544582aeofod988ccb3d27>

Since roads can have indefinite lifespans, they should be built to withstand known possible flood conditions. An extended Riser Road may only provide safe travel during flood events if it is elevated above not only today's BFE but the increased BFE due to sea level rise. To avoid flooding under the Intermediate-High sea level rise scenario, an extension of Riser Road should be elevated at least 5.3 feet in 2050 and 7.9 feet in 2100. The exact elevation of the road cannot be calculated without a survey of the proposed road alignment.



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0 75 150 300 450 600 Feet



RISER ROAD EXTENSION FEASIBILITY STUDY

Environmental Constraints

Little Ferry Borough, Bergen County, NJ February 2015

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ALTERNATIVE ROUTES ANALYSIS

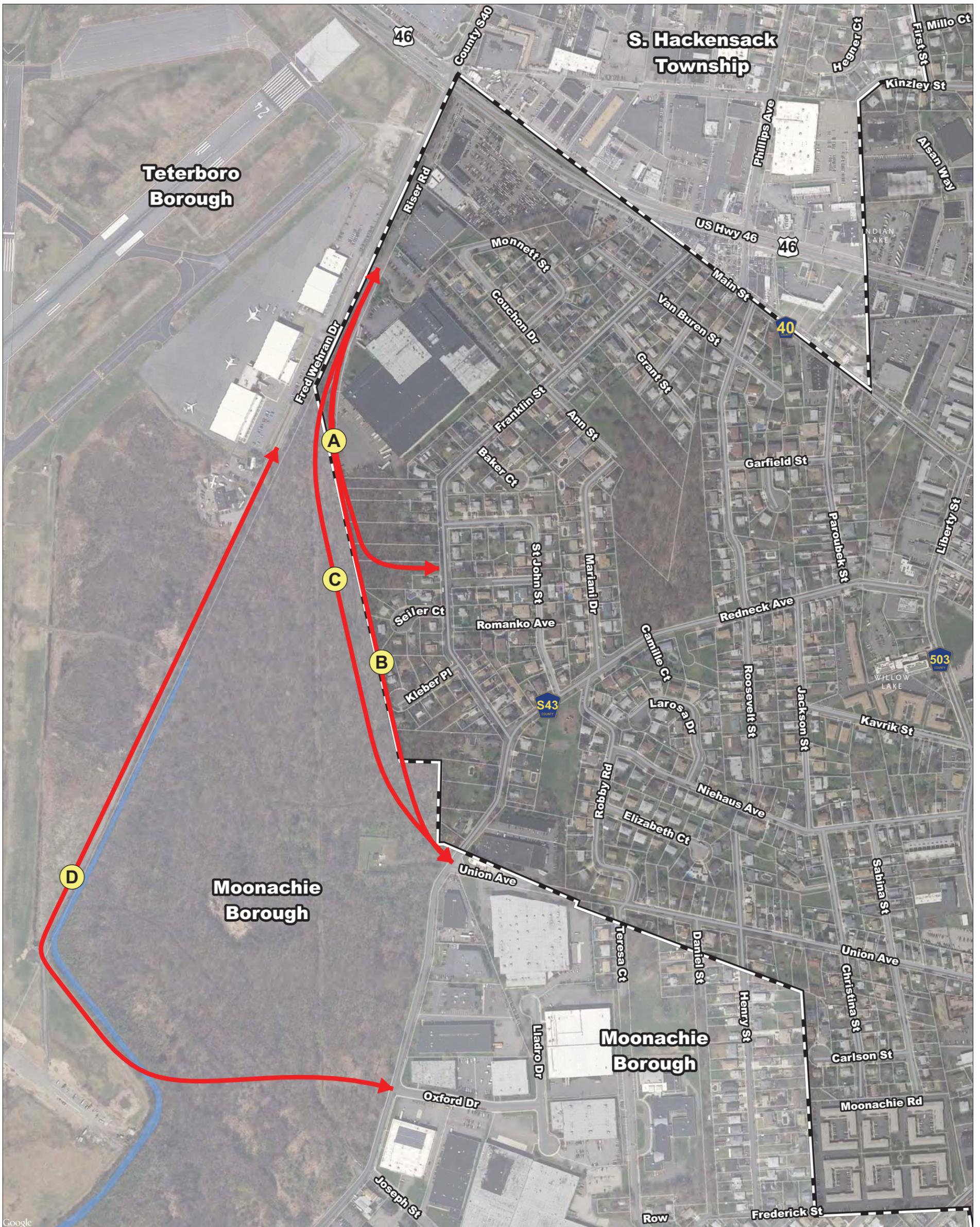
Four alternative routes were identified for an extension of Riser Road. Each of the four presents its own unique challenges in terms of cost, environmental permitting and/or acquisition of land. These four routes are depicted on the Route Alternatives map.

Route A is located entirely in Little Ferry and has a length of 1,719 feet. It extends Riser Road south along the municipal boundary with Teterboro and Moonachie until turning east, following the municipal boundary, and intersecting with Franklin Street. This route requires acquisition of land currently used for commercial and residential purposes. Included in the acquisition is the entirety of Block 70, Lot 8.02, a vacant lot, that would provide access to Franklin Street. This route requires the least amount of land acquisition and it is located entirely in Little Ferry. However, it will route traffic, including truck traffic, to Franklin Street, a primarily residential street.

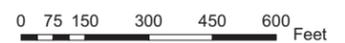
Route B is similar to Route A in that it largely follows the municipal boundary with Teterboro and Moonachie. However, it extends further south along the rear of lots fronting on Franklin Street to create a four-way intersection with Redneck Avenue and Union Avenue. The length of this Route is 2,834 feet. Acquisition of property includes commercial and residential lots in Little Ferry and a small portion of wetlands in Moonachie. This Route has the advantage of being almost entirely located in Little Ferry, but it requires substantial acquisition of residential properties.

Route C follows a similar path to Route B. However, it avoids the need for residential property acquisition by extending west into the Moonachie Woods. As with Route B, this Route extends south to create a four-way intersection with Redneck Avenue and Union Avenue. The Route has a length of 2,919 feet.

Lastly, Route D extends Fred Wehran Drive rather than Riser Road. This road, which runs parallel to Riser Road and serves Teterboro Airport, is extended southwest along the East Riser Ditch before turning east to create a four-way intersection with Joseph Street. It is entirely located in Teterboro. Not only is this the longest route at 4,439 feet, but nearly the entire route traverses



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RISER ROAD EXTENSION FEASIBILITY STUDY

Route Alternatives

Little Ferry Borough, Bergen County, NJ February 2015

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wetlands or wetlands transition areas. Additionally, its construction would require extensive coordination with three municipalities (Little Ferry, Teterboro and Moonachie), the NJ Meadowlands Commission and the Port Authority of New York and New Jersey (the owner of the Teterboro Airport).

Further consideration of each route and discussion with Little Ferry officials resulted in dismissal of two Alternative Routes. Route A was found to not adequately address the concern of truck traffic on residential streets. The feasibility of Route D was found unlikely due to its length, cost, and required coordination between several governmental jurisdictions. Accordingly, Routes B and C were selected for further analysis.

Road Design Standards

Before analyzing the details or implications of Routes B and C, it is important to understand the standards to which any extension of Riser Road must conform.

An extension of Riser Road will connect regional truck traffic along US Route 46 to Redneck Avenue, also known as County Route S43, and the industrial areas along and in proximity to this road south of Little Ferry. Due to the regional nature of such an extension, it is most appropriate for the road to convert to a County Road. Should the County accept the road in advance of construction, they will require it be constructed to the County Design Standards. As such, this analysis will assume, for the purpose of identifying implications of the road, that Riser Road and its extension will conform to the County Design Standards, unless otherwise noted.

Considering the road elevation requirements to prevent flooding and that both routes cross sizeable wetlands, the road will likely be elevated with a bridge for some of its length. Raising the road above the flood elevation will allow the Route to function during severe weather events, including allowing it to function as an evacuation route or as a location for temporary retreat of vehicles during a flood event.

Given the road’s location and purpose to connect traffic to Route 46, it will likely be considered an urban collector road.¹⁹ While the minimum ROW for a County road is 60 feet²⁰, Bergen County recommends that cartways (for any lane configuration and may include shoulders) on collectors under its jurisdiction be 46 feet wide within a 66 foot right-of-way (ROW).²¹

The County does not have a specific bridge ROW requirement²², instead it refers to AASHTO H20-44 standards for bridge loading.²³ State bridge standards refer to the local roads chapter of the AASHTO Policy on Geometric Design of Highways and Streets for non-National Highway System roads such as Riser Road.²⁴ An older edition of the guide is used because an updated version is not available for reference. However, the guidelines are likely similar. This analysis will assume, for the purpose of identifying implications of the road, that an improved Riser Road will carry over 2,000 vehicles daily. Consequently, a bridge should have a cartway 6 feet wider than the surface road, or 52 feet.²⁵ The following table summarizes the probable design of an improved Riser Road:²⁶

Improved Riser Road Widths	
Total ROW	66 ft.
Surface Road Cartway	46 ft.
Bridge Cartway	52 ft.
Sidewalk	4 ft.

19 Federal Highway Administration. “Chapter 3: Functional Classification.” Accessed: November 6, 2014. <http://www.fhwa.dot.gov/environment/publications/flexibility/cho3.cfm>

20 Bergen County Resolution 1-75. February 3, 1975

21 County has its own cartway and ROW standards and does not rely on AASHTO standards. Bergen County Department of Planning & Economic Development communications with Clarke Caton Hintz.

22 Bergen County Department of Planning & Economic Development communications with Clarke Caton Hintz.

23 Site Plan Review Resolution, Bergen County, NJ p. 17.

24 New Jersey Department of Transportation. Design Manual for Bridges and Structures, 5th Edition. p. 17.

25 American Association of State Highway and Transportation Officials (AASHTO). A Policy on Geometric Design of Highways and Streets, 2001. p. 390.

26 Sidewalk specification from Little Ferry Code of the Borough Ch. XXIII Section 2.2 (b).

While the existing segment of Riser Road will also need to be improved, its location between the East Riser Ditch to the west and developed properties to the east constrains the width of its improved roadway.

Alternative Route B Analysis

This Route is predominantly located in Little Ferry as it extends Riser Road south and continues southeast through the rear of the residential neighborhood oriented toward Franklin Street until it reaches the municipal boundary with Moonachie. The Route briefly continues through Moonachie before reaching the intersection with Redneck Avenue and Union Avenue. This Route traverses Little Ferry for 2,316 linear feet and Moonachie for 517 linear feet for a total route length of 2,834 linear feet. Only the small portion of the Route in Moonachie is within the jurisdiction of the NJMC and the Port Authority.

Construction of this Route would require acquisition of public and private property on all or a portion of 16 lots. As discussed above, a 66 foot wide right-of-way is required in order for this to be accepted by the County. This Route requires taking all or a substantial portion of five residential lots, as such the land required for acquisition exceeds the right-of-way area. In addition, construction of this Route will lead to loss of approximately 29 parking spaces and a disruption of internal circulation at the property located at 200 Riser Road (Block 70, Lots 12 and 13). Approximately 53 spaces will remain but nine (9) of those spaces in the middle of the parking area may need to be eliminated or reconfigured in order to accommodate the site's internal circulation, particularly to provide trucks with access to loading docks. As shown on the table below, the following lots must be acquired for construction of Route B.²⁷

²⁷ All information in table from 2013 NJGIN Tax Parcels for Bergen County.

Route B Land Area Acquisition			
Block / Lot	Land Use	Land For Acquisition	
		Acres	Area of Lot
B. 69.01, L. 3	Residential	0.21	14.76%
B. 69.02, L. 5*	Residential	0.20	100%
B. 69.03, L. 4*	Residential	0.29	100%
B. 70, L. 10.02	Residential	0.04	16.17%
B. 70, L. 10.03*	Residential	0.23	100%
B. 70, L. 10.04*	Residential	0.26	100%
B. 70, L. 10.05*	Residential	0.23	100%
B. 70, L. 12	Industrial	0.36	2.97%
B. 70, L. 13*	Industrial	0.48	100%
B. 70, L. 5.01	Residential	0.08	15.30%
B. 70, L. 5.02	Residential	0.08	15.58%
B. 70, L. 6.02	Residential	0.16	18.88%
B. 70, L. 7	Residential	0.16	16.86%
B. 70, L. 8.01	Residential	0.12	17.60%
B. 70, L. 8.02	Vacant	0.20	22.58%
B. 76, L. 1.02 (Moonachie)	Quasi-Public	0.78	0.17%
Total		3.88	
* The required ROW acquisition would preclude the lot from being developed with a single family home. As such, this report assumes acquisition of the entire lot.			
Note: areas calculated from parcel polygon sizes in 2013 NJGIN Tax Parcels for Bergen County GIS data file and are the basis for all analysis. These lot areas may differ slightly from figures available from the Borough's Tax Office.			

The cost of acquisition can be estimated at this time using equalized values. However, an appraisal of each property is necessary prior to calculating the anticipated project cost. Notwithstanding, the equalized values are provided as an estimate.²⁸

²⁸ All information in table from 2013 NJGIN Tax Parcels for Bergen County.

Route B Acquisition Cost			
Block / Lot	Area to Acquire	Equalized Value Per Acre	Equalized Value of Lands for Acquisition
B. 69.01, L. 3	0.21	\$461,757	\$98,105
B. 69.02, L. 5	0.20	\$1,775,770	\$362,428
B. 69.03, L. 4	0.29	\$1,266,832	\$361,311
B. 70, L. 10.02	0.04	\$1,078,568	\$45,962
B. 70, L. 10.03	0.23	\$1,589,229	\$361,311
B. 70, L. 10.04	0.26	\$1,452,164	\$370,750
B. 70, L. 10.05	0.23	\$1,791,116	\$414,087
B. 70, L. 12	0.36	\$2,197,952	\$782,894
B. 70, L. 13	0.48	\$2,197,952	\$1,048,896
B. 70, L. 5.01	0.08	\$867,995	\$67,158
B. 70, L. 5.02	0.08	\$639,709	\$51,707
B. 70, L. 6.02	0.16	\$702,921	\$110,598
B. 70, L. 7	0.16	\$341,220	\$53,271
B. 70, L. 8.01	0.12	\$317,592	\$37,277
B. 70, L. 8.02	0.20	\$342,489	\$68,201
B. 76, L. 1.02 (Moonachie)	0.78	\$394,088	\$308,763
Total	3.88		\$4,542,719
Note: Lot areas calculated from parcel polygon sizes in 2013 NJGIN Tax Parcels for Bergen County GIS data file and are the basis for all analysis. These lot areas may differ from those available from the Borough Tax Office.			

This Route has the advantage of disturbing relatively-few wetlands. Of the total land for acquisition, 48% (2.06 acres) consists of wetlands. The majority of these wetlands are classified as Intermediate Resource Value and therefore require a 50 feet transition area (buffer). Only those wetlands classified as a State Threatened Habitat area are classified as Exceptional Resources Value and therefore require a 150 feet transition area.²⁹ This Route includes 1,210 linear feet within wetlands and/or wetlands transition areas, of which 1,088 linear feet are Intermediate Value and 122 linear feet are Exceptional Value. This route features no steep slopes.

²⁹ NJAC 7:7A: Freshwater Wetlands Protection Act Rules.

Nearly the entire Route is located within the Special Flood Hazard Area (the 100-year floodplain). The BFE in this area is eight feet. With ground elevations along the Route ranging from four (4) to eight (8) feet. This Route could serve as an evacuation route during flood events if it is elevated with a bridge built at or above the base flood elevation. Currently, Liberty Street is the Borough's only north-south evacuation route. An evacuation route serving the west side of the Borough would provide an alternative to Liberty Street, which is a County-designated evacuation route heavily impacted by flooding, and Route 17, an alternate evacuation route located outside of the Borough on the other side of Teterboro Airport.³⁰

Due to the disturbance of wetlands and/or wetlands transition areas, an extension of Riser Road along Route B will require a Freshwater Wetlands Permit from the NJ Department of Environmental Protection (NJDEP). An Individual Permit is required because the Route will disturb over one quarter acre of wetlands. The criteria for this permit do not address the area disturbed. Instead, it requires the applicant to provide that the disturbance has been minimized, impacts have been mitigated, and there are no practical alternatives that would have a less adverse environmental impact.

Additionally, the northern portion of the wetlands is classified as an Exceptional Resource Value. Any Individual Permit for disturbing these wetlands must meet additional criteria requiring a demonstration that there is a compelling public need for the proposed activity greater than the need to protect the freshwater wetlands, or that denial of the permit would impose an extraordinary hardship on the applicant because of circumstances peculiar to the subject property.³¹ Overall, the permitting process will require significant multi-agency collaboration.

³⁰ Bergen County Evacuation Route Map

³¹ NJAC 7:7A: Freshwater Wetlands Protection Act Rules.

Alternative Route C Analysis

Route C extends Riser Road south and continues southeast around the residential neighborhood along Franklin Street before terminating at the intersection of Redneck Avenue and Union Avenue. All but a portion of this Route is in Moonachie and under jurisdiction of both NJMC and the Port Authority. This Route traverses Moonachie for 2,289 feet and Little Ferry for 629 feet for a total route length of 2,919 linear feet.

Construction of this Route requires acquisition of public and private property on a portion of three lots. As discussed above, a 66 foot wide right-of-way is required in order for it to be accepted by the County. This Route does not require acquisition of residential lots. As shown on the table below, the following lots must be acquired for construction of Route C.³²

Route C Land Area Acquisition			
Block / Lot	Land Use	Land For Acquisition	
		Acres	Area of Lot
B. 70, L. 12	Industrial	0.10	0.85%
B. 70, L. 13	Industrial	0.10	20.73%
B. 76, L. 1.02 (Moonachie)	Public	3.47	0.76%
Total		3.67	
Note: Lot areas calculated from parcel polygon sizes in 2013 NJGIN Tax Parcels for Bergen County GIS data file and are the basis for all analysis. These lot areas may differ from those available from the Borough Tax Office.			

Wetlands comprise a significant portion of this Route. Of the total land for acquisition, 79% (3.49 acres) consist of wetlands. The majority of these wetlands are classified as an Intermediate Resource Value and therefore require a 50 feet transition area (buffer). Only those wetlands classified as a State Threatened Habitat area are classified as an Exceptional Resources Value and therefore require a 150 feet transition area.³³ This Route includes 2,316 of linear feet within wetlands and/or wetlands transition areas, of which 1,598 linear feet are Intermediate Value and 718 linear feet are Exceptional Value. This route features no steep slopes.

³² All information in table from 2013 NJGIN Tax Parcels for Bergen County.

³³ NJAC 7:7A: Freshwater Wetlands Protection Act Rules.

The entire Route is located within the Special Flood Hazard Area (the 100-year floodplain). The BFE in this area is eight feet and ground elevations range between four (4) and eight (8) feet. Should the road be built at or above this base flood elevation, it could serve as an evacuation route during flood events. Currently, Liberty Street is the only north-south evacuation route in the Borough. An evacuation route serving the west side of the Borough would provide an alternative to Liberty Street, which is a County-designated evacuation route heavily impacted by flooding, and Route 17, an alternate County-designated evacuation located outside of the Borough on the other side of Teterboro Airport.³⁴

The cost of acquisition can be estimated at this time using equalized values. However, an appraisal of each property is necessary prior to calculating the anticipated project cost. Notwithstanding, the equalized values are provided as an estimate.³⁵

Route C Acquisition Cost			
Block / Lot	Acquisition Area	Equalized Value Per Acre	Equalized Value of Lands for Acquisition
B. 70, L. 12	0.10	\$2,166,934	\$224,055
B. 70, L. 13	0.10	\$2,166,934	\$217,428
B. 76, L. 1.02 (Moonachie)	3.47	\$1,366,622	\$394,088
Total	3.67		835,571
Note: Lot areas calculated from parcel polygon sizes in 2013 NJGIN Tax Parcels for Bergen County GIS data file and are the basis for all analysis. These lot areas may differ from those available from the Borough Tax Office.			

Due to the disturbance of wetlands and/or wetlands transition areas, an extension of Riser Road along Route C will require a Freshwater Wetlands Permit from NJDEP. An Individual Permit is required because the Route will disturb over one quarter acre of wetlands. The criteria for this permit do not address the area disturbed. Instead, it requires the applicant to provide that the disturbance has been minimized, impacts have been mitigated, and there are no practical alternatives that would have a less adverse environmental impact.

³⁴ Bergen County Evacuation Route Map

³⁵ All information in table from 2013 NJGIN Tax Parcels for Bergen County.

Additionally, the northern portion of the wetlands is classified as an Exceptional Resource Value. Any Individual Permit for disturbing these wetlands must meet additional criteria requiring a demonstration that there is a compelling public need for the proposed activity greater than the need to protect the freshwater wetlands, or that denial of the permit would impose an extraordinary hardship on the applicant because of circumstances peculiar to the subject property.³⁶ Overall, the permitting process will require significant multi-agency collaboration.

³⁶ NJAC 7:7A: Freshwater Wetlands Protection Act Rules.

Route Summaries & Conclusions

Both Routes B and C can provide not only improved access to the industrial complex south of Little Ferry and improved access to the commercial and industrial uses along Riser Road. Additionally, both Routes can provide an alternative evacuation route to the western side of Little Ferry and points south. Alternatively the route could serve as a temporary retreat location for vehicles during flood events.

While the route length and required acquisition for Routes B and C are similar, many of the characteristics and impacts differ greatly. For example, the impact on wetlands and the associated permitting challenges and costs would be greater for Route C since it traverses nearly twice the wetlands than Route B. Alternatively, Route B requires substantial acquisition of residential property - all or a portion of 12 properties. Additionally, Route C would result in a loss of at least 29 parking spaces and a disruption of internal circulation at the property located at 200 Riser Road (Block 70, Lots 12 and 13). For both routes, acquisition of residential and industrial properties would be a lengthy and costly process.

Route Summaries		
	Route B	Route C
Total Length	2,834 ft.	2,919 ft.
Little Ferry	2,316 ft.	629 ft.
Moonachie	517 ft.	2,289 ft.
Teterboro	0	0
PANYNJ	517 ft.	2,289 ft.
Total Area Acquisition	4.29 ac.	4.42 ac.
Residential Acquisition	Yes	No
Wetlands Length	1,210 ft.	2,316 ft.
Intermediate	1,088 ft.	1,598 ft.
Exceptional	122 ft.	718 ft.
Wetlands Area Acquisition	2.06 ac.	3.49 ac.
Intermediate	1.81 ac.	2.41 ac.
Exceptional	0.25 ac.	1.08 ac.

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The Borough may adopt this as an appendix to the Master Plan and thereby incorporate it into the body of Borough planning and circulation policy. The Borough should consider coordinating further feasibility discussions with, at a minimum, Bergen County, the New Jersey Meadowlands Commission and the Borough of Moonachie.

OPPORTUNITIES FOR STORMWATER RESILIENCE

Given the Borough's flood history, it is important that all development and infrastructure projects consider what resilience opportunities exist in relation to storm and flood waters.

Both Routes B and C create an opportunity to improve the existing portion of Riser Road with enhanced stormwater management. While limited space exists between the existing cartway and the existing buildings on one side and East Riser Ditch on the other, the land on either side of the cartway may be appropriate for a bioretention system(s). This strategy consists of a vegetated depression that stores and infiltrates stormwater runoff. It is composed of a soil bed planted with vegetation above layers of sand and gravel. The vegetation filters stormwater runoff, reducing the total suspended solids (TSS), and the soil and sand layers promote infiltration. Such a system would reduce peak runoff rates by slowing water entering East Riser Ditch and it would improve the quality water of reaching the Ditch that originated from Riser Road. Additionally, there may be opportunities for planting street trees that would provide water uptake.

Bioretention basins should also be considered for the extension of Riser Road in areas which do not consist of wetlands. Most notably, this includes portions of Route B along properties oriented toward Franklin Street and Route B's and C's new intersection with Redneck Avenue.

Integrating green infrastructure into road design where the road travels through or is elevated above wetlands is not appropriate. Wetlands are a natural form of green infrastructures and it thus is appropriate for stormwater runoff to utilize the qualities of the wetlands to provide filtration and infiltration. It is recommended that stormwater runoff from the road be directed to the wetlands, through vegetated filters along the cartway, as a method of providing enhanced stormwater filtration and infiltration.

The ability of the portion of Routes B and C along existing Riser Road to provide enhanced stormwater management is limited due to not only available space but also due to the significant truck traffic that traverses the Road. As a result, permeable paving or pavers, is not appropriate for the vehicle travel lanes since perme-

able materials are typically not able to function properly with the weight of continuous truck traffic. However, permeable materials, such as permeable pavers or asphalt, should be considered for the roadway shoulder and any pedestrian or bicycle areas. Permeability in these areas will increase water infiltration and reduce runoff to adjacent properties.

Site specific analysis is necessary prior to installation of any green infrastructure technique to ensure that the soil characteristics are appropriate.