Memorandum

To: Rhode Island Department of Transportation
Two Capitol Hill
Providence, RI 02903

Date: March 15, 2019

Project #: 72900.00

From: Peter J. Pavao, PE, PTOE
Director of Transportation Systems

Re: Reconstruction of the Pell Bridge Approaches
Environmental Assessment – Traffic

1. Project Overview

The Claiborne Pell Newport Bridge (Pell Bridge) carries State Route 138 between Jamestown and Newport and is the only roadway connection between Jamestown and Aquidneck Island. The Proposed Action Alternative of the Reconstruction of the Pell Bridge Approaches (Project) would provide a direct connection from the northern part of the City to Downtown Newport, reduce queued vehicle traffic exiting the Pell Bridge, reduce traffic in Downtown Newport, and provide a portion of the bicycle and pedestrian facilities envisioned in the Aquidneck Island Transportation Study. The Proposed Action (Project) would occur in the City of Newport and Town of Middletown, Rhode Island. In accordance with the National Environmental Policy Act (NEPA), an Environmental Assessment (EA) is being developed to evaluate the impacts of construction and operation of the re-designed interchange on environmental resources. This section summarizes the transportation analyses completed in support of the Project Environmental Assessment.

2. Study Area and Methodology

Numerous transportation planning and safety improvement studies and analyses have been completed within the Study Area. This section provides a detailed evaluation of the physical and operational conditions of the Study Area roadways and intersections. Data collection, prior plan review, field observations, and capacity analysis/modeling were all conducted to identify and establish the base year conditions and to determine needs and opportunities in developing the 2040 future year recommendations.

Existing Geometry

The Pell Bridge approach roadway system includes major corridors for local and regional travel between Downtown Newport, Naval Station Newport, Aquidneck Island, southern Rhode Island, Connecticut, and southeastern Massachusetts. Many of the Study Area roadways are designated hurricane evacuation routes. The Study Area extends from Farewell Street at Van Zandt Avenue on the south to the driveway of RK Shopping Plaza on the north, and from Admiral Kalbfus Road at 3rd Street on the west to Malbone Street and Girard Avenue on the east. This area includes the ramps and approach roads on the east end of the Pell Bridge, Admiral Kalbfus Road, JT Connell Highway, and Farewell Street. Table 1 provides a list of the nine Study Area intersections included in this report, which are illustrated in Figure 1.

Table 1: Study Area Intersections

Intersection Control Type	Intersection
Stop Controlled	JT Connell Road at Pell Bridge EB Off-Ramp
Signal Controlled	JT Connell Highway/Farewell Street at Van Zandt Avenue
Roundabout	JT Connell Highway at Admiral Kalbfus Road (Newport Rotary)
Signal Controlled	JT Connell Highway at Newport Towne Center Driveway
Signal Controlled	Admiral Kalbfus Road/Training Station Road at 3rd Street
Signal Controlled	Admiral Kalbfus Road at Newport Towne Center Driveway/Pell Bridge WB On-Ramp
Signal Controlled	Admiral Kalbfus Road at Newport Grand Driveway/Pell Bridge EB Off-Ramp
Stop Controlled	Admiral Kalbfus Road at Halsey Street
Stop Controlled	Admiral Kalbfus Road at Girard Avenue/Malbone Road

Roadways

Pell Bridge (Route 138)

The Pell Bridge (Route 138) is an east-west state-owned roadway locally known as the Newport Bridge. The Rhode Island Turnpike and Bridge Authority (RITBA) currently maintains the bridge and its approaches. From the toll plaza, the Pell Bridge is approximately 45 feet wide, accommodating two lanes of travel in each direction (divided) over the entire span. At the eastern bridge abutment, the two lanes of travel in each direction become divided by guardrail/raised median through the interchange of ramps to/from JT Connell Highway.

The ramps to and from the Pell Bridge are free flowing with the exception of the off-ramp to Downtown Newport, which is stop-controlled. Roadway shoulders are not present along the Pell Bridge; shoulders ranging in width between 2 and 4 feet are present to the east of the eastern bridge abutment, with a short segment approximately 12 to 14 feet wide at the gore area for the on-ramp from JT Connell Highway north. Overhead roadway lighting is present throughout the Study Area. Sidewalks and pedestrian accommodations are not provided along the Pell Bridge or the ramps to and from JT Connell Highway. The posted speed limit is 40 mph over the bridge, reducing to 30 mph approaching the JT Connell Highway interchange ramps.

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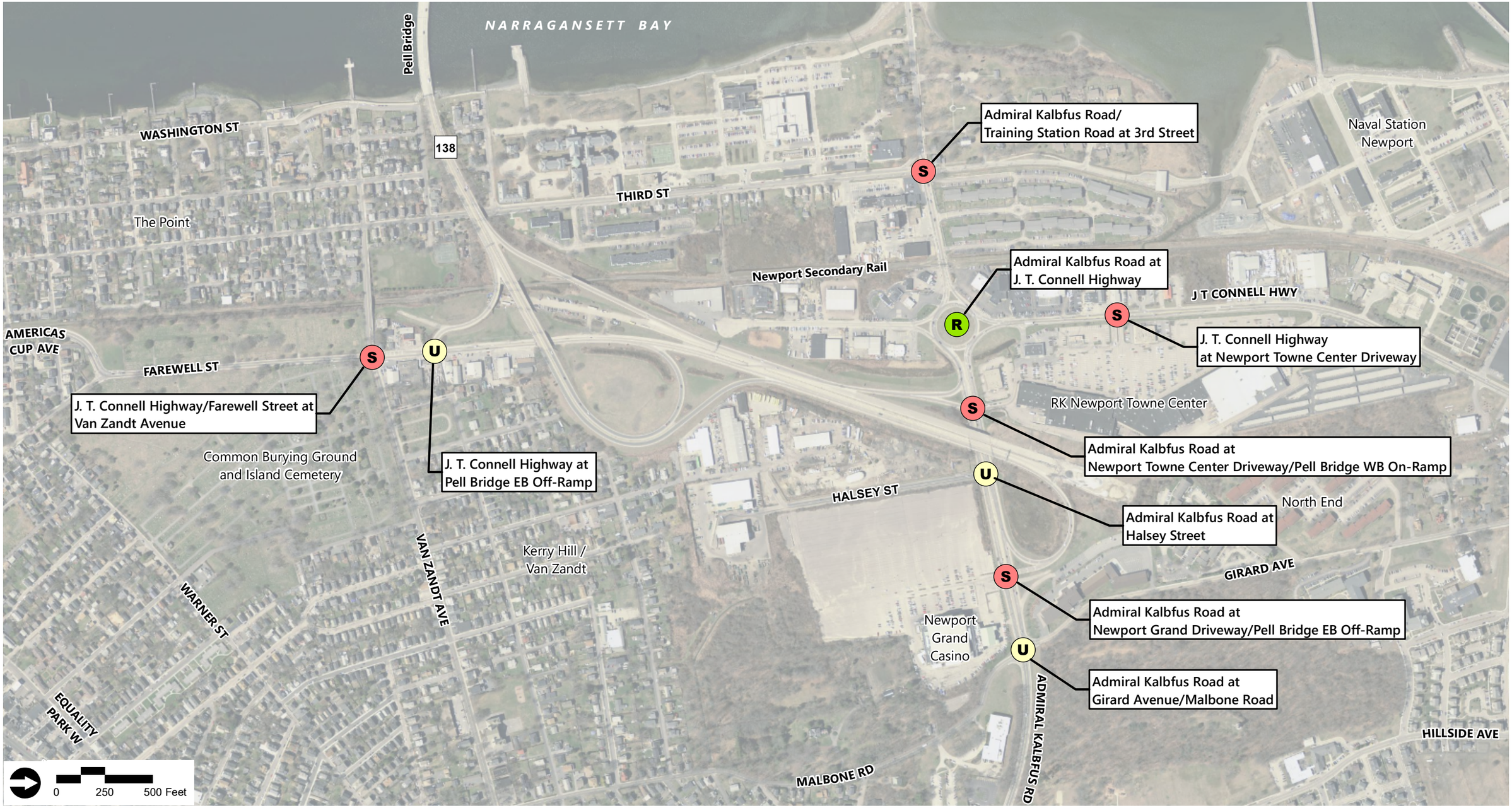


Aerial Source: RIGIS

Intersection Control Type

- R Roundabout
- S Signalized
- U Unsignalized

Figure 1

Study Area Intersections

Reconstruction of the Pell Bridge Approaches
Newport/Middletown, Rhode Island

Admiral Kalbfus Road (Route 138)

Admiral Kalbfus Road (Route 138) is an east-west state-owned roadway serving Naval Station Newport to the west and Newport Grand casino to the east within the Study Area. Between Third Street and JT Connell Highway, Admiral Kalbfus Road is a two-lane undivided roadway approximately 30 feet wide. Between JT Connell Highway and Girard Avenue/Malbone Road, Admiral Kalbfus Road is a four-lane divided roadway approximately 60 feet wide.

Admiral Kalbfus Road is intersected by several roadways and driveways. The intersections with Third Street, Newport Towne Center South Driveway/Pell Bridge on-ramp, and Newport Grand Driveway/Pell Bridge off-ramp are signal-controlled. The intersections with Halsey Street and Malbone Road/Girard Avenue are stop-controlled on the side streets. The intersection with JT Connell Highway is a four-leg rotary, of which the southern leg is a dead-end. A signalized railroad at-grade crossing is present to the west of the rotary. Roadway shoulders are not present along Admiral Kalbfus Road. Overhead roadway lighting is present throughout the Study Area. There are several RIPTA bus stops located along both sides of Admiral Kalbfus Road within the Study Area. Sidewalks are provided along both sides of Admiral Kalbfus Road; however, no pedestrian accommodations are provided across any of the intersecting roadways. The posted speed limit within the Study Area is 25 mph.

JT Connell Highway

JT Connell Highway is a north-south state-owned roadway serving the area between Gate 4/Maple Avenue and Van Zandt Avenue. It is a two-lane undivided roadway approximately 25 feet wide. There are two sections of JT Connell Highway south of Admiral Kalbfus Road; one section is a dead-end roadway south of the existing rotary, and the other section is located across from the Newport Town Center signalized south access drive. Between Admiral Kalbfus Road and the Pell Bridge, JT Connell Highway primarily serves traffic entering and exiting the Pell Bridge interchange.

JT Connell Highway is intersected by several roadways and driveways, including the ramps to and from the Pell Bridge. The intersections with the Newport Towne Center main driveway and Van Zandt Avenue are signal-controlled. The intersection with Admiral Kalbfus Road is a four-leg rotary, of which the southern leg is a dead-end. Roadway shoulders ranging in width between 4 and 5 feet are present throughout the Study Area. Overhead roadway lighting is present throughout the Study Area. There are several RIPTA bus stops located along both sides of JT Connell Highway within the Study Area. Sidewalks are provided along both sides of the highway throughout most of the Study Area; pedestrian accommodations are provided at some of the signalized intersections and across several of the driveways. The posted speed limit within the Study Area is 25 mph.

Farewell Street (Route 238)

Farewell Street (Route 238) is a north-south state-owned roadway serving the area between Van Zandt Avenue and downtown Newport. It is a two-lane undivided roadway approximately 25 feet wide, intersected by several cemetery driveways. The intersection with Van Zandt Avenue is signal-controlled. Roadway shoulders ranging in width between 1 and two 2 are present throughout the Study Area. Overhead roadway

lighting is present throughout the Study Area. There is a RIPTA bus stop located near the Farewell Street/America's Cup Avenue intersection. Sidewalks are provided along the eastern side of Farewell Street within the Study Area; pedestrian accommodations are provided across two of the approaches at the signalized intersection. There are cemeteries located along both sides of Farewell Street between Van Zandt Avenue and America's Cup Avenue. The posted speed limit within the Study Area is 25 mph.

Intersections

JT Connell Highway at Pell Bridge Eastbound Off-Ramp

The Pell Bridge eastbound off-ramp intersects JT Connell Highway to form an unsignalized T-intersection that is stop-controlled on the off-ramp approach. The JT Connell Highway northbound and southbound approaches consist of one through lane. The Pell Bridge eastbound off-ramp is 20 feet wide and mainly operates as an exclusive right-turn lane with room to accommodate occasional left turns. Sidewalks are present along the east side of the northbound approach.

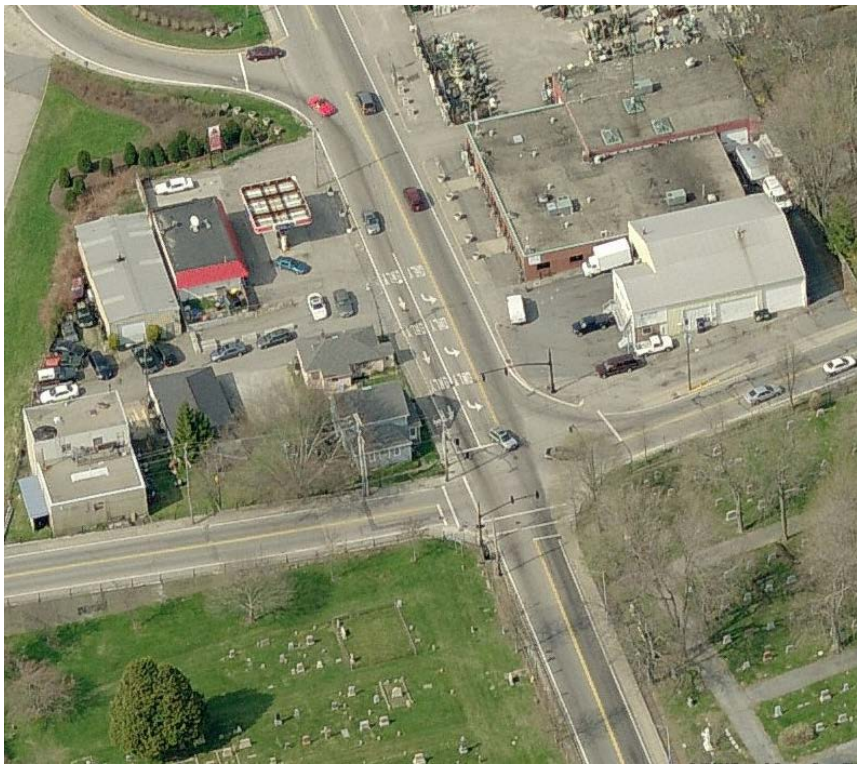
Aerial View of the JT Connell Highway at Pell Bridge Eastbound Off-Ramp Intersection

Source: www.bing.com/maps

JT Connell Highway/Farewell Street at Van Zandt Avenue

JT Connell Highway/Farewell Street intersects Van Zandt Avenue to form a four-way signalized intersection. The JT Connell Highway southbound approach consists of an exclusive left-turn lane and a shared through/right-turn lane. The Farewell Street northbound approach consists of one general purpose (left-turn/through/right-turn) lane. The Van Zandt Avenue eastbound and westbound approaches each consist of one general purpose (left-turn/through/right-turn) lane. Sidewalks are present along the east side of the northbound approach, both sides of the southbound approach, both sides of the eastbound approach, and the north side of the westbound approach. Marked, signalized pedestrian accommodations are present across the northbound and eastbound approaches to the intersection.

Aerial View of the JT Connell Highway/Farewell Street at Van Zandt Avenue Intersection



Source: www.bing.com/maps

Traffic at the intersection is controlled by a three-phase traffic signal operation. Phase 1 is for the JT Connell Highway southbound advance left-turns, phase 2 is for the JT Connell Highway/Farewell Street northbound/southbound approaches, and phase 3 is for the Van Zandt Avenue eastbound/westbound approaches.

JT Connell Highway at Newport Towne Center Main Driveway

The Newport Towne Center main driveway intersects JT Connell Highway to form a three-way signalized intersection. The JT Connell Highway northbound approach consists of one general purpose (through/right-turn) lane. The JT Connell Highway southbound approach consists of an exclusive left-turn lane and a through lane. The Newport Towne Center driveway westbound approach consists of an exclusive left-turn lane and an exclusive right-turn lane. Sidewalks are present along both sides of the northbound and southbound approaches. Marked signalized pedestrian accommodations are present across the southbound and westbound approaches to the intersection.

Aerial View of the JT Connell Highway at Newport Towne Center Main Driveway Intersection

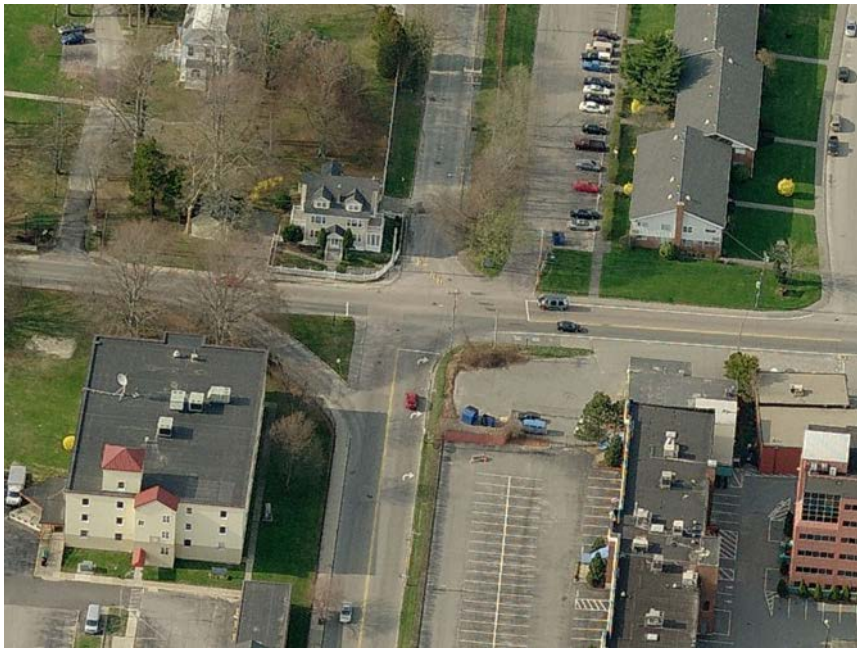
Source: www.bing.com/maps

Traffic at the intersection is controlled by a three-phase traffic signal operation. Phase 1 is for the JT Connell Highway southbound advance left-turns, phase 2 is for the JT Connell Highway northbound/southbound approaches, and phase 3 is for the Newport Town Center Main Driveway westbound approach.

Admiral Kalbfus Road/Training Station Road at 3rd Street

Admiral Kalbfus Road/Training Station Road intersects 3rd Street to form a four-way signalized intersection. The Training Station Road eastbound approach consists of one general purpose (left-turn/through/right-turn) lane. The right-turn movement is a channelized movement to 3rd Street southbound, which is yield-controlled to join the southern intersection leg. The Admiral Kalbfus Road westbound approach consists of one general purpose (left-turn/through/right-turn) lane. The 3rd Street northbound approach consists of one shared left-turn/through lane and one exclusive right-turn lane. The 3rd Street southbound approach consists of one general purpose (left-turn/through/right-turn) lane. It should be noted that there is a driveway located on the north side of Admiral Kalbfus Road on the westbound approach between the stop line and 3rd Street. Sidewalks are present along both sides of the eastbound and westbound approaches and along the west side of the northbound approach; however, no pedestrian accommodations are present across any approach at the intersection.

Aerial View of JT Connell Highway at Newport Towne Center Main Driveway Intersection



Source: www.bing.com/maps

The intersection is controlled by a two-phase traffic signal operation. Phase 1 is for the Admiral Kalbfus Road/Training Station Road eastbound/westbound approaches and phase 2 is for the 3rd Street northbound/southbound approaches.

Admiral Kalbfus Road at JT Connell Highway

Admiral Kalbfus Road intersects JT Connell Highway to form a four-way rotary intersection, commonly known as the Newport Rotary. The intersection has recently been retrofitted to operate more like a modern roundabout by increasing the splitter islands to control the approaching speeds and by the installation of new signs and pavement markings to guide and better delineate traffic approaching and traversing the intersection. For this study it is analyzed as a roundabout.

The Admiral Kalbfus Road eastbound approach has been restriped to include an exclusive left-turn lane and a shared through/right-turn lane. The westbound approach has been restriped to include a shared left-turn/through lane and an exclusive right-turn lane. The JT Connell Highway northbound approach continues to operate as one general purpose lane. The southbound approach has been restriped to include a shared left-turn/through lane and an exclusive right-turn lane. All traffic entering the intersection must yield to the circulating traffic.

Aerial View of the Admiral Kalbfus Road at JT Connell Highway Intersection

Source: Pell Bridge Design Study Report, Rhode Island Department of Transportation, 2013.

Admiral Kalbfus Road at Newport Towne Center South Driveway/Pell Bridge On-Ramp

Admiral Kalbfus Road intersects the Newport Towne Center south driveway and the Pell Bridge on-ramp to form a three-way signalized intersection. The Admiral Kalbfus Road eastbound approach consists of an exclusive left-turn lane, a through lane, and a shared through/right-turn lane. The right-turn movement is channelized to the Pell Bridge on-ramp. The Admiral Kalbfus Road westbound approach consists of an exclusive left-turn lane, a through lane, and a shared through/right-turn lane. The Newport Towne Center south driveway southbound approach consists of one general purpose (left-turn/through/right-turn) lane. Sidewalks are present along both sides of the eastbound and westbound approaches; however, no pedestrian accommodations are present across any approach at the intersection.

Aerial View of the Admiral Kalbfus Road at Newport Towne Center South Driveway/Pell Bridge On-Ramp Intersection

Source: www.bing.com/maps

Traffic at this intersection is controlled by a three-phase traffic signal operation. Phase 1 is for the Admiral Kalbfus Road eastbound/westbound left-turns, phase 2 is for eastbound/westbound through traffic, and phase 3 is for the Newport Towne Center south driveway southbound approach.

Admiral Kalbfus Road at Halsey Street

Admiral Kalbfus Road intersects Halsey Street to form an unsignalized T-intersection. The Halsey Street northbound approach is stop-controlled, whereas the Admiral Kalbfus Road approaches are free-flowing. The Admiral Kalbfus Road eastbound approach consists of one through lane and one shared through/right-turn

lane. The westbound approach consists of an exclusive left-turn lane and two through lanes. Sidewalks are present along both sides of the eastbound and westbound approaches.

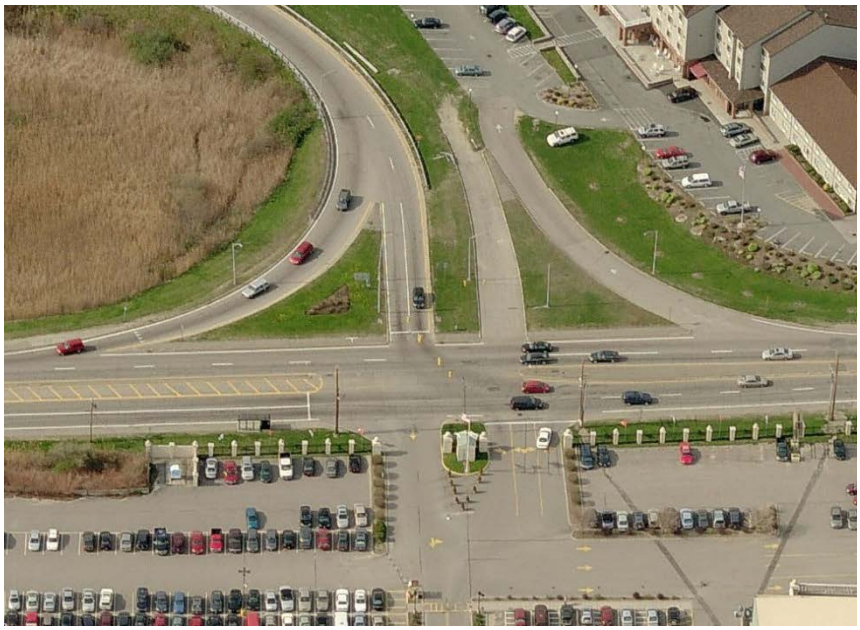
Aerial View of Admiral Kalbfus Road at Halsey Street

Source: www.bing.com/maps

Admiral Kalbfus Road at Newport Grand Driveway/Pell Bridge Off-ramp

Admiral Kalbfus Road intersects the Newport Grand Driveway and the Pell Bridge off-ramp to form a four-way signalized intersection. The Admiral Kalbfus Road eastbound approach consists of one through lane and one shared through/right-turn lane. The westbound approach consists of one shared left-turn/through lane and one through lane. The Newport Grand driveway northbound approach consists of one exclusive left-turn lane, one shared left-turn/right-turn lane, and one exclusive right-turn lane. The Pell Bridge off-ramp southbound approach consists of one exclusive left-turn lane, one shared left-turn/through lane, and one channelized right-turn lane. The channelized right-turn lane is yield-controlled onto Admiral Kalbfus Road westbound. Sidewalks are present along both sides of the eastbound and westbound approaches; however, no pedestrian accommodations are present across any approach at the intersection.

Aerial View of the Admiral Kalbfus Road at Newport Grand Driveway/ Pell Bridge Off-ramp Intersection



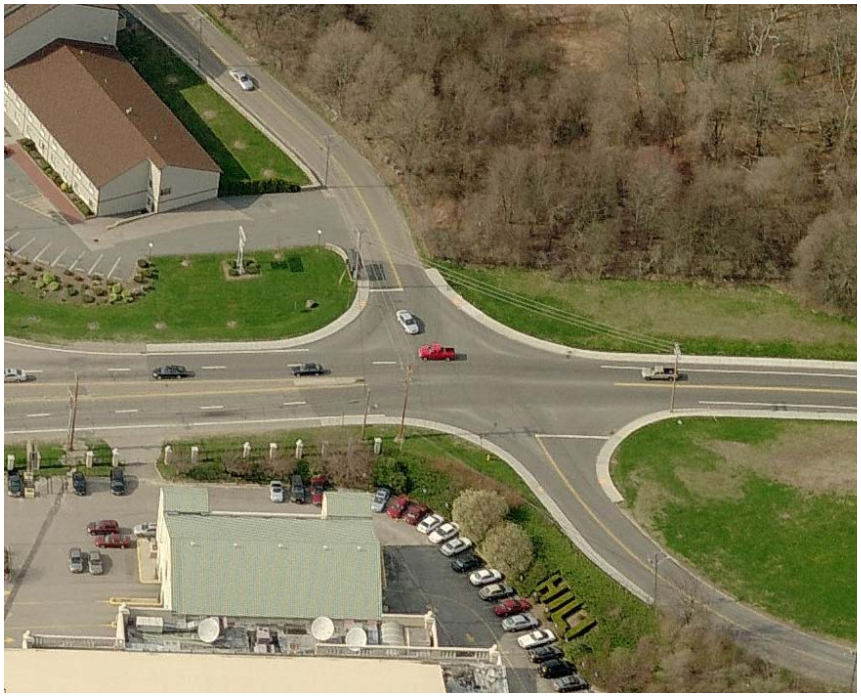
Source: www.bing.com/maps

Traffic at this intersection is controlled by a four-phase traffic signal operation. Phase 1 is for the Admiral Kalbfus Road westbound advance left-turn, phase 2 is for the eastbound/westbound approaches. Phase 3 and 4 splits between the Pell Bridge off-ramp and the Newport Grand approaches.

Admiral Kalbfus Road at Girard Avenue/Malbone Road

Admiral Kalbfus Road intersects Girard Avenue/Malbone Road to form a four-way unsignalized intersection. The Girard Avenue and Malbone Road approaches are stop-controlled, while the Admiral Kalbfus Road approaches are free-flowing. The Admiral Kalbfus Road eastbound approach consists of one shared left-turn/through lane and one shared through/right-turn lane. The two through lanes are received by a single lane; therefore, the lanes are required to merge through the intersection. The Admiral Kalbfus Road westbound approach consists of one general purpose (left-turn/through/right-turn) lane. The through lane is received by two lanes. The Girard Avenue southbound approach and the Malbone Road northbound approach each consist of one general purpose (left-turn/through/right-turn) lane. Sidewalks are present in the immediate vicinity of the Admiral Kalbfus Road/Girard Avenue/Malbone Road intersection and along the west side of Girard Avenue; however, no pedestrian accommodations are provided across any of the intersecting roadways.

Aerial View of the Admiral Kalbfus Road at Girard Avenue/Malbone Road Intersection



Source: www.bing.com/maps

3. Existing Conditions

Daily and Hourly Traffic Volumes

To identify current traffic flow characteristics, daily and hourly traffic counts were collected in July 2017 and supplemented with traffic volume data from prior studies. Typically, summer traffic counts are not preferred; however, given the impacts of summer tourism on travel on Aquidneck Island, traffic volumes are higher during this time and a summer count program was determined to be appropriate.

Traffic volumes for the Study Area roadways and intersections were collected by Precision Data Industries, LLC (PDI). This effort included 48-hour Automatic Traffic Recorder (ATR) counts collected during the weekday at the following locations:

- Pell Bridge EB Off-Ramp to Downtown Newport
- Pell Bridge EB Off-Ramp to Admiral Kalbfus Road
- Pell Bridge WB On-Ramp from JT Connell Highway NB
- Pell Bridge WB On-Ramp/JT Connell Highway from Admiral Kalbfus Road
- JT Connell Highway north of the Pell Bridge EB Off-Ramp to Downtown

- JT Connell Highway south of the Newport Towne Center Main Driveway
- Admiral Kalbfus Road east of Girard Avenue/Malbone Road

Figure 2 summarizes the existing summer peak-season weekday daily traffic volumes collected in July. The daily and hourly counts are provided in Appendix A.

Weekday morning and afternoon peak period manual turning movement counts were collected between 7:00 AM and 9:00 AM and between 4:00 PM and 6:00 PM at the following intersections:

- JT Connell Highway/Farewell Street at Van Zandt Avenue
- JT Connell Highway at Newport Towne Center Main Driveway
- Admiral Kalbfus Road/Training Station Road at 3rd Street
- Admiral Kalbfus Road at Newport Towne Center Driveway/Pell Bridge WB on-ramp
- Admiral Kalbfus Road at Newport Grand Driveway/Pell Bridge EB Off-Ramp
- Admiral Kalbfus Road at Girard Avenue/Malbone Road

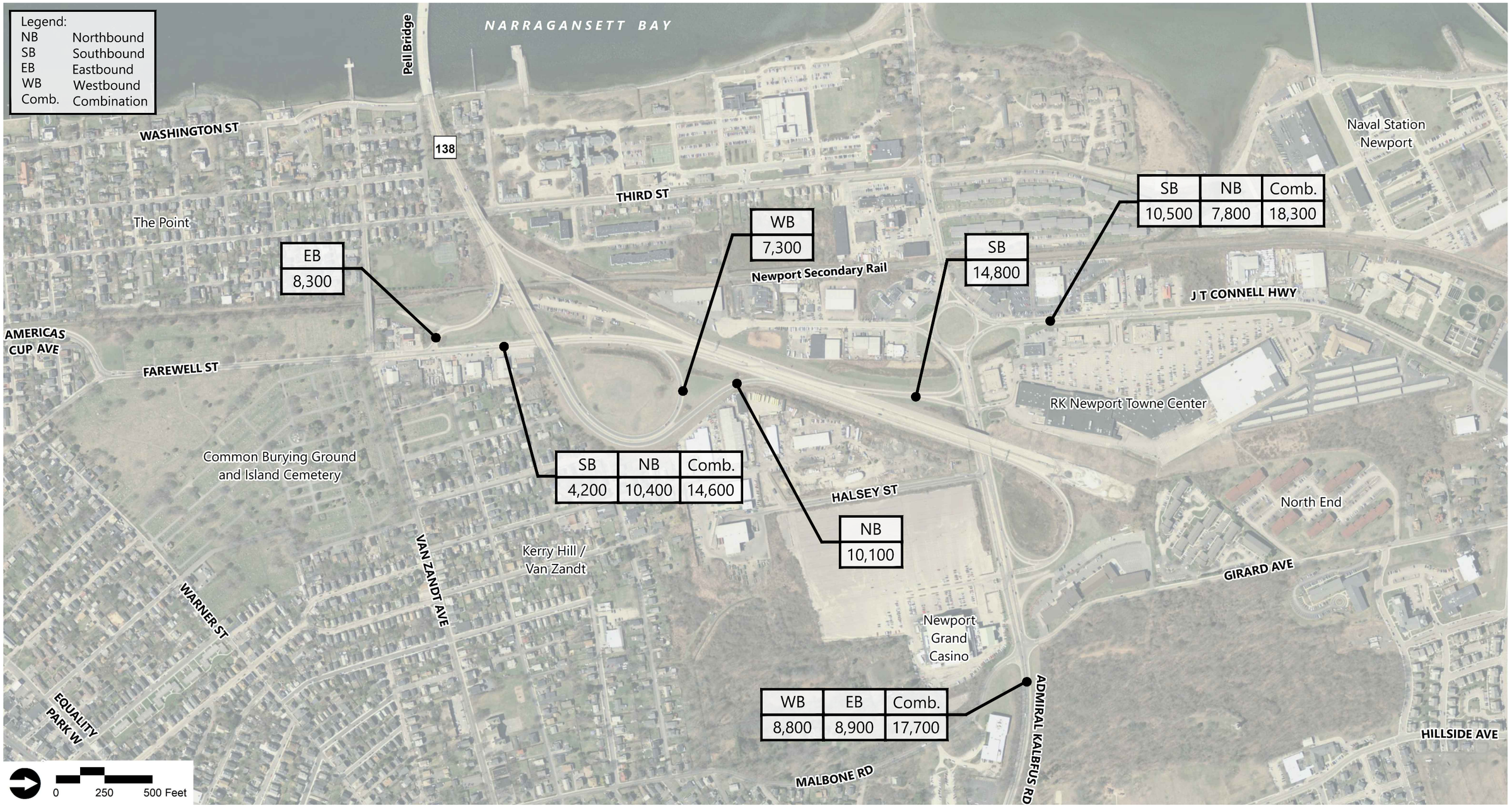
Evaluation of the morning and evening peak period turning movement counts shows that the morning peak hour for the Study Area occurs between 8:00 AM and 9:00 AM, and the evening peak hour occurs between 4:00 PM and 5:00 PM.

The turning movement counts at the intersections of Pell Bridge EB Off-Ramp to Downtown/JT Connell Highway, JT Connell Highway/Admiral Kalbfus Road, and Admiral Kalbfus Road/Halsey Street were adjusted and balanced based on ATR data, turning movement counts, and historic traffic counts from the Aquidneck Island Transportation Study. Figure 3 and Figure 4 summarize the existing weekday morning and evening peak hour traffic volumes, respectively.

Seasonal Fluctuation

Due to the unique travel characteristics of Aquidneck Island and the City of Newport specifically, seasonal fluctuations in traffic are an important consideration in the traffic analysis. Consistent with RIDOT and FHWA, the Aquidneck Island Transportation Study (AITS) adopted a practice of using the 30th highest peak hour volumes to represent summer peak season travel.

The 30th highest peak hour is determined by reviewing hourly traffic volumes over an entire year and identifying the hour with the 30th highest volume. The Aquidneck Island Transportation Study (AITS) indicated that the 30th highest hour volumes occurred during the afternoon peak (4:00 PM) on a Thursday in August during the summer peak season in Newport. Historical counts showed that traffic volumes in August were comparable to those in July; therefore, the counts collected in July were not adjusted.

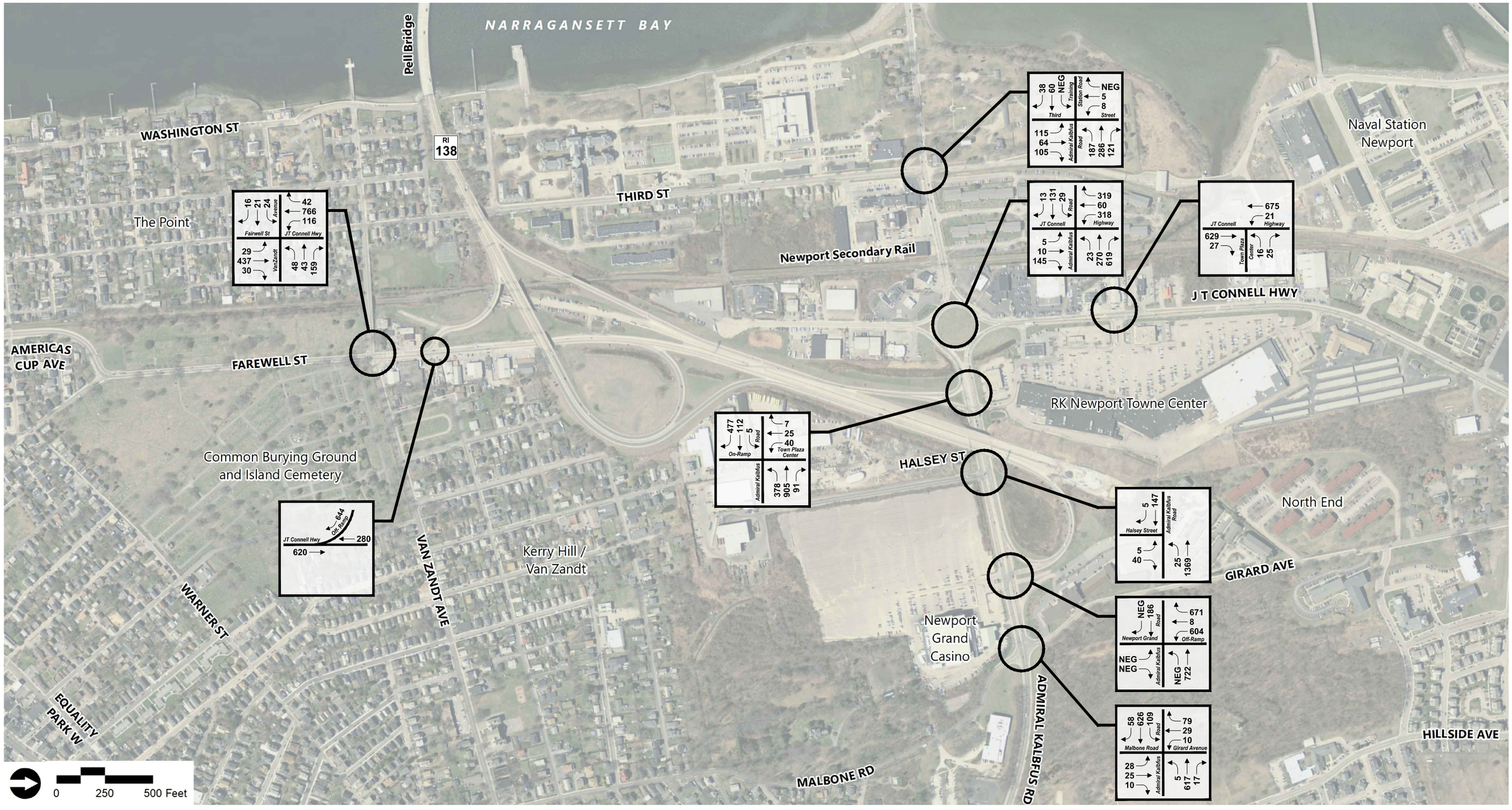


Aerial Source: RIGIS
Data Sources: Collected by Precision Data Industries LLC, compiled by VHB.

Note:
All volumes shown represent vehicles per day.

Figure 2
Existing Average Daily Traffic

Reconstruction of the Pell Bridge Approaches
Newport/Middletown, Rhode Island

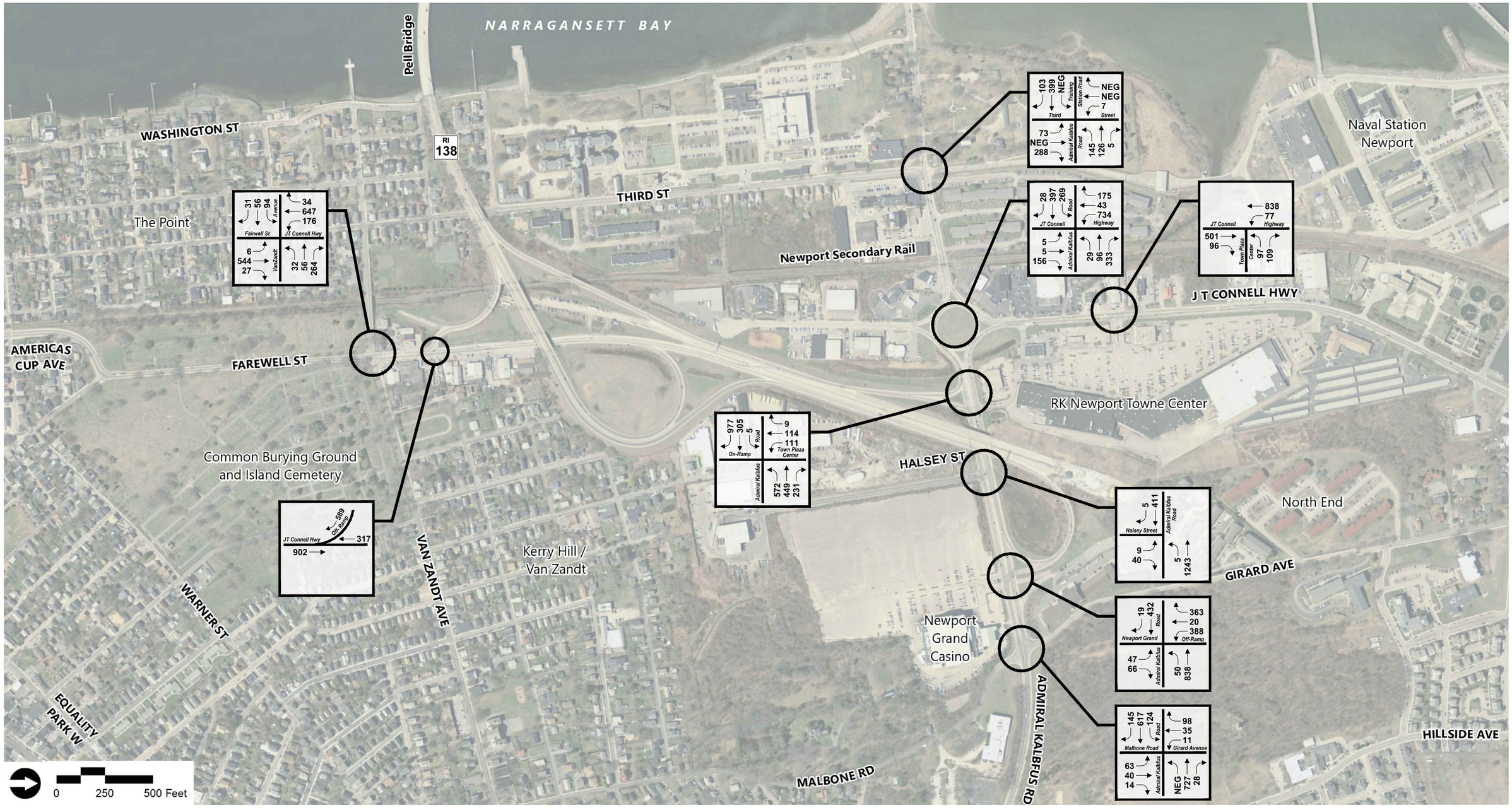


Aerial Source: RIGIS
Data Source: Collected by Precision Data Industries LLC, compiled by VHB

Figure 3

Existing Conditions
Weekday Morning Peak Hour Traffic Volumes

Reconstruction of the Pell Bridge Approaches
Newport/Middletown, Rhode Island



Aerial Source: RIGIS
Data Source: Collected by Precision Data Industries LLC, compiled by VHB

Figure 4

Existing Conditions
Weekday Evening Peak Hour Traffic Volumes

Reconstruction of the Pell Bridge Approaches
Newport/Middletown, Rhode Island

Origin-Destination Study

An origin-destination study was conducted to better understand traffic patterns in the Study Area and to calibrate the existing VISSIM microsimulation model. The data was collected by StreetLight Data, Inc using vehicle probe data, a massive volume of geospatial information created by mobile phones, GPS devices, connected vehicles/trucks, and more.

Pedestrians and Bicycles

The AITS included an inventory of the sidewalks in the Study Area, including a visual rating as either in good condition or fair/poor condition. Based on this inventory, the sidewalks along JT Connell Highway and Admiral Kalbfus Road are in fair/poor condition.

The existing bicycle system on Aquidneck Island is presented in RIDOT's publication *A Guide to Cycling in the Ocean State 2011-2012*. The guide indicates that there are no roadways within the Study Area that are designated by RIDOT as "most suitable roads" or "suitable roads" for bicycle travel. "Most suitable roads" are defined as those with adequate (wider) shoulders, while "suitable roads" have less adequate (narrower) shoulders.

State and local officials have expressed interest in expanding the bicycle network on Aquidneck Island. Such an expansion could include providing a continuous bicycle route along the west side of Aquidneck Island that would include new connections between existing "suitable" and "most suitable" roads and improving facilities on JT Connell Highway, Admiral Kalbfus Road, and 3rd Street.

Public Transportation

Bus service though the Study Area is provided by RIPTA. Gateway Center is the hub for RIPTA service in Newport. RIPTA bus service consists of six routes:

- Route 14: West Bay – Route 14 is a fixed route in Newport and Middletown that crosses the Pell Bridge. It connects Newport Gateway Center to the Kennedy Plaza. Within the Study Area, the route travels along Farewell Street and crosses Van Zandt Avenue heading to or from the Pell Bridge.
- Route 60: Providence/Newport – Route 60 is the Providence to Newport Route connecting Newport Gateway Center to Kennedy Plaza via stops along East Main and West Main Roads and the Mount Hope Bridge.
- Route 63: Broadway/Middletown Shops – Route 63, also known as the Purple Line, is a local fixed route that extends from the Stop & Shop in Middletown to the Newport Gateway Center along Admiral Kalbfus Road and JT Connell Highway.
- Route 64: Newport/URI – Route 64 is a fixed route that traverses the Pell Bridge. It extends from the Newport Gateway Center to the Kingston Railroad Station. Within the Study Area the route travels along JT Connell Highway connecting to Coddington Highway to the north.
- Route 67: Bellevue/Salve Regina University – Route 67 is a fixed-route that connects Newport Gateway Center to Salve Regina University and key tourism stops along Bellevue Avenue to the southern tip of Newport.

- Route 231: South Aquidneck Newport/Middletown – Route 231 is a FLEX service route, meaning that the route operates at a slightly lower frequency; however, it can make additional stops in the vicinity of the route by reservation. This route serves six scheduled stops in the Newport/Middletown area.

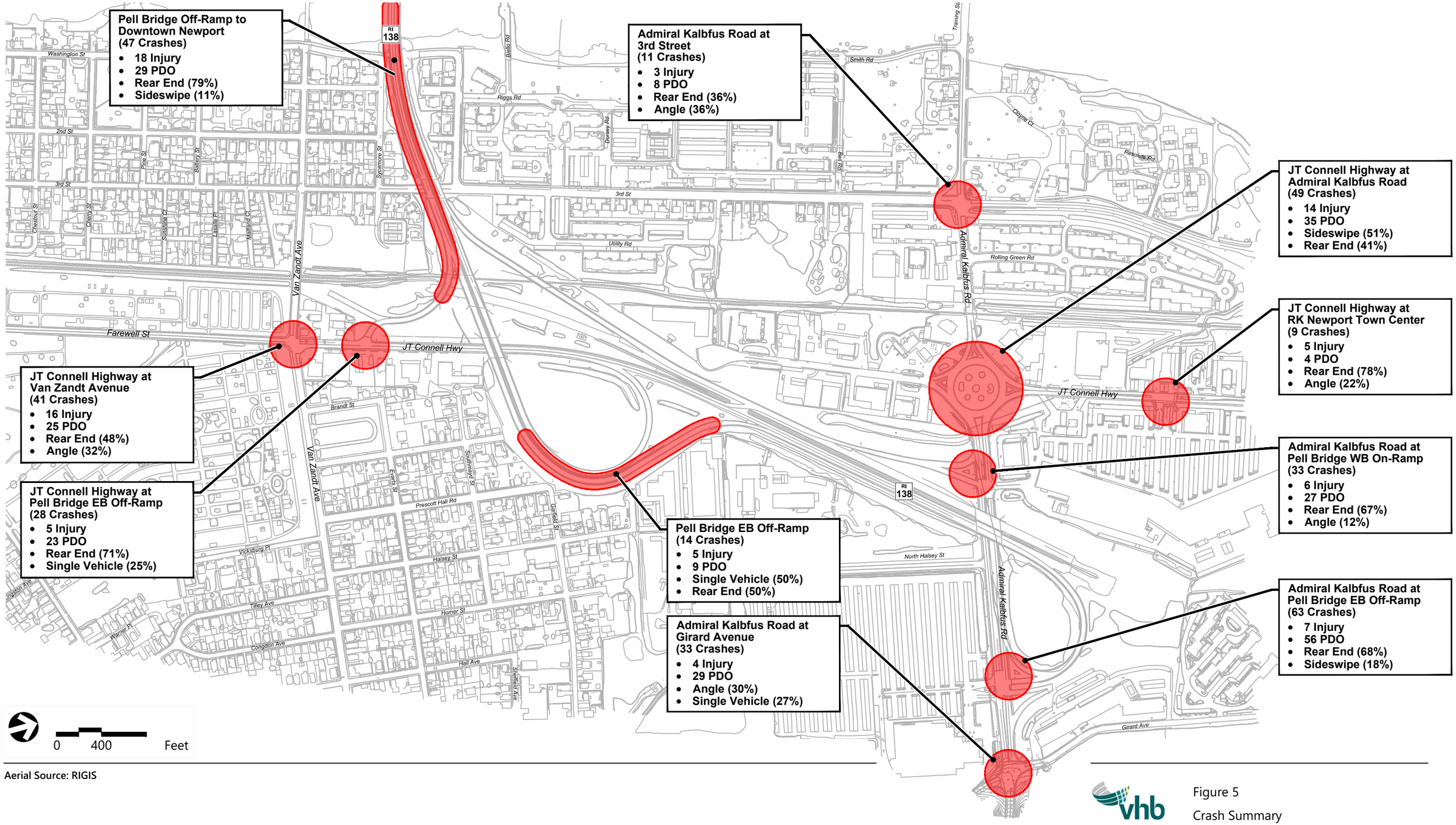
Safety Assessment

Crash data for the Study Area was provided by the RIDOT Traffic Research Unit for the five-year period between January 1, 2012 and December 31, 2016. The crashes were reviewed by severity and crash type. Severity is measured using the KABCO method, which assigns a severity type to each crash. K-type crashes result in a fatality, A-type crashes result in an incapacitating injury, B-type crashes result in an evident injury, C-type crashes result in complaints of pain, and O-type crashes result in property damage only.

Throughout the Study Area, 453 crashes occurred over the five-year analysis period. Of those, less than 1 percent were K-type crashes, 1 percent were A-type crashes, 5 percent were B-type crashes, 20 percent were C-type crashes, and the remaining 73 percent were O-type crashes. Based on the review of the crash data, the following trends were identified at key locations within the Study Area:

- At the Pell Bridge off-ramp to Downtown Newport, there were 47 crashes (rear-end and sideswipe type) that occurred due to queues extending onto the Pell Bridge from JT Connell Highway.
- At the intersection of the off-ramp to Downtown Newport and JT Connell Highway, there were 28 crashes (rear-end and run-off-the-road type) that occurred due to queues on the off-ramp or vehicles losing control when exiting Route 138.
- At the signalized intersection of JT Connell Highway and Van Zandt Avenue, there were 41 crashes (rear-end and angle type crashes) due to congestion along JT Connell Highway.
- At the signalized intersection of Admiral Kalbfus Road with the Route 138 off-ramp, there were 63 crashes (rear-end and sideswipe type) due to queues on the off-ramp and changing lanes on the off-ramp. Of the 63 crashes, 56 were property damage only or no injury (O-type).
- At the signalized intersection of Admiral Kalbfus Road at the Route 138 on-ramp, there were 33 crashes (rear-end and angle type) due to congestion and misjudgment of the turning movement onto the ramp.
- At the Newport Rotary, the intersection of JT Connell Highway at Admiral Kalbfus Road, there were 49 crashes (sideswipe and rear-end type) due to confusion regarding the right-of-way within the rotary and drivers yielding prior to entering.
- Along the JT Connell Highway/Coddington Highway corridor, there were 77 crashes. The majority of the crashes were intersection related, which include angle and rear-end crash types.

Figure 5 summarizes the crash trends described above. The detailed crash analysis can be found in Appendix B.



Aerial Source: RIGIS

Figure 5

Crash Summary
Existing Conditions

Reconstruction of the Pell Bridge Approaches
Newport/Middletown, Rhode Island

Predictive Crash Analysis

As part of the Project's alternatives analysis, the Highway Safety Manual[1] (HSM) predictive methodology was used to compare the No Action Alternative with the action alternatives using projected traffic volumes for 2040. The HSM predictive methodology uses Safety Performance Functions (SPFs) and Crash Modification Factors (CMFs) to predict crash frequency at a roadway facility as a function of traffic, geometrics, and roadside characteristics. Unfortunately, Rhode Island does not have calibrated SPFs for any of the facility types required in this analysis, meaning the alternatives had to be compared relative to each other rather than in terms of the numeric difference in predicted crashes.

When modeling ramps, ramp terminals, and collector-distributors, the Enhanced Interchanged Safety Analysis Tool (ISATe) was used for the prediction. For the arterial segments and intersections, the HSM Chapter 12 spreadsheets were used. Because the HSM does not have a predictive model for roundabouts, the roundabout was predicted as a 4-leg stop-control intersection, then roundabout CMFs[2] were applied for total (CMF=0.71) and fatal and injury crashes (CMF=0.19). Where there were segments with three through lanes, an average of the results was taken for a 2-lane and 4-lane segment analysis. The predictive methodology has inherent error, although the specific error value is unknown.

For the Proposed Action (identified as Alternative 4B in the alternatives analysis), the sum of predicted total crashes, fatal and injury (FI) crashes, and property damage only (PDO) crashes for the Proposed Action alternative were compared to the estimate for the No Action alternative. The relative difference (i.e., reduction) between the Proposed Action and the No Action alternative is presented below in Table 2.

Table 2: Predicted Reduction in Study Area Crashes for Proposed Action and No Action

Alternative	Total Crashes	FI Crashes	PDO Crashes
No Action	0%	0%	0%
Proposed Action	16%	36%	4%

The Proposed Action is predicted to reduce fatal and injury crashes by 36 percent compared to No Action, which is a significant reduction. The property damage only crashes were reduced by 4 percent between the Proposed Action and No Action in the predictive analysis, and the overall reduction in crashes was estimated at 16 percent.

The traditional predictive method for urban suburban arterials does not consider the presence and geometry of horizontal curves, and the curve geometry varies between the No Action and Proposed Action. To gain an estimate of

[1] American Association of State Highway and Transportation Officials (AASHTO). Highway Safety Manual. Washington, DC, 2010.

[2] "NCHRP Report 572: Applying Roundabouts in the United States." Washington, D.C., Transportation Research Board, National Research Council, 2007.

the potential safety impact of the curve geometry, the horizontal curve CMF for a freeway segment was used because the facility is similar in characteristics to a freeway. Applying the CMFs, found in Chapter 18 of the HSM, for the two curve radii to the Pell Bridge approach segments revealed somewhat different results, which are presented in Table 3. Evaluation by this method indicates that the Proposed Action is likely to produce fewer crashes within the interchange area because it has a radius of nearly 1200 feet, compared to the existing radius in the No Action alternative.

Table 3: Predicted Reduction in Study Area Crashes for Proposed Action and No Action Considering Freeway Curve Geometry

Alternative	Total Crashes	FI Crashes	PDO Crashes
No Action	0%	0%	0%
Proposed Action	13%	34%	-1%

Traffic Operations

Observed Traffic Operations

To fully characterize existing traffic operations and deficiencies, existing traffic conditions were observed in the field along the Pell Bridge approaches and within the Study Area. This information was used to develop the base conditions for calibrating the VISSIM traffic simulation model.

Specific highlights of the traffic observations are presented below.

- Vehicle queues on the Pell Bridge eastbound off-ramp to JT Connell Highway (Downtown Newport exit) often back up onto the Pell Bridge, impacting the mainline traffic going to Route 138/Route 114/Route 24 (Middletown and Portsmouth). This is often caused by the combination of weaving off-ramp traffic and occasional vehicle queues on JT Connell Highway extending through the off-ramp as they approach the Van Zandt Avenue traffic signal.
- Due to the single lane approach on Farewell Street northbound, long delays and vehicle queues are experienced during the weekday evening peak hour. At times, northbound through vehicles are blocked by northbound left-turning vehicles while waiting for gaps in the southbound direction.
- The vehicle queues on Admiral Kalbfus Road often spill into adjacent intersections. This includes the eastbound and westbound approaches at the Newport Towne Center south driveway/Pell Bridge eastbound on-ramp, the Newport Rotary, and Halsey Street. Due to heavy volumes traveling down JT Connell Highway toward Pell Bridge and Downtown Newport, the Admiral Kalbfus eastbound queue often extends to the Newport Rotary and westbound left-turns extend to Halsey Street during the evening peak hour.
- Due to the constraints at the Newport Towne Center south driveway/Pell Bridge WB on-ramp and the heavy traffic exiting Naval Station Newport, Admiral Kalbfus Road eastbound approaching the Newport Rotary often experiences a backup beyond the railroad track and extending to the 3rd Street traffic signal.

- Vehicle queues on the JT Connell Highway northbound and southbound approaches at the Newport Towne Center main driveway are long due to heavy through traffic in a single lane during the weekday evening peak hour.
- Traffic entering and exiting Malbone Road/Girard Avenue experiences delays during peak periods due to the large radii on all corners, which creates a confusing, wide-open intersection. The lane drop traveling eastbound through the intersection is also a contributing factor to confusion and delay. This makes it difficult for pedestrians and motorists to cross the intersection.

To quantify existing traffic operations, the Study Area roadways and intersections were modeled and analyzed using VISSIM microscopic traffic simulation software (Version 8). Because of its extensive modeling and analysis capabilities, the VISSIM model provides a more comprehensive evaluation of complex transportation facilities, such as the freeway ramp system network with closely spaced signalized, unsignalized, and roundabout/rotary intersections, compared to the traditional traffic analysis methodology based on the Highway Capacity Manual (HCM).

Traffic Operations Analysis

The Study Area roadways and intersections shown in Figure 1 were included in the VISSIM simulation model. Although there are several minor side streets and driveways along JT Connell Highway and Admiral Kalbfus Road within the Study Area, the traffic volumes entering and exiting them are relatively low based on field observations, and therefore were not included in the model.

The evaluation criteria used to analyze the Study Area roadways and intersections are based on the measures of effectiveness (MOEs) provided by the VISSIM traffic simulation model. Typical MOEs used for an operations analysis include:

- Vehicle Throughput: The purpose of tracking modeled vehicle throughput is to verify that the projected condition is being accurately modeled. Notably more or less volume being modeled than was observed could indicate a deficiency in the traffic model.
- Delay: Delay measured in seconds is used as an indicator for how the system is performing. High levels of delay suggest slower travel speeds and congestion, both of which indicate poor levels of service.
- Average Speed/Travel Time: Similar to delay, average travel speed and travel time are indicators of how long it takes to traverse the network. Slower speeds and longer travel times indicate poor levels of service.
- Level of Service (LOS): The level of service is based on delay and travel conditions. Assigning a level of service to movements and intersections helps characterize operations. LOS ranges from A to F, with LOS F being the worst (most congested) condition and LOS A – D considered acceptable. LOS is an established measure from the HCM. While VISSIM does not use the methodologies described in the HCM, the delay thresholds the HCM provides were applied to the VISSIM outputs.
- Queue Length (Average, Maximum): Queues are used as an indicator for corridor congestion.

All model results reported in this evaluation are based on an average of ten model runs, each based on a unique random seed value, to accurately model the stochastic (random) nature of traffic. The existing conditions were

calibrated using collected data and observations. All calibration thresholds were met; the results from the calibrated VISSIM model are consistent with the operational conditions observed in the field during the peak hour periods. This calibrated VISSIM model was used as a tool to identify problem areas and provide a comparison baseline for the No Action and Proposed Action conditions.

Intersection Operations Summary

The calibrated existing VISSIM model was used to characterize the existing travel conditions in the network. Overall, most intersections in the network operate well at level of service A and B. Critical intersections showing existing deficiencies include:

- JT Connell Highway at the Pell Bridge EB off-ramp
  - Weekday Morning: LOS F, critical movement EB
  - Weekday Evening: LOS F, critical movement EB
    Admiral Kalbfus/Training Station at Third Street
  - Weekday Evening: LOS E, critical movement EB, NB
- Admiral Kalbfus at JT Connell Highway
  - Weekday Evening: LOS E, critical movement EB

The VISSIM model delays, travel speeds and estimated LOS for existing weekday morning and evening peak hour conditions are summarized in Table 4. Detailed intersection MOE reports are provided in Appendix C.

As shown in Table 4, the intersection of JT Connell Highway with the Pell Bridge eastbound off-ramp is operating at LOS F during both the morning and evening peak hour period, with a long queue on the Pell Bridge eastbound off-ramp extending onto the Pell Bridge. A review of the simulation also shows that the queue is predominately located in the right lane, and several aggressive drivers used the left lane to bypass the queue and cut into the right lane at the last minute.

Even though the intersection of JT Connell Highway/Farewell Street/Van Zandt Avenue is operating at LOS B overall, the southbound queue on JT Connell Highway extends to the Pell Bridge eastbound off-ramp. Similarly, while the intersection of JT Connell Highway/Newport Towne Center is operating at LOS B, there are long queues on both the northbound and southbound approaches. The one through lane is not sufficient for the volume of traffic observed.

Table 4: Existing Weekday Traffic Conditions

Intersection Control Type	Intersection	Peak Hour	Existing Condition		
			Delay[1]	LOS[2]	LOS E/F Movements
Stop Controlled	JT Connell Highway at Pell Bridge EB off-ramp	AM	**> 100**	**F**	**EB L/R**
		PM	**71**	**F**	**EB L/R**
Signal Controlled	JT Connell Highway/Farewell Street at Van Zandt Avenue	AM	14	B	
		PM	14	B	
Signal Controlled	JT Connell Highway at Newport Towne Center Main Drive	AM	19	B	
		PM	19	B	
Signal Controlled	Admiral Kalbfus Rd/Training Station Road at 3rd Street	AM	11	B	
		PM	**75**	**E**	**EB L/T/R and NB R**
Roundabout/ Rotary[3]	Admiral Kalbfus Road at JT Connell Highway	AM	5	A	
		PM	**47**	**E**	**EB L/T/R**
Signal Controlled	Admiral Kalbfus Road at Newport Towne Center South Drive/on-ramp	AM	11	B	
		PM	22	C	
Stop Controlled	Admiral Kalbfus Road at Halsey Street	AM	3	A	
		PM	18	C	**NB L/R**
Signal Controlled	Admiral Kalbfus Road at Newport Grand Drive/off-ramp	AM	18	B	
		PM	18	B	
Stop Controlled	Admiral Kalbfus Road at Girard Avenue/Malbone Road	AM	3	A	
		PM	8	A	**NB L/T/R**

Source: VISSIM 8 Node Evaluation. Compiled by VHB based on the average of 10 VISSIM model runs.
1 Delay = Vehicle delay expressed in seconds per vehicle
2 LOS = Estimated Level of service
3 LOS criteria for roundabout/rotary are the same as LOS criteria for unsignalized intersection

While the intersection of Admiral Kalbfus Road/Training Station/3rd Street is operating at LOS B during the morning peak period and LOS E during the evening peak period, the traffic flow through the intersection is restricted by congestion at the Newport Rotary during the evening peak hour. The eastbound approach and northbound right-turn approach are delayed due to long eastbound queues at the adjacent Newport Rotary where eastbound queues extend back and fill the receiving lane.

The Newport Rotary (Admiral Kalbfus Road/JT Connell Highway) is operating at LOS E during the evening peak hour. The long delays and queue on the eastbound approach are caused by a combination of the heavy

southbound left-turn movements, congestion at the Admiral Kalbfus Road/Newport Towne Center signal, and the merge onto the Pell Bridge westbound on-ramp. The eastbound queue approaching the rotary often extends over the railroad tracks (a distance of more than 200 feet) and at times extends to the 3rd Street signal (over 600 feet). Due to the heavy left-turn movement, the southbound queue can extend to the Newport Towne Center signal.

While the intersection of Admiral Kalbfus Road/Newport Towne Center is operating at LOS C during the evening peak hour, the eastbound queue often backs up to the Newport Rotary (over 200 feet) and restricts operation at that intersection. The westbound left-turn onto the Pell Bridge on-ramp also backs up and extends to Halsey Street (over 300 feet).

Although the overall LOS at the intersection of Admiral Kalbfus Road/Halsey Streets is operating at LOS C, the stop-controlled northbound approach is operating at LOS F due to high volumes on Admiral Kalbfus Road and a wide roadway cross-section.

The intersection of Admiral Kalbfus Road/Girard Avenue/Malbone Road is operating at an overall LOS A, but the stop-controlled northbound approach is operating at LOS E.

Roadway Operations Summary

Roadway operations are primarily characterized by travel speed. Lower travel speeds indicate longer travel times and increased delay. Because of the closely spaced intersections and congested roadway network, the traffic interactions between intersections can restrict and/or meter the traffic upstream and downstream of an intersection. The average speed for each of the Study Area roadway segments is shown in Figure 6 and Figure 7 for the morning and evening peak hour periods, respectively, to help illustrate the overall level of congestion within the Study Area.

Aerial Source: RIGIS
Source: VISSIM 8 Node Evaluation. Compiled VHB Based on Average of 10 VISSIM Model Runs.

Intersection Operations

- Level of Service A/B
- Level of Service C/D
- Level of Service E/F

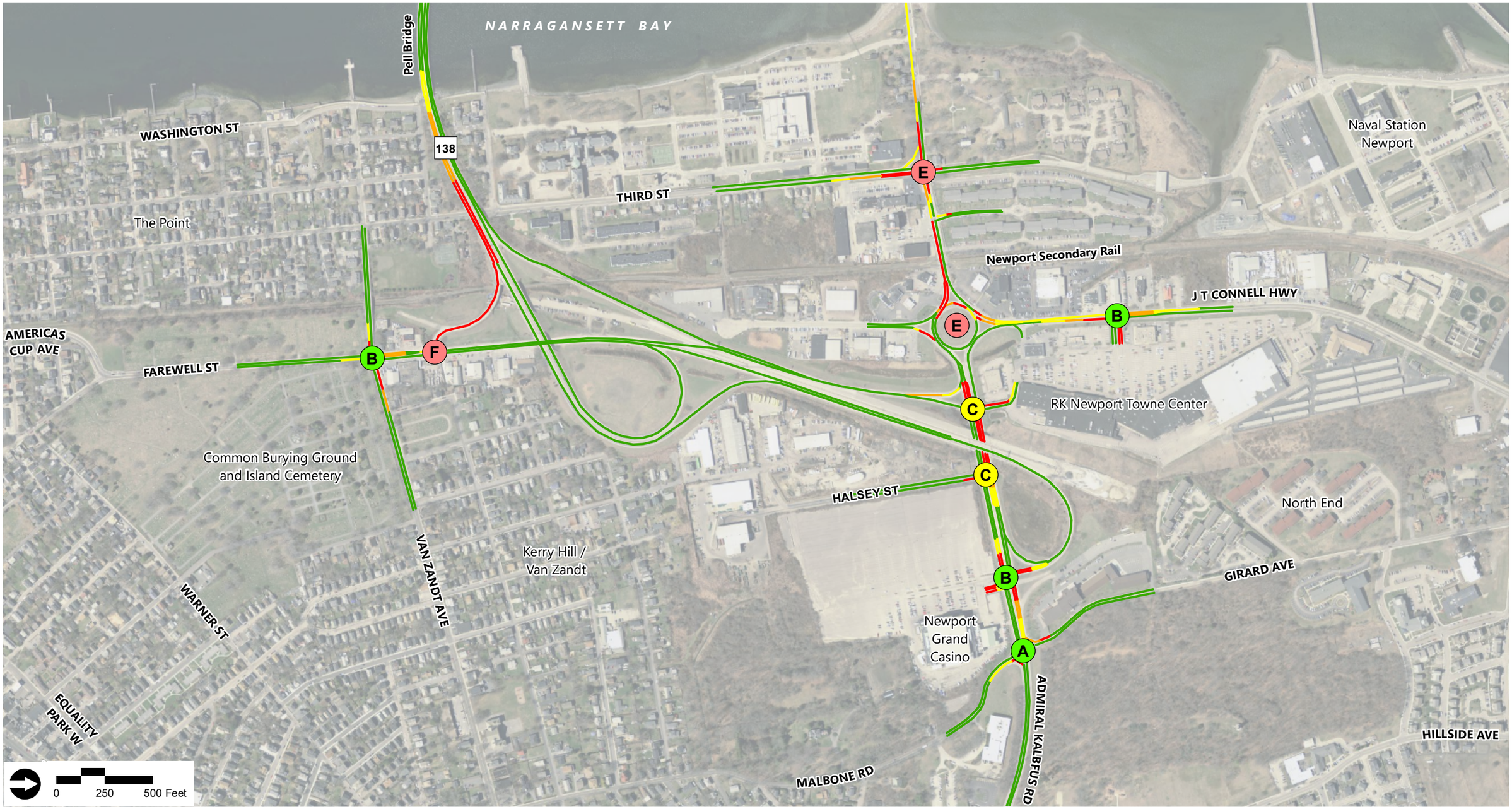
Existing Morning Average Speeds

- 0-10 MPH
- 11-15 MPH
- 16-25 MPH
- >25 MPH

Figure 6

Network Operations
Existing Conditions
Weekday Morning

Reconstruction of the Pell Bridge Approaches
Newport/Middletown, Rhode Island



Aerial Source: RIGIS
Source: VISSIM 8 Node Evaluation. Compiled VHB Based on Average of 10 VISSIM Model Runs.

Intersection Operations

- Level of Service A/B
- Level of Service C/D
- Level of Service E/F

Existing Evening Average Speeds

- 0-10 MPH
- 11-15 MPH
- 16-25 MPH
- > 25 MPH

Figure 7

Network Operations
Existing Conditions
Weekday Evening

Reconstruction of the Pell Bridge Approaches
Newport/Middletown, Rhode Island

4. Future Transportation Conditions

This section summarizes the 2040 No Action and 2040 Proposed Action conditions.

2040 No Action Condition

Traffic Volumes

Projected future traffic volumes without the Project were developed by applying an annual growth rate to the existing volumes to account for background growth in traffic, population, and planned development projects. Historical data suggests a growth rate of 0.44 percent per year on roadways within the Study Area, and growth on the Pell Bridge of 0.55 percent per year (approximately 0.5 percent overall). These annual growth rates take into account some development in the area, specifically the North End Master Plan and the Innovation Hub.

An average annual growth rate of 0.25 percent was applied to existing volumes to project the 2040 No Action traffic volumes. This growth rate represents a rate about half of what was suggested by historical data. A rate of 0.25 percent annually until the year 2040 is a very conservative estimate of population and ambient traffic growth. While there could be some years of strong growth, it is conservative to assume that growth of 0.25 percent annually can be sustained over the next 20 years.

The 2040 No Action traffic volumes are illustrated in Figures 8 and 9.

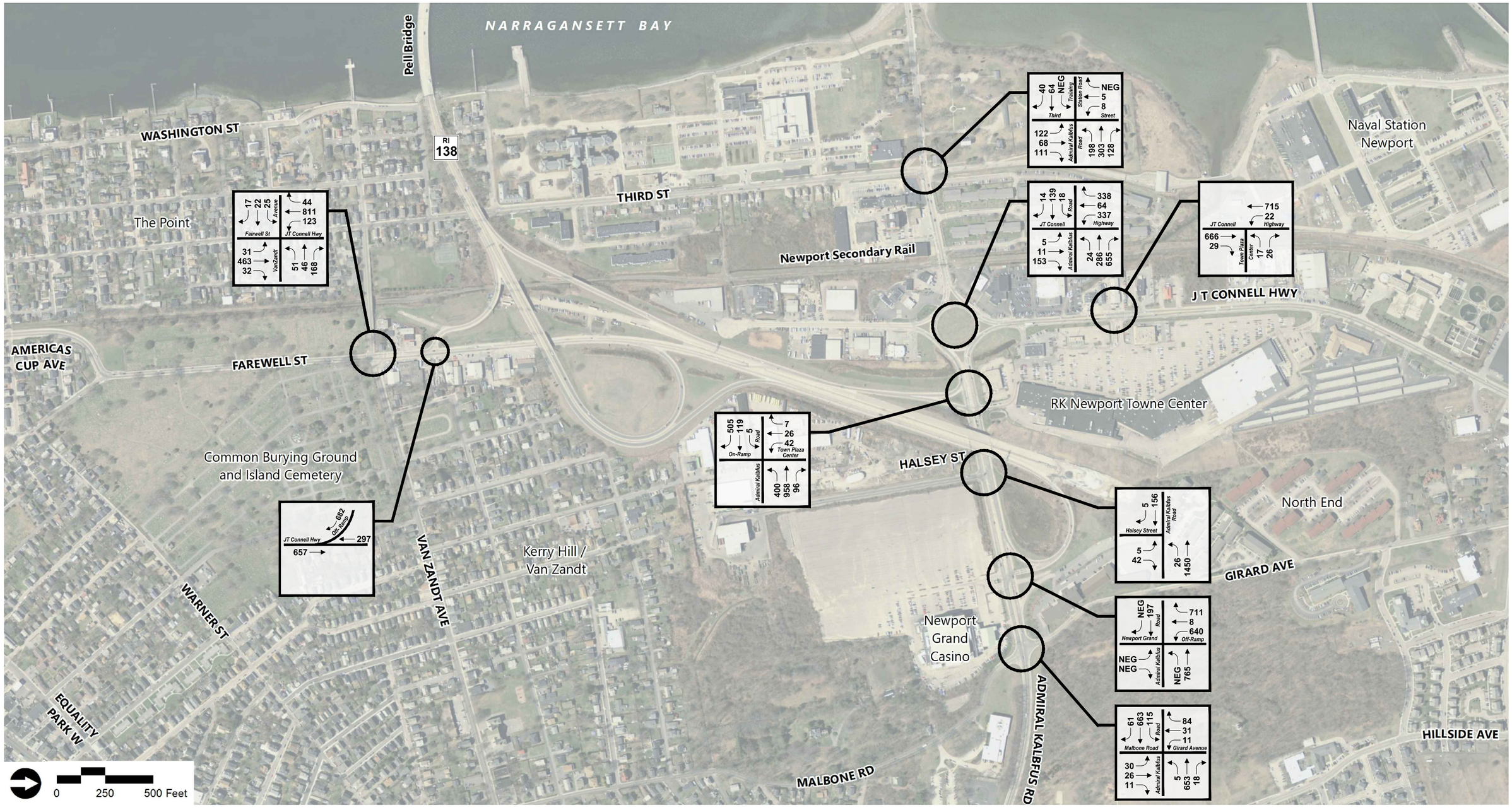
Traffic Operations Analysis

As described earlier in this chapter, the calibrated VISSIM traffic simulation model was used as a base to test and evaluate future transportation conditions by adjusting roadway geometry, where needed, and traffic conditions.

Intersection Operations Summary

Under the No Action condition, operations will continue to deteriorate at critical locations. As shown in Table 5, the Pell Bridge eastbound off-ramp will continue to operate at LOS F with queues extending further on the Pell Bridge during both the morning and evening peak periods. No Action operations are summarized below.

- The intersection of JT Connell Highway/Farwell Street/Van Zandt Avenue will operate at LOS B; however, the southbound queue will continue to extend to and block the Pell Bridge eastbound off-ramp.
- JT Connell Highway/Newport Towne Center is expected to degrade to LOS C from LOS B. The northbound and southbound queues will continue to be long due to the interactions with the nearby Newport Rotary.
- While the LOS for the intersection of Admiral Kalbfus Road/Training School Road/3rd Street remains at LOS B during the morning peak hour, the delays, queues, and LOS will continue to grow significantly during the evening peak hour.
- The LOS at the intersection of Admiral Kalbfus Road/JT Connell Highway (Newport Rotary) is expected to remain at LOS A, while the LOS during the evening peak hour is expected to degrade to LOS F. The eastbound queue will continue to extend to the 3rd Street signal and disrupt operations at that location.



Aerial Source: RIGIS

Figure 8

2040 No-Action Condition
Weekday Morning
Peak Hour Traffic Volumes

Reconstruction of the Pell Bridge Approaches
Newport/Middletown, Rhode Island

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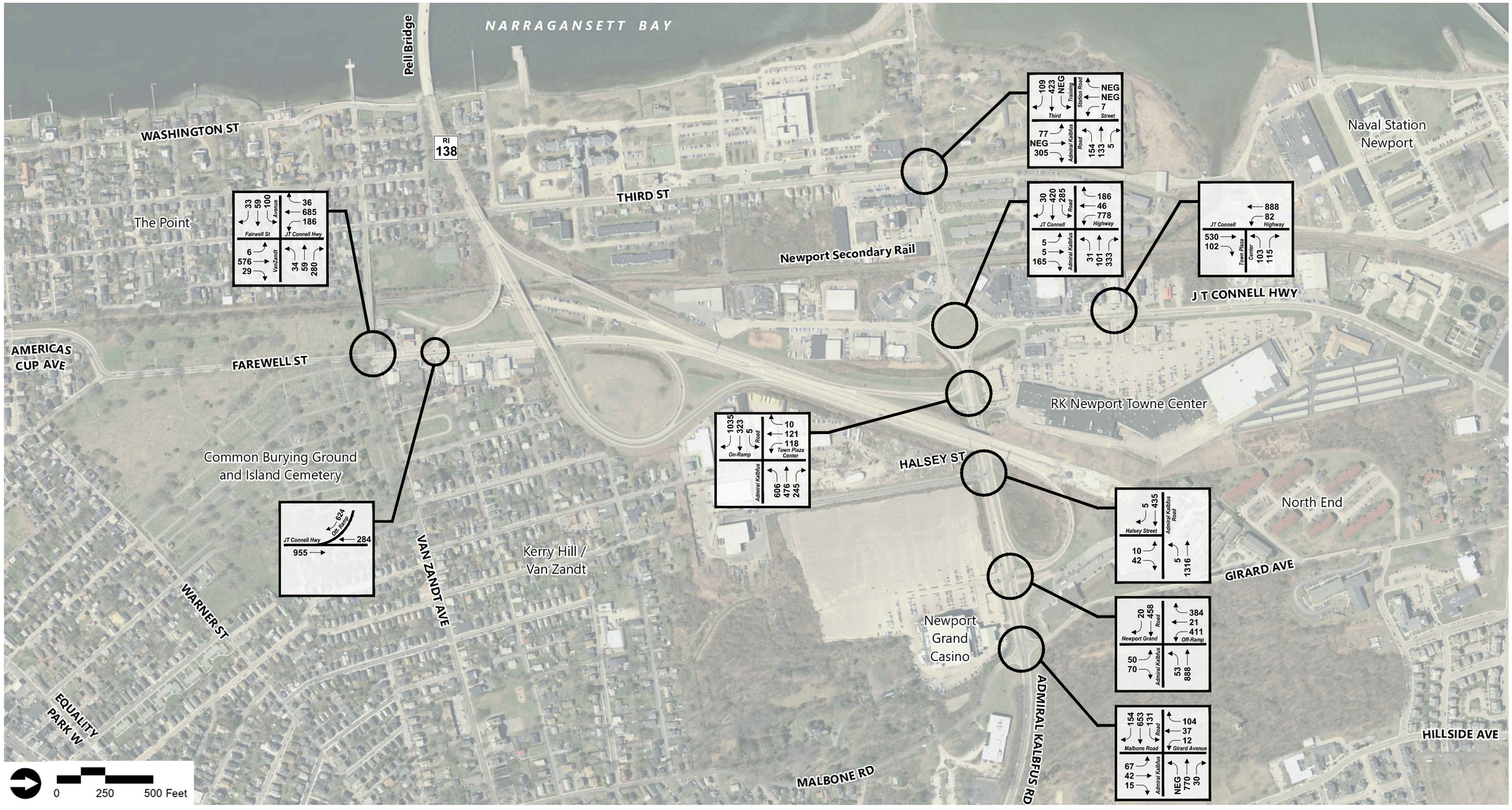

Aerial Source: RIGIS

Figure 9

2040 No-Action Condition
Weekday Evening
Peak Hour Traffic Volumes

Reconstruction of the Pell Bridge Approaches
Newport/Middletown, Rhode Island

Table 5: 2040 No Action Weekday Conditions

Intersection Control Type	Intersection	Peak Hour	Existing Condition			2040 No Action		
			Delay[1]	LOS[2]	LOS E/F Movements	Delay[1]	LOS[2]	LOS E/F Movements
Stop Controlled	JT Connell Highway at Pell Bridge EB off-ramp	AM	> 100	F	EB L/R	> 100	F	EB L/R
		PM	71	F	EB L/R	> 100	F	EB L/R
Signal Controlled	JT Connell Highway/Farewell Street at Van Zandt Avenue	AM	14	B		16	B	
		PM	14	B		16	B	
Signal Controlled	JT Connell Highway at Newport Towne Center Main Drive	AM	19	B		22	C	
		PM	19	B		28	C	
Signal Controlled	Admiral Kalbfus Road/Training Station Road at 3rd Street	AM	11	B		14	B	
		PM	75	E	EB L/T/R and NB R	> 100	F	EB L/T/R and NB R
Roundabout/ Rotary[3]	Admiral Kalbfus Road at JT Connell Highway	AM	5	A		7	A	
		PM	47	E	EB L/T/R	62	F	EB L/T/R WB L/T/R SB L/T/R
Signal Controlled	Admiral Kalbfus Road at Newport Towne Center South Drive/on-ramp	AM	11	B		16	B	
		PM	22	C		28	C	WB L
Stop Controlled	Admiral Kalbfus Road at Halsey Street	AM	3	A		5	A	
		PM	18	C	NB L/R	42	E	WB L/T NB L/R
Signal Controlled	Admiral Kalbfus Rd at Newport Grand Drive/off-ramp	AM	18	B		19	B	
		PM	18	B		26	C	
Stop Controlled	Admiral Kalbfus Road at Girard Avenue/Malbone Road	AM	3	A		3	A	
		PM	8	A	NB L/T/R	26	D	WB L/T NB L/T/R

Source: VISSIM 8 Node Evaluation. Compiled by VHB based on the average of 10 VISSIM model runs.
1 Delay = Vehicle delay expressed in seconds per vehicle
2 LOS = Estimated Level of service
3 LOS criteria for roundabout/rotary is the same of LOS criteria for unsignalized intersection

- The overall LOS at Admiral Kalbfus Road/Newport Towne Center remains the same as existing; however, the westbound left turn is expected to operate at LOS F. The eastbound and westbound queues will continue to extend and block the Newport Rotary and Halsey Street, respectively.
- The Halsey Street northbound approach will operate at LOS F; the westbound through and left-turn movements are also expected to degrade to LOS E due the restriction on the westbound approaching the Newport Towne Center signal.
- The Malbone Road northbound approach will continue to operate at LOS F, and the westbound left and through movements are also expected to operate at LOS E.

The detailed intersection MOE summary is provided in Appendix C.

Roadway Operations Summary

Under the No Action condition, travel time and delays are expected to increase and the average speed is expected to decrease. As illustrated in Figures 10 and 11, the average speed on the Pell Bridge eastbound approach, JT Connell Highway, and Admiral Kalbfus Road are all forecast to decrease due to growing traffic volumes.

2040 Proposed Action Conditions

As discussed in the Alternatives Analysis document, several alternatives were considered to meet the project Purpose and Need. Based on an alternatives screening, Alternative 4B was selected as the Proposed Action to improve safety, provide multimodal access for all roadway users (transit, bicyclists, pedestrians), and improve traffic circulation and connections through the Study Area while providing land area for redevelopment. Figure 12 illustrates the Project components, which include the following:

- Remove existing highway infrastructure and associated ramp network including the Downtown Newport off-ramp.
- Reconnect local roadway network along JT Connell Highway, Halsey Street, and Dyers Gate.
- Construct shared-use path along the Newport Secondary Rail Corridor.
- Install pedestrian and bicycle accommodations along Study Area roadways.
- Construct an approximately 300-space park and ride to accommodate parking for a pilot shuttle service, which will allow visitors to utilize a train service to enter Downtown Newport rather than driving into Downtown to find parking.
- Resurface JT Connell Highway from the RK Towne Plaza to West Main Road. Additional improvements include pedestrian and bicycle accommodations.

Aerial Source: RIGIS
Source: VISSIM 8 Node Evaluation. Compiled VHB Based on Average of 10 VISSIM Model Runs.

Intersection Operations

- Level of Service A/B
- Level of Service C/D
- Level of Service E/F

No-Action Morning Average Speeds

- 0-10 MPH
- 10-15 MPH
- 16-25 MPH
- >25 MPH

Figure 10

Network Operations
No-Action Conditions
Weekday Morning

Reconstruction of the Pell Bridge Approaches
Newport/Middletown, Rhode Island

Aerial Source: RIGIS
Source: VISSIM 8 Node Evaluation. Compiled VHB Based on Average of 10 VISSIM Model Runs.

Intersection Operations

- Level of Service A/B
- Level of Service C/D
- Level of Service E/F

No-Action Evening Average Speeds

- 0-10 MPH
- 10-15 MPH
- 16-25 MPH
- >25 MPH

Figure 11

Network Operations
No-Action Conditions
Weekday Evenings

Reconstruction of the Pell Bridge Approaches
Newport/Middletown, Rhode Island

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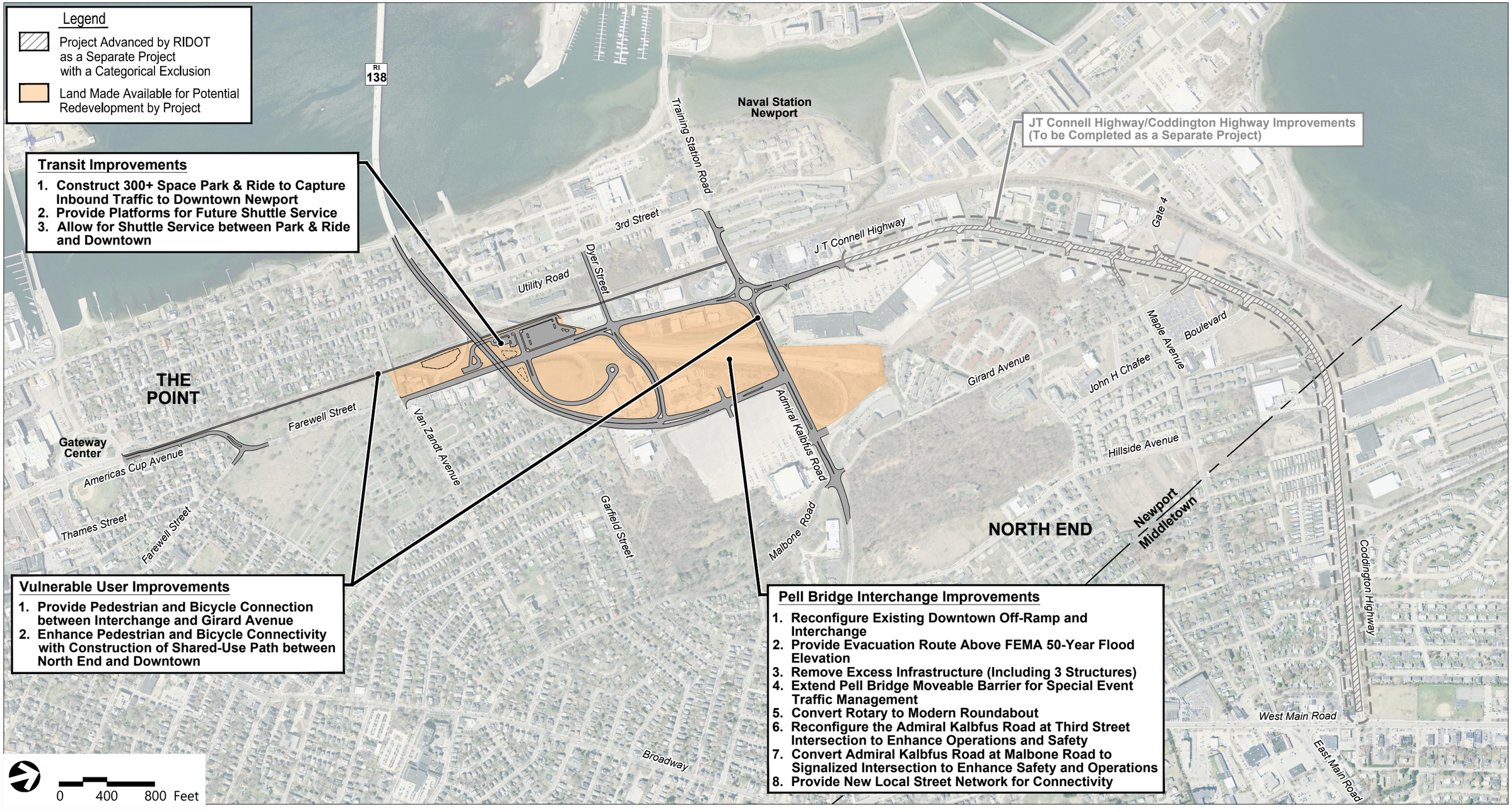


Aerial Source: RIGIS

Figure 12

2040 Proposed Action
Project Components

Reconstruction of the Pell Bridge Approaches
Newport/Middletown, Rhode Island

Traffic Volumes

Redistribution of 2040 No Action Traffic Volumes

As described above, the new roadway connections and intersections would provide alternate connections and access to improve traffic circulation and reduce congestion and queuing. However, due to limited regional north-south and east-west connections, the traffic pattern changes will alter only the local movements and access within the Study Area. The connectivity changes are not expected to change regional travel patterns. Based on the origin-destination study, field observations, and local knowledge of area traffic patterns, the 2040 traffic volumes were redistributed and assigned to the Proposed Action roadway network. The reassigned trips were then supplemented with new traffic generated by potential development.

Potential Site-Generated Traffic

To estimate the traffic impacts of the Project, it is necessary to determine the traffic volumes that may be generated due to new development. As described above, the Project would free up parcels for redevelopment. The potential site-generated traffic depends on numerous factors such as the size of the developable parcels, the building program, access, and the economic climate (which may also dictate the redevelopment timeline).

The City of Newport has envisioned a mixed-use redevelopment in the parcels made available after Project completion that includes office, research & development, commercial, intermodal support, and open space uses. In addition, the existing Newport Grand site is also planned for redevelopment. The building program for the former casino includes a 250-room hotel and 150,000 square feet of retail space. Due to the uncertainty of the development timeline and the fact that there is no specific building program for most of the right of way that would be redeveloped after completion of the Project, it is assumed that only the Newport Grand site and the 300-space Park & Ride would be constructed concurrently with the Proposed Action. Based on this assumption, ITE Trip Generation regression equations and rates for each land use were used to estimate the morning and evening peak hour vehicle trips, which are summarized in Table 6.

Table 6: Trip Generation Summary

Innovation Hub									
Parcel	Acres	Land Use	Gross Square Footage	AM Peak Hour			PM Peak Hour		
				Total	Enter	Exit	Total	Enter	Exit
D	5	Park & Ride (LUC 090)	*300 spaces*	214	169	45	188	47	141
E	3	Open Space	-						
Total	41		733,000	214	169	45	188	47	141
Newport Grand									
Newport Grand		Hotel (LUC 310)	*250 rooms*	120	71	49	161	82	79
		Retail (LUC 820)	150,000	227	141	86	734	352	382
		Total	150,000	347	212	135	895	434	461

Source: ITE Trip Generation Manual.

Not all the traffic generated by the redevelopment will be new traffic on Study Area roadways. A portion of the vehicle-trips generated will be drawn from the existing traffic stream passing through the area in the form of pass-by trips. Pass-by trips are vehicle trips already in the network that would use components of the Project en route to another destination. These trips are not additional trips added to the network, but rather existing trips which are reflected in the Project traffic volumes. Based on ITE Data, pass-by trips can be as high as 94 percent of all traffic. Typical pass-by trip rates for commercial/retail uses (LUC 820 – shopping center) average 61 percent. In order to present a conservative analysis (projecting higher than expected traffic volumes), 40 percent of the traffic generated by the commercial/retail was assumed to be pass-by trips.

The traffic generated by the redevelopment was assigned to the Proposed Action Condition roadway network based on origin-destination data, field operations, and local knowledge of the traffic patterns in the area.

2040 Proposed Action Traffic Volumes

The 2040 Proposed Action traffic volumes are determined by adding new and pass-by trips generated by the proposed Park & Ride and the redevelopment of the Newport Grand. A new traffic signal on JT Connell Highway, located just north of the Pell Bridge approach ramp, would be installed to provide access to the Park & Ride. A new traffic signal would also be installed on Halsey Street to provide access to the Newport Grand property and an easement to the waste management facility. The Proposed Action morning and evening peak hour traffic volumes are illustrated in Figure 13 and Figure 14, respectively.

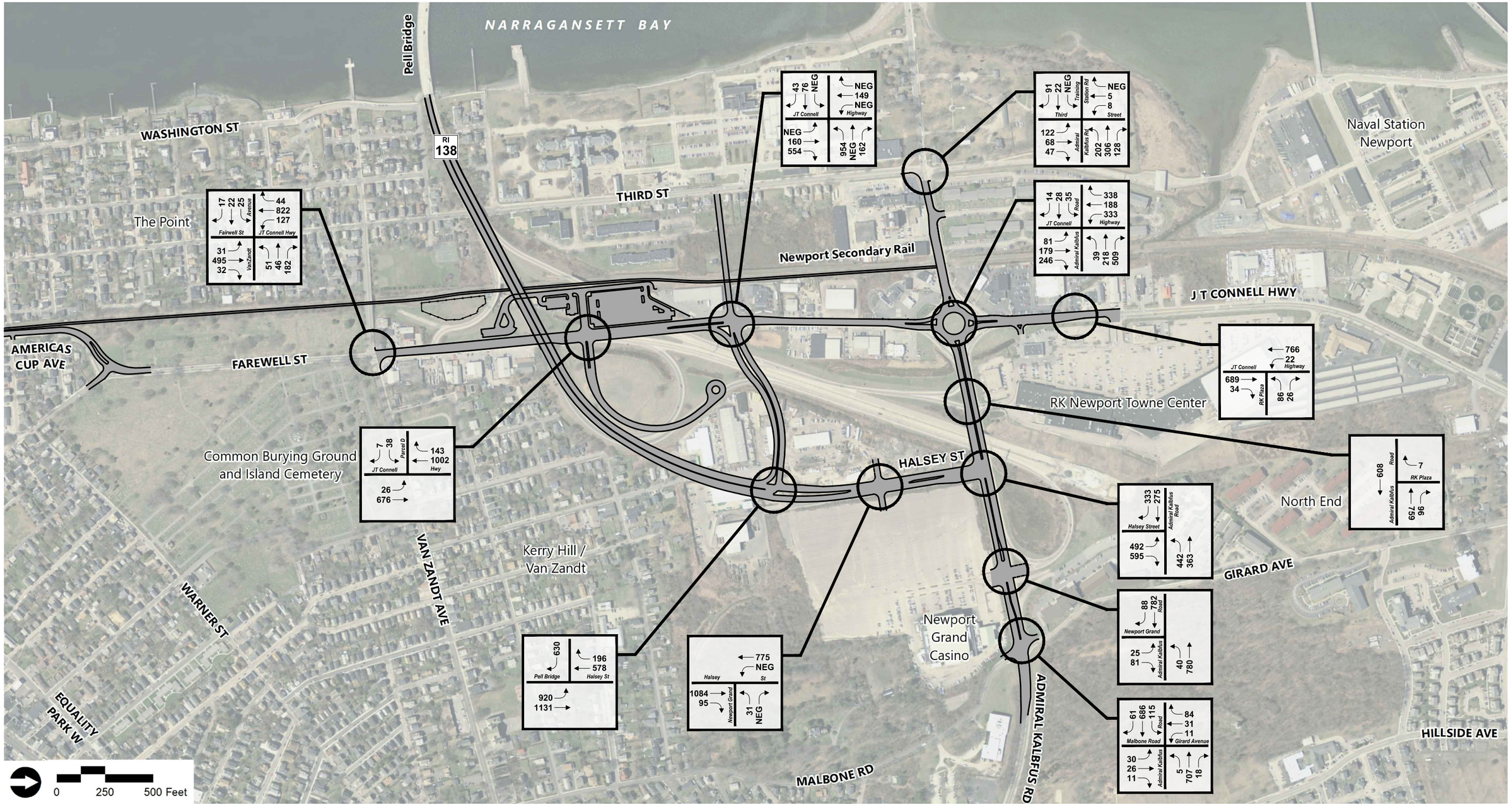
Traffic Operations Analysis

As described earlier in this report, the calibrated VISSIM traffic simulation model was used as a base to test and evaluate future transportation conditions and alternative scenarios. The model was adjusted to evaluate the proposed roadway improvements and future traffic conditions. The VISSIM model has been updated to reflect the Proposed Action roadway network, the projected changes in traffic flow resulting from the redistribution of traffic, and the projected traffic volume generated by the redevelopment. The revised VISSIM model was used to project 2040 conditions during the weekday morning and evening peak hour and the results of the operational analysis.

Intersection Operations Summary

The results of the 2040 Proposed Action conditions are presented and summarized in Table 7. With the proposed improvements, the existing queuing on the ramp to Downtown will be eliminated/shifted to the new ramp connector. Delays and queues at JT Connell Highway at Van Zandt Avenue will continue to increase. Degraded operations at this location are attributed to increased traffic flow along JT Connell Highway (improved throughput), new traffic generated by the redevelopment, and a lack of capacity improvements at the intersection with Van Zandt Avenue.

By improving the operations along JT Connell Highway and Admiral Kalbfus Road, the delays and queue at the intersections along these corridors decreased. All Study Area intersections are expected to operate at an overall LOS C or better with the exception of the JT Connell Highway/Van Zandt Avenue and JT Connell Highway/Admiral Kalbfus Road (Newport Rotary) intersections which are expected to operate at LOS D at LOS E during the evening peak hour, respectively.

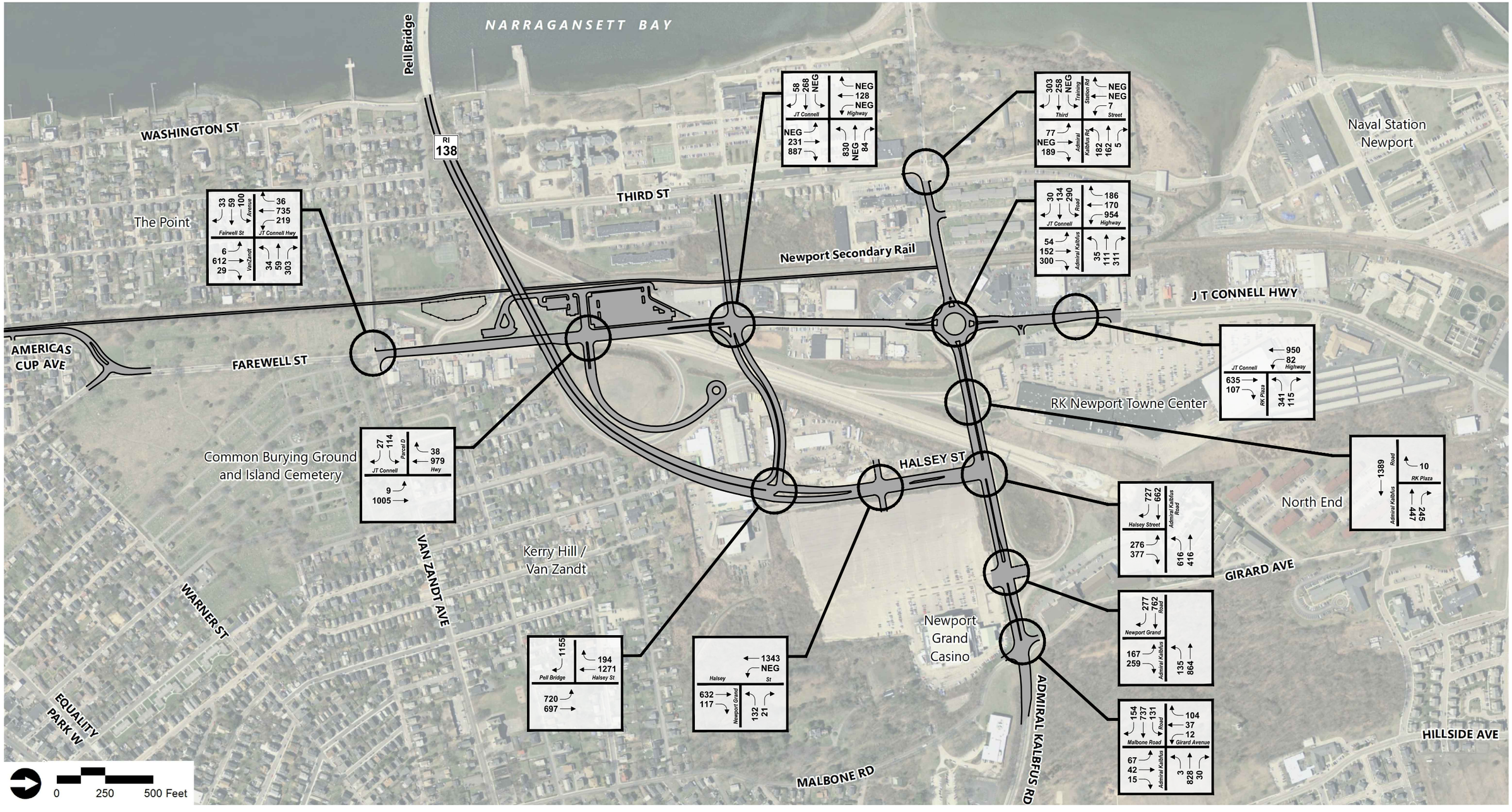


Aerial Source: RIGIS

Figure 13

2040 Proposed Action
Weekday Morning
Peak Hour Traffic Volumes

Reconstruction of the Pell Bridge Approaches
Newport/Middletown, Rhode Island



Aerial Source: RIGIS

Figure 14

2040 Proposed Action
Weekday Evening
Peak Hour Traffic Volumes

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Table 7: 2040 Proposed Action Weekday Conditions

Intersection Control Type	Intersection	Peak Hour	2040 No Action			2040 Proposed Action		
			Delay[1]	LOS[2]	LOS E/F Movements	Delay[1]	LOS[2]	LOS E/F Movements
Stop Controlled	JT Connell Highway at Pell Bridge EB off-ramp	AM	**> 100**	**F**	**EB L/R**	**Remove Existing Off-Ramp**		
		PM	**> 100**	**F**	**EB L/R**			
Signal Controlled	JT Connell Highway/Farewell Street at Van Zandt Avenue	AM	16	B		25	C	
		PM	16	B		44	D	**WB L/T/R**
Signal Controlled	JT Connell Highway at Newport Towne Center Main Drive	AM	22	C		3	A	
		PM	28	C		13	B	
Signal Controlled	Admiral Kalbfus Road/Training Station Road at 3rd Street	AM	14	B		7	A	
		PM	**> 100**	**F**	**EB L/T/R and NB R**	5	A	
Roundabout/ Rotary[3]	Admiral Kalbfus Road at JT Connell Highway	AM	7	A		7	A	
		PM	**62**	**F**	**EB L/T/R WB L/T/R SB L/T/R**	**36**	**E**	**NB L/T and T/R**
Signal Controlled	Admiral Kalbfus Road at Newport Towne Center South Drive/on-ramp	AM	16	B		**Remove Signal and Convert to Right-in/Right-out**		
		PM	28	C	**WB L**			
Stop Controlled	Admiral Kalbfus Road at Halsey Street	AM	5	A		14	B[4]	
		PM	**42**	**E**	**WB L/T NB L/R**	20	B[4]	
Signal Controlled	Admiral Kalbfus Road at Newport Grand Drive/off-ramp	AM	19	B		4	A[5]	
		PM	26	C		16	B[5]	
Stop Controlled	Admiral Kalbfus Road at Girard Avenue/Malbone Road	AM	3	A		10	B[4]	
		PM	26	D	**WB L/T NB L/T/R**	13	B[4]	
Signal Controlled	Halsey Street at Newport Grand / Parcel B	AM	**N/A**			4	A	
		PM				6	A	
Signal Controlled	Halsey Street at New Ramp Connector	AM	**N/A**			16	B	
		PM				12	B	

Intersection Control Type	Intersection	Peak Hour	2040 No Action			2040 Proposed Action		
			Delay[1]	LOS[2]	LOS E/F Movements	Delay[1]	LOS[2]	LOS E/F Movements
Signal Controlled	JT Connell Highway at New Ramp Connector / Dyer Street	AM	N/A			29	C	
		PM				28	C	
Signal Controlled	JT Connell Highway at Park & Ride / Parcel C-D	AM	N/A			4	A	
		PM				5	A	
Signal Controlled	Farewell Street at America's Cup Avenue	AM				7	A	
		PM				8	A	

Source: VISSIM 8 Node Evaluation. Compiled by VHB based on the average of 10 VISSIM model runs.
1 Delay = Vehicle delay expressed in seconds per vehicle
2 LOS = Estimated Level of service
3 LOS criteria for roundabout/rotary is the same of LOS criteria for unsignalized intersection
4 A new traffic signal has been installed under the Proposed Action conditions
5 The off-ramp from Pell Bridge has been removed under the Proposed Action conditions

It should be noted that the proposed reconstruction of JT Connell Highway at Admiral Kalbfus Road (Newport Rotary) into a modern roundabout and the new roadway network system would introduce more traffic northbound on JT Connell Highway approaching the intersection. The reconstructed modern roundabout would also introduce signalized pedestrian/bicyclist accommodation crossing the northern and western legs of the roundabout as part of the proposed shared use path. Due the heavy southbound left-turns and eastbound left-turn and through volumes, the northbound approach is expected to operate at LOS F with delays and queues. It is recommended that a queue detector be installed on JT Connell Highway northbound approach to help meter the southbound and eastbound traffic so there are gaps in the roundabout for the northbound traffic to enter. Even though the northbound is expected to operate at LOS F, the average queue is expected to less than 250 feet.

The detailed intersection MOE summary is provided in Appendix C.

When the City of Newport's Innovation Hub redevelopment building program and timeline have been determined, additional analysis will need to be performed to determine how the additional trips generated by the development would affect the operational performance of the Proposed Action. Based on the results of the capacity analysis presented above, it is expected that additional roadway and intersection improvements may be required to support the full buildout of the redevelopment parcels. Depending on the size of the developable parcels, the building program, and access, the additional improvements needed may include widening of JT Connell Highway and/or extending Halsey Street north to connect with JT Connell Highway/Coddington Road.

Roadway Operations Summary

Under the Proposed Action conditions, travel time and delays would all improve, with less delay and increased speed compared to existing and No Action conditions. The average speed for each of the Study Area roadway segments is illustrated in Figures 15 and 16 for the morning and evening peak periods, respectively.

Aerial Source: RIGIS
Source: VISSIM 8 Node Evaluation. Compiled VHB Based on Average of 10 VISSIM Model Runs.

Intersection Operations

- Level of Service A/B
- Level of Service C/D
- Level of Service E/F

Proposed Action Phase 1 Morning Average Speeds

- 0-10 MPH
- 10-15 MPH
- 16-25 MPH
- >25 MPH

Figure 15

Network Operations
Proposed Action
Weekday Morning

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Aerial Source: RIGIS
Source: VISSIM 8 Node Evaluation. Compiled VHB Based on Average of 10 VISSIM Model Runs.

Intersection Operations

- Level of Service A/B
- Level of Service C/D
- Level of Service E/F

Proposed Action Phase 1 Evening Average Speeds

- 0-10 MPH
- 10-15 MPH
- 16-25 MPH
- >25 MPH

Figure 16

Network Operations
Proposed Action
Weekday Evening

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Newport/Middletown, Rhode Island