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# Functional Design Report

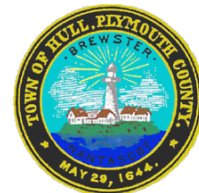
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## *Nantasket Beach Two-Way Conversion*

Hull, Massachusetts

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Prepared for: **Town of Hull**  
253 Atlantic Avenue  
Hull, Massachusetts 02045



In Association with: **Massachusetts Department of Transportation (MassDOT)**  
**Highway Division – District 5**  
1000 County Street  
Taunton, Massachusetts 02780



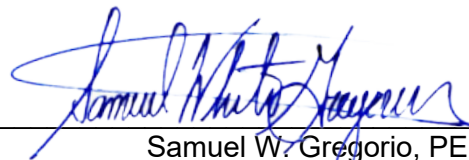
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I have reviewed this document as it relates to the proposed design and have determined the design to be safe for public health and welfare in conformity with accepted engineering standards.



Samuel W. Gregorio, PE, PTOE, RSP<sub>1</sub>  
Senior Design Engineer

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August 30, 2022

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## I. INTRODUCTION

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### **PURPOSE OF REPORT**

TEC, Inc. (TEC) has been retained by the Town of Hull to redesign the roadway system adjacent and providing access to/from Nantasket Beach. The goal of the Project is to convert the current one-way flow roadway pattern to a two-way flow roadway network to help reduce seasonal congestion, improve access to the beach for residents and visitors, improve options for emergency response vehicles, and support existing and future economic development. This Functional Design Report (FDR), associated with the 25% Design Plans, builds upon prior analysis of the proposed two-way flow conversion documented in a joint *Evaluation of Two-Way Traffic Flow on Nantucket Beach - Hull, Massachusetts*<sup>1</sup> prepared by TEC and Nelson Nygaard in February 2016. This study process involved significant public outreach and resulted in the Town of Hull's Board of Selectmen support for two-way flow improvements in 2017 and approval at the 2018 Town Meeting to authorize the Town to dispose of surplus right-of-way along the Town's portion of a two-way Nantasket Avenue to append the land owned by the Hull Redevelopment Authority (HRA).

The current 25% Design Plans build upon prior and current contracts with the Town and the HRA and closely reflect the Town-endorsed Draft 25% Design Plans dated December 23, 2019. Consistent with that plan, TEC has continued its coordination with all public entities who hold jurisdiction on parts of the roadway network, including the Massachusetts Department of Transportation (MassDOT) and the Massachusetts Department of Conservation and Recreation (DCR). This FDR focuses on the potential traffic flow impacts of converting Nantasket Avenue and Hull Shore Drive to two-way flow corridors with the addition of several new cross-streets across the HRA's redevelopment parcels between Water Street and Phipps Street at the north end of the transportation improvement project. By altering traffic flows and adding cross streets, the FDR demonstrates that these changes could relieve existing roadway congestion; improve access to the beach, especially for pedestrians and cyclists; and support the generation of traffic from future economic development projects.

This FDR pertains to the following major roadway and intersection improvements in the vicinity of Nantasket Beach in Hull, Massachusetts:

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<sup>1</sup> *Evaluation of Two-Way Traffic Flow on Nantucket Beach - Hull, Massachusetts - Traffic Feasibility and Circulation Study*; prepared by TEC, Inc. & Nelson Nygaard, February 1, 2016.

- Conversion of Nantasket Avenue from George Washington Boulevard to a point approximately 300-feet north of Water Street from one-way flow to two-way flow.
- Conversion of Hull Shore Drive from Nantasket Avenue to Phipps Street from one-way flow to two-way flow.
- Conversion of Phipps Street to two-way flow for its entire length.
- Removal of Nantasket Avenue southbound from George Washington Boulevard (Anastos Corner) to Hull Shore Drive (Miller's Crossing) from the roadway network.
- Removal of the George Washington Boulevard northbound connector roadway from George Washington Boulevard to Nantasket Avenue (Miller's Crossing).
- Removal of Samoset Avenue between Nantasket Avenue and Phipps Street.
- Implementation of a road diet along the westerly arterial roadway, defined as George Washington Boulevard south of Bay Street and Nantasket Avenue north of Bay Street to include one travel lane in each direction in addition to auxiliary turn lanes where necessary.
- Implementation of road diet along the easterly arterial roadway, defined as Nantasket Avenue south of the former George Washington Boulevard northbound connector roadway and Hull Shore Drive north of the former George Washington Boulevard northbound connector roadway to include one travel lane in each direction.
- Reconstruction of the fully actuated traffic signal at the intersection of Nantasket Avenue / Water Street.
- Installation of subsurface infrastructure related to a future fully actuated traffic signal at the intersection of Nantasket Avenue / Edgewater Road.
- New Construction or reconstruction of pedestrian and bicycle accommodations within the project limits; including:
  - Construction of new sidewalks to fill in intermittent areas along Phipps Street between Nantasket Avenue and Samoset Avenue.
  - Reconstruction of varying width sidewalk along both sides of Nantasket Avenue between Phipps Street and Whitehead Avenue with new adjacent 5-foot bicycle lanes.
  - Construction of a new 10-foot shared use path along both sides of Nantasket Avenue between Whitehead Avenue and Water Street.
  - Construction of new varying width sidewalks along Nantasket Avenue and George Washington Boulevard between Porrazzo Road and a point approximately 200-feet south of the new Nantasket Avenue Connector.
  - Limited sidewalk reconstruction along Hull Shore Drive between Phipps Street and a point approximately 100-feet south of the new Nantasket Avenue Connector meant to fill in gaps in the intermittent sidewalk and follow roadway realignment.

- Construction of a northbound bicycle lane along Hull Shore Drive between the new Nantasket Avenue Connector and Phipps Street in conjunction with shared use lane markings in the southbound direction.
- Construction of Americans with Disabilities Act (ADA) / Architectural Access Board (AAB) compliant accessible ramps at the proposed crossing locations within the project limits.
- Installation of new *Manual on Uniform Traffic Control Devices (MUTCD)* compliant pavement markings and traffic signage within the project limits; and
- Public utility modifications within the project limits to support relocated curb lines and multi-modal transportation infrastructure.
- Pavement resurfacing and/or full depth pavement, as necessary, within the project limits.

### **Why Two-Way Flow?**

Converting the roadway circulation to a two-way system would have a number of important transportation benefits which have been demonstrated in dozens of successful two-way conversions around the country as well as nearby in Lowell and Lawrence. Most recently, the Town of Hull evaluated Market Street, Merrimack Street and their cross streets in historical Downtown Lowell which were converted from one-way flow to two-way flow in 2013. In general, the conversion of a one-way pair to two-way does not affect the volume of traffic that can flow through the area. Instead, the same amount of traffic can travel in different directions, just along multiple routes.

Specifically, the benefits of converting to a two-way system on Nantasket Beach include:

- While preserving the same amount of through vehicle capacity, the system would provide **alternate circulating routes for travelers**.
- **Dispersing traffic on multiple routes** avoids the single concentrated pinch points that create congestion during peak seasonal periods today and reduces overall travel distances.
- Motorists would have **a more direct route to their destinations**, eliminating longer looping routes.
- Simple two-lane roads which will operate at **slower speeds**, making the beachfront much safer for pedestrians and enabling inland businesses to serve beachgoers on foot again like they once did.
- The conversion will also **eliminate the current multi-lane threat** associated with crosswalks in areas of two one-way lanes.
- For developers, **any street can become a front door for auto and walk-up access**, rather than highway-oriented parcels of limited utility.
- The re-imagined corridors can accommodate more person movement, provide space for in-road and separated bicycle facilities and **promote walking and biking**.

This traffic may flow at slightly slower speeds, as drivers tend to slow down due to the friction that oncoming traffic can create. However, although it may take a few more seconds for a vehicle to travel the length of a converted network, the safety for pedestrians and other users increases drastically with the decreased speeds and traffic calming.

### **Hull Redevelopment Authority Design Principles and Independent Utility**

The HRA is currently the primary landholder north of Water Street and DCR is the primary landholder south of Bay Street along the Nantasket Beach waterfront. The HRA has been developing a series of design principles as part of the redevelopment of Nantasket Beach and centered around increasing the economic viability of the waterfront through its current efforts to update the Town's Urban Renewal Plan. Among these design principles are not only providing an enhanced waterfront with a unique retail and restaurant district, but also providing a walkable and bike-able street system that provides both traffic operational efficiency and a safe route of travel for all users.

It is important to know that although the Town of Hull and the HRA may concurrently evaluate the redevelopment of the HRA parcels between Phipps Street and Water Street, *the conversion of traffic from one-way to two-way flow in the vicinity of the beachfront has independent utility*. Regardless of the redevelopment potential, the existing one-way flow has historically created a bottleneck of traffic, especially for those beach patrons attempting to leave the beach. During the summertime months, the large surface parking areas between Phipps Street and Water Street tend to empty within a small window correlating with high tide. These surface parking areas all egress onto Hull Shore Drive's northbound flow and are forced to exit onto the Nantasket Beach mainline via Phipps Street. Vehicular delay and queuing have been well documented by the Town.

The establishment of a two-way flow conversion and cross-streets, independent of any HRA redevelopment, will allow these visitors to exit the area via multiple established routes thereby alleviating traffic concerns throughout the Nantasket Beach area.

### **METHODOLOGY**

This report satisfies the requirements for the 25% Design process as specified by MassDOT – Highway Division. Included are a review of existing and future traffic conditions with and without the proposed geometric and traffic signal improvements, a safety analysis, intersection capacity and queue analyses as necessary, and a description of the proposed improvements. It examines a 10-year design horizon to the year 2032 for future traffic volume projections and includes an evaluation of the future year conditions with and without the improvements. The findings and recommendations for the improvements are based on the detailed traffic analyses included in this report.

## **II. EXISTING CONDITIONS**

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### **TRAFFIC STUDY AREA**

A comprehensive field inventory of existing traffic infrastructure and conditions within the project limits was conducted during various site visits by TEC staff. The field investigations consisted of land survey, existing roadway geometrics, study area safety concerns, and intersection operating characteristics. The key study area intersections are listed below. The surrounding roadways and the intersections are shown graphically in Figure 1. Note that many of the intersections correlate to future locations that will be introduced by the two-way flow conversion.

### **Study Area Intersections**

1. Manomet Avenue / Beach Avenue / Phipps Street
2. Hull Shore Drive / Phipps Street
3. Hull Shore Drive / Block A Driveway *[Future Year Two-Way Condition]*
4. Hull Shore Drive / Edgewater Road Extension *[Future Year Two-Way Condition]*
5. Hull Shore Drive / The Green North *[Future Year Two-Way Condition]*
6. Hull Shore Drive / The Green South *[Future Year Two-Way Condition]*
7. Hull Shore Drive / Water Street
8. Hull Shore Drive / Nantasket Avenue / George Washington Boulevard Connector
9. Hull Shore Drive / Nantasket Avenue / Nantasket Avenue Connector Road *[Future Year Two-Way Condition]*
10. Samoset Avenue / Phipps Street
11. Nantasket Avenue / Phipps Street / Mountford Road
12. Nantasket Avenue / Whitehead Avenue
13. Nantasket Avenue / Edgewater Road / Edgewater Road Extension
14. Nantasket Avenue / The Green North *[Future Year Two-Way Condition]*
15. Nantasket Avenue / The Green South *[Future Year Two-Way Condition]*
16. Nantasket Avenue / Water Street / Bay Street
17. Nantasket Avenue / George Washington Boulevard
18. Nantasket Avenue / Wharf Avenue / DCR Lot 2 Entrance
19. George Washington Boulevard / Bay Street



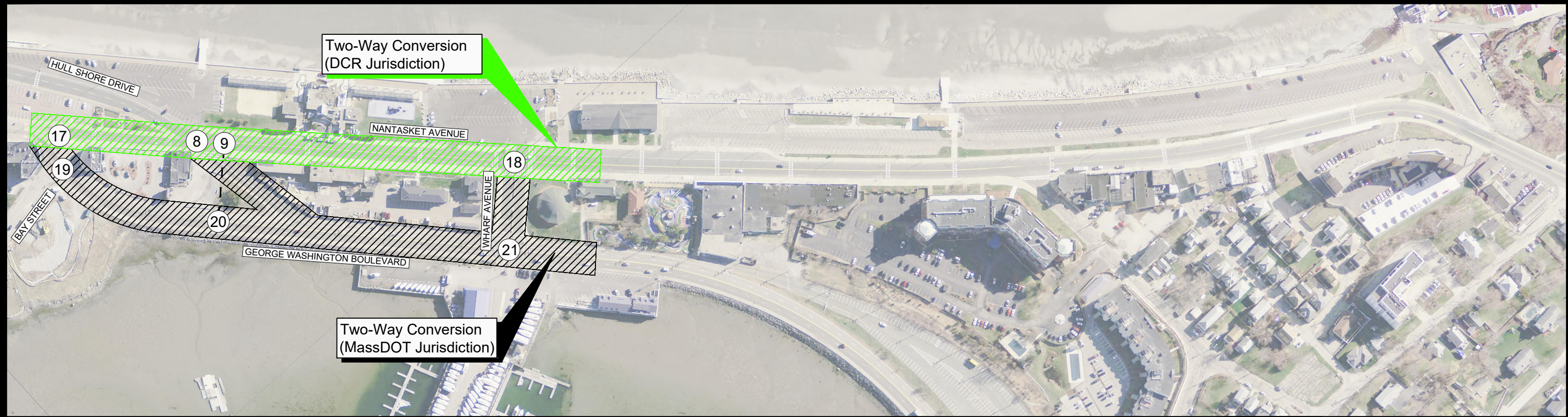
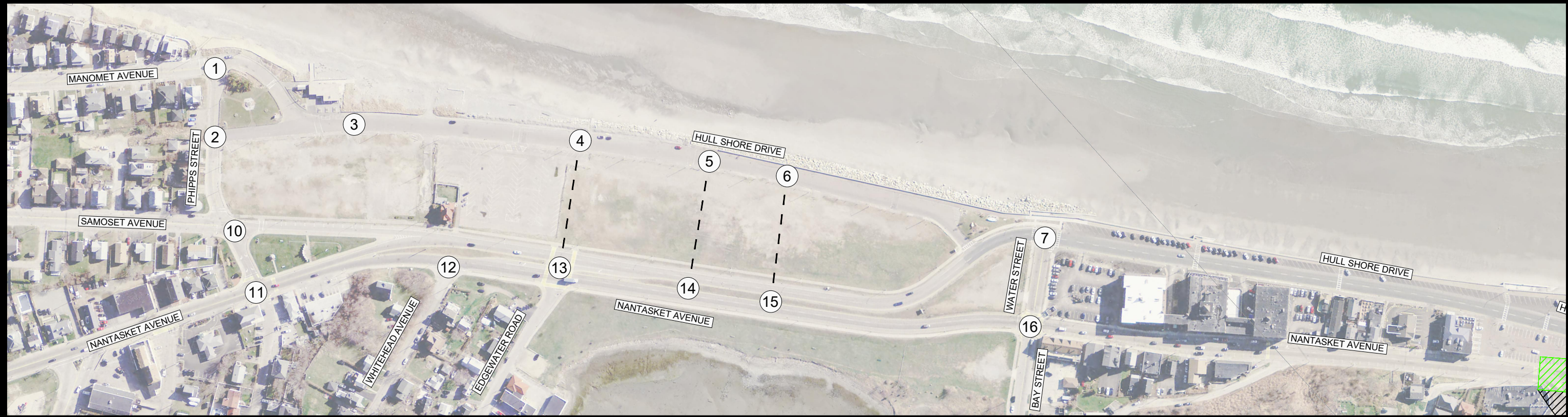


Figure 1  
Project Location Map & Study Area Intersections



20. George Washington Boulevard / Nantasket Avenue Connector Road [*Future Year Two-Way Condition*]

21. George Washington Boulevard / Wharf Avenue / McDuff's Landing Driveway

### **Intersection / Roadway Jurisdiction**

Much of the study area, including the study area intersections, are located within the jurisdiction of the Town of Hull. The study area does include roadways and/or intersections that are under the jurisdiction of MassDOT or DCR. These include:

- Nantasket Avenue between George Washington Boulevard and Wharf Avenue:
  - [#17] Nantasket Avenue / Bay Street
  - [#8] Hull Shore Drive / Nantasket Avenue / George Washington Boulevard Connector (a.k.a. Anastos Corner)
  - [#9] Hull Shore Drive / Nantasket Avenue / Nantasket Avenue Connector Road [*Future Year Two-Way Condition*]
  - [#18] Nantasket Avenue / Wharf Avenue / DCR Lot 2 Entrance
- George Washington Boulevard:
  - [#19] George Washington Boulevard / Bay Street
  - [#20] George Washington Boulevard / Nantasket Avenue Connector Road [*Future Year Two-Way Condition*]
  - [#21] George Washington Boulevard / Wharf Avenue / McDuff's Landing Driveway

Overall, the transportation related improvements within the jurisdiction of MassDOT and DCR are minimal comparative to the project as a whole.

### **GEOMETRY**

The field inventory included the collection of existing roadway geometrics, pedestrian and bicycle accommodations, traffic volumes, and safety data for the existing study area. A description of the existing roadway and intersection inventory is provided below.

#### **Roadways**

##### ***Nantasket Avenue***

Nantasket Avenue is a two to four-lane northwest-southeast urban minor arterial maintained by the Massachusetts DCR south of Bay Street and the Town of Hull north of Bay Street. For the purpose of this FDR, the cardinal direction of Nantasket Avenue will be defined as north-south. Between Water Street and Hull Shore Drive, Nantasket Avenue provides one-way flow southbound with Hull Shore Drive serving as its one-way pair northbound. Nantasket Avenue provides local connection between State Route 228 and Hingham to the south and the residential section of the Hull peninsula to the north. The posted speed limit along the roadway is 30 miles per hour (mph) in the vicinity of Nantasket Beach; however higher speeds were observed on the "freeway" segment of Nantasket Avenue between Phipps Street and Water Street. On-street parking is provided within marked locations along both sides of Nantasket Avenue for large



portions of its length. Between Miller's Crossing to the north and State Park Road to the south, Nantasket Avenue provides access/egress to multiple DCR surface parking lots. Land uses along Nantasket Avenue include retail, commercial, recreational, and residential uses.

A short segment of Nantasket Avenue was previously reconstructed between Water Street to the north and Bay Street to the south. The segment features parallel on-street parking spaces defined by sidewalk bump-outs, multiple enhanced pedestrian crossing locations, a southbound bicycle lane, and several streetscape features: including ornamental street lighting, pedestrian benches, and public shade trees.

### ***Hull Shore Drive***

Hull Shore Drive is a two-lane northwest-southeast urban minor arterial maintained by the Town of Hull. For the purpose of this FDR, the cardinal direction of Hull Shore Drive will be defined as north-south. The roadway provides one-way flow northbound with Nantasket Avenue serving as its one-way pair southbound. Hull Shore Drive provides a one-way couplet connection adjacent to Nantasket Beach. The posted speed limit along the roadway is 30 mph in the vicinity of Nantasket Beach. On-street parking is provided along the easterly side of the roadway between Water Street and Nantasket Avenue. During the summertime weekday and weekend peak hours, the traffic operation characteristics of Hull Shore Drive change as there is a significant increase in on-street parking maneuvers and pedestrian crossing maneuvers. Between Water Street and Phipps Street, Hull Shore Drive provides access/egress to several surface parking lots owned by DCR and the Town of Hull. The existing DCR-owned lot is paved while the Town lots are grassed. Land uses along Hull Shore Drive include retail, commercial, and recreational uses.

Although there are three (3) marked crossing locations between Nantasket Avenue and Water Street, pedestrians tend to cross at all locations from the retail and restaurant uses along the westerly side of the roadway and the on-street parking and beachfront along the easterly side of the roadway. This forces vehicles traveling along Hull Shore Drive to break and yield several times during the 1,600-foot stretch of road causing congestion and long queues that tend to back-up into the Miller's Crossing intersection.

### ***George Washington Boulevard***

George Washington Boulevard is a four-lane north-south urban minor arterial maintained by MassDOT. For the purpose of this FDR, the cardinal direction of George Washington Boulevard will be defined as north-south. George Washington Boulevard provides local connection between Rockland Street and Hingham to the south and Anastos Corner to the north. The posted speed limit along the roadway is 35 mph in the vicinity of Nantasket Beach. Generally, speeds were observed in excess of the posted speed limits along George Washington Boulevard (south of Wharf Avenue) due to arterial nature of the roadway. There is no on-street parking provided on either side of State Highway. Land uses along George Washington Boulevard include retail, commercial, recreational, and residential uses. Currently, George Washington Boulevard provides access/egress to a large remote surface parking field of 230 parking spaces under the jurisdiction of the Town. The Town of Hull has indicated that this parking field is underutilized due to its distance to/from the Nantasket Beach shoreline and the proximity of more convenient parking facilities closer to the beachfront, retail, and restaurant destinations.

### **Key Locations and Intersections**

### ***Manomet Avenue / Beach Avenue / Phipps Street***

Phipps Street intersects Manomet Avenue and Beach Avenue to form a three-legged unsignalized intersection. Both the Beach Avenue northbound and Manomet Avenue southbound approaches are under stop control while the Phipps Street eastbound approach is free flowing. The Phipps Street eastbound approach consists of an exclusive left-turn lane with directional flow separated by a marked centerline. The Beach Avenue northbound approach provides one-way flow northbound entering the intersection within a single general-purpose travel lane. The Manomet Avenue southbound approach consists of an exclusive right-turn lane with directional flow separated by a marked centerline. On-street parking is permitted along the easterly side of Beach Avenue and both sides of Manomet Avenue. Sidewalk is provided along the northerly side of Phipps Street, the easterly side of Beach Avenue and both sides of Manomet Avenue approaching the intersection with a crosswalk striped across the Manomet Avenue southbound approach. No formal bicycle accommodations are provided at the intersection.

The intersection of Manomet Avenue / Beach Avenue / Phipps Street is not included in the traffic operational analysis portion of this FDR as it 1) does not change directional flow or geometric characteristics based on the project and 2) will generally operate comparatively the same between both flow conditions. The intersection traffic volumes and relative information however were utilized to define traffic flow / turning movement percentages at adjacent intersections and along Hull Shore Drive to the immediate west.

### ***Hull Shore Drive / Phipps Street***

Hull Shore Drive intersects Phipps Street to form a three-legged unsignalized intersection. The Hull Shore Drive northbound approach is under stop control while the Phipps Street eastbound and westbound approaches are free flowing. Both the Phipps Street eastbound and westbound approaches consist of single through lanes with directional flow separated by a marked centerline. The Hull Shore Drive northbound approach provides one-way flow northbound entering the intersection within an exclusive left-turn and exclusive right-turn lanes. Sidewalk is provided along both sides of Phipps Street west of the intersection and along the northerly side of Phipps Street east of the intersection. Sidewalk is also provided along the westerly side of Hull Shore Drive. No crosswalks or formal bicycle accommodations are provided at the intersection.

### ***Hull Shore Drive / Water Street***

Water Street intersects Hull Shore Drive to form a three-legged unsignalized intersection. The Water Street eastbound approach is under stop control while the Hull Shore Drive northbound approach is free flowing. The Water Street eastbound approach consists of an exclusive left-turn lane with directional flow separated by a marked centerline. Hull Shore Drive enters and exits the intersection as one-way flow northbound within two general-purpose travel lanes. Head-in parking is available along the easterly side of Hull Shore Drive south of the intersection. Sidewalk is provided along both sides of Water Street and Hull Shore Drive south of the intersection. Sidewalk is also provided along the easterly side of Hull Shore Drive north of the intersection. Crosswalks are present across all three intersection approaches. On-street bicycle lanes are provided along both sides of Water Street.

### ***Hull Shore Drive / Nantasket Avenue / George Washington Boulevard Connector [Miller's Crossing]***

The intersection of Hull Shore Drive / Nantasket Avenue / George Washington Boulevard Connector is a four-legged, skewed signalized intersection also referred to as Miller's Crossing. The Nantasket Avenue northbound approach consists of two exclusive right-turn lanes with direction flow separated by a marked centerline. The Nantasket Avenue southbound approach is one-way entering the intersection and consists of two through lanes with posted turn restrictions for both right and left turns. The George Washington Boulevard Connector eastbound approach is one-way entering the intersection and consists of a through lane and a shared through/right-turn lane. This approach generally serves similar to a right-turn channelized lane for the parallel George Washington Boulevard northbound movement. The Hull Shore Drive leg of the intersection is one-way flow exiting the intersection. This intersection serves as the start/end of one-way traffic flow along Nantasket Avenue and Hull Shore Drive, north of the intersection. Sidewalk is provided along both sides of Nantasket Avenue through the intersection, along the northerly side of Hull Shore Drive east of the intersection, and the southerly side of the George Washington Boulevard Connector west of the intersection. Crosswalks are present across each approach except the Hull Shore Drive leg east of the intersection. No formal bicycle accommodations are provided at the intersection.

Upon observation, the Miller's Crossing signalized intersection operates at an acceptable level-of-service as a stand-alone intersection; however, pedestrian activity and on-street parking maneuvers during the summertime peak hours along Hull Shore Drive, immediately north of the intersection, generally force vehicles to queue back through the intersection, causing congestion along each intersection approach. Miller's Crossing is 300 linear feet away adjacent from Anastos Corner.

### ***Samoset Avenue / Phipps Street***

Samoset Avenue intersects Phipps Street to form a four-legged unsignalized intersection. All three intersection entrance approaches enter under stop control. Phipps Street west of the intersect is one-way flow exiting the intersection. The Phipps Street westbound approach consists of a single general-purpose travel lane with directional flow separated by a marked centerline. The Samoset Avenue northbound approach enters the intersection as one-way flow with a channelized left-turn lane and a shared through / right-turn lane. The Samoset Avenue southbound approach consists of a single general-purpose travel lane with directional flow separated by a marked centerline. On-street parking is permitted along the easterly side of Samoset Avenue south of the intersection and along both sides of Samoset Avenue north of the intersection. Sidewalk is provided along both sides of the Phipps Street through the intersection, along both sides of Samoset Avenue south of the intersection, and along the easterly side of Samoset Avenue north of the intersection. A crosswalk is present across the Phipps Street westbound approach. No formal bicycle accommodations are provided at the intersection.

### ***Nantasket Avenue / Phipps Street / Mountford Road [Kenberma Square]***

Phipps Street and Mountford Road intersect Nantasket Avenue to form a four-legged unsignalized intersection known as Kenberma Square. The intersection serves as the major egress point for vehicles exiting the northern section of the Nantasket Beach waterfront and the several DCR parking fields along Hull Shore Drive. Both the Mountford Road eastbound and Phipps Street

westbound approaches are under stop control while the Nantasket Avenue approaches are free flowing. Both the Nantasket Avenue northbound and southbound approaches consist of single general-purpose travel lanes with directional flow separated by a marked centerline. The Mountford Road eastbound approach consists of a single general-purpose travel lane with directional flow unmarked. The Phipps Street westbound approach is one-way entering the intersection providing both exclusive left-turn and right turn lanes. Vehicles from Phipps Street attempting to cross Nantasket Avenue to Mountford Road typically utilize the exclusive left-turn lane to do so. Sidewalks are provided along both sides of Nantasket Avenue through the intersection and along both sides of Phipps Street. No sidewalks are provided along Mountford Road. There are no formal bicycle accommodations are provided at the intersection.

During the summertime peak periods, Phipps Street experienced periods of considerable queuing. This typically occurs at the end of high-use beach day, at the end of high-tide, or at the start of a weather event which clears the beach of beachgoers. Upon observation, the queue from the Phipps Street approach to Nantasket Avenue extends back through the unsignalized intersection with Samoset Avenue and then extends down the Hull Shore Drive towards the parking lot egresses. During times of heavy traffic congestion, such as a sudden weather event, the Town of Hull Police Department locates a traffic officer at the intersection to direct traffic and assists in emptying the several northerly parking lots. The subsequent traffic operational analysis portion of this FDR will reflect a high delay per vehicle at this location, but not at the upstream intersections based on the microscopic analysis methodology imposed by the Synchro analysis software.

### ***Nantasket Avenue / Whitehead Avenue***

Whitehead Avenue intersects the southbound bore of Nantasket Avenue to form a three-legged unsignalized intersection. The Whitehead Avenue eastbound approach is under stop control while the Nantasket Avenue southbound bore is free flowing. Although the Nantasket Avenue northbound bore is adjacent to the southbound bore, directional flow is separated by a 20-foot grass median and elevation drop. Whitehead Avenue consists of an exclusive right-turn lane with directional flow unmarked. The Nantasket Avenue southbound approach consists of a single general-purpose travel lane which opens to two lanes immediately south of the intersection. On-Street parking is permitted along both sides of Whitehead Avenue. Sidewalk is provided along the southerly side of Whitehead Avenue and along the westerly side of Nantasket Avenue southbound through the intersection. No formal bicycle accommodations are provided at the intersection.

### ***Nantasket Avenue / Edgewater Road***

Edgewater Road intersects Nantasket Avenue to form a three-legged unsignalized intersection. The Edgewater Road eastbound approach is under stop control while both the Nantasket Avenue northbound and southbound approaches are free flowing. The Edgewater Road eastbound approach consists of a single general-purpose travel lane with directional flow unmarked. The Nantasket Avenue northbound approach consists of a shared left-turn / U-turn lane and two through lanes while the Nantasket Avenue southbound approach consists of an exclusive U-turn lane and two through lanes. Directional flow along Nantasket Avenue is separated by a grassed median. Sidewalk is provided along the southerly side of Edgewater Road and along both sides of Nantasket Avenue through the intersection. Sidewalk along the northerly side of Edgewater

Road terminates shortly after the intersection to the west. Crosswalks are present across all three intersection approaches. No formal bicycle accommodations are provided at the intersection.

### ***Nantasket Avenue / Bay Street / Water Street***

Bay Street and Water Street intersect Nantasket Avenue to form a four-legged signalized intersection. Both the Bay Street eastbound and Water Street westbound approaches consist of single general-purpose travel lanes with directional flow separated by a marked centerline. Nantasket Avenue is one-way flow entering the intersection from the north and exiting the intersection to the south. On-street parking is permitted along the westerly side of Nantasket Avenue south of the intersection. Sidewalks are provided along both sides of Bay Street, Water Street, and Nantasket Avenue south of the intersection. North of the intersection, sidewalk is provided along the westerly side of Nantasket Avenue. Bicycle lanes are provided along both sides of Water Street and Bay Street at the intersection and along the westerly side of Nantasket Avenue south of the intersection.

### ***Nantasket Avenue / George Washington Boulevard / Bay Street [Anastos Corner]***

The intersection of Nantasket Avenue / George Washington Boulevard / Bay Street is a four-legged, K-shaped unsignalized intersection. Both the George Washington Boulevard and Bay Street eastbound approaches are under stop control while the Nantasket Avenue southbound approach is free flowing. Nantasket Avenue is one-way flow southbound through the intersection. The George Washington Boulevard eastbound approach has recently been restriped as one travel lane at Nantasket Avenue allowing right-turn movements to Nantasket Avenue southbound only. Directional flow along the George Washington Boulevard approach is separated by a marked centerline. Bay Street eastbound, consisting of a single general-purpose travel lane with directional flow unmarked, enters George Washington Boulevard immediately south of Nantasket Avenue. On-Street parking is permitted along the westerly side of Nantasket Avenue north of the intersection and along both sides of Bay Street (resident permit only). Sidewalks are provided along both sides of all approaches with crosswalks present across all approaches. The Nantasket Avenue southbound bicycle lane entering from the north terminates at the intersection.

The intersection serves as a major split for Nantasket Avenue southbound traffic exiting Hull and Nantasket Beach. Traffic volumes at this location showed approximately a 60%/40% split for the right-turn onto George Washington and continuing through on Nantasket Avenue, respectively. Due to the high right-turn volumes, in addition to significant pedestrian crossing maneuvers, queues tend to extend from this intersection during heavy summertime beach traffic, especially during the major beach exiting events, such as high tide or sudden weather event. Anastos Corner is 300 linear feet away adjacent from Miller's Crossing.

### ***Nantasket Avenue / Wharf Avenue / DCR Lot 1 Entrance***

Wharf Avenue and the DCR Lot 1 Entrance intersects Nantasket Avenue to form a four-legged signalized intersection. The Wharf Avenue eastbound consists of a single general-purpose travel lane with directional flow separated by a raised landscaped median. The approach width allows for two lanes of vehicles to stack approaching the traffic signal. The DCR Lot 1 Entrance east of the intersection allows for one-way flow exiting the intersection. The Nantasket Avenue northbound approach consists of a single general-purpose travel lane with a wide shoulder. The Nantasket Avenue southbound approach consists of a shared left-turn / through lane and an



exclusive right-turn lane. Directional flow along Nantasket Avenue is separated by a marked centerline. A 'No Turn on Red' restriction is posted for the Wharf Avenue eastbound approach. On-street parking is permitted along the westerly side of Nantasket Avenue south of the intersection. Sidewalks are present along both side of each roadway approach (does not include DCR Lot 1 Entrance) with crosswalks across the Nantasket Avenue and Wharf Avenue approaches. No formal bicycle accommodations are provided at the intersection.

### ***George Washington Boulevard / Wharf Avenue / McDuff's Landing Driveway***

Wharf Avenue and the McDuff's Landing Driveway intersects George Washington Boulevard to provide a four-legged signalized intersection. Both the McDuff's Landing Driveway eastbound and Wharf Avenue westbound approaches consist of single general-purpose travel lane with directional flow separated by a raised landscaped median. The westbound approach width allows for two lanes of vehicles to stack approaching the traffic signal. Both the George Washington Boulevard northbound and southbound approached consist of two general-purpose travel lanes with directional flow separated by a marked centerline. A 'No Turn on Red' restriction is posted for the George Washington Boulevard Southbound approach and had previously been posted (sign missing) along the Wharf Avenue westbound approach. Sidewalks are present along both side of each roadway approach (does not include McDuff's Landing Driveway eastbound) with crosswalks across all four approaches. No formal bicycle accommodations are provided at the intersection.

### **Parking Facilities**

On-street spaces and both paved and unpaved surface parking fields combine to provide over 1,400 surface parking spaces along the Nantasket Beach beachfront. These parking spaces are serviced by either the Town of Hull or the Massachusetts DCR. During the summer months, parking is considerably more utilized than during other times of the year. Operations at the DCR parking fields include attendants for parking fee collection. General park passes are also sold to residents for all DCR parks. Based on parking inventory numbers provided by Louis Berger<sup>2</sup> as part of the *Nantasket Beach Seawall Repair and Reservation - Master Plan Services – Existing Infrastructure* documentation, dated September 2007, a total of 1,405 parking spaces are provided within the several on-street and surface parking fields along Nantasket Beach. Table 1 below (Table 3-5 from Louis Berger) provides a breakdown of the several parking facilities.

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<sup>2</sup> *Nantasket Beach Seawall Repair and Reservation – Master Plan Services – Existing Infrastructure*; The Louis Berger Group, Inc.; September 2007

**Table 1 - Marked Parking Spaces at Nantasket Beach**

<u>Lot Name</u>	<u>Lot Location</u>	<u>Spaces</u>	<u>Comments</u>
<b><u>Parking Lots</u></b>			
Lot #4	Nantasket Ave, south of Tivoli Bathhouse	332	
Lot #3	Nantasket Ave, Tivoli Bathhouse to Bernie King Pavilion	136	
Lot #2	Nantasket Ave, Bernie King Pavilion to MJM Bathhouse	81	
Lot #1	Nantasket Ave, north of MJM Bathhouse	90	
DCR (Parrot Lot)	Between Nantasket Ave and HSD, south of Red Parrot	57	
Lot near Quincy St.	Between Nantasket Ave and HSD, south of Quincy St	109	
<b><u>Parking Areas</u></b>			
Blocks 101-111, 201	Nantasket Ave, from south to Bernie King Pavilion	66	
Area 1	Hull Shore Drive, south of Water Street	89	
Area 5	Nantasket Ave, north of Bay Street	36	
Area 4	Nantasket Ave, north of Sagamore Terrace	21	
Area 3	North of Bay Street, west of Nantasket Ave	14	On grass
Area 2	North of Water Street	48	On grass
Hull Shore Drive	Hull Shore Drive, between Water Street and Phipps Street	50	Estimate
<b><u>Remote Lots</u></b>			
Remote Lot 1	George Washington Blvd.	46	
Remote Lot 2	George Washington Blvd.	<u>230</u>	
<b>Total Spaces</b>		<b>1,405</b>	

### ***Hull Shore Drive Angled Parking***

There are 89 parking spaces along the easterly side of Hull Shore Drive, between DCR (Parrot) Lot and Water Street, along the seawall are angled parking spaces. These spaces require more time for drivers to exit as sight lines are typically obstructed by the adjacent parked vehicles. These parking maneuvers along this segment of Hull Shore Drive, along with many pedestrian movements, tend to cause additional delay for vehicles travelling along Hull Shore Drive. This congestion typically backs into the Miller's Crossing intersection of Nantasket Beach / George Washington Boulevard / Hull Shore Drive.

### ***Unmarked Surface Lots***

The existing parking information that was provided by Louis Berger as part of this past study does not include all grass parking spaces which are utilized during the summer months between Phipps Street and Water Street on the easterly side of Nantasket Avenue. That study identified 62 parking spaces in a grass surface lot; however, based on direct observation and past satellite images, an additional 800 to 900 parking spaces could be available within these separated grass areas north of Water Street.

### ***Calculating Parking Lot Enter and Exit Maneuvers***

A key aspect of the two-way flow conversion is the allowance of beachgoing traffic that would be utilizing the northerly parking fields, both the grass lots and the DCR lot, between Phipps Street and Water Street to access and egress these parking fields from multiple directions. Therefore, a key aspect of the traffic redistribution that is subsequently described is based on the existing parking entrance and exit maneuvers for these parking fields. Parking lot traffic counts were not

completed concurrently with other traffic counts described in the following chapter; however, an estimate of parking usage/turnover for the lots was derived from the aforementioned *Nantasket Beach Seawall Repair and Reservation - Master Plan Services – Existing Infrastructure<sup>2</sup>* document.

## **PUBLIC TRANSPORTATION**

The Massachusetts-Bay Transit Authority (MBTA) operates a bus service that travels through project intersections. Bus route data are included in Appendix A, and a summary of the routes are provided below:

- *MBTA Bus Route 714* – Service is provided the Hingham Depot on Station Street in Hingham, MA to Pemberton Point, Hull. There are only two permanently occurring stops on this route, Hingham Depot and Pemberton Point. There are twelve (12) flag stops in-between these two stops. This bus operates from 5:26 AM to 8:10 PM during the weekdays with 30 to 50-minute headways. On Saturdays and Sundays no flags stops are to be requested. The bus will operate from 9:25 AM to 7:30 PM with a 30-minute headway on Saturdays, and from 9:22 AM to 7:30 PM with a 30 to 35-minute headway on Sundays. The bus within the project area runs through south Nantasket Avenue, along Hull Shore Drive, and through north Nantasket Avenue. Bus stops within the project area are located at the intersection of Nantasket Avenue and Wharf Avenue and along Hull Shore Drive near the Nantasket Beach Resort.



### III. TRAFFIC VOLUMES

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Traffic volume data for this report was obtained from manual Turning Movement Counts (TMCs) and supplemented with Automatic Traffic Recorder (ATR) counts conducted at the project area intersections. The details of the data collection effort for this project are described below.

#### EXISTING TRAFFIC COUNTS

To establish existing traffic-volume conditions within the study area, historical TMCs have been gathered for the study area intersections on multiple dates during the typical weekday and the typical Saturday including traffic volumes within the defined weekday evening (4:00 PM to 6:00 PM), and Saturday midday (11:00 AM to 2:00 PM) peak periods. For the summertime peak, these times correlate to the peak mix between commuter and beachgoing traffic. Table 2 presents the date, time period, and nature of each TMC performed.

**Table 2 - Turning Movement Count (TMC) Summary**

<u>Intersection</u>	<u>Source/ Vendor</u>	<u>Dates of Counts</u>	
		<u>Weekday</u>	<u>Saturday</u>
Manomet Avenue / Beach Avenue / Phipps Street	AC	8/3/2006	8/5/2006
Hull Shore Drive / Phipps Street	PDI	8/18/2015	8/15/2015
Hull Shore Drive / Water Street	PDI	8/18/2015	8/15/2015
Hull Shore Drive / Nantasket Avenue / George Washington Boulevard	PDI	8/18/2015	8/15/2015
Samoset Avenue / Phipps Street	PDI	8/18/2015	8/15/2015
Nantasket Avenue / Phipps Street / Mountford Road	PDI	8/18/2015	8/15/2015
Nantasket Avenue / Edgewater Road	AC	5/31/1995	-
Nantasket Avenue / Water Street / Bay Street	AC	8/3/2006	8/5/2006
Nantasket Avenue / Bay Street	PDI	8/18/2015	8/15/2015
Nantasket Avenue / Wharf Avenue	PDI	8/18/2015	8/15/2015
George Washington Boulevard / Bay Street	PDI	8/18/2015	8/15/2015
George Washington Boulevard / Wharf Avenue	PDI	6/4/2015	8/15/2015

AC - Counts collected by Accurate Counts (AC); North Reading, Massachusetts

PDI - Counts collected by Precision Data Industries, LLC (PDI); Hudson, Massachusetts

TMCs generally reflect summertime peak when the Nantasket Beach traffic substantially increases over school season conditions. A detailed summary of the TMCs partitioned into 15-minute intervals is provided in Appendix B. The progression of these traffic-volumes through the Build with Mitigation Condition is provided in Appendix F.

### **Historic Traffic Count Justification**

The FDR currently utilizes TMCs at the existing study area intersections as conducted in May 1995, August 2006, June 2015, and August 2015 based on available data from the Town of Hull and MassDOT. The majority of the TMCs utilized were completed concurrently on Tuesday, August 18, 2015 and Saturday, August 15, 2015 and have been utilized as they fall within the timeframe outlined in the recently issued *Traffic and Safety Engineering 25% Design Submission Guidelines*<sup>3</sup> which documents procedure for adjusting historical counts as a result of COVID-19 as of May 31, 2022.

Traffic counts completed in May 1995 and August 2006 understandably fall outside of this range; however, the Town of Hull has indicated that these counts are representative of the existing conditions immediately prior to the onset of the COVID-19 pandemic. This is a direct result of the unique nature of Hull being:

- A peninsula community where cut-through traffic unrelated to the residents, businesses, or beaches of Hull is generally nonexistent.
- The overall layout and density of residential and commercial parcels of the Town are relatively unchanged since these earlier time periods.
- The overall layout and density of residential and commercial parcels of the Town result in full build out.

For these three locations, TEC has taken care to **NOT** utilize the mainline through movements, but only the auxiliary turning movements which are analogous to trip generation projections of side streets and driveways off the mainline roadways. Through movements for these locations have been projected based on balancing the overall movements from the intersection to the direct north or south where counts were taken in August 2015.

### ***MassDOT and DCR Intersection Locations***

All intersections within the study area which are owned and maintained by either MassDOT or DCR include traffic counts completed in June or August 2015, within the timeframe of historical adjustment outlined in the recently issued *Traffic and Safety Engineering 25% Design Submission Guidelines*<sup>2</sup>. Those locations counted prior to June / August 2015 are owned and maintained by the Town of Hull.

TEC commissioned new summertime traffic counts at several MassDOT- and DCR-owned intersections in August 2022. These counts have been provided at the end of Appendix B and demonstrate a great degree of consistency with the 2015/2016 turning movement counts.

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<sup>3</sup> *Traffic and Safety Engineering 25% Design Submission Guidelines*; Massachusetts Department of Transportation; Boston, MA; revised May 31, 2022.

## **Seasonal Adjustment Factors**

In accordance with MassDOT standards, traffic volumes are typically adjusted to average-month conditions. To account for seasonal adjustment, TEC utilized MassDOT's weekday seasonal and axle correction factors as published in 2015 (year of historic traffic volumes). The factors provide a month-to-month overview of traffic volumes statewide by roadway functional classification and land (urban vs. rural) type. For urban minor arterials, traffic volumes in the month of June 2015 were 13.6 percent higher (factor of 0.88 in 2015 of the average month) and August 2015 are 11.1 percent higher (factor of 0.90 in 2015 of the average month) than average-month conditions, respectively. Although from a different calendar year, traffic volumes in May are 8.6 percent higher (factor of 0.92 in 2015 of the average month). Therefore, all counts related to the study area were unadjusted to reflect a conservative condition. The compiled seasonal adjustment data is provided in Appendix C.

## **Projecting to the 2022 Base Year Condition**

TEC acknowledges the recently issued *Traffic and Safety Engineering 25% Design Submission Guidelines*<sup>2</sup> which states that traffic counts taken in years prior to 2019 shall be upwardly adjusted to the 2022 through a two-stage methodology; including adjusting to the year 2019 based on MassDOT published growth rates for the roadway type (urban minor arterial roadways) and adjusting from 2019 to 2022 based on volume characteristics of the nearest MassDOT permanent count station. Both TEC and the Town of Hull agree that this methodology is not reasonable for the given study area based on several factors as outlines in the "Historic Traffic Count Justification" section on the preceding page of this FDR. TEC provides the following additional information regarding this disparity:

- The nearest MassDOT permanent count station is located 7-miles west of the study area on Route 3A at the Fore River Bridge bordering Quincy and Weymouth. This location is primarily a commuter roadway servicing many communities and concurrently serves as an alternate route for the Route 3 freeway. This count station, and no other nearby count stations provide a similar traffic volume growth and time-of-day profile as the roadways in the vicinity of Nantasket Beach along the Hull peninsula.
- The nearest temporary count station with multiple count timeframes is located less than 1.5-mile south of the study area along Hull Street (Nantasket Avenue) in Cohasset Town Line. Generally, a large percentage of traffic entering the study area from Nantasket Avenue passes through this count station location. This location indicates that the Tuesday schooltime September 2019 (adjusted to average month) the traffic volume of the roadway was 4,630 vehicles per day (vpd) and the Tuesday schooltime May 2016 (adjusted to average month) the traffic volume of the roadway was 5,140 vpd. Consistent with the Town of Hull's observations, the roadways have not seen growth along the study corridors through the project limits.

## ***Historic Nantasket Beach Summertime Traffic Volumes***

To assess traffic growth along the several roadways and corridors adjacent to Nantasket Beach, historic summertime traffic volume counts at key intersections were also obtained from the Central Transportation Planning Staff (CTPS). Over the period of 2006 to 2015, traffic volumes during the

weekday evening and Saturday midday peak hours had significantly decreased in the vicinity of Nantasket Beach. Specifically, comparable peak summertime counts conducted in August at the key intersections of Nantasket Avenue / Phipps Street / Mountford Street and Nantasket Avenue / George Washington Boulevard / Hull Shore Drive (Miller’s Crossing) had decreased 1%-4% each year since 2006. Table 3 presents an overview of the decrease in summertime traffic volumes.

**Table 3 – Traffic Growth per Year at Key Intersections**

Intersections	Total Traffic Entering Intersection		
	August 2006	August 2015	% Change Per Year
Nantasket Avenue / Phipps Street			
<i>Weekday Evening Peak Hour</i>	1,477	1,444	-0.8%
<i>Saturday Midday Peak Hour</i>	1,699	1,500	-4.1%
Miller’s Crossing			
<i>Weekday Evening Peak Hour</i>	1,444	1,298	-1.2%
<i>Saturday Midday Peak Hour</i>	1,814	1,551	-1.7%

The Town of Hull indicated the decrease in traffic volumes around Nantasket Beach is linked to the decrease in established developments along the waterfront. Previous retail shops and restaurants encouraged tourism and beachgoers.

Based on the above reasonings, in addition to the traffic volumes related to the project design consisting generally of the summertime beach peak timeframe and not the typical commuter weekday, no ambient growth factor was applied to the historical traffic counts to project to the 2022 Base Year condition. The compiled historic traffic count data is provided in Appendix D. The resulting 2022 Base Year (Summertime) Conditions weekday evening and Saturday midday peak-hour traffic-volume network is illustrated in Figure 2.

**FUTURE YEAR CONDITIONS**

Distinct from the previously growth condition, the project is anticipated to be a catalyst for economic development along Nantasket Beach. To determine traffic volumes under future conditions, 2022 baseline traffic volumes in the project area were projected to the year 2032 to provide a 10-year design horizon. Traffic volumes on the roadway network at that time would include existing traffic, new traffic due to general background traffic growth from unforeseen economic development, and traffic related to the redevelopment potential of the Nantasket Beach waterfront, and traffic redistribution related to conversion of flow patterns. Consideration of these factors resulted in the development of the 2032 Future Year (Summertime) Condition traffic volumes.

**Background Traffic Growth**

Traffic growth is a function of the expected land development in the immediate area and the surrounding region. Several methods can be used to estimate this growth. A procedure frequently employed estimates an ambient growth rate for the area roadways and applies that percentage to all mainline and side street traffic volumes. The drawback to such a procedure is that some turning volumes may grow at either a higher or a lower rate at particular intersections.





1"=150'



Figure 2-A

2022 Base Year Summertime Conditions  
Weekday Evening and Saturday Midday  
Peak Hour Traffic Volulmes



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282 Merrimack Street  
Lawrence, MA 01843  
978-794-1792  
www.TheEngineeringCorp.com





1"=150'



XX(XX) = Friday PM Peak (Saturday Midday Peak)

Figure 2-B

2022 Base Year Summertime Conditions  
Weekday Evening and Saturday Midday  
Peak Hour Traffic Volulmes

See Inset for Continuation



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978-794-1792  
www.TheEngineeringCorp.com

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An alternative procedure identifies the location and type of planned development, estimates the traffic to be generated, and assigns it to the area roadway network. This procedure produces a more realistic estimate of growth for local traffic. However, the drawback of this procedure is that the potential growth in population and development external to the study area would not be accounted for in the traffic projections.

To provide a conservative analysis framework, both procedures were used.

### ***General Ambient Growth***

To project traffic to a future horizon year, TEC utilized MassDOT published year-by-year annual growth data between 2016 and 2019. The data indicates that for urban minor arterials, traffic volumes between 2016 and 2017 grew 1.7 percent, between 2017 and 2018 growing 0.3 percent, and between 2018 and 2019 decreased 0.4 percent. This equates to an annual growth rate of approximately 0.5 percent per year on average between 2016 and 2019. To provide a consistent analysis scenario, a 0.5 percent per year compounded annual background traffic growth rate was used to account for potential future traffic growth external to the study area and any presently unforeseen development that is expected to be spurred by the two-way conversion project. MassDOT historic count station data have been included in Appendix E.

### ***Specific Developments by Others***

TEC coordinated with the DCR and the HRA to identify nearby private and public development projects in the vicinity of the project area that was either in the planning process or was approved by the Planning Board at the time of the traffic volume counts. Based on these discussions, the Town of Hull has indicated that there have been no new developments in the vicinity of Nantasket Beach that would have been expected to significantly change the traffic volumes or patterns since the August 2015 traffic counts. The Nantasket Beach area has experienced vacancies for businesses along the Nantasket Avenue and Hull Shore Drive corridors; however, reoccupancy of some of these vacant spaces has been offset by other vacancies. Any reoccupancies spurred by the two-way conversion project or the HRA development parcels are expected to be included within the background growth rate and/or be patronaged by the existing beachgoing traffic reflected in the August traffic volumes.

### **2032 Future Year One-Way Traffic Volumes**

The 2032 Future Year One-Way (Summertime) Condition weekday evening and Saturday midday peak hour traffic-volume networks were developed by applying the 0.5% per year compounded annual background traffic growth rate to the 2022 Base Year (Summertime) Condition peak-hour traffic volumes over the 10-year design horizon. The resulting 2032 Future Year One-Way (Summertime) Condition weekday evening and Saturday midday peak-hour traffic volume networks are illustrated in Figure 3.





1"=150'



Figure 3-A

2032 Future Year Summertime  
One-Way Conditions  
Weekday Evening and Saturday Midday  
Peak Hour Traffic Volulmes



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1"=150'



XX(XX) = Friday PM Peak (Saturday Middy Peak)

Figure 3-B

2032 Future Year Summertime One-Way Conditions Weekday Evening and Saturday Middy Peak Hour Traffic Volulmes

See Inset for Continuation

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## **Nantasket Avenue and Hull Shore Drive Two-Way Conversion**

The project seeks and the 25% Design Plans depict the conversion of Nantasket Avenue and Hull Shore Drive, within their respective one-way flow segments, to two-way flow. Forecasting the traffic diversions for the conversion of one-way flow to two-way flow required many factors to be considered. The general strategy in the vicinity of Nantasket Beach is to provide for two parallel north-south corridors that operate both with two-way traffic flow. The westernmost corridor would consist of the existing George Washington Boulevard to the south and Nantasket Avenue, north of Bay Street, while the easternmost corridor would consist of the existing Nantasket Avenue to the south of Miller's Crossing and Hull Shore Drive.

To allow for cross-corridor flow, connecting the two main corridors will be several cross-streets, similar to the existing Phipps Street, Water Street and Wharf Street connections. Providing several cross-streets within the Nantasket Beach area between Phipps Street and Water Street will allow for those vehicles needing to cross between the two corridors, to access the Nantasket Beach waterfront, or to visit the independently proposed HRA redevelopment area. Multiple cross connections allow traffic to disperse over several intersections without clustering at one location. This kind of clustering current occurs under existing conditions at Anastos Corner, Miller's Crossing, and most notably Kenberma Square.

Several steps were outlined to mark predictable traffic reassignment decisions once two-way flow is provided. These strategies are further defined in this section.

### ***Specific Link Closures***

Providing a consistent two-way flow pattern along Nantasket Avenue and Hull Shore Drive requires the closure of a series of roadway links and the corresponding redistribution of traffic volumes to divert from these links. These closures include:

- *Samoset Avenue between Nantasket Avenue and Phipps Street* – Existing one-way northbound traffic along Samoset Avenue would divert to Nantasket Avenue through the intersection of Nantasket Avenue / Phipps Street / Mountford Road or have previously diverted to Hull Shore Drive, accessing the remainder of Samoset Avenue through the intersection of Hull Shore Drive and Phipps Street.
- *Hull Shore Drive between Water Street and Nantasket Avenue* – Existing one-way northbound traffic along this couplet link would divert to Hull Shore Drive or would have previously diverted to Nantasket Avenue directly at Miller's Crossing or via several existing or proposed cross-streets.
- *George Washington Boulevard Connector between George Washington Boulevard and Nantasket Avenue* – Existing eastbound traffic along this link would divert to continue along George Washington Boulevard or divert to Hull Shore Drive via the several existing or proposed cross-streets.
- *Nantasket Avenue between Bay Street and Hull Shore Drive* – Existing southbound traffic between Miller's Crossing and Anastos Corner would divert to Hull Shore Drive or cross-over to Nantasket Avenue via several existing or proposed cross-streets.

## Introduction of Cross-Streets

There are currently four (4) locations that connect Nantasket Avenue with the parallel roads of George Washington Boulevard or Hull Shore Drive. These include Wharf Street, Miller's Crossing, Water Street, and Phipps Street. As part of the conversion to two-way traffic, up to seven (7) cross-streets will be reconfigured or introduced into the traffic network, including (from south to north):

- Wharf Street (existing)
- Nantasket Avenue Connector (reconfigured Miller's Crossing)
- Water Street (existing)
- The Green South (*New Construction*) as a one-way eastbound
- The Green North (*New Construction*) as a one-way westbound
- Edgewater Road Extension (*New Construction*)
- Phipps Street (existing)

Introducing cross-streets into the traffic network allows for traffic to better redistribute between the George Washington Boulevard / Nantasket Avenue corridor and the Nantasket Avenue / Hull Shore Drive corridor. Cross-streets also provide additional locations for on-street parking facilities, access to the potential redevelopment area, and access to off-street parking facilities. The addition of these cross-streets has independent utility from any HRA redevelopment as the several cross-streets, particularly those three (3) defined between Phipps Street and Water Street, will provide several alternative opportunities for beach-going traffic to access and egress the waterfront and parking facilities; decreasing the operational challenges that are common along Phipps Street in the present.

TEC estimated the potential for traffic to utilize the cross-streets, specifically those resident/commuter trips wishing to continue through the entire network, by assigning a specific percentage of traffic for each street. Although the cross-streets are expected to be utilized as a cut-through opportunity from each corridor, a significant portion of the resident/commuter trips were assumed to cross to/from the easternmost corridor (Nantasket Beach and Hull Shore Drive) and the westernmost corridor (Nantasket Avenue and George Washington Boulevard) prior to the project area. North of Nantasket Beach, more than half a dozen cross-streets exist between the two corridors and provide southbound residents/commuters an opportunity to cross prior to reaching the Nantasket Beach area.

To the south of the study area, Rockland House Road in Hull and Rockland Street in Cohasset provide an opportunity for northbound residents/commuters to cross prior to the Nantasket Beach area. Much of the through traffic would also be expected to utilize the seven northern (7) cross-streets. The forecasting of traffic volumes as a result of the redistribution in Appendix F.

## Surface Parking Removal

All surface and head-in / on-street parking south of Water Street is expected generally to be maintained. Although a very small amount of head-in / on-street parking in this area may change related to redefined crosswalk and ramp locations, or other physical obstructions, no significant amount of parking supply will be altered. North of Water Street, much of the parking characteristics will be changed by the project. Specifically, the grass Town of Hull lots between

Phipps Street and Water Street will be closed. The paved DCR lot opposite Edgewater Road will be retained, and its access/egress will continue to be Hull Shore Drive. On-street parking along the easterly side of Hull Shore Drive will also be retained with minor exceptions related to new crosswalk and ramp locations.

To make up parking removed as part of the project, new on-street parking is proposed along both sides of Nantasket Avenue, between Whitehead Avenue and Water Street, and along each of the cross-streets between Phipps Street and Water Street. Parking maneuvers to/from these locations to have been redistributed based on the new two-way flow of each street. This redistribution assumes that only a small amount of redistributed parking will utilize the existing parking along the easterly side of Hull Shore Drive as it is assumed that traffic volume projections during the summertime peak reflect that these spaces would already have a high occupancy rate. The relocation of parking traffic volumes as a result of the flow conversion in Appendix F. Note that the number of parking spaces in the vicinity is expected to decrease. This will likely increase the number of parked vehicles in the existing DCR surface lost south of Wharf Street. Overall, there would be less vehicular traffic utilizing the Nantasket Beach.

### **Nantasket Beach HRA Redevelopment Zone**

The conversion of roadways in the vicinity of Nantasket Beach is expected to have independent utility from any other actions taken by the Town of the HRA. The two-way conversion of roadways around Nantasket Beach is however anticipated to open the redevelopment potential of approximately 12.5 acres between Phipps Street and Water Street. This redevelopment potential is anticipated to consist of a mix of residential, retail, and lodging uses between Nantasket Avenue and the Hull Shore Drive from Phipps Street to Water Street. These individual pads will also off-street parking to satisfy patron/employee/ resident parking needs without overlapping beachgoing needs on the on-street parking system. Several new cross-street connections will greatly improve access/egress from redevelopment pads and allow for more opportunities for on-street parking. Although the redevelopment of this zone is separate from the two-way conversion project, the redevelopment zone greatly benefits from the change in traffic flow.

To assess the traffic impacts of any redevelopment potential, TEC assumed a conservative multi-use build program including 153 residential dwelling units, a 94-room hotel, 22,175 square feet (SF) of retail/restaurant space, and a 12,000 SF of community use space. Potential site-generated traffic volumes for the redevelopment were estimated based on industry standard trip rates published in the Institute of transportation Engineers (ITE) publication, *Trip Generation, 11<sup>th</sup> Edition* for Land Use Codes (LUC) 210 – Single Family Detached Housing, LUC 220 - Multi-Family Low-Rise Housing, LUC 310 – Hotel, LUC 495 – Recreational Community Center, LUC 822 – Strip Retail Plaza, and LUC 932 – High Turnover Sit-Down Restaurant. The redevelopment program is based on a conceptual layout of development currently being assessed by the HRA.

### ***Internal Capture***

It is reasonable to expect some trips to the potential redevelopment will be shared between the multiple land uses and the general beach-going visitors. For example, someone residing in the condo/townhouses may choose to dine at the restaurant establishment on-site or a general beachgoer may choose to shop at one of the retail shops. Therefore, a reduction in the overall trips experienced at the site driveways and along the adjacent roadway network can be anticipated as a result of multi-use trips that include stops at more than one use on the site and

along Nantasket Beach. TEC has identified that the site has the potential to include up to a 36 percent reduction in overall trip generation as a result of the land uses on-site. This number does not account for potential shared traffic between the beachgoers and the redevelopment which could lead to a higher percentage.

### ***Pass-by Traffic***

Not all of the trips generated by the redevelopment will be new to the roadway network. Many of the trips generated by the proposed development are already present in the existing traffic flow passing by the site. For example, some vehicles which are already travelling along Nantasket Avenue may decide to visit the site on their way to another destination. These vehicle trips are known as “pass-by” trips and are subtracted from the total trips to calculate the total primary (or “new”) trips that affect the volume of traffic within the study area away from the site. It is reasonable to anticipate that due to the commuter nature of “through” traffic along Nantasket Avenue and Hull Shore Drive that a portion of the trips would be pass-by. Based on information contained in the ITE publication *Trip Generation Handbook, 3rd Edition*, approximately 26% to 34% of the retail site-generated traffic and 43% of restaurant traffic is expected to be pass-by traffic. The forecasting of traffic volumes as a result of the potential redevelopment are presented in Appendix G. The detailed trip generation calculation worksheets are provided in Appendix G.

### ***Trip Generation Summary***

Table 4 provide a summary of the resulting trip generation estimate separated by LUC and the total trip generation separated by multi-use, pass-by, and primary trips. The detailed trip generation calculation worksheets are provided in Appendix G. The distribution of site generated traffic was assessed based on existing traffic patterns, practical travel routes and travel time, and US Census Bureau data for population, workforce, and residency. Trip distribution calculations and a graphical depiction of trip assignment are provided in Appendix G.

As shown in Table 6, the proposed HRA redevelopment zone is anticipated to generate 2,506 new vehicle trips during the average weekday, with 191 new vehicle trips (94 entering and 97 exiting) during the weekday morning peak hour and 199 new vehicle trips (120 entering and 79 exiting) during the weekday evening peak hour. On a typical Saturday, the development is expected to generate 2,352 new vehicle trips with 227 new vehicle trips (122 entering and 105 exiting) during the Saturday midday peak hour.

### **2032 Future Year Two-Way Traffic Volumes**

The 2032 Future Year Two-Way (Summertime) Condition traffic volumes were obtained by applying the two-way conversion redistribution to the 2032 Future Year One-Way (Summertime) Condition traffic volumes and adding traffic to potentially be generated by the HRA redevelopment along Nantasket Beach and Hull Shore Drive between Phipps and Water Street. This project will be permitted separately by the HRA or a future development. The volumes are included for the purpose of sound transportation planning for the two-way conversion project, which has independent utility. The resulting 2032 Future Year Two-Way (Summertime) Condition Traffic Volume networks are presented in Figure 4.

**Table 4 – Future HRA Redevelopment Trip Generation Summary**

Time Period	Single Family Housing (LUC 221)	Multi-Family Housing (LUC 822)	Hotel (LUC 310)	Comm Center (LUC 495)	Retail (LUC 822)	Restaurant (LUC 932)	Total Trips	Internal Capture	Pass-by Trips	External Primary Trips
<i>Weekday Daily</i>										
IN	32	348	376	175	317	677	<b>1,925</b>	396	276	<b>1,253</b>
OUT	<u>32</u>	<u>348</u>	<u>376</u>	<u>175</u>	<u>317</u>	<u>677</u>	<b>1,925</b>	<u>396</u>	<u>276</u>	<b>1,253</b>
TOTAL	64	696	752	350	634	1,354	<b>3,850</b>	792	552	<b>2,506</b>
<i>Weekday Morning</i>										
IN	1	13	24	15	17	67	<b>137</b>	17	26	<b>94</b>
OUT	<u>4</u>	<u>44</u>	<u>19</u>	<u>8</u>	<u>11</u>	<u>54</u>	<b>140</b>	<u>17</u>	<u>26</u>	<b>97</b>
TOTAL	5	57	43	23	28	121	<b>277</b>	34	52	<b>191</b>
<i>Weekday Evening</i>										
IN	4	37	28	28	38	70	<b>205</b>	66	19	<b>120</b>
OUT	<u>2</u>	<u>23</u>	<u>27</u>	<u>31</u>	<u>37</u>	<u>44</u>	<b>164</b>	<u>66</u>	<u>19</u>	<b>79</b>
TOTAL	6	60	55	59	75	114	<b>369</b>	132	38	<b>199</b>
<i>Saturday Daily</i>										
IN	27	348	380	55	320	773	<b>1,903</b>	413	314	<b>1,176</b>
OUT	<u>27</u>	<u>348</u>	<u>380</u>	<u>55</u>	<u>320</u>	<u>773</u>	<b>1,903</b>	<u>413</u>	<u>314</u>	<b>1,176</b>
TOTAL	54	696	760	110	640	1,546	<b>3,806</b>	826	628	<b>2,352</b>
<i>Saturday Midday</i>										
IN	8	32	40	7	32	72	<b>191</b>	41	28	<b>122</b>
OUT	<u>6</u>	<u>31</u>	<u>31</u>	<u>6</u>	<u>31</u>	<u>69</u>	<b>174</b>	<u>41</u>	<u>28</u>	<b>105</b>
TOTAL	14	63	71	13	63	141	<b>365</b>	82	56	<b>227</b>





1"=150'

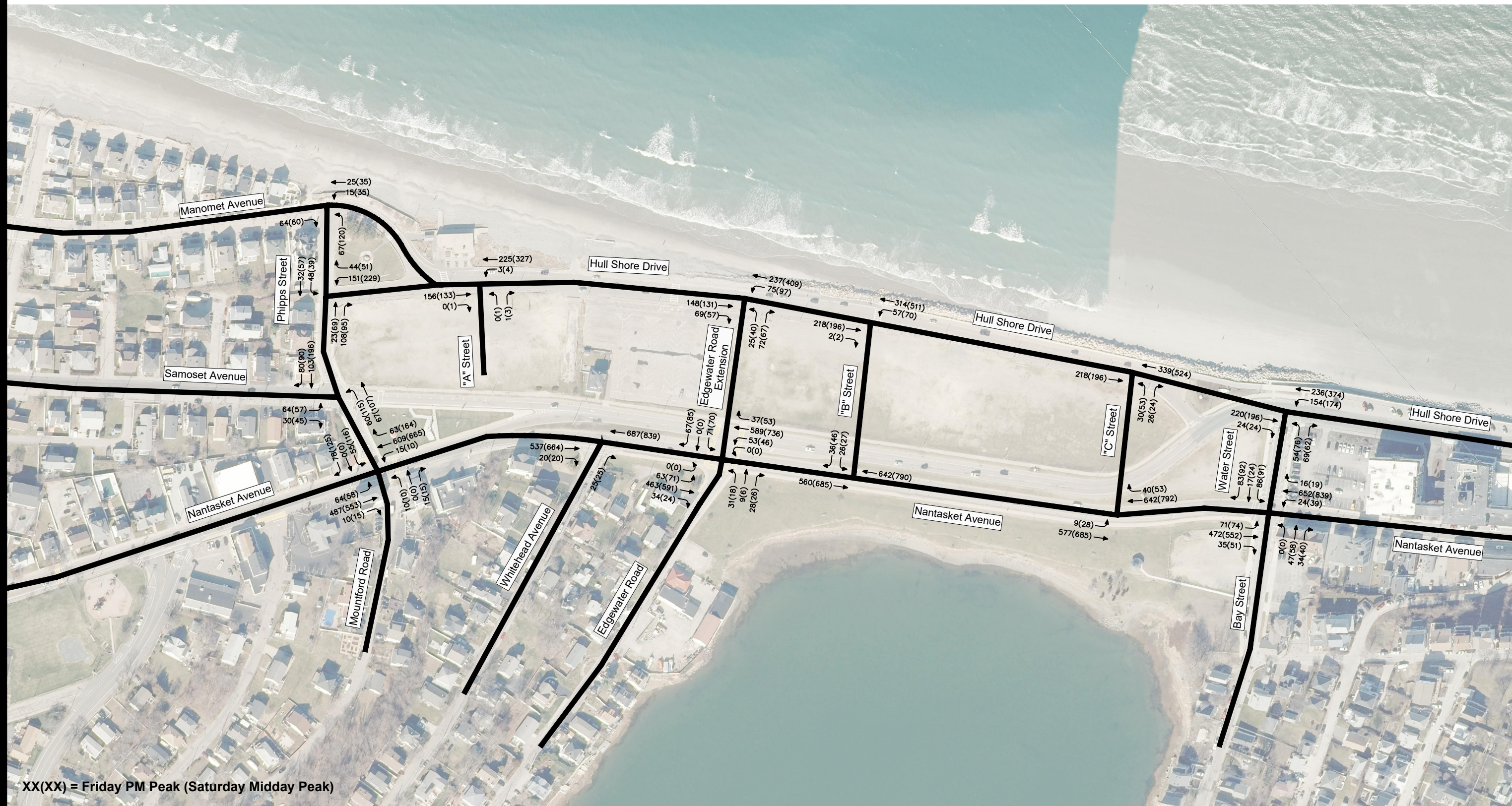


Figure 4-A

2032 Future Year Summertime  
Two-Way Conditions  
Weekday Evening and Saturday Midday  
Peak Hour Traffic Volulmes

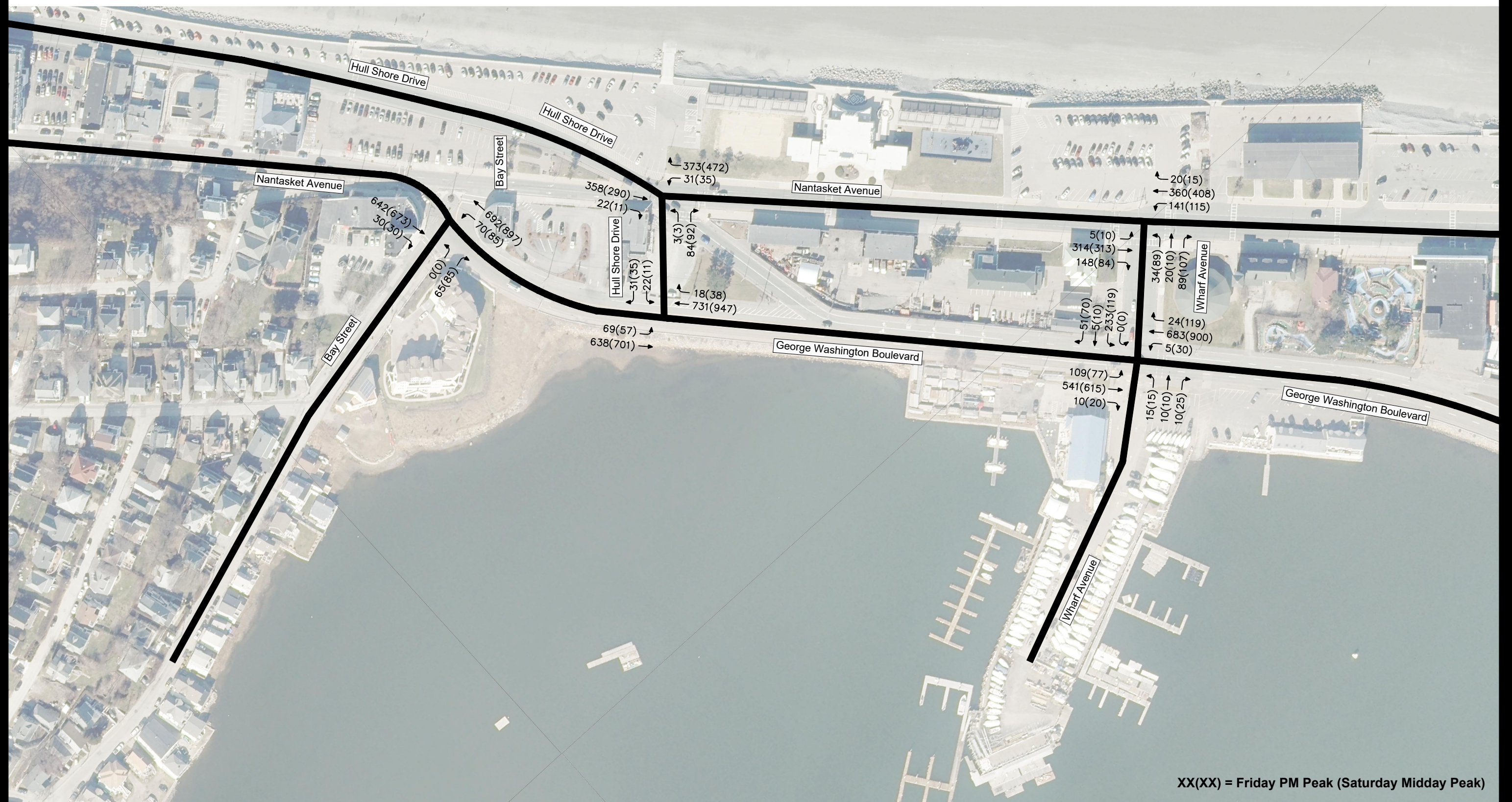


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1"=150'



XX(XX) = Friday PM Peak (Saturday Midday Peak)

Figure 4-B

2032 Future Year Summertime  
Two-Way Conditions  
Weekday Evening and Saturday Midday  
Peak Hour Traffic Volulmes

See Inset for Continuation

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## **IV. SAFETY ANALYSIS**

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A comprehensive traffic safety analysis was conducted for the project area. The traffic safety analysis included an evaluation and examination of study intersection crash data and a general safety review with consideration given to items on the MassDOT Safety Review Prompt List. Details of each step in the traffic safety analysis are described in the following section.

### **CRASH HISTORY**

Crash data at the project intersections and along the project corridors were compiled and analyzed from MassDOT for the most-recent consecutive 5+ year period (2017 - 2022) of complete data identified by MassDOT through the Interactive Mapping Portal for Analysis and Crash Tracking (IMPACT) database. This includes the most recent three-years of complete data (2017-2019) as identified by MassDOT. A summary of the vehicle crash data and crash rates are provided in Table 5. A detailed compilation of the crash data and collision diagrams is provided in Appendix H.

### **Crash Rate Worksheet**

In addition to examining the number of crashes at the study intersection, a crash rate was calculated to compare occurrence of crashes to the volume of traffic passing through the intersections and the corridor. For the purposes of this FDR, only crashes occurring in the complete years of data (2017-2019) were included in this calculation.

The crash rate per million entering vehicles (MEV) was calculated using the weekday evening peak hour volumes from the TMCs as presented in the 2022 Base Year Conditions, a calculated K-factor set as the MassDOT statewide default, and the total years of analyzed crash data. The crash rate at the study intersections was compared to the statewide and district-wide averages published by MassDOT in June 2018 to determine the significance of the crash occurrence. The statewide average for signalized intersections is 0.78 crashes per MEV, and the District 5 average rate for signalized intersections is 0.75. The statewide average for unsignalized intersections is 0.57 crashes per MEV, and the District 5 average rate for unsignalized intersections is 0.57. Crash rate calculations can be found in Appendix H.

### **Collision Diagrams**

TEC is working with the Town of Hull Police Department to gather physical crash reports for those locations within the study area where an intersection experienced three (3) or more crashes per year over the evaluation period. Based on the data compiled from the MassDOT IMPACT

database, only the intersection of Hull Shore Drive / Nantasket Avenue / George Washington Boulevard Connector (Miller's Crossing) experienced more than three (3) crashes per year. Upon receipt of these crash report, TEC will submit a supplemental FDR document to MassDOT and DCR as part of the Permit to Access State Highway process which will include collision diagram materials for the given location.

### **Intersection Crash Summary**

#### ***Hull Shore Drive / Nantasket Avenue / George Washington Boulevard***

The signalized intersection of Hull Shore Drive / Nantasket Avenue / George Washington Boulevard, also referred to as Miller's Crossing, experienced 23 crashes over the five-year period. The crash rate was calculated at 0.64 crashes per MEV which is well below the statewide and district-wide averages for signalized intersections. Approximately 35% (8 of 23) of the crashes were single vehicle crashes, while 26% (6 of 23) were sideswipe crashes, and 22% (5 of 23) were rear-end crashes. As expected, does not experience a significant number of angled crashes based on the one-way and approach-by-approach protected signal phasing nature of the intersection. One (1) crash at the intersection involved a cyclist. A little less than half (11 of 23) of the crashes occurred between 9:00 AM and 3:00 PM which is the peak period for pedestrian and bicyclist to be utilizing the sidewalks and crossing to/from the beach and other Town attractions. Only seven (7) of the crashes occurred from June through August, the overall peak timeframe of Nantasket Beach.

#### ***Nantasket Avenue / Bay Street / Water Street***

This signalized intersection of Nantasket Avenue / Bay Street / Water Street experienced thirteen (13) crashes over the five-year period. The crash rate was calculated at 0.54 crashes per MEV which is well below the statewide and district-wide averages for signalized intersections. Approximately 46% (6 of 13) of the crashes were angled crashes, two (2) were rear-end crashes, and two (2) were sideswipe crashes. More than half (8 of 13) of the crashes occurred between 9:00 AM and 3:00 PM which is the peak period for pedestrian and bicyclist to be utilizing the sidewalks and crossing to/from the beach and other Town attractions. Nearly half (6 of 13) crashes occurred on weekend days. Five (5) of the crashes occurred from June through August, the overall peak timeframe of Nantasket Beach.

All other intersections within the project area experienced two (2) or less crashes per year indicating no notable crash trend.

### **GENERAL SAFETY REVIEW**

TEC performed multiple field visits to confirm safety-related concerns and to identify additional items contributing to safety issues within the study area. TEC utilized the MassDOT Safety Review Prompt List and the former RSA to identify many safety related challenges with the existing layout of the project intersections and corridors. These challenges are summarized below:

**Table 5 – Crash Data Summary**

Parameter	Hull Shore Drive / Phipps Street	Hull Shore Drive / Water Street	Hull Shore Drive / Nantasket Avenue / GW Boulevard	Nantasket Avenue / Phipps Street / Mountford Road	Nantasket Avenue / Edgewater Road	Nantasket Avenue / Water Street / Bay Street	Nantasket Avenue / Bay Street / GW Boulevard	Nantasket Avenue / Wharf Avenue	GW Boulevard / Wharf Avenue	
Year	2017	0	4	3	3	1	0	2	2	1
	2018	1	1	3	2	0	1	1	1	3
	2019	0	0	6	1	1	6	2	1	1
	2020	0	5	4	0	1	3	3	3	1
	2021	0	3	5	1	1	1	2	1	1
	2022	0	0	2	1	0	2	0	0	1
	<b>TOTAL</b>	<b>1</b>	<b>13</b>	<b>23</b>	<b>8</b>	<b>4</b>	<b>13</b>	<b>10</b>	<b>8</b>	<b>8</b>
<b>Average Annual Crashes</b>		<b>0.33</b>	<b>1.67</b>	<b>4.00</b>	<b>2.00</b>	<b>0.67</b>	<b>2.33</b>	<b>1.67</b>	<b>1.33</b>	<b>1.33</b>
<b>Rate per MEV/MVMT</b>		<b>0.34</b>	<b>0.29</b>	<b>0.64</b>	<b>0.33</b>	<b>0.11</b>	<b>0.54</b>	<b>0.38</b>	<b>0.35</b>	<b>0.20</b>
Manner of Crash	Angle	0	6	2	2	1	6	1	1	1
	Rear-end	0	0	5	3	1	2	4	2	3
	Single Vehicle	0	3	8	1	0	2	2	1	1
	Sideswipe	1	3	6	2	1	1	2	3	2
	Head-on	0	0	1	0	0	0	0	0	0
	Pedestrian / Cyclist	0	0	0	0	0	0	0	0	0
	Other / Not Reported	0	1	1	0	1	2	1	1	1
	<b>TOTAL</b>	<b>1</b>	<b>13</b>	<b>23</b>	<b>8</b>	<b>4</b>	<b>13</b>	<b>10</b>	<b>8</b>	<b>8</b>
Road Surface Conditions	Dry	0	13	18	8	3	13	10	7	7
	Wet	1	0	4	0	0	0	0	1	1
	Snow / Ice	0	0	1	0	0	0	0	0	0
	Other / Unknown	0	0	0	0	1	0	0	0	0
	<b>TOTAL</b>	<b>1</b>	<b>13</b>	<b>23</b>	<b>8</b>	<b>4</b>	<b>13</b>	<b>10</b>	<b>8</b>	<b>8</b>
Injury Status (Crash Severity)	Property Damage	0	11	20	6	3	11	8	6	6
	Non-Fatal Injury	0	1	1	2	1	1	1	1	1
	Fatal Injury	0	1	0	0	0	1	0	0	0
	Not Reported	1	0	2	0	0	0	1	1	1
	<b>TOTAL</b>	<b>1</b>	<b>13</b>	<b>23</b>	<b>8</b>	<b>4</b>	<b>13</b>	<b>10</b>	<b>8</b>	<b>8</b>
Day of Week	Monday-Friday	0	5	15	6	4	7	2	4	4
	Saturday-Sunday	1	8	8	2	0	6	8	4	4
	<b>TOTAL</b>	<b>1</b>	<b>13</b>	<b>23</b>	<b>8</b>	<b>4</b>	<b>13</b>	<b>10</b>	<b>8</b>	<b>8</b>
Time of Day	6:00AM-9:00AM	0	1	1	0	1	0	1	0	1
	9:00AM-12:00PM	0	3	5	3	0	3	3	0	1
	12:00PM-3:00PM	0	3	6	0	0	5	2	1	4
	3:00PM-6:00PM	0	0	2	0	1	2	0	0	1
	6:00PM-9:00PM	0	2	5	2	1	2	2	5	0
	9:00PM-6:00AM	1	4	4	3	1	1	2	2	1
	<b>TOTAL</b>	<b>1</b>	<b>13</b>	<b>23</b>	<b>8</b>	<b>4</b>	<b>13</b>	<b>10</b>	<b>8</b>	<b>8</b>

### **Nantasket Avenue Corridor (South of Anastos Corner)**

The following safety challenges were observed along the Nantasket Avenue corridor, south of Anastos Corner, within the limits of the designed improvements:

- *Pavement Markings and Traffic Signs* – A large percentage of the pavement markings in this area are currently faded or non-existent. There is also a lack of lane configuration signage along both the northbound and southbound approaches which is needed based on the confusing nature of the flow patterns.
- *Pavement Conditions* – The pavement along the corridor has areas of moderate cracking and overall fatigue. Direct observations show areas of past utility patchwork which leaves an uneven surface across the corridor. The DCR pullout on the easterly side of Nantasket Avenue is pitched up to the curb line leaving the gutter line on the inside of the pullout resulting in ponding.
- *Lack of Multi-Modal Accommodations* – There are currently no bicycle facilities along this section of the Nantasket Avenue corridor. In addition, sidewalks along the corridor are generally not in compliance with current standards in terms of cross-slope, pedestrian curb ramps, and width. This area, directly in front of the Mary Murray Bath House is a heavy pedestrian area in need of fully compliant pedestrian accommodations.
- *Antiquated Traffic Signal Components*- Parts of the traffic signal at the intersection of Hull Shore Drive / Nantasket Avenue / George Washington Boulevard Connector is generally antiquated. Many signal housings have faded paint, no backplates, and incandescent signal indications. Pedestrian push buttons are located far from There are no overhead traffic signals for the Nantasket Avenue northbound approach.

### **Nantasket Avenue Corridor (From Water Street to Anastos Corner)**

Nantasket Avenue from Water Street to Anastos Corner was recently reconstructed in the mid-2010s in conjunction with a Complete Streets mindset. The following safety challenges were observed along this segment within the limits of the designed improvements:

- *Pavement Markings and Traffic Signs* – Although the pavement markings along the corridor are generally in good condition, the crosswalk markings, which are painted red between the white longitudinal lines, are somewhat faded.

### **Nantasket Avenue Corridor (From Water Street to Phipps Street)**

The following safety challenges were observed along the Nantasket Avenue corridor, from Phipps Street to Water Street, within the limits of the designed improvements:

- *High Travel Speeds* – The multi-lane and divided nature of the Nantasket Avenue northbound and southbound bores creates a ‘freeway’ feel to the arterial corridor. Vehicles generally travel at high rates of speed through this section as there is no side-friction elements such as on-street parking, streetscape items, or even vegetation.

- *Lane Configuration Traffic Signs* – There are no lane configuration signs approaching Water Street along Nantasket Avenue southbound. Lane configuration signage approaching Samoset Avenue along Nantasket Avenue northbound is painted yellow and placed on a nonstandard height. Lane configuration signage is present along each bore approaching Edgewater Road; however, this signage is placed in the median at nonstandard heights and along damaged posts.
- *Pavement Markings and Traffic Signs* – Although the pavement markings along the corridor are generally in fair condition, the crosswalk markings at Edgewater Road and Phipps Street, which are painted yellow and green respectively between the white longitudinal lines, are somewhat faded. Some traffic signs along the corridor, in addition to the lane configuration signs noted above, are faded and are in need of replacement.
- *Pavement Conditions* – The pavement along the corridor has areas of cracking, and overall fatigue.
- *Lack of Multi-Modal Accommodations* – There are currently no bicycle facilities along the Nantasket Avenue corridor in the ‘freeway’ section. Shoulders in this area are wide and support bicycle travel; however, the high-speed nature of the vehicular traffic discourages bicycles from using this section of roadway. In addition, sidewalks along the corridor are generally not in compliance with current standards in terms of cross-slope, pedestrian curb ramps, and width.

### **Hull Shore Drive Corridor (From Miller’s Crossing to Water Street)**

The following safety challenges were observed along the Hull Shore Drive corridor, from Miller’s Crossing to Water Street, within the limits of the designed improvements:

- *Parking Lot Blending* - The parking fields along the easterly side of Hull Shore Drive just north of Nantasket Avenue generally blend into the pavement even with the 6-inch granite curbing. This results in a presumption of less side-friction and higher travel speeds.
- *Mid-Block Pedestrian Crossings* – This section of Hull Shore Drive has multiple mid-block pedestrian crossings to support the commercial businesses on the westerly side of the roadway and provide connectivity to the beach and parking. There is a noticeable lack of pedestrian warning signage and advanced warning signage for each crosswalk. These crossings produce a large amount of pedestrian traffic and consistently results in queuing along Hull Shore Drive during the summer months. There are no curb extensions to support the parking side crosswalk terminus.
- *Angled Parking* – The parking along the easterly side of Hull Shore Drive is angled parking for head-in maneuvers. This results in vehicles backing up into the traffic lane with limited sight distance.
- *Pavement Markings and Traffic Signs* – There are pavement markings and traffic along the corridor and on the side-street approaches to the corridor that are minimally faded.

- *Pavement Conditions* – The pavement along the corridor has significant areas of heavy cracking and overall fatigue.
- *Lack of Multi-Modal Accommodations* – There are currently no bicycle facilities along the Hull Shore Drive corridor. It should be noted that many of the pedestrian ramps in this area seems to be recently reconstructed; but may not be in full compliance.

### **Hull Shore Drive Corridor (From Water Street to Phipps Street)**

The following safety challenges were observed along the Hull Shore Drive corridor, from Water Street to Phipps Street, within the limits of the designed improvements:

- *Pavement Markings and Traffic Signs* – There are many pavement markings and traffic along the corridor and on the side-street approaches to the corridor that are faded or damaged.
- *Pavement Conditions* – The pavement along the corridor has areas of cracking and overall fatigue.
- *Lack of Multi-Modal Accommodations* – There are currently no bicycle facilities along the Hull Shore Drive corridor. In addition, sidewalks along the corridor are generally not in compliance with current standards in terms of cross-slope, pedestrian curb ramps, and width.

### **George Washington Boulevard Corridor**

The following safety challenges were observed along the George Washington Boulevard corridor within the limits of the designed improvements:

- *Lack of Curb Reveal* – The curb reveal along the westerly side of pavement generally seems to be less than 6-inches. The asphalt surface of the sidewalk seems to blend into the pavement surface.
- *Pavement Markings and Traffic Signs* – The shoulder line along the easterly side of George Washington Boulevard just south of Dunkin Donuts terminates with no formal markings and allows the lane to widen increasing northbound travel speeds. There is no lane configuration signage along George Washington Boulevard southbound approaching Wharf Avenue.
- *Lack of or Deficient Multi-Modal Accommodations* – There are currently no bicycle facilities at the intersection. Although sidewalks are provided on both sides of each approach, the curb ramps are not sufficiently compliant to current standards.
- *Utility Pole Proximity* – Many utility poles along the corridor approaching Bay Street are at the immediate back of curb and do not provide sufficient lateral offset from the path of travel for vehicle which may result in lane departure crashes that strike these poles.
- *Drainage Cleaning* – For site visits conducted during the late summer, there was noticeable blockage of the stormwater catch basins and sand build-up along the corridor.

## **V. TRAFFIC SIGNAL WARRANTS**

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### **TRAFFIC SIGNAL WARRANTS**

#### **Warrant Locations**

The signalized intersections of Nantasket Avenue / Wharf Avenue / DCR Lot 1 Entrance (DCR jurisdiction) and George Washington Boulevard / Wharf Avenue / McDuff's Landing Driveway were not assessed for traffic signal warrants as part of this project as the intent of the project is to terminate the project limits at or in advance of these locations where no geometric or control conditions will be altered. Although traffic volumes at each location may slightly change as a result of the project, the 25% Design depicts limited "tie-in" traffic signage and pavement marking upgrades starting at the intersection of George Washington Boulevard / Wharf Avenue / McDuff's Landing Driveway and points north. Due to the limited change in traffic volume and the overall acceptable signal operations, no traffic signal timings changes are proposed.

The existing traffic signal at the intersection of Nantasket Avenue / Bay Street / Water Street, a Town of Hull intersection was recently reconstructed by the Town as part of a separate project. It is the intent of the Town to maintain traffic signal operations at this location following the project.

The 25% Design Plans depict traffic signal infrastructure to be installed at the intersection of Nantasket Avenue / Edgewater Road. As noted on the plans, the intent of the Town is to construct only subsurface traffic signal infrastructure at this location (handholes and conduit) until such time that traffic signal warrants can be credibly evaluated at the location based upon new traffic patterns introduced post-conversion of each roadway, post-introduction of the several cross-streets, and potentially post-redevelopment of the HRA redevelopment zone. The 25% Design Plans depict all signal infrastructure in order to ensure that all concurrently design infrastructure can be adequately designed and place so to not preclude the installation of a traffic signal above-ground at a future date. No traffic signal warrant analysis has been provided at this time.



## VI. TRAFFIC IMPACT ANALYSIS

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Measuring existing and future traffic volumes quantifies traffic flow within the study area. To assess quality of flow, roadway capacity and vehicle queue analyses were conducted under 2022 Base Year (Summertime) Conditions, 2032 Future Year One-Way (Summertime) Conditions and 2032 Future Year Two Way (Summertime) Conditions. Capacity analyses provide an indication of how well the roadway facilities serve the traffic demands placed upon them, with vehicle queue analyses providing a secondary measure of the operational characteristics of an intersection or section of roadway under study. *Synchro 11<sup>TM</sup>* software was used to perform the analysis.

### **METHODOLOGY**

The signalized intersection capacity and queue analysis were conducted using methodology from the *HCM 2000* due to the restrictions posed on signalized intersection analysis using *Synchro v11* by the more recently published *HCM 6<sup>th</sup> Edition*. This includes the inability of *HCM 6<sup>th</sup> Edition* to correctly analyze non-NEMA phasing, intersections with more than four approaches, or exclusive pedestrian phases which are present at project area intersections. To remain consistent throughout the study, all signalized and intersection capacity and queue analyses were therefore conducted using *HCM 2000* methodology.

MassDOT has recognized the significant deficiencies in the *HCM 6<sup>th</sup> Edition* methodology and traffic impact software such as *Synchro 11.0* when attempting to analyze traffic signals. Based on conversations with the MassDOT – Highway Division’s Traffic Section, alternate methodologies to analyze capacity, delays, and queues can be conducted if the models are properly calibrated. TEC uses *HCM 2000* methodology over the “*Synchro 11 Percentile Queue and Percentile Delay*” methodology, as the *HCM 2000* represents the most recent previous accepted methodology for analyzing capacity, delay, and queues.

### **Levels of Service**

A primary result of capacity analyses is the assignment of level of service to traffic facilities under various traffic flow conditions.<sup>4</sup> The concept of level of service is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A level of service definition provides an index to quality of traffic flow in terms of

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<sup>4</sup> The capacity analysis methodology is based on the concepts and procedures presented in the *Highway Capacity Manual 6<sup>th</sup> Edition and/or 2000*; Transportation Research Board; Washington, DC; 2000 / 2018

such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

Six levels of service are defined for each type of facility. They are given letter designations from A to F, with level of service (LOS) A representing the best operating conditions and LOS F representing the worst. Since the level of service of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of levels of service, depending on the time of day, day of week, or period of year.

### **Queue Length Analysis**

Vehicle queue analyses are a direct measurement of an intersections ability to process vehicles under various traffic control and volume scenarios and lane use arrangements. The vehicle queue analysis was performed using the Synchro 11™ intersection capacity analysis software which is also based upon the methodology and procedures presented in the *HCM 6<sup>th</sup> Edition*. Synchro reports the 95<sup>th</sup> percentile queues for unsignalized intersections and both the 50<sup>th</sup> (average) and 95<sup>th</sup> percentile vehicle queues for signalized intersections, which are based on the number of vehicles that experience a delay of six seconds or more at an intersection and is a function of the traffic signal timing; vehicle arrival patterns during the analysis period; and the saturation flow rate. The 50<sup>th</sup> percentile or average vehicle queue is the average number of vehicles that are projected to be delayed by six seconds or more at the intersection under study during the analysis period. The 95<sup>th</sup> percentile vehicle queue is the vehicle queue length that will be exceeded only five percent of the time; or approximately three minutes out of 60 minutes during the peak one hour of the day. During the remaining 57 minutes, the vehicle queue length will be less than the 95<sup>th</sup> percentile queue length.

## **PARAMETERS FOR TRAFFIC IMPACT ANALYSIS**

### **Signalized Intersections**

LOS for signalized intersections is calculated using the operational analysis methodology of the *HCM 2000*. This method assesses the effects of signal type, timing, phasing, progression; vehicle mix; and geometrics on delay. LOS designations are based on the criterion of control or signal delay per vehicle. Control or signal delay can be related to driver discomfort, frustration, and fuel consumption, and includes initial deceleration delay approaching the traffic signal, queue move-up time, stopped delay and final acceleration delay. Table 6 summarizes the relationship between LOS and control delay. The tabulated control delay criterion may be applied in assigning LOS designations to individual lane groups, to individual intersection approaches, or to entire intersections.

**Table 6 – Level of Service Criteria for Signalized Intersections<sup>(a)</sup>**

Level of Service V/C ≤ 1.00	Average Control Delay (s/veh)	Description
A	≤10.0	LOS A describes operations with very low control delay; most vehicles do not stop at all.
B	10.1 to 20.0	LOS B describes operations with relatively low control delay. However, more vehicles stop than LOS A.
C	20.1 to 35.0	LOS C describes operations with higher control delays. Individual cycle failures may begin to appear. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	35.1 to 55.0	LOS D describes operations with control delay in the range where the influence of congestion becomes more noticeable. Many vehicles stop and individual cycle failures are noticeable, whereby motorists are not able to get through the signal on one cycle.
E	55.1 to 80.0	LOS E describes operations with high control delay values. Individual cycle failures are frequent occurrences.
F	>80.0	LOS F describes operations with high control delay values that often occur with over-saturation. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

<sup>a</sup> Source: *Highway Capacity Manual 2000*; Transportation Research Board; Washington D.C.; 2010

### **Unsignalized Intersections**

The levels of service of two-way stop-controlled unsignalized intersections are determined by application of a procedure described in the *HCM 6<sup>th</sup> Edition*. Level of service is measured in terms of average control delay. Mathematically, control delay is a function of the capacity and degree of saturation of the lane group and/or approach under study and is a quantification of motorist delay associated with traffic control devices such as traffic signals and stop signs. Control delay includes the effects of initial deceleration delay approaching a stop sign, stopped delay, queue move-up time, and final acceleration delay from a stopped condition. Definitions for level of service at unsignalized intersections are also given in the *HCM 6<sup>th</sup> Edition*. Table 7 summarizes the relationship between LOS and control delay. The tabulated control delay criterion may be applied in assigning LOS designations to individual lane groups, to individual intersection approaches, or to entire intersections.

**Table 7 – Level of Service Criteria for Unsignalized Intersections<sup>(a)</sup>**

Level of Service V/C ≤ 1.00	Level of Service V/C > 1.00	Average Control Delay (s/veh)	Description
A	F	≤10.0	LOS A describes operations with very low control delay; most vehicles do not stop at all.
B	F	10.1 to 20.0	LOS B describes operations with relatively low control delay. However, more vehicles stop than LOS A.
C	F	20.1 to 35.0	LOS C describes operations with higher control delays. Individual cycle failures may begin to appear. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	F	35.1 to 55.0	LOS D describes operations with control delay in the range where the influence of congestion becomes more noticeable. Many vehicles stop and individual cycle failures are noticeable, whereby motorists are not able to get through the signal on one cycle.
E	F	55.1 to 80.0	LOS E describes operations with high control delay values. Individual cycle failures are frequent occurrences.
F	F	>80.0	LOS F describes operations with high control delay values that often occur with over-saturation. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

<sup>a</sup> Source: *Highway Capacity Manual 6<sup>th</sup> Edition*; Transportation Research Board; Washington D.C.; 2018

## **TRAFFIC IMPACT ANALYSIS RESULTS**

Capacity and queue analyses were conducted for the 2022 Base Year Conditions, 2032 Future Year One-Way Conditions and 2032 Future Year Two Way Conditions. The results of the intersection capacity and queue analyses are summarized in Table 8. The capacity analysis worksheets are provided in Appendix I. Queue diagrams for the given MassDOT and DCR intersections is provided in Appendix J.

### **DCR Jurisdiction Locations**

#### ***Hull Shore Drive / Nantasket Avenue / GW Connector (future Nantasket Avenue Connector)***

Under the two-way flow condition, the intersection formerly in the location of Miller’s Crossing is anticipated to operate at acceptable levels of service (LOS D or better) during each of the peak summertime periods with volume-to-capacity (v/c) ratios well below 1.00 indicating that adequate capacity exists at the location.

#### ***Nantasket Avenue / Wharf Avenue / DCR Lot 1 Entrance***

Under the two-way flow condition, operations at the intersection of Nantasket Avenue / Wharf Avenue / DCR Lot 1 Entrance are generally unchanged. Each movement at the intersection is expected to continue operating at acceptable levels of service (LOS D or better) during each of the peak summertime periods with v/c ratios well below 1.00 indicating that adequate capacity exists at the location. Queues are anticipated to extend further along the Nantasket Avenue northbound approach during both the weekday evening and Saturday midday peak periods; however, adequate storage is available at the intersection. The minimal level of delay for the northbound approach indicates that the longer queues are still able to traverse the intersection in a timely manner. No signal timing modifications are proposed at this location.

## **MassDOT Jurisdiction Locations**

### ***George Washington Boulevard / Bay Street***

Under the two-way flow condition, the intersection of George Washington Boulevard / Bay Street is anticipated to operate at acceptable levels of service (LOS D or better) during each of the peak summertime periods with v/c ratios well below 1.00 indicating that adequate capacity exists at the location.

### ***George Washington Boulevard / future Nantasket Avenue Connector***

The Nantasket Avenue Connector westbound approach will be expected to operate at elevated levels of service during each summertime peak period. For the remainder of the calendar year, this approach would be expected to operate at acceptable levels of service. Although delay is elevated during the peak periods, this delay is not uncommon for a stop-control approach along a mainline roadway. The v/c ratios on the approach are still well below 1.00 indicating that adequate capacity exists on the approach. Additionally, motorists will have the option to use other signalized cross streets in the event that queues are noticeable at this intersection. Movements along George Washington Boulevard are anticipated to operate at acceptable levels of service (LOS D or better).

### ***George Washington Boulevard / Wharf Avenue / McDuff's Landing Driveway***

Under the two-way flow condition, operations at the intersection of George Washington Boulevard / Wharf Avenue / McDuff's Landing Driveway are generally unchanged. Each movement at the intersection is expected to continue operating at acceptable levels of service (LOS D or better) during each of the peak summertime periods with v/c ratios well below 1.00 indicating that adequate capacity exists at the location. No signal timing modifications are proposed at this location.



**Table 8 – Intersection Capacity and Queue Analysis Summary**

Intersection / Lane Group	2022 Base Year				2032 Future Year with One-Way Flow				2032 Future Year with Two-Way Flow			
	V/C <sup>(a)</sup>	Delay <sup>(b)</sup>	LOS <sup>(c)</sup>	Queue <sup>(d)</sup>	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue
<b>TOWN: Hull Shore Drive / Phipps Street</b>												
<i>Weekday Evening Peak Period</i>												
Phipps Street WBL	-	-	-	-	-	-	-	-	0.04	7.6	A	<25
Hull Shore Drive NBL	0.21	9.9	A	<25	0.16	9.6	A	<25	0.28	11.5	B	28
<i>Saturday Midday Peak Period</i>												
Phipps Street WBL	-	-	-	-	-	-	-	-	0.03	7.7	A	<25
Hull Shore Drive NBL	0.16	10.0	B	<25	0.17	10.1	B	<25	0.43	13.8	B	55
<b>TOWN: Hull Shore Drive / Edgewater Road Extension</b>												
<i>Weekday Evening Peak Period</i>												
Edgewater Road EB	-	-	-	-	-	-	-	-	0.19	13.3	B	<25
Hull Shore Drive NBL	-	-	-	-	-	-	-	-	0.07	8.1	A	<25
<i>Saturday Midday Peak Period</i>												
Edgewater Road EB	-	-	-	-	-	-	-	-	0.28	17.1	C	28
Hull Shore Drive NBL	-	-	-	-	-	-	-	-	0.08	8.1	A	<25
<b>TOWN: Hull Shore Drive / The Green North</b>												
<i>Weekday Evening Peak Period</i>												
The Green North NBL	-	-	-	-	-	-	-	-	0.05	8.1	A	<25
<i>Saturday Midday Peak Period</i>												
The Green North NBL	-	-	-	-	-	-	-	-	0.06	8.1	A	<25
<b>TOWN: Hull Shore Drive / The Green South</b>												
<i>Weekday Evening Peak Period</i>												
The Green South EB	-	-	-	-	-	-	-	-	0.12	12.7	B	<25
<i>Saturday Midday Peak Period</i>												
The Green South EB	-	-	-	-	-	-	-	-	0.21	16.1	C	<25
<b>TOWN: Hull Shore Drive / Water Street</b>												
<i>Weekday Evening Peak Period</i>												
Water Street EB	0.26	20.7	C	25	0.25	23.1	C	25	0.38	21.1	C	43
Hull Shore Drive NBL	0.07	7.4	A	<25	0.08	7.4	A	<25	0.14	8.50	A	<25
<i>Saturday Midday Peak Period</i>												
Water Street EB	0.67	53.1	F	100	0.96	129.5	F	168	0.59	37.2	E	85
Hull Shore Drive NBL	0.08	7.5	A	<25	0.10	7.6	A	<25	0.16	8.5	A	<25
<b>DCR: Hull Shore Drive / Nantasket Avenue / GW Connector (future Nantasket Avenue Connector)</b>												
<i>Weekday Evening Peak Period</i>												
GW Connector EB	0.43	10.2	B	48/104	0.45	10.4	B	52/117	-	-	-	-
Nantasket Avenue Connector EB	-	-	-	-	-	-	-	-	0.20	14.4	B	<25
Nantasket Avenue NBL	-	-	-	-	-	-	-	-	0.03	8.7	A	<25
Nantasket Avenue NBR	0.27	9.0	A	<25/40	0.31	9.3	A	<25/50	-	-	-	-
Nantasket Avenue SBT	0.34	9.3	A	34/70	0.36	9.5	A	36/76	-	-	-	-
<b>Overall Intersection</b>	<b>0.39</b>	<b>9.6</b>	<b>A</b>	-	<b>0.41</b>	<b>9.9</b>	<b>A</b>	-	-	-	-	-
<i>Saturday Midday Peak Period</i>												
GW Connector EB	0.60	12.1	B	95/152	0.57	12.1	B	92/162	-	-	-	-
Nantasket Avenue Connector EB	-	-	-	-	-	-	-	-	0.20	13.7	B	<25
Nantasket Avenue NBL	-	-	-	-	-	-	-	-	0.04	8.4	A	<25
Nantasket Avenue NBR	0.52	12.0	B	52/109	0.54	11.9	B	55/117	-	-	-	-
Nantasket Avenue SBT	0.29	10.5	B	36/71	0.31	10.2	B	38/76	-	-	-	-
<b>Overall Intersection</b>	<b>0.56</b>	<b>11.7</b>	<b>B</b>	-	<b>0.56</b>	<b>11.6</b>	<b>B</b>	-	-	-	-	-

<sup>a</sup> Volume-to-capacity ratio

<sup>b</sup> Delay expressed in seconds per vehicle (average)

<sup>c</sup> Level of service

<sup>d</sup> 50<sup>th</sup> / 95<sup>th</sup> Percentile Queue (feet)

**Table 8 – Intersection Capacity and Queue Analysis Summary (Continued)**

Intersection / Lane Group	2022 Base Year				2032 Future Year with One-Way Flow				2032 Future Year with Two-Way Flow			
	V/C <sup>(a)</sup>	Delay <sup>(b)</sup>	LOS <sup>(c)</sup>	Queue <sup>(d)</sup>	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue
<b>TOWN: Samoset Avenue / Phipps Street</b>												
<i>Weekday Evening Peak Period</i>												
Philips Street EBL	-	-	-	-	-	-	-	-	0.05	7.9	A	<25
Philips Street WB	0.28	9.0	A	28	0.22	8.4	A	<25	-	-	-	-
Samoset Avenue NBL	0.01	8.4	A	<25	0.02	8.3	A	<25	-	-	-	-
Samoset Avenue NBTR	0.17	8.8	A	<25	0.16	8.5	A	<25	-	-	-	-
Samoset Avenue SB	0.07	7.6	A	<25	0.05	7.4	A	<25	0.16	11.9	B	<25
<i>Saturday Midday Peak Period</i>												
Philips Street EBL	-	-	-	-	-	-	-	-	0.10	8.3	A	<25
Philips Street WB	0.25	9.1	A	25	0.26	9.3	A	25	-	-	-	-
Samoset Avenue NBL	0.03	8.4	A	<25	0.04	8.5	A	<25	-	-	-	-
Samoset Avenue NBTR	0.31	9.7	A	33	0.34	10.1	B	38	-	-	-	-
Samoset Avenue SB	0.07	7.6	A	<25	0.07	7.7	A	<25	0.24	15.1	C	<25
<b>TOWN: Nantasket Avenue / Mountford Road / Phipps Street</b>												
<i>Weekday Evening Peak Period</i>												
Mountford Road EB	0.08	21.8	C	<25	0.16	29.3	D	<25	0.18	34.7	D	<25
Philips Street WBL	2.07	566.5	F	518	2.00	545.4	F	393	-	-	-	-
Philips Street WB	0.06	14.1	B	<25	0.06	14.8	B	<25	0.86	91.4	F	150
Nantasket Avenue NBL	0.01	8.8	A	<25	0.02	9.0	A	<25	0.02	8.7	A	<25
Nantasket Avenue SBL	-	-	-	-	-	-	-	-	0.08	9.7	A	<25
<i>Saturday Midday Peak Period</i>												
Mountford Road EB	0.15	32.2	D	<25	0.22	42.4	E	<25	0.30	61.4	F	28
Philips Street WBL	2.71	881.7	F	540	2.87	966.7	F	515	-	-	-	-
Philips Street WB	0.13	16.0	C	<25	0.14	16.8	C	<25	2.24	644.2	F	563
Nantasket Avenue NBL	0.01	9.3	A	<25	0.01	9.5	A	<25	0.01	8.9	A	<25
Nantasket Avenue SBL	-	-	-	-	-	-	-	-	0.09	10.4	B	<25
<b>TOWN: Nantasket Avenue / Whitehead Avenue</b>												
<i>Weekday Evening Peak Period</i>												
Whitehead Avenue EB	0.06	14.7	B	<25	0.08	16.0	C	<25	0.06	12.9	B	<25
<i>Saturday Midday Peak Period</i>												
Whitehead Avenue EB	0.07	16.6	C	<25	0.09	17.4	C	<25	0.07	14.6	B	<25
<b>TOWN: Nantasket Avenue / Edgewater Road / Edgewater Street Extension</b>												
<i>Weekday Evening Peak Period</i>												
Edgewater Street EB	0.12	19.4	C	<25	0.20	25.1	D	<25	0.28	21.6	C	<25/48
Edgewater Street WBTR	-	-	-	-	-	-	-	-	0.57	25.7	C	<25/66
Edgewater Street WBR	-	-	-	-	-	-	-	-	0.06	20.7	C	<25/<25
Nantasket Avenue NBL	0.07	10.1	B	<25	0.08	10.6	B	<25	0.18	5.7	A	<25/44
Nantasket Avenue NBTR	-	-	-	-	-	-	-	-	0.78	13.4	B	94/541
Nantasket Avenue SBUL	0.02	13.2	B	<25	0.03	14.1	B	<25	0.28	6.4	A	<25/58
Nantasket Avenue SBTR	-	-	-	-	-	-	-	-	0.62	9.0	A	63/396
<b>Overall Intersection</b>	-	-	-	-	-	-	-	-	<b>0.70</b>	<b>12.6</b>	<b>B</b>	-
<i>Saturday Midday Peak Period</i>												
Edgewater Street EB	0.14	22.3	C	<25	0.24	30.7	D	<25	0.17	21.1	C	<25/37
Edgewater Street WBTR	-	-	-	-	-	-	-	-	0.54	23.9	C	<25/65
Edgewater Street WBR	-	-	-	-	-	-	-	-	0.07	20.7	C	<25/33
Nantasket Avenue NBL	0.05	9.8	A	<25	0.07	10.3	B	<25	0.20	6.0	A	<25/43
Nantasket Avenue NB	-	-	-	-	-	-	-	-	0.99	39.5	D	154/731
Nantasket Avenue SBUL	0.03	16.3	C	<25	0.04	17.9	C	<25	0.56	12.1	B	<25/106
Nantasket Avenue SB	-	-	-	-	-	-	-	-	0.77	13.0	B	93/540
<b>Overall Intersection</b>	-	-	-	-	-	-	-	-	<b>0.86</b>	<b>25.9</b>	<b>C</b>	-

<sup>a</sup> Volume-to-capacity ratio

<sup>b</sup> Delay expressed in seconds per vehicle (average)

<sup>c</sup> Level of service

<sup>d</sup> 50<sup>th</sup> / 95<sup>th</sup> Percentile Queue (feet)

**Table 8 – Intersection Capacity and Queue Analysis Summary (Continued)**

Intersection / Lane Group	2022 Base Year				2032 Future Year with One-Way Flow				2032 Future Year with Two-Way Flow			
	V/C <sup>(a)</sup>	Delay <sup>(b)</sup>	LOS <sup>(c)</sup>	Queue <sup>(d)</sup>	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue
<b>TOWN: Nantasket Avenue / The Green North</b>												
<i>Weekday Evening Peak Period</i>												
The Green North WB	-	-	-	-	-	-	-	-	0.26	23.8	C	25
<i>Saturday Midday Peak Period</i>												
The Green North WB	-	-	-	-	-	-	-	-	0.41	36.1	E	48
<b>TOWN: Nantasket Avenue / The Green South</b>												
<i>Weekday Evening Peak Period</i>												
Nantasket Avenue SBL	-	-	-	-	-	-	-	-	0.01	9.3	A	<25
<i>Saturday Midday Peak Period</i>												
Nantasket Avenue SBL	-	-	-	-	-	-	-	-	0.04	10.2	B	<25
<b>TOWN: Nantasket Avenue / Water Street / Bay Street</b>												
<i>Weekday Evening Peak Period</i>												
Bay Street EBT	0.29	19.0	B	<25/36	0.26	18.9	B	<25/38	0.20	22.3	C	<25/58
Water Street WBT	0.73	34.6	C	27/88	0.78	40.9	D	30/96	0.81	44.8	D	44/188
Nantasket Avenue NBT	-	-	-	-	-	-	-	-	0.76	13.3	B	129/526
Nantasket Avenue SBT	0.35	3.7	A	33/52	0.38	3.9	A	38/60	0.84	19.5	B	117/493
<b>Overall Intersection</b>	<b>0.46</b>	<b>19.1</b>	<b>B</b>	<b>-</b>	<b>0.47</b>	<b>21.2</b>	<b>B</b>	<b>-</b>	<b>0.65</b>	<b>25.0</b>	<b>C</b>	<b>-</b>
<i>Saturday Midday Peak Period</i>												
Bay Street EBT	0.32	19.3	B	<25/39	0.32	19.2	B	<25/44	0.26	29.6	C	28/86
Water Street WBT	0.89	61.3	E	34/110	0.94	73.9	E	37/117	0.94	77.3	E	81/262
Nantasket Avenue NBT	-	-	-	-	-	-	-	-	0.96	34.5	C	284/861
Nantasket Avenue SBT	0.39	3.9	A	40/62	0.41	4.0	A	42/65	0.99	45.4	D	221/698
<b>Overall Intersection</b>	<b>0.53</b>	<b>28.2</b>	<b>C</b>	<b>-</b>	<b>0.56</b>	<b>32.4</b>	<b>C</b>	<b>-</b>	<b>0.90</b>	<b>42.9</b>	<b>D</b>	<b>-</b>
<b>DCR: Nantasket Avenue / Bay Street</b>												
<i>Weekday Evening Peak Period</i>												
Bay Street EB	0.06	13.5	B	0.2	0.08	14.0	B	0.2	-	-	-	-
Nantasket Avenue NBL	-	-	-	-	-	-	-	-	-	-	-	-
<i>Saturday Midday Peak Period</i>												
Bay Street EB	0.10	13.7	B	0.3	0.11	14.4	B	0.4	-	-	-	-
Nantasket Avenue NBL	-	-	-	-	-	-	-	-	-	-	-	-
<b>DCR: Nantasket Avenue / Wharf Avenue</b>												
<i>Weekday Evening Peak Period</i>												
Wharf Avenue EBT	0.36	29.5	C	<25/46	0.34	30.6	C	<25/54	0.28	28.0	C	<25/57
Wharf Avenue EBR	0.24	28.6	C	<25/34	0.23	29.8	C	<25/42	0.52	30.7	C	28/85
Nantasket Avenue NBT	0.37	8.6	A	32/124	0.36	8.3	A	31/128	0.63	13.7	B	87/419
Nantasket Avenue SBT	0.39	9.2	A	45/192	0.39	8.9	A	45/200	0.36	9.5	A	44/191
Nantasket Avenue SBR	0.06	6.5	A	<25/<25	0.06	6.3	A	<25/<25	0.11	7.4	A	<25/33
<b>Overall Intersection</b>	<b>0.28</b>	<b>16.5</b>	<b>B</b>	<b>-</b>	<b>0.28</b>	<b>16.8</b>	<b>B</b>	<b>-</b>	<b>0.56</b>	<b>13.7</b>	<b>B</b>	<b>-</b>
<i>Saturday Midday Peak Period</i>												
Wharf Avenue EBT	0.49	29.9	C	29/85	0.50	30.1	C	30/88	0.40	27.8	C	31/91
Wharf Avenue EBR	0.31	28.3	C	<25/58	0.32	28.5	C	<25/61	0.49	28.8	C	34/99
Nantasket Avenue NBT	0.34	8.8	A	32/127	0.37	9.0	A	36/140	0.65	15.3	B	103/428
Nantasket Avenue SBT	0.42	9.9	A	51/195	0.39	9.7	A	48/205	0.39	11.0	B	51/198
Nantasket Avenue SBR	0.04	6.8	A	<25/<25	0.04	6.8	A	<25/<25	0.06	8.2	A	<25/<25
<b>Overall Intersection</b>	<b>0.32</b>	<b>83.7</b>	<b>B</b>	<b>-</b>	<b>0.32</b>	<b>16.8</b>	<b>B</b>	<b>-</b>	<b>0.56</b>	<b>15.9</b>	<b>B</b>	<b>-</b>

<sup>a</sup> Volume-to-capacity ratio

<sup>b</sup> Delay expressed in seconds per vehicle (average)

<sup>c</sup> Level of service

<sup>d</sup> 50<sup>th</sup> / 95<sup>th</sup> Percentile Queue (feet)

**Table 8 – Intersection Capacity and Queue Analysis Summary (Continued)**

Intersection / Lane Group	2022 Base Year				2032 Future Year with One-Way Flow				2032 Future Year with Two-Way Flow			
	V/C <sup>(a)</sup>	Delay <sup>(b)</sup>	LOS <sup>(c)</sup>	Queue <sup>(d)</sup>	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue
<b>MassDOT: George Washington Boulevard / Bay Street</b>												
<i>Weekday Evening Peak Period</i>												
Bay Street EB	0.18	14.8	B	<25	0.17	15.3	C	<25	0.17	15.5	C	<25
George Washington NBL	0.09	9.2	A	<25	0.08	9.3	A	<25	0.09	9.6	A	<25
<i>Saturday Midday Peak Period</i>												
Bay Street EB	0.18	14.0	B	<25	0.21	15.3	C	<25	0.23	16.9	C	<25
George Washington NBL	0.11	9.2	A	<25	0.1	9.3	A	<25	0.11	9.9	A	<25
<b>MassDOT: George Washington Boulevard / Nantasket Avenue Connector</b>												
<i>Weekday Evening Peak Period</i>												
Nantasket Ave Connector WB	-	-	-	-	-	-	-	-	0.37	41.7	E	40
George Washington SBL	-	-	-	-	-	-	-	-	0.10	10.1	B	<25
<i>Saturday Midday Peak Period</i>												
Nantasket Ave Connector WB	-	-	-	-	-	-	-	-	0.36	44.4	E	38
George Washington SBL	-	-	-	-	-	-	-	-	0.10	11.3	B	<25
<b>MassDOT: George Washington Boulevard / Wharf Avenue</b>												
<i>Weekday Evening Peak Period</i>												
Wharf Avenue EBT	0.14	21.2	C	<25/35	0.09	20.9	C	<25/35	0.10	21.0	C	<25/35
Wharf Avenue WBL	-	-	-	-	-	-	-	-	0.72	34.4	C	47/174
Wharf Avenue WBT	0.76	35.6	D	56/195	0.79	38.0	D	59/205	0.68	31.5	C	46/166
George Washington NBT	0.36	8.2	A	40/127	0.40	8.5	A	46/145	0.44	8.8	A	51/161
George Washington SBT	0.40	8.5	A	43/136	0.44	9.0	A	46/150	0.53	10.2	B	51/169
<b>Overall Intersection</b>	<b>0.42</b>	<b>18.4</b>	<b>B</b>	-	<b>0.43</b>	<b>19.1</b>	<b>B</b>	-	<b>0.55</b>	<b>13.7</b>	<b>B</b>	-
<i>Saturday Midday Peak Period</i>												
Wharf Avenue EBT	0.14	21.2	C	<25/33	0.10	21.0	C	<25/39	0.11	22.2	C	<25/39
Wharf Avenue WBL	-	-	-	-	-	-	-	-	0.53	26.3	C	<25/115
Wharf Avenue WBT	0.67	29.9	C	49/106	0.54	24.6	C	39/129	0.43	24.4	C	29/91
George Washington NBT	0.55	10.0	B	66/210	0.62	11.0	B	79/248	0.69	13.4	B	89/278
George Washington SBT	0.37	8.3	A	40/130	0.42	8.8	A	46/147	0.62	12.6	B	58/193
<b>Overall Intersection</b>	<b>0.43</b>	<b>17.4</b>	<b>B</b>	-	<b>0.42</b>	<b>16.4</b>	<b>B</b>	-	<b>0.60</b>	<b>14.5</b>	<b>B</b>	-

<sup>a</sup> Volume-to-capacity ratio

<sup>b</sup> Delay expressed in seconds per vehicle (average)

<sup>c</sup> Level of service

<sup>d</sup> 50<sup>th</sup> / 95<sup>th</sup> Percentile Queue (feet)

### **Sensitivity Analysis**

TEC commissioned updated/supplemental TMCs and ATRs at select intersections in mid-August 2022 following the completion of the preceding analyses:

- Nantasket Avenue @ Hull Shore Drive / George Washington Connector (Miller's Crossing)
- Nantasket Avenue @ Wharf Avenue
- George Washington Boulevard @ Wharf Avenue

#### *Miller's Crossing Operations – Comparison of 2015 vs. 2022 Data Projections*

The volumes at this intersection increased by approximately 14%, but there was not significant change in the intersection's functional capacity. A summary of the sensitivity analysis results are provided within Table 9 on the following page. The capacity analysis reports using the new 2022 counts are provided at the end of Appendix K.



**Table 9 – Hull Shore Drive / Nantasket Avenue / GW Connector (Miller’s Crossing)  
 Intersection Capacity and Queue Analysis Comparison Summary**

Intersection / Lane Group	2032 Future Year with Two-Way Flow				2029 Future Year with Two-Way Flow with New 2022 Counts			
	V/C <sup>(a)</sup>	Delay <sup>(b)</sup>	LOS <sup>(c)</sup>	Queue <sup>(d)</sup>	V/C	Delay	LOS	Queue
<b>Miller’s Crossing</b>								
<i>Weekday Evening Peak Period</i>								
GW Connector EB	-	-	-	-	-	-	-	-
Nantasket Avenue Connector EB	0.20	14.4	B	<25	0.16	14.3	B	<25
Nantasket Avenue NBL	0.03	8.7	A	<25	0.03	8.6	A	<25
Nantasket Avenue NBR	-	-	-	-	-	-	-	-
Nantasket Avenue SBT	-	-	-	-	-	-	-	-
<b>Overall Intersection</b>	-	-	-	-	-	-	-	-
<i>Saturday Peak Period</i>								
GW Connector EB	-	-	-	-	-	-	-	-
Nantasket Avenue Connector EB	0.20	13.7	B	<25	0.22	14.0	B	<25
Nantasket Avenue NBL	0.04	8.4	A	<25	0.02	8.4	A	<25
Nantasket Avenue NBR	-	-	-	-	-	-	-	-
Nantasket Avenue SBT	-	-	-	-	-	-	-	-
<b>Overall Intersection</b>	-	-	-	-	-	-	-	-

<sup>a</sup> Volume-to-capacity ratio

<sup>b</sup> Delay expressed in seconds per vehicle (average)

<sup>c</sup> Level of service

<sup>d</sup> 95<sup>th</sup> Percentile Queue (feet)

## VII. PROPOSED IMPROVEMENTS

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After evaluating the operations and safety of the study area intersection and roadways, TEC prepared the 25% Design Plans for geometric and flow conversion improvements at the intersections in the vicinity of Nantasket Beach. The following section provides a summary of the improvement measures that have been conceptually approved by the Town of Hull in order to improve the existing and future operations and safety of the study area for drivers, pedestrians and bicyclists. The improvement measures are discussed in the following paragraphs and are graphically depicted in the 25% Design Plans.

The main features of the major roadway and intersection improvements in the vicinity of Nantasket Beach in Hull, Massachusetts are as follows:

- Conversion of Nantasket Avenue from George Washington Boulevard to a point approximately 300-feet north of Water Street from one-way flow to two-way flow.
- Conversion of Hull Shore Drive from Nantasket Avenue to Phipps Street from one-way flow to two-way flow.
- Conversion of Phipps Street to two-way flow for its entire length.
- Removal of Nantasket Avenue southbound from George Washington Boulevard (Anastos Corner) to Hull Shore Drive (Miller's Crossing) from the roadway network.
- Removal of the George Washington Boulevard northbound connector roadway from George Washington Boulevard to Nantasket Avenue (Miller's Crossing).
- Removal of Samoset Avenue between Nantasket Avenue and Phipps Street.
- Implementation of a road diet along the westerly beach roadway, defined as George Washington Boulevard south of Bay Street and Nantasket Avenue north of Bay Street to include one travel lane in each direction in addition to auxiliary turn lanes where necessary.
- Implementation of road diet along the easterly beach roadway, defined as Nantasket Avenue south of the former George Washington Boulevard northbound connector roadway and Hull Shore Drive north of the former George Washington Boulevard northbound connector roadway to include one travel lane in each direction.
- Reconstruction of the fully actuated traffic signal at the intersection of Nantasket Avenue / Water Street.
- Installation of subsurface infrastructure related to a future fully actuated traffic signal at the intersection of Nantasket Avenue / Edgewater Road.

- New Construction or reconstruction of pedestrian and bicycle accommodations within the project limits; including:
  - Construction of new sidewalks to fill in intermittent areas along Phipps Street between Nantasket Avenue and Samoset Avenue.
  - Reconstruction of varying width sidewalk along both sides of Nantasket Avenue between Phipps Street and Whitehead Avenue with new adjacent 5-foot bicycle lanes.
  - Construction of a new 10-foot shared use path along both sides of Nantasket Avenue between Whitehead Avenue and Water Street.
  - Construction of new varying width sidewalks along Nantasket Avenue / George Washington Boulevard between Porrazzo Road and a point approximately 200-feet south of the new Nantasket Avenue Connector.
  - Limited sidewalk reconstruction along Hull Shore Drive between Phipps Street and a point approximately 100-feet south of the new Nantasket Avenue Connector meant to fill in gaps in the intermittent sidewalk and follow roadway realignment.
  - Construction of a northbound bicycle lane along Hull Shore Drive between the new Nantasket Avenue Connector and Phipps Street in conjunction with shared use lane markings in the southbound direction.
- Construction of ADA / AAB compliant accessible ramps at the proposed crossing locations within the project limits.
- Installation of new *MUTCD* compliant pavement markings and traffic signage within the project limits; and
- Public utility modifications within the project limits to support relocated curb lines and multi-modal transportation infrastructure.

Pavement resurfacing and/or full depth pavement, as necessary, within the project limits.

## **PROPOSED IMPROVEMENTS AND SAFETY ENHANCEMENTS**

### **Two-Way Flow Conversion**

#### ***Specific Link Closures***

Providing a consistent two-way flow pattern along Nantasket Avenue and Hull Shore Drive requires the closure of a series of roadway links and the corresponding redistribution of traffic volumes to divert from these links. These closures include:

- Samoset Avenue between Nantasket Avenue and Phipps Street – to become part of HRA redevelopment zone.
- Hull Shore Drive between Water Street and Nantasket Avenue – to become part of HRA redevelopment zone.

- George Washington Boulevard Connector between George Washington Boulevard and Nantasket Avenue – to become landscaped area and a reconfigured cross-street designated as Nantasket Avenue Connector.
- Nantasket Avenue between Bay Street and Hull Shore Drive – to become landscaped area with continuation of the existing sidewalk only.

### ***Introduction or Retention of Cross-Streets***

There are currently four (4) locations that connect Nantasket Avenue with the parallel roads of George Washington Boulevard or Hull Shore Drive. These include Wharf Street, Miller's Crossing, Water Street, and Phipps Street. As part of the conversion to two-way traffic, up to seven (7) cross-streets will be reconfigured or introduced into the traffic network, including (from south to north):

- Wharf Avenue (existing)
- Nantasket Avenue Connector (reconfigured Miller's Crossing)
- Water Street (existing)
- The Green South (*New Construction*) as a one-way eastbound
- The Green North (*New Construction*) as a one-way westbound
- Edgewater Road Extension (*New Construction*)
- Phipps Street (existing)

#### ***Wharf Avenue***

No geometric modifications or traffic signal modifications are proposed along or in conjunction with Wharf Avenue. The 25% Design Plan do denote minor pavement marking and traffic signage upgrades along Wharf Avenue westbound to clearly delineate the two-lane nature of the cross-street that is currently experienced.

#### ***Nantasket Avenue Connector***

The future Nantasket Avenue Connector roadway, designed as two-way, is meant to replace the one-way eastbound George Washington Boulevard Connector. As a two-way cross-street, the roadway will assist in the facilitation of cross traffic between the two major corridor alignments. The cross-street is designed with two (2) 11-foot general-purpose travel lanes with directional flow separated by a marked centerline and 2-foot striped shoulders. Stop-control will be introduced at each end of the future Nantasket Avenue Connector roadway. The existing traffic signal on the cross-street's easterly end (the former intersection of Hull Shore Drive / Nantasket Avenue / George Washington Boulevard Connector) will be removed in its entirety.

A 5.5-foot concrete sidewalk will be constructed along the cross-street's northerly edge with a 10-foot shared use path constructed along the southerly edge of pavement. Each accommodation will be vertical separated from the vehicular roadway by 6-inch granite curbing. The shared use path will be further delineated by a grass panel.

### *Water Street*

Water Street will be retained and reconfigured to include two (2) 12-foot general-purpose travel lanes with directional flow separated by a marked centerline and 8-foot in-street parking lanes along each edge of pavement. The existing 5-foot bicycle lanes will be eliminated. The existing traffic control on each end of Water Street will be maintained; however, two-way flow conditions along Hull Shore Drive and Nantasket Avenue will result in modifications to each control to support the new flow.

The concrete sidewalk with grass panel on the southerly side of Water Street will also be maintained and a new 10-foot shared use path will be constructed along the northerly edge of pavement to replace the on-street bicycle lanes. Each accommodation will be vertical separated from the vehicular roadway by 6-inch granite curbing. The shared use path will be further delineated by brick accent.

### *The Green North and The Green South*

The cross-section and location of the Green North and the Green South between Nantasket Avenue and George Washington are not specifically designed within the 25% Design Plans. The final location for these cross-streets is being discussed between the Town of Hull and the HRA pending potential layouts of future development within the redevelopment zone. The design does show a stand-in location for one cross-street at approx. STA 26+00 along Nantasket Avenue. Although not specifically design, both the Green North and the Green South are expected to be a one-way pair with travel lane, a mix of on-street and head-in parking, and pedestrian / bicycle accommodations similar to the layout of Water Street and Edgewater Road Extension described in the FDR. It is anticipated that a more detail layout of each roadway will be defined by the PS&E level of this plan set.

### *Edgewater Road Extension (Future Town of Hull Right-of-Way)*

The future Edgewater Road Extension will continue the existing Edgewater Road through to Hull Shore Drive. The cross-street is designed with an 11-foot eastbound travel lane, an 11-foot westbound shared left-turn / through lane, an 11-foot westbound right-turn lane with 50-foot storage, and 8-foot on-street parking lanes along each edge of pavement. 5-foot concrete sidewalks will be provided along each edge of Edgewater Road vertically separated from the pavement with 6-inch granite curbing.

Stop-control will be introduced at both ends of Edgewater Road Extension; however, a traffic signal is projected to be installed at its intersection with Nantasket Avenue in the future. The 25% Design Plans depict traffic signal infrastructure to be installed at the intersection of Nantasket Avenue / Edgewater Road (Town jurisdiction). As noted on the plans, the intent of the Town is to construct only subsurface traffic signal infrastructure at this location (handholes and conduit) until such time that traffic signal warrants can be credibly evaluated at the location based upon new traffic patterns introduced post-conversion of each roadway, post-introduction of the several cross-streets, and potentially post-redevelopment of the HRA redevelopment zone. The 25% Design Plans depict all signal infrastructure in order to ensure that all concurrently design infrastructure can be adequately designed and place so to not preclude the installation of a traffic signal above-ground at a future date. No traffic signal warrant analysis has been provided at this time and will be justified based on the final site-generated trips and/or actual traffic volumes.



### *Phipps Street*

Phipps Street will be retained and reconfigured to provide two-way flow between Nantasket Avenue and Manomet Avenue. This includes striping and maintaining two (2) 13-foot travel lanes in each directional with directional flow separated by a marked centerline with no marked shoulders. As 5-foot sidewalks generally exist along both sides of the corridor, the project will construct new and reconstruction portions of the sidewalk system in order to connect these sidewalks along each edge of pavement where the Samoset Avenue northbound approach formerly existed. Sidewalks will be vertical separated from the vehicular roadway by 6-inch granite curbing. The two-way conversion project will significantly reduce side street traffic volumes at this intersection.

### **Arterial Roadways**

#### *Easterly Corridor (Nantasket Avenue & Hull Shore Drive)*

The project includes the reconstruction of easterly corridor, including Nantasket Avenue from a point 100-feet south of the proposed Nantasket Avenue Connector to Hull Shore Drive and Hull Shore Drive from Nantasket Avenue to Phipps Street. Generally, the reconstruction will include a typical cross-section of 11-foot travel lanes in both the northbound and southbound directions, 2- to 3-foot shoulder in the southbound direction. The corridor will maintain its angled parking and on-street parking for the Hull Shore Drive portion with only minor adjustments based on upgraded crosswalk and ramp locations. The angled parking along the easterly side of the roadway between Nantasket Avenue and Water Street will be rotated to be back-in spaces. Sidewalks along each side of the corridor will be maintained with only minor upgrades for crosswalk and ramp locations as needed. Between Water Street and the Edgewater Road Extension, new 5-foot concrete sidewalk will be constructed along the westerly side of pavement.

#### *Westerly Corridor (George Washington Boulevard & Nantasket Avenue)*

The project includes the reconstruction of the westerly corridor, including George Washington Boulevard from Wharf Avenue to Nantasket Avenue and Nantasket Avenue from George Washington Boulevard to Phipps Street. The reconstruction is defined by four distinct zones:

- *George Washington Boulevard from Wharf Avenue to Nantasket Avenue Connector* – General vehicular cross-section to include two 10- or 11-foot travel lanes per direction with 1-foot shoulders. Pedestrian and bicycle accommodations in this zone will be retained except sidewalk will be extended across the former George Washington Boulevard Connector opening. The rightmost northbound lane will be marked as right-turn only and bicycle sharrows configured on each direction of travel.
- *George Washington Boulevard from Nantasket Avenue Connector to Nantasket Avenue* – General vehicular cross-section to include two 11-foot travel lanes with 2-foot shoulders. Pedestrian and bicycle accommodations will be installed as a 10-foot shared use path along the westerly side of pavement and a 5-foot sidewalk along the easterly edge of pavement. Sidewalk and the shared use path will be vertical separated from the vehicular roadway by 6-inch granite curbing and grass panels.

- *Nantasket Avenue from George Washington Boulevard to Water Street* – The cross-section of this corridor segment will remain relatively the same; however, the two-lane cross-section will be converted from one-way flow to two-way flow with directional flow separated by a marked centerline. The southbound bicycle lane will be maintained.
- *Nantasket Avenue from Water Street to Phipps Street* – General vehicular cross-section will include two 11-foot travel lanes with a 10-foot center aisle utilized as a striped median or exclusive left-turn lanes as needed. Left-turn lanes are currently designed in each direction at the intersection with Edgewater Road and The Green South cross-street. The corridor will also support 8-foot on-street parking lanes with curb extensions provided at each cross-street location. 10-foot shared use paths will be constructed on both sides of Nantasket Avenue between Whitehead Avenue and Water Street separated from vehicular traffic with both 6-inch granite curb and a grass panel. North of Whitehead Avenue, the project will maintain or reconstruct varying width concrete sidewalks with 5-foot bicycle lanes provided.

### **Throughout Project Limits**

The following improvements have been included within the project limits and depicted as part of the 25% Design:

- Completion of a pavement resurfacing and or full depth pavement throughout the project limit. Provide full depth pavement areas where roadway segments are widened and or new comparative to the existing alignments and future closures.
- Striping of new thermoplastic crosswalks, STOP lines, centerlines, lane lines, shoulder lines, bike lanes, and legend markings within the project limits.
- Replacement of faded/damaged traffic signage along each roadway within the project limits.
- Installation of new and/or replacement of existing signage throughout the project limits to support the two-way flow and multi-modal nature of the 25% Design.

### **Proposed Traffic Control Modifications**

#### ***Wharf Avenue Intersections***

The signalized intersections of Nantasket Avenue / Wharf Avenue / DCR Lot 1 Entrance (DCR jurisdiction) and George Washington Boulevard / Wharf Avenue / McDuff's Landing Driveway are not anticipated to change control or receive modification to traffic signal timings. No further evaluation of intersection control was conducted for these two locations.

#### ***Retainage, Removal, and Introduction of Stop Control***

The following locations have retained stop-control as part of the project:

- Hull Shore Drive northbound at Phipps Street
- Water Street eastbound at Hull Shore Drive
- Phipps Street westbound and Mountford Road eastbound at Nantasket Avenue

- Whitehead Avenue eastbound at Nantasket Avenue
- Edgewater Road eastbound at Nantasket Avenue (subsurface traffic signal infrastructure to be installed as part of project)
- Sagamore Terrace eastbound at Nantasket Avenue
- Bay Street eastbound at George Washington Boulevard

The following locations have removed stop-control as part of the project:

- Samoset Avenue northbound at Phipps Street with closure of Samoset Avenue segment
- George Washington Boulevard eastbound at Nantasket Avenue with closure of Nantasket Avenue between George Washington Boulevard and Hull Shore Drive

The following locations have introduced stop-control as part of the project:

- Nantasket Avenue Connector eastbound at Nantasket Avenue and Hull Shore Drive
- The Green South eastbound at Hull Shore Drive
- Edgewater Road westbound at Nantasket Avenue (subsurface traffic signal infrastructure to be installed as part of project)
- The Green North westbound at Nantasket Avenue
- Nantasket Avenue Connector westbound at George Washington Boulevard

Each stop sign location has been designed with a stop sign (R1-1) and stop line in compliance with the *MUCTD*.

### ***Traffic Signals Installation or Modifications***

The existing traffic signal at the intersection of Nantasket Avenue / Bay Street / Water Street, a Town of Hull intersection, was recently reconstructed by the Town as part of a separate project. It is the intent of the Town to maintain traffic signal operations at this location as part of the project. The traffic signal at this location will be reconstructed to support two-way flow through the intersection along Nantasket Avenue. All signal infrastructure at the intersection will be new with exception to the controller, cabinet and equipment, and the pedestrian signal housings (to be removed and reset).

The 25% Design Plans depict traffic signal infrastructure to be installed at the intersection of Nantasket Avenue / Edgewater Road. As noted on the plans, the intent of the Town is to construct only subsurface traffic signal infrastructure at this location (handholes and conduit) until such time that traffic signal warrants can be credibly evaluated at the location based upon new traffic patterns introduced post-conversion of each roadway, post-introduction of the several cross-streets, and potentially post-redevelopment of the HRA redevelopment zone. The 25% Design Plans depict all signal infrastructure in order to ensure that all concurrently design infrastructure can be adequately designed and place so to not preclude the installation of a traffic signal above-ground at a future date. No traffic signal warrant analysis has been provided at this time.

Clearance intervals for each movement at both intersections have been recalculated based on guidance provided in the *MassDOT Guidance on Calculating Clearance Intervals at Traffic*

*Signals Interoffice Memorandum*<sup>5</sup>. The methodology is based upon clearance interval calculations guidance provided in the *MUTCD* and the *NCHRP Report 731 (Guidance for Yellow and All-Red Intervals at Signalized Intersections)*<sup>6</sup>. Pedestrian clearance intervals have also been calculated based on the MassDOT guidelines. Clearance interval calculations are provided in Appendix L.

The new and reconstructed fully actuated traffic signals will include the following:

- New overhead traffic signal indications for all approaches.
- Multiple signal timing schemes to accommodate the differing traffic demands during the commuter peak periods.
- Provide for an exclusive pedestrian signal phase at the intersections.
- Video detection system for vehicles and bicycles.
- APS equipment including audible warning devices to be attached to the pedestrian signal housings and vibratory pedestrian push buttons with appropriate push button signage (R10-3e); and
- Emergency vehicle pre-emption.

All traffic signal infrastructure as part of the newly constructed traffic signal has been designed to provide the minimum 1.5-foot lateral offset from the face of the curb as described in the *MassDOT Project Development and Design Guide (PDDG)*<sup>7</sup>. The traffic signal will be wired through a new conduit and pull box network.

### **Pedestrian and Bicycle Accommodations**

The proposed pedestrian and bicycle improvements will create a more pedestrian and cyclist-friendly area with streetscape improvements. The shared-use paths will be designed to encourage walking and biking. The following lists the scope of pedestrian and bicycle accommodations.

#### **Scope of Pedestrian Accommodations**

- Construction of new sidewalks to fill in intermittent areas along both sides of Phipps Street between Nantasket Avenue and Samoset Avenue. Sidewalk width will match the sidewalks on each end of the intermittent breaks.
- Reconstruction of varying width sidewalk along both sides of Nantasket Avenue between Phipps Street and Whitehead Avenue.
- Construction of a new 10-foot shared use path along both sides of Nantasket Avenue between Whitehead Avenue and Water Street.

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<sup>5</sup> *MassDOT Guidance on Calculating Clearance Intervals at Traffic Signals – Interoffice Memorandum*; Massachusetts Department of Transportation – Highway Division; Boston, Massachusetts; Issued January 8, 2013

<sup>6</sup> *NCHRP Report 731 – Guidance for Yellow and All-Red Intervals at Signalized Intersections*; National Cooperative Highway Research Program – Transportation Research Board; Washington, D.C.; 2012

<sup>7</sup> *MassHighway Project Development and Design Guide*; MassHighway (presently Massachusetts Department of Transportation – Highway Division); Boston, Massachusetts; 2006



- Reconstruction of a varying width sidewalk along the easterly side of George Washington Boulevard between Nantasket Avenue and the Nantasket Avenue Connector.
- Reconstruction of a varying width sidewalk along the westerly side of George Washington Boulevard between Nantasket Avenue and a point 100-feet south of Bay Street. Reconstruction of sidewalk to accommodate a 10-foot shared use along the westerly side of George Washington Boulevard between a point 100-feet south of Bay Street and the Nantasket Avenue Connector.
- Construction of new and reconstruction of existing sidewalk along both sides of George Washington Boulevard, south of Nantasket Avenue Connector, to match into the existing sidewalk network.
- Limited sidewalk reconstruction along Hull Shore Drive between Phipps Street and the Red Parrot meant to fill in gaps in the intermittent sidewalk and follow roadway realignment. From the Red Parrot to a point approximately 100-feet south of the new Nantasket Avenue Connector, varying width sidewalk will be reconstructed along each realigned roadway edge.
- Sidewalk and/or shared-use path construction and/or reconstruction along the new Edgewater Extension, the new Green North and Green South cross-streets, Water Street, and the Nantasket Avenue Connector.
- All sidewalk construction and reconstruction as noted will be completed with vertical granite curbing to provide vertical separation between vehicular and pedestrian traffic.
- Reconstruction of all ADA/AAB-compliant accessible curb ramps at the project area intersections within the project limits.
- Restriping of high visibility thermoplastic crosswalks across each unsignalized, midblock, and signalized intersection approach, as well as at all side-street approaches within the project limits.
- Introduction of new pedestrian warning signage at and in advance of midblock or uncontrolled crosswalk locations within the project limits.
- Private driveway aprons will be reconstructed where necessary to match the proposed sidewalk in accordance with ADA requirements.

### **Scope of Bicycle Accommodations**

- Introduction of Reconstruction of varying width sidewalk new 5-foot bicycle lanes along both sides of Nantasket Avenue between Phipps Street and Whitehead Avenue.
- Construction of a new 10-foot shared use path along both sides of Nantasket Avenue between Whitehead Avenue and Water Street.
- Continuation of the 5-foot southbound bicycle lane along Nantasket Avenue north of George Washington Boulevard along George Washington Boulevard to a point 100-feet south of Bay Street.

- Construction of a new 10-foot shared use path along the westerly side of George Washington Boulevard between a point 100-feet south of Bay Street and the Nantasket Avenue Connector.
- Retain the 6-foot bicycle lane along Hull Shore Drive northbound between Phipps Street and a point 100-feet south of the Nantasket Avenue Connector.
- Shared-use path construction and/or reconstruction along the new Edgewater Extension, the new Green North and Green South cross-streets, Water Street, and the Nantasket Avenue Connector.
- Provide new bicycle detection pavement markings at appropriate locations at each signalized intersection to assist in placement of bicycles to be detected by the new video detection system at each location.

Overall, the proposed pedestrian and bicycle infrastructure will greatly improve pedestrian and bicycle access to and safety along Nantasket Beach within the project limits and provide additional pedestrian and bicycle access to the adjacent residential and commercial neighborhoods.

## **CONSTRUCTION TRAFFIC MANAGEMENT**

The construction plans have been prepared in a manner to provide safe and efficient movements for all facility users (vehicles, bicycles, and pedestrians) through the construction areas in accordance with the latest *MUTCD* and the MassDOT Standard Details for the Development of Temporary Traffic Control Plans. All necessary traffic control devices such as signs, drums, temporary pavement markings, changeable message signs, and barriers have also been detailed on the plans.

### **Scope of Construction Work**

Major construction components of the project include pavement resurfacing, full depth pavement, roadway realignment, utility relocation, sidewalk/shared use path, accessible ramp reconstruction, pavement markings / signage installation, and the reconstruction of the existing traffic signal infrastructure. The Special Provisions (to be submitted with the 75% Design Plans) shall direct the Contractor to perform all non-pavement work from Monday through Friday (Excluding Holidays) between 7:00 AM and 3:00 PM. Pavement work and pavement marking application will be conducted during the midday or nighttime hours in accordance with the Town of Hull desires. To the best of the Town's ability, work on the major sections of the project will be completed outside of the peak summertime period.

### **Temporary Traffic Control**

For most of the work, it is expected that traffic will be maintained along each of the easterly and westerly arterial corridors. The multi-lane nature and one-way nature of the existing roadways lend itself for a contractor to complete large portions of the work without significant traffic disruptions. Where one lane could be closed on Hull Shore Drive, the second travel lane can be utilized so to not impede directional traffic flow.

Some construction activities, such as the soil excavation for the proposed traffic signal foundations, roadway removal, and resetting of new curb lines may require the shifting of traffic, where bidirectional or one-directional traffic will be maintained by alternating flow as directed by

police detail. In addition, activities to set-in-place mast arms and traffic signal poles may require a bucket-truck within the center of the intersection, where one quadrant or the center of the intersection is closed for the placement of the vehicle. Bi-directional flow along Nantasket Street or Water Street will be maintained during these periods by police detail. The temporary traffic control conditions where a police detail is present; including, one-lane alternating traffic, one quadrant closure, and intersection center closure; will only be permitted during midday, off-peak hours (9:00 AM to 3:00 PM).

Major detour routes are not expected as part of the project due to the limited alternate route within the Hull peninsula. Short-term detours may be necessary for short segments of the project based on the limited cross-section in only a few locations. For instance, if work requires Nantasket Avenue to reduce to one-lane between Phipps Street and Whitehead Avenue, then a short-term detour could be put in place utilizing Samoset Avenue adjacent to Nantasket Avenue. It is expected that a minimum travel lane width of 11-feet will be maintained during construction.

### **Pedestrian and Bicycle Accommodations**

The existing pedestrian accommodations are expected to be similar to the existing conditions throughout the construction period. Temporary sidewalks, where needed, will be ADA/AAB accessible. Where applicable, temporary curb ramps will include accessible features consistent with the features present in the existing pedestrian facility. The project Special Provisions specifically call for pedestrian accommodations to be retained during construction. Where permanent roadway closures exist, such as Samoset Avenue or the Nantasket Avenue link between Miller's Crossing and Anastos Corner, pedestrian travel will be detoured to the shortest possible route while maintaining local business operations and patronage.

### **Capacity Analysis**

#### ***MassDOT Jurisdiction***

The available traffic counts indicate that the two-way traffic volumes, during the typical weekday evening peak when lanes may be closed, along George Washington Boulevard are generally less than 1,250 vph. Based on this information and the studies presented in Figure Gen-1 of the *MassDOT Standard Details and Drawings for the Development of Temporary Traffic Control Plans*, one travel lane could be closed with two travel lane open along to support the corridor volumes north of Wharf Avenue. When a lane is closed, the project will maintain two-way traffic flow.

#### ***DCR Jurisdiction***

The available traffic counts indicate that the two-way traffic volumes, during the typical weekday evening peak when lanes may be closed, along Nantasket Avenue, south of Hull Shore Drive, are generally less than 800 vph. Based on this information and the studies presented in Figure Gen-1 of the *MassDOT Standard Details and Drawings for the Development of Temporary Traffic Control Plans*, two travel lane could be closed with two travel lane open along to support the corridor volumes north of Wharf Avenue. When two lanes are closed, the project will maintain two-way traffic flow.

The available traffic counts indicate that the one-way traffic volumes, during the typical weekday evening peak when lanes may be closed, along Nantasket Avenue, north of Hull Shore Drive, are generally less than 500 vph. Based on this information and the studies presented in Figure Gen-1 of the *MassDOT Standard Details and Drawings for the Development of Temporary Traffic Control Plans*, one travel lane could be closed with one travel lane open along to support the corridor volumes north of Hull Shore Drive. When a lane is closed, the project will maintain two-way traffic flow.



## VIII. CONCLUSION

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The main features of the improvements in the vicinity of Nantasket Beach are as follow:

- Conversion of Nantasket Avenue from George Washington Boulevard to a point approximately 300-feet north of Water Street from one-way flow to two-way flow.
- Conversion of Hull Shore Drive from Nantasket Avenue to Phipps Street from one-way flow to two-way flow.
- Conversion of Phipps Street to two-way flow for its entire length.
- Removal of Nantasket Avenue southbound from George Washington Boulevard (Anastos Corner) to Hull Shore Drive (Miller's Crossing) from the roadway network.
- Removal of the George Washington Boulevard northbound connector roadway from George Washington Boulevard to Nantasket Avenue (Miller's Crossing).
- Removal of Samoset Avenue between Nantasket Avenue and Phipps Street.
- Implementation of a road diet along the westerly beach roadway, defined as George Washington Boulevard south of Bay Street and Nantasket Avenue north of Bay Street to include one travel lane in each direction in addition to auxiliary turn lanes where necessary.
- Implementation of road diet along the easterly beach roadway, defined as Nantasket Avenue south of the former George Washington Boulevard northbound connector roadway and Hull Shore Drive north of the former George Washington Boulevard northbound connector roadway to include one travel lane in each direction.
- Reconstruction of the fully actuated traffic signal at the intersection of Nantasket Avenue / Water Street.
- Installation of subsurface infrastructure related to a future fully actuated traffic signal at the intersection of Nantasket Avenue / Edgewater Road.
- New Construction or reconstruction of pedestrian and bicycle accommodations within the project limits; including:
  - Construction of new sidewalks to fill in intermittent areas along Phipps Street between Nantasket Avenue and Samoset Avenue.

- Reconstruction of varying width sidewalk along both sides of Nantasket Avenue between Phipps Street and Whitehead Avenue with new adjacent 5-foot bicycle lanes.
  - Construction of a new 10-foot shared use path along both sides of Nantasket Avenue between Whitehead Avenue and Water Street.
  - Construction of new varying width sidewalks along Nantasket Avenue / George Washington Boulevard between Porrazzo Road and a point approximately 200-feet south of the new Nantasket Avenue Connector.
  - Limited sidewalk reconstruction along Hull Shore Drive between Phipps Street and a point approximately 100-feet south of the new Nantasket Avenue Connector meant to fill in gaps in the intermittent sidewalk and follow roadway realignment.
  - Construction of a northbound bicycle lane along Hull Shore Drive between the new Nantasket Avenue Connector and Phipps Street in conjunction with shared use lane markings in the southbound direction.
- Construction of ADA / AAB compliant accessible ramps at the proposed crossing locations within the project limits.
  - Installation of new *MUTCD* compliant pavement markings and traffic signage within the project limits; and
  - Public utility modifications within the project limits to support relocated curb lines and multi-modal transportation infrastructure.
  - Pavement resurfacing and/or full depth pavement, as necessary, within the project limits.

The proposed two-way conversion project is expected to significantly improve traffic flow, provide improved options for emergency access vehicles to access portions of the roadways currently limited by one-way flow, improve access to existing businesses, improve intersection capacity, and provide reserve capacity for future redevelopment projects in Hull.

The enclosed 25% design plans depict the improvements necessary to implement a two-way flow pattern while also improving access for pedestrians and bicyclists through the construction of new infrastructure and retrofits along other existing segments of roadways.

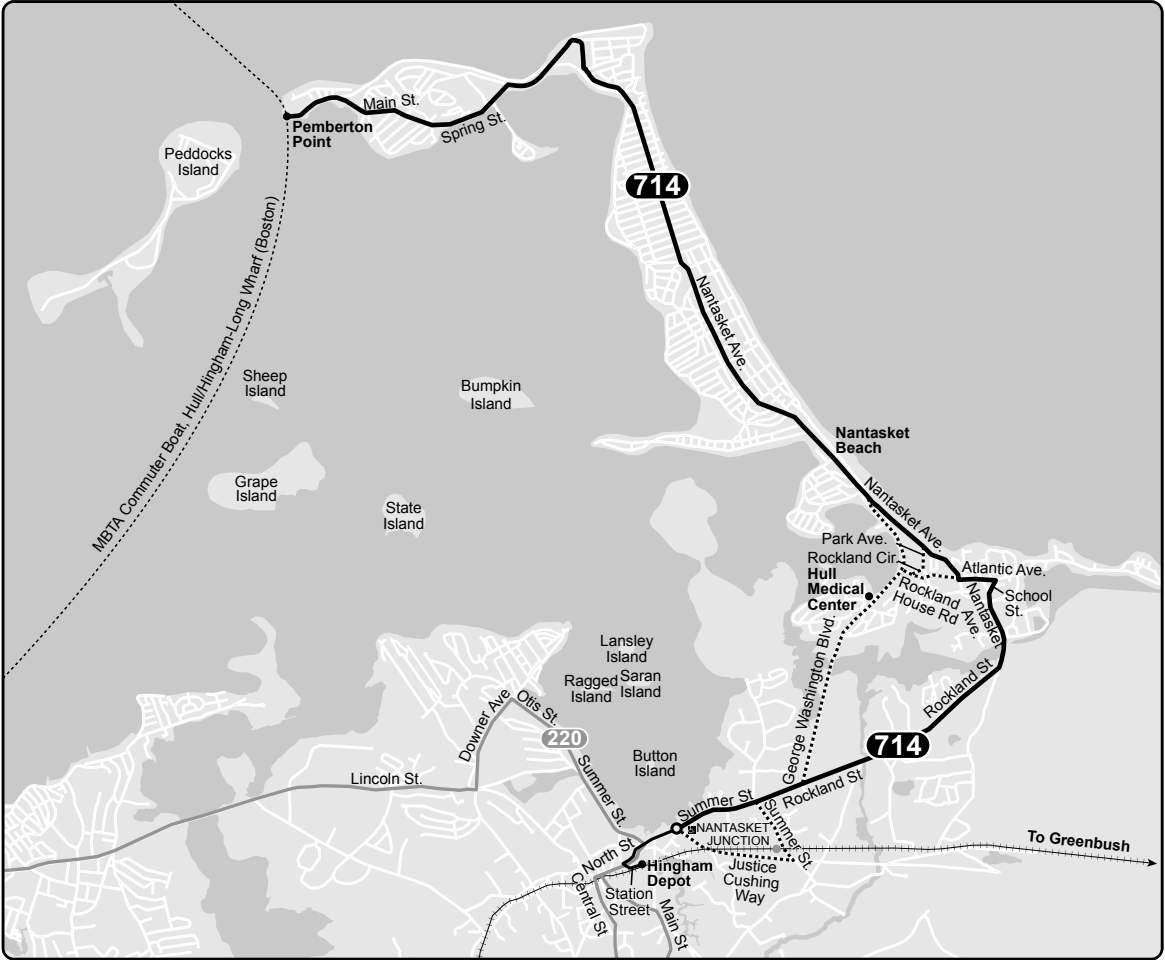
## **Appendix A**

Public Transportation Data



Effective **March 13, 2022**

# 714 Pemberton Pt, Hull – Station St, Hingham



### Connections

**GREENBUSH LINE**



Information **617-222-3200**  
 Lost and Found **781-396-2500**  
 TTY **617-222-2399**

Operated by Joseph's for the MBTA

**mbta.com**

PVT-3-22.0

- Exact fare only and no transfers.
- Children 11 & under ride free with a paying customer.
- ♿ Joseph's buses accessible to people with disabilities.

Cash on board | Reduced fare  
**\$1.70** | **\$0.85**

Fare/pass rules and free/reduced fare eligibility for this route:  
**mbta.com/fares** or call **781-396-2500**

**Weekday 714**

Inbound				Outbound						
Pemberton Point	Request Only	Nantasket Junction	Station St, Hingham	220 leaves Station St, Hingham	220 leaves Station St, Hingham	Station St, Hingham	Request Only	Nantasket Junction	Pemberton Point	
A 5:52	-	6:25	6:44	A 5:26	5:27	-	-	-	5:52	
6:50	7:21	7:25	7:38	A 6:16	6:25	-	-	-	6:50	
7:50	-	8:20	8:27	A 7:03	7:25	-	-	-	7:50	
8:55	-	9:20	9:36	-	8:18	8:30	-	-	8:55	
B 9:50	-	10:20	10:23	-	9:05	9:25	-	-	9:50	
B 11:00	-	11:25	11:35	A 10:16	10:35	-	-	-	11:00	
<b>B 12:00</b>	-	<b>12:25</b>	<b>12:29</b>	B 11:28	11:35	-	-	-	<b>12:00</b>	
B 1:55	<b>2:28</b>	<b>2:35</b>	<b>2:36</b>	<b>B 1:28</b>	<b>1:30</b>	-	-	-	<b>1:55</b>	
B 2:55	-	<b>3:25</b>	<b>3:47</b>	B 2:29	<b>2:40</b>	<b>3:04</b>	-	-	<b>3:05</b>	
A 4:00	-	<b>4:30</b>	<b>4:41</b>	B 3:12	<b>3:35</b>	-	-	-	<b>4:00</b>	
A 5:00	<b>5:42</b>	<b>5:30</b>	<b>5:41</b>	<b>4:35</b>	<b>4:35</b>	-	-	-	<b>5:00</b>	
<b>6:00</b>	-	<b>6:30</b>	<b>6:47</b>	<b>5:35</b>	<b>5:35</b>	<b>5:58</b>	-	-	<b>6:00</b>	
<b>7:00</b>	<b>7:26</b>	<b>7:30</b>	<b>8:10</b>	<b>6:12</b>	<b>6:35</b>	-	-	-	<b>7:00</b>	
<b>8:10</b>	-	<b>8:40</b>	<b>9:05</b>	<b>6:36</b>	<b>7:45</b>	-	-	-	<b>8:10</b>	

**Saturday 714**

Inbound			Outbound			
Pemberton Point	Station St, Hingham	220 leaves Station St, Hingham	220 arrives Station St, Hingham	Station St, Hingham	Pemberton Point	
10:00	10:30	10:31	9:25	9:35	10:00	
11:00	11:30	11:35	10:26	10:35	11:00	
<b>12:00</b>	<b>12:30</b>	<b>12:39</b>	11:29	11:35	<b>12:00</b>	
<b>1:00</b>	<b>1:30</b>	<b>1:41</b>	<b>12:33</b>	<b>12:35</b>	<b>1:00</b>	
<b>3:00</b>	<b>3:30</b>	<b>3:44</b>	<b>2:06</b>	<b>2:35</b>	<b>3:00</b>	
<b>4:00</b>	<b>4:30</b>	<b>4:44</b>	<b>3:07</b>	<b>3:35</b>	<b>4:00</b>	
<b>5:00</b>	<b>5:30</b>	<b>5:40</b>	<b>4:08</b>	<b>4:35</b>	<b>5:00</b>	
<b>6:00</b>	<b>6:30</b>	<b>6:34</b>	<b>5:07</b>	<b>5:35</b>	<b>6:00</b>	
<b>6:55</b>	<b>7:20</b>	<b>7:30</b>	<b>6:30</b>	<b>6:30</b>	<b>6:55</b>	

**Sunday 714**

Inbound			Outbound			
Pemberton Point	Station St, Hingham	220 leaves Station St, Hingham	220 arrives Station St, Hingham	Station St, Hingham	Pemberton Point	
9:50	10:20	10:30	9:22	9:25	9:50	
10:50	11:20	11:30	10:25	10:25	10:50	
11:50	<b>12:20</b>	<b>12:30</b>	11:25	11:25	11:50	
<b>12:50</b>	<b>1:20</b>	<b>1:30</b>	<b>12:25</b>	<b>12:25</b>	<b>12:50</b>	
<b>2:50</b>	<b>3:20</b>	<b>3:30</b>	<b>2:25</b>	<b>2:25</b>	<b>2:50</b>	
<b>3:50</b>	<b>4:20</b>	<b>4:30</b>	<b>3:25</b>	<b>3:25</b>	<b>3:50</b>	
<b>4:50</b>	<b>5:20</b>	<b>5:30</b>	<b>4:25</b>	<b>4:25</b>	<b>4:50</b>	
<b>5:50</b>	<b>6:20</b>	<b>6:30</b>	<b>5:25</b>	<b>5:25</b>	<b>5:50</b>	
<b>6:50</b>	<b>7:20</b>	<b>7:30</b>	<b>6:25</b>	<b>6:25</b>	<b>6:50</b>	

**Contracted Service**

This route operated by Joseph's Transportation for the MBTA.

Nantasket Junction Station served by request only. Contact Joseph's Transportation at 781-396-2500 for service options.

Ferry and Commuter Rail connections are not guaranteed.

Shaded columns are MBTA Route 220 trip times

**A** via Washington Boulevard

**B** via Hull Medical Center, Park Ave and Rockland House Road

PM times are **bold**

Information in this timetable is subject to change without notice. Traffic and weather may affect running times.

Always check bus destination signs before boarding. Some buses may only serve a part, or skip portions of this route.

**2022 Holidays**

- SUN Memorial Day
- SUN Independence Day
- SUN Labor Day
- SUN Thanksgiving Day
- SUN Christmas Day
- SUN Christmas Day Observed
- SAT New Year's Eve
- SUN New Year's Day

## **Appendix B**

Turning Movement Counts (TMCs)





PRECISION  
D A T A  
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503  
Office: 508.481.3999 Fax: 508.545.1234  
Email: datarequests@pdillc.com

N/S: George Washington Blvd  
E/W: Wharf Avenue  
City, State: Hull, MA  
Client: TEC/ R. Brown

File Name : 154600 A  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

**Groups Printed- Cars - Heavy Vehicles**

Start Time	George Washington Boulevard From North				Wharf Avenue From East				George Washington Boulevard From South				Wharf Avenue From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
12:00 PM	7	142	7	0	9	3	19	1	28	204	5	0	4	2	3	0	434
12:15 PM	3	139	5	0	6	1	17	0	27	194	10	0	7	2	3	0	414
12:30 PM	6	143	4	0	10	2	28	2	29	196	8	0	3	2	3	0	436
12:45 PM	3	132	6	0	3	2	12	0	26	194	4	0	11	2	3	0	398
<b>Total</b>	<b>19</b>	<b>556</b>	<b>22</b>	<b>0</b>	<b>28</b>	<b>8</b>	<b>76</b>	<b>3</b>	<b>110</b>	<b>788</b>	<b>27</b>	<b>0</b>	<b>25</b>	<b>8</b>	<b>12</b>	<b>0</b>	<b>1682</b>
01:00 PM	1	140	3	0	5	3	15	2	30	191	2	0	1	2	2	0	397
01:15 PM	5	124	2	0	7	2	20	0	21	198	2	0	3	4	5	0	393
01:30 PM	3	132	4	0	7	1	29	0	28	178	3	0	4	0	8	0	397
01:45 PM	3	125	5	0	11	3	22	2	20	181	4	0	3	1	3	0	383
<b>Total</b>	<b>12</b>	<b>521</b>	<b>14</b>	<b>0</b>	<b>30</b>	<b>9</b>	<b>86</b>	<b>4</b>	<b>99</b>	<b>748</b>	<b>11</b>	<b>0</b>	<b>11</b>	<b>7</b>	<b>18</b>	<b>0</b>	<b>1570</b>
<b>Grand Total</b>	<b>31</b>	<b>1077</b>	<b>36</b>	<b>0</b>	<b>58</b>	<b>17</b>	<b>162</b>	<b>7</b>	<b>209</b>	<b>1536</b>	<b>38</b>	<b>0</b>	<b>36</b>	<b>15</b>	<b>30</b>	<b>0</b>	<b>3252</b>
Apprch %	2.7	94.1	3.1	0	23.8	7	66.4	2.9	11.7	86.1	2.1	0	44.4	18.5	37	0	
Total %	1	33.1	1.1	0	1.8	0.5	5	0.2	6.4	47.2	1.2	0	1.1	0.5	0.9	0	
Cars	30	1066	36	0	57	17	159	7	205	1524	38	0	36	15	30	0	3220
% Cars	96.8	99	100	0	98.3	100	98.1	100	98.1	99.2	100	0	100	100	100	0	99
Heavy Vehicles	1	11	0	0	1	0	3	0	4	12	0	0	0	0	0	0	32
% Heavy Vehicles	3.2	1	0	0	1.7	0	1.9	0	1.9	0.8	0	0	0	0	0	0	1

Start Time	George Washington Boulevard From North					Wharf Avenue From East					George Washington Boulevard From South					Wharf Avenue From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	7	142	7	0	156	9	3	19	1	32	28	204	5	0	237	4	2	3	0	9	434
12:15 PM	3	139	5	0	147	6	1	17	0	24	27	194	10	0	231	7	2	3	0	12	414
12:30 PM	6	143	4	0	153	10	2	28	2	42	29	196	8	0	233	3	2	3	0	8	436
12:45 PM	3	132	6	0	141	3	2	12	0	17	26	194	4	0	224	11	2	3	0	16	398
Total Volume	19	556	22	0	597	28	8	76	3	115	110	788	27	0	925	25	8	12	0	45	1682
% App. Total	3.2	93.1	3.7	0		24.3	7	66.1	2.6		11.9	85.2	2.9	0		55.6	17.8	26.7	0		
PHF	.679	.972	.786	.000	.957	.700	.667	.679	.375	.685	.948	.966	.675	.000	.976	.568	1.00	1.00	.000	.703	.964
Cars	18	550	22	0	590	27	8	73	3	111	109	783	27	0	919	25	8	12	0	45	1665
% Cars	94.7	98.9	100	0	98.8	96.4	100	96.1	100	96.5	99.1	99.4	100	0	99.4	100	100	100	0	100	99.0
Heavy Vehicles	1	6	0	0	7	1	0	3	0	4	1	5	0	0	6	0	0	0	0	0	17
% Heavy Vehicles	5.3	1.1	0	0	1.2	3.6	0	3.9	0	3.5	0.9	0.6	0	0	0.6	0	0	0	0	0	1.0



PRECISION  
D A T A  
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503  
Office: 508.481.3999 Fax: 508.545.1234  
Email: datarequests@pdillc.com

File Name : 154600 A  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

N/S: George Washington Blvd  
E/W: Wharf Avenue  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Cars

Start Time	George Washington Boulevard From North				Wharf Avenue From East				George Washington Boulevard From South				Wharf Avenue From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
12:00 PM	7	140	7	0	9	3	17	1	28	202	5	0	4	2	3	0	428
12:15 PM	2	138	5	0	6	1	17	0	27	194	10	0	7	2	3	0	412
12:30 PM	6	141	4	0	10	2	28	2	28	195	8	0	3	2	3	0	432
12:45 PM	3	131	6	0	2	2	11	0	26	192	4	0	11	2	3	0	393
Total	18	550	22	0	27	8	73	3	109	783	27	0	25	8	12	0	1665
01:00 PM	1	138	3	0	5	3	15	2	29	190	2	0	1	2	2	0	393
01:15 PM	5	124	2	0	7	2	20	0	21	196	2	0	3	4	5	0	391
01:30 PM	3	129	4	0	7	1	29	0	26	177	3	0	4	0	8	0	391
01:45 PM	3	125	5	0	11	3	22	2	20	178	4	0	3	1	3	0	380
Total	12	516	14	0	30	9	86	4	96	741	11	0	11	7	18	0	1555
Grand Total	30	1066	36	0	57	17	159	7	205	1524	38	0	36	15	30	0	3220
Apprch %	2.7	94.2	3.2	0	23.8	7.1	66.2	2.9	11.6	86.2	2.2	0	44.4	18.5	37	0	
Total %	0.9	33.1	1.1	0	1.8	0.5	4.9	0.2	6.4	47.3	1.2	0	1.1	0.5	0.9	0	

Start Time	George Washington Boulevard From North					Wharf Avenue From East					George Washington Boulevard From South					Wharf Avenue From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	7	140	7	0	154	9	3	17	1	30	28	202	5	0	235	4	2	3	0	9	428
12:15 PM	2	138	5	0	145	6	1	17	0	24	27	194	10	0	231	7	2	3	0	12	412
12:30 PM	6	141	4	0	151	10	2	28	2	42	28	195	8	0	231	3	2	3	0	8	432
12:45 PM	3	131	6	0	140	2	2	11	0	15	26	192	4	0	222	11	2	3	0	16	393
Total Volume	18	550	22	0	590	27	8	73	3	111	109	783	27	0	919	25	8	12	0	45	1665
% App. Total	3.1	93.2	3.7	0		24.3	7.2	65.8	2.7		11.9	85.2	2.9	0		55.6	17.8	26.7	0		
PHF	.643	.975	.786	.000	.958	.675	.667	.652	.375	.661	.973	.969	.675	.000	.978	.568	1.00	1.00	.000	.703	.964





PRECISION  
D A T A  
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503  
Office: 508.481.3999 Fax: 508.545.1234  
Email: datarequests@pdillc.com

File Name : 154600 A  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

N/S: George Washington Blvd  
E/W: Wharf Avenue  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Peds and Bikes

Start Time	George Washington Boulevard From North					Wharf Avenue From East					George Washington Boulevard From South					Wharf Avenue From West					Int. Total
	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	
12:00 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	7	1	0	0	0	1	0	10
12:15 PM	0	1	0	5	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	8
12:30 PM	6	0	0	0	0	0	0	0	0	0	0	0	1	6	0	0	0	0	0	5	18
12:45 PM	0	0	0	5	11	0	0	0	2	1	0	0	0	12	5	0	0	0	6	1	43
Total	7	1	0	10	11	0	0	0	2	2	0	0	0	20	13	0	0	0	7	6	79
01:00 PM	0	0	0	3	4	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	9
01:15 PM	0	0	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8
01:30 PM	0	0	0	0	3	0	0	0	0	0	0	1	0	8	0	0	0	0	0	5	17
01:45 PM	0	0	0	8	1	0	0	0	4	0	0	0	0	5	8	0	0	0	0	2	28
Total	0	0	0	14	12	0	0	0	4	0	0	1	0	7	16	0	0	0	0	8	62
Grand Total	7	1	0	24	23	0	0	0	6	2	0	1	0	27	29	0	0	0	7	14	141
Apprch %	12.7	1.8	0	43.6	41.8	0	0	0	75	25	0	1.8	0	47.4	50.9	0	0	0	33.3	66.7	
Total %	5	0.7	0	17	16.3	0	0	0	4.3	1.4	0	0.7	0	19.1	20.6	0	0	0	5	9.9	

Start Time	George Washington Boulevard From North						Wharf Avenue From East						George Washington Boulevard From South						Wharf Avenue From West						Int. Total
	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																									
Peak Hour for Entire Intersection Begins at 12:00 PM																									
12:00 PM	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	7	1	8	0	0	0	1	0	1	10
12:15 PM	0	1	0	5	0	6	0	0	0	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	8
12:30 PM	6	0	0	0	0	6	0	0	0	0	0	0	0	0	1	6	7	0	0	0	0	5	5	18	
12:45 PM	0	0	0	5	11	16	0	0	0	2	1	3	0	0	0	12	5	17	0	0	0	6	1	7	43
Total Volume	7	1	0	10	11	29	0	0	0	2	2	4	0	0	0	20	13	33	0	0	0	7	6	13	79
% App. Total	24.1	3.4	0	34.5	37.9		0	0	0	50	50		0	0	0	60.6	39.4		0	0	0	53.8	46.2		
PHF	.292	.250	.000	.500	.250	.453	.000	.000	.000	.250	.500	.333	.000	.000	.000	.417	.542	.485	.000	.000	.000	.292	.300	.464	.459





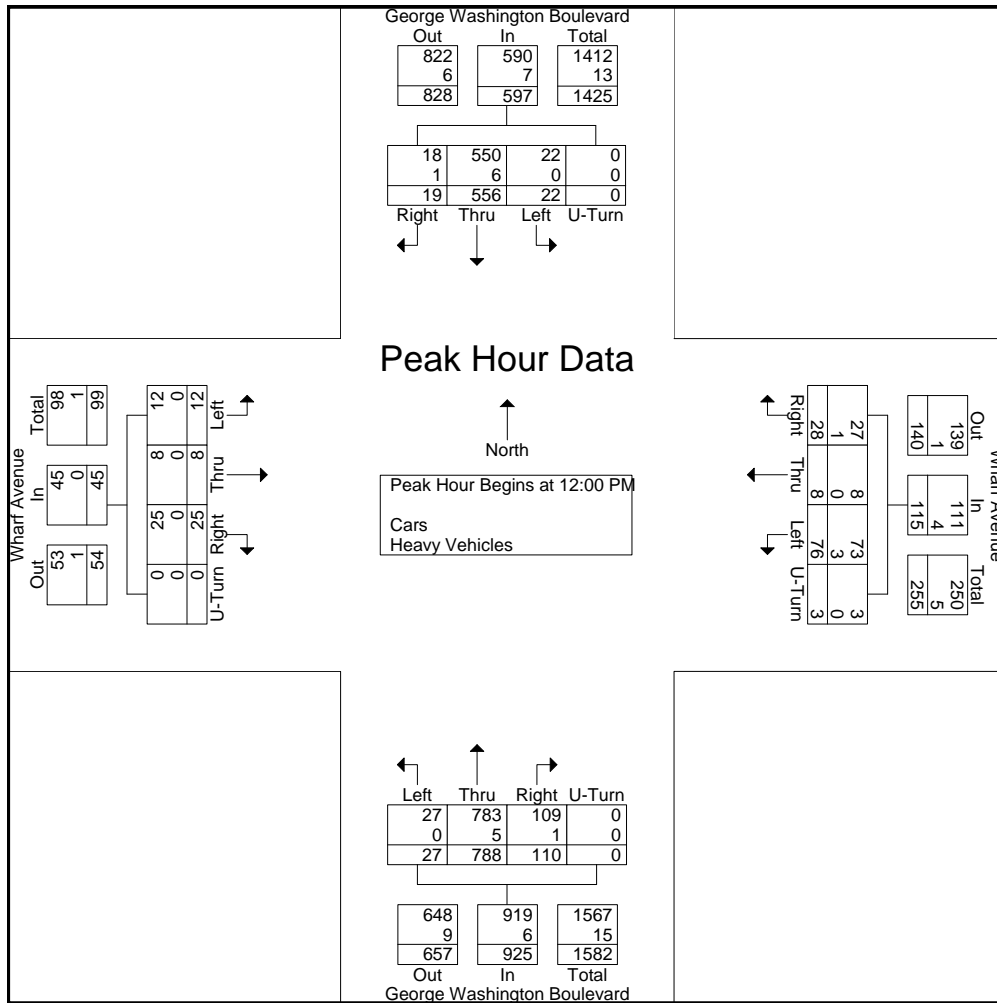
PRECISION  
DATA  
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503  
Office: 508.481.3999 Fax: 508.545.1234  
Email: datarequests@pdillc.com

N/S: George Washington Blvd  
E/W: Wharf Avenue  
City, State: Hull, MA  
Client: TEC/ R. Brown

File Name : 154600 A  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

Start Time	George Washington Boulevard From North					Wharf Avenue From East					George Washington Boulevard From South					Wharf Avenue From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	7	142	7	0	156	9	3	19	1	32	28	204	5	0	237	4	2	3	0	9	434
12:15 PM	3	139	5	0	147	6	1	17	0	24	27	194	10	0	231	7	2	3	0	12	414
12:30 PM	6	143	4	0	153	10	2	28	2	42	29	196	8	0	233	3	2	3	0	8	436
12:45 PM	3	132	6	0	141	3	2	12	0	17	26	194	4	0	224	11	2	3	0	16	398
Total Volume	19	556	22	0	597	28	8	76	3	115	110	788	27	0	925	25	8	12	0	45	1682
% App. Total	3.2	93.1	3.7	0		24.3	7	66.1	2.6		11.9	85.2	2.9	0		55.6	17.8	26.7	0		
PHF	.679	.972	.786	.000	.957	.700	.667	.679	.375	.685	.948	.966	.675	.000	.976	.568	1.00	1.00	.000	.703	.964
Cars	18	550	22	0	590	27	8	73	3	111	109	783	27	0	919	25	8	12	0	45	1665
% Cars	94.7	98.9	100	0	98.8	96.4	100	96.1	100	96.5	99.1	99.4	100	0	99.4	100	100	100	0	100	99.0
Heavy Vehicles	1	6	0	0	7	1	0	3	0	4	1	5	0	0	6	0	0	0	0	0	17
% Heavy Vehicles	5.3	1.1	0	0	1.2	3.6	0	3.9	0	3.5	0.9	0.6	0	0	0.6	0	0	0	0	0	1.0





PRECISION  
D A T A  
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503  
Office: 508.481.3999 Fax: 508.545.1234  
Email: datarequests@pdillc.com

File Name : 154600 B  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

N/S: Hull Shore Drive  
E/W: Franklin Street/ Water Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

**Groups Printed- Cars - Heavy Vehicles**

Start Time	Hull Shore Drive From North				Franklin Street (Hull Shore Drive Ext) From East				Hull Shore Drive From South				Water Street From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
12:00 PM	0	0	0	0	0	0	0	0	54	245	31	0	0	6	16	0	352
12:15 PM	0	0	0	0	0	0	0	0	73	213	34	0	0	15	9	0	344
12:30 PM	0	0	0	0	0	0	0	0	55	251	25	0	0	5	19	0	355
12:45 PM	0	0	0	0	0	0	0	0	57	232	40	0	0	14	16	0	359
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>239</b>	<b>941</b>	<b>130</b>	<b>0</b>	<b>0</b>	<b>40</b>	<b>60</b>	<b>0</b>	<b>1410</b>
01:00 PM	0	0	0	0	0	0	0	0	46	214	34	0	0	11	11	0	316
01:15 PM	0	0	0	0	0	0	0	0	56	220	33	0	0	6	8	0	323
01:30 PM	0	0	0	0	0	0	0	0	39	174	57	0	0	8	7	0	285
01:45 PM	0	0	0	0	0	0	0	0	39	204	44	0	0	6	9	0	302
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>180</b>	<b>812</b>	<b>168</b>	<b>0</b>	<b>0</b>	<b>31</b>	<b>35</b>	<b>0</b>	<b>1226</b>
<b>Grand Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>419</b>	<b>1753</b>	<b>298</b>	<b>0</b>	<b>0</b>	<b>71</b>	<b>95</b>	<b>0</b>	<b>2636</b>
Apprch %	0	0	0	0	0	0	0	0	17	71	12.1	0	0	42.8	57.2	0	
Total %	0	0	0	0	0	0	0	0	15.9	66.5	11.3	0	0	2.7	3.6	0	
Cars	0	0	0	0	0	0	0	0	417	1738	296	0	0	71	95	0	2617
% Cars	0	0	0	0	0	0	0	0	99.5	99.1	99.3	0	0	100	100	0	99.3
Heavy Vehicles	0	0	0	0	0	0	0	0	2	15	2	0	0	0	0	0	19
% Heavy Vehicles	0	0	0	0	0	0	0	0	0.5	0.9	0.7	0	0	0	0	0	0.7

Start Time	Hull Shore Drive From North					Franklin Street (Hull Shore Drive Ext) From East					Hull Shore Drive From South					Water Street From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	0	0	0	0	0	0	0	0	0	0	54	245	31	0	330	0	6	16	0	22	352
12:15 PM	0	0	0	0	0	0	0	0	0	0	73	213	34	0	320	0	15	9	0	24	344
12:30 PM	0	0	0	0	0	0	0	0	0	0	55	251	25	0	331	0	5	19	0	24	355
12:45 PM	0	0	0	0	0	0	0	0	0	0	57	232	40	0	329	0	14	16	0	30	359
Total Volume	0	0	0	0	0	0	0	0	0	0	239	941	130	0	1310	0	40	60	0	100	1410
% App. Total	0	0	0	0	0	0	0	0	0	0	18.2	71.8	9.9	0		0	40	60	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.818	.937	.813	.000	.989	.000	.667	.789	.000	.833	.982
Cars	0	0	0	0	0	0	0	0	0	0	237	933	129	0	1299	0	40	60	0	100	1399
% Cars	0	0	0	0	0	0	0	0	0	0	99.2	99.1	99.2	0	99.2	0	100	100	0	100	99.2
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	2	8	1	0	11	0	0	0	0	0	11
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0.8	0.9	0.8	0	0.8	0	0	0	0	0	0.8



PRECISION  
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INDUSTRIES, LLC

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File Name : 154600 B  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

N/S: Hull Shore Drive  
E/W: Franklin Street/ Water Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Cars

Start Time	Hull Shore Drive From North				Franklin Street (Hull Shore Drive Ext) From East				Hull Shore Drive From South				Water Street From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
12:00 PM	0	0	0	0	0	0	0	0	54	242	30	0	0	6	16	0	348
12:15 PM	0	0	0	0	0	0	0	0	73	212	34	0	0	15	9	0	343
12:30 PM	0	0	0	0	0	0	0	0	55	250	25	0	0	5	19	0	354
12:45 PM	0	0	0	0	0	0	0	0	55	229	40	0	0	14	16	0	354
Total	0	0	0	0	0	0	0	0	237	933	129	0	0	40	60	0	1399
01:00 PM	0	0	0	0	0	0	0	0	46	212	34	0	0	11	11	0	314
01:15 PM	0	0	0	0	0	0	0	0	56	218	33	0	0	6	8	0	321
01:30 PM	0	0	0	0	0	0	0	0	39	173	57	0	0	8	7	0	284
01:45 PM	0	0	0	0	0	0	0	0	39	202	43	0	0	6	9	0	299
Total	0	0	0	0	0	0	0	0	180	805	167	0	0	31	35	0	1218
Grand Total	0	0	0	0	0	0	0	0	417	1738	296	0	0	71	95	0	2617
Apprch %	0	0	0	0	0	0	0	0	17	70.9	12.1	0	0	42.8	57.2	0	
Total %	0	0	0	0	0	0	0	0	15.9	66.4	11.3	0	0	2.7	3.6	0	

Start Time	Hull Shore Drive From North					Franklin Street (Hull Shore Drive Ext) From East					Hull Shore Drive From South					Water Street From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	0	0	0	0	0	0	0	0	0	0	54	242	30	0	326	0	6	16	0	22	348
12:15 PM	0	0	0	0	0	0	0	0	0	0	73	212	34	0	319	0	15	9	0	24	343
12:30 PM	0	0	0	0	0	0	0	0	0	0	55	250	25	0	330	0	5	19	0	24	354
12:45 PM	0	0	0	0	0	0	0	0	0	0	55	229	40	0	324	0	14	16	0	30	354
Total Volume	0	0	0	0	0	0	0	0	0	0	237	933	129	0	1299	0	40	60	0	100	1399
% App. Total	0	0	0	0	0	0	0	0	0	0	18.2	71.8	9.9	0		0	40	60	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.812	.933	.806	.000	.984	.000	.667	.789	.000	.833	.988



PRECISION  
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INDUSTRIES, LLC

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Office: 508.481.3999 Fax: 508.545.1234  
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File Name : 154600 B  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

N/S: Hull Shore Drive  
E/W: Franklin Street/ Water Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

**Groups Printed- Heavy Vehicles**

Start Time	Hull Shore Drive From North				Franklin Street (Hull Shore Drive Ext) From East				Hull Shore Drive From South				Water Street From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
12:00 PM	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	4
12:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
12:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
12:45 PM	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	5
<b>Total</b>	0	0	0	0	0	0	0	0	2	8	1	0	0	0	0	0	11
01:00 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
01:15 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
01:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
01:45 PM	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	3
<b>Total</b>	0	0	0	0	0	0	0	0	0	7	1	0	0	0	0	0	8
<b>Grand Total</b>	0	0	0	0	0	0	0	0	2	15	2	0	0	0	0	0	19
Apprch %	0	0	0	0	0	0	0	0	10.5	78.9	10.5	0	0	0	0	0	
Total %	0	0	0	0	0	0	0	0	10.5	78.9	10.5	0	0	0	0	0	

Start Time	Hull Shore Drive From North					Franklin Street (Hull Shore Drive Ext) From East					Hull Shore Drive From South					Water Street From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	3	1	0	4	0	0	0	0	0	4
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
12:45 PM	0	0	0	0	0	0	0	0	0	0	2	3	0	0	5	0	0	0	0	0	5
Total Volume	0	0	0	0	0	0	0	0	0	0	2	8	1	0	11	0	0	0	0	0	11
% App. Total	0	0	0	0	0	0	0	0	0	0	18.2	72.7	9.1	0		0	0	0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.667	.250	.000	.550	.000	.000	.000	.000	.000	.550





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INDUSTRIES, LLC

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Office: 508.481.3999 Fax: 508.545.1234  
Email: datarequests@pdillc.com

File Name : 154600 B  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

N/S: Hull Shore Drive  
E/W: Franklin Street/ Water Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Peds and Bikes

Start Time	Hull Shore Drive From North					Franklin Street (Hull Shore Drive Ext) From East					Hull Shore Drive From South					Water Street From West					Int. Total
	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	
12:00 PM	0	0	0	3	1	0	0	0	0	0	1	1	0	1	3	0	0	0	1	0	11
12:15 PM	0	0	0	6	3	0	0	0	0	0	4	0	0	2	9	0	0	0	0	0	24
12:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	2	3	0	0	0	0	0	6
12:45 PM	0	0	0	1	1	0	0	0	4	0	1	2	0	7	2	0	0	0	1	2	21
Total	0	0	0	10	5	0	0	0	4	0	7	3	0	12	17	0	0	0	2	2	62
01:00 PM	0	0	0	1	2	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	8
01:15 PM	0	0	0	6	2	0	0	0	4	0	0	0	0	4	0	0	0	0	0	0	16
01:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	10	3	0	0	0	2	4	20
01:45 PM	0	0	0	7	0	0	0	0	1	0	0	0	0	3	6	0	0	0	2	6	25
Total	0	0	0	14	4	0	0	0	5	0	1	0	0	20	11	0	0	0	4	10	69
Grand Total	0	0	0	24	9	0	0	0	9	0	8	3	0	32	28	0	0	0	6	12	131
Apprch %	0	0	0	72.7	27.3	0	0	0	100	0	11.3	4.2	0	45.1	39.4	0	0	0	33.3	66.7	
Total %	0	0	0	18.3	6.9	0	0	0	6.9	0	6.1	2.3	0	24.4	21.4	0	0	0	4.6	9.2	

Start Time	Hull Shore Drive From North						Franklin Street (Hull Shore Drive Ext) From East						Hull Shore Drive From South						Water Street From West						Int. Total						
	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	App. Total							
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 01:00 PM																															
01:00 PM	0	0	0	1	2	3	0	0	0	0	0	0	0	0	0	3	2	5	0	0	0	0	0	0	0	0	0	0	0	0	8
01:15 PM	0	0	0	6	2	8	0	0	0	4	0	4	0	0	0	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	16
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	10	3	14	0	0	0	2	4	6	0	0	0	2	4	6	20
01:45 PM	0	0	0	7	0	7	0	0	0	1	0	1	0	0	0	3	6	9	0	0	0	2	6	8	0	0	0	2	6	8	25
Total Volume	0	0	0	14	4	18	0	0	0	5	0	5	1	0	0	20	11	32	0	0	0	4	10	14	0	0	0	4	10	14	69
% App. Total	0	0	0	77.8	22.2		0	0	0	100	0		3.1	0	0	62.5	34.4		0	0	0	28.6	71.4		0	0	0	28.6	71.4		
PHF	.000	.000	.000	.500	.500	.563	.000	.000	.000	.313	.000	.313	.250	.000	.000	.500	.458	.571	.000	.000	.000	.500	.417	.438	.000	.000	.000	.500	.417	.438	.690



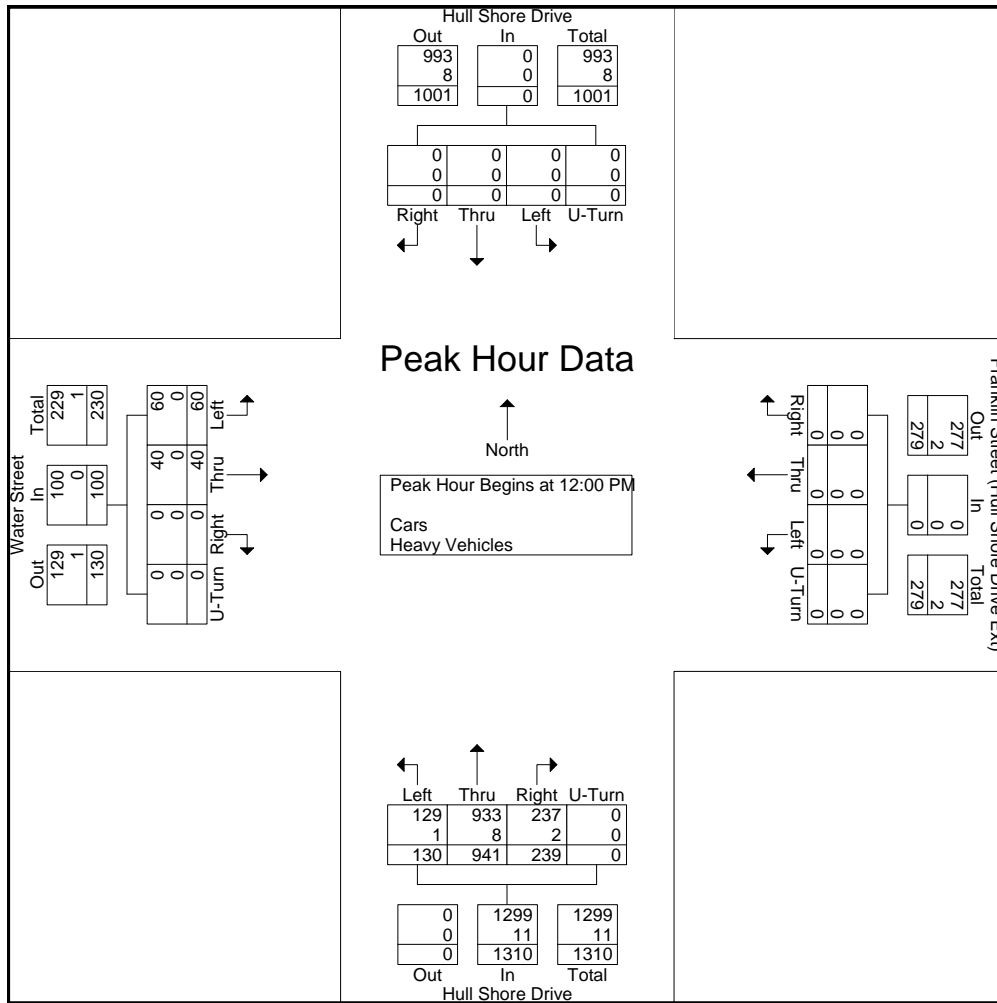
PRECISION  
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INDUSTRIES, LLC

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File Name : 154600 B  
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Start Date : 8/15/2015  
Page No : 1

N/S: Hull Shore Drive  
E/W: Franklin Street/ Water Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

Start Time	Hull Shore Drive From North					Franklin Street (Hull Shore Drive Ext) From East					Hull Shore Drive From South					Water Street From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	0	0	0	0	0	0	0	0	0	0	54	245	31	0	330	0	6	16	0	22	352
12:15 PM	0	0	0	0	0	0	0	0	0	0	73	213	34	0	320	0	15	9	0	24	344
12:30 PM	0	0	0	0	0	0	0	0	0	0	55	251	25	0	331	0	5	19	0	24	355
12:45 PM	0	0	0	0	0	0	0	0	0	0	57	232	40	0	329	0	14	16	0	30	359
Total Volume	0	0	0	0	0	0	0	0	0	0	239	941	130	0	1310	0	40	60	0	100	1410
% App. Total	0	0	0	0	0	0	0	0	0	0	18.2	71.8	9.9	0		0	40	60	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.818	.937	.813	.000	.989	.000	.667	.789	.000	.833	.982
Cars	0	0	0	0	0	0	0	0	0	0	237	933	129	0	1299	0	40	60	0	100	1399
% Cars	0	0	0	0	0	0	0	0	0	0	99.2	99.1	99.2	0	99.2	0	100	100	0	100	99.2
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	2	8	1	0	11	0	0	0	0	0	11
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0.8	0.9	0.8	0	0.8	0	0	0	0	0	0.8





PRECISION  
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Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

N/S: Hull Shore Drive  
E/W: Franklin Street/ Water Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Cars - Heavy Vehicles

Start Time	Hull Shore Drive From North				Franklin Street (Hull Shore Drive Ext) From East				Hull Shore Drive From South				Water Street From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
04:00 PM	0	0	0	0	0	0	0	0	25	177	32	0	0	6	13	0	253
04:15 PM	0	0	0	0	1	0	0	0	24	198	23	0	0	4	10	0	260
04:30 PM	0	0	0	0	0	0	0	0	20	210	24	0	0	6	5	0	265
04:45 PM	0	0	0	0	0	0	0	0	19	197	25	0	0	4	4	0	249
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>88</b>	<b>782</b>	<b>104</b>	<b>0</b>	<b>0</b>	<b>20</b>	<b>32</b>	<b>0</b>	<b>1027</b>
05:00 PM	0	0	0	0	0	0	0	0	19	186	21	0	0	2	9	0	237
05:15 PM	0	0	0	0	0	0	0	0	9	217	16	0	0	3	11	0	256
05:30 PM	0	0	0	0	0	0	0	0	9	198	18	0	0	0	8	0	233
05:45 PM	0	0	0	0	0	0	0	0	19	229	21	0	0	2	12	0	283
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>56</b>	<b>830</b>	<b>76</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>40</b>	<b>0</b>	<b>1009</b>
<b>Grand Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>144</b>	<b>1612</b>	<b>180</b>	<b>0</b>	<b>0</b>	<b>27</b>	<b>72</b>	<b>0</b>	<b>2036</b>
Apprch %	0	0	0	0	100	0	0	0	7.4	83.3	9.3	0	0	27.3	72.7	0	
Total %	0	0	0	0	0	0	0	0	7.1	79.2	8.8	0	0	1.3	3.5	0	
Cars	0	0	0	0	1	0	0	0	143	1589	179	0	0	26	68	0	2006
% Cars	0	0	0	0	100	0	0	0	99.3	98.6	99.4	0	0	96.3	94.4	0	98.5
Heavy Vehicles	0	0	0	0	0	0	0	0	1	23	1	0	0	1	4	0	30
% Heavy Vehicles	0	0	0	0	0	0	0	0	0.7	1.4	0.6	0	0	3.7	5.6	0	1.5

Start Time	Hull Shore Drive From North					Franklin Street (Hull Shore Drive Ext) From East					Hull Shore Drive From South					Water Street From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	0	0	0	0	0	25	177	32	0	234	0	6	13	0	19	253
04:15 PM	0	0	0	0	0	1	0	0	0	1	24	198	23	0	245	0	4	10	0	14	260
04:30 PM	0	0	0	0	0	0	0	0	0	0	20	210	24	0	254	0	6	5	0	11	265
04:45 PM	0	0	0	0	0	0	0	0	0	0	19	197	25	0	241	0	4	4	0	8	249
Total Volume	0	0	0	0	0	1	0	0	0	1	88	782	104	0	974	0	20	32	0	52	1027
% App. Total	0	0	0	0	0	100	0	0	0	0	9	80.3	10.7	0	974	0	38.5	61.5	0	0	
PHF	.000	.000	.000	.000	.000	.250	.000	.000	.000	.250	.880	.931	.813	.000	.959	.000	.833	.615	.000	.684	.969
Cars	0	0	0	0	0	1	0	0	0	1	87	768	103	0	958	0	19	28	0	47	1006
% Cars	0	0	0	0	0	100	0	0	0	100	98.9	98.2	99.0	0	98.4	0	95.0	87.5	0	90.4	98.0
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	1	14	1	0	16	0	1	4	0	5	21
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	1.1	1.8	1.0	0	1.6	0	5.0	12.5	0	9.6	2.0



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File Name : 154600 BB  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

N/S: Hull Shore Drive  
E/W: Franklin Street/ Water Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Cars

Start Time	Hull Shore Drive From North				Franklin Street (Hull Shore Drive Ext) From East				Hull Shore Drive From South				Water Street From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
04:00 PM	0	0	0	0	0	0	0	0	25	174	31	0	0	6	10	0	246
04:15 PM	0	0	0	0	1	0	0	0	24	194	23	0	0	4	10	0	256
04:30 PM	0	0	0	0	0	0	0	0	20	207	24	0	0	5	5	0	261
04:45 PM	0	0	0	0	0	0	0	0	18	193	25	0	0	4	3	0	243
Total	0	0	0	0	1	0	0	0	87	768	103	0	0	19	28	0	1006
05:00 PM	0	0	0	0	0	0	0	0	19	185	21	0	0	2	9	0	236
05:15 PM	0	0	0	0	0	0	0	0	9	215	16	0	0	3	11	0	254
05:30 PM	0	0	0	0	0	0	0	0	9	195	18	0	0	0	8	0	230
05:45 PM	0	0	0	0	0	0	0	0	19	226	21	0	0	2	12	0	280
Total	0	0	0	0	0	0	0	0	56	821	76	0	0	7	40	0	1000
Grand Total	0	0	0	0	1	0	0	0	143	1589	179	0	0	26	68	0	2006
Apprch %	0	0	0	0	100	0	0	0	7.5	83.2	9.4	0	0	27.7	72.3	0	
Total %	0	0	0	0	0	0	0	0	7.1	79.2	8.9	0	0	1.3	3.4	0	

Start Time	Hull Shore Drive From North					Franklin Street (Hull Shore Drive Ext) From East					Hull Shore Drive From South					Water Street From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	0	0	0	0	0	25	174	31	0	230	0	6	10	0	16	246
04:15 PM	0	0	0	0	0	1	0	0	0	1	24	194	23	0	241	0	4	10	0	14	256
04:30 PM	0	0	0	0	0	0	0	0	0	0	20	207	24	0	251	0	5	5	0	10	261
04:45 PM	0	0	0	0	0	0	0	0	0	0	18	193	25	0	236	0	4	3	0	7	243
Total Volume	0	0	0	0	0	1	0	0	0	1	87	768	103	0	958	0	19	28	0	47	1006
% App. Total	0	0	0	0	0	100	0	0	0		9.1	80.2	10.8	0		0	40.4	59.6	0		
PHF	.000	.000	.000	.000	.000	.250	.000	.000	.000	.250	.870	.928	.831	.000	.954	.000	.792	.700	.000	.734	.964





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File Name : 154600 BB  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

N/S: Hull Shore Drive  
E/W: Franklin Street/ Water Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

**Groups Printed- Heavy Vehicles**

Start Time	Hull Shore Drive From North				Franklin Street (Hull Shore Drive Ext) From East				Hull Shore Drive From South				Water Street From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
04:00 PM	0	0	0	0	0	0	0	0	0	3	1	0	0	0	3	0	7
04:15 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4
04:30 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	4
04:45 PM	0	0	0	0	0	0	0	0	1	4	0	0	0	0	1	0	6
<b>Total</b>	0	0	0	0	0	0	0	0	1	14	1	0	0	1	4	0	21
05:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
05:30 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3
05:45 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3
<b>Total</b>	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	9
<b>Grand Total</b>	0	0	0	0	0	0	0	0	1	23	1	0	0	1	4	0	30
Apprch %	0	0	0	0	0	0	0	0	4	92	4	0	0	20	80	0	
Total %	0	0	0	0	0	0	0	0	3.3	76.7	3.3	0	0	3.3	13.3	0	

Start Time	Hull Shore Drive From North					Franklin Street (Hull Shore Drive Ext) From East					Hull Shore Drive From South					Water Street From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	3	1	0	4	0	0	3	0	3	7
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	4
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	1	0	0	1	4
04:45 PM	0	0	0	0	0	0	0	0	0	0	1	4	0	0	5	0	0	1	0	1	6
Total Volume	0	0	0	0	0	0	0	0	0	0	1	14	1	0	16	0	1	4	0	5	21
% App. Total	0	0	0	0	0	0	0	0	0	0	6.2	87.5	6.2	0		0	20	80	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.875	.250	.000	.800	.000	.250	.333	.000	.417	.750



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File Name : 154600 BB  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

N/S: Hull Shore Drive  
E/W: Franklin Street/ Water Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Peds and Bikes

Start Time	Hull Shore Drive From North					Franklin Street (Hull Shore Drive Ext) From East					Hull Shore Drive From South					Water Street From West					Int. Total
	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	
04:00 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	4
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5
04:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	3
Total	0	0	0	1	1	0	0	0	0	0	0	0	1	2	7	0	1	0	1	0	14
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	3
05:30 PM	0	0	0	0	2	0	0	0	0	0	0	0	0	1	5	0	0	0	0	0	8
05:45 PM	0	0	0	1	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	4
Total	0	0	0	1	2	0	0	0	0	0	2	0	0	2	8	0	0	0	0	0	15
Grand Total	0	0	0	2	3	0	0	0	0	0	2	0	1	4	15	0	1	0	1	0	29
Apprch %	0	0	0	40	60	0	0	0	0	0	9.1	0	4.5	18.2	68.2	0	50	0	50	0	
Total %	0	0	0	6.9	10.3	0	0	0	0	0	6.9	0	3.4	13.8	51.7	0	3.4	0	3.4	0	

Start Time	Hull Shore Drive From North						Franklin Street (Hull Shore Drive Ext) From East						Hull Shore Drive From South						Water Street From West						Int. Total				
	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	App. Total					
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																													
Peak Hour for Entire Intersection Begins at 05:00 PM																													
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	3	0	0	0	0	0	0	0	0	0	3	
05:30 PM	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	1	5	6	0	0	0	0	0	0	0	0	0	8	
05:45 PM	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	1	1	3	0	0	0	0	0	0	0	0	0	4	
Total Volume	0	0	0	1	2	3	0	0	0	0	0	0	2	0	0	2	8	12	0	0	0	0	0	0	0	0	0	15	
% App. Total	0	0	0	33.3	66.7		0	0	0	0	0		16.7	0	0	16.7	66.7		0	0	0	0	0		0	0	0		
PHF	.000	.000	.000	.250	.250	.375	.000	.000	.000	.000	.000	.000	.500	.000	.000	.500	.400	.500	.000	.000	.000	.000	.000	.000	.000	.000	.000	.469	



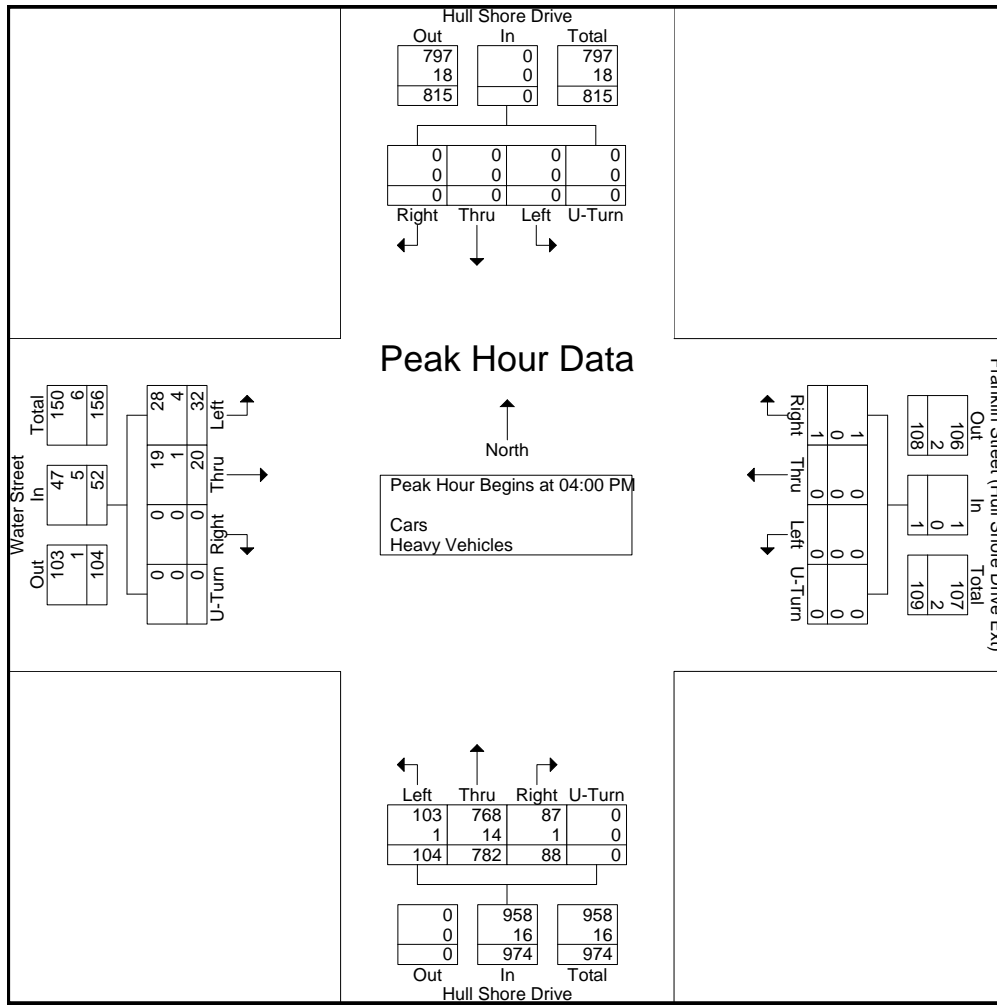
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File Name : 154600 BB  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

N/S: Hull Shore Drive  
E/W: Franklin Street/ Water Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

Start Time	Hull Shore Drive From North					Franklin Street (Hull Shore Drive Ext) From East					Hull Shore Drive From South					Water Street From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	0	0	0	0	0	25	177	32	0	234	0	6	13	0	19	253
04:15 PM	0	0	0	0	0	1	0	0	0	1	24	198	23	0	245	0	4	10	0	14	260
04:30 PM	0	0	0	0	0	0	0	0	0	0	20	210	24	0	254	0	6	5	0	11	265
04:45 PM	0	0	0	0	0	0	0	0	0	0	19	197	25	0	241	0	4	4	0	8	249
Total Volume	0	0	0	0	0	1	0	0	0	1	88	782	104	0	974	0	20	32	0	52	1027
% App. Total	0	0	0	0	0	100	0	0	0	0	9	80.3	10.7	0	0	0	38.5	61.5	0	0	
PHF	.000	.000	.000	.000	.000	.250	.000	.000	.000	.250	.880	.931	.813	.000	.959	.000	.833	.615	.000	.684	.969
Cars	0	0	0	0	0	1	0	0	0	1	87	768	103	0	958	0	19	28	0	47	1006
% Cars	0	0	0	0	0	100	0	0	0	100	98.9	98.2	99.0	0	98.4	0	95.0	87.5	0	90.4	98.0
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	1	14	1	0	16	0	1	4	0	5	21
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	1.1	1.8	1.0	0	1.6	0	5.0	12.5	0	9.6	2.0









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File Name : 154600 C  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

S: Franklin Street  
E/W: Phipps Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Cars

Start Time	Phipps Street From East			Franklin Street From South			Phipps Street From West			Int. Total
	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	
12:00 PM	9	0	0	0	31	0	0	10	0	50
12:15 PM	15	0	0	2	32	0	0	13	0	62
12:30 PM	13	0	0	3	32	0	0	15	0	63
12:45 PM	11	0	0	1	28	0	0	13	0	53
Total	48	0	0	6	123	0	0	51	0	228
01:00 PM	10	0	0	1	40	0	0	11	0	62
01:15 PM	5	0	0	0	37	0	0	7	0	49
01:30 PM	9	0	0	0	17	0	0	7	0	33
01:45 PM	8	0	0	1	33	0	0	4	0	46
Total	32	0	0	2	127	0	0	29	0	190
Grand Total	80	0	0	8	250	0	0	80	0	418
Apprch %	100	0	0	3.1	96.9	0	0	100	0	
Total %	19.1	0	0	1.9	59.8	0	0	19.1	0	

Start Time	Phipps Street From East				Franklin Street From South				Phipps Street From West				Int. Total
	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 12:15 PM													
12:15 PM	15	0	0	15	2	32	0	34	0	13	0	13	62
12:30 PM	13	0	0	13	3	32	0	35	0	15	0	15	63
12:45 PM	11	0	0	11	1	28	0	29	0	13	0	13	53
01:00 PM	10	0	0	10	1	40	0	41	0	11	0	11	62
Total Volume	49	0	0	49	7	132	0	139	0	52	0	52	240
% App. Total	100	0	0		5	95	0		0	100	0		
PHF	.817	.000	.000	.817	.583	.825	.000	.848	.000	.867	.000	.867	.952





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File Name : 154600 C  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

S: Franklin Street  
E/W: Phipps Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

**Groups Printed- Peds and Bikes**

Start Time	Phipps Street From East				Franklin Street From South				Phipps Street From West				Int. Total
	Thru	Left	Peds SB	Peds NB	Right	Left	Peds WB	Peds EB	Right	Thru	Peds NB	Peds SB	
12:00 PM	1	0	0	0	0	1	0	1	1	0	0	2	6
12:15 PM	0	0	0	0	0	0	0	0	1	0	0	2	3
12:30 PM	0	0	0	0	0	2	1	2	0	0	1	0	6
12:45 PM	0	0	0	0	0	0	0	0	0	3	0	0	3
Total	1	0	0	0	0	3	1	3	2	3	1	4	18
01:00 PM	0	0	5	0	0	0	5	0	0	0	0	1	11
01:15 PM	2	0	1	0	0	3	4	0	1	0	1	0	12
01:30 PM	0	1	2	0	0	2	2	0	2	0	0	0	9
01:45 PM	6	0	0	0	0	0	0	0	0	2	0	0	8
Total	8	1	8	0	0	5	11	0	3	2	1	1	40
Grand Total	9	1	8	0	0	8	12	3	5	5	2	5	58
Apprch %	50	5.6	44.4	0	0	34.8	52.2	13	29.4	29.4	11.8	29.4	
Total %	15.5	1.7	13.8	0	0	13.8	20.7	5.2	8.6	8.6	3.4	8.6	

Start Time	Phipps Street From East					Franklin Street From South					Phipps Street From West					Int. Total
	Thru	Left	Peds SB	Peds NB	App. Total	Right	Left	Peds WB	Peds EB	App. Total	Right	Thru	Peds NB	Peds SB	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																
Peak Hour for Entire Intersection Begins at 01:00 PM																
01:00 PM	0	0	5	0	5	0	0	5	0	5	0	0	0	1	1	11
01:15 PM	2	0	1	0	3	0	3	4	0	7	1	0	1	0	2	12
01:30 PM	0	1	2	0	3	0	2	2	0	4	2	0	0	0	2	9
01:45 PM	6	0	0	0	6	0	0	0	0	0	0	2	0	0	2	8
Total Volume	8	1	8	0	17	0	5	11	0	16	3	2	1	1	7	40
% App. Total	47.1	5.9	47.1	0		0	31.2	68.8	0		42.9	28.6	14.3	14.3		
PHF	.333	.250	.400	.000	.708	.000	.417	.550	.000	.571	.375	.250	.250	.250	.875	.833



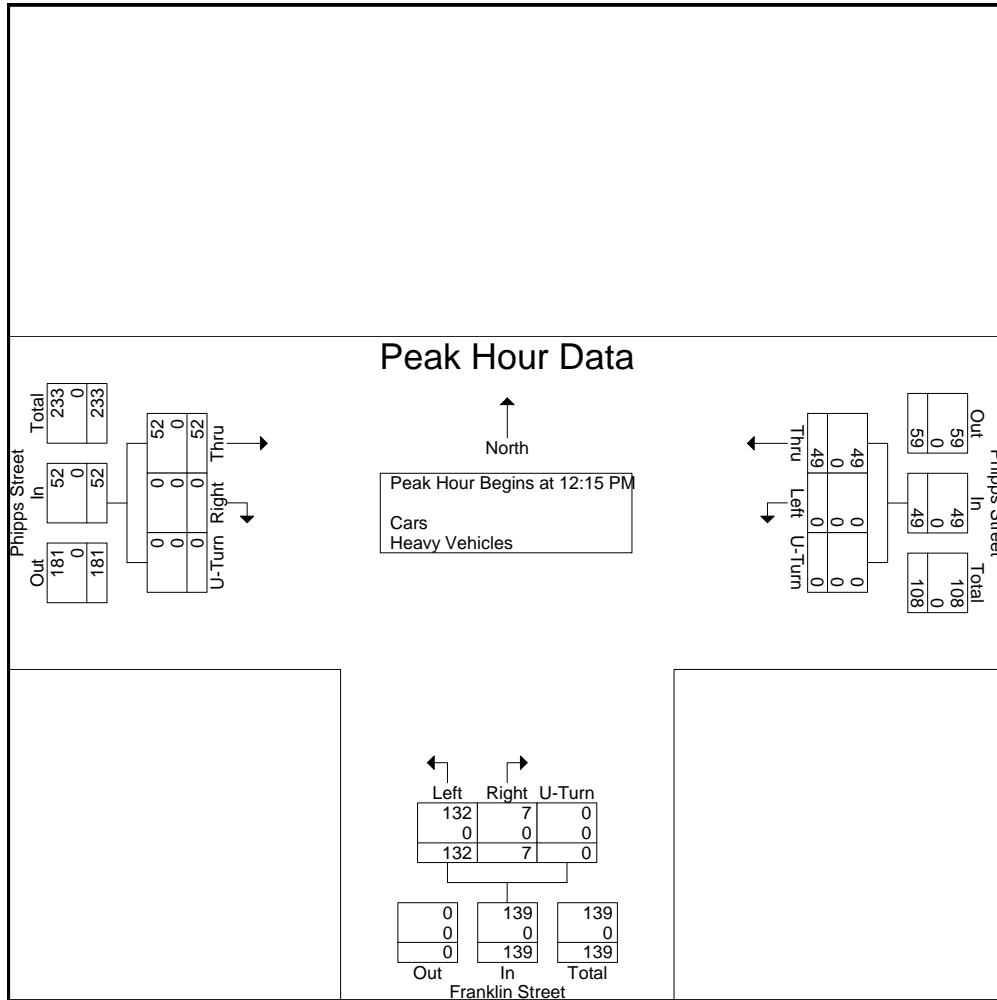
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S: Franklin Street  
E/W: Phipps Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

File Name : 154600 C  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

Start Time	Phipps Street From East				Franklin Street From South				Phipps Street From West				Int. Total
	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 12:15 PM													
12:15 PM	15	0	0	15	2	32	0	34	0	13	0	13	62
12:30 PM	13	0	0	13	3	32	0	35	0	15	0	15	63
12:45 PM	11	0	0	11	1	28	0	29	0	13	0	13	53
01:00 PM	10	0	0	10	1	40	0	41	0	11	0	11	62
Total Volume	49	0	0	49	7	132	0	139	0	52	0	52	240
% App. Total	100	0	0	100	5	95	0	100	0	100	0	100	100
PHF	.817	.000	.000	.817	.583	.825	.000	.848	.000	.867	.000	.867	.952
Cars	49	0	0	49	7	132	0	139	0	52	0	52	240
% Cars	100	0	0	100	100	100	0	100	0	100	0	100	100
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0







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File Name : 154600 CC  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

S: Franklin Street  
E/W: Phipps Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Cars - Heavy Vehicles

Start Time	Phipps Street From East			Franklin Street From South			Phipps Street From West			Int. Total
	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	
04:00 PM	6	0	0	4	42	0	0	2	0	54
04:15 PM	2	0	0	2	40	0	0	1	0	45
04:30 PM	6	0	1	1	23	0	0	3	0	34
04:45 PM	8	0	0	0	17	0	0	1	0	26
Total	22	0	1	7	122	0	0	7	0	159
05:00 PM	6	0	0	1	13	0	0	5	0	25
05:15 PM	4	0	0	0	13	0	0	1	0	18
05:30 PM	6	0	0	0	12	0	0	0	0	18
05:45 PM	3	0	0	0	8	0	0	1	0	12
Total	19	0	0	1	46	0	0	7	0	73
Grand Total	41	0	1	8	168	0	0	14	0	232
Apprch %	97.6	0	2.4	4.5	95.5	0	0	100	0	
Total %	17.7	0	0.4	3.4	72.4	0	0	6	0	
Cars	40	0	1	8	167	0	0	13	0	229
% Cars	97.6	0	100	100	99.4	0	0	92.9	0	98.7
Heavy Vehicles	1	0	0	0	1	0	0	1	0	3
% Heavy Vehicles	2.4	0	0	0	0.6	0	0	7.1	0	1.3

Start Time	Phipps Street From East				Franklin Street From South				Phipps Street From West				Int. Total
	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:00 PM													
04:00 PM	6	0	0	6	4	42	0	46	0	2	0	2	54
04:15 PM	2	0	0	2	2	40	0	42	0	1	0	1	45
04:30 PM	6	0	1	7	1	23	0	24	0	3	0	3	34
04:45 PM	8	0	0	8	0	17	0	17	0	1	0	1	26
Total Volume	22	0	1	23	7	122	0	129	0	7	0	7	159
% App. Total	95.7	0	4.3		5.4	94.6	0		0	100	0		
PHF	.688	.000	.250	.719	.438	.726	.000	.701	.000	.583	.000	.583	.736
Cars	21	0	1	22	7	121	0	128	0	6	0	6	156
% Cars	95.5	0	100	95.7	100	99.2	0	99.2	0	85.7	0	85.7	98.1
Heavy Vehicles	1	0	0	1	0	1	0	1	0	1	0	1	3
% Heavy Vehicles	4.5	0	0	4.3	0	0.8	0	0.8	0	14.3	0	14.3	1.9



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Page No : 1

S: Franklin Street  
E/W: Phipps Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Cars

Start Time	Phipps Street From East			Franklin Street From South			Phipps Street From West			Int. Total
	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	
04:00 PM	6	0	0	4	42	0	0	2	0	54
04:15 PM	2	0	0	2	39	0	0	1	0	44
04:30 PM	6	0	1	1	23	0	0	2	0	33
04:45 PM	7	0	0	0	17	0	0	1	0	25
<b>Total</b>	<b>21</b>	<b>0</b>	<b>1</b>	<b>7</b>	<b>121</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>156</b>
05:00 PM	6	0	0	1	13	0	0	5	0	25
05:15 PM	4	0	0	0	13	0	0	1	0	18
05:30 PM	6	0	0	0	12	0	0	0	0	18
05:45 PM	3	0	0	0	8	0	0	1	0	12
<b>Total</b>	<b>19</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>46</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>73</b>
<b>Grand Total</b>	<b>40</b>	<b>0</b>	<b>1</b>	<b>8</b>	<b>167</b>	<b>0</b>	<b>0</b>	<b>13</b>	<b>0</b>	<b>229</b>
Apprch %	97.6	0	2.4	4.6	95.4	0	0	100	0	
Total %	17.5	0	0.4	3.5	72.9	0	0	5.7	0	

Start Time	Phipps Street From East				Franklin Street From South				Phipps Street From West				Int. Total
	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:00 PM													
04:00 PM	6	0	0	6	4	42	0	46	0	2	0	2	54
04:15 PM	2	0	0	2	2	39	0	41	0	1	0	1	44
04:30 PM	6	0	1	7	1	23	0	24	0	2	0	2	33
04:45 PM	7	0	0	7	0	17	0	17	0	1	0	1	25
<b>Total Volume</b>	<b>21</b>	<b>0</b>	<b>1</b>	<b>22</b>	<b>7</b>	<b>121</b>	<b>0</b>	<b>128</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>6</b>	<b>156</b>
<b>% App. Total</b>	<b>95.5</b>	<b>0</b>	<b>4.5</b>		<b>5.5</b>	<b>94.5</b>	<b>0</b>		<b>0</b>	<b>100</b>	<b>0</b>		
PHF	.750	.000	.250	.786	.438	.720	.000	.696	.000	.750	.000	.750	.722





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Site Code : T0597  
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Page No : 1

S: Franklin Street  
E/W: Phipps Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

**Groups Printed- Peds and Bikes**

Start Time	Phipps Street From East				Franklin Street From South				Phipps Street From West				Int. Total
	Thru	Left	Peds SB	Peds NB	Right	Left	Peds WB	Peds EB	Right	Thru	Peds NB	Peds SB	
04:00 PM	0	0	0	2	0	0	2	2	0	0	0	0	6
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	2	0	0	0	0	0	2
04:45 PM	0	0	0	0	0	0	1	0	0	0	0	0	1
Total	0	0	0	2	0	0	5	2	0	0	0	0	9
05:00 PM	0	1	1	0	1	0	0	0	0	0	0	2	5
05:15 PM	2	0	0	0	0	1	0	0	0	0	0	0	3
05:30 PM	0	0	1	0	0	0	0	0	0	0	0	0	1
05:45 PM	0	0	0	0	0	2	0	0	0	0	0	0	2
Total	2	1	2	0	1	3	0	0	0	0	0	2	11
Grand Total	2	1	2	2	1	3	5	2	0	0	0	2	20
Apprch %	28.6	14.3	28.6	28.6	9.1	27.3	45.5	18.2	0	0	0	100	
Total %	10	5	10	10	5	15	25	10	0	0	0	10	

Start Time	Phipps Street From East					Franklin Street From South					Phipps Street From West					Int. Total
	Thru	Left	Peds SB	Peds NB	App. Total	Right	Left	Peds WB	Peds EB	App. Total	Right	Thru	Peds NB	Peds SB	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																
Peak Hour for Entire Intersection Begins at 04:30 PM																
04:30 PM	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	2
04:45 PM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1
05:00 PM	0	1	1	0	2	1	0	0	0	1	0	0	0	2	2	5
05:15 PM	2	0	0	0	2	0	1	0	0	1	0	0	0	0	0	3
Total Volume	2	1	1	0	4	1	1	3	0	5	0	0	0	2	2	11
% App. Total	50	25	25	0		20	20	60	0		0	0	0	100		
PHF	.250	.250	.250	.000	.500	.250	.250	.375	.000	.625	.000	.000	.000	.250	.250	.550





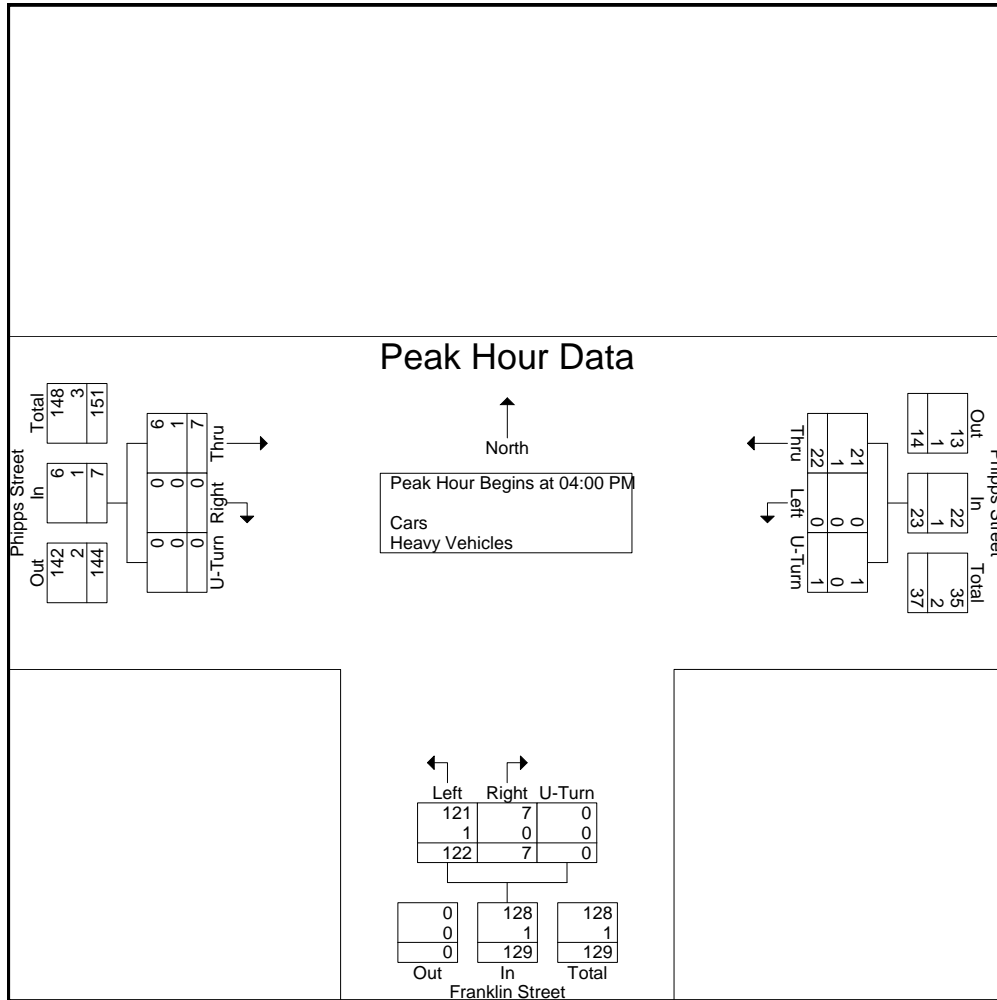
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City, State: Hull, MA  
Client: TEC/ R. Brown

File Name : 154600 CC  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

Start Time	Phipps Street From East				Franklin Street From South				Phipps Street From West				Int. Total
	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:00 PM													
04:00 PM	6	0	0	6	4	42	0	46	0	2	0	2	54
04:15 PM	2	0	0	2	2	40	0	42	0	1	0	1	45
04:30 PM	6	0	1	7	1	23	0	24	0	3	0	3	34
04:45 PM	8	0	0	8	0	17	0	17	0	1	0	1	26
Total Volume	22	0	1	23	7	122	0	129	0	7	0	7	159
% App. Total	95.7	0	4.3		5.4	94.6	0		0	100	0		
PHF	.688	.000	.250	.719	.438	.726	.000	.701	.000	.583	.000	.583	.736
Cars	21	0	1	22	7	121	0	128	0	6	0	6	156
% Cars	95.5	0	100	95.7	100	99.2	0	99.2	0	85.7	0	85.7	98.1
Heavy Vehicles	1	0	0	1	0	1	0	1	0	1	0	1	3
% Heavy Vehicles	4.5	0	0	4.3	0	0.8	0	0.8	0	14.3	0	14.3	1.9





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N/S: Nantasket Avenue  
E/W: Phipps Street/ Mountford Road  
City, State: Hull, MA  
Client: TEC/ R. Brown

File Name : 154600 D  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

Groups Printed- Cars - Heavy Vehicles

Start Time	Nantasket Avenue From North				Phipps Street From East				Nantasket Avenue From South				Mountford Road From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
12:00 PM	1	152	0	0	6	0	41	0	0	164	0	0	2	0	0	0	366
12:15 PM	1	154	0	0	13	0	54	0	0	143	1	0	3	0	0	0	369
12:30 PM	1	157	0	0	13	0	42	0	0	170	0	0	1	0	0	0	384
12:45 PM	3	177	0	0	4	0	41	0	0	149	3	0	3	0	1	0	381
Total	6	640	0	0	36	0	178	0	0	626	4	0	9	0	1	0	1500
01:00 PM	0	128	0	0	4	0	51	0	0	164	0	1	1	0	0	0	349
01:15 PM	0	127	0	0	5	0	47	0	0	170	0	0	0	0	2	0	351
01:30 PM	0	149	0	0	2	0	31	0	1	113	2	0	1	0	0	0	299
01:45 PM	0	127	0	0	5	1	37	0	0	159	5	0	0	0	0	0	334
Total	0	531	0	0	16	1	166	0	1	606	7	1	2	0	2	0	1333
Grand Total	6	1171	0	0	52	1	344	0	1	1232	11	1	11	0	3	0	2833
Apprch %	0.5	99.5	0	0	13.1	0.3	86.6	0	0.1	99	0.9	0.1	78.6	0	21.4	0	
Total %	0.2	41.3	0	0	1.8	0	12.1	0	0	43.5	0.4	0	0.4	0	0.1	0	
Cars	6	1153	0	0	52	1	343	0	1	1213	11	1	11	0	3	0	2795
% Cars	100	98.5	0	0	100	100	99.7	0	100	98.5	100	100	100	0	100	0	98.7
Heavy Vehicles	0	18	0	0	0	0	1	0	0	19	0	0	0	0	0	0	38
% Heavy Vehicles	0	1.5	0	0	0	0	0.3	0	0	1.5	0	0	0	0	0	0	1.3

Start Time	Nantasket Avenue From North					Phipps Street From East					Nantasket Avenue From South					Mountford Road From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	1	152	0	0	153	6	0	41	0	47	0	164	0	0	164	2	0	0	0	2	366
12:15 PM	1	154	0	0	155	13	0	54	0	67	0	143	1	0	144	3	0	0	0	3	369
12:30 PM	1	157	0	0	158	13	0	42	0	55	0	170	0	0	170	1	0	0	0	1	384
12:45 PM	3	177	0	0	180	4	0	41	0	45	0	149	3	0	152	3	0	1	0	4	381
Total Volume	6	640	0	0	646	36	0	178	0	214	0	626	4	0	630	9	0	1	0	10	1500
% App. Total	0.9	99.1	0	0		16.8	0	83.2	0		0	99.4	0.6	0		90	0	10	0		
PHF	.500	.904	.000	.000	.897	.692	.000	.824	.000	.799	.000	.921	.333	.000	.926	.750	.000	.250	.000	.625	.977
Cars	6	630	0	0	636	36	0	177	0	213	0	617	4	0	621	9	0	1	0	10	1480
% Cars	100	98.4	0	0	98.5	100	0	99.4	0	99.5	0	98.6	100	0	98.6	100	0	100	0	100	98.7
Heavy Vehicles	0	10	0	0	10	0	0	1	0	1	0	9	0	0	9	0	0	0	0	0	20
% Heavy Vehicles	0	1.6	0	0	1.5	0	0	0.6	0	0.5	0	1.4	0	0	1.4	0	0	0	0	0	1.3



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Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

N/S: Nantasket Avenue  
E/W: Phipps Street/ Mountford Road  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Cars

Start Time	Nantasket Avenue From North				Phipps Street From East				Nantasket Avenue From South				Mountford Road From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
12:00 PM	1	152	0	0	6	0	41	0	0	161	0	0	2	0	0	0	363
12:15 PM	1	150	0	0	13	0	53	0	0	142	1	0	3	0	0	0	363
12:30 PM	1	154	0	0	13	0	42	0	0	169	0	0	1	0	0	0	380
12:45 PM	3	174	0	0	4	0	41	0	0	145	3	0	3	0	1	0	374
Total	6	630	0	0	36	0	177	0	0	617	4	0	9	0	1	0	1480
01:00 PM	0	127	0	0	4	0	51	0	0	161	0	1	1	0	0	0	345
01:15 PM	0	127	0	0	5	0	47	0	0	167	0	0	0	0	2	0	348
01:30 PM	0	145	0	0	2	0	31	0	1	112	2	0	1	0	0	0	294
01:45 PM	0	124	0	0	5	1	37	0	0	156	5	0	0	0	0	0	328
Total	0	523	0	0	16	1	166	0	1	596	7	1	2	0	2	0	1315
Grand Total	6	1153	0	0	52	1	343	0	1	1213	11	1	11	0	3	0	2795
Apprch %	0.5	99.5	0	0	13.1	0.3	86.6	0	0.1	98.9	0.9	0.1	78.6	0	21.4	0	
Total %	0.2	41.3	0	0	1.9	0	12.3	0	0	43.4	0.4	0	0.4	0	0.1	0	

Start Time	Nantasket Avenue From North					Phipps Street From East					Nantasket Avenue From South					Mountford Road From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	1	152	0	0	153	6	0	41	0	47	0	161	0	0	161	2	0	0	0	2	363
12:15 PM	1	150	0	0	151	13	0	53	0	66	0	142	1	0	143	3	0	0	0	3	363
12:30 PM	1	154	0	0	155	13	0	42	0	55	0	169	0	0	169	1	0	0	0	1	380
12:45 PM	3	174	0	0	177	4	0	41	0	45	0	145	3	0	148	3	0	1	0	4	374
Total Volume	6	630	0	0	636	36	0	177	0	213	0	617	4	0	621	9	0	1	0	10	1480
% App. Total	0.9	99.1	0	0		16.9	0	83.1	0		0	99.4	0.6	0		90	0	10	0		
PHF	.500	.905	.000	.000	.898	.692	.000	.835	.000	.807	.000	.913	.333	.000	.919	.750	.000	.250	.000	.625	.974





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INDUSTRIES, LLC

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Office: 508.481.3999 Fax: 508.545.1234  
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File Name : 154600 D  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

N/S: Nantasket Avenue  
E/W: Phipps Street/ Mountford Road  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Peds and Bikes

Start Time	Nantasket Avenue From North					Phipps Street From East					Nantasket Avenue From South					Mountford Road From West					Int. Total
	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	
12:00 PM	0	1	0	0	0	0	0	2	0	0	0	2	0	4	4	0	0	0	1	1	15
12:15 PM	0	0	0	0	0	1	0	0	2	0	0	0	0	0	4	0	0	0	1	2	10
12:30 PM	0	5	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	3	13
12:45 PM	0	1	0	0	0	0	0	0	4	0	0	0	0	2	1	0	0	0	3	2	13
Total	0	7	0	0	0	1	0	2	6	0	0	2	0	8	12	0	0	0	5	8	51
01:00 PM	0	1	0	2	0	0	0	0	1	0	0	0	0	2	5	0	0	0	1	0	12
01:15 PM	0	0	0	0	0	1	0	0	2	0	0	0	0	3	1	0	0	0	3	3	13
01:30 PM	0	3	0	0	1	0	0	0	1	0	0	0	0	3	2	0	0	0	3	1	14
01:45 PM	0	1	0	0	0	0	0	7	0	0	0	0	0	1	0	0	0	0	5	1	15
Total	0	5	0	2	1	1	0	7	4	0	0	0	0	9	8	0	0	0	12	5	54
Grand Total	0	12	0	2	1	2	0	9	10	0	0	2	0	17	20	0	0	0	17	13	105
Apprch %	0	80	0	13.3	6.7	9.5	0	42.9	47.6	0	0	5.1	0	43.6	51.3	0	0	0	56.7	43.3	
Total %	0	11.4	0	1.9	1	1.9	0	8.6	9.5	0	0	1.9	0	16.2	19	0	0	0	16.2	12.4	

Start Time	Nantasket Avenue From North						Phipps Street From East						Nantasket Avenue From South						Mountford Road From West						Int. Total
	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																									
Peak Hour for Entire Intersection Begins at 01:00 PM																									
01:00 PM	0	1	0	2	0	3	0	0	0	1	0	1	0	0	0	2	5	7	0	0	0	1	0	1	12
01:15 PM	0	0	0	0	0	0	1	0	0	2	0	3	0	0	0	3	1	4	0	0	0	3	3	6	13
01:30 PM	0	3	0	0	1	4	0	0	0	1	0	1	0	0	0	3	2	5	0	0	0	3	1	4	14
01:45 PM	0	1	0	0	0	1	0	0	7	0	0	7	0	0	0	1	0	1	0	0	0	5	1	6	15
Total Volume	0	5	0	2	1	8	1	0	7	4	0	12	0	0	0	9	8	17	0	0	0	12	5	17	54
% App. Total	0	62.5	0	25	12.5		8.3	0	58.3	33.3	0		0	0	0	52.9	47.1		0	0	0	70.6	29.4		
PHF	.000	.417	.000	.250	.250	.500	.250	.000	.250	.500	.000	.429	.000	.000	.000	.750	.400	.607	.000	.000	.000	.600	.417	.708	.900





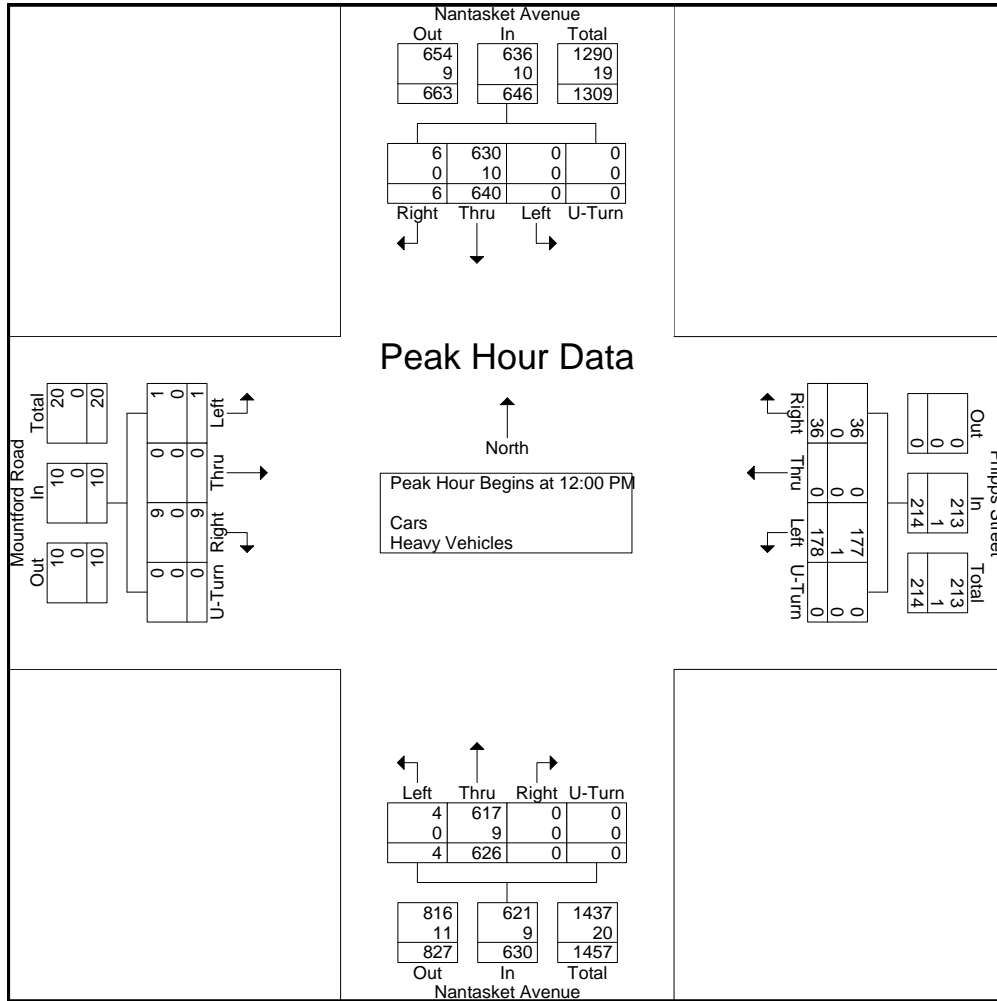
PRECISION  
D A T A  
INDUSTRIES, LLC

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File Name : 154600 D  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

N/S: Nantasket Avenue  
E/W: Phipps Street/ Mountford Road  
City, State: Hull, MA  
Client: TEC/ R. Brown

Start Time	Nantasket Avenue From North					Phipps Street From East					Nantasket Avenue From South					Mountford Road From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	1	152	0	0	153	6	0	41	0	47	0	164	0	0	164	2	0	0	0	2	366
12:15 PM	1	154	0	0	155	13	0	54	0	67	0	143	1	0	144	3	0	0	0	3	369
12:30 PM	1	157	0	0	158	13	0	42	0	55	0	170	0	0	170	1	0	0	0	1	384
12:45 PM	3	177	0	0	180	4	0	41	0	45	0	149	3	0	152	3	0	1	0	4	381
Total Volume	6	640	0	0	646	36	0	178	0	214	0	626	4	0	630	9	0	1	0	10	1500
% App. Total	0.9	99.1	0	0		16.8	0	83.2	0		0	99.4	0.6	0		90	0	10	0		
PHF	.500	.904	.000	.000	.897	.692	.000	.824	.000	.799	.000	.921	.333	.000	.926	.750	.000	.250	.000	.625	.977
Cars	6	630	0	0	636	36	0	177	0	213	0	617	4	0	621	9	0	1	0	10	1480
% Cars	100	98.4	0	0	98.5	100	0	99.4	0	99.5	0	98.6	100	0	98.6	100	0	100	0	100	98.7
Heavy Vehicles	0	10	0	0	10	0	0	1	0	1	0	9	0	0	9	0	0	0	0	0	20
% Heavy Vehicles	0	1.6	0	0	1.5	0	0	0.6	0	0.5	0	1.4	0	0	1.4	0	0	0	0	0	1.3





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N/S: Nantasket Avenue  
E/W: Phipps Street/ Mountford Road  
City, State: Hull, MA  
Client: TEC/ R. Brown

File Name : 154600 DD  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

Groups Printed- Cars - Heavy Vehicles

Start Time	Nantasket Avenue From North				Phipps Street From East				Nantasket Avenue From South				Nountford Road From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
04:00 PM	1	159	0	0	5	0	56	0	0	147	2	0	1	0	1	0	372
04:15 PM	0	158	0	0	1	0	42	0	0	168	3	0	2	0	0	0	374
04:30 PM	1	148	0	0	3	0	33	0	0	168	2	0	3	0	0	0	358
04:45 PM	1	143	0	0	3	0	26	0	0	161	3	0	2	0	1	0	340
Total	3	608	0	0	12	0	157	0	0	644	10	0	8	0	2	0	1444
05:00 PM	2	157	0	0	3	0	17	0	0	148	1	0	1	0	1	0	330
05:15 PM	2	140	0	0	4	0	26	0	0	169	2	0	2	0	0	0	345
05:30 PM	1	133	0	0	2	1	25	0	0	168	2	0	1	0	0	0	333
05:45 PM	0	122	0	0	2	0	13	0	0	193	1	0	0	0	0	0	331
Total	5	552	0	0	11	1	81	0	0	678	6	0	4	0	1	0	1339
Grand Total	8	1160	0	0	23	1	238	0	0	1322	16	0	12	0	3	0	2783
Apprch %	0.7	99.3	0	0	8.8	0.4	90.8	0	0	98.8	1.2	0	80	0	20	0	
Total %	0.3	41.7	0	0	0.8	0	8.6	0	0	47.5	0.6	0	0.4	0	0.1	0	
Cars	8	1131	0	0	22	1	234	0	0	1297	16	0	12	0	3	0	2724
% Cars	100	97.5	0	0	95.7	100	98.3	0	0	98.1	100	0	100	0	100	0	97.9
Heavy Vehicles	0	29	0	0	1	0	4	0	0	25	0	0	0	0	0	0	59
% Heavy Vehicles	0	2.5	0	0	4.3	0	1.7	0	0	1.9	0	0	0	0	0	0	2.1

Start Time	Nantasket Avenue From North					Phipps Street From East					Nantasket Avenue From South					Nountford Road From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	1	159	0	0	160	5	0	56	0	61	0	147	2	0	149	1	0	1	0	2	372
04:15 PM	0	158	0	0	158	1	0	42	0	43	0	168	3	0	171	2	0	0	0	2	374
04:30 PM	1	148	0	0	149	3	0	33	0	36	0	168	2	0	170	3	0	0	0	3	358
04:45 PM	1	143	0	0	144	3	0	26	0	29	0	161	3	0	164	2	0	1	0	3	340
Total Volume	3	608	0	0	611	12	0	157	0	169	0	644	10	0	654	8	0	2	0	10	1444
% App. Total	0.5	99.5	0	0		7.1	0	92.9	0		0	98.5	1.5	0		80	0	20	0		
PHF	.750	.956	.000	.000	.955	.600	.000	.701	.000	.693	.000	.958	.833	.000	.956	.667	.000	.500	.000	.833	.965
Cars	3	587	0	0	590	11	0	153	0	164	0	629	10	0	639	8	0	2	0	10	1403
% Cars	100	96.5	0	0	96.6	91.7	0	97.5	0	97.0	0	97.7	100	0	97.7	100	0	100	0	100	97.2
Heavy Vehicles	0	21	0	0	21	1	0	4	0	5	0	15	0	0	15	0	0	0	0	0	41
% Heavy Vehicles	0	3.5	0	0	3.4	8.3	0	2.5	0	3.0	0	2.3	0	0	2.3	0	0	0	0	0	2.8



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File Name : 154600 DD  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

N/S: Nantasket Avenue  
E/W: Phipps Street/ Mountford Road  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Cars

Start Time	Nantasket Avenue From North				Phipps Street From East				Nantasket Avenue From South				Nountford Road From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
04:00 PM	1	152	0	0	5	0	56	0	0	142	2	0	1	0	1	0	360
04:15 PM	0	154	0	0	1	0	41	0	0	165	3	0	2	0	0	0	366
04:30 PM	1	144	0	0	2	0	31	0	0	167	2	0	3	0	0	0	350
04:45 PM	1	137	0	0	3	0	25	0	0	155	3	0	2	0	1	0	327
Total	3	587	0	0	11	0	153	0	0	629	10	0	8	0	2	0	1403
05:00 PM	2	154	0	0	3	0	17	0	0	146	1	0	1	0	1	0	325
05:15 PM	2	139	0	0	4	0	26	0	0	166	2	0	2	0	0	0	341
05:30 PM	1	129	0	0	2	1	25	0	0	165	2	0	1	0	0	0	326
05:45 PM	0	122	0	0	2	0	13	0	0	191	1	0	0	0	0	0	329
Total	5	544	0	0	11	1	81	0	0	668	6	0	4	0	1	0	1321
Grand Total	8	1131	0	0	22	1	234	0	0	1297	16	0	12	0	3	0	2724
Apprch %	0.7	99.3	0	0	8.6	0.4	91.1	0	0	98.8	1.2	0	80	0	20	0	
Total %	0.3	41.5	0	0	0.8	0	8.6	0	0	47.6	0.6	0	0.4	0	0.1	0	

Start Time	Nantasket Avenue From North					Phipps Street From East					Nantasket Avenue From South					Nountford Road From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	1	152	0	0	153	5	0	56	0	61	0	142	2	0	144	1	0	1	0	2	360
04:15 PM	0	154	0	0	154	1	0	41	0	42	0	165	3	0	168	2	0	0	0	2	366
04:30 PM	1	144	0	0	145	2	0	31	0	33	0	167	2	0	169	3	0	0	0	3	350
04:45 PM	1	137	0	0	138	3	0	25	0	28	0	155	3	0	158	2	0	1	0	3	327
Total Volume	3	587	0	0	590	11	0	153	0	164	0	629	10	0	639	8	0	2	0	10	1403
% App. Total	0.5	99.5	0	0		6.7	0	93.3	0		0	98.4	1.6	0		80	0	20	0		
PHF	.750	.953	.000	.000	.958	.550	.000	.683	.000	.672	.000	.942	.833	.000	.945	.667	.000	.500	.000	.833	.958





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File Name : 154600 DD  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

N/S: Nantasket Avenue  
E/W: Phipps Street/ Mountford Road  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Peds and Bikes

Start Time	Nantasket Avenue From North					Phipps Street From East					Nantasket Avenue From South					Nountford Road From West					Int. Total
	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	
04:00 PM	0	0	0	0	0	0	0	0	0	6	0	1	0	0	0	0	0	0	4	1	12
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
04:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3
04:45 PM	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	3
Total	0	2	0	0	0	0	0	0	0	6	0	2	0	0	0	0	0	0	6	3	19
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
05:15 PM	0	2	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	6
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	2	5
05:45 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	3
Total	0	2	0	0	0	1	0	2	0	0	0	0	0	1	0	0	0	0	5	4	15
Grand Total	0	4	0	0	0	1	0	2	0	6	0	2	0	1	0	0	0	0	11	7	34
Apprch %	0	100	0	0	0	11.1	0	22.2	0	66.7	0	66.7	0	33.3	0	0	0	0	61.1	38.9	
Total %	0	11.8	0	0	0	2.9	0	5.9	0	17.6	0	5.9	0	2.9	0	0	0	0	32.4	20.6	

Start Time	Nantasket Avenue From North						Phipps Street From East						Nantasket Avenue From South						Nountford Road From West						Int. Total
	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																									
Peak Hour for Entire Intersection Begins at 04:00 PM																									
04:00 PM	0	0	0	0	0	0	0	0	0	0	6	6	0	1	0	0	0	1	0	0	0	4	1	5	12
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
04:30 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	3
04:45 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	1	3
Total Volume	0	2	0	0	0	2	0	0	0	0	6	6	0	2	0	0	0	2	0	0	0	6	3	9	19
% App. Total	0	100	0	0	0		0	0	0	0	100		0	100	0	0	0		0	0	0	66.7	33.3		
PHF	.000	.500	.000	.000	.000	.500	.000	.000	.000	.000	.250	.250	.000	.500	.000	.000	.000	.500	.000	.000	.000	.375	.750	.450	.396











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File Name : 154600 E  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

N/S: Samoset Avenue  
E/W: Phipps Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Heavy Vehicles

Start Time	Samoset Avenue From North				Phipps Street From East				Samoset Avenue From South				Phipps Street From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
12:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
12:15 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Grand Total	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3
Apprch %	100	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	
Total %	66.7	0	0	0	0	33.3	0	0	0	0	0	0	0	0	0	0	

Start Time	Samoset Avenue From North					Phipps Street From East					Samoset Avenue From South					Phipps Street From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
12:15 PM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	1	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
% App. Total	100	0	0	0		0	100	0	0		0	0	0	0		0	0	0	0		
PHF	.250	.000	.000	.000	.250	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500







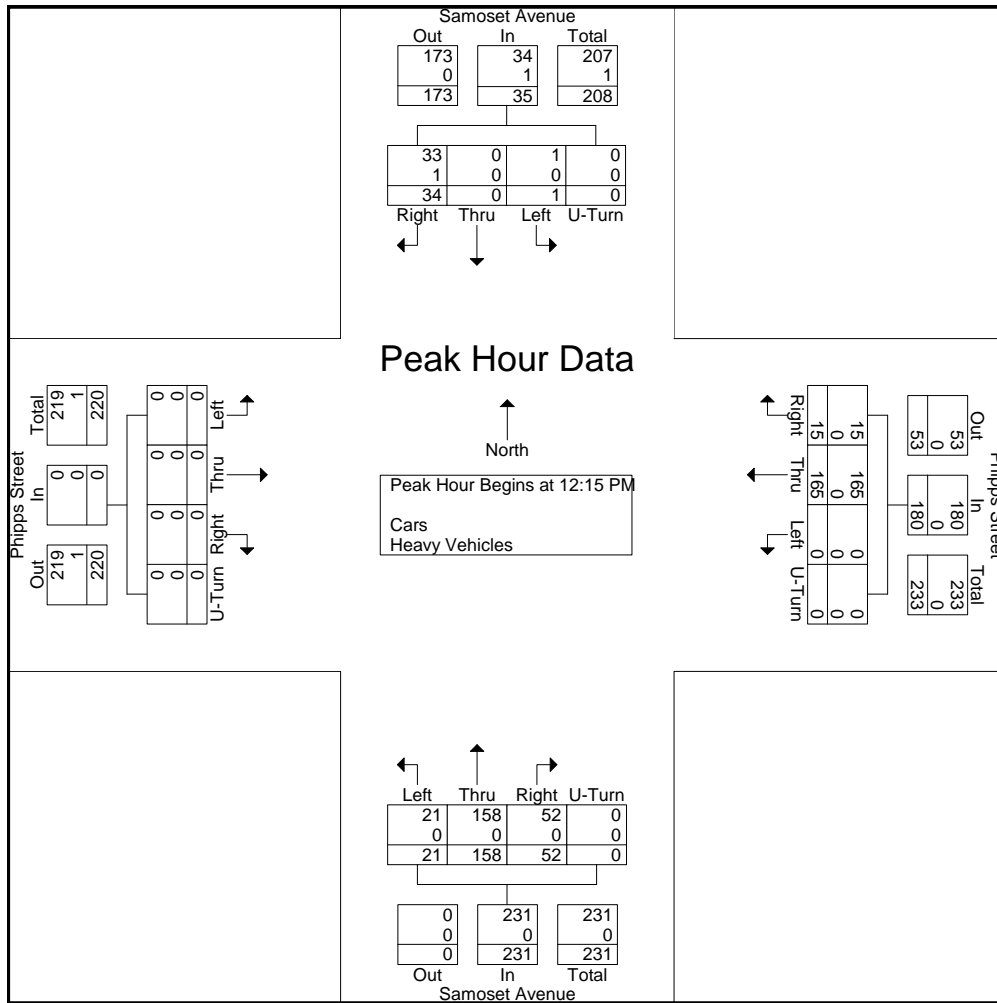
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P.O. Box 301 Berlin, MA 01503  
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N/S: Samoset Avenue  
E/W: Phipps Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

File Name : 154600 E  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

Start Time	Samoset Avenue From North					Phipps Street From East					Samoset Avenue From South					Phipps Street From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:15 PM																					
12:15 PM	13	0	0	0	13	3	44	0	0	47	14	39	7	0	60	0	0	0	0	0	120
12:30 PM	7	0	1	0	8	2	41	0	0	43	14	37	8	0	59	0	0	0	0	0	110
12:45 PM	9	0	0	0	9	5	35	0	0	40	13	40	2	0	55	0	0	0	0	0	104
01:00 PM	5	0	0	0	5	5	45	0	0	50	11	42	4	0	57	0	0	0	0	0	112
Total Volume	34	0	1	0	35	15	165	0	0	180	52	158	21	0	231	0	0	0	0	0	446
% App. Total	97.1	0	2.9	0		8.3	91.7	0	0		22.5	68.4	9.1	0		0	0	0	0		
PHF	.654	.000	.250	.000	.673	.750	.917	.000	.000	.900	.929	.940	.656	.000	.963	.000	.000	.000	.000	.000	.929
Cars	33	0	1	0	34	15	165	0	0	180	52	158	21	0	231	0	0	0	0	0	445
% Cars	97.1	0	100	0	97.1	100	100	0	0	100	100	100	100	0	100	0	0	0	0	0	99.8
Heavy Vehicles	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Heavy Vehicles	2.9	0	0	0	2.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2





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File Name : 154600 EE  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

N/S: Samoset Avenue  
E/W: Phipps Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Cars - Heavy Vehicles

Start Time	Samoset Avenue From North				Phipps Street From East				Samoset Avenue From South				Phipps Street From West				Int. Total	
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn		
04:00 PM	4	0	0	0	1	54	0	0	2	15	0	0	0	0	0	0	0	76
04:15 PM	3	0	0	0	4	38	0	0	1	24	0	0	0	0	0	0	0	70
04:30 PM	11	0	1	0	4	25	0	0	2	21	1	0	0	0	0	0	0	65
04:45 PM	4	0	0	0	2	23	0	0	1	26	1	0	0	0	0	0	0	57
Total	22	0	1	0	11	140	0	0	6	86	2	0	0	0	0	0	0	268
05:00 PM	6	0	0	0	0	19	0	0	5	15	1	0	0	0	0	0	0	46
05:15 PM	8	0	0	0	1	16	0	0	1	23	1	0	0	0	0	0	0	50
05:30 PM	8	0	0	0	1	17	0	0	0	29	1	0	0	0	0	0	0	56
05:45 PM	8	0	1	0	4	7	0	0	1	23	0	0	0	0	0	0	0	44
Total	30	0	1	0	6	59	0	0	7	90	3	0	0	0	0	0	0	196
Grand Total	52	0	2	0	17	199	0	0	13	176	5	0	0	0	0	0	0	464
Apprch %	96.3	0	3.7	0	7.9	92.1	0	0	6.7	90.7	2.6	0	0	0	0	0	0	
Total %	11.2	0	0.4	0	3.7	42.9	0	0	2.8	37.9	1.1	0	0	0	0	0	0	
Cars	50	0	1	0	17	196	0	0	12	175	5	0	0	0	0	0	0	456
% Cars	96.2	0	50	0	100	98.5	0	0	92.3	99.4	100	0	0	0	0	0	0	98.3
Heavy Vehicles	2	0	1	0	0	3	0	0	1	1	0	0	0	0	0	0	0	8
% Heavy Vehicles	3.8	0	50	0	0	1.5	0	0	7.7	0.6	0	0	0	0	0	0	0	1.7

Start Time	Samoset Avenue From North					Phipps Street From East					Samoset Avenue From South					Phipps Street From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	4	0	0	0	4	1	54	0	0	55	2	15	0	0	17	0	0	0	0	0	76
04:15 PM	3	0	0	0	3	4	38	0	0	42	1	24	0	0	25	0	0	0	0	0	70
04:30 PM	11	0	1	0	12	4	25	0	0	29	2	21	1	0	24	0	0	0	0	0	65
04:45 PM	4	0	0	0	4	2	23	0	0	25	1	26	1	0	28	0	0	0	0	0	57
Total Volume	22	0	1	0	23	11	140	0	0	151	6	86	2	0	94	0	0	0	0	0	268
% App. Total	95.7	0	4.3	0		7.3	92.7	0	0		6.4	91.5	2.1	0		0	0	0	0	0	
PHF	.500	.000	.250	.000	.479	.688	.648	.000	.000	.686	.750	.827	.500	.000	.839	.000	.000	.000	.000	.000	.882
Cars	20	0	1	0	21	11	138	0	0	149	5	85	2	0	92	0	0	0	0	0	262
% Cars	90.9	0	100	0	91.3	100	98.6	0	0	98.7	83.3	98.8	100	0	97.9	0	0	0	0	0	97.8
Heavy Vehicles	2	0	0	0	2	0	2	0	0	2	1	1	0	0	2	0	0	0	0	0	6
% Heavy Vehicles	9.1	0	0	0	8.7	0	1.4	0	0	1.3	16.7	1.2	0	0	2.1	0	0	0	0	0	2.2





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File Name : 154600 EE  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

N/S: Samoset Avenue  
E/W: Phipps Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Heavy Vehicles

Start Time	Samoset Avenue From North				Phipps Street From East				Samoset Avenue From South				Phipps Street From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2
04:30 PM	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3
04:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Total	2	0	0	0	0	2	0	0	1	1	0	0	0	0	0	0	6
05:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
Grand Total	2	0	1	0	0	3	0	0	1	1	0	0	0	0	0	0	8
Apprch %	66.7	0	33.3	0	0	100	0	0	50	50	0	0	0	0	0	0	
Total %	25	0	12.5	0	0	37.5	0	0	12.5	12.5	0	0	0	0	0	0	

Start Time	Samoset Avenue From North					Phipps Street From East					Samoset Avenue From South					Phipps Street From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	2
04:30 PM	2	0	0	0	2	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	3
04:45 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:00 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Total Volume	2	0	0	0	2	0	3	0	0	3	1	1	0	0	2	0	0	0	0	0	7
% App. Total	100	0	0	0		0	100	0	0		50	50	0	0		0	0	0	0		
PHF	.250	.000	.000	.000	.250	.000	.750	.000	.000	.750	.250	.250	.000	.000	.500	.000	.000	.000	.000	.000	.583



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File Name : 154600 EE  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

N/S: Samoset Avenue  
E/W: Phipps Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Peds and Bikes

Start Time	Samoset Avenue From North					Phipps Street From East					Samoset Avenue From South					Phipps Street From West					Int. Total					
	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB						
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	1	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Total	2	0	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Grand Total	2	0	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Apprch %	100	0	0	0	0	20	40	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total %	28.6	0	0	0	0	14.3	28.6	28.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Start Time	Samoset Avenue From North						Phipps Street From East						Samoset Avenue From South						Phipps Street From West						Int. Total					
	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	App. Total						
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																														
Peak Hour for Entire Intersection Begins at 05:00 PM																														
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	1	0	0	0	0	1	0	2	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	1	0	0	0	0	1	1	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Total Volume	2	0	0	0	0	2	1	2	2	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
% App. Total	100	0	0	0	0		20	40	40	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	
PHF	.500	.000	.000	.000	.000	.500	.250	.250	.500	.000	.000	.417	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.438	





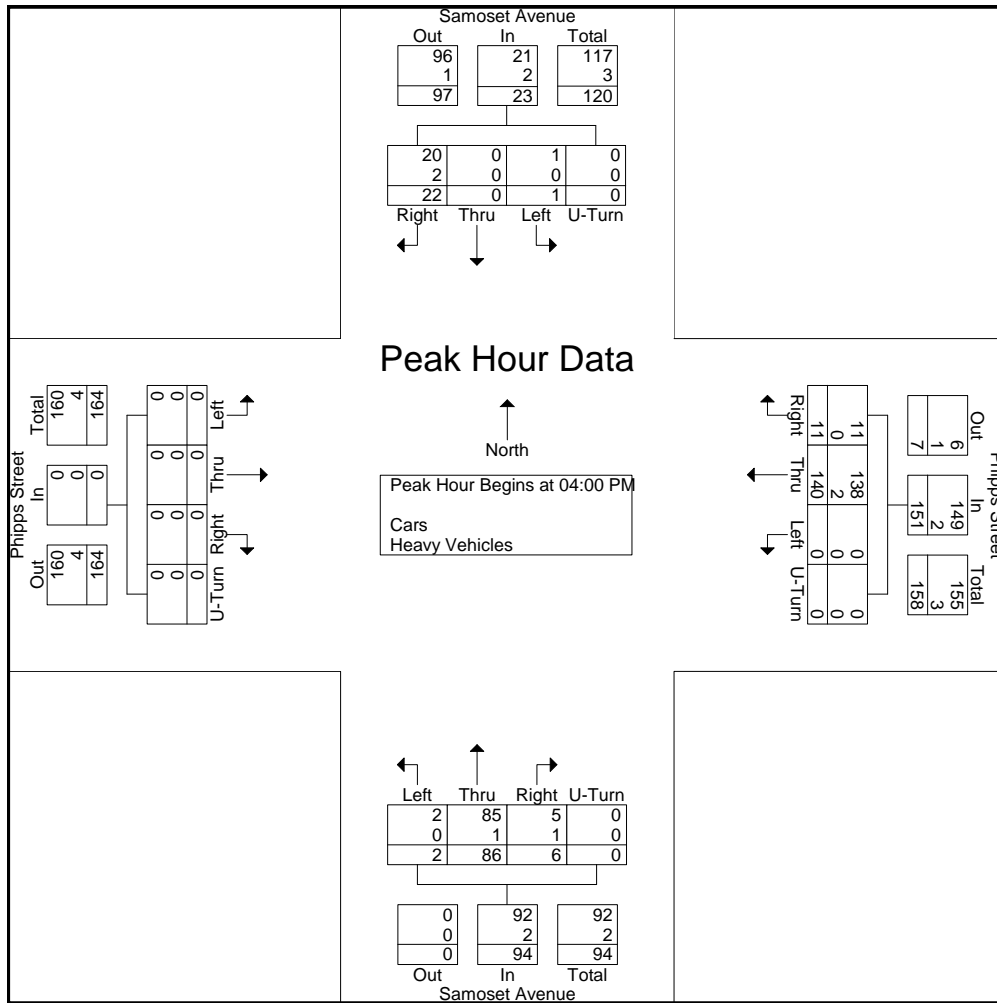
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N/S: Samoset Avenue  
E/W: Phipps Street  
City, State: Hull, MA  
Client: TEC/ R. Brown

File Name : 154600 EE  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

Start Time	Samoset Avenue From North					Phipps Street From East					Samoset Avenue From South					Phipps Street From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	4	0	0	0	4	1	54	0	0	55	2	15	0	0	17	0	0	0	0	0	76
04:15 PM	3	0	0	0	3	4	38	0	0	42	1	24	0	0	25	0	0	0	0	0	70
04:30 PM	11	0	1	0	12	4	25	0	0	29	2	21	1	0	24	0	0	0	0	0	65
04:45 PM	4	0	0	0	4	2	23	0	0	25	1	26	1	0	28	0	0	0	0	0	57
Total Volume	22	0	1	0	23	11	140	0	0	151	6	86	2	0	94	0	0	0	0	0	268
% App. Total	95.7	0	4.3	0		7.3	92.7	0	0		6.4	91.5	2.1	0		0	0	0	0		
PHF	.500	.000	.250	.000	.479	.688	.648	.000	.000	.686	.750	.827	.500	.000	.839	.000	.000	.000	.000	.000	.882
Cars	20	0	1	0	21	11	138	0	0	149	5	85	2	0	92	0	0	0	0	0	262
% Cars	90.9	0	100	0	91.3	100	98.6	0	0	98.7	83.3	98.8	100	0	97.9	0	0	0	0	0	97.8
Heavy Vehicles	2	0	0	0	2	0	2	0	0	2	1	1	0	0	2	0	0	0	0	0	6
% Heavy Vehicles	9.1	0	0	0	8.7	0	1.4	0	0	1.3	16.7	1.2	0	0	2.1	0	0	0	0	0	2.2





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File Name : 154600 F  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

N/S: Nantasket Avenue (Route 228)  
E/W: Parking Lot/ Wharf Avenue  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Cars - Heavy Vehicles

Start Time	Nantasket Avenue (Route 228) From North				Parking Lot From East				Nantasket Avenue (Route 228) From South				Wharf Avenue From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
12:00 PM	9	52	1	0	0	0	0	0	2	100	18	0	14	2	23	0	221
12:15 PM	12	65	1	0	0	0	0	0	2	91	12	0	10	2	20	1	216
12:30 PM	20	78	2	0	0	0	0	0	2	87	21	0	15	0	19	0	244
12:45 PM	3	86	3	0	0	0	0	0	6	102	12	0	16	2	15	0	245
Total	44	281	7	0	0	0	0	0	12	380	63	0	55	6	77	1	926
01:00 PM	15	80	0	0	0	0	0	0	4	92	11	0	11	3	25	0	241
01:15 PM	15	73	1	0	0	0	0	0	1	76	12	0	9	2	17	0	206
01:30 PM	18	65	4	0	0	0	0	0	3	98	23	0	15	5	15	0	246
01:45 PM	22	70	2	0	0	0	0	0	3	97	17	0	13	1	15	0	240
Total	70	288	7	0	0	0	0	0	11	363	63	0	48	11	72	0	933
Grand Total	114	569	14	0	0	0	0	0	23	743	126	0	103	17	149	1	1859
Apprch %	16.4	81.6	2	0	0	0	0	0	2.6	83.3	14.1	0	38.1	6.3	55.2	0.4	
Total %	6.1	30.6	0.8	0	0	0	0	0	1.2	40	6.8	0	5.5	0.9	8	0.1	
Cars	114	557	14	0	0	0	0	0	23	731	121	0	99	17	149	1	1826
% Cars	100	97.9	100	0	0	0	0	0	100	98.4	96	0	96.1	100	100	100	98.2
Heavy Vehicles	0	12	0	0	0	0	0	0	0	12	5	0	4	0	0	0	33
% Heavy Vehicles	0	2.1	0	0	0	0	0	0	0	1.6	4	0	3.9	0	0	0	1.8

Start Time	Nantasket Avenue (Route 228) From North					Parking Lot From East					Nantasket Avenue (Route 228) From South					Wharf Avenue From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:15 PM																					
12:15 PM	12	65	1	0	78	0	0	0	0	0	2	91	12	0	105	10	2	20	1	33	216
12:30 PM	20	78	2	0	100	0	0	0	0	0	2	87	21	0	110	15	0	19	0	34	244
12:45 PM	3	86	3	0	92	0	0	0	0	0	6	102	12	0	120	16	2	15	0	33	245
01:00 PM	15	80	0	0	95	0	0	0	0	0	4	92	11	0	107	11	3	25	0	39	241
Total Volume	50	309	6	0	365	0	0	0	0	0	14	372	56	0	442	52	7	79	1	139	946
% App. Total	13.7	84.7	1.6	0		0	0	0	0	0	3.2	84.2	12.7	0		37.4	5	56.8	0.7		
PHF	.625	.898	.500	.000	.913	.000	.000	.000	.000	.000	.583	.912	.667	.000	.921	.813	.583	.790	.250	.891	.965
Cars	50	305	6	0	361	0	0	0	0	0	14	367	54	0	435	50	7	79	1	137	933
% Cars	100	98.7	100	0	98.9	0	0	0	0	0	100	98.7	96.4	0	98.4	96.2	100	100	100	98.6	98.6
Heavy Vehicles	0	4	0	0	4	0	0	0	0	0	0	5	2	0	7	2	0	0	0	2	13
% Heavy Vehicles	0	1.3	0	0	1.1	0	0	0	0	0	0	1.3	3.6	0	1.6	3.8	0	0	0	1.4	1.4



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File Name : 154600 F  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

N/S: Nantasket Avenue (Route 228)  
E/W: Parking Lot/ Wharf Avenue  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Cars

Start Time	Nantasket Avenue (Route 228) From North				Parking Lot From East				Nantasket Avenue (Route 228) From South				Wharf Avenue From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
12:00 PM	9	51	1	0	0	0	0	0	2	98	16	0	14	2	23	0	216
12:15 PM	12	63	1	0	0	0	0	0	2	91	12	0	10	2	20	1	214
12:30 PM	20	78	2	0	0	0	0	0	2	85	21	0	14	0	19	0	241
12:45 PM	3	85	3	0	0	0	0	0	6	100	10	0	16	2	15	0	240
Total	44	277	7	0	0	0	0	0	12	374	59	0	54	6	77	1	911
01:00 PM	15	79	0	0	0	0	0	0	4	91	11	0	10	3	25	0	238
01:15 PM	15	73	1	0	0	0	0	0	1	74	12	0	9	2	17	0	204
01:30 PM	18	61	4	0	0	0	0	0	3	98	22	0	13	5	15	0	239
01:45 PM	22	67	2	0	0	0	0	0	3	94	17	0	13	1	15	0	234
Total	70	280	7	0	0	0	0	0	11	357	62	0	45	11	72	0	915
Grand Total	114	557	14	0	0	0	0	0	23	731	121	0	99	17	149	1	1826
Apprch %	16.6	81.3	2	0	0	0	0	0	2.6	83.5	13.8	0	37.2	6.4	56	0.4	
Total %	6.2	30.5	0.8	0	0	0	0	0	1.3	40	6.6	0	5.4	0.9	8.2	0.1	

Start Time	Nantasket Avenue (Route 228) From North					Parking Lot From East					Nantasket Avenue (Route 228) From South					Wharf Avenue From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:15 PM																					
12:15 PM	12	63	1	0	76	0	0	0	0	0	2	91	12	0	105	10	2	20	1	33	214
12:30 PM	20	78	2	0	100	0	0	0	0	0	2	85	21	0	108	14	0	19	0	33	241
12:45 PM	3	85	3	0	91	0	0	0	0	0	6	100	10	0	116	16	2	15	0	33	240
01:00 PM	15	79	0	0	94	0	0	0	0	0	4	91	11	0	106	10	3	25	0	38	238
Total Volume	50	305	6	0	361	0	0	0	0	0	14	367	54	0	435	50	7	79	1	137	933
% App. Total	13.9	84.5	1.7	0		0	0	0	0		3.2	84.4	12.4	0		36.5	5.1	57.7	0.7		
PHF	.625	.897	.500	.000	.903	.000	.000	.000	.000	.000	.583	.918	.643	.000	.938	.781	.583	.790	.250	.901	.968



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INDUSTRIES, LLC

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File Name : 154600 F  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

N/S: Nantasket Avenue (Route 228)  
E/W: Parking Lot/ Wharf Avenue  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Heavy Vehicles

Start Time	Nantasket Avenue (Route 228) From North				Parking Lot From East				Nantasket Avenue (Route 228) From South				Wharf Avenue From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
12:00 PM	0	1	0	0	0	0	0	0	0	2	2	0	0	0	0	0	5
12:15 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
12:30 PM	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	3
12:45 PM	0	1	0	0	0	0	0	0	0	2	2	0	0	0	0	0	5
Total	0	4	0	0	0	0	0	0	0	6	4	0	1	0	0	0	15
01:00 PM	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	3
01:15 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
01:30 PM	0	4	0	0	0	0	0	0	0	0	1	0	2	0	0	0	7
01:45 PM	0	3	0	0	0	0	0	0	0	3	0	0	0	0	0	0	6
Total	0	8	0	0	0	0	0	0	0	6	1	0	3	0	0	0	18
Grand Total	0	12	0	0	0	0	0	0	0	12	5	0	4	0	0	0	33
Apprch %	0	100	0	0	0	0	0	0	0	70.6	29.4	0	100	0	0	0	
Total %	0	36.4	0	0	0	0	0	0	0	36.4	15.2	0	12.1	0	0	0	

Start Time	Nantasket Avenue (Route 228) From North					Parking Lot From East					Nantasket Avenue (Route 228) From South					Wharf Avenue From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 01:00 PM																					
01:00 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	3
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
01:30 PM	0	4	0	0	4	0	0	0	0	0	0	0	1	0	1	2	0	0	0	2	7
01:45 PM	0	3	0	0	3	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	6
Total Volume	0	8	0	0	8	0	0	0	0	0	0	6	1	0	7	3	0	0	0	3	18
% App. Total	0	100	0	0		0	0	0	0		0	85.7	14.3	0		100	0	0	0		
PHF	.000	.500	.000	.000	.500	.000	.000	.000	.000	.000	.000	.500	.250	.000	.583	.375	.000	.000	.000	.375	.643



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File Name : 154600 F  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

N/S: Nantasket Avenue (Route 228)  
E/W: Parking Lot/ Wharf Avenue  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Peds and Bikes

Start Time	Nantasket Avenue (Route 228) From North					Parking Lot From East					Nantasket Avenue (Route 228) From South					Wharf Avenue From West					Int. Total
	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	
12:00 PM	0	1	0	0	0	0	0	0	5	0	0	3	0	5	1	0	0	0	11	2	28
12:15 PM	0	0	0	3	0	0	0	0	9	5	0	4	0	4	0	0	0	0	6	9	40
12:30 PM	0	0	0	3	0	0	0	0	9	2	0	6	0	3	0	0	0	0	4	7	34
12:45 PM	0	1	0	6	6	0	0	0	6	6	0	0	0	10	5	0	0	0	10	15	65
Total	0	2	0	12	6	0	0	0	29	13	0	13	0	22	6	0	0	0	31	33	167
01:00 PM	0	3	0	4	1	0	0	0	10	4	0	1	0	2	0	0	0	0	8	4	37
01:15 PM	0	0	0	8	1	0	0	0	6	10	0	0	0	10	2	0	0	0	12	9	58
01:30 PM	1	3	0	0	2	0	0	0	0	0	0	1	0	2	7	0	0	0	10	10	36
01:45 PM	0	1	0	5	2	0	0	0	8	12	1	0	0	4	14	0	0	0	8	12	67
Total	1	7	0	17	6	0	0	0	24	26	1	2	0	18	23	0	0	0	38	35	198
Grand Total	1	9	0	29	12	0	0	0	53	39	1	15	0	40	29	0	0	0	69	68	365
Apprch %	2	17.6	0	56.9	23.5	0	0	0	57.6	42.4	1.2	17.6	0	47.1	34.1	0	0	0	50.4	49.6	
Total %	0.3	2.5	0	7.9	3.3	0	0	0	14.5	10.7	0.3	4.1	0	11	7.9	0	0	0	18.9	18.6	

Start Time	Nantasket Avenue (Route 228) From North						Parking Lot From East						Nantasket Avenue (Route 228) From South						Wharf Avenue From West						Int. Total
	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																									
Peak Hour for Entire Intersection Begins at 01:00 PM																									
01:00 PM	0	3	0	4	1	8	0	0	0	10	4	14	0	1	0	2	0	3	0	0	0	8	4	12	37
01:15 PM	0	0	0	8	1	9	0	0	0	6	10	16	0	0	0	10	2	12	0	0	0	12	9	21	58
01:30 PM	1	3	0	0	2	6	0	0	0	0	0	0	0	1	0	2	7	10	0	0	0	10	10	20	36
01:45 PM	0	1	0	5	2	8	0	0	0	8	12	20	1	0	0	4	14	19	0	0	0	8	12	20	67
Total Volume	1	7	0	17	6	31	0	0	0	24	26	50	1	2	0	18	23	44	0	0	0	38	35	73	198
% App. Total	3.2	22.6	0	54.8	19.4		0	0	0	48	52		2.3	4.5	0	40.9	52.3		0	0	0	52.1	47.9		
PHF	.250	.583	.000	.531	.750	.861	.000	.000	.000	.600	.542	.625	.250	.500	.000	.450	.411	.579	.000	.000	.000	.792	.729	.869	.739





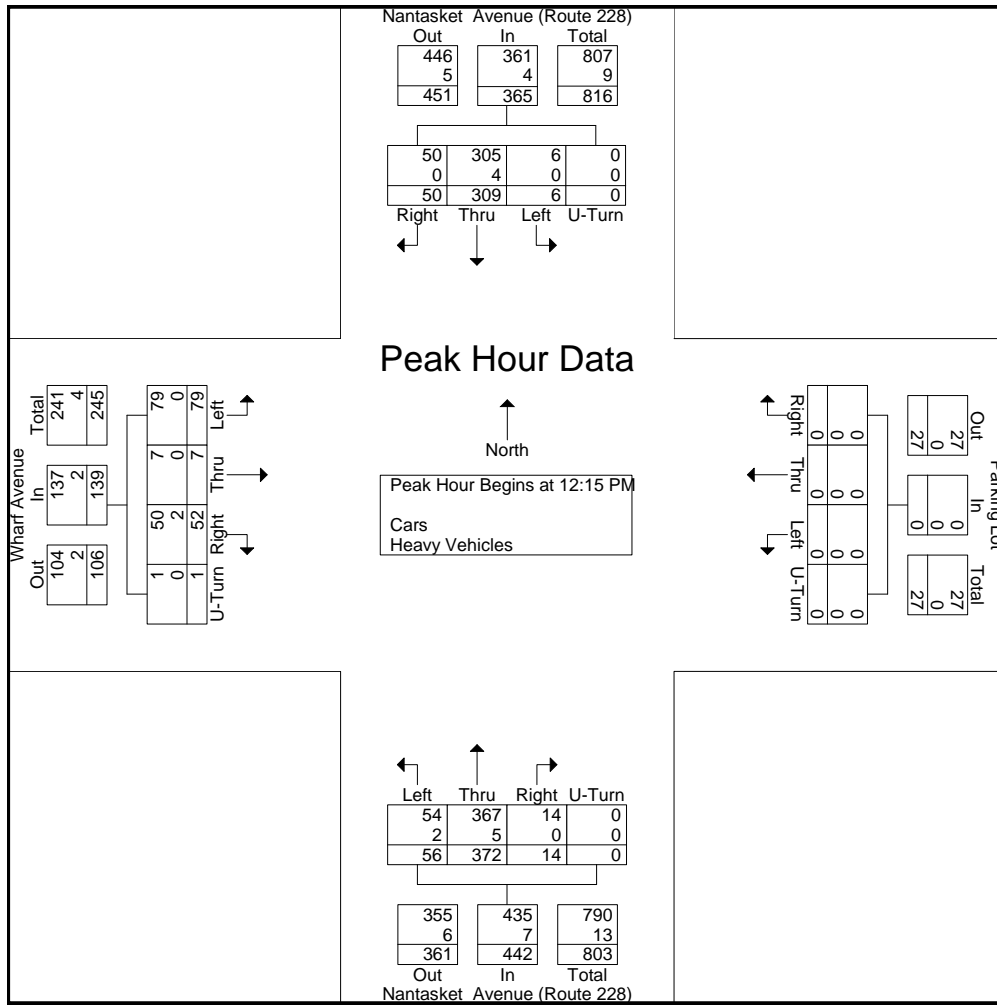
PRECISION  
D A T A  
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503  
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N/S: Nantasket Avenue (Route 228)  
E/W: Parking Lot/ Wharf Avenue  
City, State: Hull, MA  
Client: TEC/ R. Brown

File Name : 154600 F  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

Start Time	Nantasket Avenue (Route 228) From North					Parking Lot From East					Nantasket Avenue (Route 228) From South					Wharf Avenue From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:15 PM																					
12:15 PM	12	65	1	0	78	0	0	0	0	0	2	91	12	0	105	10	2	20	1	33	216
12:30 PM	20	78	2	0	100	0	0	0	0	0	2	87	21	0	110	15	0	19	0	34	244
12:45 PM	3	86	3	0	92	0	0	0	0	0	6	102	12	0	120	16	2	15	0	33	245
01:00 PM	15	80	0	0	95	0	0	0	0	0	4	92	11	0	107	11	3	25	0	39	241
Total Volume	50	309	6	0	365	0	0	0	0	0	14	372	56	0	442	52	7	79	1	139	946
% App. Total	13.7	84.7	1.6	0		0	0	0	0		3.2	84.2	12.7	0		37.4	5	56.8	0.7		
PHF	.625	.898	.500	.000	.913	.000	.000	.000	.000	.000	.583	.912	.667	.000	.921	.813	.583	.790	.250	.891	.965
Cars	50	305	6	0	361	0	0	0	0	0	14	367	54	0	435	50	7	79	1	137	933
% Cars	100	98.7	100	0	98.9	0	0	0	0	0	100	98.7	96.4	0	98.4	96.2	100	100	100	98.6	98.6
Heavy Vehicles	0	4	0	0	4	0	0	0	0	0	0	5	2	0	7	2	0	0	0	2	13
% Heavy Vehicles	0	1.3	0	0	1.1	0	0	0	0	0	0	1.3	3.6	0	1.6	3.8	0	0	0	1.4	1.4





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File Name : 154600 FF  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

N/S: Nantasket Avenue (Route 228)  
E/W: Parking Lot/ Wharf Avenue  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Cars - Heavy Vehicles

Start Time	Nantasket Avenue (Route 228) From North				Parking Lot From East				Nantasket Avenue (Route 228) From South				Wharf Avenue From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
04:00 PM	19	92	1	0	0	1	0	0	5	81	40	0	9	8	9	0	265
04:15 PM	19	79	4	0	0	0	0	0	6	91	23	0	10	3	4	0	239
04:30 PM	20	70	4	0	0	1	1	0	1	79	20	0	7	4	5	0	212
04:45 PM	11	75	0	0	0	0	1	0	6	68	17	0	4	4	5	0	191
Total	69	316	9	0	0	2	2	0	18	319	100	0	30	19	23	0	907
05:00 PM	12	63	0	0	0	0	0	0	2	77	16	0	6	7	5	0	188
05:15 PM	5	76	1	0	0	0	0	0	1	81	17	0	7	2	4	0	194
05:30 PM	9	70	2	0	0	0	0	0	5	59	17	0	2	1	1	0	166
05:45 PM	9	48	2	0	0	1	0	0	5	93	12	0	7	2	9	0	188
Total	35	257	5	0	0	1	0	0	13	310	62	0	22	12	19	0	736
Grand Total	104	573	14	0	0	3	2	0	31	629	162	0	52	31	42	0	1643
Apprch %	15.1	82.9	2	0	0	60	40	0	3.8	76.5	19.7	0	41.6	24.8	33.6	0	
Total %	6.3	34.9	0.9	0	0	0.2	0.1	0	1.9	38.3	9.9	0	3.2	1.9	2.6	0	
Cars	104	558	14	0	0	3	2	0	31	614	160	0	52	31	42	0	1611
% Cars	100	97.4	100	0	0	100	100	0	100	97.6	98.8	0	100	100	100	0	98.1
Heavy Vehicles	0	15	0	0	0	0	0	0	0	15	2	0	0	0	0	0	32
% Heavy Vehicles	0	2.6	0	0	0	0	0	0	0	2.4	1.2	0	0	0	0	0	1.9

Start Time	Nantasket Avenue (Route 228) From North					Parking Lot From East					Nantasket Avenue (Route 228) From South					Wharf Avenue From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	19	92	1	0	112	0	1	0	0	1	5	81	40	0	126	9	8	9	0	26	265
04:15 PM	19	79	4	0	102	0	0	0	0	0	6	91	23	0	120	10	3	4	0	17	239
04:30 PM	20	70	4	0	94	0	1	1	0	2	1	79	20	0	100	7	4	5	0	16	212
04:45 PM	11	75	0	0	86	0	0	1	0	1	6	68	17	0	91	4	4	5	0	13	191
Total Volume	69	316	9	0	394	0	2	2	0	4	18	319	100	0	437	30	19	23	0	72	907
% App. Total	17.5	80.2	2.3	0		0	50	50	0		4.1	73	22.9	0		41.7	26.4	31.9	0		
PHF	.863	.859	.563	.000	.879	.000	.500	.500	.000	.500	.750	.876	.625	.000	.867	.750	.594	.639	.000	.692	.856
Cars	69	306	9	0	384	0	2	2	0	4	18	310	98	0	426	30	19	23	0	72	886
% Cars	100	96.8	100	0	97.5	0	100	100	0	100	100	97.2	98.0	0	97.5	100	100	100	0	100	97.7
Heavy Vehicles	0	10	0	0	10	0	0	0	0	0	0	9	2	0	11	0	0	0	0	0	21
% Heavy Vehicles	0	3.2	0	0	2.5	0	0	0	0	0	0	2.8	2.0	0	2.5	0	0	0	0	0	2.3



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N/S: Nantasket Avenue (Route 228)  
E/W: Parking Lot/ Wharf Avenue  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Cars

Start Time	Nantasket Avenue (Route 228) From North				Parking Lot From East				Nantasket Avenue (Route 228) From South				Wharf Avenue From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
04:00 PM	19	90	1	0	0	1	0	0	5	80	40	0	9	8	9	0	262
04:15 PM	19	77	4	0	0	0	0	0	6	89	22	0	10	3	4	0	234
04:30 PM	20	67	4	0	0	1	1	0	1	77	20	0	7	4	5	0	207
04:45 PM	11	72	0	0	0	0	1	0	6	64	16	0	4	4	5	0	183
Total	69	306	9	0	0	2	2	0	18	310	98	0	30	19	23	0	886
05:00 PM	12	61	0	0	0	0	0	0	2	77	16	0	6	7	5	0	186
05:15 PM	5	75	1	0	0	0	0	0	1	80	17	0	7	2	4	0	192
05:30 PM	9	68	2	0	0	0	0	0	5	57	17	0	2	1	1	0	162
05:45 PM	9	48	2	0	0	1	0	0	5	90	12	0	7	2	9	0	185
Total	35	252	5	0	0	1	0	0	13	304	62	0	22	12	19	0	725
Grand Total	104	558	14	0	0	3	2	0	31	614	160	0	52	31	42	0	1611
Apprch %	15.4	82.5	2.1	0	0	60	40	0	3.9	76.3	19.9	0	41.6	24.8	33.6	0	
Total %	6.5	34.6	0.9	0	0	0.2	0.1	0	1.9	38.1	9.9	0	3.2	1.9	2.6	0	

Start Time	Nantasket Avenue (Route 228) From North					Parking Lot From East					Nantasket Avenue (Route 228) From South					Wharf Avenue From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
04:00 PM	19	90	1	0	110	0	1	0	0	1	5	80	40	0	125	9	8	9	0	26	262
04:15 PM	19	77	4	0	100	0	0	0	0	0	6	89	22	0	117	10	3	4	0	17	234
04:30 PM	20	67	4	0	91	0	1	1	0	2	1	77	20	0	98	7	4	5	0	16	207
04:45 PM	11	72	0	0	83	0	0	1	0	1	6	64	16	0	86	4	4	5	0	13	183
Total Volume	69	306	9	0	384	0	2	2	0	4	18	310	98	0	426	30	19	23	0	72	886
% App. Total	18	79.7	2.3	0		0	50	50	0		4.2	72.8	23	0		41.7	26.4	31.9	0		
PHF	.863	.850	.563	.000	.873	.000	.500	.500	.000	.500	.750	.871	.613	.000	.852	.750	.594	.639	.000	.692	.845

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:00 PM





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File Name : 154600 FF  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

N/S: Nantasket Avenue (Route 228)  
E/W: Parking Lot/ Wharf Avenue  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Peds and Bikes

Start Time	Nantasket Avenue (Route 228) From North					Parking Lot From East					Nantasket Avenue (Route 228) From South					Wharf Avenue From West					Int. Total
	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	
04:00 PM	0	0	0	0	0	0	0	0	9	2	0	0	0	5	0	0	0	0	2	5	23
04:15 PM	0	0	0	0	0	0	0	0	1	3	0	0	0	4	0	0	0	0	8	2	18
04:30 PM	0	0	0	0	0	0	0	0	5	1	0	0	0	6	0	0	0	0	0	2	14
04:45 PM	0	0	0	0	0	0	0	0	2	9	0	1	0	0	3	0	0	0	5	0	20
Total	0	0	0	0	0	0	0	0	17	15	0	1	0	15	3	0	0	0	15	9	75
05:00 PM	0	0	0	0	0	0	0	0	11	2	0	0	0	10	3	0	0	0	0	3	29
05:15 PM	0	2	0	0	1	0	0	0	5	0	0	0	0	5	0	0	0	0	1	0	14
05:30 PM	0	0	0	0	0	0	0	0	7	3	0	0	0	5	3	0	0	0	2	0	20
05:45 PM	0	0	0	0	0	0	0	0	6	3	0	0	0	4	0	0	0	0	0	1	14
Total	0	2	0	0	1	0	0	0	29	8	0	0	0	24	6	0	0	0	3	4	77
Grand Total	0	2	0	0	1	0	0	0	46	23	0	1	0	39	9	0	0	0	18	13	152
Apprch %	0	66.7	0	0	33.3	0	0	0	66.7	33.3	0	2	0	79.6	18.4	0	0	0	58.1	41.9	
Total %	0	1.3	0	0	0.7	0	0	0	30.3	15.1	0	0.7	0	25.7	5.9	0	0	0	11.8	8.6	

Start Time	Nantasket Avenue (Route 228) From North						Parking Lot From East						Nantasket Avenue (Route 228) From South						Wharf Avenue From West						Int. Total
	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																									
Peak Hour for Entire Intersection Begins at 04:45 PM																									
04:45 PM	0	0	0	0	0	0	0	0	0	2	9	11	0	1	0	0	3	4	0	0	0	5	0	5	20
05:00 PM	0	0	0	0	0	0	0	0	0	11	2	13	0	0	0	10	3	13	0	0	0	0	3	3	29
05:15 PM	0	2	0	0	1	3	0	0	0	5	0	5	0	0	0	5	0	5	0	0	0	1	0	1	14
05:30 PM	0	0	0	0	0	0	0	0	0	7	3	10	0	0	0	5	3	8	0	0	0	2	0	2	20
Total Volume	0	2	0	0	1	3	0	0	0	25	14	39	0	1	0	20	9	30	0	0	0	8	3	11	83
% App. Total	0	66.7	0	0	33.3		0	0	0	64.1	35.9		0	3.3	0	66.7	30		0	0	0	72.7	27.3		
PHF	.000	.250	.000	.000	.250	.250	.000	.000	.000	.568	.389	.750	.000	.250	.000	.500	.750	.577	.000	.000	.000	.400	.250	.550	.716





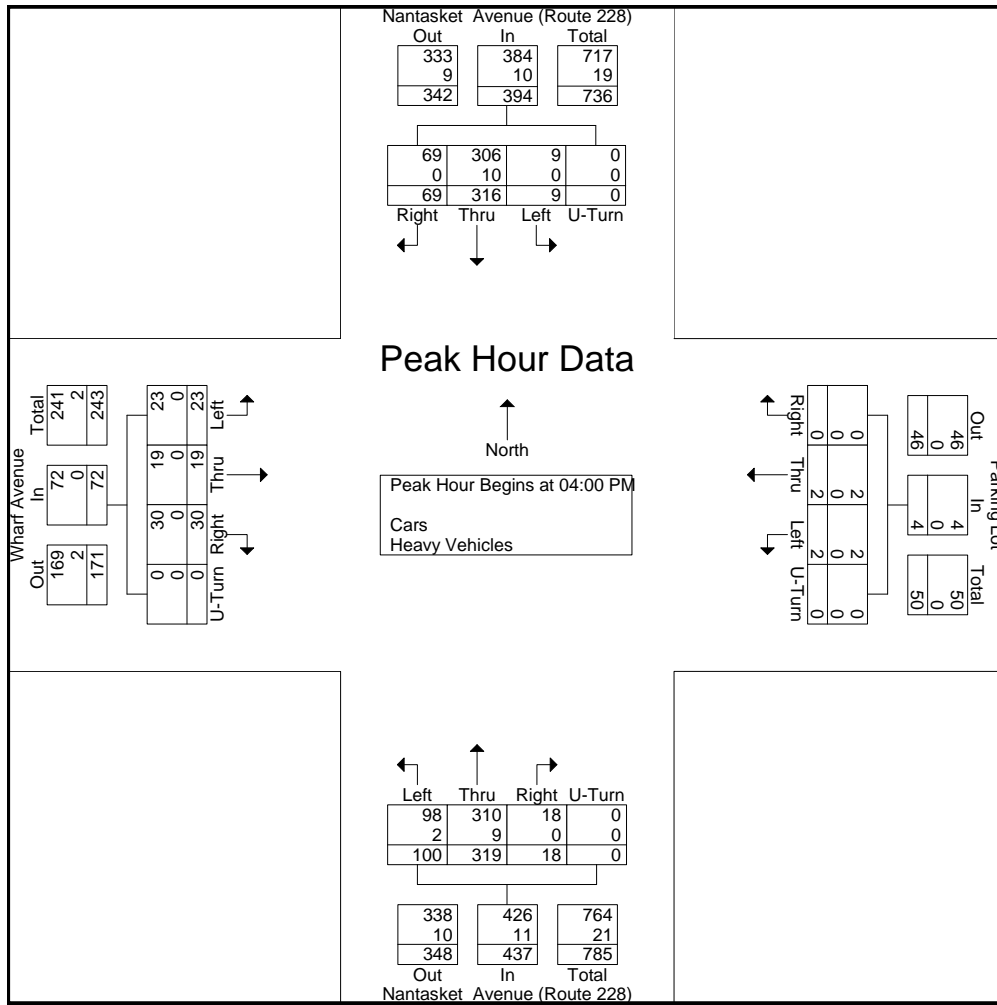
PRECISION  
D A T A  
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503  
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Email: datarequests@pdillc.com

N/S: Nantasket Avenue (Route 228)  
E/W: Parking Lot/ Wharf Avenue  
City, State: Hull, MA  
Client: TEC/ R. Brown

File Name : 154600 FF  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

Start Time	Nantasket Avenue (Route 228) From North					Parking Lot From East					Nantasket Avenue (Route 228) From South					Wharf Avenue From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	19	92	1	0	112	0	1	0	0	1	5	81	40	0	126	9	8	9	0	26	265
04:15 PM	19	79	4	0	102	0	0	0	0	0	6	91	23	0	120	10	3	4	0	17	239
04:30 PM	20	70	4	0	94	0	1	1	0	2	1	79	20	0	100	7	4	5	0	16	212
04:45 PM	11	75	0	0	86	0	0	1	0	1	6	68	17	0	91	4	4	5	0	13	191
Total Volume	69	316	9	0	394	0	2	2	0	4	18	319	100	0	437	30	19	23	0	72	907
% App. Total	17.5	80.2	2.3	0		0	50	50	0		4.1	73	22.9	0		41.7	26.4	31.9	0		
PHF	.863	.859	.563	.000	.879	.000	.500	.500	.000	.500	.750	.876	.625	.000	.867	.750	.594	.639	.000	.692	.856
Cars	69	306	9	0	384	0	2	2	0	4	18	310	98	0	426	30	19	23	0	72	886
% Cars	100	96.8	100	0	97.5	0	100	100	0	100	100	97.2	98.0	0	97.5	100	100	100	0	100	97.7
Heavy Vehicles	0	10	0	0	10	0	0	0	0	0	0	9	2	0	11	0	0	0	0	0	21
% Heavy Vehicles	0	3.2	0	0	2.5	0	0	0	0	0	0	2.8	2.0	0	2.5	0	0	0	0	0	2.3





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File Name : 154600 G  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

N/S: Nantasket Avenue (Route 228)  
W/SW: Bay Street/ George Washington Blvd  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Cars - Heavy Vehicles

Start Time	Nantasket Avenue (Route 228) From North				Nantasket Avenue (Route 228) From South				George Washington Boulevard From Southwest				Bay Street From West				Int. Total
	Right	Bear Right	Thru	U-Turn	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Left	U-Turn	
12:00 PM	6	143	61	0	0	0	0	0	5	0	21	1	16	0	0	0	253
12:15 PM	5	131	73	0	0	0	0	0	6	0	17	0	18	1	0	0	251
12:30 PM	2	134	89	0	0	0	0	0	12	0	24	1	13	1	0	0	276
12:45 PM	10	124	90	0	0	0	0	0	4	0	17	0	19	1	0	0	265
Total	23	532	313	0	0	0	0	0	27	0	79	2	66	3	0	0	1045
01:00 PM	9	130	87	0	0	0	0	0	5	0	20	0	12	2	0	0	265
01:15 PM	5	123	87	0	0	0	0	0	5	0	30	0	18	0	0	0	268
01:30 PM	2	123	82	0	0	0	0	0	6	0	19	0	13	1	0	0	246
01:45 PM	10	115	83	0	0	0	0	0	11	0	20	1	12	2	0	0	254
Total	26	491	339	0	0	0	0	0	27	0	89	1	55	5	0	0	1033
Grand Total	49	1023	652	0	0	0	0	0	54	0	168	3	121	8	0	0	2078
Apprch %	2.8	59.3	37.8	0	0	0	0	0	24	0	74.7	1.3	93.8	6.2	0	0	
Total %	2.4	49.2	31.4	0	0	0	0	0	2.6	0	8.1	0.1	5.8	0.4	0	0	
Cars	49	1013	643	0	0	0	0	0	54	0	166	3	120	8	0	0	2056
% Cars	100	99	98.6	0	0	0	0	0	100	0	98.8	100	99.2	100	0	0	98.9
Heavy Vehicles	0	10	9	0	0	0	0	0	0	0	2	0	1	0	0	0	22
% Heavy Vehicles	0	1	1.4	0	0	0	0	0	0	0	1.2	0	0.8	0	0	0	1.1

Start Time	Nantasket Avenue (Route 228) From North					Nantasket Avenue (Route 228) From South					George Washington Boulevard From Southwest					Bay Street From West					Int. Total
	Right	Bear Right	Thru	U-Turn	App. Total	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:30 PM																					
12:30 PM	2	134	89	0	225	0	0	0	0	0	12	0	24	1	37	13	1	0	0	14	276
12:45 PM	10	124	90	0	224	0	0	0	0	0	4	0	17	0	21	19	1	0	0	20	265
01:00 PM	9	130	87	0	226	0	0	0	0	0	5	0	20	0	25	12	2	0	0	14	265
01:15 PM	5	123	87	0	215	0	0	0	0	0	5	0	30	0	35	18	0	0	0	18	268
Total Volume	26	511	353	0	890	0	0	0	0	0	26	0	91	1	118	62	4	0	0	66	1074
% App. Total	2.9	57.4	39.7	0	99.3	0	0	0	0	0	22	0	77.1	0.8	93.9	6.1	0	0	0		
PHF	.650	.953	.981	.000	.985	.000	.000	.000	.000	.000	.542	.000	.758	.250	.797	.816	.500	.000	.000	.825	.973
Cars	26	508	350	0	884	0	0	0	0	0	26	0	89	1	116	61	4	0	0	65	1065
% Cars	100	99.4	99.2	0	99.3	0	0	0	0	0	100	0	97.8	100	98.3	98.4	100	0	0	98.5	99.2
Heavy Vehicles	0	3	3	0	6	0	0	0	0	0	0	0	2	0	2	1	0	0	0	1	9
% Heavy Vehicles	0	0.6	0.8	0	0.7	0	0	0	0	0	0	0	2.2	0	1.7	1.6	0	0	0	1.5	0.8



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File Name : 154600 G  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

N/S: Nantasket Avenue (Route 228)  
W/SW: Bay Street/ George Washington Blvd  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Cars

Start Time	Nantasket Avenue (Route 228) From North				Nantasket Avenue (Route 228) From South				George Washington Boulevard From Southwest				Bay Street From West				Int. Total
	Right	Bear Right	Thru	U-Turn	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Left	U-Turn	
12:00 PM	6	141	61	0	0	0	0	0	5	0	21	1	16	0	0	0	251
12:15 PM	5	129	71	0	0	0	0	0	6	0	17	0	18	1	0	0	247
12:30 PM	2	133	88	0	0	0	0	0	12	0	23	1	13	1	0	0	273
12:45 PM	10	124	89	0	0	0	0	0	4	0	16	0	19	1	0	0	263
Total	23	527	309	0	0	0	0	0	27	0	77	2	66	3	0	0	1034
01:00 PM	9	128	86	0	0	0	0	0	5	0	20	0	11	2	0	0	261
01:15 PM	5	123	87	0	0	0	0	0	5	0	30	0	18	0	0	0	268
01:30 PM	2	120	80	0	0	0	0	0	6	0	19	0	13	1	0	0	241
01:45 PM	10	115	81	0	0	0	0	0	11	0	20	1	12	2	0	0	252
Total	26	486	334	0	0	0	0	0	27	0	89	1	54	5	0	0	1022
Grand Total	49	1013	643	0	0	0	0	0	54	0	166	3	120	8	0	0	2056
Apprch %	2.9	59.4	37.7	0	0	0	0	0	24.2	0	74.4	1.3	93.8	6.2	0	0	
Total %	2.4	49.3	31.3	0	0	0	0	0	2.6	0	8.1	0.1	5.8	0.4	0	0	

Start Time	Nantasket Avenue (Route 228) From North					Nantasket Avenue (Route 228) From South					George Washington Boulevard From Southwest					Bay Street From West					Int. Total
	Right	Bear Right	Thru	U-Turn	App. Total	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:30 PM																					
12:30 PM	2	133	88	0	223	0	0	0	0	0	12	0	23	1	36	13	1	0	0	14	273
12:45 PM	10	124	89	0	223	0	0	0	0	0	4	0	16	0	20	19	1	0	0	20	263
01:00 PM	9	128	86	0	223	0	0	0	0	0	5	0	20	0	25	11	2	0	0	13	261
01:15 PM	5	123	87	0	215	0	0	0	0	0	5	0	30	0	35	18	0	0	0	18	268
Total Volume	26	508	350	0	884	0	0	0	0	0	26	0	89	1	116	61	4	0	0	65	1065
% App. Total	2.9	57.5	39.6	0		0	0	0	0		22.4	0	76.7	0.9		93.8	6.2	0	0		
PHF	.650	.955	.983	.000	.991	.000	.000	.000	.000	.000	.542	.000	.742	.250	.806	.803	.500	.000	.000	.813	.975



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File Name : 154600 G  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

N/S: Nantasket Avenue (Route 228)  
W/SW: Bay Street/ George Washington Blvd  
City, State: Hull, MA  
Client: TEC/ R. Brown

**Groups Printed- Heavy Vehicles**

Start Time	Nantasket Avenue (Route 228) From North				Nantasket Avenue (Route 228) From South				George Washington Boulevard From Southwest				Bay Street From West				Int. Total
	Right	Bear Right	Thru	U-Turn	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Left	U-Turn	
12:00 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
12:15 PM	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	4
12:30 PM	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	3
12:45 PM	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	2
Total	0	5	4	0	0	0	0	0	0	0	2	0	0	0	0	0	11
01:00 PM	0	2	1	0	0	0	0	0	0	0	0	0	1	0	0	0	4
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	5
01:45 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	0	5	5	0	0	0	0	0	0	0	0	0	1	0	0	0	11
Grand Total	0	10	9	0	0	0	0	0	0	0	2	0	1	0	0	0	22
Apprch %	0	52.6	47.4	0	0	0	0	0	0	0	100	0	100	0	0	0	
Total %	0	45.5	40.9	0	0	0	0	0	0	0	9.1	0	4.5	0	0	0	

Start Time	Nantasket Avenue (Route 228) From North					Nantasket Avenue (Route 228) From South					George Washington Boulevard From Southwest					Bay Street From West					Int. Total
	Right	Bear Right	Thru	U-Turn	App. Total	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:15 PM																					
12:15 PM	0	2	2	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
12:30 PM	0	1	1	0	2	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	3
12:45 PM	0	0	1	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2
01:00 PM	0	2	1	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	4
Total Volume	0	5	5	0	10	0	0	0	0	0	0	2	0	2	1	0	0	0	0	1	13
% App. Total	0	50	50	0		0	0	0	0		0	0	100	0	100	0	0	0	0		
PHF	.000	.625	.625	.000	.625	.000	.000	.000	.000	.000	.000	.500	.000	.500	.250	.000	.000	.000	.000	.250	.813



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Start Date : 8/15/2015  
Page No : 1

N/S: Nantasket Avenue (Route 228)  
W/SW: Bay Street/ George Washington Blvd  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Peds and Bikes

Start Time	Nantasket Avenue (Route 228) From North					Nantasket Avenue (Route 228) From South					George Washington Boulevard From Southwest					Bay Street From West					Int. Total
	Right	Bear Right	Thru	Peds EB	Peds WB	Thru	Left	Hard Left	Peds WB	Peds EB	Hard Right	Bear Left	Hard Left	Peds NWB	Peds SEB	Hard Right	Right	Left	Peds NB	Peds SB	
12:00 PM	0	1	1	11	0	0	0	0	4	8	0	0	0	0	0	0	0	0	1	0	26
12:15 PM	0	1	1	6	6	0	0	0	4	6	0	0	0	0	0	0	0	0	0	0	24
12:30 PM	0	6	0	8	7	0	0	0	7	3	0	0	0	0	0	0	0	0	0	2	33
12:45 PM	0	0	0	11	2	0	0	0	4	3	0	0	0	0	0	0	0	0	2	0	22
Total	0	8	2	36	15	0	0	0	19	20	0	0	0	0	0	0	0	0	3	2	105
01:00 PM	0	1	1	6	2	0	0	0	3	5	0	0	0	0	0	0	0	0	1	0	19
01:15 PM	1	0	2	6	3	0	0	0	4	3	0	0	0	0	2	0	0	0	0	0	21
01:30 PM	0	0	0	2	2	0	0	0	4	3	0	0	0	0	2	0	0	0	0	0	13
01:45 PM	0	0	0	14	3	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	22
Total	1	1	3	28	10	0	0	0	13	14	0	0	0	0	4	0	0	0	1	0	75
Grand Total	1	9	5	64	25	0	0	0	32	34	0	0	0	0	4	0	0	0	4	2	180
Apprch %	1	8.7	4.8	61.5	24	0	0	0	48.5	51.5	0	0	0	0	100	0	0	0	66.7	33.3	
Total %	0.6	5	2.8	35.6	13.9	0	0	0	17.8	18.9	0	0	0	0	2.2	0	0	0	2.2	1.1	

Start Time	Nantasket Avenue (Route 228) From North						Nantasket Avenue (Route 228) From South						George Washington Boulevard From Southwest						Bay Street From West						Int. Total
	Right	Bear Right	Thru	Peds EB	Peds WB	App. Total	Thru	Left	Hard Left	Peds WB	Peds EB	App. Total	Hard Right	Bear Left	Hard Left	Peds NWB	Peds SEB	App. Total	Hard Right	Right	Left	Peds NB	Peds SB	App. Total	
12:00 PM	0	1	1	11	0	13	0	0	0	4	8	12	0	0	0	0	0	0	0	0	0	1	0	1	26
12:15 PM	0	1	1	6	6	14	0	0	0	4	6	10	0	0	0	0	0	0	0	0	0	0	0	0	24
12:30 PM	0	6	0	8	7	21	0	0	0	7	3	10	0	0	0	0	0	0	0	0	0	0	2	2	33
12:45 PM	0	0	0	11	2	13	0	0	0	4	3	7	0	0	0	0	0	0	0	0	0	2	0	2	22
Total Volume	0	8	2	36	15	61	0	0	0	19	20	39	0	0	0	0	0	0	0	0	0	3	2	5	105
% App. Total	0	13.1	3.3	59	24.6		0	0	0	48.7	51.3		0	0	0	0	0		0	0	0	60	40		
PHF	.000	.333	.500	.818	.536	.726	.000	.000	.000	.679	.625	.813	.000	.000	.000	.000	.000	.000	.000	.000	.000	.375	.250	.625	.795

Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 12:00 PM





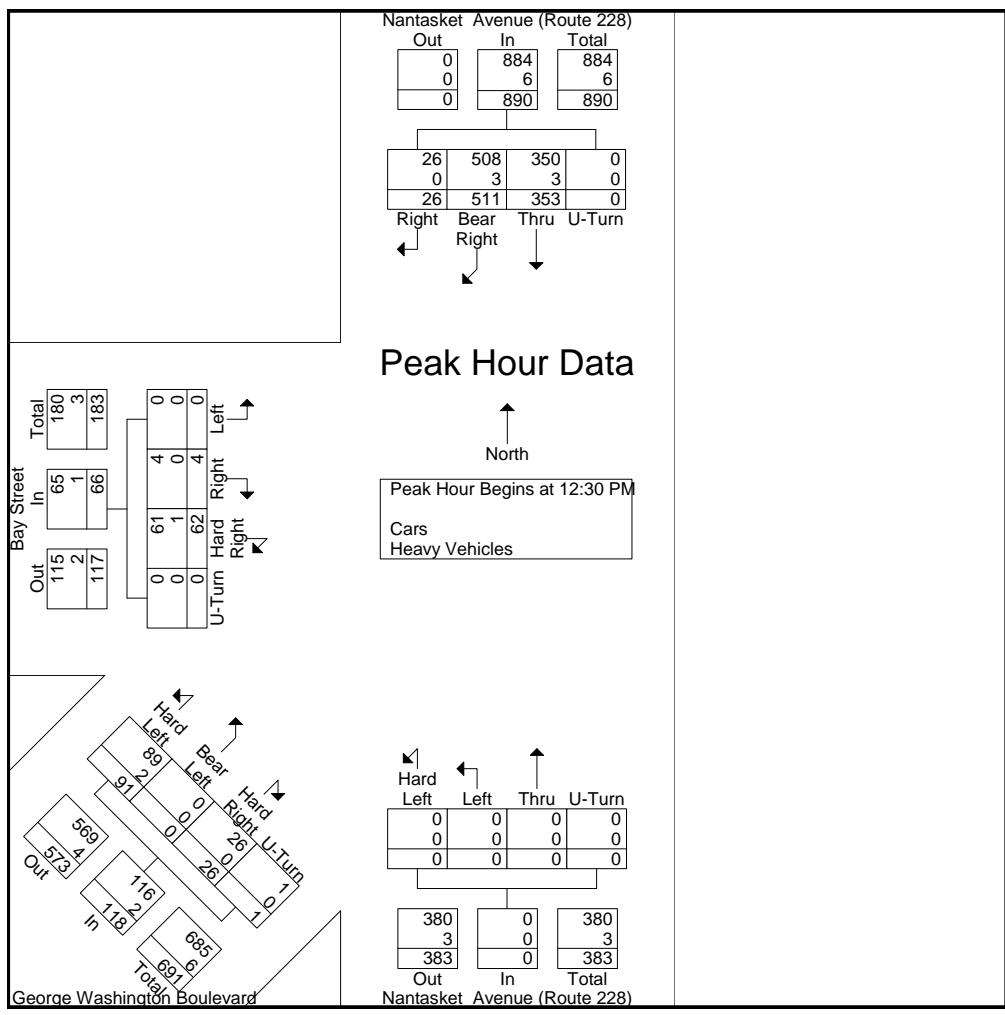
PRECISION  
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INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503  
Office: 508.481.3999 Fax: 508.545.1234  
Email: datarequests@pdillc.com

File Name : 154600 G  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

N/S: Nantasket Avenue (Route 228)  
W/SW: Bay Street/ George Washington Blvd  
City, State: Hull, MA  
Client: TEC/ R. Brown

Start Time	Nantasket Avenue (Route 228) From North					Nantasket Avenue (Route 228) From South					George Washington Boulevard From Southwest					Bay Street From West					Int. Total
	Right	Bear Right	Thru	U-Turn	App. Total	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:30 PM																					
12:30 PM	2	134	89	0	225	0	0	0	0	0	12	0	24	1	37	13	1	0	0	14	276
12:45 PM	10	124	90	0	224	0	0	0	0	0	4	0	17	0	21	19	1	0	0	20	265
01:00 PM	9	130	87	0	226	0	0	0	0	0	5	0	20	0	25	12	2	0	0	14	265
01:15 PM	5	123	87	0	215	0	0	0	0	0	5	0	30	0	35	18	0	0	0	18	268
Total Volume	26	511	353	0	890	0	0	0	0	0	26	0	91	1	118	62	4	0	0	66	1074
% App. Total	2.9	57.4	39.7	0		0	0	0	0		22	0	77.1	0.8		93.9	6.1	0	0		
PHF	.650	.953	.981	.000	.985	.000	.000	.000	.000	.000	.542	.000	.758	.250	.797	.816	.500	.000	.000	.825	.973
Cars	26	508	350	0	884	0	0	0	0	0	26	0	89	1	116	61	4	0	0	65	1065
% Cars	100	99.4	99.2	0	99.3	0	0	0	0	0	100	0	97.8	100	98.3	98.4	100	0	0	98.5	99.2
Heavy Vehicles	0	3	3	0	6	0	0	0	0	0	0	0	2	0	2	1	0	0	0	1	9
% Heavy Vehicles	0	0.6	0.8	0	0.7	0	0	0	0	0	0	0	2.2	0	1.7	1.6	0	0	0	1.5	0.8





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N/S: Nantasket Avenue (Route 228)  
W/SW: Bay Street/ George Washington Blvd  
City, State: Hull, MA  
Client: TEC/ R. Brown

File Name : 154600 GG  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

Groups Printed- Cars - Heavy Vehicles

Start Time	Nantasket Avenue (Route 228) From North				Nantasket Avenue (Route 228) From South				George Washington Boulevard From Southwest				Bay Street From West				Int. Total
	Right	Bear Right	Thru	U-Turn	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Left	U-Turn	
04:00 PM	5	152	103	0	0	0	0	0	3	0	21	0	8	1	0	0	293
04:15 PM	6	132	95	0	0	0	0	0	3	0	20	0	16	3	0	0	275
04:30 PM	4	137	86	0	0	0	0	0	2	0	18	0	12	1	0	0	260
04:45 PM	7	127	80	0	0	0	0	0	0	0	10	0	9	3	0	0	236
Total	22	548	364	0	0	0	0	0	8	0	69	0	45	8	0	0	1064
05:00 PM	4	118	71	0	0	0	0	0	2	0	22	0	12	1	0	0	230
05:15 PM	3	105	76	0	0	0	0	0	1	0	18	0	12	3	0	0	218
05:30 PM	1	100	75	0	0	0	0	0	0	0	18	0	10	4	0	0	208
05:45 PM	5	94	58	0	0	0	0	0	1	0	25	0	14	2	0	0	199
Total	13	417	280	0	0	0	0	0	4	0	83	0	48	10	0	0	855
Grand Total	35	965	644	0	0	0	0	0	12	0	152	0	93	18	0	0	1919
Apprch %	2.1	58.7	39.2	0	0	0	0	0	7.3	0	92.7	0	83.8	16.2	0	0	
Total %	1.8	50.3	33.6	0	0	0	0	0	0.6	0	7.9	0	4.8	0.9	0	0	
Cars	35	954	627	0	0	0	0	0	12	0	150	0	93	17	0	0	1888
% Cars	100	98.9	97.4	0	0	0	0	0	100	0	98.7	0	100	94.4	0	0	98.4
Heavy Vehicles	0	11	17	0	0	0	0	0	0	0	2	0	0	1	0	0	31
% Heavy Vehicles	0	1.1	2.6	0	0	0	0	0	0	0	1.3	0	0	5.6	0	0	1.6

Start Time	Nantasket Avenue (Route 228) From North					Nantasket Avenue (Route 228) From South					George Washington Boulevard From Southwest					Bay Street From West					Int. Total
	Right	Bear Right	Thru	U-Turn	App. Total	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	5	152	103	0	260	0	0	0	0	0	3	0	21	0	24	8	1	0	0	9	293
04:15 PM	6	132	95	0	233	0	0	0	0	0	3	0	20	0	23	16	3	0	0	19	275
04:30 PM	4	137	86	0	227	0	0	0	0	0	2	0	18	0	20	12	1	0	0	13	260
04:45 PM	7	127	80	0	214	0	0	0	0	0	0	0	10	0	10	9	3	0	0	12	236
Total Volume	22	548	364	0	934	0	0	0	0	0	8	0	69	0	77	45	8	0	0	53	1064
% App. Total	2.4	58.7	39.2	0	97.8	0	0	0	0	0	10.4	0	89.6	0	97.4	84.9	15.1	0	0	100	97.8
PHF	.786	.901	.883	.000	.898	.000	.000	.000	.000	.000	.667	.000	.821	.000	.802	.703	.667	.000	.000	.697	.908
Cars	22	540	351	0	913	0	0	0	0	0	8	0	67	0	75	45	8	0	0	53	1041
% Cars	100	98.5	96.4	0	97.8	0	0	0	0	0	100	0	97.1	0	97.4	100	100	0	0	100	97.8
Heavy Vehicles	0	8	13	0	21	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	23
% Heavy Vehicles	0	1.5	3.6	0	2.2	0	0	0	0	0	0	0	2.9	0	2.6	0	0	0	0	0	2.2



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File Name : 154600 GG  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

N/S: Nantasket Avenue (Route 228)  
W/SW: Bay Street/ George Washington Blvd  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Cars

Start Time	Nantasket Avenue (Route 228) From North				Nantasket Avenue (Route 228) From South				George Washington Boulevard From Southwest				Bay Street From West				Int. Total
	Right	Bear Right	Thru	U-Turn	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Left	U-Turn	
04:00 PM	5	148	99	0	0	0	0	0	3	0	21	0	8	1	0	0	285
04:15 PM	6	132	94	0	0	0	0	0	3	0	19	0	16	3	0	0	273
04:30 PM	4	136	82	0	0	0	0	0	2	0	18	0	12	1	0	0	255
04:45 PM	7	124	76	0	0	0	0	0	0	0	9	0	9	3	0	0	228
Total	22	540	351	0	0	0	0	0	8	0	67	0	45	8	0	0	1041
05:00 PM	4	117	69	0	0	0	0	0	2	0	22	0	12	1	0	0	227
05:15 PM	3	104	76	0	0	0	0	0	1	0	18	0	12	2	0	0	216
05:30 PM	1	99	73	0	0	0	0	0	0	0	18	0	10	4	0	0	205
05:45 PM	5	94	58	0	0	0	0	0	1	0	25	0	14	2	0	0	199
Total	13	414	276	0	0	0	0	0	4	0	83	0	48	9	0	0	847
Grand Total	35	954	627	0	0	0	0	0	12	0	150	0	93	17	0	0	1888
Apprch %	2.2	59	38.8	0	0	0	0	0	7.4	0	92.6	0	84.5	15.5	0	0	
Total %	1.9	50.5	33.2	0	0	0	0	0	0.6	0	7.9	0	4.9	0.9	0	0	

Start Time	Nantasket Avenue (Route 228) From North					Nantasket Avenue (Route 228) From South					George Washington Boulevard From Southwest					Bay Street From West					Int. Total
	Right	Bear Right	Thru	U-Turn	App. Total	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	5	148	99	0	252	0	0	0	0	0	3	0	21	0	24	8	1	0	0	9	285
04:15 PM	6	132	94	0	232	0	0	0	0	0	3	0	19	0	22	16	3	0	0	19	273
04:30 PM	4	136	82	0	222	0	0	0	0	0	2	0	18	0	20	12	1	0	0	13	255
04:45 PM	7	124	76	0	207	0	0	0	0	0	0	0	9	0	9	9	3	0	0	12	228
Total Volume	22	540	351	0	913	0	0	0	0	0	8	0	67	0	75	45	8	0	0	53	1041
% App. Total	2.4	59.1	38.4	0		0	0	0	0		10.7	0	89.3	0		84.9	15.1	0	0		
PHF	.786	.912	.886	.000	.906	.000	.000	.000	.000	.000	.667	.000	.798	.000	.781	.703	.667	.000	.000	.697	.913









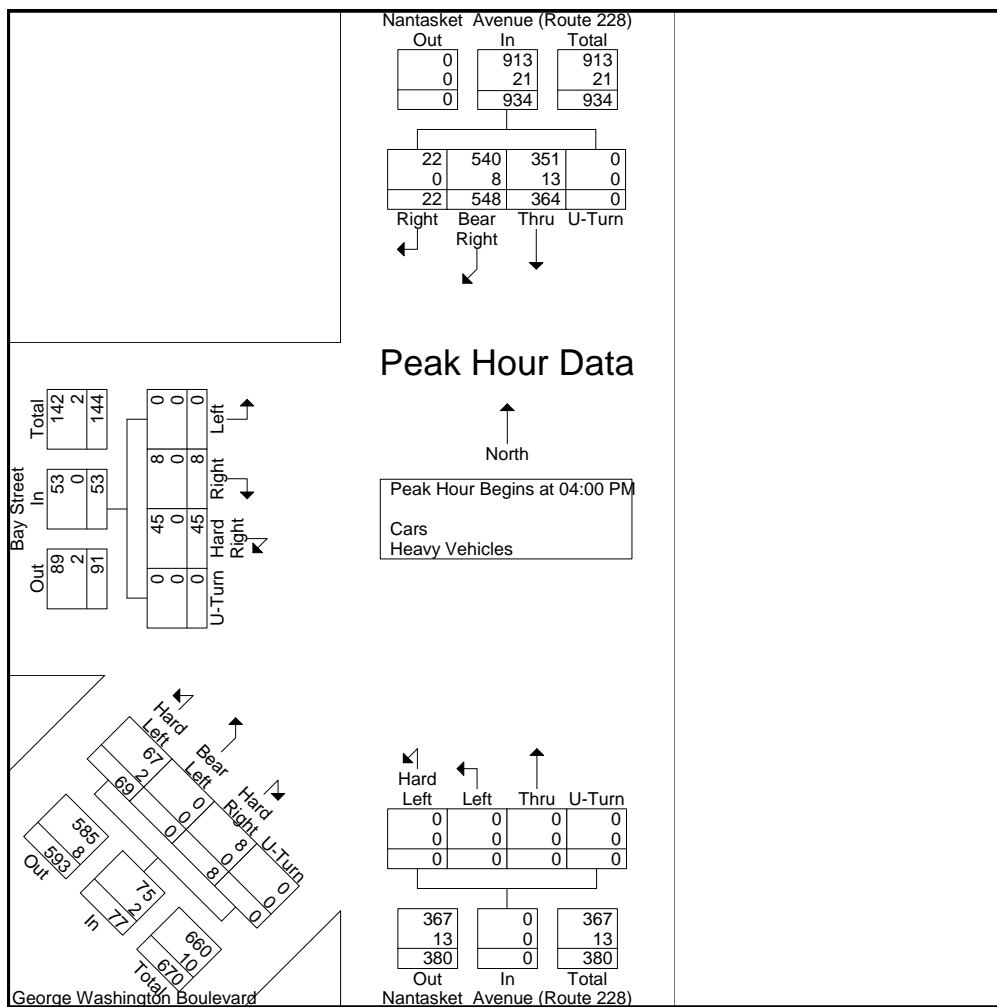
PRECISION  
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INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503  
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Email: datarequests@pdillc.com

N/S: Nantasket Avenue (Route 228)  
W/SW: Bay Street/ George Washington Blvd  
City, State: Hull, MA  
Client: TEC/ R. Brown

File Name : 154600 GG  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

Start Time	Nantasket Avenue (Route 228) From North					Nantasket Avenue (Route 228) From South					George Washington Boulevard From Southwest					Bay Street From West					Int. Total
	Right	Bear Right	Thru	U-Turn	App. Total	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	5	152	103	0	260	0	0	0	0	0	3	0	21	0	24	8	1	0	0	9	293
04:15 PM	6	132	95	0	233	0	0	0	0	0	3	0	20	0	23	16	3	0	0	19	275
04:30 PM	4	137	86	0	227	0	0	0	0	0	2	0	18	0	20	12	1	0	0	13	260
04:45 PM	7	127	80	0	214	0	0	0	0	0	0	0	10	0	10	9	3	0	0	12	236
Total Volume	22	548	364	0	934	0	0	0	0	0	8	0	69	0	77	45	8	0	0	53	1064
% App. Total	2.4	58.7	39	0		0	0	0	0		10.4	0	89.6	0		84.9	15.1	0	0		
PHF	.786	.901	.883	.000	.898	.000	.000	.000	.000	.000	.667	.000	.821	.000	.802	.703	.667	.000	.000	.697	.908
Cars	22	540	351	0	913	0	0	0	0	0	8	0	67	0	75	45	8	0	0	53	1041
% Cars	100	98.5	96.4	0	97.8	0	0	0	0	0	100	0	97.1	0	97.4	100	100	0	0	100	97.8
Heavy Vehicles	0	8	13	0	21	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	23
% Heavy Vehicles	0	1.5	3.6	0	2.2	0	0	0	0	0	0	0	2.9	0	2.6	0	0	0	0	0	2.2





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File Name : 154600 H  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

N/S:Hull Shore Dr/ George Washington Blv  
E/W: Nantasket Avenue (Route 228)  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Cars

Start Time	Hull Shore Drive From North				Nantasket Avenue (Route 228) From East				George Washington Boulevard From South				Nantasket Avenue (Route 228) From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
12:00 PM	0	0	0	0	119	0	0	0	0	191	0	0	0	62	0	0	372
12:15 PM	0	0	0	0	114	0	0	0	0	185	0	0	0	78	0	0	377
12:30 PM	0	0	0	0	116	0	0	0	0	172	0	0	0	105	0	0	393
12:45 PM	0	0	0	0	127	0	0	0	0	167	0	0	0	96	0	0	390
Total	0	0	0	0	476	0	0	0	0	715	0	0	0	341	0	0	1532
01:00 PM	0	0	0	0	118	0	0	0	0	169	0	0	0	91	2	0	380
01:15 PM	0	0	0	0	102	0	0	0	0	195	0	0	2	88	1	0	388
01:30 PM	0	0	0	0	116	0	0	0	0	166	0	0	0	85	0	0	367
01:45 PM	0	0	0	0	121	0	0	0	1	156	0	0	0	92	1	0	371
Total	0	0	0	0	457	0	0	0	1	686	0	0	2	356	4	0	1506
Grand Total	0	0	0	0	933	0	0	0	1	1401	0	0	2	697	4	0	3038
Apprch %	0	0	0	0	100	0	0	0	0.1	99.9	0	0	0.3	99.1	0.6	0	
Total %	0	0	0	0	30.7	0	0	0	0	46.1	0	0	0.1	22.9	0.1	0	

Start Time	Hull Shore Drive From North					Nantasket Avenue (Route 228) From East					George Washington Boulevard From South					Nantasket Avenue (Route 228) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:30 PM																					
12:30 PM	0	0	0	0	0	116	0	0	0	116	0	172	0	0	172	0	105	0	0	105	393
12:45 PM	0	0	0	0	0	127	0	0	0	127	0	167	0	0	167	0	96	0	0	96	390
01:00 PM	0	0	0	0	0	118	0	0	0	118	0	169	0	0	169	0	91	2	0	93	380
01:15 PM	0	0	0	0	0	102	0	0	0	102	0	195	0	0	195	2	88	1	0	91	388
Total Volume	0	0	0	0	0	463	0	0	0	463	0	703	0	0	703	2	380	3	0	385	1551
% App. Total	0	0	0	0	0	100	0	0	0	100	0	100	0	0	100	0.5	98.7	0.8	0		
PHF	.000	.000	.000	.000	.000	.911	.000	.000	.000	.911	.000	.901	.000	.000	.901	.250	.905	.375	.000	.917	.987



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File Name : 154600 H  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

N/S:Hull Shore Dr/ George Washington Blv  
E/W: Nantasket Avenue (Route 228)  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Heavy Vehicles

Start Time	Hull Shore Drive From North				Nantasket Avenue (Route 228) From East				George Washington Boulevard From South				Nantasket Avenue (Route 228) From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
12:00 PM	0	0	0	0	2	0	0	0	0	3	0	0	0	0	0	0	5
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
12:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	2
12:45 PM	0	0	0	0	3	0	0	0	0	2	0	0	0	1	0	0	6
Total	0	0	0	0	6	0	0	0	0	5	0	0	0	4	0	0	15
01:00 PM	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	3
01:15 PM	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	3
01:30 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	4
01:45 PM	0	0	0	0	3	0	0	0	0	3	0	0	0	3	0	0	9
Total	0	0	0	0	6	0	0	0	0	7	0	0	0	6	0	0	19
Grand Total	0	0	0	0	12	0	0	0	0	12	0	0	0	10	0	0	34
Apprch %	0	0	0	0	100	0	0	0	0	100	0	0	0	100	0	0	
Total %	0	0	0	0	35.3	0	0	0	0	35.3	0	0	0	29.4	0	0	

Start Time	Hull Shore Drive From North					Nantasket Avenue (Route 228) From East					George Washington Boulevard From South					Nantasket Avenue (Route 228) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 01:00 PM																					
01:00 PM	0	0	0	0	0	1	0	0	0	1	0	1	0	0	1	0	1	0	0	1	3
01:15 PM	0	0	0	0	0	2	0	0	0	2	0	1	0	0	1	0	0	0	0	0	3
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	2	0	0	2	4
01:45 PM	0	0	0	0	0	3	0	0	0	3	0	3	0	0	3	0	3	0	0	3	9
Total Volume	0	0	0	0	0	6	0	0	0	6	0	7	0	0	7	0	6	0	0	6	19
% App. Total	0	0	0	0	0	100	0	0	0	0	0	100	0	0	0	0	100	0	0	0	
PHF	.000	.000	.000	.000	.000	.500	.000	.000	.000	.500	.000	.583	.000	.000	.583	.000	.500	.000	.000	.500	.528



PRECISION  
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File Name : 154600 H  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

N/S:Hull Shore Dr/ George Washington Blv  
E/W: Nantasket Avenue (Route 228)  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Peds and Bikes

Start Time	Hull Shore Drive From North					Nantasket Avenue (Route 228) From East					George Washington Boulevard From South					Nantasket Avenue (Route 228) From West					Int. Total
	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	
12:00 PM	0	0	0	4	0	2	0	0	0	0	0	0	0	11	1	0	1	0	4	0	23
12:15 PM	0	0	0	0	4	3	0	0	0	0	0	0	0	9	10	1	0	0	0	4	31
12:30 PM	0	0	0	4	1	5	0	0	0	0	0	0	0	3	8	0	0	0	3	6	30
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	8	5	0	1	0	11	2	27
Total	0	0	0	8	5	10	0	0	0	0	0	0	0	31	24	1	2	0	18	12	111
01:00 PM	0	0	0	2	5	1	0	0	1	2	0	0	0	6	6	0	3	0	1	5	32
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5	0	1	0	1	0	9
01:30 PM	0	0	0	1	0	1	0	0	0	0	0	0	0	11	6	0	3	0	2	2	26
01:45 PM	0	0	0	0	2	1	0	0	0	0	0	0	0	8	6	0	0	0	0	2	19
Total	0	0	0	3	7	3	0	0	1	2	0	0	0	27	23	0	7	0	4	9	86
Grand Total	0	0	0	11	12	13	0	0	1	2	0	0	0	58	47	1	9	0	22	21	197
Apprch %	0	0	0	47.8	52.2	81.2	0	0	6.2	12.5	0	0	0	55.2	44.8	1.9	17	0	41.5	39.6	
Total %	0	0	0	5.6	6.1	6.6	0	0	0.5	1	0	0	0	29.4	23.9	0.5	4.6	0	11.2	10.7	

Start Time	Hull Shore Drive From North						Nantasket Avenue (Route 228) From East						George Washington Boulevard From South						Nantasket Avenue (Route 228) From West						Int. Total
	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																									
Peak Hour for Entire Intersection Begins at 12:15 PM																									
12:15 PM	0	0	0	4	4	4	3	0	0	0	0	3	0	0	0	9	10	19	1	0	0	0	4	5	31
12:30 PM	0	0	0	4	1	5	5	0	0	0	0	5	0	0	0	3	8	11	0	0	0	3	6	9	30
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	5	13	0	1	0	11	2	14	27
01:00 PM	0	0	0	2	5	7	1	0	0	1	2	4	0	0	0	6	6	12	0	3	0	1	5	9	32
Total Volume	0	0	0	6	10	16	9	0	0	1	2	12	0	0	0	26	29	55	1	4	0	15	17	37	120
% App. Total	0	0	0	37.5	62.5		75	0	0	8.3	16.7		0	0	0	47.3	52.7		2.7	10.8	0	40.5	45.9		
PHF	.000	.000	.000	.375	.500	.571	.450	.000	.000	.250	.250	.600	.000	.000	.000	.722	.725	.724	.250	.333	.000	.341	.708	.661	.938



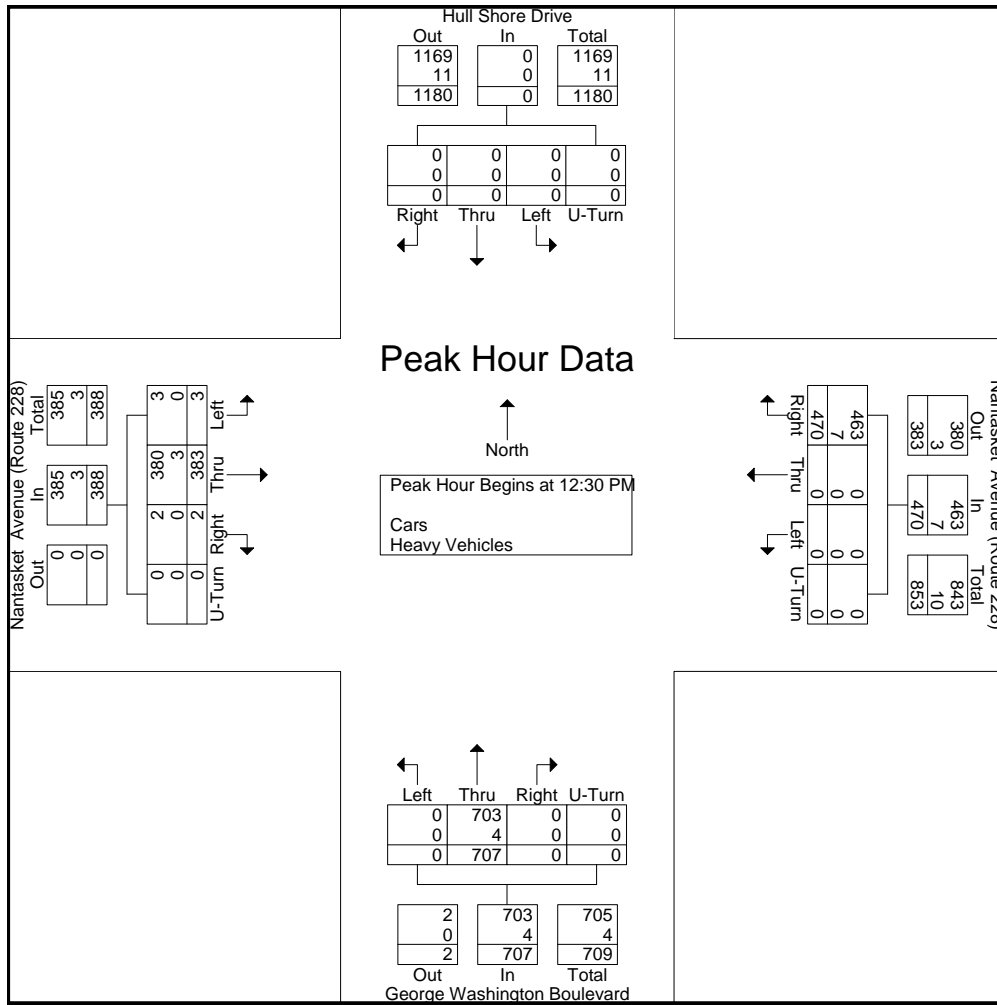
PRECISION  
D A T A  
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N/S:Hull Shore Dr/ George Washington Blv  
E/W: Nantasket Avenue (Route 228)  
City, State: Hull, MA  
Client: TEC/ R. Brown

File Name : 154600 H  
Site Code : T0597  
Start Date : 8/15/2015  
Page No : 1

Start Time	Hull Shore Drive From North					Nantasket Avenue (Route 228) From East					George Washington Boulevard From South					Nantasket Avenue (Route 228) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:30 PM																					
12:30 PM	0	0	0	0	0	117	0	0	0	117	0	172	0	0	172	0	106	0	0	106	395
12:45 PM	0	0	0	0	0	130	0	0	0	130	0	169	0	0	169	0	97	0	0	97	396
01:00 PM	0	0	0	0	0	119	0	0	0	119	0	170	0	0	170	0	92	2	0	94	383
01:15 PM	0	0	0	0	0	104	0	0	0	104	0	196	0	0	196	2	88	1	0	91	391
Total Volume	0	0	0	0	0	470	0	0	0	470	0	707	0	0	707	2	383	3	0	388	1565
% App. Total	0	0	0	0	0	100	0	0	0	100	0	100	0	0	100	0.5	98.7	0.8	0		
PHF	.000	.000	.000	.000	.000	.904	.000	.000	.000	.904	.000	.902	.000	.000	.902	.250	.903	.375	.000	.915	.988
Cars	0	0	0	0	0	463	0	0	0	463	0	703	0	0	703	2	380	3	0	385	1551
% Cars	0	0	0	0	0	98.5	0	0	0	98.5	0	99.4	0	0	99.4	100	99.2	100	0	99.2	99.1
Heavy Vehicles	0	0	0	0	0	7	0	0	0	7	0	4	0	0	4	0	3	0	0	3	14
% Heavy Vehicles	0	0	0	0	0	1.5	0	0	0	1.5	0	0.6	0	0	0.6	0	0.8	0	0	0.8	0.9





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File Name : 154600 HH  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

N/S:Hull Shore Dr/ George Washington Blv  
E/W: Nantasket Avenue (Route 228)  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Cars - Heavy Vehicles

Start Time	Hull Shore Drive From North				Nantasket Avenue (Route 228) From East				George Washington Boulevard From South				Nantasket Avenue (Route 228) From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
04:00 PM	0	0	0	0	101	0	0	0	0	132	0	0	0	103	0	0	336
04:15 PM	0	0	0	0	104	0	0	0	0	120	0	0	0	105	0	0	329
04:30 PM	0	0	0	0	98	0	0	0	0	145	0	0	0	89	0	0	332
04:45 PM	0	0	0	0	80	0	0	0	0	139	0	0	0	82	0	0	301
Total	0	0	0	0	383	0	0	0	0	536	0	0	0	379	0	0	1298
05:00 PM	0	0	0	0	89	0	0	0	0	126	0	0	0	76	0	0	291
05:15 PM	0	0	0	0	87	0	0	0	0	140	0	0	0	80	0	0	307
05:30 PM	0	0	0	0	65	0	0	0	1	152	0	0	0	80	0	0	298
05:45 PM	0	0	0	0	109	0	0	0	0	148	0	0	0	62	0	0	319
Total	0	0	0	0	350	0	0	0	1	566	0	0	0	298	0	0	1215
Grand Total	0	0	0	0	733	0	0	0	1	1102	0	0	0	677	0	0	2513
Apprch %	0	0	0	0	100	0	0	0	0.1	99.9	0	0	0	100	0	0	
Total %	0	0	0	0	29.2	0	0	0	0	43.9	0	0	0	26.9	0	0	
Cars	0	0	0	0	719	0	0	0	1	1095	0	0	0	659	0	0	2474
% Cars	0	0	0	0	98.1	0	0	0	100	99.4	0	0	0	97.3	0	0	98.4
Heavy Vehicles	0	0	0	0	14	0	0	0	0	7	0	0	0	18	0	0	39
% Heavy Vehicles	0	0	0	0	1.9	0	0	0	0	0.6	0	0	0	2.7	0	0	1.6

Start Time	Hull Shore Drive From North					Nantasket Avenue (Route 228) From East					George Washington Boulevard From South					Nantasket Avenue (Route 228) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	101	0	0	0	101	0	132	0	0	132	0	103	0	0	103	336
04:15 PM	0	0	0	0	0	104	0	0	0	104	0	120	0	0	120	0	105	0	0	105	329
04:30 PM	0	0	0	0	0	98	0	0	0	98	0	145	0	0	145	0	89	0	0	89	332
04:45 PM	0	0	0	0	0	80	0	0	0	80	0	139	0	0	139	0	82	0	0	82	301
Total Volume	0	0	0	0	0	383	0	0	0	383	0	536	0	0	536	0	379	0	0	379	1298
% App. Total	0	0	0	0	0	100	0	0	0	100	0	100	0	0	100	0	100	0	0	100	
PHF	.000	.000	.000	.000	.000	.921	.000	.000	.000	.921	.000	.924	.000	.000	.924	.000	.902	.000	.000	.902	.966
Cars	0	0	0	0	0	374	0	0	0	374	0	530	0	0	530	0	367	0	0	367	1271
% Cars	0	0	0	0	0	97.7	0	0	0	97.7	0	98.9	0	0	98.9	0	96.8	0	0	96.8	97.9
Heavy Vehicles	0	0	0	0	0	9	0	0	0	9	0	6	0	0	6	0	12	0	0	12	27
% Heavy Vehicles	0	0	0	0	0	2.3	0	0	0	2.3	0	1.1	0	0	1.1	0	3.2	0	0	3.2	2.1





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P.O. Box 301 Berlin, MA 01503  
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File Name : 154600 HH  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

N/S:Hull Shore Dr/ George Washington Blv  
E/W: Nantasket Avenue (Route 228)  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Cars

Start Time	Hull Shore Drive From North				Nantasket Avenue (Route 228) From East				George Washington Boulevard From South				Nantasket Avenue (Route 228) From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
04:00 PM	0	0	0	0	100	0	0	0	0	131	0	0	0	101	0	0	332
04:15 PM	0	0	0	0	102	0	0	0	0	119	0	0	0	102	0	0	323
04:30 PM	0	0	0	0	96	0	0	0	0	144	0	0	0	86	0	0	326
04:45 PM	0	0	0	0	76	0	0	0	0	136	0	0	0	78	0	0	290
Total	0	0	0	0	374	0	0	0	0	530	0	0	0	367	0	0	1271
05:00 PM	0	0	0	0	89	0	0	0	0	126	0	0	0	74	0	0	289
05:15 PM	0	0	0	0	86	0	0	0	0	140	0	0	0	78	0	0	304
05:30 PM	0	0	0	0	63	0	0	0	1	151	0	0	0	78	0	0	293
05:45 PM	0	0	0	0	107	0	0	0	0	148	0	0	0	62	0	0	317
Total	0	0	0	0	345	0	0	0	1	565	0	0	0	292	0	0	1203
Grand Total	0	0	0	0	719	0	0	0	1	1095	0	0	0	659	0	0	2474
Apprch %	0	0	0	0	100	0	0	0	0.1	99.9	0	0	0	100	0	0	
Total %	0	0	0	0	29.1	0	0	0	0	44.3	0	0	0	26.6	0	0	

Start Time	Hull Shore Drive From North					Nantasket Avenue (Route 228) From East					George Washington Boulevard From South					Nantasket Avenue (Route 228) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
04:00 PM	0	0	0	0	0	100	0	0	0	100	0	131	0	0	131	0	101	0	0	101	332
04:15 PM	0	0	0	0	0	102	0	0	0	102	0	119	0	0	119	0	102	0	0	102	323
04:30 PM	0	0	0	0	0	96	0	0	0	96	0	144	0	0	144	0	86	0	0	86	326
04:45 PM	0	0	0	0	0	76	0	0	0	76	0	136	0	0	136	0	78	0	0	78	290
Total Volume	0	0	0	0	0	374	0	0	0	374	0	530	0	0	530	0	367	0	0	367	1271
% App. Total	0	0	0	0	0	100	0	0	0	100	0	100	0	0	100	0	100	0	0	100	
PHF	.000	.000	.000	.000	.000	.917	.000	.000	.000	.917	.000	.920	.000	.000	.920	.000	.900	.000	.000	.900	.957

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:00 PM



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File Name : 154600 HH  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

N/S:Hull Shore Dr/ George Washington Blv  
E/W: Nantasket Avenue (Route 228)  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Heavy Vehicles

Start Time	Hull Shore Drive From North				Nantasket Avenue (Route 228) From East				George Washington Boulevard From South				Nantasket Avenue (Route 228) From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
04:00 PM	0	0	0	0	1	0	0	0	0	1	0	0	0	2	0	0	4
04:15 PM	0	0	0	0	2	0	0	0	0	1	0	0	0	3	0	0	6
04:30 PM	0	0	0	0	2	0	0	0	0	1	0	0	0	3	0	0	6
04:45 PM	0	0	0	0	4	0	0	0	0	3	0	0	0	4	0	0	11
Total	0	0	0	0	9	0	0	0	0	6	0	0	0	12	0	0	27
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
05:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	3
05:30 PM	0	0	0	0	2	0	0	0	0	1	0	0	0	2	0	0	5
05:45 PM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Total	0	0	0	0	5	0	0	0	0	1	0	0	0	6	0	0	12
Grand Total	0	0	0	0	14	0	0	0	0	7	0	0	0	18	0	0	39
Apprch %	0	0	0	0	100	0	0	0	0	100	0	0	0	100	0	0	
Total %	0	0	0	0	35.9	0	0	0	0	17.9	0	0	0	46.2	0	0	

Start Time	Hull Shore Drive From North					Nantasket Avenue (Route 228) From East					George Washington Boulevard From South					Nantasket Avenue (Route 228) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
04:00 PM	0	0	0	0	0	1	0	0	0	1	0	1	0	0	1	0	2	0	0	2	4
04:15 PM	0	0	0	0	0	2	0	0	0	2	0	1	0	0	1	0	3	0	0	3	6
04:30 PM	0	0	0	0	0	2	0	0	0	2	0	1	0	0	1	0	3	0	0	3	6
04:45 PM	0	0	0	0	0	4	0	0	0	4	0	3	0	0	3	0	4	0	0	4	11
Total Volume	0	0	0	0	0	9	0	0	0	9	0	6	0	0	6	0	12	0	0	12	27
% App. Total	0	0	0	0	0	100	0	0	0	0	0	100	0	0	0	0	100	0	0	0	
PHF	.000	.000	.000	.000	.000	.563	.000	.000	.000	.563	.000	.500	.000	.000	.500	.000	.750	.000	.000	.750	.614

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:00 PM



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File Name : 154600 HH  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

N/S:Hull Shore Dr/ George Washington Blv  
E/W: Nantasket Avenue (Route 228)  
City, State: Hull, MA  
Client: TEC/ R. Brown

Groups Printed- Peds and Bikes

Start Time	Hull Shore Drive From North					Nantasket Avenue (Route 228) From East					George Washington Boulevard From South					Nantasket Avenue (Route 228) From West					Int. Total
	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	
04:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	1	2	0	1	0	1	1	7
04:15 PM	0	0	0	0	3	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	5
04:30 PM	0	0	0	0	3	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	6
04:45 PM	0	0	0	1	0	2	0	0	0	0	0	0	0	7	3	0	0	0	0	1	14
Total	0	0	0	1	7	2	0	0	0	0	0	0	0	8	9	0	1	0	1	3	32
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	4	6
05:30 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	5
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	0	0	0	0	0	0	0	0	0	4	2	0	2	0	0	4	13
Grand Total	0	0	0	2	7	2	0	0	0	0	0	0	0	12	11	0	3	0	1	7	45
Apprch %	0	0	0	22.2	77.8	100	0	0	0	0	0	0	0	52.2	47.8	0	27.3	0	9.1	63.6	
Total %	0	0	0	4.4	15.6	4.4	0	0	0	0	0	0	0	26.7	24.4	0	6.7	0	2.2	15.6	

Start Time	Hull Shore Drive From North						Nantasket Avenue (Route 228) From East						George Washington Boulevard From South						Nantasket Avenue (Route 228) From West						Int. Total
	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	App. Total	
04:00 PM	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	2	3	0	1	0	1	1	3	7
04:15 PM	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	5
04:30 PM	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	1	1	6
04:45 PM	0	0	0	1	0	1	2	0	0	0	0	2	0	0	0	7	3	10	0	0	0	0	1	1	14
Total Volume	0	0	0	1	7	8	2	0	0	0	0	2	0	0	0	8	9	17	0	1	0	1	3	5	32
% App. Total	0	0	0	12.5	87.5		100	0	0	0	0		0	0	0	47.1	52.9		0	20	0	20	60		
PHF	.000	.000	.000	.250	.583	.667	.250	.000	.000	.000	.250		.000	.000	.000	.286	.750	.425	.000	.250	.000	.250	.750	.417	.571

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:00 PM



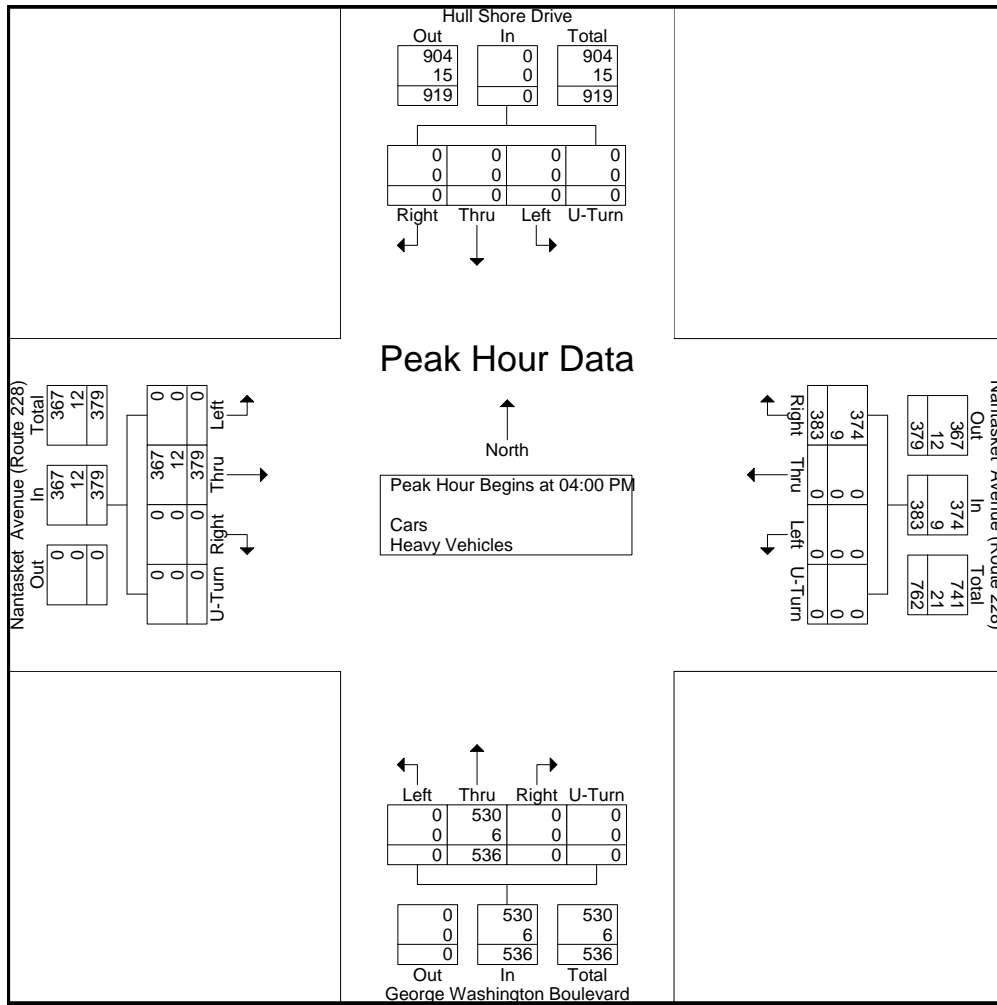
PRECISION  
D A T A  
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503  
Office: 508.481.3999 Fax: 508.545.1234  
Email: datarequests@pdillc.com

N/S:Hull Shore Dr/ George Washington Blv  
E/W: Nantasket Avenue (Route 228)  
City, State: Hull, MA  
Client: TEC/ R. Brown

File Name : 154600 HH  
Site Code : T0597  
Start Date : 8/18/2015  
Page No : 1

Start Time	Hull Shore Drive From North					Nantasket Avenue (Route 228) From East					George Washington Boulevard From South					Nantasket Avenue (Route 228) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	101	0	0	0	101	0	132	0	0	132	0	103	0	0	103	336
04:15 PM	0	0	0	0	0	104	0	0	0	104	0	120	0	0	120	0	105	0	0	105	329
04:30 PM	0	0	0	0	0	98	0	0	0	98	0	145	0	0	145	0	89	0	0	89	332
04:45 PM	0	0	0	0	0	80	0	0	0	80	0	139	0	0	139	0	82	0	0	82	301
Total Volume	0	0	0	0	0	383	0	0	0	383	0	536	0	0	536	0	379	0	0	379	1298
% App. Total	0	0	0	0	0	100	0	0	0	100	0	100	0	0	100	0	100	0	0	100	
PHF	.000	.000	.000	.000	.000	.921	.000	.000	.000	.921	.000	.924	.000	.000	.924	.000	.902	.000	.000	.902	.966
Cars	0	0	0	0	0	374	0	0	0	374	0	530	0	0	530	0	367	0	0	367	1271
% Cars	0	0	0	0	0	97.7	0	0	0	97.7	0	98.9	0	0	98.9	0	96.8	0	0	96.8	97.9
Heavy Vehicles	0	0	0	0	0	9	0	0	0	9	0	6	0	0	6	0	12	0	0	12	27
% Heavy Vehicles	0	0	0	0	0	2.3	0	0	0	2.3	0	1.1	0	0	1.1	0	3.2	0	0	3.2	2.1



Thursday June 4, 2015

**Study Name** Hull - George Washington Boulevard at Wharf Avenue and McDuff's Landing TM8 TMC  
**Start Date** Thursday, June 04, 2015 7:00 AM  
**End Date** Thursday, June 04, 2015 6:00 PM  
**Site Code**

### Report Summary

Time Period	Class.	Southbound				Westbound				Northbound				Eastbound				Crosswalk													
		R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O	Total	Pedestrians	Total									
<b>Peak 1</b>	Motorcycles	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	N	1	1							
Specified Period	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%								
7:00 AM - 9:00 AM	Cars	4	570	21	0	595	230	14	3	11	0	28	32	11	215	1	1	228	585	3	0	1	0	4	8	855	E	0	0		
One Hour Peak	%	80%	90%	95%	0%	90%	78%	88%	75%	73%	0%	80%	94%	92%	78%	100%	100%	79%	89%	60%	0%	50%	0%	57%	80%	86%	0%				
7:30 AM - 8:30 AM	Light Goods Vehicles	0	50	1	0	51	43	1	1	2	0	4	2	1	41	0	0	42	53	1	0	1	0	2	1	99	S	1	1		
	%	0%	8%	5%	0%	8%	15%	6%	25%	13%	0%	11%	6%	8%	15%	0%	0%	14%	8%	20%	0%	50%	0%	29%	10%	10%	100%				
	Buses	0	1	0	0	1	3	0	0	0	0	0	0	0	3	0	0	3	1	0	0	0	0	0	0	0	4	W	4	4	
	%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%			
	Single-Unit Trucks	0	8	0	0	8	14	1	0	2	0	3	0	0	13	0	0	13	11	1	0	0	0	1	0	25		6	6		
	%	0%	1%	0%	0%	1%	5%	6%	0%	13%	0%	9%	0%	0%	5%	0%	0%	4%	2%	20%	0%	0%	0%	14%	0%	3%					
	Articulated Trucks	0	4	0	0	4	4	0	0	0	0	0	0	0	4	0	0	4	4	0	0	0	0	0	0	0	8				
	%	0%	1%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	1%					
	Bicycles on Road	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1				
	%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	0%	0%				
	<b>Total</b>	<b>5</b>	<b>634</b>	<b>22</b>	<b>0</b>	<b>661</b>	<b>294</b>	<b>16</b>	<b>4</b>	<b>15</b>	<b>0</b>	<b>35</b>	<b>34</b>	<b>12</b>	<b>276</b>	<b>1</b>	<b>1</b>	<b>290</b>	<b>655</b>	<b>5</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>7</b>	<b>10</b>	<b>993</b>					
	PHF	0.42	0.93	0.55	0	0.93	0.88	0.67	0.33	0.62	0	0.8	0.65	0.5	0.88	0.25	0.25	0.88	0.92	0.62	0	0.5	0	0.88	0.42	0.93					
	Approach %					67%	30%					4%	3%					29%	66%					1%	1%						
<b>Peak 2</b>	Motorcycles	0	2	2	0	4	3	0	0	0	0	0	2	0	3	0	0	3	2	0	0	0	0	0	0	7	N	1	1		
Specified Period	%	0%	0%	12%	0%	1%	0%	0%	0%	0%	0%	0%	6%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	100%				
4:00 PM - 6:00 PM	Cars	9	342	14	0	365	533	13	2	30	0	45	29	12	509	4	0	525	377	5	3	11	0	19	15	954	E	0	0		
One Hour Peak	%	90%	85%	82%	0%	85%	86%	87%	100%	86%	0%	87%	81%	92%	86%	80%	0%	86%	85%	71%	50%	85%	0%	73%	88%	85%	0%				
4:30 PM - 5:30 PM	Light Goods Vehicles	1	50	1	0	52	74	2	0	5	0	7	5	1	70	1	0	72	57	2	3	2	0	7	2	138	S	0	0		
	%	10%	12%	6%	0%	12%	12%	13%	0%	14%	0%	13%	14%	8%	12%	20%	0%	12%	13%	29%	50%	15%	0%	27%	12%	12%	0%				
	Buses	0	2	0	0	2	2	0	0	0	0	0	0	0	2	0	0	2	2	0	0	0	0	0	0	4	W	2	2		
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%				
	Single-Unit Trucks	0	6	0	0	6	9	0	0	0	0	0	0	0	9	0	0	9	6	0	0	0	0	0	0	15		3	3		
	%	0%	1%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	1%					
	Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%				
	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%				
	<b>Total</b>	<b>10</b>	<b>402</b>	<b>17</b>	<b>0</b>	<b>429</b>	<b>621</b>	<b>15</b>	<b>2</b>	<b>35</b>	<b>0</b>	<b>52</b>	<b>36</b>	<b>13</b>	<b>593</b>	<b>5</b>	<b>0</b>	<b>611</b>	<b>444</b>	<b>7</b>	<b>6</b>	<b>13</b>	<b>0</b>	<b>26</b>	<b>17</b>	<b>1118</b>					
	PHF	0.62	0.95	0.53	0	0.98	0.91	0.75	0.5	0.73	0	0.72	0.9	0.81	0.91	0.42	0	0.92	0.97	0.58	0.38	0.65	0	0.65	0.71	0.95					
	Approach %					38%	56%					5%	3%					55%	40%					2%	2%						

N/S Street : Manomet Ave/Hull Shore Dr  
E/W Street: Phipps Street  
City/State : Hull, MA  
Weather : Clear

File Name : 14640003  
Site Code : 14640003  
Start Date : 8/3/2006  
Page No : 1

Groups Printed- Cars - Trucks

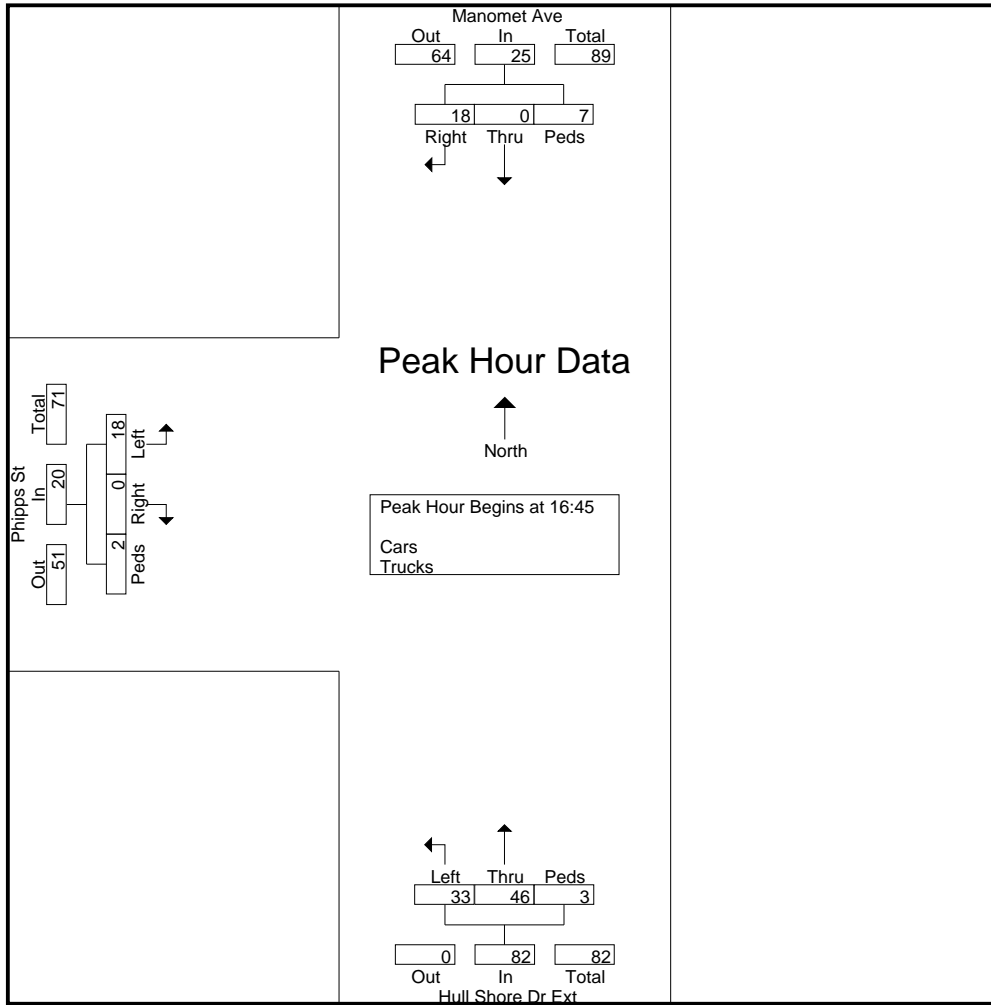
Start Time	Manomet Ave From North			Hull Shore Dr Ext From South			Phipps St From West			Int. Total
	Thru	Right	Peds	Left	Thru	Peds	Left	Right	Peds	
16:00	0	5	3	8	7	0	2	0	1	26
16:15	0	7	0	9	4	0	5	0	1	26
16:30	0	3	1	9	6	0	6	0	0	25
16:45	0	2	4	7	12	1	4	0	0	30
Total	0	17	8	33	29	1	17	0	2	107
17:00	0	5	1	7	14	0	7	0	0	34
17:15	0	5	1	11	10	0	4	0	0	31
17:30	0	6	1	8	10	2	3	0	2	32
17:45	0	3	0	3	7	0	5	0	0	18
Total	0	19	3	29	41	2	19	0	2	115
Grand Total	0	36	11	62	70	3	36	0	4	222
Apprch %	0	76.6	23.4	45.9	51.9	2.2	90	0	10	
Total %	0	16.2	5	27.9	31.5	1.4	16.2	0	1.8	
Cars	0	36	11	62	70	3	36	0	4	222
% Cars	0	100	100	100	100	100	100	0	100	100
Trucks	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0

Start Time	Manomet Ave From North				Hull Shore Dr Ext From South				Phipps St From West				Int. Total
	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	
16:45	0	2	4	6	7	12	1	20	4	0	0	4	30
17:00	0	5	1	6	7	14	0	21	7	0	0	7	34
17:15	0	5	1	6	11	10	0	21	4	0	0	4	31
17:30	0	6	1	7	8	10	2	20	3	0	2	5	32
Total Volume	0	18	7	25	33	46	3	82	18	0	2	20	127
% App. Total	0	72	28		40.2	56.1	3.7		90	0	10		
PHF	.000	.750	.438	.893	.750	.821	.375	.976	.643	.000	.250	.714	.934

Peak Hour Analysis From 07:00 to 17:45 - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 16:45

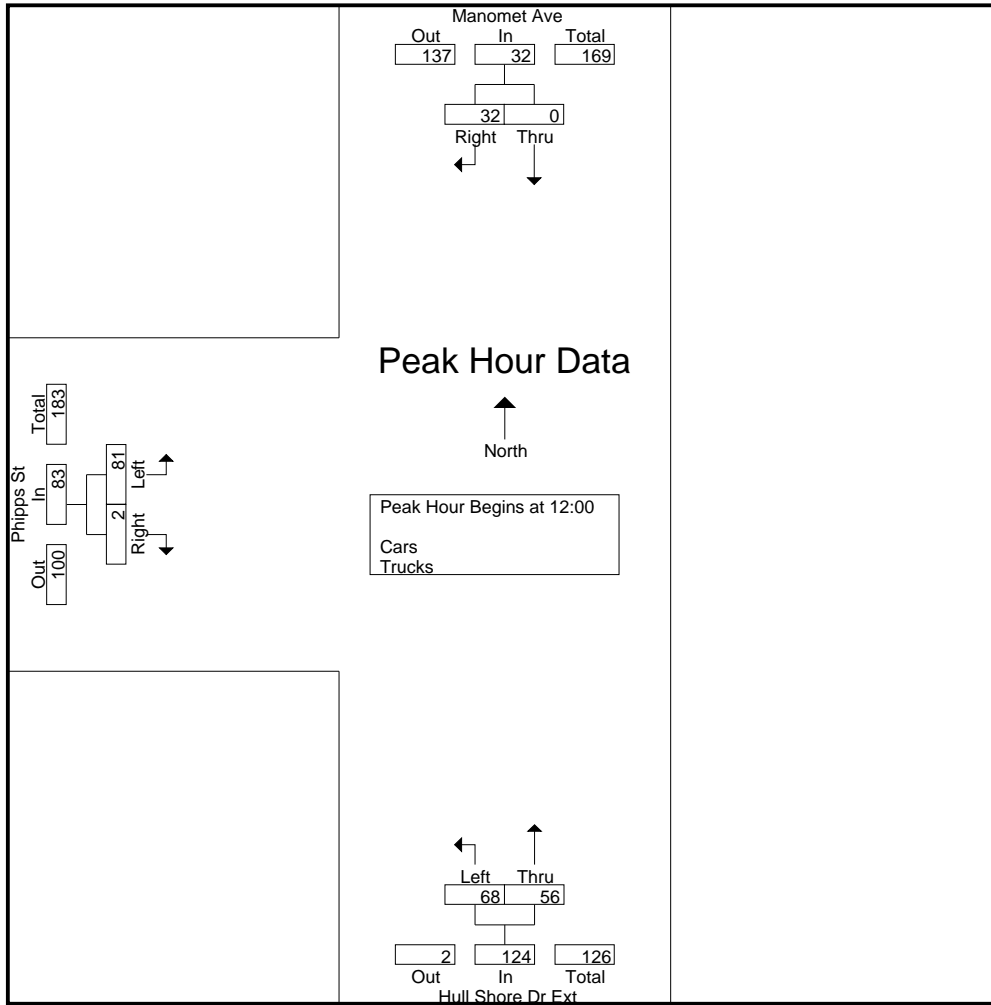




Groups Printed- Cars - Trucks

Start Time	Manomet Ave From North			Hull Shore Dr Ext From South			Phipps St From West			Exclu. Total	Inclu. Total	Int. Total
	Thru	Right	Peds	Left	Thru	Peds	Left	Right	Peds			
11:00	0	4	0	3	21	0	5	0	0	0	33	33
11:15	0	10	0	4	18	0	7	0	0	0	39	39
11:30	0	8	0	7	21	0	13	0	0	0	49	49
11:45	0	2	0	10	11	0	16	0	0	0	39	39
Total	0	24	0	24	71	0	41	0	0	0	160	160
12:00	0	8	0	15	13	0	23	0	0	0	59	59
12:15	0	10	0	22	12	0	23	1	0	0	68	68
12:30	0	5	0	14	13	0	16	1	0	0	49	49
12:45	0	9	0	17	18	0	19	0	0	0	63	63
Total	0	32	0	68	56	0	81	2	0	0	239	239
13:00	0	6	0	14	14	0	13	0	0	0	47	47
13:15	0	7	0	16	24	0	16	0	0	0	63	63
13:30	0	10	0	19	21	0	8	0	0	0	58	58
13:45	0	12	0	14	12	0	12	0	0	0	50	50
Total	0	35	0	63	71	0	49	0	0	0	218	218
Grand Total	0	91	0	155	198	0	171	2	0	0	617	617
Apprch %	0	100		43.9	56.1		98.8	1.2				
Total %	0	14.7		25.1	32.1		27.7	0.3		0	100	
Cars	0	88		155	198		169	2		0	0	612
% Cars	0	96.7	0	100	100	0	98.8	100	0	0	0	99.2
Trucks	0	3		0	0		2	0		0	0	5
% Trucks	0	3.3	0	0	0	0	1.2	0	0	0	0	0.8

Start Time	Manomet Ave From North			Hull Shore Dr Ext From South			Phipps St From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 11:00 to 13:45 - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 12:00										
12:00	0	8	8	15	13	28	23	0	23	59
12:15	0	10	10	22	12	34	23	1	24	68
12:30	0	5	5	14	13	27	16	1	17	49
12:45	0	9	9	17	18	35	19	0	19	63
Total Volume	0	32	32	68	56	124	81	2	83	239
% App. Total	0	100		54.8	45.2		97.6	2.4		
PHF	.000	.800	.800	.773	.778	.886	.880	.500	.865	.879



Groups Printed- Cars - Trucks

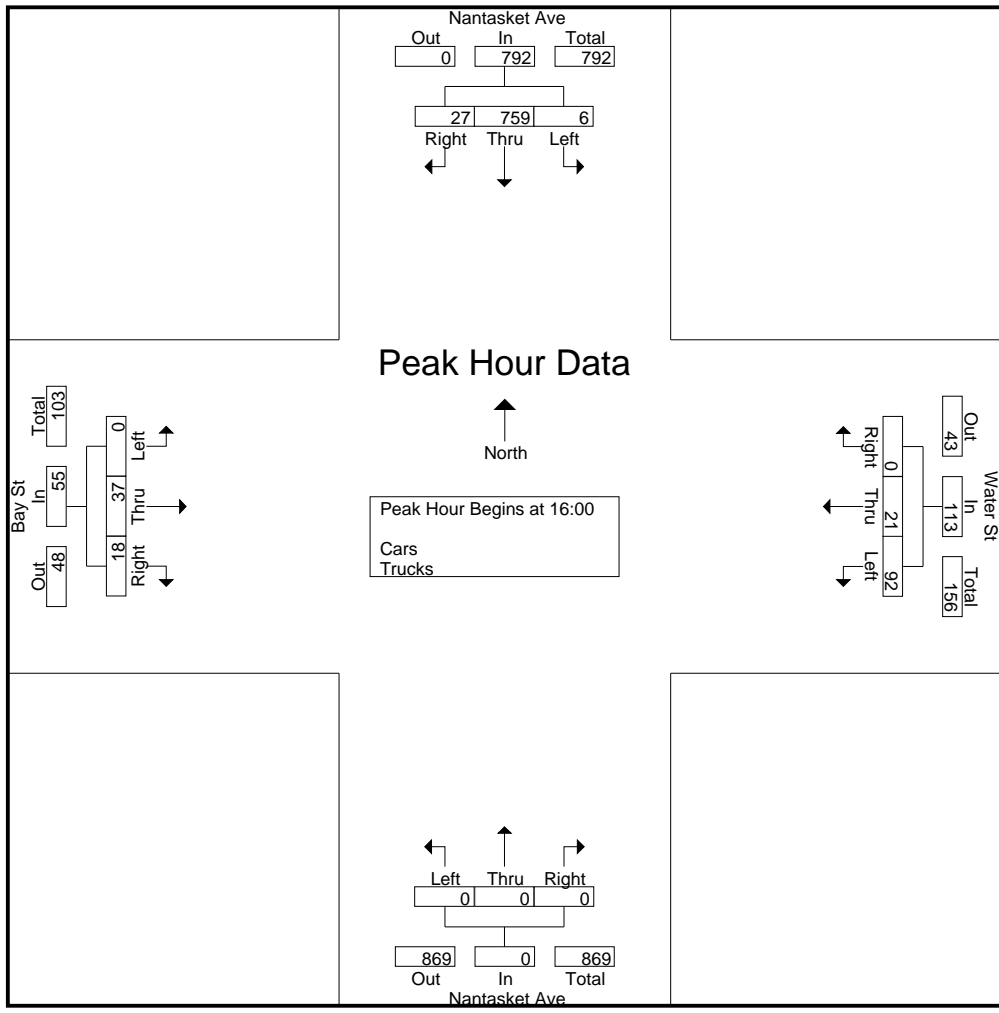
Start Time	Nantasket Ave From North			Water St From East			Nantasket Ave From South			Bay St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:00	2	204	8	24	1	0	0	0	0	0	11	6	256
16:15	0	184	8	21	8	0	0	0	0	0	9	3	233
16:30	2	182	8	24	7	0	0	0	0	0	9	7	239
16:45	2	189	3	23	5	0	0	0	0	0	8	2	232
Total	6	759	27	92	21	0	0	0	0	0	37	18	960
17:00	1	157	15	19	8	0	0	0	0	0	14	3	217
17:15	0	165	10	23	6	0	0	0	0	0	3	1	208
17:30	0	171	8	16	8	0	0	0	0	0	10	1	214
17:45	2	166	14	21	7	0	0	0	0	0	11	8	229
Total	3	659	47	79	29	0	0	0	0	0	38	13	868
Grand Total	9	1418	74	171	50	0	0	0	0	0	75	31	1828
Apprch %	0.6	94.5	4.9	77.4	22.6	0	0	0	0	0	70.8	29.2	
Total %	0.5	77.6	4	9.4	2.7	0	0	0	0	0	4.1	1.7	
Cars	9	1391	73	166	50	0	0	0	0	0	73	31	1793
% Cars	100	98.1	98.6	97.1	100	0	0	0	0	0	97.3	100	98.1
Trucks	0	27	1	5	0	0	0	0	0	0	2	0	35
% Trucks	0	1.9	1.4	2.9	0	0	0	0	0	0	2.7	0	1.9

Start Time	Nantasket Ave From North				Water St From East				Nantasket Ave From South				Bay St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 16:00

16:00	2	204	8	214	24	1	0	25	0	0	0	0	0	11	6	17	256
16:15	0	184	8	192	21	8	0	29	0	0	0	0	0	9	3	12	233
16:30	2	182	8	192	24	7	0	31	0	0	0	0	0	9	7	16	239
16:45	2	189	3	194	23	5	0	28	0	0	0	0	0	8	2	10	232
Total Volume	6	759	27	792	92	21	0	113	0	0	0	0	0	37	18	55	960
% App. Total	0.8	95.8	3.4		81.4	18.6	0		0	0	0	0	0	67.3	32.7		
PHF	.750	.930	.844	.925	.958	.656	.000	.911	.000	.000	.000	.000	.000	.841	.643	.809	.938



Accurate Counts  
978-664-2565

N/S Street : Nantasket Avenue  
E/W Street: Water St / Bay St  
City/State : Hull, MA  
Weather : Clear

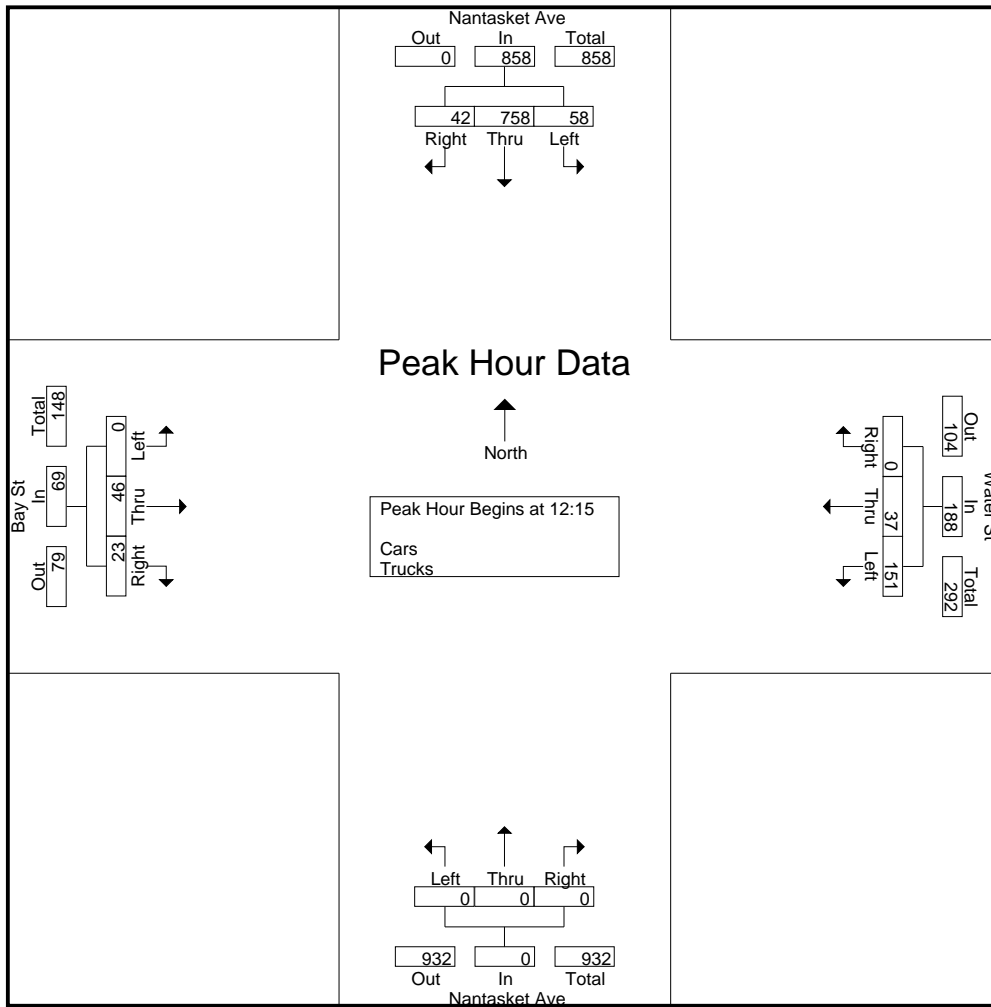
File Name : 146400A4  
Site Code : 14640004  
Start Date : 8/5/2006  
Page No : 1

Groups Printed- Cars - Trucks

Start Time	Nantasket Ave From North			Water St From East			Nantasket Ave From South			Bay St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
11:00	1	178	10	25	4	0	0	0	0	0	10	3	231
11:15	2	182	13	31	9	0	0	0	0	0	9	2	248
11:30	2	181	14	29	11	0	0	0	0	0	13	3	253
11:45	11	209	17	36	4	0	0	0	0	0	13	11	301
Total	16	750	54	121	28	0	0	0	0	0	45	19	1033
12:00	13	159	10	22	3	0	0	0	0	0	14	5	226
12:15	18	176	12	41	9	0	0	0	0	0	14	4	274
12:30	11	201	9	43	6	0	0	0	0	0	9	7	286
12:45	15	201	14	24	10	0	0	0	0	0	14	7	285
Total	57	737	45	130	28	0	0	0	0	0	51	23	1071
13:00	14	180	7	43	12	0	0	0	0	0	9	5	270
13:15	6	153	12	31	8	0	0	0	0	0	11	3	224
13:30	19	157	7	37	8	0	0	0	0	0	11	1	240
13:45	4	196	16	32	9	0	0	0	0	0	13	2	272
Total	43	686	42	143	37	0	0	0	0	0	44	11	1006
Grand Total	116	2173	141	394	93	0	0	0	0	0	140	53	3110
Apprch %	4.8	89.4	5.8	80.9	19.1	0	0	0	0	0	72.5	27.5	
Total %	3.7	69.9	4.5	12.7	3	0	0	0	0	0	4.5	1.7	
Cars	116	2143	134	392	92	0	0	0	0	0	138	53	3068
% Cars	100	98.6	95	99.5	98.9	0	0	0	0	0	98.6	100	98.6
Trucks	0	30	7	2	1	0	0	0	0	0	2	0	42
% Trucks	0	1.4	5	0.5	1.1	0	0	0	0	0	1.4	0	1.4

Start Time	Nantasket Ave From North				Water St From East				Nantasket Ave From South				Bay St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 11:00 to 13:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:15																	
12:15	18	176	12	206	41	9	0	50	0	0	0	0	0	14	4	18	274
12:30	11	201	9	221	43	6	0	49	0	0	0	0	0	9	7	16	286
12:45	15	201	14	230	24	10	0	34	0	0	0	0	0	14	7	21	285
13:00	14	180	7	201	43	12	0	55	0	0	0	0	0	9	5	14	270
Total Volume	58	758	42	858	151	37	0	188	0	0	0	0	0	46	23	69	1115
% App. Total	6.8	88.3	4.9		80.3	19.7	0		0	0	0		0	66.7	33.3		
PHF	.806	.943	.750	.933	.878	.771	.000	.855	.000	.000	.000	.000	.000	.821	.821	.821	.975





ACCURATE COUNTS

Site Code : 28700003  
 N-S Street: Nantasket  
 E-W Street: Edgewater  
 City/Town : Hull, MA

PAGE: 1  
 FILE: 28700003

Sum of the Primary and Secondary

DATE: 5/31/95

Time Begin	From North				From East				From South				From West				Vehicle Total	U-TRN Total
	U-TRN	RT	THRU	LT	U-TRN	RT	THRU	LT	U-TRN	RT	THRU	LT	U-TRN	RT	THRU	LT		
4:00 PM	2	1	154	0	0	0	0	0	2	0	177	5	0	1	0	0	342	4
4:15	1	1	163	0	0	0	0	0	3	0	188	6	0	1	0	0	363	4
4:30	3	2	162	0	0	0	0	0	1	0	212	14	0	2	0	4	400	4
4:45	3	5	172	0	0	0	0	0	2	0	222	9	0	6	0	0	419	5
HR TOTAL	9	9	651	0	0	0	0	0	8	0	799	34	0	10	0	4	1524	17
5:00 PM	2	3	140	0	0	0	0	0	2	0	225	7	0	5	0	3	387	4
5:15	0 <sup>8</sup>	3 <sup>13</sup>	156 <sup>630</sup>	0	0	0	0	0	0 <sup>✓</sup>	0	188 <sup>247</sup>	13 <sup>45</sup>	0	4 <sup>27</sup>	0	0 <sup>7</sup>	364 <sup>1520</sup>	0
5:30	1	3	152	0	0	0	0	0	0	0	215	10	0	6	0	2	389	1
5:45	0	2	154	0	0	0	0	0	3	0	213	9	0	8	0	2	391	3
HR TOTAL	3	11	602	0	0	0	0	0	5	0	841	39	0	23	0	7	1531	8
DAY TOTAL	12	20	1253	0	0	0	0	0	13	0	1640	73	0	33	0	11	3055	25

PEAK PERIOD ANALYSIS FOR THE PERIOD: 4:00 PM - 6:00 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES					PERCENTS			
			U-TRN	Right	Thru	Left	Total	U-TRN	Right	Thru	Left
North	4:00 PM	0.93	9	9	651	0	669	1	1	97	0
East	4:00 PM	0.00	0	0	0	0	0	0	0	0	0
South	4:30 PM	0.96	5	0	847	43	895	1	0	95	5
West	5:00 PM	0.75	0	23	0	7	30	0	77	0	23
Entire Intersection											
North	4:30 PM	0.90	8	13	630	0	651	1	2	97	0
East		0.00	0	0	0	0	0	0	0	0	0
South		0.96	5	0	847	43	895	1	0	95	5
West		0.75	0	17	0	7	24	0	71	0	29

ACCURATE COUNTS

Site Code : 28700003  
 N-S Street: Nantasket  
 E-W Street: Edgewater  
 City/Town : Hull, MA

PAGE: 1  
 FILE: 28700003

Sum of the Primary and Secondary

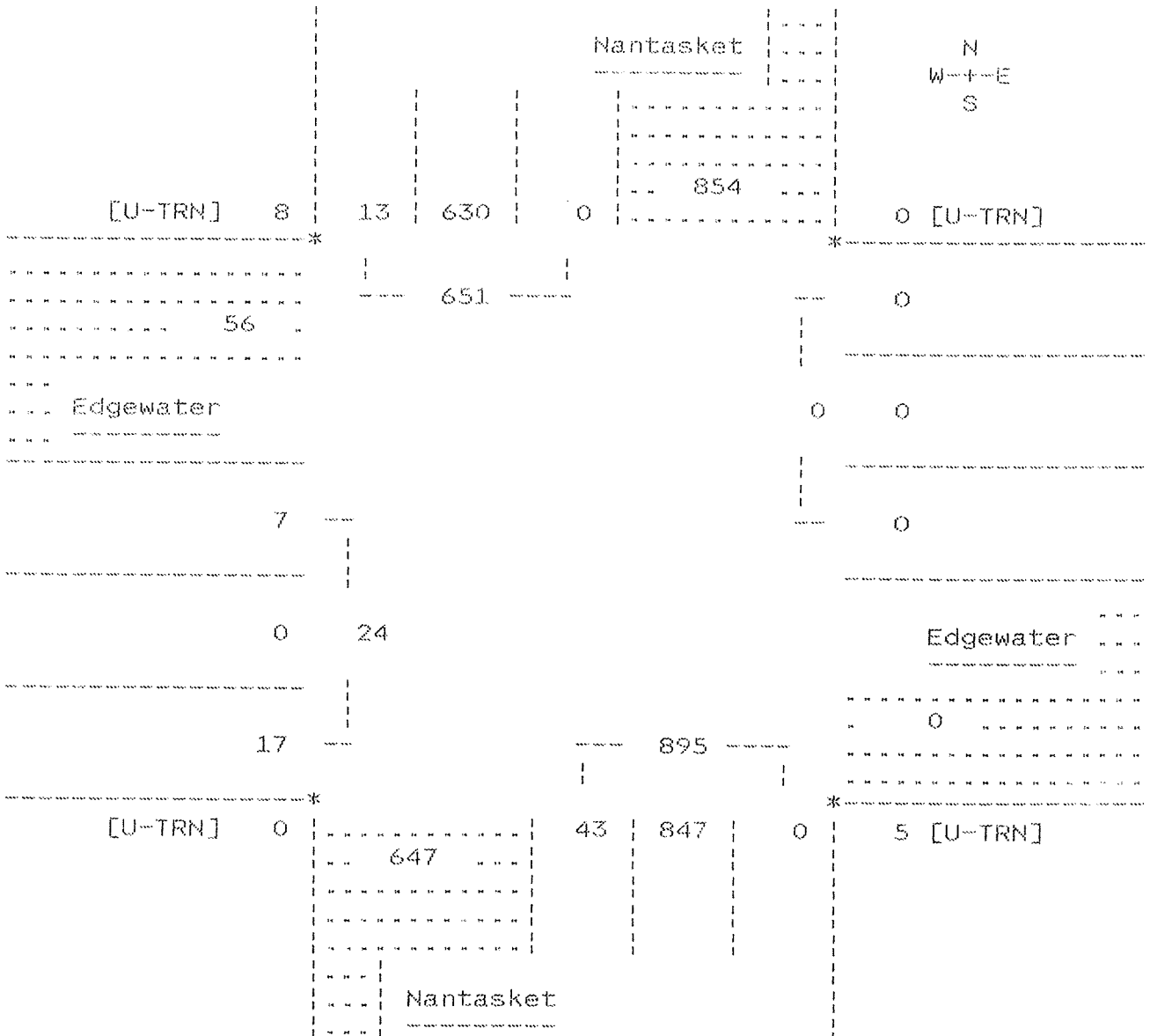
DATE: 5/31/95

PEAK PERIOD ANALYSIS FOR THE PERIOD: 4:00 PM - 6:00 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	..... VOLUMES .....				..... PERCENTS .....				
			U-TRN	Right	Thru	Left	Total	U-TRN	Right	Thru	Left
North	4:00 PM	0.93	9	9	651	0	669	1	1	97	0
East	4:00 PM	0.00	0	0	0	0	0	0	0	0	0
South	4:30 PM	0.96	5	0	847	43	895	1	0	95	5
West	5:00 PM	0.75	0	23	0	7	30	0	77	0	23

Entire Intersection

North	4:30 PM	0.90	8	13	630	0	651	1	2	97	0
East		0.00	0	0	0	0	0	0	0	0	0
South		0.96	5	0	847	43	895	1	0	95	5
West		0.75	0	17	0	7	24	0	71	0	29



PDI File #: **228818 A**  
 Location: **N: Nantasket Avenue S: Nantasket Avenue**  
 Location: **E: Hull Shore Road W: Hull Shore Road**  
 City, State: **Hull, MA**  
 Client: **TEC/K. Dandrade**  
 Site Code: **T0597.03**  
 Count Date: **Thursday, August 18, 2022**  
 Start Time: **4:00 PM**  
 End Time: **6:00 PM**  
 Class:



**Cars and Heavy Vehicles (Combined)**

	Nantasket Avenue					Hull Shore Road					Nantasket Avenue					Hull Shore Road					Total
	from North					from East					from South					from West					
	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	
4:00 PM	0	79	0	0	79	0	0	0	0	0	87	0	0	0	87	0	135	0	0	135	301
4:15 PM	0	83	1	0	84	0	0	0	0	0	82	0	0	0	82	0	137	0	0	137	303
4:30 PM	0	72	0	0	72	0	0	0	0	0	85	0	0	0	85	0	157	0	0	157	314
4:45 PM	0	61	0	0	61	0	0	0	0	0	86	0	0	0	86	0	149	0	0	149	296
<b>Total</b>	<b>0</b>	<b>295</b>	<b>1</b>	<b>0</b>	<b>296</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>340</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>340</b>	<b>0</b>	<b>578</b>	<b>0</b>	<b>0</b>	<b>578</b>	<b>1214</b>
5:00 PM	0	68	1	0	69	0	0	0	0	0	87	0	0	0	87	0	154	0	0	154	310
5:15 PM	0	69	0	0	69	0	0	0	0	0	83	0	0	0	83	0	137	0	0	137	289
5:30 PM	0	49	0	0	49	0	0	0	0	0	74	0	0	0	74	0	147	0	0	147	270
5:45 PM	1	77	0	0	78	0	0	0	0	0	92	0	0	0	92	1	121	0	0	122	292
<b>Total</b>	<b>1</b>	<b>263</b>	<b>1</b>	<b>0</b>	<b>265</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>336</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>336</b>	<b>1</b>	<b>559</b>	<b>0</b>	<b>0</b>	<b>560</b>	<b>1161</b>
Grand Total	1	558	2	0	561	0	0	0	0	0	676	0	0	0	676	1	1137	0	0	1138	2375
Approach %	0.2	99.5	0.4	0.0		0.0	0.0	0.0	0.0		100.0	0.0	0.0	0.0		0.1	99.9	0.0	0.0		
Total %	0.0	23.5	0.1	0.0	23.6	0.0	0.0	0.0	0.0	0.0	28.5	0.0	0.0	0.0	28.5	0.0	47.9	0.0	0.0	47.9	
Exiting Leg Total	0					1815					559					1					2375
Cars	1	554	2	0	557	0	0	0	0	0	663	0	0	0	663	1	1133	0	0	1134	2354
% Cars	100.0	99.3	100.0	0.0	99.3	0.0	0.0	0.0	0.0	0.0	98.1	0.0	0.0	0.0	98.1	100.0	99.6	0.0	0.0	99.6	99.1
Exiting Leg Total	0					1798					555					1					2354
Heavy Vehicles	0	4	0	0	4	0	0	0	0	0	13	0	0	0	13	0	4	0	0	4	21
% Heavy Vehicles	0.0	0.7	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	1.9	0.0	0.4	0.0	0.0	0.4	0.9
Exiting Leg Total	0					17					4					0					21

Peak Hour Analysis from 04:00 PM to 06:00 PM begins at:

4:15 PM	Nantasket Avenue					Hull Shore Road					Nantasket Avenue					Hull Shore Road					Total
	from North					from East					from South					from West					
	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	
4:15 PM	0	83	1	0	84	0	0	0	0	0	82	0	0	0	82	0	137	0	0	137	303
4:30 PM	0	72	0	0	72	0	0	0	0	0	85	0	0	0	85	0	157	0	0	157	314
4:45 PM	0	61	0	0	61	0	0	0	0	0	86	0	0	0	86	0	149	0	0	149	296
5:00 PM	0	68	1	0	69	0	0	0	0	0	87	0	0	0	87	0	154	0	0	154	310
Total Volume	0	284	2	0	286	0	0	0	0	0	340	0	0	0	340	0	597	0	0	597	1223
% Approach Total	0.0	99.3	0.7	0.0		0.0	0.0	0.0	0.0		100.0	0.0	0.0	0.0		0.0	100.0	0.0	0.0		
PHF	0.000	0.855	0.500	0.000	0.851	0.000	0.000	0.000	0.000	0.000	0.977	0.000	0.000	0.000	0.977	0.000	0.951	0.000	0.000	0.951	0.974
Cars	0	283	2	0	285	0	0	0	0	0	332	0	0	0	332	0	593	0	0	593	1210
Cars %	0.0	99.6	100.0	0.0	99.7	0.0	0.0	0.0	0.0	0.0	97.6	0.0	0.0	0.0	97.6	0.0	99.3	0.0	0.0	99.3	98.9
Heavy Vehicles	0	1	0	0	1	0	0	0	0	0	8	0	0	0	8	0	4	0	0	4	13
Heavy Vehicles %	0.0	0.4	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	2.4	0.0	0.7	0.0	0.0	0.7	1.1
Cars Enter Leg	0	283	2	0	285	0	0	0	0	0	332	0	0	0	332	0	593	0	0	593	1210
Heavy Enter Leg	0	1	0	0	1	0	0	0	0	0	8	0	0	0	8	0	4	0	0	4	13
Total Entering Leg	0	284	2	0	286	0	0	0	0	0	340	0	0	0	340	0	597	0	0	597	1223
Cars Exiting Leg	0					927					283					0					1210
Heavy Exiting Leg	0					12					1					0					13
Total Exiting Leg	0					939					284					0					1223

PDI File #: **228818 A**  
 Location: **N: Nantasket Avenue S: Nantasket Avenue**  
 Location: **E: Hull Shore Road W: Hull Shore Road**  
 City, State: **Hull, MA**  
 Client: **TEC/K. Dandrade**  
 Site Code: **T0597.03**  
 Count Date: **Saturday, August 20, 2022**  
 Start Time: **12:00 PM**  
 End Time: **2:00 PM**  
 Class:



**Cars and Heavy Vehicles (Combined)**

	Nantasket Avenue					Hull Shore Road					Nantasket Avenue					Hull Shore Road					Total
	from North					from East					from South					from West					
	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	
12:00 PM	0	75	1	0	76	0	0	0	0	0	108	0	0	0	108	0	151	0	0	151	335
12:15 PM	0	77	0	0	77	0	0	0	0	0	110	0	0	0	110	0	191	0	0	191	378
12:30 PM	0	77	0	0	77	0	0	0	0	0	114	0	0	0	114	1	154	0	0	155	346
12:45 PM	0	76	0	0	76	0	0	0	0	0	100	0	0	0	100	0	197	0	0	197	373
<b>Total</b>	<b>0</b>	<b>305</b>	<b>1</b>	<b>0</b>	<b>306</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>432</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>432</b>	<b>1</b>	<b>693</b>	<b>0</b>	<b>0</b>	<b>694</b>	<b>1432</b>
1:00 PM	0	84	1	0	85	0	0	0	0	0	98	0	0	0	98	1	177	0	0	178	361
1:15 PM	0	94	2	0	96	0	0	0	0	0	125	0	0	0	125	0	150	0	0	150	371
1:30 PM	0	92	0	0	92	0	0	0	0	0	130	0	0	0	130	1	169	0	0	170	392
1:45 PM	1	91	0	0	92	0	0	0	0	0	115	0	0	0	115	0	167	0	0	167	374
<b>Total</b>	<b>1</b>	<b>361</b>	<b>3</b>	<b>0</b>	<b>365</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>468</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>468</b>	<b>2</b>	<b>663</b>	<b>0</b>	<b>0</b>	<b>665</b>	<b>1498</b>
Grand Total	1	666	4	0	671	0	0	0	0	0	900	0	0	0	900	3	1356	0	0	1359	2930
Approach %	0.1	99.3	0.6	0.0		0.0	0.0	0.0	0.0		100.0	0.0	0.0	0.0		0.2	99.8	0.0	0.0		
Total %	0.0	22.7	0.1	0.0	22.9	0.0	0.0	0.0	0.0	0.0	30.7	0.0	0.0	0.0	30.7	0.1	46.3	0.0	0.0	46.4	
Exiting Leg Total	0					2260					669					1					2930
Cars	1	649	4	0	654	0	0	0	0	0	892	0	0	0	892	3	1344	0	0	1347	2893
% Cars	100.0	97.4	100.0	0.0	97.5	0.0	0.0	0.0	0.0	0.0	99.1	0.0	0.0	0.0	99.1	100.0	99.1	0.0	0.0	99.1	98.7
Exiting Leg Total	0					2240					652					1					2893
Heavy Vehicles	0	17	0	0	17	0	0	0	0	0	8	0	0	0	8	0	12	0	0	12	37
% Heavy Vehicles	0.0	2.6	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.9	0.0	0.9	0.0	0.0	0.9	1.3
Exiting Leg Total	0					20					17					0					37

Peak Hour Analysis from 12:00 PM to 02:00 PM begins at:

	Nantasket Avenue					Hull Shore Road					Nantasket Avenue					Hull Shore Road					Total
	from North					from East					from South					from West					
	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	
1:00 PM	0	84	1	0	85	0	0	0	0	0	98	0	0	0	98	1	177	0	0	178	361
1:15 PM	0	94	2	0	96	0	0	0	0	0	125	0	0	0	125	0	150	0	0	150	371
1:30 PM	0	92	0	0	92	0	0	0	0	0	130	0	0	0	130	1	169	0	0	170	392
1:45 PM	1	91	0	0	92	0	0	0	0	0	115	0	0	0	115	0	167	0	0	167	374
<b>Total Volume</b>	<b>1</b>	<b>361</b>	<b>3</b>	<b>0</b>	<b>365</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>468</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>468</b>	<b>2</b>	<b>663</b>	<b>0</b>	<b>0</b>	<b>665</b>	<b>1498</b>
% Approach Total	0.3	98.9	0.8	0.0		0.0	0.0	0.0	0.0		100.0	0.0	0.0	0.0		0.3	99.7	0.0	0.0		
PHF	0.250	0.960	0.375	0.000	0.951	0.000	0.000	0.000	0.000	0.000	0.900	0.000	0.000	0.000	0.900	0.500	0.936	0.000	0.000	0.934	0.955
Cars	1	353	3	0	357	0	0	0	0	0	465	0	0	0	465	2	656	0	0	658	1480
Cars %	100.0	97.8	100.0	0.0	97.8	0.0	0.0	0.0	0.0	0.0	99.4	0.0	0.0	0.0	99.4	100.0	98.9	0.0	0.0	98.9	98.8
Heavy Vehicles	0	8	0	0	8	0	0	0	0	0	3	0	0	0	3	0	7	0	0	7	18
Heavy Vehicles %	0.0	2.2	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.6	0.0	1.1	0.0	0.0	1.1	1.2
Cars Enter Leg	1	353	3	0	357	0	0	0	0	0	465	0	0	0	465	2	656	0	0	658	1480
Heavy Enter Leg	0	8	0	0	8	0	0	0	0	0	3	0	0	0	3	0	7	0	0	7	18
<b>Total Entering Leg</b>	<b>1</b>	<b>361</b>	<b>3</b>	<b>0</b>	<b>365</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>468</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>468</b>	<b>2</b>	<b>663</b>	<b>0</b>	<b>0</b>	<b>665</b>	<b>1498</b>
Cars Exiting Leg	0					1124					355					1					1480
Heavy Exiting Leg	0					10					8					0					18
<b>Total Exiting Leg</b>	<b>0</b>					<b>1134</b>					<b>363</b>					<b>1</b>					<b>1498</b>

PDI File #: **228818 B**  
 Location: **N: Nantasket Avenue S: Nantasket Avenue**  
 Location: **E: Parking Lot W: Wharf Avenue**  
 City, State: **Hull, MA**  
 Client: **TEC/K. Dandrade**  
 Site Code: **T0597.03**  
 Count Date: **Thursday, August 18, 2022**  
 Start Time: **4:00 PM**  
 End Time: **6:00 PM**  
 Class:



**Cars and Heavy Vehicles (Combined)**

	Nantasket Avenue					Parking Lot					Nantasket Avenue					Wharf Avenue					Total
	from North					from East					from South					from West					
	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	
4:00 PM	16	68	1	0	85	0	2	0	0	2	1	72	11	0	84	5	1	8	0	14	185
4:15 PM	11	69	0	0	80	0	1	1	0	2	7	70	11	0	88	7	0	4	0	11	181
4:30 PM	6	67	0	0	73	0	0	1	0	1	2	74	10	0	86	9	3	10	0	22	182
4:45 PM	10	54	1	0	65	0	0	0	0	0	1	79	11	0	91	7	6	5	0	18	174
<b>Total</b>	<b>43</b>	<b>258</b>	<b>2</b>	<b>0</b>	<b>303</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>0</b>	<b>5</b>	<b>11</b>	<b>295</b>	<b>43</b>	<b>0</b>	<b>349</b>	<b>28</b>	<b>10</b>	<b>27</b>	<b>0</b>	<b>65</b>	<b>722</b>
5:00 PM	5	63	0	0	68	0	0	0	0	0	4	71	14	0	89	10	0	5	0	15	172
5:15 PM	2	71	1	0	74	0	0	0	0	0	2	73	17	0	92	6	2	5	0	13	179
5:30 PM	3	44	1	0	48	0	0	0	0	0	1	63	12	0	76	6	5	5	0	16	140
5:45 PM	7	65	0	0	72	0	1	0	0	1	0	74	17	0	91	5	4	4	0	13	177
<b>Total</b>	<b>17</b>	<b>243</b>	<b>2</b>	<b>0</b>	<b>262</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>7</b>	<b>281</b>	<b>60</b>	<b>0</b>	<b>348</b>	<b>27</b>	<b>11</b>	<b>19</b>	<b>0</b>	<b>57</b>	<b>668</b>
Grand Total	60	501	4	0	565	0	4	2	0	6	18	576	103	0	697	55	21	46	0	122	1390
Approach %	10.6	88.7	0.7	0.0		0.0	66.7	33.3	0.0		2.6	82.6	14.8	0.0		45.1	17.2	37.7	0.0		
Total %	4.3	36.0	0.3	0.0	40.6	0.0	0.3	0.1	0.0	0.4	1.3	41.4	7.4	0.0	50.1	4.0	1.5	3.3	0.0	8.8	
Exiting Leg Total	622					43					558					167					1390
Cars	60	497	4	0	561	0	4	2	0	6	18	562	102	0	682	53	21	46	0	120	1369
% Cars	100.0	99.2	100.0	0.0	99.3	0.0	100.0	100.0	0.0	100.0	100.0	97.6	99.0	0.0	97.8	96.4	100.0	100.0	0.0	98.4	98.5
Exiting Leg Total	608					43					552					166					1369
Heavy Vehicles	0	4	0	0	4	0	0	0	0	0	0	14	1	0	15	2	0	0	0	2	21
% Heavy Vehicles	0.0	0.8	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	2.4	1.0	0.0	2.2	3.6	0.0	0.0	0.0	1.6	1.5
Exiting Leg Total	14					0					6					1					21

Peak Hour Analysis from 04:00 PM to 06:00 PM begins at:

	Nantasket Avenue					Parking Lot					Nantasket Avenue					Wharf Avenue					Total
	from North					from East					from South					from West					
	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	
4:00 PM	16	68	1	0	85	0	2	0	0	2	1	72	11	0	84	5	1	8	0	14	185
4:15 PM	11	69	0	0	80	0	1	1	0	2	7	70	11	0	88	7	0	4	0	11	181
4:30 PM	6	67	0	0	73	0	0	1	0	1	2	74	10	0	86	9	3	10	0	22	182
4:45 PM	10	54	1	0	65	0	0	0	0	0	1	79	11	0	91	7	6	5	0	18	174
Total Volume	43	258	2	0	303	0	3	2	0	5	11	295	43	0	349	28	10	27	0	65	722
% Approach Total	14.2	85.1	0.7	0.0		0.0	60.0	40.0	0.0		3.2	84.5	12.3	0.0		43.1	15.4	41.5	0.0		
PHF	0.672	0.935	0.500	0.000	0.891	0.000	0.375	0.500	0.000	0.625	0.393	0.934	0.977	0.000	0.959	0.778	0.417	0.675	0.000	0.739	0.976
Cars	43	257	2	0	302	0	3	2	0	5	11	285	42	0	338	26	10	27	0	63	708
Cars %	100.0	99.6	100.0	0.0	99.7	0.0	100.0	100.0	0.0	100.0	100.0	96.6	97.7	0.0	96.8	92.9	100.0	100.0	0.0	96.9	98.1
Heavy Vehicles	0	1	0	0	1	0	0	0	0	0	0	10	1	0	11	2	0	0	0	2	14
Heavy Vehicles %	0.0	0.4	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	3.4	2.3	0.0	3.2	7.1	0.0	0.0	0.0	3.1	1.9
Cars Enter Leg	43	257	2	0	302	0	3	2	0	5	11	285	42	0	338	26	10	27	0	63	708
Heavy Enter Leg	0	1	0	0	1	0	0	0	0	0	0	10	1	0	11	2	0	0	0	2	14
Total Entering Leg	43	258	2	0	303	0	3	2	0	5	11	295	43	0	349	28	10	27	0	65	722
Cars Exiting Leg	312					23					285					88					708
Heavy Exiting Leg	10					0					3					1					14
Total Exiting Leg	322					23					288					89					722



PDI File #: **228818 B**  
 Location: **N: Nantasket Avenue S: Nantasket Avenue**  
 Location: **E: Parking Lot W: Wharf Avenue**  
 City, State: **Hull, MA**  
 Client: **TEC/K. Dandrade**  
 Site Code: **T0597.03**  
 Count Date: **Saturday, August 20, 2022**  
 Start Time: **12:00 PM**  
 End Time: **2:00 PM**  
 Class:



**Cars and Heavy Vehicles (Combined)**

	Nantasket Avenue					Parking Lot					Nantasket Avenue					Wharf Avenue					Total
	from North					from East					from South					from West					
	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	
12:00 PM	13	57	1	0	71	0	0	0	0	0	4	80	12	0	96	12	2	18	0	32	199
12:15 PM	3	75	4	0	82	0	0	0	0	0	2	96	23	0	121	10	6	13	0	29	232
12:30 PM	8	57	1	0	66	0	0	0	0	0	3	84	16	0	103	12	1	18	0	31	200
12:45 PM	9	74	1	0	84	0	0	1	0	1	5	82	25	0	112	16	0	12	0	28	225
<b>Total</b>	<b>33</b>	<b>263</b>	<b>7</b>	<b>0</b>	<b>303</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>14</b>	<b>342</b>	<b>76</b>	<b>0</b>	<b>432</b>	<b>50</b>	<b>9</b>	<b>61</b>	<b>0</b>	<b>120</b>	<b>856</b>
1:00 PM	8	70	3	0	81	1	0	0	0	1	5	71	25	0	101	15	3	22	0	40	223
1:15 PM	12	79	2	0	93	0	0	0	0	0	7	91	26	0	124	10	2	19	0	31	248
1:30 PM	11	79	1	2	93	0	0	0	0	0	6	85	20	0	111	19	1	28	0	48	252
1:45 PM	17	76	1	0	94	0	0	0	0	0	4	87	23	0	114	3	8	13	0	24	232
<b>Total</b>	<b>48</b>	<b>304</b>	<b>7</b>	<b>2</b>	<b>361</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>22</b>	<b>334</b>	<b>94</b>	<b>0</b>	<b>450</b>	<b>47</b>	<b>14</b>	<b>82</b>	<b>0</b>	<b>143</b>	<b>955</b>
Grand Total	81	567	14	2	664	1	0	1	0	2	36	676	170	0	882	97	23	143	0	263	1811
Approach %	12.2	85.4	2.1	0.3		50.0	0.0	50.0	0.0		4.1	76.6	19.3	0.0		36.9	8.7	54.4	0.0		
Total %	4.5	31.3	0.8	0.1	36.7	0.1	0.0	0.1	0.0	0.1	2.0	37.3	9.4	0.0	48.7	5.4	1.3	7.9	0.0	14.5	
Exiting Leg Total	822					73					665					251					1811
Cars	79	551	14	2	646	1	0	1	0	2	36	667	170	0	873	96	23	143	0	262	1783
% Cars	97.5	97.2	100.0	100.0	97.3	100.0	0.0	100.0	0.0	100.0	100.0	98.7	100.0	0.0	99.0	99.0	100.0	100.0	0.0	99.6	98.5
Exiting Leg Total	813					73					648					249					1783
Heavy Vehicles	2	16	0	0	18	0	0	0	0	0	0	9	0	0	9	1	0	0	0	1	28
% Heavy Vehicles	2.5	2.8	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.4	1.5
Exiting Leg Total	9					0					17					2					28

Peak Hour Analysis from 12:00 PM to 02:00 PM begins at:

	Nantasket Avenue					Parking Lot					Nantasket Avenue					Wharf Avenue					Total
	from North					from East					from South					from West					
	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	
1:00 PM	8	70	3	0	81	1	0	0	0	1	5	71	25	0	101	15	3	22	0	40	223
1:15 PM	12	79	2	0	93	0	0	0	0	0	7	91	26	0	124	10	2	19	0	31	248
1:30 PM	11	79	1	2	93	0	0	0	0	0	6	85	20	0	111	19	1	28	0	48	252
1:45 PM	17	76	1	0	94	0	0	0	0	0	4	87	23	0	114	3	8	13	0	24	232
<b>Total Volume</b>	<b>48</b>	<b>304</b>	<b>7</b>	<b>2</b>	<b>361</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>22</b>	<b>334</b>	<b>94</b>	<b>0</b>	<b>450</b>	<b>47</b>	<b>14</b>	<b>82</b>	<b>0</b>	<b>143</b>	<b>955</b>
% Approach Total	13.3	84.2	1.9	0.6		100.0	0.0	0.0	0.0		4.9	74.2	20.9	0.0		32.9	9.8	57.3	0.0		
PHF	0.706	0.962	0.583	0.250	0.960	0.250	0.000	0.000	0.000	0.250	0.786	0.918	0.904	0.000	0.907	0.618	0.438	0.732	0.000	0.745	0.947
Cars	47	296	7	2	352	1	0	0	0	1	22	332	94	0	448	47	14	82	0	143	944
Cars %	97.9	97.4	100.0	100.0	97.5	100.0	0.0	0.0	0.0	100.0	100.0	99.4	100.0	0.0	99.6	100.0	100.0	100.0	0.0	100.0	98.8
Heavy Vehicles	1	8	0	0	9	0	0	0	0	0	0	2	0	2	2	0	0	0	0	0	11
Heavy Vehicles %	2.1	2.6	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	1.2
Cars Enter Leg	47	296	7	2	352	1	0	0	0	1	22	332	94	0	448	47	14	82	0	143	944
Heavy Enter Leg	1	8	0	0	9	0	0	0	0	0	0	2	0	2	2	0	0	0	0	0	11
<b>Total Entering Leg</b>	<b>48</b>	<b>304</b>	<b>7</b>	<b>2</b>	<b>361</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>22</b>	<b>334</b>	<b>94</b>	<b>0</b>	<b>450</b>	<b>47</b>	<b>14</b>	<b>82</b>	<b>0</b>	<b>143</b>	<b>955</b>
Cars Exiting Leg	417					43					343					141					944
Heavy Exiting Leg	2					0					8					1					11
<b>Total Exiting Leg</b>	<b>419</b>					<b>43</b>					<b>351</b>					<b>142</b>					<b>955</b>

PDI File #: **228818 C**  
 Location: **N: George Washington Blvd S: George Washington Blvd**  
 Location: **E: Wharf Avenue W: Wharf Ave/Driveway**  
 City, State: **Hull, MA**  
 Client: **TEC/K. Dandrade**  
 Site Code: **T0597.03**  
 Count Date: **Thursday, August 18, 2022**  
 Start Time: **4:00 PM**  
 End Time: **6:00 PM**  
 Class:



**Cars and Heavy Vehicles (Combined)**

	George Washington Blvd					Wharf Avenue					George Washington Blvd					Wharf Ave/Driveway					Total
	from North					from East					from South					from West					
	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	
4:00 PM	0	98	3	0	101	0	1	28	0	29	10	150	3	0	163	6	1	2	0	9	302
4:15 PM	0	120	5	0	125	3	3	17	0	23	6	147	5	0	158	1	0	1	0	2	308
4:30 PM	1	123	8	0	132	6	0	11	0	17	13	179	1	0	193	1	1	0	0	2	344
4:45 PM	1	129	5	0	135	6	1	13	1	21	12	170	1	0	183	0	1	1	0	2	341
<b>Total</b>	<b>2</b>	<b>470</b>	<b>21</b>	<b>0</b>	<b>493</b>	<b>15</b>	<b>5</b>	<b>69</b>	<b>1</b>	<b>90</b>	<b>41</b>	<b>646</b>	<b>10</b>	<b>0</b>	<b>697</b>	<b>8</b>	<b>3</b>	<b>4</b>	<b>0</b>	<b>15</b>	<b>1295</b>
5:00 PM	5	123	5	0	133	2	2	18	0	22	9	159	3	0	171	4	0	2	0	6	332
5:15 PM	3	113	2	0	118	4	0	14	0	18	11	137	5	0	153	3	0	1	0	4	293
5:30 PM	1	94	2	0	97	3	2	12	0	17	14	170	4	0	188	0	0	2	0	2	304
5:45 PM	5	105	1	0	111	3	5	18	0	26	10	137	5	0	152	3	0	0	0	3	292
<b>Total</b>	<b>14</b>	<b>435</b>	<b>10</b>	<b>0</b>	<b>459</b>	<b>12</b>	<b>9</b>	<b>62</b>	<b>0</b>	<b>83</b>	<b>44</b>	<b>603</b>	<b>17</b>	<b>0</b>	<b>664</b>	<b>10</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>15</b>	<b>1221</b>
Grand Total	16	905	31	0	952	27	14	131	1	173	85	1249	27	0	1361	18	3	9	0	30	2516
Approach %	1.7	95.1	3.3	0.0		15.6	8.1	75.7	0.6		6.2	91.8	2.0	0.0		60.0	10.0	30.0	0.0		
Total %	0.6	36.0	1.2	0.0	37.8	1.1	0.6	5.2	0.0	6.9	3.4	49.6	1.1	0.0	54.1	0.7	0.1	0.4	0.0	1.2	
Exiting Leg Total	1285					120					1054					57					2516
Cars	16	890	31	0	937	27	14	130	1	172	84	1244	27	0	1355	18	3	9	0	30	2494
% Cars	100.0	98.3	100.0	0.0	98.4	100.0	100.0	99.2	100.0	99.4	98.8	99.6	100.0	0.0	99.6	100.0	100.0	100.0	0.0	100.0	99.1
Exiting Leg Total	1280					119					1038					57					2494
Heavy Vehicles	0	15	0	0	15	0	0	1	0	1	1	5	0	0	6	0	0	0	0	0	22
% Heavy Vehicles	0.0	1.7	0.0	0.0	1.6	0.0	0.0	0.8	0.0	0.6	1.2	0.4	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.9
Exiting Leg Total	5					1					16					0					22

Peak Hour Analysis from 04:00 PM to 06:00 PM begins at:

	George Washington Blvd					Wharf Avenue					George Washington Blvd					Wharf Ave/Driveway					Total
	from North					from East					from South					from West					
	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	
4:15 PM	0	120	5	0	125	3	3	17	0	23	6	147	5	0	158	1	0	1	0	2	308
4:30 PM	1	123	8	0	132	6	0	11	0	17	13	179	1	0	193	1	1	0	0	2	344
4:45 PM	1	129	5	0	135	6	1	13	1	21	12	170	1	0	183	0	1	1	0	2	341
5:00 PM	5	123	5	0	133	2	2	18	0	22	9	159	3	0	171	4	0	2	0	6	332
Total Volume	7	495	23	0	525	17	6	59	1	83	40	655	10	0	705	6	2	4	0	12	1325
% Approach Total	1.3	94.3	4.4	0.0		20.5	7.2	71.1	1.2		5.7	92.9	1.4	0.0		50.0	16.7	33.3	0.0		
PHF	0.350	0.959	0.719	0.000	0.972	0.708	0.500	0.819	0.250	0.902	0.769	0.915	0.500	0.000	0.913	0.375	0.500	0.500	0.000	0.500	0.963
Cars	7	488	23	0	518	17	6	58	1	82	39	650	10	0	699	6	2	4	0	12	1311
Cars %	100.0	98.6	100.0	0.0	98.7	100.0	100.0	98.3	100.0	98.8	97.5	99.2	100.0	0.0	99.1	100.0	100.0	100.0	0.0	100.0	98.9
Heavy Vehicles	0	7	0	0	7	0	0	1	0	1	1	5	0	0	6	0	0	0	0	0	14
Heavy Vehicles %	0.0	1.4	0.0	0.0	1.3	0.0	0.0	1.7	0.0	1.2	2.5	0.8	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	1.1
Cars Enter Leg	7	488	23	0	518	17	6	58	1	82	39	650	10	0	699	6	2	4	0	12	1311
Heavy Enter Leg	0	7	0	0	7	0	0	1	0	1	1	5	0	0	6	0	0	0	0	0	14
Total Entering Leg	7	495	23	0	525	17	6	59	1	83	40	655	10	0	705	6	2	4	0	12	1325
Cars Exiting Leg	671					65					552					23					1311
Heavy Exiting Leg	5					1					8					0					14
Total Exiting Leg	676					66					560					23					1325

PDI File #: **228818 C**  
 Location: **N: George Washington Blvd S: George Washington Blvd**  
 Location: **E: Wharf Avenue W: Wharf Ave/Driveway**  
 City, State: **Hull, MA**  
 Client: **TEC/K. Dandrade**  
 Site Code: **T0597.03**  
 Count Date: **Saturday, August 20, 2022**  
 Start Time: **12:00 PM**  
 End Time: **2:00 PM**  
 Class:



**Cars and Heavy Vehicles (Combined)**

	George Washington Blvd					Wharf Avenue					George Washington Blvd					Wharf Ave/Driveway					Total
	from North					from East					from South					from West					
	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	
12:00 PM	2	138	6	0	146	4	1	23	1	29	26	165	1	0	192	1	0	2	0	3	370
12:15 PM	3	121	4	0	128	4	3	17	0	24	24	205	4	0	233	2	1	2	0	5	390
12:30 PM	2	129	7	0	138	8	4	15	0	27	19	177	2	0	198	0	3	1	0	4	367
12:45 PM	3	115	3	0	121	10	1	25	1	37	24	215	2	0	241	3	0	1	0	4	403
<b>Total</b>	10	503	20	0	533	26	9	80	2	117	93	762	9	0	864	6	4	6	0	16	1530
1:00 PM	5	135	4	0	144	8	0	23	1	32	33	191	4	0	228	3	1	0	0	4	408
1:15 PM	2	122	2	0	126	7	3	25	0	35	29	179	3	0	211	3	3	1	0	7	379
1:30 PM	2	140	4	0	146	6	2	26	0	34	36	180	5	0	221	1	3	0	0	4	405
1:45 PM	2	121	1	0	124	15	0	25	0	40	21	177	3	0	201	4	1	3	0	8	373
<b>Total</b>	11	518	11	0	540	36	5	99	1	141	119	727	15	0	861	11	8	4	0	23	1565
Grand Total	21	1021	31	0	1073	62	14	179	3	258	212	1489	24	0	1725	17	12	10	0	39	3095
Approach %	2.0	95.2	2.9	0.0		24.0	5.4	69.4	1.2		12.3	86.3	1.4	0.0		43.6	30.8	25.6	0.0		
Total %	0.7	33.0	1.0	0.0	34.7	2.0	0.5	5.8	0.1	8.3	6.8	48.1	0.8	0.0	55.7	0.5	0.4	0.3	0.0	1.3	
Exiting Leg Total	1561					258					1217					59					3095
Cars	21	1013	31	0	1065	61	14	178	3	256	211	1477	23	0	1711	17	12	10	0	39	3071
% Cars	100.0	99.2	100.0	0.0	99.3	98.4	100.0	99.4	100.0	99.2	99.5	99.2	95.8	0.0	99.2	100.0	100.0	100.0	0.0	100.0	99.2
Exiting Leg Total	1548					257					1208					58					3071
Heavy Vehicles	0	8	0	0	8	1	0	1	0	2	1	12	1	0	14	0	0	0	0	0	24
% Heavy Vehicles	0.0	0.8	0.0	0.0	0.7	1.6	0.0	0.6	0.0	0.8	0.5	0.8	4.2	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.8
Exiting Leg Total	13					1					9					1					24

Peak Hour Analysis from 12:00 PM to 02:00 PM begins at:

12:45 PM	George Washington Blvd					Wharf Avenue					George Washington Blvd					Wharf Ave/Driveway					Total
	from North					from East					from South					from West					
	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	
12:45 PM	3	115	3	0	121	10	1	25	1	37	24	215	2	0	241	3	0	1	0	4	403
1:00 PM	5	135	4	0	144	8	0	23	1	32	33	191	4	0	228	3	1	0	0	4	408
1:15 PM	2	122	2	0	126	7	3	25	0	35	29	179	3	0	211	3	3	1	0	7	379
1:30 PM	2	140	4	0	146	6	2	26	0	34	36	180	5	0	221	1	3	0	0	4	405
Total Volume	12	512	13	0	537	31	6	99	2	138	122	765	14	0	901	10	7	2	0	19	1595
% Approach Total	2.2	95.3	2.4	0.0		22.5	4.3	71.7	1.4		13.5	84.9	1.6	0.0		52.6	36.8	10.5	0.0		
PHF	0.600	0.914	0.813	0.000	0.920	0.775	0.500	0.952	0.500	0.932	0.847	0.890	0.700	0.000	0.935	0.833	0.583	0.500	0.000	0.679	0.977
Cars	12	508	13	0	533	31	6	99	2	138	122	760	14	0	896	10	7	2	0	19	1586
Cars %	100.0	99.2	100.0	0.0	99.3	100.0	100.0	100.0	100.0	100.0	100.0	99.3	100.0	0.0	99.4	100.0	100.0	100.0	0.0	100.0	99.4
Heavy Vehicles	0	4	0	0	4	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	9
Heavy Vehicles %	0.0	0.8	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.6
Cars Enter Leg	12	508	13	0	533	31	6	99	2	138	122	760	14	0	896	10	7	2	0	19	1586
Heavy Enter Leg	0	4	0	0	4	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	9
Total Entering Leg	12	512	13	0	537	31	6	99	2	138	122	765	14	0	901	10	7	2	0	19	1595
Cars Exiting Leg	793					144					617					32					1586
Heavy Exiting Leg	5					0					4					0					9
Total Exiting Leg	798					144					621					32					1595

## **Appendix C**

MassDOT Seasonal Adjustment Data

Massachusetts Highway Department  
 Statewide Traffic Data Collection  
 2015 Weekday Seasonal Factors

Factor Group	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Axle Factor
R1	1.24	1.26	1.21	1.09	0.98	0.96	0.88	0.88	1.02	1.02	1.04	1.09	0.90
R2	1.14	1.09	1.06	1.00	0.94	0.90	0.89	0.87	0.94	0.94	1.01	0.99	0.98
R3	1.12	1.16	1.07	0.98	0.93	0.90	0.91	0.89	0.95	0.95	0.95	1.02	0.96
R4-R7	1.15	1.11	1.10	1.04	0.93	0.91	0.88	0.89	0.92	0.94	1.01	1.04	0.93
U1-Boston	1.02	1.15	0.98	0.97	0.95	0.92	0.91	0.90	0.94	0.92	0.97	0.96	0.95
U1-Essex	1.09	1.17	1.04	1.01	0.95	0.91	0.87	0.88	0.93	0.94	0.99	1.01	0.92
U1-Southeast	1.16	1.25	1.07	0.99	0.93	0.89	0.86	0.85	0.91	0.93	0.98	0.98	0.94
U1-West	1.03	1.04	1.00	0.95	0.91	0.91	0.91	0.91	0.91	0.90	0.95	0.98	0.93
U1-Worcester	1.07	1.39	1.09	1.02	0.97	0.93	0.92	0.91	0.96	0.97	1.00	1.03	0.91
U2	1.12	1.20	1.03	0.97	0.92	0.89	0.87	0.87	0.91	0.93	0.98	0.99	0.96
U3	1.05	1.09	1.01	0.96	0.92	0.91	0.90	0.91	0.94	0.93	0.97	0.97	0.95
U4-U7	1.10	1.09	1.01	0.96	0.92	0.88	0.90	0.90	0.90	0.92	0.96	0.97	0.93

Round off:

0-999 = 10

>1000 = 100

U = Urban

R= Rural

1 - Interstate

2 - Freeway and Expressway

3 - Other Principal Arterial

4 - Minor Arterial

5 - Major Collector

6 - Minor Collector

7 - Local Road and Street

## **Appendix D**

Historic Traffic Data



Location Info	
Location ID	7006
Type	I-SECTION
Functional Class	4
Located On	HULL STREET
NORTH OF	CANTERBURY STREET
Direction	2-WAY
Community	Hingham
MPO_ID	
HPMS ID	1.31018E+11
Agency	Massachusetts Highway Department

Count Data Info	
Start Date	9/24/2019
End Date	9/25/2019
Start Time	12:00 PM
End Time	12:00 PM
Direction	
Notes	
Count Source	
File Name	
Weather	
Study	
Owner	mhdcov
QC Status	Accepted

Interval: 15 mins					
Time	15 Min				Hourly Count
	1st	2nd	3rd	4th	
00:00 - 01:00	1	3	1	2	7
01:00 - 02:00	1	4	1	0	6
02:00 - 03:00	0	0	0	0	0
03:00 - 04:00	0	2	3	4	9
04:00 - 05:00	3	1	4	3	11
05:00 - 06:00	5	10	19	14	48
06:00 - 07:00	19	25	51	57	152
07:00 - 08:00	67	73	82	74	296
08:00 - 09:00	84	86	84	79	333
09:00 - 10:00	59	52	74	73	258
10:00 - 11:00	77	66	74	76	293
11:00 - 12:00	84	89	77	71	321
12:00 - 13:00	97	88	107	112	404
13:00 - 14:00	88	86	82	79	335
14:00 - 15:00	83	88	103	86	360
15:00 - 16:00	82	93	89	94	358
16:00 - 17:00	80	88	94	82	344
17:00 - 18:00	80	100	101	80	361
18:00 - 19:00	83	100	91	85	359
19:00 - 20:00	62	55	55	40	212
20:00 - 21:00	40	33	36	33	142
21:00 - 22:00	27	29	18	14	88
22:00 - 23:00	18	15	10	10	53
23:00 - 24:00	5	6	5	5	21
TOTAL					4771

Location Info	
Location ID	7006
Type	I-SECTION
Functional Class	4
Located On	HULL STREET
NORTH OF	CANTERBURY STREET
Direction	2-WAY
Community	Hingham
MPO_ID	
HPMS ID	1.31018E+11
Agency	Massachusetts Highway Department

Count Data Info	
Start Date	5/17/2016
End Date	5/18/2016
Start Time	10:00 AM
End Time	10:00 AM
Direction	
Notes	
Count Source	
File Name	
Weather	
Study	
Owner	mhd1
QC Status	Accepted

Interval: 15 mins					
Time	15 Min				Hourly Count
	1st	2nd	3rd	4th	
00:00 - 01:00	6	7	3	0	16
01:00 - 02:00	4	0	1	0	5
02:00 - 03:00	1	1	1	1	4
03:00 - 04:00	1	0	1	3	5
04:00 - 05:00	0	4	4	6	14
05:00 - 06:00	7	7	15	19	48
06:00 - 07:00	30	42	48	57	177
07:00 - 08:00	94	86	79	87	346
08:00 - 09:00	62	74	111	83	330
09:00 - 10:00	80	69	79	89	317
10:00 - 11:00	59	71	84	71	285
11:00 - 12:00	84	78	84	91	337
12:00 - 13:00	75	72	91	79	317
13:00 - 14:00	82	90	96	75	343
14:00 - 15:00	90	80	96	91	357
15:00 - 16:00	87	100	109	92	388
16:00 - 17:00	108	93	76	81	358
17:00 - 18:00	88	107	82	96	373
18:00 - 19:00	113	80	69	65	327
19:00 - 20:00	59	53	61	55	228
20:00 - 21:00	44	46	53	50	193
21:00 - 22:00	37	42	20	31	130
22:00 - 23:00	23	21	12	8	64
23:00 - 24:00	9	6	6	6	27
TOTAL					4989

## **Appendix E**

MassDOT Annual Growth Data

# MassDOT Yearly Growth Rates

for data from 2014 to 2018

Growth					
Group	Grow 2014 to 2015	Grow 2015 to 2016	Grow 2016 to 2017	Grow 2017 to 2018	Grow 2018 to 2019
R1	0	0.023	0.004	0.018	0.016
R2	0.05	0.068	0.004	0.014	0.014
R3	-0.038	0.002	0.008	0.011	0.06
R4-7	-0.01	0.003	0.001	0.011	0.012
Rec - East		0.032	0.02	0.041	0.025
Rec - West		0.051	-0.008	0.029	0
U1-Boston	0.061	0.07	-0.003	0.012	0.006
U1-Essex	0.024	0.025	0.007	0.014	0.011
U1-Southeast	0.05	0.062	0.021	0.014	0
U1-West	0.03	-0.027	0.02	0.028	0.013
U1-Worcester	0.042	0.005	0.018	0.01	0.01
U2	0.04	0.048	0.008	0.01	0.02
U3	0.011	0.013	0.011	0.014	0.004
U4-7	0.023	0.062	0.017	0.003	-0.004

updated 5/1/2020

## **Appendix F**

Traffic Volume Progression







George Washington Blvd NBL	5	5	5	5	5	-4	-16	16	5	58%	14	75%	17	10%	3	49%	23	0	5
George Washington Blvd NBT	593	595	630	630	630	4			626									57	683
George Washington Blvd NBR	13	15	20	20	20				24									0	24
George Washington Blvd SBL	17	40	55	55	109				109									0	109
George Washington Blvd SBT	402	545	575	575	575		-68	35	507	58%	9	75%	17	10%	3	49%	5	34	541
George Washington Blvd SBR	10	10	10	10	10				10									0	10

Closure of Samoset Avenue NBL	10									100%	100%	24	15	100%	100%	22	22	90%	90%	26	28	100%	100%	46	11
Closure of Samoset Avenue NBT	85																								
Closure of Samoset Avenue NBR	10																								
Closure of Nantasket Avenue SBT	415	363	15	15	15																				

Closure of Nantasket Avenue SBT	415	363	15	15	15																				
		54																							
		54	Wharf	A																					
		54	Connector	B																					
		54	Water	C																					
		54	Edgewater	D																					
		54	Phipps	E																					
		39	Manomet	F																					
		54	Samoset	G																					
Closure of Hull Shore Drive Extension Entrance	115	Through	Bay	Parking																					
From GW to Nantasket via HSD	560	529	15	16																					
Edgewater U-Turn to Nantasket	5																								
Edgewater U-Turn to Samoset	10																								
From Nantasket S to Nantasket	305																								
From Nantasket to Nantasket across Wharf	31																								
From Nantasket to Nantasket via New Cut	31																								
From Nantasket to Nantasket across Water	31																								
From Nantasket to Nantasket across B (The Green North)	31																								
From Nantasket to Nantasket via Edgewater	61																								
From Nantasket to Nantasket via Phipps	31																								
From Nantasket to Nantasket via Samoset	89	60	29																						
From GW to Hull Shore Drive	20																								
From GW to Hull Shore Drive via Wharf	4																								
From GW to Hull Shore Drive via New Cut	3																								
From GW to Hull Shore Drive via Water	3																								
From GW to Hull Shore Drive via D (The Green South)	3																								
From GW to Hull Shore Drive via Edgewater	4																								
From GW to Hull Shore Drive via Phipps	3																								
From GW to Nantasket	35																								
From GW to Bay	15																								
From Nantasket to Samoset	35																								

From Nantasket to Samoset	35																								
From GW to Hull Shore Drive	20																								
From GW to Hull Shore Drive via Wharf	4																								
From GW to Hull Shore Drive via New Cut	3																								
From GW to Hull Shore Drive via Water	3																								
From GW to Hull Shore Drive via D (The Green South)	3																								
From GW to Hull Shore Drive via Edgewater	4																								
From GW to Hull Shore Drive via Phipps	3																								
From GW to Nantasket	35																								
From GW to Bay	15																								
From Nantasket to Samoset	35																								
DCR Northern Lot (Hull Shore Drive Extension) In	40																								
		A	16	10	14																				
		B			1																				
		C	1	1	1																				
		D	1	0	1																				
		E	1	1	2																				
		F	1	1																					
		G	1	1																					
		H	1	0																					
		I	2	1																					
		J		0																					
		K	1		1																				
		L	2	2	2																				
		M	1	1	1																				
		N	1	1	1																				
		O	2	1	2																				
		P	1	0																					
		Q	1	0	1																				
DCR Northern Lot (Hull Shore Drive Extension) Out	75																								
		A	35	22	18																				
		B			2																				
		C	2	1	1																				
		D	1	1	1																				
		E	4	3	2																				
		F	4	2																					
		G	2	1																					
		H	1	1																					
		I	5	3																					
		J		1																					
		K	1		1																				
		L	5	3	3																				



Nantasket Avenue NBT			985	1040	-35	1005	-197		20	828	13%	3	5%	5%	1	50%	50%	3	8%	4	11	839	
Nantasket Avenue SBT			815	860	-138	722			59	646	11%	4	5%	2	1	50%	4	3	17%	1%	8	18	664
Nantasket Avenue SBR		15	15	20		20				20											0	20	
<b>18 Nantasket Avenue @ Edgewater Road/Edgewater Road Extension</b>																							
Edgewater Road EBL		10	10	15		15				15	2%	1				50%	3	2%	1	3	18		
Edgewater Road EBT										0						30%	4	1%	1	1	6		
Edgewater Road EBR		20	20	25		25				25						10%	1	1%	0	1	1	26	
Edgewater Road Ext WBL								52	0	52	58%	16						1%	1	1	18	70	
Edgewater Road Ext WBT										0	1%	0						1%	0	0	0	0	
Edgewater Road Ext WBR									70	80	7%	2						5%	3	3	5	85	
Nantasket Avenue NB U-Turn		0	0	0	0	0				0											0	0	
Nantasket Avenue NBL		40	40	45		45				45	1%	0			10%			1%	0	0	1	46	
Nantasket Avenue NBT										990	6%	1						3%	1	1	3	736	
Nantasket Avenue NBR										25								2%	1	6	20	53	
Nantasket Avenue SB U-Turn		10	10	10		10		3	1	33	41%	13			1			12%	1	6	0	0	
Nantasket Avenue SBL		0	0	0		0				64	11%	4						3%	4%	1	2	7	71
Nantasket Avenue SBT										584								10%	5	0	7	591	
Nantasket Avenue SBR		15	15	20		20				20								1%	0	0	4	24	
<b>19 Nantasket Avenue @ New Street B (The Green North)</b>																							
B Street WBL						0			10	16								16%	7%	8	3	11	27
B Street WBR						0	35			45								3%	1	1	1	46	
Nantasket Avenue NBT			1005	1060	0	1060	-298			767	41%	13	1	5%	1	10%		10%	5%	5	23	790	
Nantasket Avenue SBT			830	880	-175	705				659	58%	16	2	5%	2	10%	10%	4%	11%	2	5	26	685
<b>20 Nantasket Avenue @ New Street D (The Green South)</b>																							
Nantasket Avenue NBT			1005	1060	0	1060	-298		5	769	41%	13	1	5%	1	10%		14%	1%	7	0	23	792
Nantasket Avenue NBR						0	3		20	27	17%	5						33%	14%	15	6	26	53
Nantasket Avenue SBL						0				22								3%	8%	2	4	6	28
Nantasket Avenue SBT			830	880	-175	705			9	650	58%	16	2	5%	2	10%	10%	13%	23%	6	10	35	685
<b>21 Nantasket Avenue @ Water Street/Bay Street</b>																							
Bay Street EBL						0				0								2%	0	0	0	0	0
Bay Street EBT		46	50	55		55				55	10%	3						38%	3	3	3	58	
Bay Street EBR		23	25	30		30				30	38%	10						37%	10	10	10	40	
Water Street WBL		151	90	95	0	95	-25		8	68	10%	4						28%	13	13	23	91	
Water Street WBT		37	40	45		45				45	13%	5						38%	3%	4	1	4	24
Water Street WBR						0	25			78	38%	14	1					13%	2%	7	1	14	39
Nantasket Avenue NBL						0			8	25	13%	5						38%	3%	4	1	14	39
Nantasket Avenue NBT						689	689	80		799	58%	19						47%	2%	21	40	839	
Nantasket Avenue NBR						0	3		30	4	37%	13			10%			2%	1	1	15	19	
Nantasket Avenue SBL		58	60	65	47	65			1	67	3%	1						1%	14%	0	6	7	74
Nantasket Avenue SBT		758	725	765	-222	543			7	526	58%	16	2	5%	2	10%	10%	1%	21%	9	26	552	
Nantasket Avenue SBR		42	45	50		50				50	2%	1						10%	1	1	1	51	
<b>22 Nantasket Avenue @ Parrot Lot Driveway</b>																							
Parrot Lot Driveway WBL			20	20		20				20											0	20	
Parrot Lot Driveway WBR						0				0											0	0	
Nantasket Avenue NBT						689	689	108		828	58%	19						75%	27	10%	1	69	897
Nantasket Avenue NBR						0			31	0											0	0	
Nantasket Avenue SBL			20	20		20				20											0	20	
Nantasket Avenue SBT			855	900	-222	678				624	58%	16	2	5%	2	10%	10%	49%	22	59	683		
<b>23 Nantasket Ave/George Washington Blvd @ Bay St</b>																							
Bay Street EBR		3	5	10	-10	0				0											0	0	
Bay Street EBR		66	70	75	10	85				85											0	85	
George Washington Blvd NBL		79	80	85		85				85											0	85	
George Washington Blvd NBT						689	689	108		828	58%	19						75%	27	10%	1	69	897
George Washington Blvd NBR		27	30	35	-35	0			31	0											0	0	
Nantasket Avenue SBT		313	315	325	-315	9				0											0	0	
Nantasket Avenue SBR		532	535	565	94	659				614	58%	16	2	5%	2	10%	10%	49%	22	59	673		
Nantasket Avenue SBR		23	25	30		30				30											0	30	
<b>24 Nantasket Avenue @ Hull Shore Drive (New Hull Shore Drive Connector)</b>																							
Hull Shore Drive EBT to EBL		720	725	765	-689	76	-42			3											0	3	
Hull Shore Drive EBR		0	0	0		92				92											0	92	
Hull Shore Drive WBL to SBT						222				265	22%	6						20%	5	10%	1	25	290
Hull Shore Drive SBR						0				11											0	11	
Nantasket Avenue NBL						0	35			35											0	35	
Nantasket Avenue NBT		482	485	510		510	-66			444	22%	7						20%	7	10%	1	28	472
Nantasket Avenue SBL		0	0	0		0				0											0	0	
Nantasket Avenue SBT		345	350	370	-361	9				345	22%	6	2	5%	2	10%	10%	28%	13	25	420		
<b>25 Nantasket Avenue @ DCR Lot 2 Exit</b>																							
DCR Lot 2 Driveway WBL			25	25		25				25											0	25	
DCR Lot 2 Driveway WBR						10				10											0	10	
Nantasket Avenue NBT			475	500		500	-31			469	22%	7						20%	7	10%	1	28	497
Nantasket Avenue SBT			350	370	-47	323				357	22%	6	2	5%	2	10%	10%	28%	13	25	382		
<b>26 Nantasket Avenue @ Wharf Avenue/DCR Lot 2 Enter</b>																							
Wharf Avenue EBL		78	80	85		85	4			89											0	89	
Wharf Avenue EBT		6	10	10		10				10											0	10	
Wharf Avenue EBR		55	55	60	47	107				107											0	107	
DCR Driveway 2 WBL		0	0	0		0				0											0	0	
DCR Driveway 2 WBT		0	0	0		0				0											0	0	
DCR Driveway 2 WBR		0	0	0		0				0											0	0	
Nantasket Avenue NBL		63	75	80		80	35			115											0	115	
Nantasket Avenue NBT		380	395	415		415	-35			380	22%	7						20%	7	10%	1	28	408
Nantasket Avenue NBR		12	15	15		15				15											0	15	
Nantasket Avenue SBL		7	10	10		10				10											0	10	
Nantasket Avenue SBT		281	320	335	-47	288				288	22%	6	2	5%	2	10%	10%	28%	13	25	313		
Nantasket Avenue SBR		44	45	50		50				84											0	84	
<b>27 Nantasket Avenue @ DCR Lot 3 (Pavilion) Driveway</b>																							
DCR Driveway 3 WBL			10	10		10</																	



## **Appendix G**

HRA Redevelopment Zone Trip Generation & Distribution





1"=150'

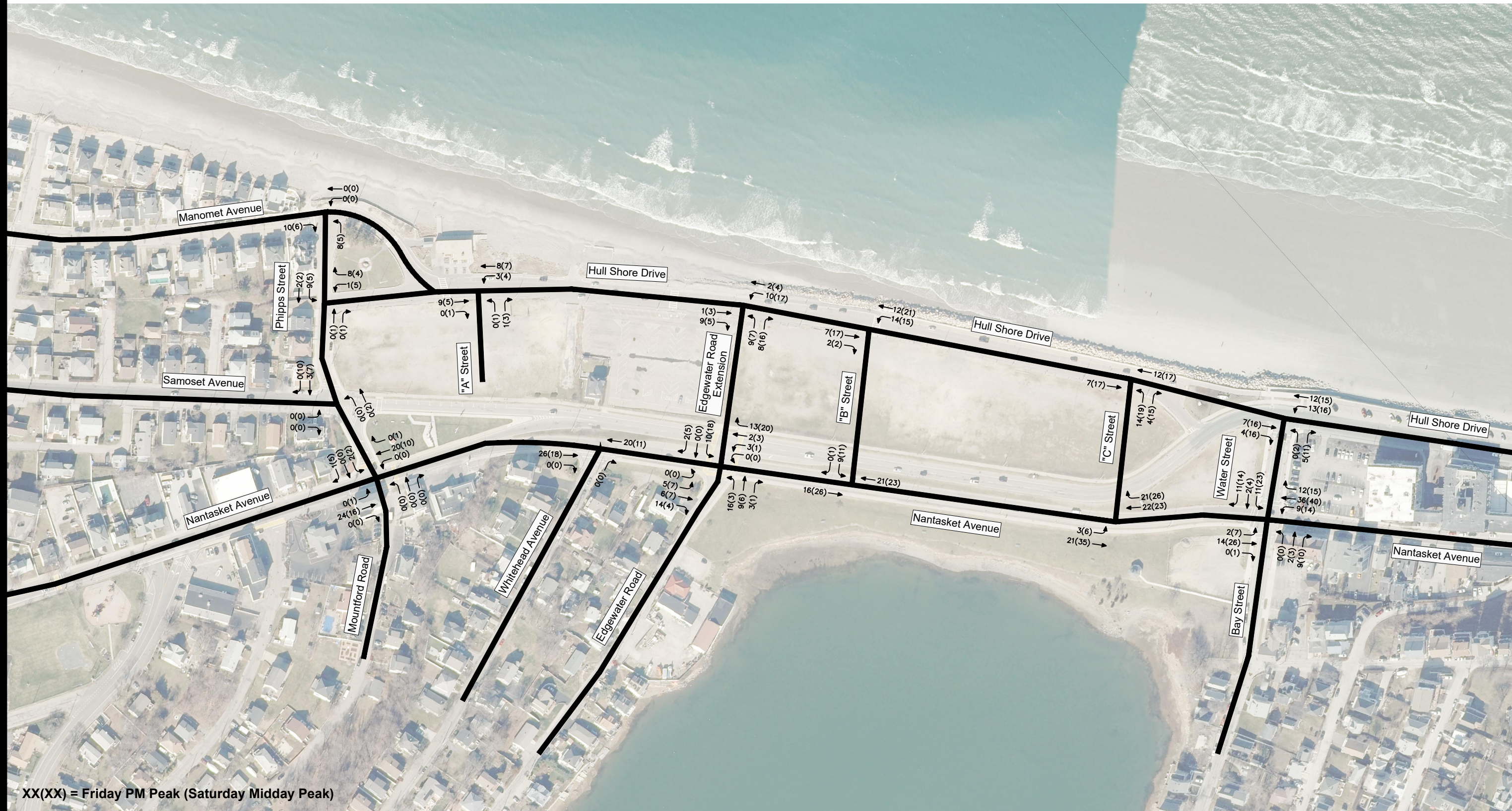


Figure G-1

HRA Redevelopment Zone  
Trip Generation Assignment  
Weekday Evening and Saturday Midday  
Peak Hour Traffic Volumes



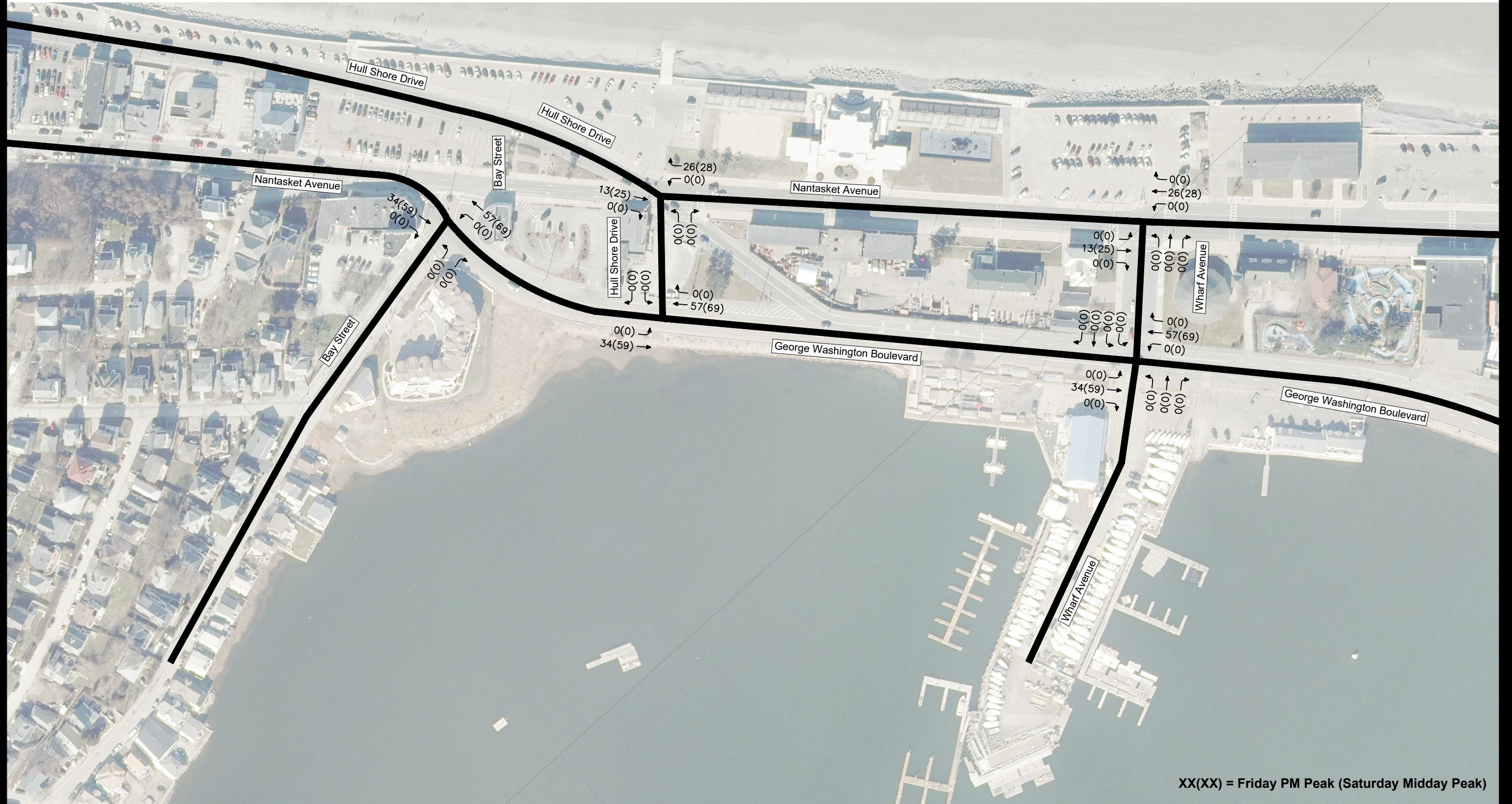
TEC, Inc.  
282 Merrimack Street  
Lawrence, MA 01843  
978-794-1792  
www.TheEngineeringCorp.com

T:\T0597\T0597.03\CAD\Highway\Graphics\T0597.03\_Graphical Traffic Networks.dwg 8/12/2022 12:17:54 PM





1"=150'



XX(XX) = Friday PM Peak (Saturday Midday Peak)

Figure G-2

HRA Redevelopment Zone  
Trip Generation Assignment  
Weekday Evening and Saturday Midday  
Peak Hour Traffic Volumes



TEC, Inc.  
282 Merrimack Street  
Lawrence, MA 01843  
978-794-1792  
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See Inset for Continuation





## CONCEPTUAL MASTER PLAN: ALT. 3A

### PROGRAM SUMMARY

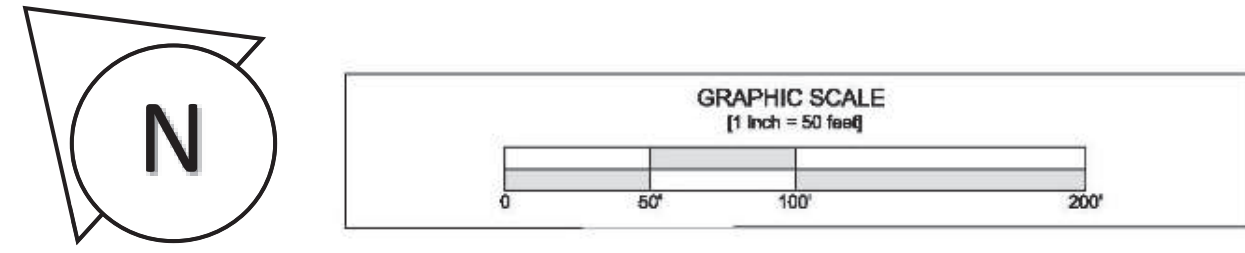
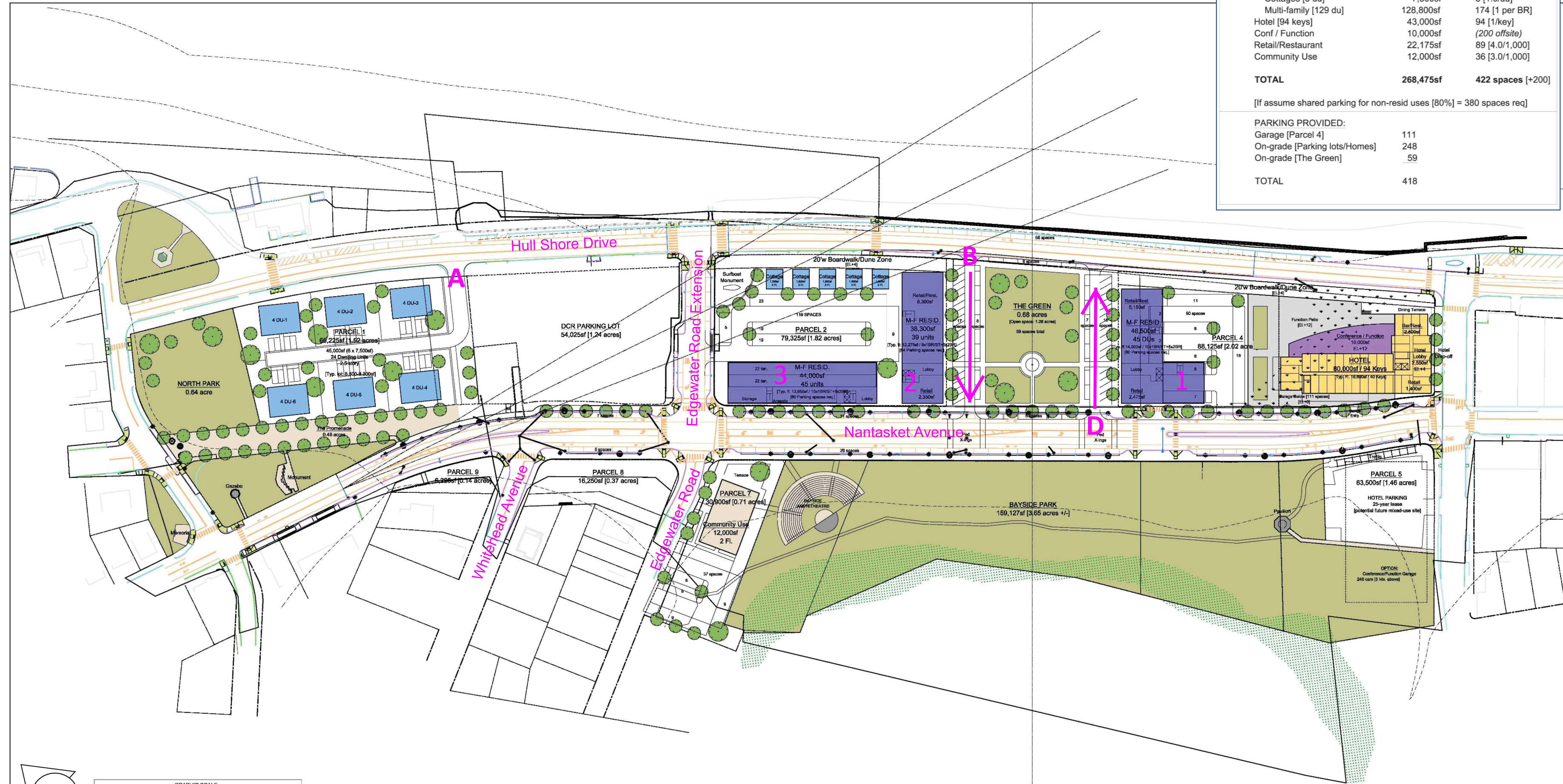
PROPOSED DEVELOPMENT:

Use	Area	Parking Req.
Residential: [158 du total]		
4-Unit Bldgs [24 du]	45,000sf	24 [1.0/du]
Cottages [5 du]	7,500sf	5 [1.0/du]
Multi-family [129 du]	128,800sf	174 [1 per BR]
Hotel [94 keys]	43,000sf	94 [1/key]
Conf / Function	10,000sf	(200 offsite)
Retail/Restaurant	22,175sf	89 [4.0/1,000]
Community Use	12,000sf	36 [3.0/1,000]
<b>TOTAL</b>	<b>268,475sf</b>	<b>422 spaces [+200]</b>

[If assume shared parking for non-resid uses [80%] = 380 spaces req]

PARKING PROVIDED:

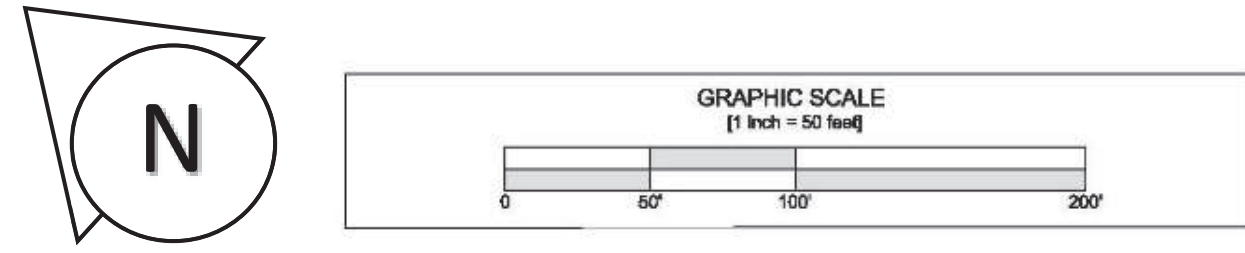
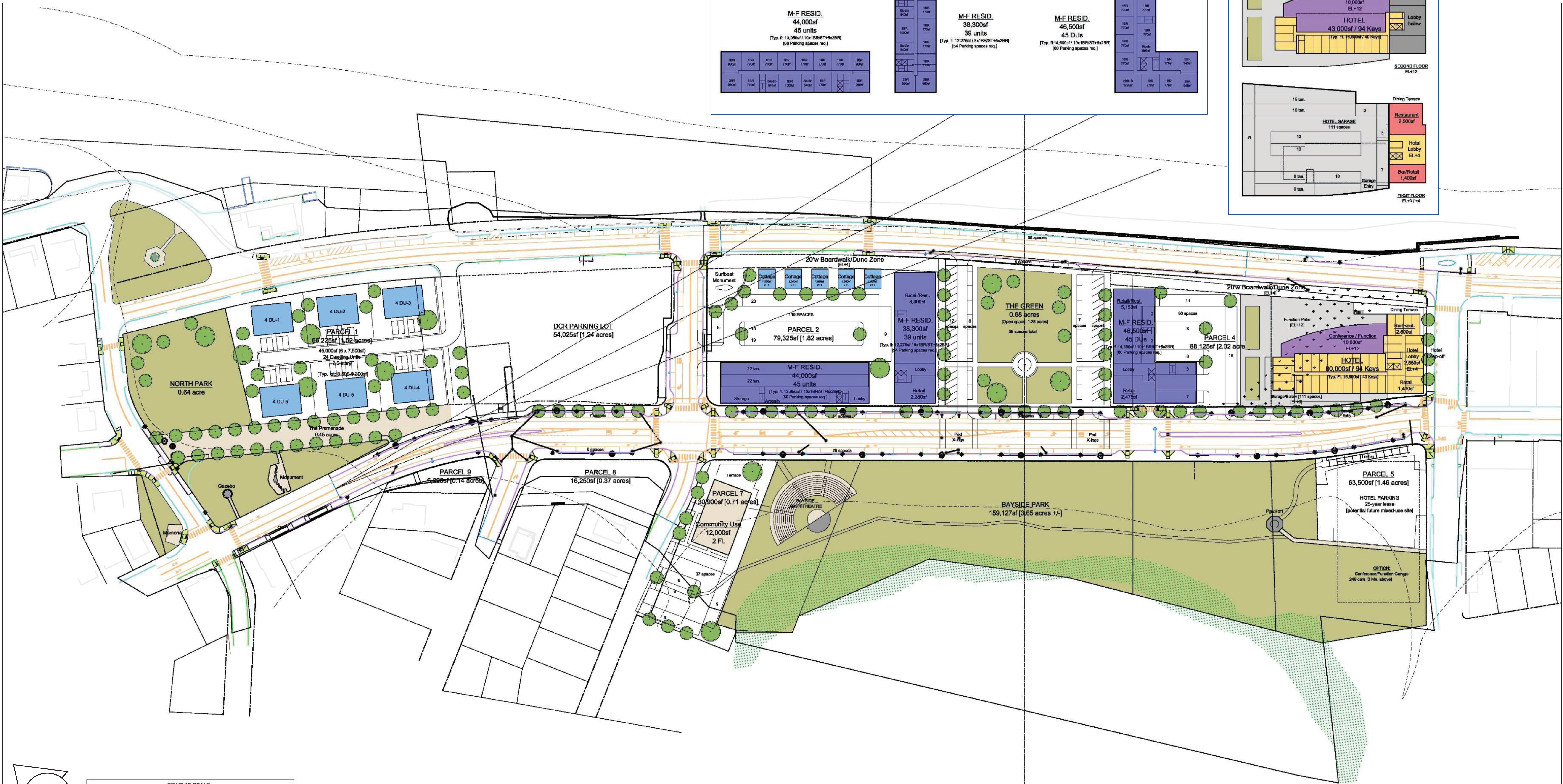
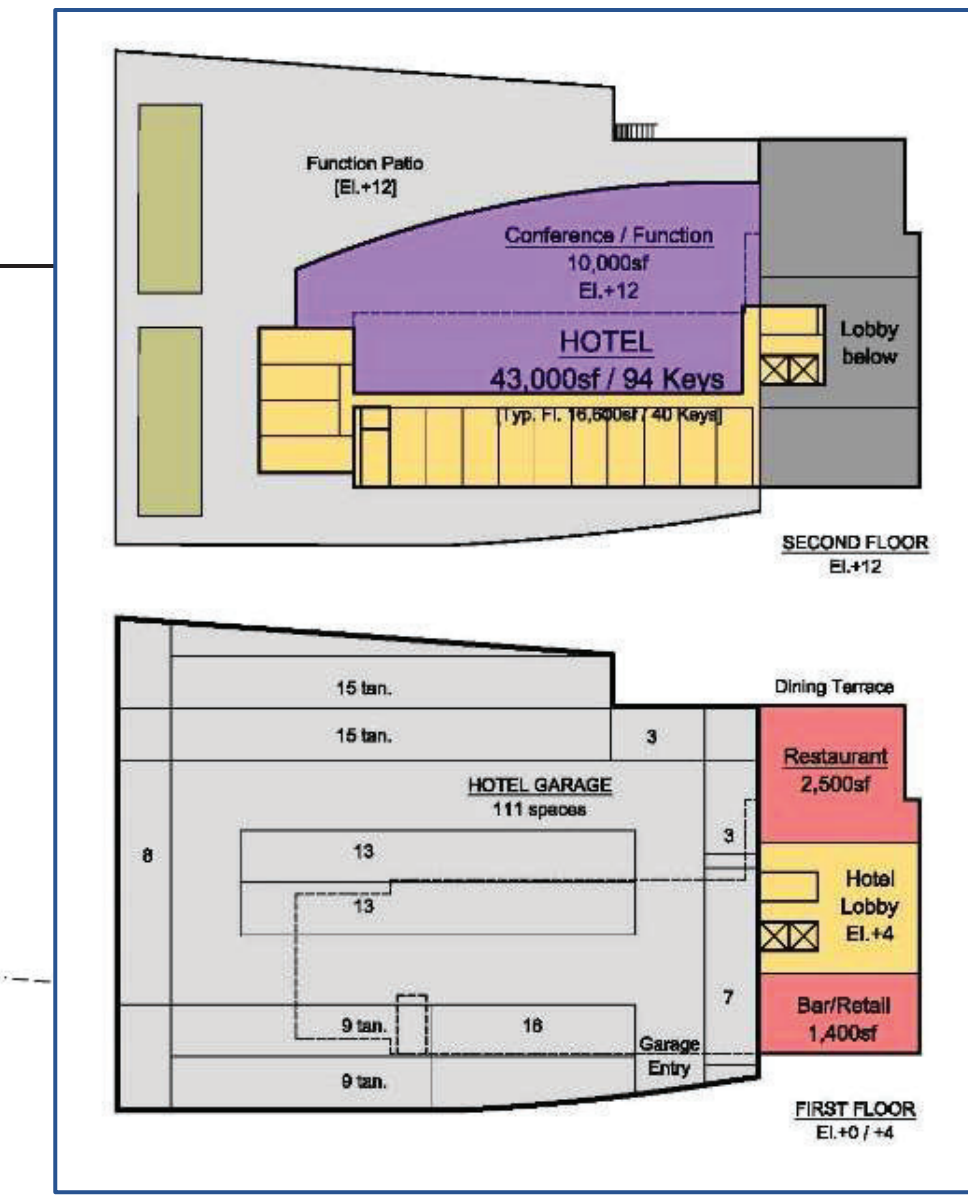
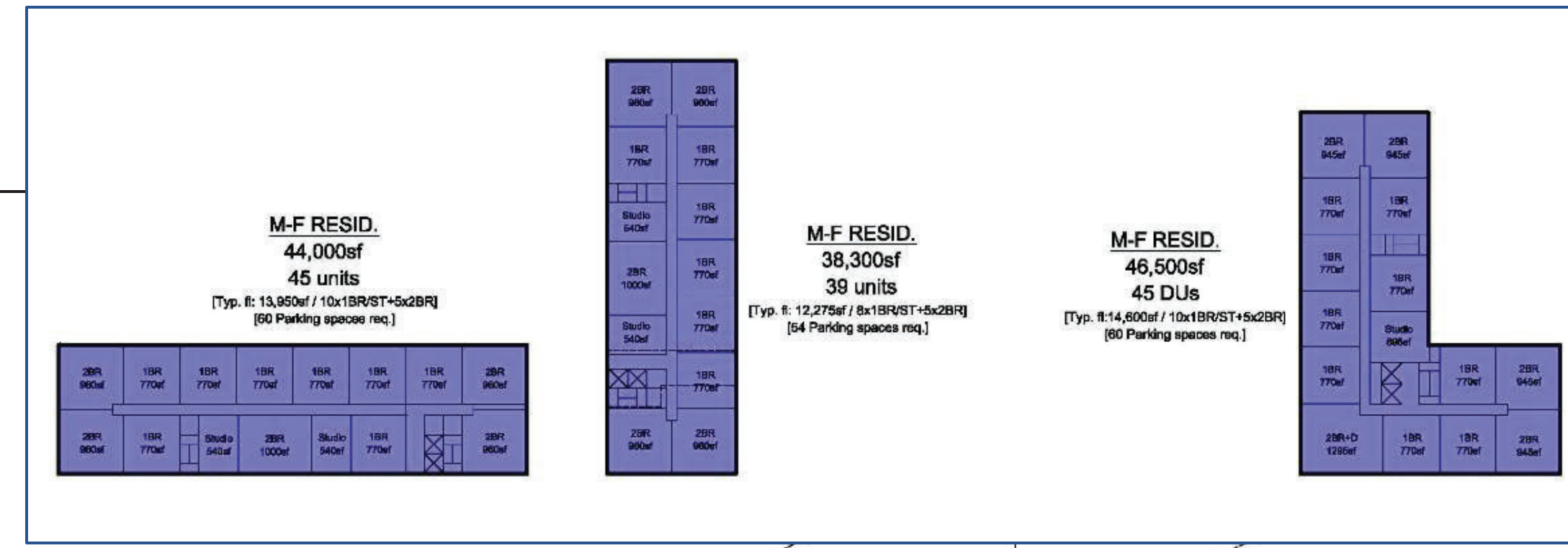
Garage [Parcel 4]	111
On-grade [Parking lots/Homes]	248
On-grade [The Green]	59
<b>TOTAL</b>	<b>418</b>







## CONCEPTUAL MASTER PLAN: ALT. 3A

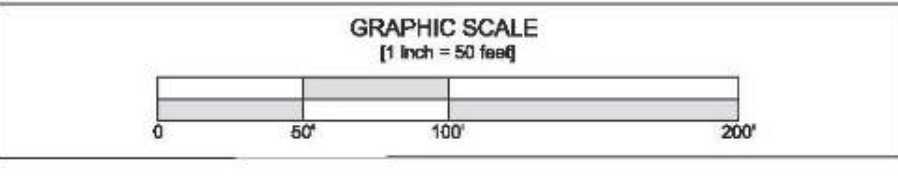
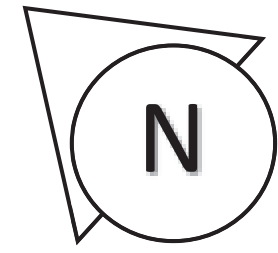
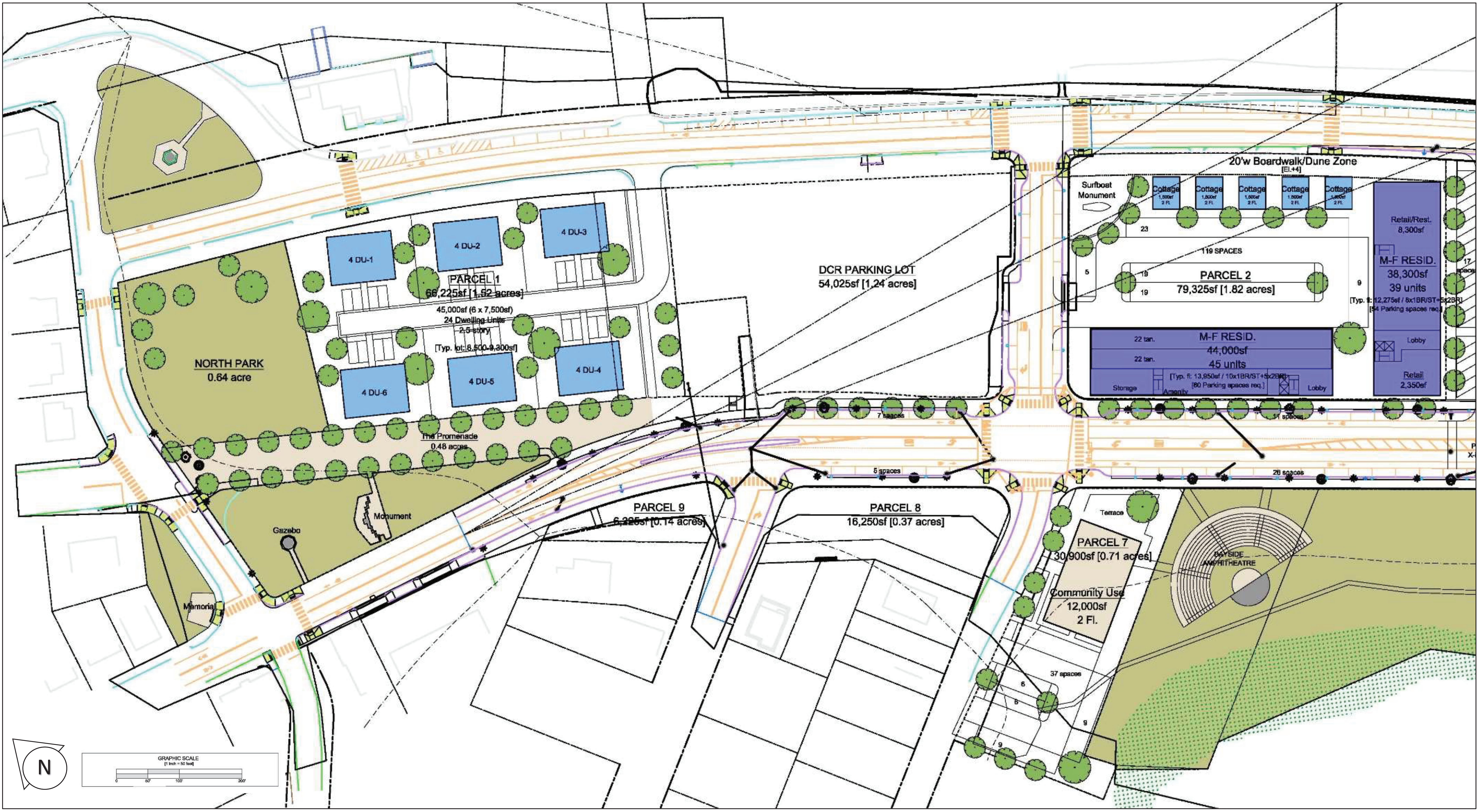






# CONCEPTUAL MASTER PLAN: ALT. 3A

## NORTH END





## Trip Generation Assessment

Project: Nantasket Beach Two-Way  
 Date: 7/12/2022  
 Analyst: TEC, Inc. / Samuel W. Gregorio, PE, PTOE, RSP  
 Source: Institute of Transportation Engineers - Trip Generation - 10th Ed.

### Proposed Development

#### Single Family Detached Housing (ITE LUC 210)

Units:	5 Units		Total Trips		% Distribution		# New Trips		Multi-Use Trips		Total New Pass-by Trips	Total New Primary Trips	# Passby Trips		# Primary Trips	
	Calc	New Trips	IN	OUT	IN	OUT	IN	OUT	IN	OUT			IN	OUT	IN	OUT
Weekday Daily	N/A	64	64	50%	50%	32	32	6	8	0	0	50	0	0	26	24
Weekday AM PH	N/A	5	5	26%	74%	1	4	0	1	0	4	0	0	1	3	
Weekday PM PH	N/A	6	6	63%	37%	4	2	2	1	0	3	0	0	2	1	
Saturday Daily	N/A	54	54	50%	50%	27	27	5	7	0	42	0	0	22	20	
Sat Midday PH	N/A	14	14	54%	46%	8	6	1	1	0	12	0	0	7	5	

#### Multi-Family Low Rise Housing (ITE LUC 220)

Units:	153 Units		Total Trips		% Distribution		# New Trips		Multi-Use Trips		Total New Pass-by Trips	Total New Primary Trips	# Passby Trips		# Primary Trips	
	Calc	New Trips	IN	OUT	IN	OUT	IN	OUT	IN	OUT			IN	OUT	IN	OUT
Weekday Daily	N/A	696	696	50%	50%	348	348	67	89	0	540	0	0	281	259	
Weekday AM PH	N/A	57	57	23%	77%	13	44	1	9	0	47	0	0	12	35	
Weekday PM PH	N/A	60	60	61%	39%	37	23	15	9	0	36	0	0	22	14	
Saturday Daily	N/A	696	696	50%	50%	348	348	68	97	0	531	0	0	280	251	
Sat Midday PH	N/A	63	63	50%	50%	32	31	5	8	0	50	0	0	27	23	

#### Hotel (ITE LUC 310)

Keys:	94 Keys		Total Trips		% Distribution		# New Trips		Multi-Use Trips		Total New Pass-by Trips	Total New Primary Trips	# Passby Trips		# Primary Trips	
	Calc	New Trips	IN	OUT	IN	OUT	IN	OUT	IN	OUT			IN	OUT	IN	OUT
Weekday Daily	N/A	752	752	50%	50%	376	376	40	40	0	672	0	0	336	336	
Weekday AM PH	N/A	43	43	56%	44%	24	19	1	3	0	39	0	0	23	16	
Weekday PM PH	N/A	55	55	51%	49%	28	27	6	5	0	44	0	0	22	22	
Saturday Daily	N/A	760	760	50%	50%	380	380	44	45	0	671	0	0	336	335	
Sat Midday PH	N/A	71	71	56%	44%	40	31	4	5	0	62	0	0	36	26	

#### Recreational Community Center (ITE LUC 495)

Area:	12 KSF		Total Trips		% Distribution		# New Trips		Multi-Use Trips		Total New Pass-by Trips	Total New Primary Trips	# Passby Trips		# Primary Trips	
	Calc	New Trips	IN	OUT	IN	OUT	IN	OUT	IN	OUT			IN	OUT	IN	OUT
Weekday Daily	N/A	350	350	50%	50%	175	175	0	0	0	350	0	0	175	175	
Weekday AM PH	N/A	23	23	66%	34%	15	8	0	0	0	23	0	0	15	8	
Weekday PM PH	N/A	59	59	47%	53%	28	31	0	0	0	59	0	0	28	31	
Saturday Daily	N/A	110	110	50%	50%	55	55	0	0	0	110	0	0	55	55	
Sat Midday PH	N/A	13	13	54%	46%	7	6	0	0	0	13	0	0	7	6	

#### Strip Retail Plaza (ITE LUC 822)

Area:	9.55 KSF		Total Trips		% Distribution		# New Trips		Multi-Use Trips		Total New Pass-by Trips	Total New Primary Trips	# Passby Trips		# Primary Trips	
	Calc	New Trips	IN	OUT	IN	OUT	IN	OUT	IN	OUT			IN	OUT	IN	OUT
Weekday Daily	N/A	634	634	50%	50%	317	317	114	108	108	304	54	54	149	155	
Weekday AM PH	N/A	28	28	60%	40%	17	11	2	1	6	19	3	3	12	7	
Weekday PM PH	N/A	75	75	50%	50%	38	37	23	23	10	19	5	5	10	9	
Saturday Daily	N/A	640	640	50%	50%	320	320	115	108	108	309	54	54	151	158	
Sat Midday PH	N/A	63	63	51%	49%	32	31	13	10	10	30	5	5	14	16	

Assumed 34% pass-by rate for weekday PM and 26% pass-by rate for all others (Trip Generation Handbook, 3rd Edition).

#### High-Turnover (Sit-Down) Restaurant (ITE LUC 932)

Area:	12.65 KSF		Total Trips		% Distribution		# New Trips		Multi-Use Trips		Total New Pass-by Trips	Total New Primary Trips	# Passby Trips		# Primary Trips	
	Calc	New Trips	IN	OUT	IN	OUT	IN	OUT	IN	OUT			IN	OUT	IN	OUT
Weekday Daily	N/A	1354	1354	50%	50%	677	677	169	151	444	590	222	222	286	304	
Weekday AM PH	N/A	121	121	55%	45%	67	54	13	3	46	59	23	23	31	28	
Weekday PM PH	N/A	114	114	61%	39%	70	44	20	28	28	38	14	14	36	2	
Saturday Daily	N/A	1546	1546	50%	50%	773	773	181	156	520	689	260	260	332	357	
Sat Midday PH	N/A	141	141	51%	49%	72	69	18	17	46	60	23	23	31	29	

TOTAL NEW DEVELOPMENT	Total Trips	Calc	New Trips	% Distribution		# New Trips		Multi-Use Trips		Total New Pass-by Trips	Total New Primary Trips	# Passby Trips		# Primary Trips	
				IN	OUT	IN	OUT	IN	OUT			IN	OUT		
Weekday Daily	3850			1925	1925	396	396	552	2506	276	276	1253	1253		
Weekday AM Peak Hour	277			137	140	17	17	52	191	26	26	94	97		
Weekday PM Peak Hour	369			205	164	66	66	38	199	19	19	120	79		
Saturday Daily	3806			1903	1903	413	413	628	2352	314	314	1176	1176		
Sat Midday Peak Hour	365			191	174	41	41	56	227	28	28	122	105		

Land Use Description	Land Use	A	B	C	D
	Land Use Name	Retail	Restaurant	Hotel	Residential
	Land Use Type	Retail	Restaurant	Hotel	Residential
	ITE LUC	822	932	310	210&230
	Size	9.55 KSF	12.65 KSF	94 Keys	158 units
New Trips	<i>Weekday Daily</i>				
	Enter	317	677	376	380
	Exit	317	677	376	380
	<i>Weekday AM</i>				
	Enter	17	67	24	14
	Exit	11	54	19	48
	<i>Weekday PM</i>				
	Enter	38	70	28	41
	Exit	37	44	27	25
	<i>Saturday Daily</i>				
	Enter	320	773	380	375
	Exit	320	773	380	375
	<i>Saturday Midday</i>				
	Enter	32	72	40	40
	Exit	31	69	31	37

Project Name: Nantasket Beach Two-Way  
Analyst: TEC Inc. / Frankie Ann Schripsema  
Date: 7/13/2022

KEY: Entry Cells

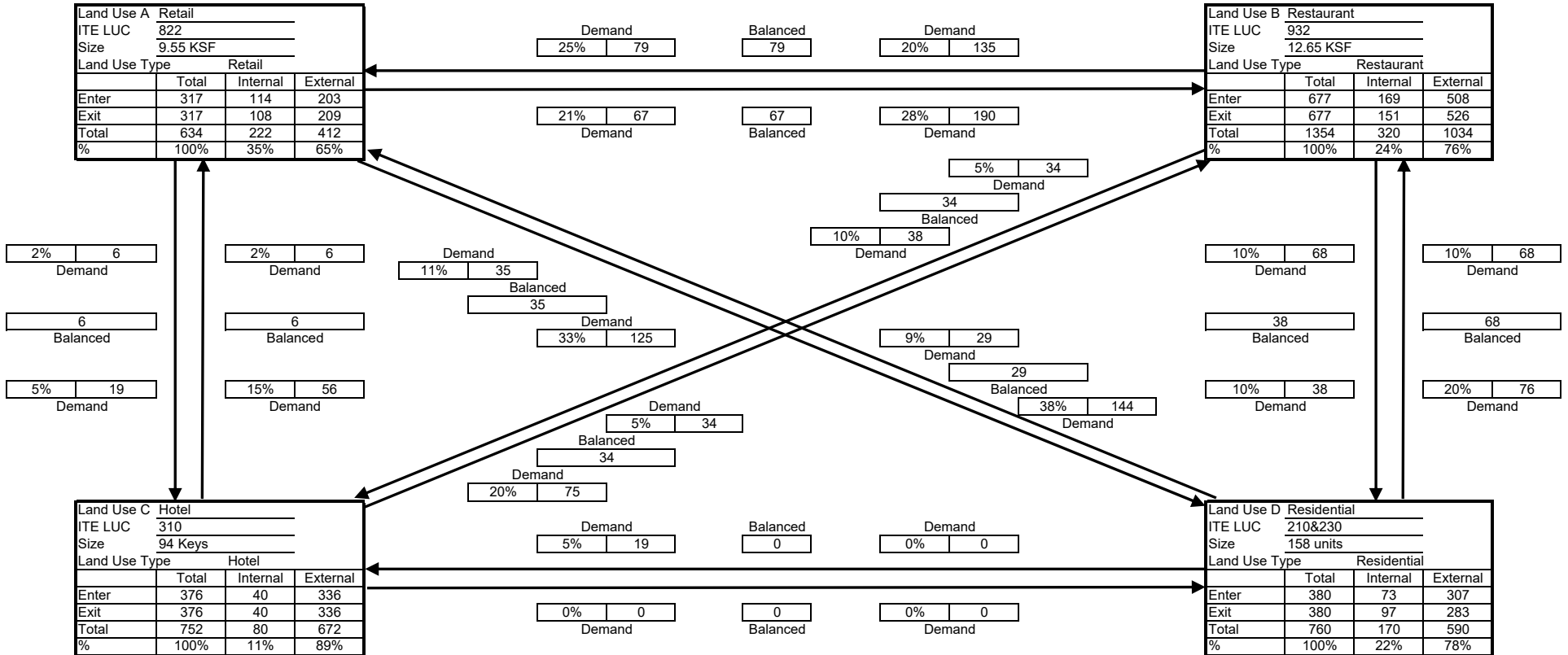
- INSTRUCTIONS:
- 1.) Enter the Land Use Name for each land use in table above.
  - 2.) Select from the drop down menu in the table above which Land Use Type to use.
  - 3.) Enter the ITE LUC for each land use in the table above.
  - 4.) Enter the Size of each land use in the table above.
  - 5.) Fill in the NEW TRIPS for each land use in the table above (Note: This is the total of primary and pass-by trips).
  - 6.) Enter the Project Name above.
  - 7.) Enter you initials for the Analyst above.
  - 8.) Enter the Date above.
  - 9.) Print the Multi-Use Trip Generation Calculation Sheet for each time period.



## Multi-Use Trip Generation Calculation

Analyst: TEC Inc. / Frankie Ann S  
 Date: 7/13/2022

Project Name: Nantasket Beach Two-Way  
 Time Period: Weekday Daily

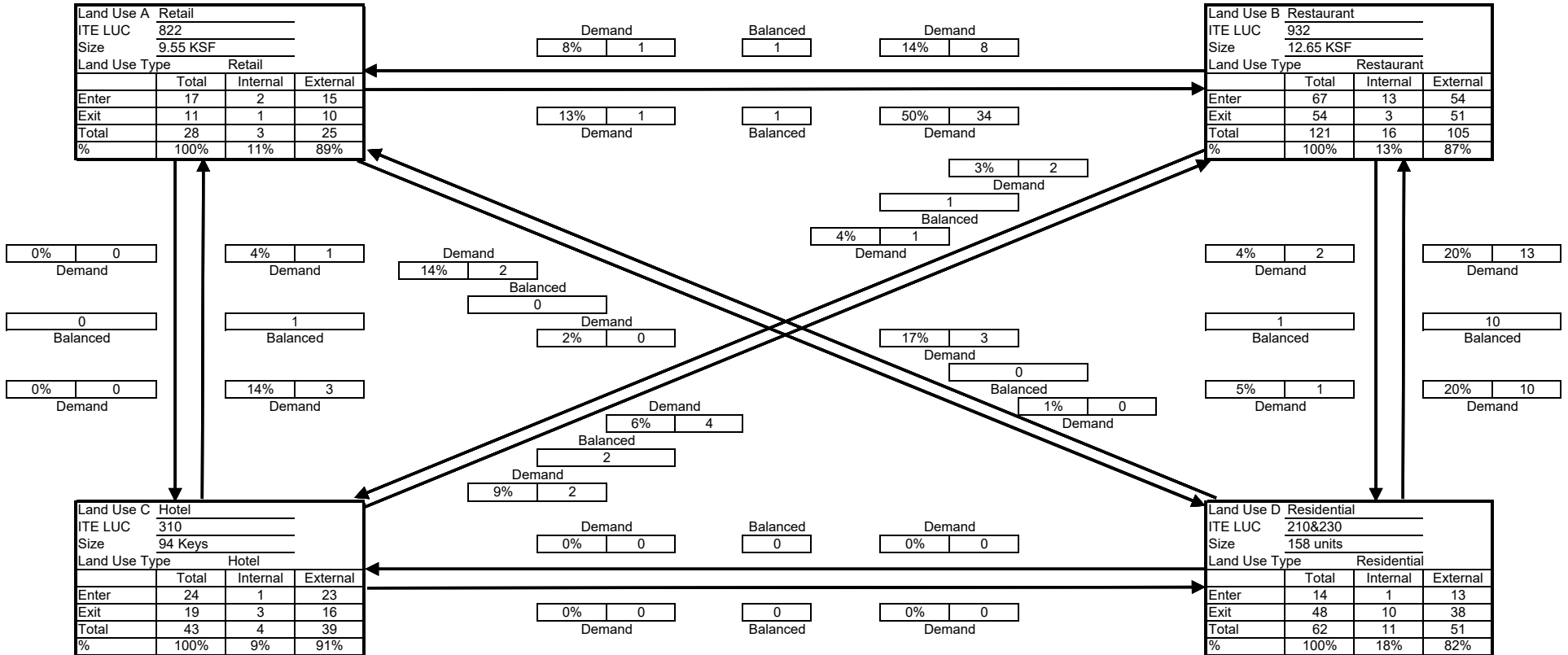


Net External Trips for Multi-Use Development						
Land Use	A	B	C	D	Total	
Enter	203	508	336	307	1354	
Exit	209	526	336	283	1354	
<b>Total External Trips</b>	<b>412</b>	<b>1034</b>	<b>672</b>	<b>590</b>	<b>2708</b>	<b>Internal Capture</b>
Single-Use Trip Gen. Est.	634	1354	752	760	3500	23%
<b>Net Internal Trips</b>	<b>222</b>	<b>320</b>	<b>80</b>	<b>170</b>	<b>792</b>	

## Multi-Use Trip Generation Calculation

Analyst: TEC Inc. / Frankie Ann S  
 Date: 7/13/2022

Project Name: Nantasket Beach Two-Way  
 Time Period: Weekday AM Peak Hour

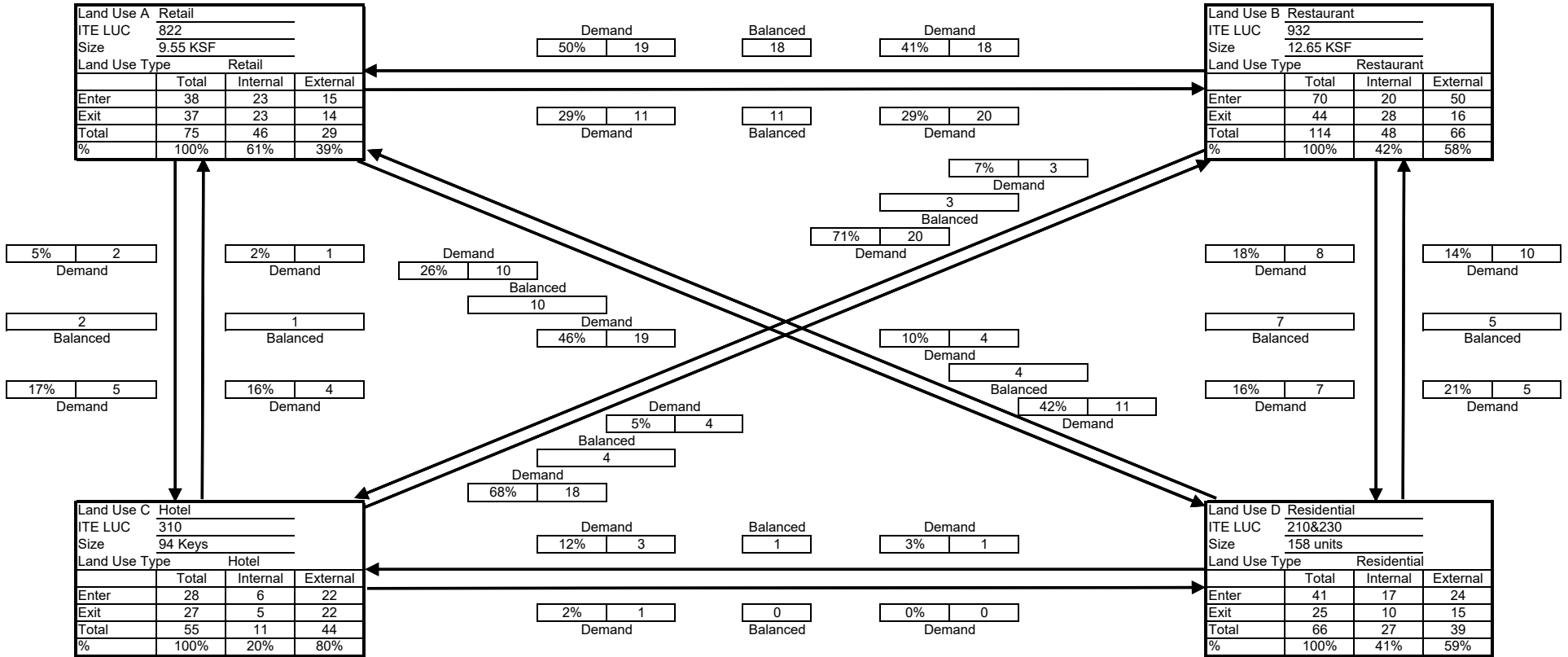


Net External Trips for Multi-Use Development						
Land Use	A	B	C	D	Total	
Enter	15	54	23	13	105	
Exit	10	51	16	38	115	
<b>Total External Trips</b>	<b>25</b>	<b>105</b>	<b>39</b>	<b>51</b>	<b>220</b>	<b>Internal Capture</b>
Single-Use Trip Gen. Est.	28	121	43	62	254	13%
<b>Net Internal Trips</b>	<b>3</b>	<b>16</b>	<b>4</b>	<b>11</b>	<b>34</b>	

## Multi-Use Trip Generation Calculation

Analyst: TEC Inc. / Frankie Ann S  
 Date: 7/13/2022

Project Name: Nantasket Beach Two-Way  
 Time Period: Weekday PM Peak Hour

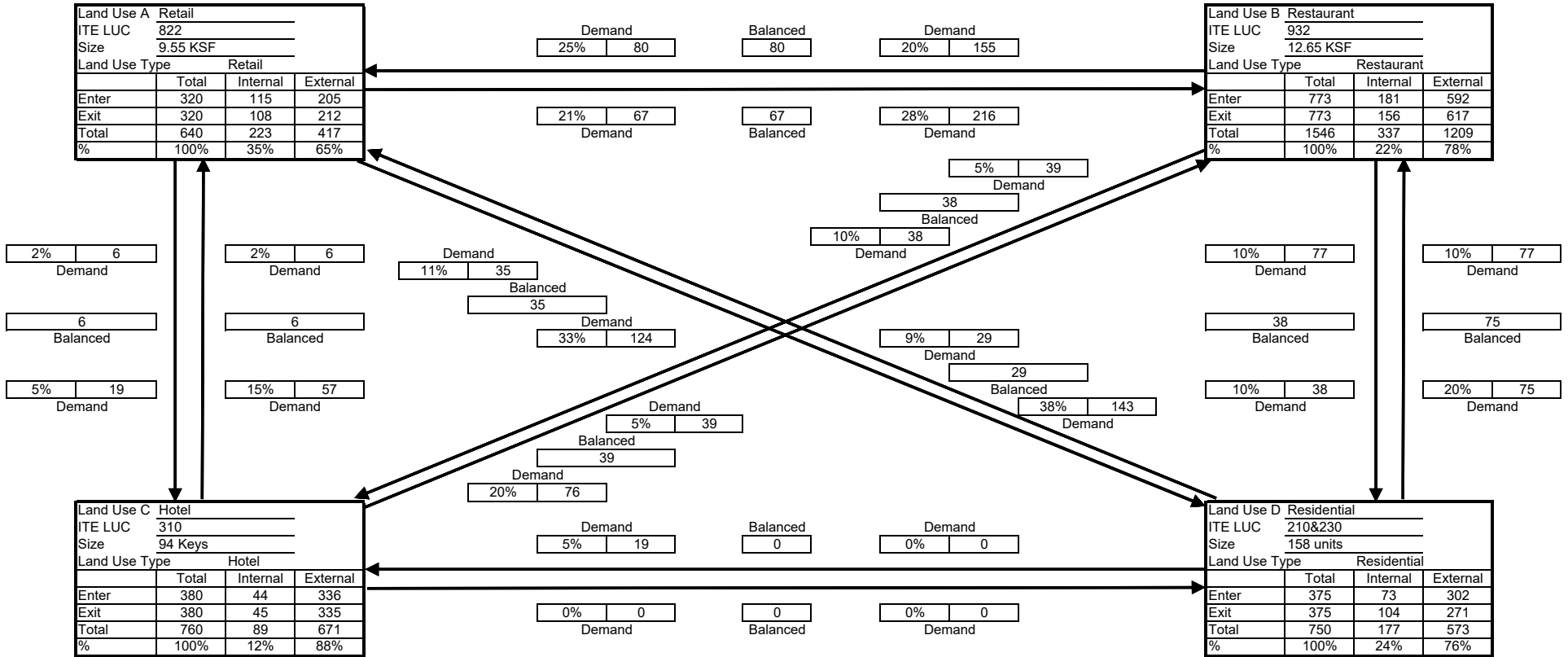


Net External Trips for Multi-Use Development						
Land Use	A	B	C	D	Total	
Enter	15	50	22	24	111	
Exit	14	16	22	15	67	
<b>Total External Trips</b>	<b>29</b>	<b>66</b>	<b>44</b>	<b>39</b>	<b>178</b>	<b>Internal Capture</b>
Single-Use Trip Gen. Est.	75	114	55	66	310	43%
<b>Net Internal Trips</b>	<b>46</b>	<b>48</b>	<b>11</b>	<b>27</b>	<b>132</b>	

## Multi-Use Trip Generation Calculation

Analyst: TEC Inc. / Frankie Ann S  
 Date: 7/13/2022

Project Name: Nantasket Beach Two-Way  
 Time Period: Saturday Daily



Net External Trips for Multi-Use Development					
Land Use	A	B	C	D	Total
Enter	205	592	336	302	1435
Exit	212	617	335	271	1435
<b>Total External Trips</b>	<b>417</b>	<b>1209</b>	<b>671</b>	<b>573</b>	<b>2870</b>
Single-Use Trip Gen. Est.	640	1546	760	750	3696
<b>Net Internal Trips</b>	<b>223</b>	<b>337</b>	<b>89</b>	<b>177</b>	<b>826</b>

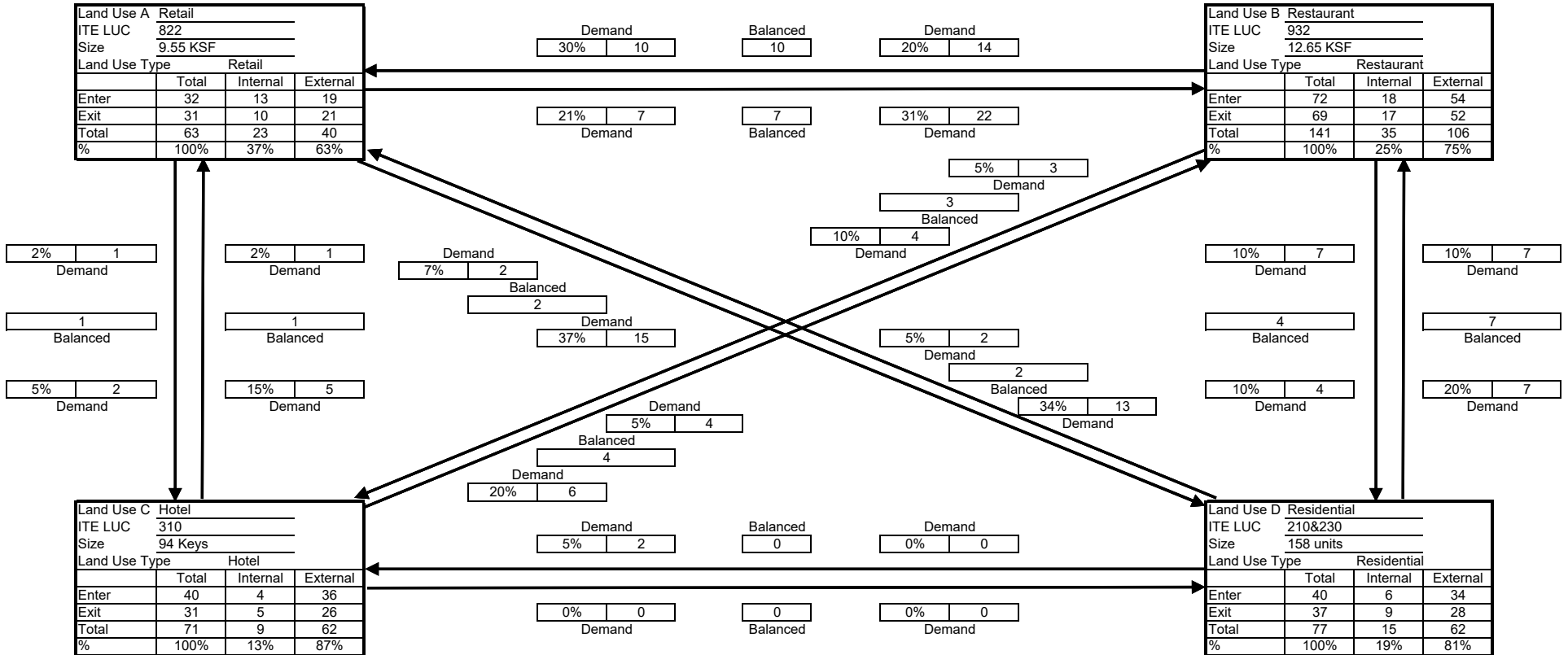
**Internal Capture** 22%



## Multi-Use Trip Generation Calculation

Analyst: TEC Inc. / Frankie Ann S  
 Date: 7/13/2022

Project Name: Nantasket Beach Two-Way  
 Time Period: Saturday MIDDAY



Net External Trips for Multi-Use Development						
Land Use	A	B	C	D	Total	
Enter	19	54	36	34	143	
Exit	21	52	26	28	127	
<b>Total External Trips</b>	<b>40</b>	<b>106</b>	<b>62</b>	<b>62</b>	<b>270</b>	<b>Internal Capture</b>
Single-Use Trip Gen. Est.	63	141	71	77	352	23%
<b>Net Internal Trips</b>	<b>23</b>	<b>35</b>	<b>9</b>	<b>15</b>	<b>82</b>	

From	To	Weekday Midday Peak Hour	Weekday AM Peak Hour	Weekday PM Peak Hour	Weekday Daily
None	Office	0%	0%	0%	0%
None	None	0%	0%	0%	0%
None	Hotel	0%	0%	0%	0%
None	Restaurant	0%	0%	0%	0%
None	Retail	0%	0%	0%	0%
None	Residential	0%	0%	0%	0%
Office	Office	2%	2%	1%	2%
Office	None	0%	0%	0%	0%
Office	Hotel	0%	0%	0%	0%
Office	Restaurant	20%	63%	4%	22%
Office	Retail	20%	28%	20%	22%
Office	Residential	0%	1%	2%	2%
Hotel	Office	20%	75%	0%	20%
Hotel	None	0%	0%	0%	0%
Hotel	Hotel	0%	0%	0%	0%
Hotel	Restaurant	20%	9%	68%	20%
Hotel	Retail	15%	14%	16%	15%
Hotel	Residential	0%	0%	2%	0%
Restaurant	Office	20%	31%	3%	15%
Restaurant	None	0%	0%	0%	0%
Restaurant	Hotel	5%	3%	7%	5%
Restaurant	Restaurant	0%	0%	0%	0%
Restaurant	Retail	20%	14%	41%	20%
Restaurant	Residential	10%	4%	18%	10%
Retail	Office	3%	29%	2%	3%
Retail	None	0%	0%	0%	0%
Retail	Hotel	2%	0%	5%	2%
Retail	Restaurant	21%	13%	29%	21%
Retail	Retail	29%	20%	20%	30%
Retail	Residential	7%	14%	26%	11%
Residential	Office	2%	2%	4%	2%
Residential	None	0%	0%	0%	0%
Residential	Hotel	0%	0%	3%	0%
Residential	Restaurant	20%	20%	21%	20%
Residential	Retail	34%	1%	42%	38%
Residential	Residential	0%	0%	0%	0%

Note: Weekday Midday and Weekday Daily shared trip percentages were obtained from the Trip Generation Handbook 2nd Edition unless otherwise noted. Green highlighted numbers are interpolated from other data. No data is provided for blue highlighted numbers but some shared use is reasonable. All other data obtained from Trip Generation Handbook 3rd Edition.

To	From	Weekday Midday Peak Hour	Weekday AM Peak Hour	Weekday PM Peak Hour	Weekday Daily
Office	Office	6%	6%	6%	2%
Office	None	0%	0%	0%	0%
Office	Hotel	1%	3%	0%	1%
Office	Restaurant	15%	14%	30%	15%
Office	Retail	38%	4%	31%	15%
Office	Residential	10%	3%	57%	10%
Hotel	Office	0%	0%	0%	0%
Hotel	None	0%	0%	0%	0%
Hotel	Hotel	0%	0%	0%	0%
Hotel	Restaurant	10%	4%	71%	10%
Hotel	Retail	5%	0%	17%	5%
Hotel	Residential	5%	0%	12%	5%
Restaurant	Office	5%	23%	2%	5%
Restaurant	None	0%	0%	0%	0%
Restaurant	Hotel	5%	6%	5%	5%
Restaurant	Restaurant	0%	0%	0%	0%
Restaurant	Retail	31%	50%	29%	28%
Restaurant	Residential	10%	20%	14%	10%
Retail	Office	4%	32%	8%	4%
Retail	None	0%	0%	0%	0%
Retail	Hotel	2%	4%	2%	2%
Retail	Restaurant	30%	8%	50%	25%
Retail	Retail	31%	20%	20%	28%
Retail	Residential	5%	17%	10%	9%
Residential	Office	0%	0%	4%	3%
Residential	None	0%	0%	0%	0%
Residential	Hotel	0%	0%	0%	0%
Residential	Restaurant	10%	5%	16%	10%
Residential	Retail	37%	2%	46%	33%
Residential	Residential	0%	0%	0%	0%
None	None	0%	0%	0%	0%
None	Office	0%	0%	0%	0%
None	Hotel	0%	0%	0%	0%
None	Restaurant	0%	0%	0%	0%
None	Retail	0%	0%	0%	0%
None	Residential	0%	0%	0%	0%

Note: Weekday Midday and Weekday Daily shared trip percentages were obtained from the Trip Generation Handbook 2nd Edition unless otherwise noted. Green highlighted numbers are interpolated from other data. No data is provided for blue highlighted numbers but some shared use is reasonable. All other data obtained from Trip Generation Handbook 3rd Edition.

**Trip Distribution Gravity Model - Retail**

Project: T0597.03 - Hull, MA  
 Date: June 10, 2022  
 Analyst: TEC, Inc  
 Source: U.S. Census Data - 2020, Estimated Population by Residence State-County

Surrounding Community State-County-MCD Name	Population	Distance (Travel Time)	Competing Opportunity	Adjusted Population	Nantasket Ave (North)	Nantasket Ave (South)	George Wash. Blvd (South)	Hull Shore Drive (East)	Edgewater Road (West)	TOTAL
Hingham Town Plymouth Co. MA	24,284	0.5	1	12,142		20%	80%			100%
Cohasset Town Norfolk Co. MA	8,381	0.5	1	4,191		80%	20%			100%
Weymouth Town City Norfolk Co. MA	57,437	0.1	1	5,744		20%	80%			100%
Norwell Town Plymouth Co. MA	11,351	0.1	1	1,135		50%	50%			100%
Scituate Town Plymouth Co. MA	19,063	0.1	1	1,906		80%	20%			100%
Hull Town Plymouth Co. MA	10,072	1	1	10,072	50%	10%	10%	20%	10%	100%
<b>Use</b>										

- Notes:  
 1.) 7.5-mile gravity model  
 2.) Distance Factors: 0-15 min. = 1.0; 15-30 min = 0.5; +30min = 0.25  
 3.) Competing Opportunities Factors: Little-No Competition = 1.0; Same distance to competition = 0.5; Closer to competition = 0.1

Surrounding Community State-County-MCD Name	Nantasket Ave (North)	Nantasket Ave (South)	George Wash. Blvd (South)	Hull Shore Drive (East)	Edgewater Road (West)	Total
Hingham Town Plymouth Co. MA	0	2428	9714	0	0	12142
Cohasset Town Norfolk Co. MA	0	3352	838	0	0	4191
Weymouth Town City Norfolk Co. MA	0	1149	4595	0	0	5744
Norwell Town Plymouth Co. MA	0	568	568	0	0	1135
Scituate Town Plymouth Co. MA	0	1525	381	0	0	1906
Hull Town Plymouth Co. MA	5036	1007	1007	2014	1007	10072
<b>Total</b>	<b>5036</b>	<b>10029</b>	<b>17103</b>	<b>2014</b>	<b>1007</b>	<b>35190</b>
<b>Percentage</b>	<b>14.3%</b>	<b>28.5%</b>	<b>48.6%</b>	<b>5.7%</b>	<b>2.9%</b>	<b>100%</b>
<b>Use</b>	<b>14%</b>	<b>28%</b>	<b>49%</b>	<b>6%</b>	<b>3%</b>	<b>100%</b>



**Trip Distribution Gravity Model**

Project: T0597.03 - Workers - Hull, MA  
 Date: June 10, 2022  
 Analyst: TEC, Inc.  
 Source: United States Census Bureau, 5-Year ACS, 2009-2013

Residence State-County-MCD Name	Workplace-County-MCD Name	Count	% of Total Hull Workers	% of Distributed Workforce	Major Route Entering / Exiting						Major Route Entering / Exiting					
					Nantasket Ave (North)	Nantasket Ave (South)	George Wash. Blvd (South)	Hull Shore Drive (North)	Edgewater Road (West)	Check	Nantasket Ave (North)	Nantasket Ave (South)	George Wash. Blvd (South)	Shore Drive (North)	Edgewater Road (West)	Check
Hull Town Plymouth Co. MA	Hull Town Plymouth Co. MA	1,060	21.58%	25.12%	50%	10%	10%	20%	10%	100%	13%	3%	3%	5%	3%	25%
Hull Town Plymouth Co. MA	Boston City Suffolk Co. MA	1,032	21.01%	24.45%			20%	80%		100%	0%	5%	20%	0%	0%	24%
Hull Town Plymouth Co. MA	Hingham Town Plymouth Co. MA	580	11.81%	13.74%			20%	80%		100%	0%	3%	11%	0%	0%	14%
Hull Town Plymouth Co. MA	Quincy City Norfolk Co. MA	380	7.73%	9.00%			20%	80%		100%	0%	2%	7%	0%	0%	9%
Hull Town Plymouth Co. MA	Weymouth Town City Norfolk Co. MA	308	6.27%	7.30%			20%	80%		100%	0%	1%	6%	0%	0%	7%
Hull Town Plymouth Co. MA	Braintree Town City Norfolk Co. MA	241	4.91%	5.71%			20%	80%		100%	0%	1%	5%	0%	0%	6%
Hull Town Plymouth Co. MA	Norwell Town Plymouth Co. MA	174	3.54%	4.12%			50%	50%		100%	0%	2%	2%	0%	0%	4%
Hull Town Plymouth Co. MA	Cohasset Town Norfolk Co. MA	119	2.42%	2.82%			80%	20%		100%	0%	2%	1%	0%	0%	3%
Hull Town Plymouth Co. MA	Cambridge City Middlesex Co. MA	94	1.91%	2.23%			20%	80%		100%	0%	0%	2%	0%	0%	2%
Hull Town Plymouth Co. MA	Scituate Town Plymouth Co. MA	82	1.67%	1.94%			80%	20%		100%	0%	2%	0%	0%	0%	2%
Hull Town Plymouth Co. MA	Milton Town Norfolk Co. MA	80	1.63%	1.90%			20%	80%		100%	0%	0%	2%	0%	0%	2%
Hull Town Plymouth Co. MA	Plymouth Town Plymouth Co. MA	70	1.42%	1.66%			40%	60%		100%	0%	1%	1%	0%	0%	2%
<b>TOTAL</b>		<b>4913</b>	<b>85.89%</b>	<b>100.00%</b>							<b>12.6%</b>	<b>21.9%</b>	<b>58.0%</b>	<b>5.0%</b>	<b>2.5%</b>	<b>100.0%</b>
										Say	<b>13%</b>	<b>22%</b>	<b>58%</b>	<b>5%</b>	<b>2%</b>	<b>100%</b>

## **Appendix H**

Crash Data

**Crash Data Summary Tables**  
 George Washington Blvd @ Nantasket Ave @ Hull Shore Dr - Hull, MA  
 01/01/2017 - 06/01/2022

Collision Diagram	Crash Number	Crash Date	Crash Time	Ambient Light	Weather Condition	Road Surface	Number of Vehicles	Vehicle Travel Directions				Crash Severity	Number of NonFatal Injuries	Manner of Collision	Driver Contributing Codes	Detailed Narrative (from Crash Report)
								V1	V2	V3	V4					
1	4362933	4/20/2017	10:42:00 AM	Daylight	Cloudy	Dry	2	N	N			Property Damage Only	0	Angled	Failure to Keep in Proper Lane	V1: Travelling straight ahead / V2: Travelling straight ahead
2	4441264	9/23/2017	3:18:00 AM	Dark - Lighted	Rain	Wet	1					Not Reported	0	Single Vehicle	Not Reported	V1: Not reported
3	4441269	9/14/2017	9:11:00 PM	Dark - Lighted	Clear	Dry	2	N				Property Damage Only	0	Sideswipe	Not Reported	V1: Travelling straight ahead / V2: Travelling straight ahead
4	4553867	4/22/2018	1:17:00 PM	Daylight	Clear	Dry	2	E	E			Property Damage Only	0	Sideswipe	Failure to Keep in Proper Lane	V1: Travelling straight ahead / V2: Travelling straight ahead
5	4555157	5/23/2018	8:35:00 PM	Dark - Lighted	Clear	Dry	1	N				Property Damage Only	0	Single Vehicle	Erratic / Aggressive / Reckless Driving	V1: Travelling straight ahead
6	4586755	8/6/2018	1:06:00 PM	Daylight	Clear	Dry	2	E	E			Property Damage Only	0	Angled	Failure to Keep in Proper Lane	V1: Turning right / V2: Turning right
7	4696276	4/5/2019	3:14:00 PM	Daylight	Clear	Dry	2	E	W			Property Damage Only	0	Rear-end	Inattention / Distracted	V1: Slowing or stopped in traffic / V2: Travelling straight ahead
8	4696281	4/22/2019	12:14:00 PM	Daylight	Rain	Wet	2	S	S			Non-fatal injury	3	Rear-end	Not Reported	V1: Travelling straight ahead / V2: Slowing or stopped in traffic
9	4743953	8/19/2019	4:08:00 PM	Daylight	Clear	Dry	2	N	N			Property Damage Only	0	Sideswipe	Inattention / Distracted	V1: Travelling straight ahead / V2: Travelling straight ahead
10	4746552	8/23/2019	11:35:00 AM	Daylight	Clear	Dry	2	S	S			Property Damage Only	0	Rear-end	Not Reported	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic
11	4779024	11/17/2019	6:55:00 PM	Dark - Lighted	Clear	Dry	1	N				Property Damage Only	0	Single Vehicle	Erratic / Aggressive / Reckless Driving	V1: Travelling straight ahead
12	4872177	8/25/2020	12:10:00 PM	Daylight	Cloudy	Dry	2	N	E			Property Damage Only	0	Sideswipe	Other	V1: Travelling straight ahead / V2: Turning right
13	4880986	9/10/2020	8:29:00 PM	Dark - Lighted	Rain	Wet	1	S				Property Damage Only	0	Single Vehicle	Erratic / Aggressive / Reckless Driving	V1: Travelling straight ahead
14	4905206	10/29/2020	2:49:00 PM	Daylight	Cloudy	Dry	2	N	N			Property Damage Only	0	Sideswipe	Not Reported	V1: Travelling straight ahead / V2: Travelling straight ahead
15	4905208	11/8/2020	5:02:00 PM	Dark - Lighted	Clear	Dry	2	S	S			Property Damage Only	0	Rear-end	Not Reported	V1: Travelling straight ahead / V2: Travelling straight ahead
16	4919901	1/27/2019	2:16:00 PM	Daylight	Clear	Dry	2	N	N			Property Damage Only	0	Sideswipe	Not Reported	V1: Turning right / V2: Travelling straight ahead
17	4942045	3/13/2021	11:47:00 AM	Daylight	Clear	Dry	1	N				Property Damage Only	0	Head-on	Failure to Yield Right-of-Way	V1: Slowing or stopped in traffic
18	4956083	4/25/2021	7:31:00 AM	Daylight	Cloudy	Dry	1	N				Property Damage Only	0	Single Vehicle	Disregarded Traffic Controls	V1: Turning left
19	4971703	6/3/2021	5:32:00 PM	Daylight	Clear	Dry	2	E	N			Property Damage Only	0	Sideswipe	Disregarded Traffic Controls	V1: Travelling straight ahead / V2: Turning left
20	4974181	6/16/2021	6:30 AM	Daylight	Clear	Dry	2	S	S			Property Damage Only	0	Sideswipe	Failure to Keep in Proper Lane	V1: Turning right / V2: Turning right
21	5002053	8/25/2021	10:41:00 AM	Daylight	Clear	Dry	2	E	W			Property Damage Only	0	Rear-end	No Improper Driving	V1: Backing / V2: Slowing or stopped in traffic
22	5072870	2/6/2022	10:22:00 AM	Daylight	Clear	Ice	1	S				Property Damage Only	0	Single Vehicle	Not Reported	V1: Turning left
23	5091590	3/17/2022	9:51:00 PM	Dark - Lighted	Other	Wet	1					Not Reported	0	Other	Not Reported	V1: Not reported

**Crash Data Summary Tables**  
 George Washington Blvd @ Nantasket Ave @ Bay St - Hull, MA  
 01/01/2017 - 06/01/2022

Collision Diagram	Crash Number	Crash Date	Crash Time	Ambient Light	Weather Condition	Road Surface	Number of Vehicles	Vehicle Travel Directions				Crash Severity	Number of NonFatal Injuries	Manner of Collision	Driver Contributing Codes	Detailed Narrative (from Crash Report)
								V1	V2	V3	V4					
1	4388778	7/5/2017	11:40:00 AM	Daylight	Clear	Dry	2	S	S			Property Damage Only	0	Rear-end	Other	V1: Turning left / V2: Travelling straight ahead
2	4497188	11/29/2017	9:59:00 AM	Daylight	Clear	Dry	2		E			Property Damage Only	0	Rear-end	Excessive Speed	V1: Parked / V2: Travelling straight ahead
3	4586758	8/15/2018	7:47:00 PM	Dark - Lighted	Clear	Dry	2	E	E			Property Damage Only	0	Rear-end	Other	V1: Parked / V2: Parked
4	4719255	6/12/2019	1:26:00 PM	Daylight	Clear	Dry	2	N	S			Non-fatal Injury	1	Angled	Failure to Yield Right-of-Way	V1: Turning left / V2: Travelling straight ahead
5	4719262	6/30/2019	1:25:00 AM	Dark - Lighted	Clear	Dry	1	E				Property Damage Only	0	Sideswipe	Erratic / Aggressive / Reckless Driving	V1: Travelling straight ahead
6	4830852	3/14/2020	1:14:00 PM	Daylight	Clear	Dry	2	S	S			Property Damage Only	0	Sideswipe	No Improper Driving	V1: Travelling straight ahead / V2: Travelling straight ahead
7	4864708	7/29/2020	7:41:00 AM	Daylight	Clear	Dry	1	N				Property Damage Only	0	Single Vehicle	Other	V1: Travelling straight ahead
8	4870836	8/5/2020	5:47:00 PM	Daylight	Clear	Dry	1	S				Property Damage Only	0	Single Vehicle	No Improper Driving	V1: Travelling straight ahead
9	4961778	5/4/2021	5:27:00 AM	Daylight	Clear	Dry	2	E	S			Not Reported	0	Rear-end	Other	V1: Backing / V2: Travelling straight ahead
10	5050982	12/22/2021	9:14:00 AM	Daylight	Other	Dry	2	S	S			Property Damage Only	0	Other	Not Reported	V1: Travelling straight ahead / V2: Travelling straight ahead

**Crash Data Summary Tables**  
 George Washington Blvd @ Wharf Ave - Hull, MA  
 01/01/2017 - 06/01/2022

Collision Diagram	Crash Number	Crash Date	Crash Time	Ambient Light	Weather Condition	Road Surface	Number of Vehicles	Vehicle Travel Directions				Crash Severity	Number of NonFatal Injuries	Manner of Collision	Driver Contributing Codes	Detailed Narrative (from Crash Report)
								V1	V2	V3	V4					
1	4391750	6/23/2017	1:52 PM	Daylight	Clear	Dry	2	S	N			Property Damage Only	0	Angled	Failure to Yield Right-of-Way	V1: Turning left / V2: Travelling straight ahead
2	4560880	6/30/2018	2:30 PM	Daylight	Not Reported	Dry	2	N	N			Property Damage Only	0	Rear-end		V1: Slowing or stopped in traffic / V2: Travelling straight ahead
3	4564220	6/25/2018	11:38 AM	Daylight	Clear	Dry	1					Not Reported	0	Not Reported		V1: Parked
4	4586689	8/26/2018	9:20 PM	Dark - Not Lighted	Clear	Dry	1	E				Property Damage Only	0	Single Vehicle	No Improper Driving	V1: Backing
5	4760674	10/10/2019	1:02 PM	Daylight	Cloudy	Wet	2	S	E			Property Damage Only	0	Sideswipe	Failure to Yield Right-of-Way	V1: Travelling straight ahead / V2: Turning left
6	4863817	7/19/2020	3:15 PM	Daylight	Clear	Dry	2	S	S			Property Damage Only	0	Rear-end	Inattention / Distracted	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic
7	5042156	11/10/2021	6:46 AM	Daylight	Cloudy	Dry	2	S	S			Property Damage Only	0	Rear-end	No Improper Driving	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic
8	5105761	5/15/2022	2:29 PM	Daylight	Clear	Dry	2	N	S			Non-fatal Injury	0	Single Vehicle	Swerving / Avoiding	V1: Travelling straight ahead / V2: Turning left



**Crash Data Summary Tables**  
Hull Shore Dr @ Nantasket Ave - Hull, MA  
01/01/2017 - 06/01/2022

Collision Diagram	Crash Number	Crash Date	Crash Time	Ambient Light	Weather Condition	Road Surface	Number of Vehicles	Vehicle Travel Directions				Crash Severity	Number of NonFatal Injuries	Manner of Collision	Driver Contributing Codes	Detailed Narrative (from Crash Report)
								V1	V2	V3	V4					
1	4495406	12/21/2017	7:56 AM	Daylight	Clear	Dry	2	S	E			Property Damage Only	0	Head-on	Not Reported	V1: Travelling straight ahead / V2: Travelling straight ahead
2	4564216	6/10/2018	6:22 PM	Daylight	Clear	Dry	2	W	W			Property Damage Only	0	Not Reported	No Improper Driving	V1: Parked / V2: Parked
3	4685653	3/17/2019	4:25 PM	Daylight	Clear	Dry	2	N	N			Property Damage Only	0	Sideswipe	No Improper Driving	V1: Travelling straight ahead / V2: Travelling straight ahead
4	4696278	4/14/2019	3:06 PM	Daylight	Cloudy	Dry	2	N	N			Property Damage Only	0	Rear-end	Followed Too Closely	V1: Slowing or stopped in traffic / V2: Travelling straight ahead
5	4709942	6/9/2019	11:58 AM	Daylight	Clear	Dry	2	N				Non-fatal Injury	1	Rear-end	Not Reported	V1: Slowing or stopped in traffic / V2: Travelling straight ahead
6	4786823	12/6/2019	9:50 PM	Dark - Lighted	Cloudy	Wet	1	N				Non-fatal Injury	0	Head-on	Erratic / Aggressive / Reckless Driving	V1: Travelling straight ahead
7	5105655	5/17/2022	3:41 PM	Daylight	Clear	Dry	2	N	N			Property Damage Only	0	Rear-end	Erratic / Aggressive / Reckless Driving	V1: Slowing or stopped in traffic / V2: Travelling straight ahead

**Crash Data Summary Tables**  
Hull Shore Drive @ Phipps St - Hull, MA  
01/01/2017 - 06/01/2022

Collision Diagram	Crash Number	Crash Date	Crash Time	Ambient Light	Weather Condition	Road Surface	Number of Vehicles	Vehicle Travel Directions				Crash Severity	Number of NonFatal Injuries	Manner of Collision	Driver Contributing Codes	Detailed Narrative (from Crash Report)
								V1	V2	V3	V4					
1	4586756	8/12/2018	2:41 AM	Dark - Lighted	Snow	Wet	1	N				Not Reported	0	Single Vehicle	Failure to Keep in Proper Lane	V1: Travelling straight ahead

**Crash Data Summary Tables**  
 Nantasket Ave @ Samoset Ave @ Mountford Rd - Hull, MA  
 01/01/2017 - 06/01/2022

Collision Diagram	Crash Number	Crash Date	Crash Time	Ambient Light	Weather Condition	Road Surface	Number of Vehicles	Vehicle Travel Directions				Crash Severity	Number of NonFatal Injuries	Manner of Collision	Driver Contributing Codes	Detailed Narrative (from Crash Report)
								V1	V2	V3	V4					
1	4343555	1/13/2017	11:38 PM	Dark - Lighted	Clear	Dry	2	N				Non-fatal Injury	1	Rear-end	No Improper Driving	V1: Travelling straight ahead / V2: Travelling straight ahead
2	4404199	7/2/2017	5:00 PM	Daylight	Clear	Dry	3	N				Property Damage Only	0	Angled	No Improper Driving	V1: Travelling straight ahead / V2: Not reported / V3: Not reported
3	4490459	10/30/2017	9:06 AM	Daylight	Cloudy	Dry	2	N	N			Property Damage Only	0	Rear-end	Inattention / Distracted	V1: Slowing or stopped in traffic / V2: Travelling straight ahead
4	4564219	6/21/2018	7:25 PM	Daylight	Clear	Dry	1	N				Non-fatal Injury	1	Single Vehicle	Glare	V1: Turning left
5	4612513	10/22/2018	10:25 AM	Daylight	Clear	Dry	2	N	S			Property Damage Only	0	Sideswipe	Inattention / Distracted	V1: Travelling straight ahead / V2: Turning left
6	4779021	11/11/2019	10:43 AM	Daylight	Clear	Dry	2	W				Property Damage Only	0	Angled	Inattention / Distracted	V1: Travelling straight ahead / V2: Parked
7	4961779	5/8/2021	11:43 PM	Dark - Lighted	Clear	Dry	1	N				Property Damage Only	0	Single Vehicle	Erratic / Aggressive / Reckless Driving	V1: Travelling straight ahead
8	5105659	5/12/2022	11:52 PM	Dark - Lighted	Not Reported	Dry	2	E	W			Property Damage Only	0	Rear-end	Failure to Keep in Proper Lane	V1: Slowing or stopped in traffic / V2: Turning left

**Crash Data Summary Tables**  
 Nantasket Ave @ Bay St @ Water St - Hull, MA  
 01/01/2017 - 06/01/2022

Collision Diagram	Crash Number	Crash Date	Crash Time	Ambient Light	Weather Condition	Road Surface	Number of Vehicles	Vehicle Travel Directions				Crash Severity	Number of NonFatal Injuries	Manner of Collision	Driver Contributing Codes	Detailed Narrative (from Crash Report)
								V1	V2	V3	V4					
1	4606968	10/6/2018	10:05 PM	Dark - Lighted	Not Reported	Dry	2	N	N			Property Damage Only	0	Angled	Failure to Keep in Proper Lane	V1: Turning left / V2: Travelling straight ahead
2	4685651	3/7/2019	4:53 PM	Daylight	Clear	Dry	2	W	W			Property Damage Only	0	Single Vehicle	No Improper Driving	V1: Travelling straight ahead / V2: Turning right
3	4696279	4/15/2019	11:21 AM	Daylight	Clear	Dry	2	S	W			Non-fatal Injury	0	Angled	Disregarded Traffic Controls	V1: Travelling straight ahead / V2: Entering traffic lane
4	4696282	4/25/2019	12:32 PM	Daylight	Clear	Dry	2		W			Property Damage Only	0	Other	Visibility Obstructed	V1: Parked / V2: Backing
5	4709936	5/26/2019	11:43 AM	Daylight	Clear	Dry	3	S	S	S		Property Damage Only	0	Rear-end	Not Reported	V1: Travelling straight ahead / V2: Slowing or stopped in traffic / V3: Travelling straight ahead
6	4719261	6/27/2019	8:47 PM	Daylight	Clear	Dry	2	W	E			Property Damage Only	0	Angled	No Improper Driving	V1: Turning left / V2: Travelling straight ahead
7	4734061	7/26/2019	5:06 PM	Daylight	Clear	Dry	2	N	N			Property Damage Only	0	Angled	Made an Improper Turn	V1: Travelling straight ahead / V2: Turning left
8	4872365	8/22/2020	12:39 PM	Daylight	Not Reported	Dry	2	N	S			Property Damage Only	0	Sideswipe	Other	V1: Backing / V2: Parked
9	4880785	9/3/2020	1:52 PM	Daylight	Cloudy	Dry	1	E				Property Damage Only	0	Not Reported	No Improper Driving	V1: Parked
10	4888380	9/29/2020	12:23 PM	Daylight	Not Reported	Dry	2	E	S			Property Damage Only	0	Sideswipe	Other	V1: Turning left / V2: Travelling straight ahead
11	5046993	12/4/2021	11:59 AM	Daylight	Clear	Dry	2	S	W			Fatal Injury	0	Angled	Failure to Yield Right-of-Way	V1: Travelling straight ahead / V2: Travelling straight ahead
12	5080497	2/26/2022	12:25 PM	Daylight	Other	Dry	2	N	N			Property Damage Only	0	Rear-end	Followed Too Closely	V1: Slowing or stopped in traffic / V2: Travelling straight ahead
13	5101437	5/8/2022	3:31 PM	Daylight	Not Reported	Dry	2	E	S			Property Damage Only	0	Angled	Other	V1: Turning left / V2: Travelling straight ahead

**Crash Data Summary Tables**  
 Nantasket Ave @ Edgewater Rd - Hull, MA  
 01/01/2017 - 06/01/2022

Collision Diagram	Crash Number	Crash Date	Crash Time	Ambient Light	Weather Condition	Road Surface	Number of Vehicles	Vehicle Travel Directions				Crash Severity	Number of NonFatal Injuries	Manner of Collision	Driver Contributing Codes	Detailed Narrative (from Crash Report)
								V1	V2	V3	V4					
1	4490456	10/18/2017	8:16 AM	Daylight	Clear	Dry	2	S	S			Property Damage Only	0	Rear-end	Erratic / Aggressive / Reckless Driving	V1: Travelling straight ahead / V2: Travelling straight ahead
2	4704241	5/16/2019	9:05 PM	Dark - Not Lighted	Clear	Dry	1	N				Non-fatal Injury	0	Single Vehicle	No Improper Driving	V1: Turning left
3	4862142	7/3/2020	8:02 PM	Dusk	Cloudy	Dry	2	N	N			Property Damage Only	0	Angled	Disregarded Traffic Controls	V1: Entering traffic lane / V2: Travelling straight ahead
4	5046994	12/2/2021	4:12 PM	Dusk	Rain	Other	2	S	S			Property Damage Only	0	Other	Excessive Speed	V1: Travelling straight ahead / V2: Travelling straight ahead



**Crash Data Summary Tables**  
 Nantasket Ave @ Water St - Hull, MA  
 01/01/2017 - 06/01/2022

Collision Diagram	Crash Number	Crash Date	Crash Time	Ambient Light	Weather Condition	Road Surface	Number of Vehicles	Vehicle Travel Directions				Crash Severity	Number of NonFatal Injuries	Manner of Collision	Driver Contributing Codes	Detailed Narrative (from Crash Report)
								V1	V2	V3	V4					
1	4495406	12/21/2017	7:56 AM	Daylight	Clear	Dry	2	S	E			Property Damage Only	0	Head-on	Not Reported	V1: Travelling straight ahead / V2: Travelling straight ahead
2	4564216	6/10/2018	6:22 PM	Daylight	Clear	Dry	2	W	W			Property Damage Only	0	Not Reported	Not Reported	V1: Parked / V2: Parked
3	4685653	3/17/2019	4:25 PM	Daylight	Clear	Dry	2	N	N			Property Damage Only	0	Sideswipe	Not Reported	V1: Travelling straight ahead / V2: Travelling straight ahead
4	4696278	4/14/2019	3:06 PM	Daylight	Cloudy	Dry	2	N	N			Property Damage Only	0	Rear-end	Followed Too Closely	V1: Slowing or stopped in traffic / V2: Travelling straight ahead
5	4709942	6/9/2019	11:58 AM	Daylight	Clear	Dry	2	N	N			Non-fatal Injury	1	Rear-end	Not Reported	V1: Slowing or stopped in traffic / V2: Travelling straight ahead
6	4786823	12/6/2019	9:50 PM	Dark - Lighted	Cloudy	Wet	1	N				Non-fatal Injury	0	Head-on	Erratic / Aggressive / Reckless Driving	V1: Travelling straight ahead
7	5105655	5/17/2022	3:41 PM	Daylight	Clear	Dry	2	N	N			Property Damage Only	0	Rear-end	Erratic / Aggressive / Reckless Driving	V1: Slowing or stopped in traffic / V2: Travelling straight ahead

**Crash Data Summary Tables**  
 Nantasket Ave @ Water St @ Hull Shore Dr - Hull, MA  
 01/01/2017 - 06/01/2022

Collision Diagram	Crash Number	Crash Date	Crash Time	Ambient Light	Weather Condition	Road Surface	Number of Vehicles	Vehicle Travel Directions				Crash Severity	Number of NonFatal Injuries	Manner of Collision	Driver Contributing Codes	Detailed Narrative (from Crash Report)
								V1	V2	V3	V4					
1	4362937	4/8/2017	10:12 PM	Dark - Lighted	Clear	Dry	1	N				Property Damage Only	0	Single Vehicle	Erratic / Aggressive / Reckless Driving	V1: Backing
2	4398198	7/19/2017	9:30 AM	Daylight	Clear	Dry	2	N	N			Property Damage Only	0	Sideswipe	Made an Improper Turn	V1: Turning left / V2: Travelling straight ahead
3	4437066	8/9/2017	7:55 PM	Dusk	Clear	Dry	2	N	N			Property Damage Only	0	Angled	Failure to Yield Right-of-Way	V1: Travelling straight ahead / V2: Changing lanes
4	4507982	12/18/2017	1:54 AM	Dark - Lighted	Clear	Dry	1	N				Property Damage Only	0	Single Vehicle	Erratic / Aggressive / Reckless Driving	V1: Travelling straight ahead
5	4574565	7/29/2018	9:01 AM	Daylight	Clear	Dry	2	N	N			Property Damage Only	0	Angled	Erratic / Aggressive / Reckless Driving	V1: Turning left / V2: Travelling straight ahead
6	4826947	3/7/2020	11:26 AM	Daylight	Cloudy	Dry	2	N	N			Property Damage Only	0	Angled	Failure to Yield Right-of-Way	V1: Changing lanes / V2: Travelling straight ahead
7	4836080	4/5/2020	12:22 PM	Daylight	Clear	Dry	2	N	N			Property Damage Only	0	Angled	Made an Improper Turn	V1: Turning left / V2: Travelling straight ahead
8	4851845	6/14/2020	6:02 PM	Daylight	Clear	Dry	2	W	N			Property Damage Only	0	Other	Inattention / Distracted	V1: Turning left / V2: Travelling straight ahead
9	4862148	7/19/2020	8:35 AM	Daylight	Clear	Dry	2	N	N			Property Damage Only	0	Angled	Other	V1: Turning left / V2: Travelling straight ahead
10	4932682	1/1/2020	3:35 AM	Dark - Lighted	Not Reported	Dry	1	N				Fatal Injury	0	Single Vehicle	Erratic / Aggressive / Reckless Driving	V1: Leaving traffic lane
11	4972227	5/23/2021	1:46 PM	Daylight	Clear	Dry	2	N	N			Property Damage Only	0	Angled	Not Reported	V1: Travelling straight ahead / V2: Turning left
12	4984803	7/11/2021	10:18 PM	Dark - Not Lighted	Clear	Dry	2	N	N			Property Damage Only	0	Sideswipe	Made an Improper Turn	V1: Turning left / V2: Travelling straight ahead
13	4995910	8/13/2021	1:28 PM	Daylight	Cloudy	Dry	2	N	N			Non-fatal Injury	0	Sideswipe	Made an Improper Turn	V1: Turning left / V2: Travelling straight ahead

**Crash Data Summary Tables**  
 Nantasket Ave @ Wharf Ave - Hull, MA  
 01/01/2017 - 06/01/2022

Collision Diagram	Crash Number	Crash Date	Crash Time	Ambient Light	Weather Condition	Road Surface	Number of Vehicles	Vehicle Travel Directions				Crash Severity	Number of NonFatal Injuries	Manner of Collision	Driver Contributing Codes	Detailed Narrative (from Crash Report)
								V1	V2	V3	V4					
1	4383867	5/20/2017	7:25 PM	Daylight	Clear	Dry	2	E	S			Non-fatal Injury	1	Angled	Inattention / Distracted	V1: Travelling straight ahead / V2: Travelling straight ahead
2	4472828	11/27/2017	10:16 PM	Dark - Lighted	Clear	Dry	1	N				Not Reported	0	Single Vehicle	Made an Improper Turn	V1: Travelling straight ahead
3	4565130	7/7/2018	6:19 PM	Daylight	Clear	Dry	3	S	S			Property Damage Only	0	Sideswipe	Not Reported	V1: Travelling straight ahead / V2: Travelling straight ahead / V3: Travelling straight ahead
4	4738926	8/10/2019	1:00 PM	Daylight	Not Reported	Dry	2	S	S			Property Damage Only	0	Other	Inattention / Distracted	V1: Parked / V2: Backing
5	4826787	2/25/2020	8:05 PM	Dark - Lighted	Rain	Wet	1	E				Property Damage Only	0	Single Vehicle	Visibility Obstructed	V1: Travelling straight ahead
6	4863429	7/21/2020	5:08 PM	Daylight	Clear	Dry	2	N	N			Property Damage Only	0	Rear-end	Not Reported	V1: Travelling straight ahead / V2: Travelling straight ahead
7	4892150	10/24/2020	10:44 PM	Dark - Lighted	Clear	Dry	1	N				Property Damage Only	0	Single Vehicle	Erratic / Aggressive / Reckless Driving	V1: Travelling straight ahead
8	4975457	6/25/2021	5:50 PM	Daylight	Clear	Dry	2	N	N			Property Damage Only	0	Rear-end	Inattention / Distracted	V1: Travelling straight ahead / V2: Slowing or stopped in traffic



# INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Hull, Massachusetts COUNT DATE : \_\_\_\_\_

DISTRICT : \_\_\_\_\_ UNSIGNALIZED :  SIGNALIZED :

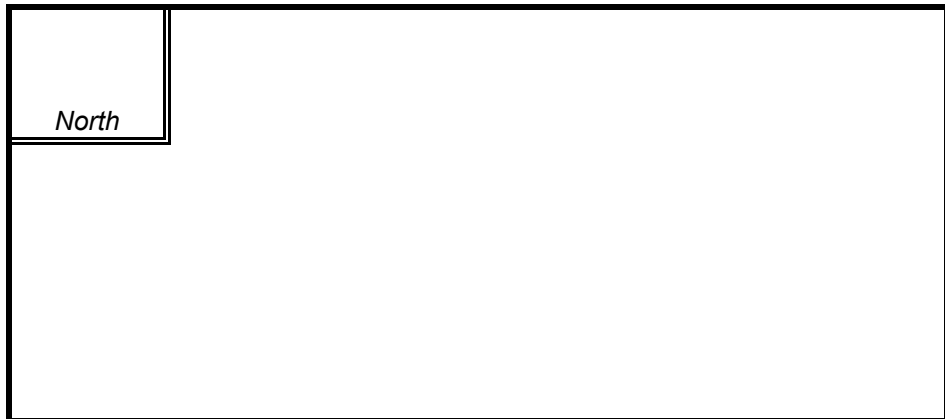
~ INTERSECTION DATA ~

MAJOR STREET : Nantasket Avenue

MINOR STREET(S) : George Washington Boulevard

Hull Shore Drive

**INTERSECTION  
DIAGRAM  
(Label Approaches)**



**PEAK HOUR VOLUMES**

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :						
PEAK HOURLY VOLUMES (AM/PM) :	1,551					1,551

" K " FACTOR :  INTERSECTION ADT ( V ) = TOTAL DAILY APPROACH VOLUME :

TOTAL # OF CRASHES :  # OF YEARS :  AVERAGE # OF CRASHES PER YEAR ( A ) :

**CRASH RATE CALCULATION :**

**0.64**

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments : \_\_\_\_\_

Project Title & Date: Nantasket Beach Two-Way Conversion



# INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Hull, Massachusetts      COUNT DATE : \_\_\_\_\_

DISTRICT : \_\_\_\_\_      UNSIGNALIZED :       SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : \_\_\_\_\_

MINOR STREET(S) : \_\_\_\_\_



**PEAK HOUR VOLUMES**

APPROACH :	1	2	3	4	5	<b>Total Peak Hourly Approach Volume</b>
DIRECTION :						
PEAK HOURLY VOLUMES (AM/PM) :	1,074					<b>1,074</b>

" K " FACTOR :       INTERSECTION ADT ( V ) = TOTAL DAILY APPROACH VOLUME :

TOTAL # OF CRASHES :       # OF YEARS :       AVERAGE # OF CRASHES PER YEAR ( A ) :

**CRASH RATE CALCULATION :**            RATE =  $\frac{(A * 1,000,000)}{(V * 365)}$

Comments : \_\_\_\_\_

Project Title & Date:      Nantasket Beach Two-Way Conversion





# INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Hull, Massachusetts      COUNT DATE : \_\_\_\_\_

DISTRICT : \_\_\_\_\_      UNSIGNALIZED :       SIGNALIZED :

### ~ INTERSECTION DATA ~

MAJOR STREET : \_\_\_\_\_

MINOR STREET(S) : \_\_\_\_\_



### PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	<b>Total Peak Hourly Approach Volume</b>
DIRECTION :						
PEAK HOURLY VOLUMES (AM/PM) :	1,682					<b>1,682</b>

" K " FACTOR :       INTERSECTION ADT ( V ) = TOTAL DAILY APPROACH VOLUME :

TOTAL # OF CRASHES :       # OF YEARS :       AVERAGE # OF CRASHES PER YEAR ( A ) :

**CRASH RATE CALCULATION :**            RATE =  $\frac{(A * 1,000,000)}{(V * 365)}$

Comments : \_\_\_\_\_

Project Title & Date:      Nantasket Beach Two-Way Conversion



# INTERSECTION CRASH RATE WORKSHEET

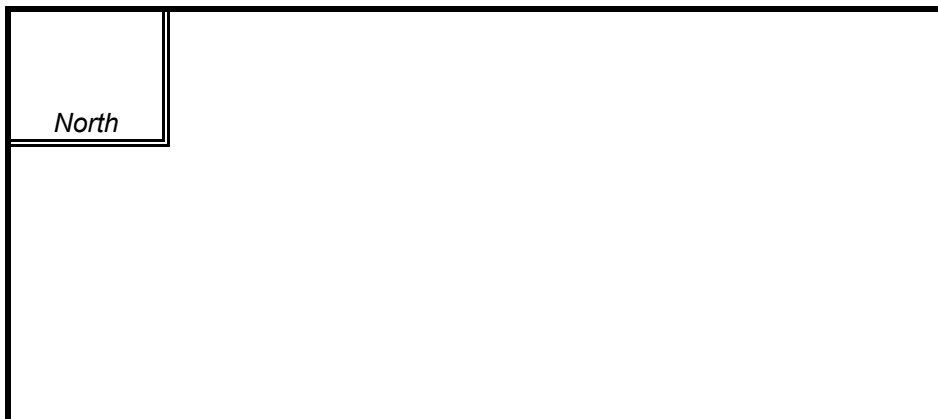
CITY/TOWN : Hull, Massachusetts      COUNT DATE : \_\_\_\_\_

DISTRICT : \_\_\_\_\_      UNSIGNALIZED :       SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : \_\_\_\_\_

MINOR STREET(S) : \_\_\_\_\_



**PEAK HOUR VOLUMES**

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :						
PEAK HOURLY VOLUMES (AM/PM) :	1,410					1,410

" K " FACTOR :       INTERSECTION ADT ( V ) = TOTAL DAILY APPROACH VOLUME :

TOTAL # OF CRASHES :       # OF YEARS :       AVERAGE # OF CRASHES PER YEAR ( A ) :

**CRASH RATE CALCULATION :**       RATE =  $\frac{(A * 1,000,000)}{(V * 365)}$

Comments : \_\_\_\_\_

Project Title & Date: Nantasket Beach Two-Way Conversion



# INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Hull, Massachusetts COUNT DATE : \_\_\_\_\_

DISTRICT : \_\_\_\_\_ UNSIGNALIZED :  SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : \_\_\_\_\_

MINOR STREET(S) : \_\_\_\_\_

**INTERSECTION  
DIAGRAM  
(Label Approaches)**



**PEAK HOUR VOLUMES**

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :						
PEAK HOURLY VOLUMES (AM/PM) :	240					240

" K " FACTOR :  INTERSECTION ADT ( V ) = TOTAL DAILY APPROACH VOLUME :

TOTAL # OF CRASHES :  # OF YEARS :  AVERAGE # OF CRASHES PER YEAR ( A ) :

**CRASH RATE CALCULATION :**

**0.34**

RATE =  $\frac{(A * 1,000,000)}{(V * 365)}$

Comments : \_\_\_\_\_

Project Title & Date: Nantasket Beach Two-Way Conversion



# INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Nantasket Beach Massachusetts      COUNT DATE : \_\_\_\_\_

DISTRICT : \_\_\_\_\_      UNSIGNALIZED :       SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : \_\_\_\_\_

MINOR STREET(S) : \_\_\_\_\_

**INTERSECTION  
DIAGRAM**  
(Label Approaches)



**PEAK HOUR VOLUMES**

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :						
PEAK HOURLY VOLUMES (AM/PM) :	1,500					1,500

" K " FACTOR :       INTERSECTION ADT ( V ) = TOTAL DAILY APPROACH VOLUME :

TOTAL # OF CRASHES :       # OF YEARS :       AVERAGE # OF CRASHES PER YEAR ( A ) :

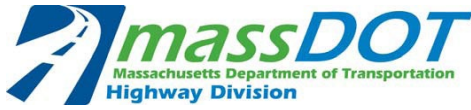
**CRASH RATE CALCULATION :**

**0.33**

RATE =  $\frac{(A * 1,000,000)}{(V * 365)}$

Comments : \_\_\_\_\_

Project Title & Date: Nantasket Beach Two-Way Conversion



# INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Hull, Massachusetts      COUNT DATE : \_\_\_\_\_

DISTRICT : \_\_\_\_\_      UNSIGNALIZED :       SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : \_\_\_\_\_

MINOR STREET(S) : \_\_\_\_\_



**PEAK HOUR VOLUMES**

APPROACH :	1	2	3	4	5	<b>Total Peak Hourly Approach Volume</b>
DIRECTION :						
PEAK HOURLY VOLUMES (AM/PM) :	1,074					<b>1,074</b>

" K " FACTOR :       INTERSECTION ADT ( V ) = TOTAL DAILY APPROACH VOLUME :

TOTAL # OF CRASHES :       # OF YEARS :       AVERAGE # OF CRASHES PER YEAR ( A ) :

**CRASH RATE CALCULATION :**            RATE =  $\frac{(A * 1,000,000)}{(V * 365)}$

Comments : \_\_\_\_\_

Project Title & Date:      Nantasket Beach Two-Way Conversion





# INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Hull, Massachusetts      COUNT DATE : \_\_\_\_\_

DISTRICT : \_\_\_\_\_      UNSIGNALIZED :       SIGNALIZED :

### ~ INTERSECTION DATA ~

MAJOR STREET : \_\_\_\_\_

MINOR STREET(S) : \_\_\_\_\_



### PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	<b>Total Peak Hourly Approach Volume</b>
DIRECTION :						
PEAK HOURLY VOLUMES (AM/PM) :	1,500					<b>1,500</b>

" K " FACTOR :       INTERSECTION ADT ( V ) = TOTAL DAILY APPROACH VOLUME :

TOTAL # OF CRASHES :       # OF YEARS :       AVERAGE # OF CRASHES PER YEAR ( A ) :

**CRASH RATE CALCULATION :**            RATE =  $\frac{(A * 1,000,000)}{(V * 365)}$

Comments : \_\_\_\_\_

Project Title & Date:      Nantasket Beach Two-Way Conversion



# INTERSECTION CRASH RATE WORKSHEET

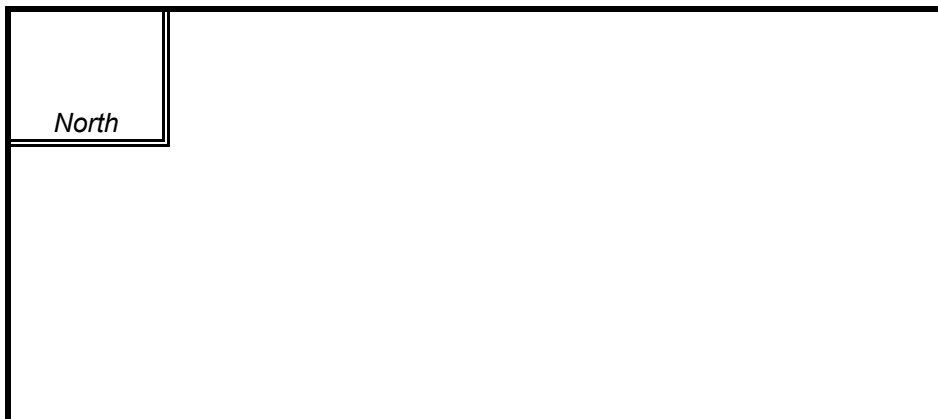
CITY/TOWN : Hull, Massachusetts      COUNT DATE : \_\_\_\_\_

DISTRICT : \_\_\_\_\_      UNSIGNALIZED :       SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : \_\_\_\_\_

MINOR STREET(S) : \_\_\_\_\_



**INTERSECTION  
DIAGRAM**  
(Label Approaches)

**PEAK HOUR VOLUMES**

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :						
PEAK HOURLY VOLUMES (AM/PM) :	1,410					1,410

" K " FACTOR :       INTERSECTION ADT ( V ) = TOTAL DAILY APPROACH VOLUME :

TOTAL # OF CRASHES :       # OF YEARS :       AVERAGE # OF CRASHES PER YEAR ( A ) :

**CRASH RATE CALCULATION :**            RATE =  $\frac{(A * 1,000,000)}{(V * 365)}$

Comments : \_\_\_\_\_

Project Title & Date:      Nantasket Beach Two-Way Conversion



# INTERSECTION CRASH RATE WORKSHEET

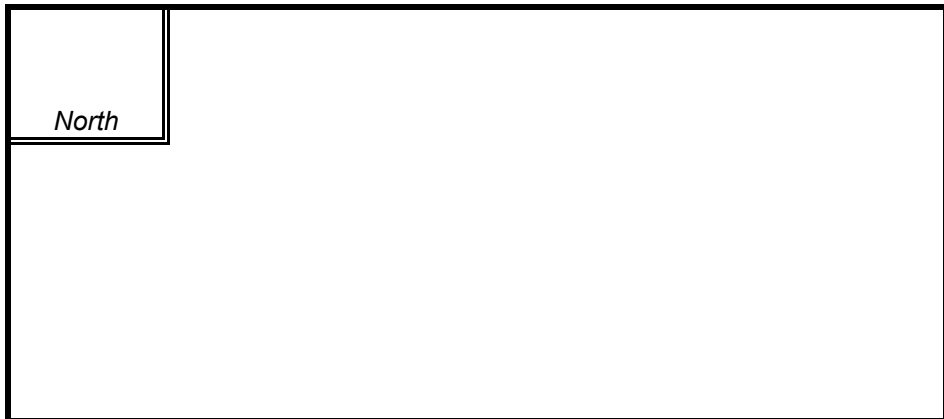
CITY/TOWN : Hull, Massachusetts      COUNT DATE : \_\_\_\_\_

DISTRICT : \_\_\_\_\_      UNSIGNALIZED :       SIGNALIZED :

### ~ INTERSECTION DATA ~

MAJOR STREET : \_\_\_\_\_

MINOR STREET(S) : \_\_\_\_\_



### PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :						
PEAK HOURLY VOLUMES (AM/PM) :	1,410					1,410

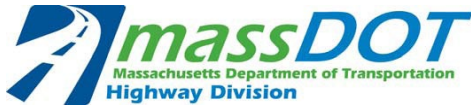
" K " FACTOR :       INTERSECTION ADT ( V ) = TOTAL DAILY APPROACH VOLUME :

TOTAL # OF CRASHES :       # OF YEARS :       AVERAGE # OF CRASHES PER YEAR ( A ) :

**CRASH RATE CALCULATION :**       RATE =  $\frac{(A * 1,000,000)}{(V * 365)}$

Comments : \_\_\_\_\_

Project Title & Date: Nantasket Beach Two-Way Conversion



# INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Hull, Massachusetts      COUNT DATE : \_\_\_\_\_

DISTRICT : \_\_\_\_\_      UNSIGNALIZED :       SIGNALIZED :

### ~ INTERSECTION DATA ~

MAJOR STREET : \_\_\_\_\_

MINOR STREET(S) : \_\_\_\_\_



### PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :						
PEAK HOURLY VOLUMES (AM/PM) :	946					946

" K " FACTOR :       INTERSECTION ADT ( V ) = TOTAL DAILY APPROACH VOLUME :

TOTAL # OF CRASHES :       # OF YEARS :       AVERAGE # OF CRASHES PER YEAR ( A ) :

**CRASH RATE CALCULATION :**            RATE =  $\frac{(A * 1,000,000)}{(V * 365)}$

Comments : \_\_\_\_\_

Project Title & Date:      Nantasket Beach Two-Way Conversion










## **Appendix I**

Capacity and Queue Analysis Worksheets



Lanes, Volumes, Timings  
 1: Beach Avenue/Manomet Avenue & Phipps Street

2022 Base Year Conditions  
 Weekday Evening











						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	25	0	15	20	0	10
Future Volume (vph)	25	0	15	20	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	16	16	16
Link Speed (mph)	25			25	25	
Link Distance (ft)	178			287	279	
Travel Time (s)	4.9			7.8	7.6	
Peak Hour Factor	0.58	0.58	0.70	0.70	0.48	0.48
Heavy Vehicles (%)	14%	0%	1%	1%	0%	20%
Shared Lane Traffic (%)						
Sign Control	Free			Stop	Stop	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Lanes, Volumes, Timings  
 2: Hull Shore Drive & Phipps Street

2022 Base Year Conditions  
 Weekday Evening

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	15	0	0	25	135	10
Future Volume (vph)	15	0	0	25	135	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	12	12	15	12
Link Speed (mph)	25			25	25	
Link Distance (ft)	224			178	191	
Travel Time (s)	6.1			4.9	5.2	
Confl. Peds. (#/hr)		7	9		7	9
Peak Hour Factor	0.58	0.58	0.72	0.72	0.70	0.70
Heavy Vehicles (%)	14%	0%	0%	5%	1%	0%
Parking (#/hr)					5	5
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh 7.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↖	↗
Traffic Vol, veh/h	15	0	0	25	135	10
Future Vol, veh/h	15	0	0	25	135	10
Conflicting Peds, #/hr	0	7	9	0	7	9
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	58	58	72	72	70	70
Heavy Vehicles, %	14	0	0	5	1	0
Mvmt Flow	26	0	0	35	193	14










Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	-	68
Stage 1	-	-	26
Stage 2	-	-	42
Critical Hdwy	-	-	6.41
Critical Hdwy Stg 1	-	-	5.41
Critical Hdwy Stg 2	-	-	5.41
Follow-up Hdwy	-	-	3.509
Pot Cap-1 Maneuver	-	0	939
Stage 1	-	0	999
Stage 2	-	0	983
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	932
Mov Cap-2 Maneuver	-	-	932
Stage 1	-	-	999
Stage 2	-	-	976

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	WBT
Capacity (veh/h)	932	1036	-	-
HCM Lane V/C Ratio	0.207	0.014	-	-
HCM Control Delay (s)	9.9	8.5	-	-
HCM Lane LOS	A	A	-	-
HCM 95th %tile Q(veh)	0.8	0	-	-

Lanes, Volumes, Timings  
 7: Hull Shore Drive & Water Street

2022 Base Year Conditions  
 Weekday Evening

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 		
Traffic Volume (vph)	55	0	105	870	0	0
Future Volume (vph)	55	0	105	870	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	16	16	12	12
Link Speed (mph)	25			25	25	
Link Distance (ft)	195			1096	177	
Travel Time (s)	5.3			29.9	4.8	
Confl. Peds. (#/hr)	3		10			
Peak Hour Factor	0.68	0.68	0.96	0.96	0.92	0.92
Heavy Vehicles (%)	10%	0%	1%	2%	2%	2%
Parking (#/hr)			5	5		
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh	2.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	55	0	105	870	0	0
Future Vol, veh/h	55	0	105	870	0	0
Conflicting Peds, #/hr	3	0	10	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	68	68	96	96	92	92
Heavy Vehicles, %	10	0	1	2	2	2
Mvmt Flow	81	0	109	906	0	0

Major/Minor	Minor2	Major1	
Conflicting Flow All	684	-	10
Stage 1	10	-	-
Stage 2	674	-	-
Critical Hdwy	7	-	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	6	-	-
Follow-up Hdwy	3.6	-	2.21
Pot Cap-1 Maneuver	365	0	1615
Stage 1	-	0	-
Stage 2	447	0	-
Platoon blocked, %			-
Mov Cap-1 Maneuver	310	-	1603
Mov Cap-2 Maneuver	310	-	-
Stage 1	-	-	-
Stage 2	443	-	-

Approach	EB	NB
HCM Control Delay, s	20.7	1.2
HCM LOS	C	

Minor Lane/Major Mvmt	NBL	NBT	EBLn1
Capacity (veh/h)	1603	-	310
HCM Lane V/C Ratio	0.068	-	0.261
HCM Control Delay (s)	7.4	0.4	20.7
HCM Lane LOS	A	A	C
HCM 95th %tile Q(veh)	0.2	-	1



Lanes, Volumes, Timings

2022 Base Year Conditions

8: Nantasket Avenue & Hull Shore Drive Connection/Hull Shore Drive

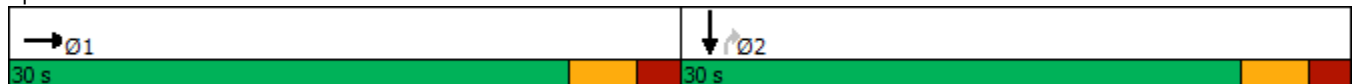
Weekday Evening

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑							↑↑		↑↑	
Traffic Volume (vph)	0	545	0	0	0	0	0	0	385	0	385	0
Future Volume (vph)	0	545	0	0	0	0	0	0	385	0	385	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	13	13	12	12	12	10	10	10	11	11	11
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		329			308			572			400	
Travel Time (s)		9.0			8.4			15.6			10.9	
Confl. Peds. (#/hr)	12		21	17		8	21		17	8		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.90	0.90	0.90
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	2%	0%	3%	0%
Parking (#/hr)										5	5	20
Shared Lane Traffic (%)												
Turn Type		NA							Perm		NA	
Protected Phases		1									2	
Permitted Phases									2			
Detector Phase		1							2		2	
Switch Phase												
Minimum Initial (s)		15.0							15.0		15.0	
Minimum Split (s)		22.0							22.0		22.0	
Total Split (s)		30.0							30.0		30.0	
Total Split (%)		50.0%							50.0%		50.0%	
Maximum Green (s)		25.0							25.0		25.0	
Yellow Time (s)		3.0							3.0		3.0	
All-Red Time (s)		2.0							2.0		2.0	
Lost Time Adjust (s)		0.0							0.0		0.0	
Total Lost Time (s)		5.0							5.0		5.0	
Lead/Lag		Lead							Lag		Lag	
Lead-Lag Optimize?		Yes							Yes		Yes	
Vehicle Extension (s)		3.0							3.0		3.0	
Recall Mode		None							Min		Min	
Walk Time (s)		7.0							7.0		7.0	
Flash Dont Walk (s)		8.0							8.0		8.0	
Pedestrian Calls (#/hr)		10							10		10	

Intersection Summary

Area Type: Other  
 Cycle Length: 60  
 Actuated Cycle Length: 42.9  
 Natural Cycle: 45  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Nantasket Avenue & Hull Shore Drive Connection/Hull Shore Drive



## Queues

2022 Base Year Conditions

## 8: Nantasket Avenue &amp; Hull Shore Drive Connection/Hull Shore Drive

Weekday Evening













	→	↗	↓
Lane Group	EBT	NBR	SBT
Lane Group Flow (vph)	592	418	428
v/c Ratio	0.43	0.37	0.34
Control Delay	11.6	4.8	10.2
Queue Delay	0.0	0.0	0.0
Total Delay	11.6	4.8	10.2
Queue Length 50th (ft)	48	12	34
Queue Length 95th (ft)	104	40	70
Internal Link Dist (ft)	249		320
Turn Bay Length (ft)			
Base Capacity (vph)	2176	1557	1872
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.27	0.27	0.23
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

2022 Base Year Conditions

















8: Nantasket Avenue & Hull Shore Drive Connection/Hull Shore Drive

Weekday Evening

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑							↑↑		↑↑		
Traffic Volume (vph)	0	545	0	0	0	0	0	0	385	0	385	0	
Future Volume (vph)	0	545	0	0	0	0	0	0	385	0	385	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	13	13	13	12	12	12	10	10	10	11	11	11	
Total Lost time (s)		5.0							5.0		5.0		
Lane Util. Factor		0.95							0.88		0.95		
Frbp, ped/bikes		1.00							0.96		1.00		
Flpb, ped/bikes		1.00							1.00		1.00		
Frt		1.00							0.85		1.00		
Flt Protected		1.00							1.00		1.00		
Satd. Flow (prot)		3693							2487		3176		
Flt Permitted		1.00							1.00		1.00		
Satd. Flow (perm)		3693							2487		3176		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.90	0.90	0.90	
Adj. Flow (vph)	0	592	0	0	0	0	0	0	418	0	428	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	157	0	0	0	
Lane Group Flow (vph)	0	592	0	0	0	0	0	0	261	0	428	0	
Confl. Peds. (#/hr)	12		21	17			8	21		17	8	12	
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	2%	0%	3%	0%	
Parking (#/hr)										5	5	20	
Turn Type		NA							Perm		NA		
Protected Phases		1									2		
Permitted Phases									2				
Actuated Green, G (s)		16.0							16.8		16.8		
Effective Green, g (s)		16.0							16.8		16.8		
Actuated g/C Ratio		0.37							0.39		0.39		
Clearance Time (s)		5.0							5.0		5.0		
Vehicle Extension (s)		3.0							3.0		3.0		
Lane Grp Cap (vph)		1380							976		1246		
v/s Ratio Prot		c0.16									c0.13		
v/s Ratio Perm									0.10				
v/c Ratio		0.43							0.27		0.34		
Uniform Delay, d1		10.0							8.8		9.1		
Progression Factor		1.00							1.00		1.00		
Incremental Delay, d2		0.2							0.1		0.2		
Delay (s)		10.2							9.0		9.3		
Level of Service		B							A		A		
Approach Delay (s)		10.2			0.0			9.0			9.3		
Approach LOS		B			A			A			A		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			9.6		HCM 2000 Level of Service				A				
HCM 2000 Volume to Capacity ratio			0.39										
Actuated Cycle Length (s)			42.8		Sum of lost time (s)				10.0				
Intersection Capacity Utilization			38.5%		ICU Level of Service				A				
Analysis Period (min)			15										
c Critical Lane Group													

Lanes, Volumes, Timings  
 10: Samoset Avenue & Phipps Street

2022 Base Year Conditions  
 Weekday Evening

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	145	15	5	90	10	5	0	25
Future Volume (vph)	0	0	0	0	145	15	5	90	10	5	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	13	13	16	16	16	16	16	16
Storage Length (ft)	0		0	0		0	40		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25				25
Link Distance (ft)		183			224			545				306
Travel Time (s)		5.0			6.1			14.9				8.3
Peak Hour Factor	0.92	0.92	0.92	0.69	0.69	0.69	0.84	0.84	0.84	0.48	0.48	0.48
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	17%	0%	0%	9%
Parking (#/hr)							5	5	5			
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Intersection Delay, s/veh	8.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔		↔	↔			↔	
Traffic Vol, veh/h	0	0	0	0	145	15	5	90	10	5	0	25
Future Vol, veh/h	0	0	0	0	145	15	5	90	10	5	0	25
Peak Hour Factor	0.92	0.92	0.92	0.69	0.69	0.69	0.84	0.84	0.84	0.48	0.48	0.48
Heavy Vehicles, %	0	0	0	0	1	0	0	1	17	0	0	9
Mvmt Flow	0	0	0	0	210	22	6	107	12	10	0	52
Number of Lanes	0	0	0	0	1	0	1	1	0	0	1	0


















Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	9	8.8	7.6
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	0%	17%
Vol Thru, %	0%	90%	91%	0%
Vol Right, %	0%	10%	9%	83%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	100	160	30
LT Vol	5	0	0	5
Through Vol	0	90	145	0
RT Vol	0	10	15	25
Lane Flow Rate	6	119	232	62
Geometry Grp	7	7	2	5
Degree of Util (X)	0.009	0.166	0.278	0.073
Departure Headway (Hd)	5.588	5.032	4.315	4.224
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	642	714	835	849
Service Time	3.309	2.752	2.328	2.246
HCM Lane V/C Ratio	0.009	0.167	0.278	0.073
HCM Control Delay	8.4	8.8	9	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0	0.6	1.1	0.2



Lanes, Volumes, Timings  
 11: Nantasket Avenue & Mountford Road/Phipps Street

2022 Base Year Conditions  
 Weekday Evening

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	10	160	0	15	10	670	0	0	590	5
Future Volume (vph)	5	0	10	160	0	15	10	670	0	0	590	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	13	13	11	11	11	15	15	15	14	14	14
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		407			183			492			302	
Travel Time (s)		11.1			5.0			8.4			5.1	
Confl. Peds. (#/hr)	9		9	6		6	9		6	6		9
Peak Hour Factor	0.83	0.83	0.83	0.64	0.64	0.64	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	3%	0%	8%	0%	2%	0%	0%	4%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection												
Int Delay, s/veh	87.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔		↔		↔			↔	
Traffic Vol, veh/h	5	0	10	160	0	15	10	670	0	0	590	5
Future Vol, veh/h	5	0	10	160	0	15	10	670	0	0	590	5
Conflicting Peds, #/hr	9	0	9	6	0	6	9	0	6	6	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	64	64	64	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	3	0	8	0	2	0	0	4	0
Mvmt Flow	6	0	12	250	0	23	10	698	0	0	615	5

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1366	1345	636	1351	-	707	629	0	-	-	-	0
Stage 1	627	627	-	718	-	-	-	-	-	-	-	-
Stage 2	739	718	-	633	-	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.13	-	6.28	4.1	-	-	-	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.13	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.13	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.527	-	3.372	2.2	-	-	-	-	-
Pot Cap-1 Maneuver	126	153	481	~ 127	0	425	963	-	0	0	-	-
Stage 1	475	479	-	419	0	-	-	-	0	0	-	-
Stage 2	412	436	-	466	0	-	-	-	0	0	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	115	149	473	~ 121	-	421	955	-	-	-	-	-
Mov Cap-2 Maneuver	115	149	-	~ 121	-	-	-	-	-	-	-	-
Stage 1	463	475	-	412	-	-	-	-	-	-	-	-
Stage 2	379	429	-	450	-	-	-	-	-	-	-	-

















Approach	EB	WB	NB	SB
HCM Control Delay, s	21.8	\$ 519.2	0.1	0
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	955	-	232	121	421	-	-
HCM Lane V/C Ratio	0.011	-	0.078	2.066	0.056	-	-
HCM Control Delay (s)	8.8	0	21.8	566.5	14.1	-	-
HCM Lane LOS	A	A	C	F	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	20.7	0.2	-	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Lanes, Volumes, Timings  
 12: Nantasket Avenue & Whitehead Avenue/Samoset Avenue

2022 Base Year Conditions  
 Weekday Evening

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	20	0	0	0	0	680	105	0	745	15
Future Volume (vph)	0	0	20	0	0	0	0	680	105	0	745	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	12	12	12	12	12	12	12	12	12
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		477			545			276			492	
Travel Time (s)		13.0			14.9			4.7			8.4	
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.95	0.95	0.95	0.96	0.96	0.96
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	2%	1%	0%	4%	2%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗					↖	↗		↖	
Traffic Vol, veh/h	0	0	20	0	0	0	0	680	105	0	745	15
Future Vol, veh/h	0	0	20	0	0	0	0	680	105	0	745	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	92	92	92	95	95	95	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2	0	2	1	0	4	2
Mvmt Flow	0	0	22	0	0	0	0	716	111	0	776	16














Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	-	-	784	792	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	4.1	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	2.2	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	393	838	-	-	0	-	-
Stage 1	0	0	-	-	-	-	0	-	-
Stage 2	0	0	-	-	-	-	0	-	-
Platoon blocked, %									
Mov Cap-1 Maneuver	-	0	393	838	-	-	-	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.7	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBT	SBR
Capacity (veh/h)	838	-	-	393	-	-
HCM Lane V/C Ratio	-	-	-	0.057	-	-
HCM Control Delay (s)	0	-	-	14.7	-	-
HCM Lane LOS	A	-	-	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	-	-

Lanes, Volumes, Timings  
 13: Nantasket Avenue & Edgewater Road

2022 Base Year Conditions  
 Weekday Evening

								
Lane Group	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	10	20	5	45	765	10	740	15
Future Volume (vph)	10	20	5	45	765	10	740	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	13	12	12	12	10	12	12
Storage Length (ft)	0	0		100		100		100
Storage Lanes	1	0		1		1		0
Taper Length (ft)	25			25		25		
Link Speed (mph)	25				40		40	
Link Distance (ft)	561				717		276	
Travel Time (s)	15.3				12.2		4.7	
Peak Hour Factor	0.90	0.90	0.95	0.95	0.95	0.96	0.96	0.96
Heavy Vehicles (%)	2%	2%	0%	2%	2%	0%	4%	2%
Shared Lane Traffic (%)								
Sign Control	Stop				Free		Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized



Intersection								
Int Delay, s/veh	0.8							
Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Traffic Vol, veh/h	10	20	5	45	765	10	740	15
Future Vol, veh/h	10	20	5	45	765	10	740	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	-	None
Storage Length	0	-	-	100	-	100	-	-
Veh in Median Storage, #	0	-	-	-	0	-	0	-
Grade, %	0	-	-	-	0	-	0	-
Peak Hour Factor	90	90	95	95	95	96	96	96
Heavy Vehicles, %	2	2	0	2	2	0	4	2
Mvmt Flow	11	22	5	47	805	10	771	16

Major/Minor	Minor2	Major1			Major2		
Conflicting Flow All	1306	394	786	787	0	805	0
Stage 1	799	-	-	-	-	-	-
Stage 2	507	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.4	4.14	-	6.4	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.5	2.22	-	2.5	-
Pot Cap-1 Maneuver	151	605	462	828	-	449	-
Stage 1	403	-	-	-	-	-	-
Stage 2	570	-	-	-	-	-	-
Platoon blocked, %					-	-	-
Mov Cap-1 Maneuver	138	605	763	763	-	449	-
Mov Cap-2 Maneuver	138	-	-	-	-	-	-
Stage 1	375	-	-	-	-	-	-
Stage 2	557	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.4	0.6	0.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBU	SBT	SBR
Capacity (veh/h)	763	-	284	449	-	-
HCM Lane V/C Ratio	0.069	-	0.117	0.023	-	-
HCM Control Delay (s)	10.1	-	19.4	13.2	-	-
HCM Lane LOS	B	-	C	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.4	0.1	-	-

Lanes, Volumes, Timings  
 16: Nantasket Avenue & Bay Street/Water Street

2022 Base Year Conditions  
 Weekday Evening

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	45	20	80	25	0	0	0	0	10	725	30
Future Volume (vph)	0	45	20	80	25	0	0	0	0	10	725	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	13	13	12	12	12	12	12	12
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			40	
Link Distance (ft)		338			195			1092			395	
Travel Time (s)		9.2			5.3			29.8			6.7	
Peak Hour Factor	0.81	0.81	0.81	0.91	0.91	0.91	0.92	0.92	0.92	0.96	0.96	0.96
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	4%	2%
Parking (#/hr)							0	0	0			
Shared Lane Traffic (%)												
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			2						1	
Permitted Phases				2						1		
Detector Phase		2		2	2					1	1	
Switch Phase												
Minimum Initial (s)		5.0		5.0	5.0					27.0	27.0	
Minimum Split (s)		10.0		10.0	10.0					32.0	32.0	
Total Split (s)		10.0		10.0	10.0					32.0	32.0	
Total Split (%)		17.5%		17.5%	17.5%					56.1%	56.1%	
Maximum Green (s)		5.0		5.0	5.0					27.0	27.0	
Yellow Time (s)		3.0		3.0	3.0					3.0	3.0	
All-Red Time (s)		2.0		2.0	2.0					2.0	2.0	
Lost Time Adjust (s)		0.0			0.0						0.0	
Total Lost Time (s)		5.0			5.0						5.0	
Lead/Lag		Lag		Lag	Lag					Lead	Lead	
Lead-Lag Optimize?		Yes		Yes	Yes					Yes	Yes	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Recall Mode		None		None	None					Max	Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other  
 Cycle Length: 57  
 Actuated Cycle Length: 45  
 Natural Cycle: 60  
 Control Type: Semi Act-Uncoord

Splits and Phases: 16: Nantasket Avenue & Bay Street/Water Street



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Lane Group	Ø3
<hr/>	
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Parking (#/hr)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	15.0
Total Split (s)	15.0
Total Split (%)	26%
Maximum Green (s)	10.0
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	3.0
Pedestrian Calls (#/hr)	0
<hr/>	
Intersection Summary	

Queues  
 16: Nantasket Avenue & Bay Street/Water Street

2022 Base Year Conditions  
 Weekday Evening

















	→	←	↓
Lane Group	EBT	WBT	SBT
Lane Group Flow (vph)	81	115	796
v/c Ratio	0.36	0.74	0.35
Control Delay	18.0	50.0	3.9
Queue Delay	0.0	0.0	0.0
Total Delay	18.0	50.0	3.9
Queue Length 50th (ft)	12	27	33
Queue Length 95th (ft)	36	#88	52
Internal Link Dist (ft)	258	115	315
Turn Bay Length (ft)			
Base Capacity (vph)	223	156	2286
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.36	0.74	0.35

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
 16: Nantasket Avenue & Bay Street/Water Street










2022 Base Year Conditions  
 Weekday Evening

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations											 		
Traffic Volume (vph)	0	45	20	80	25	0	0	0	0	10	725	30	
Future Volume (vph)	0	45	20	80	25	0	0	0	0	10	725	30	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	12	12	12	13	13	13	12	12	12	12	12	12	
Total Lost time (s)		5.0			5.0						5.0		
Lane Util. Factor		1.00			1.00						0.95		
Frt		0.96			1.00						0.99		
Flt Protected		1.00			0.96						1.00		
Satd. Flow (prot)		1785			1854						3452		
Flt Permitted		1.00			0.72						1.00		
Satd. Flow (perm)		1785			1393						3452		
Peak-hour factor, PHF	0.81	0.81	0.81	0.91	0.91	0.91	0.92	0.92	0.92	0.96	0.96	0.96	
Adj. Flow (vph)	0	56	25	88	27	0	0	0	0	10	755	31	
RTOR Reduction (vph)	0	22	0	0	0	0	0	0	0	0	3	0	
Lane Group Flow (vph)	0	59	0	0	115	0	0	0	0	0	793	0	
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	4%	2%	
Parking (#/hr)							0	0	0				
Turn Type		NA		Perm	NA					Perm	NA		
Protected Phases		2			2						1		
Permitted Phases				2						1			
Actuated Green, G (s)		5.1			5.1						29.8		
Effective Green, g (s)		5.1			5.1						29.8		
Actuated g/C Ratio		0.11			0.11						0.66		
Clearance Time (s)		5.0			5.0						5.0		
Vehicle Extension (s)		3.0			3.0						3.0		
Lane Grp Cap (vph)		202			158						2291		
v/s Ratio Prot		0.03											
v/s Ratio Perm					0.08							0.23	
v/c Ratio		0.29			0.73							0.35	
Uniform Delay, d1		18.2			19.2							3.3	
Progression Factor		1.00			1.00							1.00	
Incremental Delay, d2		0.8			15.4							0.4	
Delay (s)		19.0			34.6							3.7	
Level of Service		B			C							A	
Approach Delay (s)		19.0			34.6			0.0				3.7	
Approach LOS		B			C			A				A	
<b>Intersection Summary</b>													
HCM 2000 Control Delay			8.5									HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.47										
Actuated Cycle Length (s)			44.9									Sum of lost time (s)	15.0
Intersection Capacity Utilization			43.2%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													



Lanes, Volumes, Timings  
 17: Nantasket Avenue & George Washington Boulevard

2022 Base Year Conditions  
 Weekday Evening

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations					 	
Traffic Volume (vph)	0	20	0	0	365	575
Future Volume (vph)	0	20	0	0	365	575
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	12	12	12	12
Link Speed (mph)	40			25	25	
Link Distance (ft)	123			400	146	
Travel Time (s)	2.1			10.9	4.0	
Confl. Peds. (#/hr)		33				25
Peak Hour Factor	0.80	0.80	0.92	0.92	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	0%	4%	2%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗			↖	
Traffic Vol, veh/h	0	20	0	0	365	575
Future Vol, veh/h	0	20	0	0	365	575
Conflicting Peds, #/hr	0	33	0	0	0	25
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	92	92	90	90
Heavy Vehicles, %	0	0	0	0	4	2
Mvmt Flow	0	25	0	0	406	639

Major/Minor	Minor2		Major2	
Conflicting Flow All	-	581	-	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.9	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.3	-	-
Pot Cap-1 Maneuver	0	462	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	450	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	SB
HCM Control Delay, s	13.5	0
HCM LOS	B	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	450	-	-
HCM Lane V/C Ratio	0.056	-	-
HCM Control Delay (s)	13.5	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0.2	-	-

Lanes, Volumes, Timings  
 18: Nantasket Avenue & Wharf Avenue/DCR Lot 2 Enter

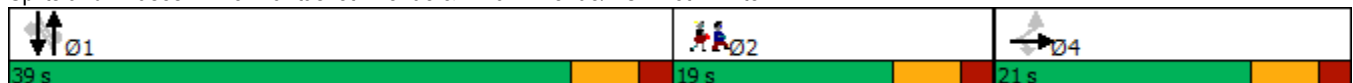
2022 Base Year Conditions  
 Weekday Evening

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	20	30	0	0	0	100	350	20	5	330	75
Future Volume (vph)	25	20	30	0	0	0	100	350	20	5	330	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	12	16	12	12	12	10	10	12	12	10	10
Right Turn on Red			No			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		213			191			311			200	
Travel Time (s)		5.8			5.2			8.5			5.5	
Peak Hour Factor	0.69	0.69	0.69	0.50	0.50	0.50	0.87	0.87	0.87	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	3%	0%	0%	3%	0%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm				Perm	NA		Perm	NA	Perm
Protected Phases		4						1			1	
Permitted Phases	4		4				1			1		1
Detector Phase	4	4	4				1	1		1	1	1
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0				33.0	33.0		33.0	33.0	33.0
Minimum Split (s)	21.0	21.0	21.0				39.0	39.0		39.0	39.0	39.0
Total Split (s)	21.0	21.0	21.0				39.0	39.0		39.0	39.0	39.0
Total Split (%)	26.6%	26.6%	26.6%				49.4%	49.4%		49.4%	49.4%	49.4%
Maximum Green (s)	15.0	15.0	15.0				33.0	33.0		33.0	33.0	33.0
Yellow Time (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0				2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	0.0
Total Lost Time (s)		6.0	6.0					6.0			6.0	6.0
Lead/Lag							Lead	Lead		Lead	Lead	Lead
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None				Max	Max		Max	Max	Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other  
 Cycle Length: 79  
 Actuated Cycle Length: 61.8  
 Natural Cycle: 80  
 Control Type: Semi Act-Uncoord

Splits and Phases: 18: Nantasket Avenue & Wharf Avenue/DCR Lot 2 Enter



Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	19.0
Total Split (s)	19.0
Total Split (%)	24%
Maximum Green (s)	13.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	6.0
Pedestrian Calls (#/hr)	30
Intersection Summary	

## Queues

2022 Base Year Conditions

## 18: Nantasket Avenue &amp; Wharf Avenue/DCR Lot 2 Enter


















Weekday Evening

	→	↘	↑	↓	↙
Lane Group	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	65	43	540	381	85
v/c Ratio	0.28	0.19	0.33	0.35	0.08
Control Delay	29.9	28.6	10.0	11.2	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	29.9	28.6	10.0	11.2	1.4
Queue Length 50th (ft)	18	12	32	45	0
Queue Length 95th (ft)	46	34	124	192	11
Internal Link Dist (ft)	133		231	120	
Turn Bay Length (ft)					
Base Capacity (vph)	460	455	1634	1090	1006
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.14	0.09	0.33	0.35	0.08
Intersection Summary					












HCM Signalized Intersection Capacity Analysis  
 18: Nantasket Avenue & Wharf Avenue/DCR Lot 2 Enter

2022 Base Year Conditions  
 Weekday Evening

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	25	20	30	0	0	0	100	350	20	5	330	75	
Future Volume (vph)	25	20	30	0	0	0	100	350	20	5	330	75	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	16	12	16	12	12	12	10	10	12	12	10	10	
Total Lost time (s)		6.0	6.0					6.0			6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95			1.00	1.00	
Frt		1.00	0.85					0.99			1.00	0.85	
Flt Protected		0.97	1.00					0.99			1.00	1.00	
Satd. Flow (prot)		1849	1830					3227			1721	1507	
Flt Permitted		0.97	1.00					0.78			0.99	1.00	
Satd. Flow (perm)		1849	1830					2557			1709	1507	
Peak-hour factor, PHF	0.69	0.69	0.69	0.50	0.50	0.50	0.87	0.87	0.87	0.88	0.88	0.88	
Adj. Flow (vph)	36	29	43	0	0	0	115	402	23	6	375	85	
RTOR Reduction (vph)	0	0	0	0	0	0	0	3	0	0	0	37	
Lane Group Flow (vph)	0	65	43	0	0	0	0	537	0	0	381	48	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	3%	0%	0%	3%	0%	
Turn Type	Perm	NA	Perm				Perm	NA		Perm	NA	Perm	
Protected Phases		4						1			1		
Permitted Phases	4		4				1			1		1	
Actuated Green, G (s)		6.5	6.5					38.0			38.0	38.0	
Effective Green, g (s)		6.5	6.5					38.0			38.0	38.0	
Actuated g/C Ratio		0.10	0.10					0.57			0.57	0.57	
Clearance Time (s)		6.0	6.0					6.0			6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0			3.0	3.0	
Lane Grp Cap (vph)		179	178					1454			972	857	
v/s Ratio Prot													
v/s Ratio Perm		0.04	0.02					0.21			0.22	0.03	
v/c Ratio		0.36	0.24					0.37			0.39	0.06	
Uniform Delay, d1		28.2	27.9					7.9			8.0	6.4	
Progression Factor		1.00	1.00					1.00			1.00	1.00	
Incremental Delay, d2		1.3	0.7					0.7			1.2	0.1	
Delay (s)		29.5	28.6					8.6			9.2	6.5	
Level of Service		C	C					A			A	A	
Approach Delay (s)		29.1			0.0			8.6			8.7		
Approach LOS		C			A			A			A		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			10.6									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.35										
Actuated Cycle Length (s)			66.8									Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

Lanes, Volumes, Timings  
 19: George Washington Boulevard & Bay Street

2022 Base Year Conditions  
 Weekday Evening

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	10	45	70	10	550	25
Future Volume (vph)	10	45	70	10	550	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	15	15	15
Link Speed (mph)	25			40	40	
Link Distance (ft)	237			204	123	
Travel Time (s)	6.5			3.5	2.1	
Peak Hour Factor	0.70	0.70	0.80	0.80	0.90	0.90
Heavy Vehicles (%)	0%	0%	3%	0%	2%	0%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh	2.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	45	70	10	550	25
Future Vol, veh/h	10	45	70	10	550	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	70	70	80	80	90	90
Heavy Vehicles, %	0	0	3	0	2	0
Mvmt Flow	14	64	88	13	611	28

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	814	625	639	0	0
Stage 1	625	-	-	-	-
Stage 2	189	-	-	-	-
Critical Hdwy	6.4	6.2	4.13	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.227	-	-
Pot Cap-1 Maneuver	350	488	940	-	-
Stage 1	537	-	-	-	-
Stage 2	848	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	317	488	940	-	-
Mov Cap-2 Maneuver	317	-	-	-	-
Stage 1	487	-	-	-	-
Stage 2	848	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.8	8.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	940	-	444	-	-
HCM Lane V/C Ratio	0.093	-	0.177	-	-
HCM Control Delay (s)	9.2	0	14.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.6	-	-

Lanes, Volumes, Timings  
 21: George Washington Boulevard & Wharf Avenue

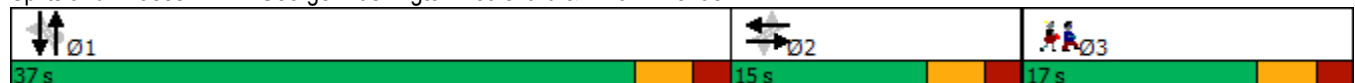
2022 Base Year Conditions  
 Weekday Evening

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	15	10	155	5	15	5	595	15	40	545	10
Future Volume (vph)	15	15	10	155	5	15	5	595	15	40	545	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	11	11	11	11	11	11
Right Turn on Red			Yes			No			Yes			No
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		219			213			784			515	
Travel Time (s)		6.0			5.8			13.4			8.8	
Peak Hour Factor	0.71	0.71	0.71	0.90	0.90	0.90	0.97	0.97	0.97	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Detector Phase	2	2		2	2		1	1		1	1	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		32.0	32.0		32.0	32.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		37.0	37.0		37.0	37.0	
Total Split (s)	15.0	15.0		15.0	15.0		37.0	37.0		37.0	37.0	
Total Split (%)	21.7%	21.7%		21.7%	21.7%		53.6%	53.6%		53.6%	53.6%	
Maximum Green (s)	10.0	10.0		10.0	10.0		32.0	32.0		32.0	32.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lead		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Max	Max		Max	Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other  
 Cycle Length: 69  
 Actuated Cycle Length: 55.4  
 Natural Cycle: 70  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 21: George Washington Boulevard & Wharf Avenue



Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	6.0
Minimum Split (s)	17.0
Total Split (s)	17.0
Total Split (%)	25%
Maximum Green (s)	12.0
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	6.0
Flash Dont Walk (s)	6.0
Pedestrian Calls (#/hr)	15
Intersection Summary	



Queues  
 21: George Washington Boulevard & Wharf Avenue

2022 Base Year Conditions  
 Weekday Evening

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	56	195	633	654
v/c Ratio	0.16	0.71	0.33	0.37
Control Delay	18.7	40.5	7.6	8.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	18.7	40.5	7.6	8.0
Queue Length 50th (ft)	11	56	40	43
Queue Length 95th (ft)	35	#195	127	136
Internal Link Dist (ft)	139	133	704	435
Turn Bay Length (ft)				
Base Capacity (vph)	346	276	1899	1766
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.16	0.71	0.33	0.37

















Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
 21: George Washington Boulevard & Wharf Avenue










2022 Base Year Conditions

Weekday Evening

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	15	10	155	5	15	5	595	15	40	545	10
Future Volume (vph)	15	15	10	155	5	15	5	595	15	40	545	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.97			0.99			1.00			1.00	
Flt Protected		0.98			0.96			1.00			1.00	
Satd. Flow (prot)		2042			2038			3410			3407	
Flt Permitted		0.88			0.71			0.95			0.88	
Satd. Flow (perm)		1834			1514			3244			3022	
Peak-hour factor, PHF	0.71	0.71	0.71	0.90	0.90	0.90	0.97	0.97	0.97	0.91	0.91	0.91
Adj. Flow (vph)	21	21	14	172	6	17	5	613	15	44	599	11
RTOR Reduction (vph)	0	12	0	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	44	0	0	195	0	0	631	0	0	654	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		10.1			10.1			32.4			32.4	
Effective Green, g (s)		10.1			10.1			32.4			32.4	
Actuated g/C Ratio		0.17			0.17			0.55			0.55	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		311			257			1769			1648	
v/s Ratio Prot												
v/s Ratio Perm		0.02			0.13			0.19			0.22	
v/c Ratio		0.14			0.76			0.36			0.40	
Uniform Delay, d1		21.0			23.5			7.6			7.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.2			12.1			0.6			0.7	
Delay (s)		21.2			35.6			8.2			8.5	
Level of Service		C			D			A			A	
Approach Delay (s)		21.2			35.6			8.2			8.5	
Approach LOS		C			D			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			12.3									B
HCM 2000 Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			59.4								15.0	
Intersection Capacity Utilization			70.5%									C
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings  
 1: Beach Avenue/Manomet Avenue & Phipps Street

2022 Base Year Conditions  
 Saturday Afternoon











						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	70	0	35	30	0	15
Future Volume (vph)	70	0	35	30	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	16	16	16
Link Speed (mph)	25			25	25	
Link Distance (ft)	178			287	279	
Travel Time (s)	4.9			7.8	7.6	
Confl. Peds. (#/hr)	5	9	9			5
Peak Hour Factor	0.85	0.85	0.92	0.92	0.82	0.82
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%
Shared Lane Traffic (%)						
Sign Control	Free			Stop	Stop	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Lanes, Volumes, Timings  
 2: Hull Shore Drive & Phipps Street

2022 Base Year Conditions  
 Saturday Afternoon

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	60	0	0	50	125	10
Future Volume (vph)	60	0	0	50	125	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	12	12	15	12
Link Speed (mph)	25			25	25	
Link Distance (ft)	224			178	191	
Travel Time (s)	6.1			4.9	5.2	
Confl. Peds. (#/hr)		9	4		9	4
Peak Hour Factor	0.85	0.85	0.82	0.82	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%
Parking (#/hr)					5	5
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh	5.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↖	↗
Traffic Vol, veh/h	60	0	0	50	125	10
Future Vol, veh/h	60	0	0	50	125	10
Conflicting Peds, #/hr	0	9	4	0	9	4
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	82	82	92	92
Heavy Vehicles, %	0	0	0	2	0	0
Mvmt Flow	71	0	0	61	136	11

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	-	-	141	75
Stage 1	-	-	-	71	-
Stage 2	-	-	-	70	-
Critical Hdwy	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	-	0	0	857	992
Stage 1	-	0	0	957	-
Stage 2	-	0	0	958	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	849	989
Mov Cap-2 Maneuver	-	-	-	849	-
Stage 1	-	-	-	957	-
Stage 2	-	-	-	949	-









Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	WBT
Capacity (veh/h)	849	989	-	-
HCM Lane V/C Ratio	0.16	0.011	-	-
HCM Control Delay (s)	10	8.7	-	-
HCM Lane LOS	B	A	-	-
HCM 95th %tile Q(veh)	0.6	0	-	-



Lanes, Volumes, Timings  
7: Hull Shore Drive & Water Street

2022 Base Year Conditions  
Saturday Afternoon

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	110	0	130	1175	0	0
Future Volume (vph)	110	0	130	1175	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	16	16	12	12
Link Speed (mph)	25			25	25	
Link Distance (ft)	195			1096	177	
Travel Time (s)	5.3			29.9	4.8	
Confl. Peds. (#/hr)	19	33	33			19
Peak Hour Factor	0.83	0.83	0.99	0.99	0.92	0.92
Heavy Vehicles (%)	0%	0%	1%	1%	2%	0%
Parking (#/hr)			5	5		
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
Control Type: Unsignalized

Intersection

Int Delay, s/veh 6.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
----------	-----	-----	-----	-----	-----	-----

Lane Configurations	↙			↗↖		
Traffic Vol, veh/h	110	0	130	1175	0	0
Future Vol, veh/h	110	0	130	1175	0	0
Conflicting Peds, #/hr	19	33	33	0	0	19
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	99	99	92	92
Heavy Vehicles, %	0	0	1	1	2	0
Mvmt Flow	133	0	131	1187	0	0

Major/Minor	Minor2	Major1
-------------	--------	--------

Conflicting Flow All	908	- 33	0
Stage 1	33	- -	-
Stage 2	875	- -	-
Critical Hdwy	6.8	- 4.12	-
Critical Hdwy Stg 1	-	- -	-
Critical Hdwy Stg 2	5.8	- -	-
Follow-up Hdwy	3.5	- 2.21	-
Pot Cap-1 Maneuver	279	0 1585	-
Stage 1	-	0 -	-
Stage 2	373	0 -	-
Platoon blocked, %			-
Mov Cap-1 Maneuver	199	- 1545	-
Mov Cap-2 Maneuver	199	- -	-
Stage 1	-	- -	-
Stage 2	364	- -	-

Approach	EB	NB
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HCM Control Delay, s	53.1	1.5
HCM LOS	F	

Minor Lane/Major Mvmt	NBL	NBT	EBLn1
-----------------------	-----	-----	-------

Capacity (veh/h)	1545	-	199
HCM Lane V/C Ratio	0.085	-	0.666
HCM Control Delay (s)	7.5	0.8	53.1
HCM Lane LOS	A	A	F
HCM 95th %tile Q(veh)	0.3	-	4

Lanes, Volumes, Timings

2022 Base Year Conditions

8: Nantasket Avenue & Hull Shore Drive Connection/Hull Shore Drive

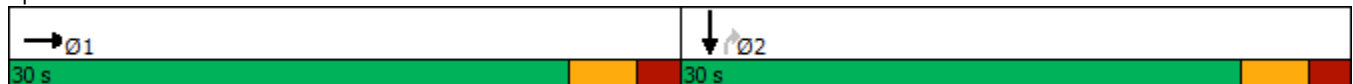
Saturday Afternoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑							↑↑		↑↑	
Traffic Volume (vph)	0	725	0	0	0	0	0	0	485	0	350	0
Future Volume (vph)	0	725	0	0	0	0	0	0	485	0	350	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	13	13	12	12	12	10	10	10	11	11	11
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		329			308			572			400	
Travel Time (s)		9.0			8.4			15.6			10.9	
Confl. Peds. (#/hr)	42		85	55		12	85		55	12		42
Peak Hour Factor	0.81	0.81	0.81	0.25	0.25	0.25	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	1%	0%	1%	0%
Parking (#/hr)										5	5	5
Shared Lane Traffic (%)												
Turn Type		NA							Perm		NA	
Protected Phases		1									2	
Permitted Phases									2			
Detector Phase		1							2		2	
Switch Phase												
Minimum Initial (s)		15.0							15.0		15.0	
Minimum Split (s)		22.0							22.0		22.0	
Total Split (s)		30.0							30.0		30.0	
Total Split (%)		50.0%							50.0%		50.0%	
Maximum Green (s)		25.0							25.0		25.0	
Yellow Time (s)		3.0							3.0		3.0	
All-Red Time (s)		2.0							2.0		2.0	
Lost Time Adjust (s)		0.0							0.0		0.0	
Total Lost Time (s)		5.0							5.0		5.0	
Lead/Lag		Lead							Lag		Lag	
Lead-Lag Optimize?		Yes							Yes		Yes	
Vehicle Extension (s)		3.0							3.0		3.0	
Recall Mode		None							Min		Min	
Walk Time (s)		7.0							7.0		7.0	
Flash Dont Walk (s)		8.0							8.0		8.0	
Pedestrian Calls (#/hr)		10							10		10	

Intersection Summary

Area Type: Other  
 Cycle Length: 60  
 Actuated Cycle Length: 49.4  
 Natural Cycle: 45  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Nantasket Avenue & Hull Shore Drive Connection/Hull Shore Drive















	→	↗	↓
Lane Group	EBT	NBR	SBT
Lane Group Flow (vph)	895	516	372
v/c Ratio	0.60	0.56	0.30
Control Delay	13.9	13.4	11.6
Queue Delay	0.0	0.0	0.0
Total Delay	13.9	13.4	11.6
Queue Length 50th (ft)	95	52	36
Queue Length 95th (ft)	152	109	71
Internal Link Dist (ft)	249		320
Turn Bay Length (ft)			
Base Capacity (vph)	1923	1222	1686
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.47	0.42	0.22
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

2022 Base Year Conditions

















8: Nantasket Avenue & Hull Shore Drive Connection/Hull Shore Drive

Saturday Afternoon

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑							↑↑		↑↑		
Traffic Volume (vph)	0	725	0	0	0	0	0	0	485	0	350	0	
Future Volume (vph)	0	725	0	0	0	0	0	0	485	0	350	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	13	13	13	12	12	12	10	10	10	11	11	11	
Total Lost time (s)		5.0							5.0		5.0		
Lane Util. Factor		0.95							0.88		0.95		
Frbp, ped/bikes		1.00							0.89		1.00		
Flpb, ped/bikes		1.00							1.00		1.00		
Frt		1.00							0.85		1.00		
Flt Protected		1.00							1.00		1.00		
Satd. Flow (prot)		3693							2342		3239		
Flt Permitted		1.00							1.00		1.00		
Satd. Flow (perm)		3693							2342		3239		
Peak-hour factor, PHF	0.81	0.81	0.81	0.25	0.25	0.25	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	0	895	0	0	0	0	0	0	516	0	372	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	37	0	0	0	
Lane Group Flow (vph)	0	895	0	0	0	0	0	0	479	0	372	0	
Confl. Peds. (#/hr)	42		85	55			12	85		55	12	42	
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	1%	0%	1%	0%	
Parking (#/hr)										5	5	5	
Turn Type		NA							Perm		NA		
Protected Phases		1									2		
Permitted Phases									2				
Actuated Green, G (s)		20.0							19.2		19.2		
Effective Green, g (s)		20.0							19.2		19.2		
Actuated g/C Ratio		0.41							0.39		0.39		
Clearance Time (s)		5.0							5.0		5.0		
Vehicle Extension (s)		3.0							3.0		3.0		
Lane Grp Cap (vph)		1501							913		1264		
v/s Ratio Prot		c0.24									0.11		
v/s Ratio Perm									c0.20				
v/c Ratio		0.60							0.52		0.29		
Uniform Delay, d1		11.4							11.5		10.3		
Progression Factor		1.00							1.00		1.00		
Incremental Delay, d2		0.6							0.5		0.1		
Delay (s)		12.1							12.0		10.5		
Level of Service		B							B		B		
Approach Delay (s)		12.1			0.0			12.0			10.5		
Approach LOS		B			A			B			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			11.7		HCM 2000 Level of Service					B			
HCM 2000 Volume to Capacity ratio			0.56										
Actuated Cycle Length (s)			49.2		Sum of lost time (s)					10.0			
Intersection Capacity Utilization			49.6%		ICU Level of Service					A			
Analysis Period (min)			15										
c Critical Lane Group													

Lanes, Volumes, Timings  
 10: Samoset Avenue & Phipps Street

2022 Base Year Conditions  
 Saturday Afternoon

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	160	15	20	165	55	5	0	40
Future Volume (vph)	0	0	0	0	160	15	20	165	55	5	0	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	13	13	16	16	16	16	16	16
Storage Length (ft)	0		0	0		0	40		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25				25
Link Distance (ft)		183			224			545				306
Travel Time (s)		5.0			6.1			14.9				8.3
Confl. Peds. (#/hr)	1		18	18		1	18		18	1		1
Peak Hour Factor	0.92	0.92	0.92	0.90	0.90	0.90	0.97	0.97	0.97	0.75	0.75	0.75
Heavy Vehicles (%)	2%	2%	2%	0%	1%	0%	0%	0%	0%	0%	0%	3%
Parking (#/hr)							5	5	0			
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized



Intersection

Intersection Delay, s/veh 9.2  
 Intersection LOS A


















Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔		↔	↔			↔	
Traffic Vol, veh/h	0	0	0	0	160	15	20	165	55	5	0	40
Future Vol, veh/h	0	0	0	0	160	15	20	165	55	5	0	40
Peak Hour Factor	0.92	0.92	0.92	0.90	0.90	0.90	0.97	0.97	0.97	0.75	0.75	0.75
Heavy Vehicles, %	2	2	2	0	1	0	0	0	0	0	0	3
Mvmt Flow	0	0	0	0	178	17	21	170	57	7	0	53
Number of Lanes	0	0	0	0	1	0	1	1	0	0	1	0

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	9.1	9.6	7.6
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	0%	11%
Vol Thru, %	0%	75%	91%	0%
Vol Right, %	0%	25%	9%	89%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	20	220	175	45
LT Vol	20	0	0	5
Through Vol	0	165	160	0
RT Vol	0	55	15	40
Lane Flow Rate	21	227	194	60
Geometry Grp	7	7	2	5
Degree of Util (X)	0.032	0.305	0.248	0.071
Departure Headway (Hd)	5.518	4.84	4.594	4.248
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	649	744	782	842
Service Time	3.246	2.567	2.619	2.282
HCM Lane V/C Ratio	0.032	0.305	0.248	0.071
HCM Control Delay	8.4	9.7	9.1	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	1.3	1	0.2

Lanes, Volumes, Timings  
 11: Nantasket Avenue & Mountford Road/Phipps Street

2022 Base Year Conditions  
 Saturday Afternoon

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	10	180	0	40	5	740	0	0	640	10
Future Volume (vph)	5	0	10	180	0	40	5	740	0	0	640	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	13	13	11	11	11	15	15	15	14	14	14
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		407			183			492			302	
Travel Time (s)		11.1			5.0			8.4			5.1	
Confl. Peds. (#/hr)	13		33	26		6	33		26	6		13
Peak Hour Factor	0.63	0.63	0.63	0.80	0.80	0.80	0.93	0.93	0.93	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	1%	0%	0%	2%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection												
Int Delay, s/veh	109.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔		↔		↔			↔	
Traffic Vol, veh/h	5	0	10	180	0	40	5	740	0	0	640	10
Future Vol, veh/h	5	0	10	180	0	40	5	740	0	0	640	10
Conflicting Peds, #/hr	13	0	33	26	0	6	33	0	26	6	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	63	63	63	80	80	80	93	93	93	90	90	90
Heavy Vehicles, %	0	0	0	1	0	1	0	1	0	0	2	0
Mvmt Flow	8	0	16	225	0	50	5	796	0	0	711	11

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1594	1556	783	1564	-	809	755	0	-	-	-	0
Stage 1	750	750	-	806	-	-	-	-	-	-	-	-
Stage 2	844	806	-	758	-	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.11	-	6.21	4.1	-	-	-	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.11	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.11	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.509	-	3.309	2.2	-	-	-	-	-
Pot Cap-1 Maneuver	87	114	397	~91	0	382	865	-	0	0	-	-
Stage 1	407	422	-	377	0	-	-	-	0	0	-	-
Stage 2	361	398	-	401	0	-	-	-	0	0	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	72	109	372	~83	-	377	839	-	-	-	-	-
Mov Cap-2 Maneuver	72	109	-	~83	-	-	-	-	-	-	-	-
Stage 1	391	409	-	373	-	-	-	-	-	-	-	-
Stage 2	306	394	-	371	-	-	-	-	-	-	-	-

















Approach	EB	WB	NB	SB
HCM Control Delay, s	32.2	\$ 724.3	0.1	0
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1WBLn1WBLn2	SBT	SBR
Capacity (veh/h)	839	-	156 83 377	-	-
HCM Lane V/C Ratio	0.006	-	0.153 2.711 0.133	-	-
HCM Control Delay (s)	9.3	0	32.2\$ 881.7 16	-	-
HCM Lane LOS	A	A	D F C	-	-
HCM 95th %tile Q(veh)	0	-	0.5 21.6 0.5	-	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Lanes, Volumes, Timings  
 12: Nantasket Avenue & Whitehead Avenue/Samoset Avenue

2022 Base Year Conditions  
 Saturday Afternoon

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	20	0	0	0	0	745	240	0	815	15
Future Volume (vph)	0	0	20	0	0	0	0	745	240	0	815	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	12	12	12	12	12	12	12	12	12
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		477			545			276			492	
Travel Time (s)		13.0			14.9			4.7			8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.95	0.95	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	1%	0%	0%	2%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗					↖	↗		↖	
Traffic Vol, veh/h	0	0	20	0	0	0	0	745	240	0	815	15
Future Vol, veh/h	0	0	20	0	0	0	0	745	240	0	815	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	95	95	95	90	90	90
Heavy Vehicles, %	2	2	2	0	0	0	0	1	0	0	2	0
Mvmt Flow	0	0	22	0	0	0	0	784	253	0	906	17













Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	-	-	915	923	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	4.1	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	2.2	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	331	748	-	-	0	-	-
Stage 1	0	0	-	-	-	-	0	-	-
Stage 2	0	0	-	-	-	-	0	-	-
Platoon blocked, %									
Mov Cap-1 Maneuver	-	0	331	748	-	-	-	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.6	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBT	SBR
Capacity (veh/h)	748	-	-	331	-	-
HCM Lane V/C Ratio	-	-	-	0.066	-	-
HCM Control Delay (s)	0	-	-	16.6	-	-
HCM Lane LOS	A	-	-	C	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	-	-

Lanes, Volumes, Timings  
 13: Nantasket Avenue & Edgewater Road

2022 Base Year Conditions  
 Saturday Afternoon

							
Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	10	20	40	965	10	810	15
Future Volume (vph)	10	20	40	965	10	810	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	13	12	12	10	12	12
Storage Length (ft)	0	0	100		100		100
Storage Lanes	1	0	1		1		0
Taper Length (ft)	25		25		25		
Link Speed (mph)	25			40		40	
Link Distance (ft)	561			717		276	
Travel Time (s)	15.3			12.2		4.7	
Peak Hour Factor	0.90	0.90	0.95	0.95	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	1%	0%	2%	0%
Shared Lane Traffic (%)							
Sign Control	Stop			Free		Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized



Intersection

Int Delay, s/veh	0.7						
Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	10	20	40	965	10	810	15
Future Vol, veh/h	10	20	40	965	10	810	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	100	-	100	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	90	90	95	95	96	96	96
Heavy Vehicles, %	0	0	0	1	0	2	0
Mvmt Flow	11	22	42	1016	10	844	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1464	430	860	0	1016	0
Stage 1	872	-	-	-	-	-
Stage 2	592	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	6.4	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	2.5	-
Pot Cap-1 Maneuver	121	579	790	-	330	-
Stage 1	374	-	-	-	-	-
Stage 2	521	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	111	579	790	-	330	-
Mov Cap-2 Maneuver	111	-	-	-	-	-
Stage 1	354	-	-	-	-	-
Stage 2	505	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.3	0.4	0.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBU	SBT	SBR
Capacity (veh/h)	790	-	241	330	-	-
HCM Lane V/C Ratio	0.053	-	0.138	0.032	-	-
HCM Control Delay (s)	9.8	-	22.3	16.3	-	-
HCM Lane LOS	A	-	C	C	-	-
HCM 95th %tile Q(veh)	0.2	-	0.5	0.1	-	-

Lanes, Volumes, Timings  
 16: Nantasket Avenue & Bay Street/Water Street

2022 Base Year Conditions  
 Saturday Afternoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	50	25	90	40	0	0	0	0	60	725	45
Future Volume (vph)	0	50	25	90	40	0	0	0	0	60	725	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	13	13	12	12	12	12	12	12
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			40	
Link Distance (ft)		338			195			1092			395	
Travel Time (s)		9.2			5.3			29.8			6.7	
Peak Hour Factor	0.81	0.81	0.81	0.91	0.91	0.91	0.92	0.92	0.92	0.90	0.90	0.90
Heavy Vehicles (%)	0%	2%	2%	2%	2%	0%	0%	0%	0%	0%	2%	0%
Shared Lane Traffic (%)												
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			2						1	
Permitted Phases				2						1		
Detector Phase		2		2	2					1	1	
Switch Phase												
Minimum Initial (s)		5.0		5.0	5.0					27.0	27.0	
Minimum Split (s)		10.0		10.0	10.0					32.0	32.0	
Total Split (s)		10.0		10.0	10.0					32.0	32.0	
Total Split (%)		17.5%		17.5%	17.5%					56.1%	56.1%	
Maximum Green (s)		5.0		5.0	5.0					27.0	27.0	
Yellow Time (s)		3.0		3.0	3.0					3.0	3.0	
All-Red Time (s)		2.0		2.0	2.0					2.0	2.0	
Lost Time Adjust (s)		0.0			0.0						0.0	
Total Lost Time (s)		5.0			5.0						5.0	
Lead/Lag		Lag		Lag	Lag					Lead	Lead	
Lead-Lag Optimize?		Yes		Yes	Yes					Yes	Yes	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Recall Mode		None		None	None					Max	Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other  
 Cycle Length: 57  
 Actuated Cycle Length: 45  
 Natural Cycle: 60  
 Control Type: Semi Act-Uncoord

Splits and Phases: 16: Nantasket Avenue & Bay Street/Water Street



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Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	15.0
Total Split (s)	15.0
Total Split (%)	26%
Maximum Green (s)	10.0
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	3.0
Pedestrian Calls (#/hr)	0
Intersection Summary	

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Queues  
 16: Nantasket Avenue & Bay Street/Water Street

2022 Base Year Conditions  
 Saturday Afternoon

















	→	←	↓
Lane Group	EBT	WBT	SBT
Lane Group Flow (vph)	93	143	923
v/c Ratio	0.41	0.90	0.40
Control Delay	18.4	75.4	4.1
Queue Delay	0.0	0.0	0.0
Total Delay	18.4	75.4	4.1
Queue Length 50th (ft)	14	34	40
Queue Length 95th (ft)	39	#110	62
Internal Link Dist (ft)	258	115	315
Turn Bay Length (ft)			
Base Capacity (vph)	228	159	2324
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.41	0.90	0.40

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.










HCM Signalized Intersection Capacity Analysis  
 16: Nantasket Avenue & Bay Street/Water Street

2022 Base Year Conditions  
 Saturday Afternoon

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											 	
Traffic Volume (vph)	0	50	25	90	40	0	0	0	0	60	725	45
Future Volume (vph)	0	50	25	90	40	0	0	0	0	60	725	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	13	13	13	12	12	12	12	12	12
Total Lost time (s)		5.0			5.0						5.0	
Lane Util. Factor		1.00			1.00						0.95	
Frt		0.95			1.00						0.99	
Flt Protected		1.00			0.97						1.00	
Satd. Flow (prot)		1779			1860						3506	
Flt Permitted		1.00			0.74						1.00	
Satd. Flow (perm)		1779			1416						3506	
Peak-hour factor, PHF	0.81	0.81	0.81	0.91	0.91	0.91	0.92	0.92	0.92	0.90	0.90	0.90
Adj. Flow (vph)	0	62	31	99	44	0	0	0	0	67	806	50
RTOR Reduction (vph)	0	27	0	0	0	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	66	0	0	143	0	0	0	0	0	918	0
Heavy Vehicles (%)	0%	2%	2%	2%	2%	0%	0%	0%	0%	0%	2%	0%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			2						1	
Permitted Phases				2						1		
Actuated Green, G (s)		5.1			5.1						29.8	
Effective Green, g (s)		5.1			5.1						29.8	
Actuated g/C Ratio		0.11			0.11						0.66	
Clearance Time (s)		5.0			5.0						5.0	
Vehicle Extension (s)		3.0			3.0						3.0	
Lane Grp Cap (vph)		202			160						2326	
v/s Ratio Prot		0.04										
v/s Ratio Perm					0.10						0.26	
v/c Ratio		0.32			0.89						0.39	
Uniform Delay, d1		18.3			19.6						3.4	
Progression Factor		1.00			1.00						1.00	
Incremental Delay, d2		0.9			41.7						0.5	
Delay (s)		19.3			61.3						3.9	
Level of Service		B			E						A	
Approach Delay (s)		19.3			61.3			0.0			3.9	
Approach LOS		B			E			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			12.2			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			44.9			Sum of lost time (s)				15.0		
Intersection Capacity Utilization			45.3%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings  
 17: Nantasket Avenue & George Washington Boulevard

2022 Base Year Conditions  
 Saturday Afternoon

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations					 	
Traffic Volume (vph)	0	35	0	0	315	560
Future Volume (vph)	0	35	0	0	315	560
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	12	12	12	12
Link Speed (mph)	40			25	25	
Link Distance (ft)	123			400	146	
Travel Time (s)	2.1			10.9	4.0	
Confl. Peds. (#/hr)		39				51
Peak Hour Factor	0.73	0.76	0.92	0.92	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized



Intersection

Int Delay, s/veh 0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗			↖	
Traffic Vol, veh/h	0	35	0	0	315	560
Future Vol, veh/h	0	35	0	0	315	560
Conflicting Peds, #/hr	0	39	0	0	0	51
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	73	76	92	92	96	96
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	0	46	0	0	328	583

Major/Minor	Minor2	Major2
Conflicting Flow All	- 546	- 0
Stage 1	- -	- -
Stage 2	- -	- -
Critical Hdwy	- 6.9	- -
Critical Hdwy Stg 1	- -	- -
Critical Hdwy Stg 2	- -	- -
Follow-up Hdwy	- 3.3	- -
Pot Cap-1 Maneuver	0 487	- -
Stage 1	0 -	- -
Stage 2	0 -	- -
Platoon blocked, %	-	- -
Mov Cap-1 Maneuver	- 461	- -
Mov Cap-2 Maneuver	- -	- -
Stage 1	- -	- -
Stage 2	- -	- -

Approach	EB	SB
HCM Control Delay, s	13.7	0
HCM LOS	B	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	461	-	-
HCM Lane V/C Ratio	0.1	-	-
HCM Control Delay (s)	13.7	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0.3	-	-

Lanes, Volumes, Timings  
 18: Nantasket Avenue & Wharf Avenue/DCR Lot 2 Enter

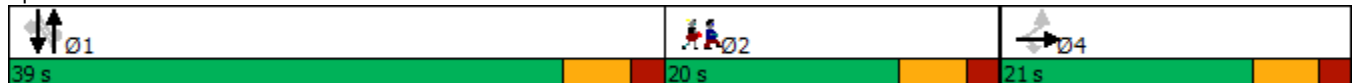
2022 Base Year Conditions  
 Saturday Afternoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	10	55	0	0	0	75	395	15	10	320	45
Future Volume (vph)	80	10	55	0	0	0	75	395	15	10	320	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	12	16	12	12	12	10	10	12	12	10	10
Right Turn on Red			No			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		213			191			311			200	
Travel Time (s)		5.8			5.2			8.5			5.5	
Peak Hour Factor	0.89	0.89	0.89	0.25	0.25	0.25	0.95	0.95	0.95	0.83	0.83	0.83
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	6%	2%	0%	0%	1%	0%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm				Perm	NA		Perm	NA	Perm
Protected Phases		4						1			1	
Permitted Phases	4		4				1			1		1
Detector Phase	4	4	4				1	1		1	1	1
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0				33.0	33.0		33.0	33.0	33.0
Minimum Split (s)	21.0	21.0	21.0				39.0	39.0		39.0	39.0	39.0
Total Split (s)	21.0	21.0	21.0				39.0	39.0		39.0	39.0	39.0
Total Split (%)	26.3%	26.3%	26.3%				48.8%	48.8%		48.8%	48.8%	48.8%
Maximum Green (s)	15.0	15.0	15.0				33.0	33.0		33.0	33.0	33.0
Yellow Time (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0				2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	0.0
Total Lost Time (s)		6.0	6.0					6.0			6.0	6.0
Lead/Lag							Lead	Lead		Lead	Lead	Lead
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None				Max	Max		Max	Max	Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other  
 Cycle Length: 80  
 Actuated Cycle Length: 62.3  
 Natural Cycle: 80  
 Control Type: Semi Act-Uncoord

Splits and Phases: 18: Nantasket Avenue & Wharf Avenue/DCR Lot 2 Enter



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Lane Group	Ø2
<b>Lane Configurations</b>	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	19.0
Total Split (s)	20.0
Total Split (%)	25%
Maximum Green (s)	14.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	6.0
Pedestrian Calls (#/hr)	30
<b>Intersection Summary</b>	

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Queues

2022 Base Year Conditions

18: Nantasket Avenue & Wharf Avenue/DCR Lot 2 Enter


















Saturday Afternoon

	→	↘	↑	↓	↙
Lane Group	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	101	62	511	398	54
v/c Ratio	0.39	0.24	0.30	0.37	0.05
Control Delay	30.8	28.3	10.4	12.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	30.9	28.3	10.4	12.2	0.1
Queue Length 50th (ft)	29	17	32	51	0
Queue Length 95th (ft)	85	58	127	195	0
Internal Link Dist (ft)	133		231	120	
Turn Bay Length (ft)					
Base Capacity (vph)	451	445	1697	1077	987
Starvation Cap Reductn	22	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.24	0.14	0.30	0.37	0.05

Intersection Summary










HCM Signalized Intersection Capacity Analysis  
 18: Nantasket Avenue & Wharf Avenue/DCR Lot 2 Enter

2022 Base Year Conditions  
 Saturday Afternoon

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	80	10	55	0	0	0	75	395	15	10	320	45	
Future Volume (vph)	80	10	55	0	0	0	75	395	15	10	320	45	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	16	12	16	12	12	12	10	10	12	12	10	10	
Total Lost time (s)		6.0	6.0					6.0			6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95			1.00	1.00	
Frt		1.00	0.85					1.00			1.00	0.85	
Flt Protected		0.96	1.00					0.99			1.00	1.00	
Satd. Flow (prot)		1819	1794					3245			1754	1507	
Flt Permitted		0.96	1.00					0.83			0.98	1.00	
Satd. Flow (perm)		1819	1794					2716			1725	1507	
Peak-hour factor, PHF	0.89	0.89	0.89	0.25	0.25	0.25	0.95	0.95	0.95	0.83	0.83	0.83	
Adj. Flow (vph)	90	11	62	0	0	0	79	416	16	12	386	54	
RTOR Reduction (vph)	0	0	0	0	0	0	0	2	0	0	0	24	
Lane Group Flow (vph)	0	101	62	0	0	0	0	509	0	0	398	30	
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	6%	2%	0%	0%	1%	0%	
Turn Type	Perm	NA	Perm				Perm	NA		Perm	NA	Perm	
Protected Phases		4						1			1		
Permitted Phases	4		4				1			1		1	
Actuated Green, G (s)		7.6	7.6					37.5			37.5	37.5	
Effective Green, g (s)		7.6	7.6					37.5			37.5	37.5	
Actuated g/C Ratio		0.11	0.11					0.56			0.56	0.56	
Clearance Time (s)		6.0	6.0					6.0			6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0			3.0	3.0	
Lane Grp Cap (vph)		205	202					1511			959	838	
v/s Ratio Prot													
v/s Ratio Perm		0.06	0.03					0.19			0.23	0.02	
v/c Ratio		0.49	0.31					0.34			0.42	0.04	
Uniform Delay, d1		28.1	27.5					8.2			8.6	6.8	
Progression Factor		1.00	1.00					1.00			1.00	1.00	
Incremental Delay, d2		1.9	0.9					0.6			1.3	0.1	
Delay (s)		29.9	28.3					8.8			9.9	6.8	
Level of Service		C	C					A			A	A	
Approach Delay (s)		29.3			0.0			8.8			9.6		
Approach LOS		C			A			A			A		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			12.1									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.39										
Actuated Cycle Length (s)			67.4									Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

Lanes, Volumes, Timings  
 19: George Washington Boulevard & Bay Street

2022 Base Year Conditions  
 Saturday Afternoon

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	5	70	80	30	535	25
Future Volume (vph)	5	70	80	30	535	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	15	15	15
Link Speed (mph)	25			40	40	
Link Distance (ft)	237			204	123	
Travel Time (s)	6.5			3.5	2.1	
Confl. Peds. (#/hr)	5	5	5			5
Peak Hour Factor	0.86	0.86	0.73	0.73	0.96	0.96
Heavy Vehicles (%)	0%	0%	3%	0%	1%	1%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized



Intersection						
Int Delay, s/veh	2.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Vol, veh/h	5	70	80	30	535	25
Future Vol, veh/h	5	70	80	30	535	25
Conflicting Peds, #/hr	5	5	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	73	73	96	96
Heavy Vehicles, %	0	0	3	0	1	1
Mvmt Flow	6	81	110	41	557	26

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	841	580	588	0	-	0
Stage 1	575	-	-	-	-	-
Stage 2	266	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.13	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.227	-	-	-
Pot Cap-1 Maneuver	338	518	982	-	-	-
Stage 1	567	-	-	-	-	-
Stage 2	783	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	296	513	977	-	-	-
Mov Cap-2 Maneuver	296	-	-	-	-	-
Stage 1	500	-	-	-	-	-
Stage 2	779	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14	6.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	977	-	489	-	-
HCM Lane V/C Ratio	0.112	-	0.178	-	-
HCM Control Delay (s)	9.2	0	14	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.4	-	0.6	-	-

Lanes, Volumes, Timings  
 21: George Washington Boulevard & Wharf Avenue

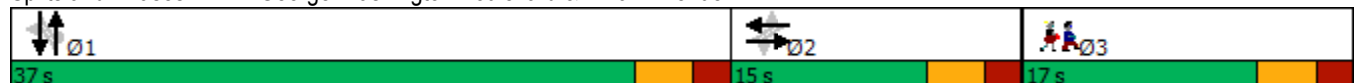
2022 Base Year Conditions  
 Saturday Afternoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	10	25	80	10	30	30	790	110	25	560	20
Future Volume (vph)	15	10	25	80	10	30	30	790	110	25	560	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	11	11	11	11	11	11
Right Turn on Red			Yes			No			Yes			No
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		219			213			784			515	
Travel Time (s)		6.0			5.8			13.4			8.8	
Peak Hour Factor	0.70	0.70	0.70	0.69	0.69	0.69	0.98	0.98	0.98	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	4%	0%	4%	0%	1%	1%	0%	1%	5%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Detector Phase	2	2		2	2		1	1		1	1	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		32.0	32.0		32.0	32.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		37.0	37.0		37.0	37.0	
Total Split (s)	15.0	15.0		15.0	15.0		37.0	37.0		37.0	37.0	
Total Split (%)	21.7%	21.7%		21.7%	21.7%		53.6%	53.6%		53.6%	53.6%	
Maximum Green (s)	10.0	10.0		10.0	10.0		32.0	32.0		32.0	32.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lead		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Max	Max		Max	Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other  
 Cycle Length: 69  
 Actuated Cycle Length: 55.4  
 Natural Cycle: 70  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 21: George Washington Boulevard & Wharf Avenue



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Lane Group	Ø3
<hr/>	
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	6.0
Minimum Split (s)	17.0
Total Split (s)	17.0
Total Split (%)	25%
Maximum Green (s)	12.0
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	6.0
Flash Dont Walk (s)	6.0
Pedestrian Calls (#/hr)	15
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Intersection Summary	

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Queues  
 21: George Washington Boulevard & Wharf Avenue

2022 Base Year Conditions  
 Saturday Afternoon

















	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	71	173	949	630
v/c Ratio	0.20	0.62	0.52	0.35
Control Delay	14.8	35.8	9.0	7.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.8	35.8	9.0	7.8
Queue Length 50th (ft)	9	49	66	40
Queue Length 95th (ft)	33	#106	210	130
Internal Link Dist (ft)	139	133	704	435
Turn Bay Length (ft)				
Base Capacity (vph)	357	277	1842	1806
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.20	0.62	0.52	0.35










Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
 21: George Washington Boulevard & Wharf Avenue

2022 Base Year Conditions  
 Saturday Afternoon

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	15	10	25	80	10	30	30	790	110	25	560	20	
Future Volume (vph)	15	10	25	80	10	30	30	790	110	25	560	20	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	16	16	16	16	16	16	11	11	11	11	11	11	
Total Lost time (s)		5.0			5.0			5.0			5.0		
Lane Util. Factor		1.00			1.00			0.95			0.95		
Frt		0.93			0.97			0.98			0.99		
Flt Protected		0.99			0.97			1.00			1.00		
Satd. Flow (prot)		1977			1942			3390			3428		
Flt Permitted		0.89			0.76			0.92			0.90		
Satd. Flow (perm)		1793			1516			3132			3087		
Peak-hour factor, PHF	0.70	0.70	0.70	0.69	0.69	0.69	0.98	0.98	0.98	0.96	0.96	0.96	
Adj. Flow (vph)	21	14	36	116	14	43	31	806	112	26	583	21	
RTOR Reduction (vph)	0	30	0	0	0	0	0	13	0	0	0	0	
Lane Group Flow (vph)	0	41	0	0	173	0	0	936	0	0	630	0	
Heavy Vehicles (%)	0%	0%	0%	4%	0%	4%	0%	1%	1%	0%	1%	5%	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA		
Protected Phases		2			2			1			1		
Permitted Phases	2			2			1			1			
Actuated Green, G (s)		10.1			10.1			32.4			32.4		
Effective Green, g (s)		10.1			10.1			32.4			32.4		
Actuated g/C Ratio		0.17			0.17			0.55			0.55		
Clearance Time (s)		5.0			5.0			5.0			5.0		
Vehicle Extension (s)		3.0			3.0			3.0			3.0		
Lane Grp Cap (vph)		304			257			1708			1683		
v/s Ratio Prot													
v/s Ratio Perm		0.02			0.11			0.30			0.20		
v/c Ratio		0.14			0.67			0.55			0.37		
Uniform Delay, d1		20.9			23.1			8.8			7.7		
Progression Factor		1.00			1.00			1.00			1.00		
Incremental Delay, d2		0.2			6.8			1.3			0.6		
Delay (s)		21.1			29.9			10.0			8.3		
Level of Service		C			C			B			A		
Approach Delay (s)		21.1			29.9			10.0			8.3		
Approach LOS		C			C			B			A		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			11.8									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.55										
Actuated Cycle Length (s)			59.4									Sum of lost time (s)	15.0
Intersection Capacity Utilization			69.3%									ICU Level of Service	C
Analysis Period (min)			15										
c Critical Lane Group													

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	30	0	15	25	0	15
Future Volume (vph)	30	0	15	25	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	16	16	16
Link Speed (mph)	25			25	25	
Link Distance (ft)	178			287	279	
Travel Time (s)	4.9			7.8	7.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	14%	0%	1%	1%	0%	20%
Shared Lane Traffic (%)						
Sign Control	Free			Stop	Stop	











Intersection Summary

Area Type: Other  
 Control Type: Unsignalized



Lanes, Volumes, Timings  
 2: Hull Shore Drive & Phipps Street

2032 Future Year Existing Flow Conditions  
 Weekday Evening

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	20	0	0	30	140	10
Future Volume (vph)	20	0	0	30	140	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	12	12	15	12
Link Speed (mph)	25			25	25	
Link Distance (ft)	224			178	191	
Travel Time (s)	6.1			4.9	5.2	
Confl. Peds. (#/hr)		7	9		7	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	14%	0%	0%	5%	1%	0%
Parking (#/hr)					5	5
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh	7.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↘	↘
Traffic Vol, veh/h	20	0	0	30	140	10
Future Vol, veh/h	20	0	0	30	140	10
Conflicting Peds, #/hr	0	7	9	0	7	9
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	14	0	0	5	1	0
Mvmt Flow	22	0	0	33	152	11










Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	-	-	62	31
Stage 1	-	-	-	22	-
Stage 2	-	-	-	40	-
Critical Hdwy	-	-	-	6.41	6.2
Critical Hdwy Stg 1	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	5.41	-
Follow-up Hdwy	-	-	-	3.509	3.3
Pot Cap-1 Maneuver	-	0	0	947	1049
Stage 1	-	0	0	1003	-
Stage 2	-	0	0	985	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	940	1041
Mov Cap-2 Maneuver	-	-	-	940	-
Stage 1	-	-	-	1003	-
Stage 2	-	-	-	978	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	WBT
Capacity (veh/h)	940	1041	-	-
HCM Lane V/C Ratio	0.162	0.01	-	-
HCM Control Delay (s)	9.6	8.5	-	-
HCM Lane LOS	A	A	-	-
HCM 95th %tile Q(veh)	0.6	0	-	-

Lanes, Volumes, Timings  
7: Hull Shore Drive & Water Street

2032 Future Year Existing Flow Conditions  
Weekday Evening

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 		
Traffic Volume (vph)	60	0	115	915	0	0
Future Volume (vph)	60	0	115	915	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	16	16	12	12
Link Speed (mph)	25			25	25	
Link Distance (ft)	195			1096	177	
Travel Time (s)	5.3			29.9	4.8	
Confl. Peds. (#/hr)	3		10			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	0%	1%	2%	2%	2%
Parking (#/hr)			5	5		
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
Control Type: Unsignalized

Intersection

Int Delay, s/veh 2.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
----------	-----	-----	-----	-----	-----	-----

Lane Configurations	↙			↗↖		
Traffic Vol, veh/h	60	0	115	915	0	0
Future Vol, veh/h	60	0	115	915	0	0
Conflicting Peds, #/hr	3	0	10	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	0	1	2	2	2
Mvmt Flow	65	0	125	995	0	0

Major/Minor	Minor2	Major1
-------------	--------	--------

Conflicting Flow All	761	- 10	0
Stage 1	10	- -	-
Stage 2	751	- -	-
Critical Hdwy	7	- 4.12	-
Critical Hdwy Stg 1	-	- -	-
Critical Hdwy Stg 2	6	- -	-
Follow-up Hdwy	3.6	- 2.21	-
Pot Cap-1 Maneuver	325	0 1615	-
Stage 1	-	0 -	-
Stage 2	407	0 -	-
Platoon blocked, %			-
Mov Cap-1 Maneuver	264	- 1603	-
Mov Cap-2 Maneuver	264	- -	-
Stage 1	-	- -	-
Stage 2	404	- -	-

Approach	EB	NB
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HCM Control Delay, s	23.1	1.3
HCM LOS	C	

Minor Lane/Major Mvmt	NBL	NBT	EBLn1
-----------------------	-----	-----	-------

Capacity (veh/h)	1603	-	264
HCM Lane V/C Ratio	0.078	-	0.247
HCM Control Delay (s)	7.4	0.5	23.1
HCM Lane LOS	A	A	C
HCM 95th %tile Q(veh)	0.3	-	0.9

Lanes, Volumes, Timings

2032 Future Year Existing Flow Conditions

8: Nantasket Avenue & Hull Shore Drive Connection/Hull Shore Drive

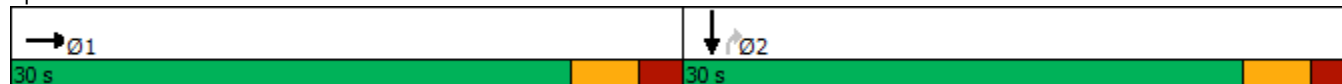
Weekday Evening

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑							↑↑		↑↑	
Traffic Volume (vph)	0	580	0	0	0	0	0	0	405	0	415	0
Future Volume (vph)	0	580	0	0	0	0	0	0	405	0	415	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	13	13	12	12	12	10	10	10	11	11	11
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		329			308			572			400	
Travel Time (s)		9.0			8.4			15.6			10.9	
Confl. Peds. (#/hr)	12		21	17		8	21		17	8		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	2%	0%	3%	0%
Parking (#/hr)										5	5	20
Shared Lane Traffic (%)												
Turn Type		NA							Perm		NA	
Protected Phases		1									2	
Permitted Phases									2			
Detector Phase		1							2		2	
Switch Phase												
Minimum Initial (s)		15.0							15.0		15.0	
Minimum Split (s)		22.0							22.0		22.0	
Total Split (s)		30.0							30.0		30.0	
Total Split (%)		50.0%							50.0%		50.0%	
Maximum Green (s)		25.0							25.0		25.0	
Yellow Time (s)		3.0							3.0		3.0	
All-Red Time (s)		2.0							2.0		2.0	
Lost Time Adjust (s)		0.0							0.0		0.0	
Total Lost Time (s)		5.0							5.0		5.0	
Lead/Lag		Lead							Lag		Lag	
Lead-Lag Optimize?		Yes							Yes		Yes	
Vehicle Extension (s)		3.0							3.0		3.0	
Recall Mode		None							Min		Min	
Walk Time (s)		7.0							7.0		7.0	
Flash Dont Walk (s)		8.0							8.0		8.0	
Pedestrian Calls (#/hr)		10							10		10	

Intersection Summary

Area Type: Other  
 Cycle Length: 60  
 Actuated Cycle Length: 43.9  
 Natural Cycle: 45  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Nantasket Avenue & Hull Shore Drive Connection/Hull Shore Drive



## Queues

2032 Future Year Existing Flow Conditions













## 8: Nantasket Avenue &amp; Hull Shore Drive Connection/Hull Shore Drive

Weekday Evening

	→	↗	↓
Lane Group	EBT	NBR	SBT
Lane Group Flow (vph)	630	440	451
v/c Ratio	0.45	0.40	0.36
Control Delay	12.0	5.8	10.5
Queue Delay	0.0	0.0	0.0
Total Delay	12.0	5.8	10.5
Queue Length 50th (ft)	52	17	36
Queue Length 95th (ft)	117	50	76
Internal Link Dist (ft)	249		320
Turn Bay Length (ft)			
Base Capacity (vph)	2138	1521	1839
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.29	0.29	0.25
Intersection Summary			



















HCM Signalized Intersection Capacity Analysis      2032 Future Year Existing Flow Conditions  
 8: Nantasket Avenue & Hull Shore Drive Connection/Hull Shore Drive      Weekday Evening

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑							↑↑		↑↑		
Traffic Volume (vph)	0	580	0	0	0	0	0	0	405	0	415	0	
Future Volume (vph)	0	580	0	0	0	0	0	0	405	0	415	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	13	13	13	12	12	12	10	10	10	11	11	11	
Total Lost time (s)		5.0							5.0		5.0		
Lane Util. Factor		0.95							0.88		0.95		
Frbp, ped/bikes		1.00							0.96		1.00		
Flpb, ped/bikes		1.00							1.00		1.00		
Frt		1.00							0.85		1.00		
Flt Protected		1.00							1.00		1.00		
Satd. Flow (prot)		3693							2486		3176		
Flt Permitted		1.00							1.00		1.00		
Satd. Flow (perm)		3693							2486		3176		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	630	0	0	0	0	0	0	440	0	451	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	139	0	0	0	
Lane Group Flow (vph)	0	630	0	0	0	0	0	0	301	0	451	0	
Confl. Peds. (#/hr)	12		21	17			8	21		17	8	12	
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	2%	0%	3%	0%	
Parking (#/hr)										5	5	20	
Turn Type		NA							Perm		NA		
Protected Phases		1									2		
Permitted Phases									2				
Actuated Green, G (s)		16.5							17.2		17.2		
Effective Green, g (s)		16.5							17.2		17.2		
Actuated g/C Ratio		0.38							0.39		0.39		
Clearance Time (s)		5.0							5.0		5.0		
Vehicle Extension (s)		3.0							3.0		3.0		
Lane Grp Cap (vph)		1394							978		1250		
v/s Ratio Prot		c0.17									c0.14		
v/s Ratio Perm									0.12				
v/c Ratio		0.45							0.31		0.36		
Uniform Delay, d1		10.2							9.1		9.4		
Progression Factor		1.00							1.00		1.00		
Incremental Delay, d2		0.2							0.2		0.2		
Delay (s)		10.4							9.3		9.5		
Level of Service		B							A		A		
Approach Delay (s)		10.4			0.0			9.3			9.5		
Approach LOS		B			A			A			A		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			9.9		HCM 2000 Level of Service					A			
HCM 2000 Volume to Capacity ratio			0.41										
Actuated Cycle Length (s)			43.7		Sum of lost time (s)					10.0			
Intersection Capacity Utilization			40.2%		ICU Level of Service					A			
Analysis Period (min)			15										
c Critical Lane Group													

Lanes, Volumes, Timings  
 10: Samoset Avenue & Phipps Street

2032 Future Year Existing Flow Conditions  
 Weekday Evening

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	150	20	10	95	10	10	0	30
Future Volume (vph)	0	0	0	0	150	20	10	95	10	10	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	13	13	16	16	16	16	16	16
Storage Length (ft)	0		0	0		0	40		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25				25
Link Distance (ft)		183			224			545				306
Travel Time (s)		5.0			6.1			14.9				8.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	17%	0%	0%	9%
Parking (#/hr)							5	5	0			
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔		↔	↔			↔	
Traffic Vol, veh/h	0	0	0	0	150	20	10	95	10	10	0	30
Future Vol, veh/h	0	0	0	0	150	20	10	95	10	10	0	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	0	1	0	0	1	17	0	0	9
Mvmt Flow	0	0	0	0	163	22	11	103	11	11	0	33
Number of Lanes	0	0	0	0	1	0	1	1	0	0	1	0

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	8.4	8.5	7.4
HCM LOS	A	A	A


















Lane	NBLn1	NBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	0%	25%
Vol Thru, %	0%	90%	88%	0%
Vol Right, %	0%	10%	12%	75%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	10	105	170	40
LT Vol	10	0	0	10
Through Vol	0	95	150	0
RT Vol	0	10	20	30
Lane Flow Rate	11	114	185	43
Geometry Grp	7	7	2	5
Degree of Util (X)	0.016	0.156	0.218	0.05
Departure Headway (Hd)	5.457	4.905	4.255	4.17
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	658	734	846	861
Service Time	3.17	2.617	2.264	2.186
HCM Lane V/C Ratio	0.017	0.155	0.219	0.05
HCM Control Delay	8.3	8.5	8.4	7.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0	0.6	0.8	0.2

Lanes, Volumes, Timings

2032 Future Year Existing Flow Conditions

11: Nantasket Avenue & Mountford Road/Phipps Street

Weekday Evening

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	15	170	0	20	15	700	0	0	620	10
Future Volume (vph)	10	0	15	170	0	20	15	700	0	0	620	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	13	13	11	11	11	15	15	15	14	14	14
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		407			183			492			302	
Travel Time (s)		11.1			5.0			8.4			5.1	
Confl. Peds. (#/hr)	9		9	6		6	9		6	6		9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	3%	0%	8%	0%	2%	0%	0%	4%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

HCM 6th TWSC  
 11: Nantasket Avenue & Mountford Road/Phipps Street

2032 Future Year Existing Flow Conditions  
 Weekday Evening

Intersection												
Int Delay, s/veh	60.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔		↔		↔			↔	
Traffic Vol, veh/h	10	0	15	170	0	20	15	700	0	0	620	10
Future Vol, veh/h	10	0	15	170	0	20	15	700	0	0	620	10
Conflicting Peds, #/hr	9	0	9	6	0	6	9	0	6	6	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	3	0	8	0	2	0	0	4	0
Mvmt Flow	11	0	16	185	0	22	16	761	0	0	674	11

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1502	1482	698	1490	-	770	694	0	-	-	-	0
Stage 1	689	689	-	793	-	-	-	-	-	-	-	-
Stage 2	813	793	-	697	-	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.13	-	6.28	4.1	-	-	-	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.13	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.13	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.527	-	3.372	2.2	-	-	-	-	-
Pot Cap-1 Maneuver	101	126	444	~ 101	0	391	911	-	0	0	-	-
Stage 1	439	450	-	380	0	-	-	-	0	0	-	-
Stage 2	375	403	-	430	0	-	-	-	0	0	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	92	121	436	~ 94	-	388	904	-	-	-	-	-
Mov Cap-2 Maneuver	92	121	-	~ 94	-	-	-	-	-	-	-	-
Stage 1	422	446	-	368	-	-	-	-	-	-	-	-
Stage 2	340	391	-	410	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	29.3	\$ 489.5	0.2	0
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	904	-	175	94	388	-	-
HCM Lane V/C Ratio	0.018	-	0.155	1.966	0.056	-	-
HCM Control Delay (s)	9.1	0	29.3	\$ 545.4	14.8	-	-
HCM Lane LOS	A	A	D	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	15.7	0.2	-	-

















Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Lanes, Volumes, Timings

2032 Future Year Existing Flow Conditions

12: Nantasket Avenue & Whitehead Avenue/Samoset Avenue

Weekday Evening

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	25	0	0	0	0	715	115	0	785	20
Future Volume (vph)	0	0	25	0	0	0	0	715	115	0	785	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	12	12	12	12	12	12	12	12	12
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		477			545			276			492	
Travel Time (s)		13.0			14.9			4.7			8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	2%	1%	0%	4%	2%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized



Intersection

Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗					↖	↗		↖	
Traffic Vol, veh/h	0	0	25	0	0	0	0	715	115	0	785	20
Future Vol, veh/h	0	0	25	0	0	0	0	715	115	0	785	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	0	2	1	0	4	2
Mvmt Flow	0	0	27	0	0	0	0	777	125	0	853	22














Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	-	-	864	875	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	4.1	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	2.2	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	354	780	-	-	0	-	-
Stage 1	0	0	-	-	-	-	0	-	-
Stage 2	0	0	-	-	-	-	0	-	-
Platoon blocked, %									
Mov Cap-1 Maneuver	-	0	354	780	-	-	-	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBT	SBR
Capacity (veh/h)	780	-	-	354	-	-
HCM Lane V/C Ratio	-	-	-	0.077	-	-
HCM Control Delay (s)	0	-	-	16	-	-
HCM Lane LOS	A	-	-	C	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	-	-

Lanes, Volumes, Timings  
 13: Nantasket Avenue & Edgewater Road

2032 Future Year Existing Flow Conditions  
 Weekday Evening

								
Lane Group	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	15	25	5	50	805	10	780	20
Future Volume (vph)	15	25	5	50	805	10	780	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	13	12	12	12	10	12	12
Storage Length (ft)	0	0		100		100		100
Storage Lanes	1	0		1		1		0
Taper Length (ft)	25			25		25		
Link Speed (mph)	25				40		40	
Link Distance (ft)	561				717		276	
Travel Time (s)	15.3				12.2		4.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	0%	2%	2%	0%	4%	2%
Shared Lane Traffic (%)								
Sign Control	Stop				Free		Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh	1							
Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Traffic Vol, veh/h	15	25	5	50	805	10	780	20
Future Vol, veh/h	15	25	5	50	805	10	780	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	-	None
Storage Length	0	-	-	100	-	100	-	-
Veh in Median Storage, #	0	-	-	-	0	-	0	-
Grade, %	0	-	-	-	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	0	2	2	0	4	2
Mvmt Flow	16	27	5	54	875	11	848	22

Major/Minor	Minor2	Major1		Major2			
Conflicting Flow All	1437	435	870	870	0	875	0
Stage 1	881	-	-	-	-	-	-
Stage 2	556	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.4	4.14	-	6.4	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.5	2.22	-	2.5	-
Pot Cap-1 Maneuver	124	569	409	770	-	406	-
Stage 1	365	-	-	-	-	-	-
Stage 2	538	-	-	-	-	-	-
Platoon blocked, %					-	-	-
Mov Cap-1 Maneuver	110	569	708	708	-	406	-
Mov Cap-2 Maneuver	110	-	-	-	-	-	-
Stage 1	334	-	-	-	-	-	-
Stage 2	523	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	25.1	0.7	0.2
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBU	SBT	SBR
Capacity (veh/h)	708	-	222	406	-	-
HCM Lane V/C Ratio	0.084	-	0.196	0.027	-	-
HCM Control Delay (s)	10.6	-	25.1	14.1	-	-
HCM Lane LOS	B	-	D	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.7	0.1	-	-

Lanes, Volumes, Timings  
 16: Nantasket Avenue & Bay Street/Water Street

2032 Future Year Existing Flow Conditions  
 Weekday Evening

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	45	25	85	30	0	0	0	0	15	760	35
Future Volume (vph)	0	45	25	85	30	0	0	0	0	15	760	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	13	13	12	12	12	12	12	12
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			40	
Link Distance (ft)		338			195			1092			395	
Travel Time (s)		9.2			5.3			29.8			6.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	4%	2%
Parking (#/hr)							0	0	0			
Shared Lane Traffic (%)												
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			2						1	
Permitted Phases				2						1		
Detector Phase		2		2	2					1	1	
Switch Phase												
Minimum Initial (s)		5.0		5.0	5.0					27.0	27.0	
Minimum Split (s)		10.0		10.0	10.0					32.0	32.0	
Total Split (s)		10.0		10.0	10.0					32.0	32.0	
Total Split (%)		17.5%		17.5%	17.5%					56.1%	56.1%	
Maximum Green (s)		5.0		5.0	5.0					27.0	27.0	
Yellow Time (s)		3.0		3.0	3.0					3.0	3.0	
All-Red Time (s)		2.0		2.0	2.0					2.0	2.0	
Lost Time Adjust (s)		0.0			0.0						0.0	
Total Lost Time (s)		5.0			5.0						5.0	
Lead/Lag		Lag		Lag	Lag					Lead	Lead	
Lead-Lag Optimize?		Yes		Yes	Yes					Yes	Yes	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Recall Mode		None		None	None					Max	Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other  
 Cycle Length: 57  
 Actuated Cycle Length: 45  
 Natural Cycle: 60  
 Control Type: Semi Act-Uncoord

Splits and Phases: 16: Nantasket Avenue & Bay Street/Water Street



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Lane Group	Ø3
<hr/>	
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Parking (#/hr)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	15.0
Total Split (s)	15.0
Total Split (%)	26%
Maximum Green (s)	10.0
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	3.0
Pedestrian Calls (#/hr)	0
<hr/>	
Intersection Summary	

Queues  
 16: Nantasket Avenue & Bay Street/Water Street

2032 Future Year Existing Flow Conditions  
 Weekday Evening

	→	←	↓
Lane Group	EBT	WBT	SBT
Lane Group Flow (vph)	76	125	880
v/c Ratio	0.34	0.79	0.38
Control Delay	16.9	56.2	4.0
Queue Delay	0.0	0.0	0.0
Total Delay	16.9	56.2	4.0
Queue Length 50th (ft)	11	30	38
Queue Length 95th (ft)	38	#96	60
Internal Link Dist (ft)	258	115	315
Turn Bay Length (ft)			
Base Capacity (vph)	223	159	2287
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.34	0.79	0.38

















Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.












HCM Signalized Intersection Capacity Analysis  
 16: Nantasket Avenue & Bay Street/Water Street

2032 Future Year Existing Flow Conditions  
 Weekday Evening

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations											 			
Traffic Volume (vph)	0	45	25	85	30	0	0	0	0	15	760	35		
Future Volume (vph)	0	45	25	85	30	0	0	0	0	15	760	35		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width	12	12	12	13	13	13	12	12	12	12	12	12		
Total Lost time (s)		5.0			5.0						5.0			
Lane Util. Factor		1.00			1.00						0.95			
Frt		0.95			1.00						0.99			
Flt Protected		1.00			0.96						1.00			
Satd. Flow (prot)		1773			1857						3450			
Flt Permitted		1.00			0.73						1.00			
Satd. Flow (perm)		1773			1414						3450			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92		
Adj. Flow (vph)	0	49	27	92	33	0	0	0	0	16	826	38		
RTOR Reduction (vph)	0	24	0	0	0	0	0	0	0	0	4	0		
Lane Group Flow (vph)	0	52	0	0	125	0	0	0	0	0	876	0		
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	4%	2%		
Parking (#/hr)							0	0	0					
Turn Type		NA		Perm	NA					Perm	NA			
Protected Phases		2			2						1			
Permitted Phases				2						1				
Actuated Green, G (s)		5.1			5.1						29.8			
Effective Green, g (s)		5.1			5.1						29.8			
Actuated g/C Ratio		0.11			0.11						0.66			
Clearance Time (s)		5.0			5.0						5.0			
Vehicle Extension (s)		3.0			3.0						3.0			
Lane Grp Cap (vph)		201			160						2289			
v/s Ratio Prot		0.03												
v/s Ratio Perm					0.09						0.25			
v/c Ratio		0.26			0.78						0.38			
Uniform Delay, d1		18.2			19.4						3.4			
Progression Factor		1.00			1.00						1.00			
Incremental Delay, d2		0.7			21.5						0.5			
Delay (s)		18.9			40.9						3.9			
Level of Service		B			D						A			
Approach Delay (s)		18.9			40.9			0.0			3.9			
Approach LOS		B			D			A			A			
<b>Intersection Summary</b>														
HCM 2000 Control Delay			9.2									HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio			0.51											
Actuated Cycle Length (s)			44.9								15.0			
Intersection Capacity Utilization			43.8%										ICU Level of Service	A
Analysis Period (min)			15											
c Critical Lane Group														

Lanes, Volumes, Timings  
 17: Nantasket Avenue & George Washington Boulevard

2032 Future Year Existing Flow Conditions  
 Weekday Evening

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations					 	
Traffic Volume (vph)	0	30	0	0	385	620
Future Volume (vph)	0	30	0	0	385	620
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	12	12	12	12
Link Speed (mph)	40			25	25	
Link Distance (ft)	123			400	146	
Travel Time (s)	2.1			10.9	4.0	
Confl. Peds. (#/hr)		33				25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	4%	2%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗			↖	
Traffic Vol, veh/h	0	30	0	0	385	620
Future Vol, veh/h	0	30	0	0	385	620
Conflicting Peds, #/hr	0	33	0	0	0	25
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	4	2
Mvmt Flow	0	33	0	0	418	674

Major/Minor	Minor2	Major2
Conflicting Flow All	- 604	- 0
Stage 1	- -	- -
Stage 2	- -	- -
Critical Hdwy	- 6.9	- -
Critical Hdwy Stg 1	- -	- -
Critical Hdwy Stg 2	- -	- -
Follow-up Hdwy	- 3.3	- -
Pot Cap-1 Maneuver	0 446	- -
Stage 1	0 -	- -
Stage 2	0 -	- -
Platoon blocked, %		- -
Mov Cap-1 Maneuver	- 434	- -
Mov Cap-2 Maneuver	- -	- -
Stage 1	- -	- -
Stage 2	- -	- -

Approach	EB	SB
HCM Control Delay, s	14	0
HCM LOS	B	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	434	-	-
HCM Lane V/C Ratio	0.075	-	-
HCM Control Delay (s)	14	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0.2	-	-

Lanes, Volumes, Timings

2032 Future Year Existing Flow Conditions

18: Nantasket Avenue & Wharf Avenue/DCR Lot 2 Enter

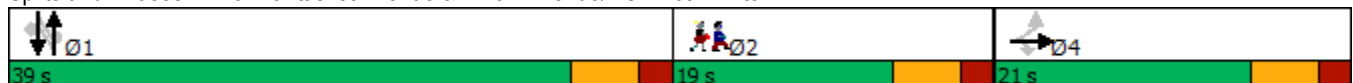
Weekday Evening

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	20	35	0	0	0	110	365	20	5	355	80
Future Volume (vph)	30	20	35	0	0	0	110	365	20	5	355	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	12	16	12	12	12	10	10	12	12	10	10
Right Turn on Red			No			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		213			191			311			200	
Travel Time (s)		5.8			5.2			8.5			5.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	3%	0%	0%	3%	0%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm				Perm	NA		Perm	NA	Perm
Protected Phases		4						1			1	
Permitted Phases	4		4				1			1		1
Detector Phase	4	4	4				1	1		1	1	1
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0				33.0	33.0		33.0	33.0	33.0
Minimum Split (s)	21.0	21.0	21.0				39.0	39.0		39.0	39.0	39.0
Total Split (s)	21.0	21.0	21.0				39.0	39.0		39.0	39.0	39.0
Total Split (%)	26.6%	26.6%	26.6%				49.4%	49.4%		49.4%	49.4%	49.4%
Maximum Green (s)	15.0	15.0	15.0				33.0	33.0		33.0	33.0	33.0
Yellow Time (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0				2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	0.0
Total Lost Time (s)		6.0	6.0					6.0			6.0	6.0
Lead/Lag							Lead	Lead		Lead	Lead	Lead
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None				Max	Max		Max	Max	Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other  
 Cycle Length: 79  
 Actuated Cycle Length: 63.6  
 Natural Cycle: 80  
 Control Type: Semi Act-Uncoord

Splits and Phases: 18: Nantasket Avenue & Wharf Avenue/DCR Lot 2 Enter



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Lane Group	Ø2
<hr/>	
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	19.0
Total Split (s)	19.0
Total Split (%)	24%
Maximum Green (s)	13.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	6.0
Pedestrian Calls (#/hr)	30
<hr/>	
Intersection Summary	
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Queues


















18: Nantasket Avenue & Wharf Avenue/DCR Lot 2 Enter

	→	↘	↑	↓	↙
Lane Group	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	55	38	539	391	87
v/c Ratio	0.25	0.18	0.33	0.35	0.08
Control Delay	30.2	29.1	9.7	10.9	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	30.2	29.1	9.7	10.9	1.4
Queue Length 50th (ft)	15	11	31	45	0
Queue Length 95th (ft)	54	42	128	200	13
Internal Link Dist (ft)	133		231	120	
Turn Bay Length (ft)					
Base Capacity (vph)	444	440	1647	1115	1024
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.12	0.09	0.33	0.35	0.08

Intersection Summary












HCM Signalized Intersection Capacity Analysis      2032 Future Year Existing Flow Conditions  
 18: Nantasket Avenue & Wharf Avenue/DCR Lot 2 Enter      Weekday Evening

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	30	20	35	0	0	0	110	365	20	5	355	80	
Future Volume (vph)	30	20	35	0	0	0	110	365	20	5	355	80	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	16	12	16	12	12	12	10	10	12	12	10	10	
Total Lost time (s)		6.0	6.0					6.0			6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95			1.00	1.00	
Frt		1.00	0.85					0.99			1.00	0.85	
Flt Protected		0.97	1.00					0.99			1.00	1.00	
Satd. Flow (prot)		1845	1830					3226			1721	1507	
Flt Permitted		0.97	1.00					0.77			0.99	1.00	
Satd. Flow (perm)		1845	1830					2524			1712	1507	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	33	22	38	0	0	0	120	397	22	5	386	87	
RTOR Reduction (vph)	0	0	0	0	0	0	0	3	0	0	0	36	
Lane Group Flow (vph)	0	55	38	0	0	0	0	536	0	0	391	51	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	3%	0%	0%	3%	0%	
Turn Type	Perm	NA	Perm				Perm	NA		Perm	NA	Perm	
Protected Phases		4						1			1		
Permitted Phases	4		4				1			1		1	
Actuated Green, G (s)		6.1	6.1					40.0			40.0	40.0	
Effective Green, g (s)		6.1	6.1					40.0			40.0	40.0	
Actuated g/C Ratio		0.09	0.09					0.58			0.58	0.58	
Clearance Time (s)		6.0	6.0					6.0			6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0			3.0	3.0	
Lane Grp Cap (vph)		164	162					1471			998	878	
v/s Ratio Prot													
v/s Ratio Perm		0.03	0.02					0.21			0.23	0.03	
v/c Ratio		0.34	0.23					0.36			0.39	0.06	
Uniform Delay, d1		29.3	29.1					7.6			7.7	6.2	
Progression Factor		1.00	1.00					1.00			1.00	1.00	
Incremental Delay, d2		1.2	0.7					0.7			1.2	0.1	
Delay (s)		30.6	29.8					8.3			8.9	6.3	
Level of Service		C	C					A			A	A	
Approach Delay (s)		30.3			0.0			8.3			8.4		
Approach LOS		C			A			A			A		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			10.2									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.35										
Actuated Cycle Length (s)			68.6									Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.0%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

Lanes, Volumes, Timings  
 19: George Washington Boulevard & Bay Street

2032 Future Year Existing Flow Conditions  
 Weekday Evening

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	15	50	70	15	590	30
Future Volume (vph)	15	50	70	15	590	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	15	15	15
Link Speed (mph)	25			40	40	
Link Distance (ft)	237			204	123	
Travel Time (s)	6.5			3.5	2.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	3%	0%	2%	0%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh	2.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	50	70	15	590	30
Future Vol, veh/h	15	50	70	15	590	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	3	0	2	0
Mvmt Flow	16	54	76	16	641	33

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	826	658	674	0	0
Stage 1	658	-	-	-	-
Stage 2	168	-	-	-	-
Critical Hdwy	6.4	6.2	4.13	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.227	-	-
Pot Cap-1 Maneuver	345	468	912	-	-
Stage 1	519	-	-	-	-
Stage 2	867	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	316	468	912	-	-
Mov Cap-2 Maneuver	316	-	-	-	-
Stage 1	475	-	-	-	-
Stage 2	867	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.3	7.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	912	-	421	-	-
HCM Lane V/C Ratio	0.083	-	0.168	-	-
HCM Control Delay (s)	9.3	0	15.3	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.3	-	0.6	-	-

Lanes, Volumes, Timings  
 21: George Washington Boulevard & Wharf Avenue

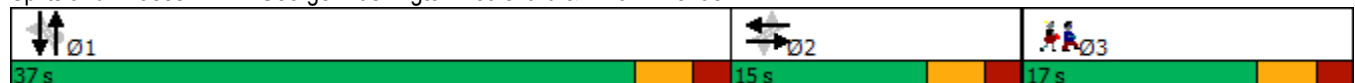
2032 Future Year Existing Flow Conditions  
 Weekday Evening

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	10	10	165	5	20	5	630	20	55	575	10
Future Volume (vph)	15	10	10	165	5	20	5	630	20	55	575	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	11	11	11	11	11	11
Right Turn on Red			Yes			No			Yes			No
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		219			213			784			515	
Travel Time (s)		6.0			5.8			13.4			8.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Detector Phase	2	2		2	2		1	1		1	1	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		32.0	32.0		32.0	32.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		37.0	37.0		37.0	37.0	
Total Split (s)	15.0	15.0		15.0	15.0		37.0	37.0		37.0	37.0	
Total Split (%)	21.7%	21.7%		21.7%	21.7%		53.6%	53.6%		53.6%	53.6%	
Maximum Green (s)	10.0	10.0		10.0	10.0		32.0	32.0		32.0	32.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lead		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Max	Max		Max	Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other  
 Cycle Length: 69  
 Actuated Cycle Length: 55.4  
 Natural Cycle: 70  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 21: George Washington Boulevard & Wharf Avenue



Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	6.0
Minimum Split (s)	17.0
Total Split (s)	17.0
Total Split (%)	25%
Maximum Green (s)	12.0
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	6.0
Flash Dont Walk (s)	6.0
Pedestrian Calls (#/hr)	15
Intersection Summary	

Queues  
 21: George Washington Boulevard & Wharf Avenue

2032 Future Year Existing Flow Conditions  
 Weekday Evening

















	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	38	206	712	696
v/c Ratio	0.11	0.73	0.38	0.41
Control Delay	18.0	41.9	7.9	8.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	18.0	41.9	7.9	8.4
Queue Length 50th (ft)	7	59	46	46
Queue Length 95th (ft)	35	#205	145	150
Internal Link Dist (ft)	139	133	704	435
Turn Bay Length (ft)				
Base Capacity (vph)	340	281	1898	1691
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.11	0.73	0.38	0.41










Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



HCM Signalized Intersection Capacity Analysis      2032 Future Year Existing Flow Conditions  
 21: George Washington Boulevard & Wharf Avenue      Weekday Evening

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	15	10	10	165	5	20	5	630	20	55	575	10	
Future Volume (vph)	15	10	10	165	5	20	5	630	20	55	575	10	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	16	16	16	16	16	16	11	11	11	11	11	11	
Total Lost time (s)		5.0			5.0			5.0			5.0		
Lane Util. Factor		1.00			1.00			0.95			0.95		
Frt		0.96			0.99			1.00			1.00		
Flt Protected		0.98			0.96			1.00			1.00		
Satd. Flow (prot)		2027			2034			3407			3405		
Flt Permitted		0.88			0.73			0.95			0.84		
Satd. Flow (perm)		1812			1543			3241			2890		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	16	11	11	179	5	22	5	685	22	60	625	11	
RTOR Reduction (vph)	0	9	0	0	0	0	0	3	0	0	0	0	
Lane Group Flow (vph)	0	29	0	0	206	0	0	709	0	0	696	0	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA		
Protected Phases		2			2			1			1		
Permitted Phases	2			2			1			1			
Actuated Green, G (s)		10.1			10.1			32.4			32.4		
Effective Green, g (s)		10.1			10.1			32.4			32.4		
Actuated g/C Ratio		0.17			0.17			0.55			0.55		
Clearance Time (s)		5.0			5.0			5.0			5.0		
Vehicle Extension (s)		3.0			3.0			3.0			3.0		
Lane Grp Cap (vph)		308			262			1767			1576		
v/s Ratio Prot													
v/s Ratio Perm		0.02			0.13			0.22			0.24		
v/c Ratio		0.09			0.79			0.40			0.44		
Uniform Delay, d1		20.8			23.6			7.9			8.1		
Progression Factor		1.00			1.00			1.00			1.00		
Incremental Delay, d2		0.1			14.3			0.7			0.9		
Delay (s)		20.9			38.0			8.5			9.0		
Level of Service		C			D			A			A		
Approach Delay (s)		20.9			38.0			8.5			9.0		
Approach LOS		C			D			A			A		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			12.7									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.50										
Actuated Cycle Length (s)			59.4									Sum of lost time (s)	15.0
Intersection Capacity Utilization			83.1%									ICU Level of Service	E
Analysis Period (min)			15										
c Critical Lane Group													

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	80	0	35	35	0	20
Future Volume (vph)	80	0	35	35	0	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	16	16	16
Link Speed (mph)	25			25	25	
Link Distance (ft)	178			287	279	
Travel Time (s)	4.9			7.8	7.6	
Confl. Peds. (#/hr)	5	9	9			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%
Shared Lane Traffic (%)						
Sign Control	Free			Stop	Stop	











Intersection Summary

Area Type: Other

Control Type: Unsignalized

Lanes, Volumes, Timings  
 2: Hull Shore Drive & Phipps Street

2032 Future Year Existing Flow Conditions  
 Saturday Afternoon

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	65	0	0	55	130	15
Future Volume (vph)	65	0	0	55	130	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	12	12	15	12
Link Speed (mph)	25			25	25	
Link Distance (ft)	224			178	191	
Travel Time (s)	6.1			4.9	5.2	
Confl. Peds. (#/hr)		9	4		9	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%
Parking (#/hr)					5	5
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh 5.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↘	↗
Traffic Vol, veh/h	65	0	0	55	130	15
Future Vol, veh/h	65	0	0	55	130	15
Conflicting Peds, #/hr	0	9	4	0	9	4
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	2	0	0
Mvmt Flow	71	0	0	60	141	16










Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	-	140
Stage 1	-	-	71
Stage 2	-	-	69
Critical Hdwy	-	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	-	-	3.5
Pot Cap-1 Maneuver	-	0	858
Stage 1	-	0	957
Stage 2	-	0	959
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	850
Mov Cap-2 Maneuver	-	-	850
Stage 1	-	-	957
Stage 2	-	-	950

Approach	EB	WB	NB
HCM Control Delay, s	0	0	10
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	WBT
Capacity (veh/h)	850	989	-	-
HCM Lane V/C Ratio	0.166	0.016	-	-
HCM Control Delay (s)	10.1	8.7	-	-
HCM Lane LOS	B	A	-	-
HCM 95th %tile Q(veh)	0.6	0.1	-	-

Lanes, Volumes, Timings  
7: Hull Shore Drive & Water Street

2032 Future Year Existing Flow Conditions  
Saturday Afternoon

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 		
Traffic Volume (vph)	120	0	140	1235	0	0
Future Volume (vph)	120	0	140	1235	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	16	16	12	12
Link Speed (mph)	25			25	25	
Link Distance (ft)	195			1096	177	
Travel Time (s)	5.3			29.9	4.8	
Confl. Peds. (#/hr)	19	33	33			19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	1%	1%	2%	0%
Parking (#/hr)			5	5		
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
Control Type: Unsignalized

Intersection

Int Delay, s/veh 12.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
----------	-----	-----	-----	-----	-----	-----

Lane Configurations	↘			↖↗		
Traffic Vol, veh/h	120	0	140	1235	0	0
Future Vol, veh/h	120	0	140	1235	0	0
Conflicting Peds, #/hr	19	33	33	0	0	19
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	1	1	2	0
Mvmt Flow	130	0	152	1342	0	0

Major/Minor	Minor2	Major1
-------------	--------	--------

Conflicting Flow All	1027	- 33	0
Stage 1	33	- -	-
Stage 2	994	- -	-
Critical Hdwy	6.8	- 4.12	-
Critical Hdwy Stg 1	-	- -	-
Critical Hdwy Stg 2	5.8	- -	-
Follow-up Hdwy	3.5	- 2.21	-
Pot Cap-1 Maneuver	234	0 1585	-
Stage 1	-	0 -	-
Stage 2	323	0 -	-
Platoon blocked, %			-
Mov Cap-1 Maneuver	136	- 1545	-
Mov Cap-2 Maneuver	136	- -	-
Stage 1	-	- -	-
Stage 2	315	- -	-

Approach	EB	NB
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HCM Control Delay, s	129.5	1.9
HCM LOS	F	

Minor Lane/Major Mvmt	NBL	NBT	EBLn1
-----------------------	-----	-----	-------

Capacity (veh/h)	1545	-	136
HCM Lane V/C Ratio	0.098	-	0.959
HCM Control Delay (s)	7.6	1.2	129.5
HCM Lane LOS	A	A	F
HCM 95th %tile Q(veh)	0.3	-	6.7



Lanes, Volumes, Timings

2032 Future Year Existing Flow Conditions

8: Nantasket Avenue & Hull Shore Drive Connection/Hull Shore Drive

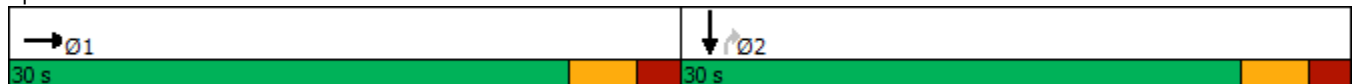
Saturday Afternoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑							↑↑		↑↑	
Traffic Volume (vph)	0	765	0	0	0	0	0	0	510	0	370	0
Future Volume (vph)	0	765	0	0	0	0	0	0	510	0	370	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	13	13	12	12	12	10	10	10	11	11	11
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		329			308			572			400	
Travel Time (s)		9.0			8.4			15.6			10.9	
Confl. Peds. (#/hr)	42		85	55		12	85		55	12		42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	1%	0%	1%	0%
Parking (#/hr)										5	5	5
Shared Lane Traffic (%)												
Turn Type		NA							Perm		NA	
Protected Phases		1									2	
Permitted Phases									2			
Detector Phase		1							2		2	
Switch Phase												
Minimum Initial (s)		15.0							15.0		15.0	
Minimum Split (s)		22.0							22.0		22.0	
Total Split (s)		30.0							30.0		30.0	
Total Split (%)		50.0%							50.0%		50.0%	
Maximum Green (s)		25.0							25.0		25.0	
Yellow Time (s)		3.0							3.0		3.0	
All-Red Time (s)		2.0							2.0		2.0	
Lost Time Adjust (s)		0.0							0.0		0.0	
Total Lost Time (s)		5.0							5.0		5.0	
Lead/Lag		Lead							Lag		Lag	
Lead-Lag Optimize?		Yes							Yes		Yes	
Vehicle Extension (s)		3.0							3.0		3.0	
Recall Mode		None							Min		Min	
Walk Time (s)		7.0							7.0		7.0	
Flash Dont Walk (s)		8.0							8.0		8.0	
Pedestrian Calls (#/hr)		10							10		10	

Intersection Summary

Area Type: Other  
 Cycle Length: 60  
 Actuated Cycle Length: 49.4  
 Natural Cycle: 45  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Nantasket Avenue & Hull Shore Drive Connection/Hull Shore Drive



## Queues













2032 Future Year Existing Flow Conditions

## 8: Nantasket Avenue &amp; Hull Shore Drive Connection/Hull Shore Drive

Saturday Afternoon

	→	↗	↓
Lane Group	EBT	NBR	SBT
Lane Group Flow (vph)	832	554	402
v/c Ratio	0.57	0.58	0.31
Control Delay	14.0	13.1	11.3
Queue Delay	0.0	0.0	0.0
Total Delay	14.0	13.1	11.3
Queue Length 50th (ft)	92	55	38
Queue Length 95th (ft)	162	117	76
Internal Link Dist (ft)	249		320
Turn Bay Length (ft)			
Base Capacity (vph)	1927	1231	1690
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.43	0.45	0.24
Intersection Summary			

















HCM Signalized Intersection Capacity Analysis      2032 Future Year Existing Flow Conditions  
 8: Nantasket Avenue & Hull Shore Drive Connection/Hull Shore Drive      Saturday Afternoon

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑							↑↑		↑↑		
Traffic Volume (vph)	0	765	0	0	0	0	0	0	510	0	370	0	
Future Volume (vph)	0	765	0	0	0	0	0	0	510	0	370	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	13	13	13	12	12	12	10	10	10	11	11	11	
Total Lost time (s)		5.0							5.0		5.0		
Lane Util. Factor		0.95							0.88		0.95		
Frbp, ped/bikes		1.00							0.89		1.00		
Flpb, ped/bikes		1.00							1.00		1.00		
Frt		1.00							0.85		1.00		
Flt Protected		1.00							1.00		1.00		
Satd. Flow (prot)		3693							2342		3239		
Flt Permitted		1.00							1.00		1.00		
Satd. Flow (perm)		3693							2342		3239		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	832	0	0	0	0	0	0	554	0	402	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	45	0	0	0	
Lane Group Flow (vph)	0	832	0	0	0	0	0	0	509	0	402	0	
Confl. Peds. (#/hr)	42		85	55			12	85		55	12	42	
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	1%	0%	1%	0%	
Parking (#/hr)										5	5	5	
Turn Type		NA							Perm		NA		
Protected Phases		1									2		
Permitted Phases									2				
Actuated Green, G (s)		19.4							19.7		19.7		
Effective Green, g (s)		19.4							19.7		19.7		
Actuated g/C Ratio		0.40							0.40		0.40		
Clearance Time (s)		5.0							5.0		5.0		
Vehicle Extension (s)		3.0							3.0		3.0		
Lane Grp Cap (vph)		1459							939		1299		
v/s Ratio Prot		c0.23									0.12		
v/s Ratio Perm									c0.22				
v/c Ratio		0.57							0.54		0.31		
Uniform Delay, d1		11.6							11.2		10.0		
Progression Factor		1.00							1.00		1.00		
Incremental Delay, d2		0.5							0.6		0.1		
Delay (s)		12.1							11.9		10.2		
Level of Service		B							B		B		
Approach Delay (s)		12.1			0.0			11.9			10.2		
Approach LOS		B			A			B			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			11.6		HCM 2000 Level of Service					B			
HCM 2000 Volume to Capacity ratio			0.56										
Actuated Cycle Length (s)			49.1		Sum of lost time (s)					10.0			
Intersection Capacity Utilization			51.6%		ICU Level of Service					A			
Analysis Period (min)			15										
c Critical Lane Group													

Lanes, Volumes, Timings  
10: Samoset Avenue & Phipps Street

2032 Future Year Existing Flow Conditions

Saturday Afternoon

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	165	20	25	175	55	10	0	45
Future Volume (vph)	0	0	0	0	165	20	25	175	55	10	0	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	13	13	16	16	16	16	16	16
Storage Length (ft)	0		0	0		0	40		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		183			224			545			306	
Travel Time (s)		5.0			6.1			14.9			8.3	
Confl. Peds. (#/hr)	1		18	18		1	18		18	1		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	1%	0%	0%	0%	0%	0%	0%	3%
Parking (#/hr)							5	5	0			
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

Intersection

Intersection Delay, s/veh	9.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	165	20	25	175	55	10	0	45
Future Vol, veh/h	0	0	0	0	165	20	25	175	55	10	0	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	0	1	0	0	0	0	0	0	3
Mvmt Flow	0	0	0	0	179	22	27	190	60	11	0	49
Number of Lanes	0	0	0	0	1	0	1	1	0	0	1	0

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	9.3	9.9	7.7
HCM LOS	A	A	A


















Lane	NBLn1	NBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	0%	18%
Vol Thru, %	0%	76%	89%	0%
Vol Right, %	0%	24%	11%	82%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	25	230	185	55
LT Vol	25	0	0	10
Through Vol	0	175	165	0
RT Vol	0	55	20	45
Lane Flow Rate	27	250	201	60
Geometry Grp	7	7	2	5
Degree of Util (X)	0.042	0.338	0.26	0.072
Departure Headway (Hd)	5.539	4.868	4.653	4.361
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	647	738	772	819
Service Time	3.271	2.6	2.679	2.401
HCM Lane V/C Ratio	0.042	0.339	0.26	0.073
HCM Control Delay	8.5	10.1	9.3	7.7
HCM Lane LOS	A	B	A	A
HCM 95th-tile Q	0.1	1.5	1	0.2

Lanes, Volumes, Timings

2032 Future Year Existing Flow Conditions

11: Nantasket Avenue & Mountford Road/Phipps Street

Saturday Afternoon

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	15	190	0	45	10	775	0	0	675	15
Future Volume (vph)	10	0	15	190	0	45	10	775	0	0	675	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	13	13	11	11	11	15	15	15	14	14	14
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		407			183			492			302	
Travel Time (s)		11.1			5.0			8.4			5.1	
Confl. Peds. (#/hr)	13		33	26		6	33		26	6		13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	1%	0%	0%	2%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized



HCM 6th TWSC  
 11: Nantasket Avenue & Mountford Road/Phipps Street

2032 Future Year Existing Flow Conditions  
 Saturday Afternoon

Intersection												
Int Delay, s/veh	106.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔		↔		↔			↔	
Traffic Vol, veh/h	10	0	15	190	0	45	10	775	0	0	675	15
Future Vol, veh/h	10	0	15	190	0	45	10	775	0	0	675	15
Conflicting Peds, #/hr	13	0	33	26	0	6	33	0	26	6	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	1	0	1	0	1	0	0	2	0
Mvmt Flow	11	0	16	207	0	49	11	842	0	0	734	16

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1677	1639	808	1647	-	855	783	0	-	-	-	0
Stage 1	775	775	-	864	-	-	-	-	-	-	-	-
Stage 2	902	864	-	783	-	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.11	-	6.21	4.1	-	-	-	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.11	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.11	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.509	-	3.309	2.2	-	-	-	-	-
Pot Cap-1 Maneuver	76	101	384	~80	0	359	844	-	0	0	-	-
Stage 1	394	411	-	350	0	-	-	-	0	0	-	-
Stage 2	335	374	-	388	0	-	-	-	0	0	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	62	96	360	~72	-	354	819	-	-	-	-	-
Mov Cap-2 Maneuver	62	96	-	~72	-	-	-	-	-	-	-	-
Stage 1	373	399	-	341	-	-	-	-	-	-	-	-
Stage 2	278	365	-	358	-	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	42.4		\$ 784.7		0.1		0	
HCM LOS	E		F					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	819	-	123	72	354	-	-
HCM Lane V/C Ratio	0.013	-	0.221	2.868	0.138	-	-
HCM Control Delay (s)	9.5	0	42.4	\$ 966.6	16.8	-	-
HCM Lane LOS	A	A	E	F	C	-	-
HCM 95th %tile Q(veh)	0	-	0.8	20.6	0.5	-	-

















Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Lanes, Volumes, Timings

2032 Future Year Existing Flow Conditions

12: Nantasket Avenue & Whitehead Avenue/Samoset Avenue

Saturday Afternoon

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	25	0	0	0	0	785	255	0	860	20
Future Volume (vph)	0	0	25	0	0	0	0	785	255	0	860	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	12	12	12	12	12	12	12	12	12
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		477			545			276			492	
Travel Time (s)		13.0			14.9			4.7			8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	1%	0%	0%	2%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗					↖	↗		↖	
Traffic Vol, veh/h	0	0	25	0	0	0	0	785	255	0	860	20
Future Vol, veh/h	0	0	25	0	0	0	0	785	255	0	860	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	0	0	0	0	1	0	0	2	0
Mvmt Flow	0	0	27	0	0	0	0	853	277	0	935	22













Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	-	-	946	957	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	4.1	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	2.2	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	317	727	-	-	0	-	-
Stage 1	0	0	-	-	-	-	0	-	-
Stage 2	0	0	-	-	-	-	0	-	-
Platoon blocked, %									
Mov Cap-1 Maneuver	-	0	317	727	-	-	-	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.4	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBT	SBR
Capacity (veh/h)	727	-	-	317	-	-
HCM Lane V/C Ratio	-	-	-	0.086	-	-
HCM Control Delay (s)	0	-	-	17.4	-	-
HCM Lane LOS	A	-	-	C	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	-	-

Lanes, Volumes, Timings  
 13: Nantasket Avenue & Edgewater Road

2032 Future Year Existing Flow Conditions  
 Saturday Afternoon

							
Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	15	25	45	1015	10	855	20
Future Volume (vph)	15	25	45	1015	10	855	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	13	12	12	10	12	12
Storage Length (ft)	0	0	100		100		100
Storage Lanes	1	0	1		1		0
Taper Length (ft)	25		25		25		
Link Speed (mph)	25			40		40	
Link Distance (ft)	561			717		276	
Travel Time (s)	15.3			12.2		4.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	1%	0%	2%	0%
Shared Lane Traffic (%)							
Sign Control	Stop			Free		Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh	0.9						
Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	15	25	45	1015	10	855	20
Future Vol, veh/h	15	25	45	1015	10	855	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	100	-	100	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	1	0	2	0
Mvmt Flow	16	27	49	1103	11	929	22

Major/Minor	Minor2		Major1	Major2			
Conflicting Flow All	1612	476	951	0	1103	-	0
Stage 1	962	-	-	-	-	-	-
Stage 2	650	-	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	6.4	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	2.5	-	-
Pot Cap-1 Maneuver	97	541	730	-	290	-	-
Stage 1	336	-	-	-	-	-	-
Stage 2	487	-	-	-	-	-	-
Platoon blocked, %				-	-	-	-
Mov Cap-1 Maneuver	87	541	730	-	290	-	-
Mov Cap-2 Maneuver	87	-	-	-	-	-	-
Stage 1	313	-	-	-	-	-	-
Stage 2	468	-	-	-	-	-	-

Approach	EB		NB	SB
HCM Control Delay, s	30.7		0.4	0.2
HCM LOS	D			

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBU	SBT	SBR
Capacity (veh/h)	730	-	183	290	-	-
HCM Lane V/C Ratio	0.067	-	0.238	0.037	-	-
HCM Control Delay (s)	10.3	-	30.7	17.9	-	-
HCM Lane LOS	B	-	D	C	-	-
HCM 95th %tile Q(veh)	0.2	-	0.9	0.1	-	-

Lanes, Volumes, Timings  
16: Nantasket Avenue & Bay Street/Water Street

2032 Future Year Existing Flow Conditions  
Saturday Afternoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	55	30	95	45	0	0	0	0	65	765	50
Future Volume (vph)	0	55	30	95	45	0	0	0	0	65	765	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	13	13	12	12	12	12	12	12
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			40	
Link Distance (ft)		338			195			1092			395	
Travel Time (s)		9.2			5.3			29.8			6.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	2%	2%	2%	0%	0%	0%	0%	0%	2%	0%
Shared Lane Traffic (%)												
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			2						1	
Permitted Phases				2						1		
Detector Phase		2		2	2					1	1	
Switch Phase												
Minimum Initial (s)		5.0		5.0	5.0					27.0	27.0	
Minimum Split (s)		10.0		10.0	10.0					32.0	32.0	
Total Split (s)		10.0		10.0	10.0					32.0	32.0	
Total Split (%)		17.5%		17.5%	17.5%					56.1%	56.1%	
Maximum Green (s)		5.0		5.0	5.0					27.0	27.0	
Yellow Time (s)		3.0		3.0	3.0					3.0	3.0	
All-Red Time (s)		2.0		2.0	2.0					2.0	2.0	
Lost Time Adjust (s)		0.0			0.0						0.0	
Total Lost Time (s)		5.0			5.0						5.0	
Lead/Lag		Lag		Lag	Lag					Lead	Lead	
Lead-Lag Optimize?		Yes		Yes	Yes					Yes	Yes	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Recall Mode		None		None	None					Max	Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other  
 Cycle Length: 57  
 Actuated Cycle Length: 45  
 Natural Cycle: 60  
 Control Type: Semi Act-Uncoord

Splits and Phases: 16: Nantasket Avenue & Bay Street/Water Street





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Lane Group	Ø3
<hr/>	
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	15.0
Total Split (s)	15.0
Total Split (%)	26%
Maximum Green (s)	10.0
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	3.0
Pedestrian Calls (#/hr)	0
<hr/>	
Intersection Summary	

Queues  
 16: Nantasket Avenue & Bay Street/Water Street

2032 Future Year Existing Flow Conditions  
 Saturday Afternoon

















	→	←	↓
Lane Group	EBT	WBT	SBT
Lane Group Flow (vph)	93	152	957
v/c Ratio	0.41	0.95	0.41
Control Delay	18.1	86.6	4.2
Queue Delay	0.0	0.0	0.0
Total Delay	18.1	86.6	4.2
Queue Length 50th (ft)	13	37	42
Queue Length 95th (ft)	44	#117	65
Internal Link Dist (ft)	258	115	315
Turn Bay Length (ft)			
Base Capacity (vph)	229	160	2324
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.41	0.95	0.41

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
 16: Nantasket Avenue & Bay Street/Water Street










2032 Future Year Existing Flow Conditions  
 Saturday Afternoon

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations											 		
Traffic Volume (vph)	0	55	30	95	45	0	0	0	0	65	765	50	
Future Volume (vph)	0	55	30	95	45	0	0	0	0	65	765	50	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	12	12	12	13	13	13	12	12	12	12	12	12	
Total Lost time (s)		5.0			5.0						5.0		
Lane Util. Factor		1.00			1.00						0.95		
Frt		0.95			1.00						0.99		
Flt Protected		1.00			0.97						1.00		
Satd. Flow (prot)		1774			1862						3505		
Flt Permitted		1.00			0.74						1.00		
Satd. Flow (perm)		1774			1424						3505		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	60	33	103	49	0	0	0	0	71	832	54	
RTOR Reduction (vph)	0	29	0	0	0	0	0	0	0	0	5	0	
Lane Group Flow (vph)	0	64	0	0	152	0	0	0	0	0	952	0	
Heavy Vehicles (%)	0%	2%	2%	2%	2%	0%	0%	0%	0%	0%	2%	0%	
Turn Type		NA		Perm	NA					Perm	NA		
Protected Phases		2			2						1		
Permitted Phases				2						1			
Actuated Green, G (s)		5.1			5.1						29.8		
Effective Green, g (s)		5.1			5.1						29.8		
Actuated g/C Ratio		0.11			0.11						0.66		
Clearance Time (s)		5.0			5.0						5.0		
Vehicle Extension (s)		3.0			3.0						3.0		
Lane Grp Cap (vph)		201			161						2326		
v/s Ratio Prot		0.04											
v/s Ratio Perm					0.11						0.27		
v/c Ratio		0.32			0.94						0.41		
Uniform Delay, d1		18.3			19.8						3.5		
Progression Factor		1.00			1.00						1.00		
Incremental Delay, d2		0.9			54.1						0.5		
Delay (s)		19.2			73.9						4.0		
Level of Service		B			E						A		
Approach Delay (s)		19.2			73.9			0.0			4.0		
Approach LOS		B			E			A			A		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			14.0									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.57										
Actuated Cycle Length (s)			44.9									Sum of lost time (s)	15.0
Intersection Capacity Utilization			47.3%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													

Lanes, Volumes, Timings  
 17: Nantasket Avenue & George Washington Boulevard

2032 Future Year Existing Flow Conditions

Saturday Afternoon

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations					 	
Traffic Volume (vph)	0	45	0	0	325	595
Future Volume (vph)	0	45	0	0	325	595
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	12	12	12	12
Link Speed (mph)	40			25	25	
Link Distance (ft)	123			400	146	
Travel Time (s)	2.1			10.9	4.0	
Confl. Peds. (#/hr)		39				51
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh 0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗			↖	
Traffic Vol, veh/h	0	45	0	0	325	595
Future Vol, veh/h	0	45	0	0	325	595
Conflicting Peds, #/hr	0	39	0	0	0	51
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	0	49	0	0	353	647

Major/Minor	Minor2	Major2
Conflicting Flow All	- 590	- 0
Stage 1	- -	- -
Stage 2	- -	- -
Critical Hdwy	- 6.9	- -
Critical Hdwy Stg 1	- -	- -
Critical Hdwy Stg 2	- -	- -
Follow-up Hdwy	- 3.3	- -
Pot Cap-1 Maneuver	0 456	- -
Stage 1	0 -	- -
Stage 2	0 -	- -
Platoon blocked, %	- -	- -
Mov Cap-1 Maneuver	- 432	- -
Mov Cap-2 Maneuver	- -	- -
Stage 1	- -	- -
Stage 2	- -	- -

Approach	EB	SB
HCM Control Delay, s	14.4	0
HCM LOS	B	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	432	-	-
HCM Lane V/C Ratio	0.113	-	-
HCM Control Delay (s)	14.4	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0.4	-	-

Lanes, Volumes, Timings

2032 Future Year Existing Flow Conditions

18: Nantasket Avenue & Wharf Avenue/DCR Lot 2 Enter

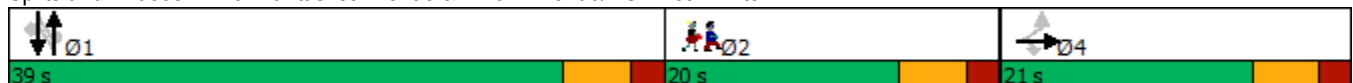
Saturday Afternoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	10	60	0	0	0	80	415	15	10	335	50
Future Volume (vph)	85	10	60	0	0	0	80	415	15	10	335	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	12	16	12	12	12	10	10	12	12	10	10
Right Turn on Red			No			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		213			191			311			200	
Travel Time (s)		5.8			5.2			8.5			5.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	6%	2%	0%	0%	1%	0%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm				Perm	NA		Perm	NA	Perm
Protected Phases		4						1			1	
Permitted Phases	4		4				1			1		1
Detector Phase	4	4	4				1	1		1	1	1
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0				33.0	33.0		33.0	33.0	33.0
Minimum Split (s)	21.0	21.0	21.0				39.0	39.0		39.0	39.0	39.0
Total Split (s)	21.0	21.0	21.0				39.0	39.0		39.0	39.0	39.0
Total Split (%)	26.3%	26.3%	26.3%				48.8%	48.8%		48.8%	48.8%	48.8%
Maximum Green (s)	15.0	15.0	15.0				33.0	33.0		33.0	33.0	33.0
Yellow Time (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0				2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	0.0
Total Lost Time (s)		6.0	6.0					6.0			6.0	6.0
Lead/Lag							Lead	Lead		Lead	Lead	Lead
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None				Max	Max		Max	Max	Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other  
 Cycle Length: 80  
 Actuated Cycle Length: 62.4  
 Natural Cycle: 80  
 Control Type: Semi Act-Uncoord

Splits and Phases: 18: Nantasket Avenue & Wharf Avenue/DCR Lot 2 Enter





Lane Group Ø2

Lane Configurations

Traffic Volume (vph)

Future Volume (vph)

Ideal Flow (vphpl)

Lane Width (ft)

Right Turn on Red

Link Speed (mph)

Link Distance (ft)

Travel Time (s)

Peak Hour Factor

Heavy Vehicles (%)

Shared Lane Traffic (%)

Turn Type

Protected Phases 2

Permitted Phases

Detector Phase

Switch Phase

Minimum Initial (s) 7.0

Minimum Split (s) 19.0

Total Split (s) 20.0

Total Split (%) 25%

Maximum Green (s) 14.0

Yellow Time (s) 4.0

All-Red Time (s) 2.0

Lost Time Adjust (s)

Total Lost Time (s)

Lead/Lag Lag

Lead-Lag Optimize? Yes

Vehicle Extension (s) 3.0

Recall Mode None

Walk Time (s) 7.0

Flash Dont Walk (s) 6.0

Pedestrian Calls (#/hr) 30

Intersection Summary

## Queues


















2032 Future Year Existing Flow Conditions

18: Nantasket Avenue &amp; Wharf Avenue/DCR Lot 2 Enter

Saturday Afternoon










	→	↘	↑	↓	↙
Lane Group	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	103	65	554	375	54
v/c Ratio	0.39	0.25	0.33	0.35	0.05
Control Delay	30.8	28.4	10.7	12.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	30.9	28.4	10.7	12.0	0.1
Queue Length 50th (ft)	30	18	36	48	0
Queue Length 95th (ft)	88	61	140	205	0
Internal Link Dist (ft)	133		231	120	
Turn Bay Length (ft)					
Base Capacity (vph)	451	444	1692	1075	985
Starvation Cap Reductn	23	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.24	0.15	0.33	0.35	0.05
Intersection Summary					

HCM Signalized Intersection Capacity Analysis      2032 Future Year Existing Flow Conditions  
 18: Nantasket Avenue & Wharf Avenue/DCR Lot 2 Enter      Saturday Afternoon

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	85	10	60	0	0	0	80	415	15	10	335	50	
Future Volume (vph)	85	10	60	0	0	0	80	415	15	10	335	50	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	16	12	16	12	12	12	10	10	12	12	10	10	
Total Lost time (s)		6.0	6.0					6.0			6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95			1.00	1.00	
Frt		1.00	0.85					1.00			1.00	0.85	
Flt Protected		0.96	1.00					0.99			1.00	1.00	
Satd. Flow (prot)		1819	1794					3245			1754	1507	
Flt Permitted		0.96	1.00					0.83			0.98	1.00	
Satd. Flow (perm)		1819	1794					2713			1724	1507	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	92	11	65	0	0	0	87	451	16	11	364	54	
RTOR Reduction (vph)	0	0	0	0	0	0	0	2	0	0	0	24	
Lane Group Flow (vph)	0	103	65	0	0	0	0	552	0	0	375	30	
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	6%	2%	0%	0%	1%	0%	
Turn Type	Perm	NA	Perm					Perm	NA		Perm	NA	Perm
Protected Phases		4						1			1		
Permitted Phases	4		4				1			1		1	
Actuated Green, G (s)		7.6	7.6					37.5			37.5	37.5	
Effective Green, g (s)		7.6	7.6					37.5			37.5	37.5	
Actuated g/C Ratio		0.11	0.11					0.56			0.56	0.56	
Clearance Time (s)		6.0	6.0					6.0			6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0			3.0	3.0	
Lane Grp Cap (vph)		205	202					1509			959	838	
v/s Ratio Prot													
v/s Ratio Perm		0.06	0.04					0.20			0.22	0.02	
v/c Ratio		0.50	0.32					0.37			0.39	0.04	
Uniform Delay, d1		28.1	27.5					8.3			8.5	6.8	
Progression Factor		1.00	1.00					1.00			1.00	1.00	
Incremental Delay, d2		1.9	0.9					0.7			1.2	0.1	
Delay (s)		30.1	28.5					9.0			9.7	6.8	
Level of Service		C	C					A			A	A	
Approach Delay (s)		29.4			0.0			9.0			9.3		
Approach LOS		C			A			A			A		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			12.1										
HCM 2000 Volume to Capacity ratio			0.37										
Actuated Cycle Length (s)			67.4						18.0				
Intersection Capacity Utilization			75.2%										
Analysis Period (min)			15										
c Critical Lane Group													

Lanes, Volumes, Timings  
 19: George Washington Boulevard & Bay Street

2032 Future Year Existing Flow Conditions  
 Saturday Afternoon

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	10	75	85	35	565	30
Future Volume (vph)	10	75	85	35	565	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	15	15	15
Link Speed (mph)	25			40	40	
Link Distance (ft)	237			204	123	
Travel Time (s)	6.5			3.5	2.1	
Confl. Peds. (#/hr)	5	5	5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	3%	0%	1%	1%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh	2.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	75	85	35	565	30
Future Vol, veh/h	10	75	85	35	565	30
Conflicting Peds, #/hr	5	5	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	3	0	1	1
Mvmt Flow	11	82	92	38	614	33

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	863	641	652	0	0
Stage 1	636	-	-	-	-
Stage 2	227	-	-	-	-
Critical Hdwy	6.4	6.2	4.13	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.227	-	-
Pot Cap-1 Maneuver	328	478	930	-	-
Stage 1	531	-	-	-	-
Stage 2	815	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	292	473	925	-	-
Mov Cap-2 Maneuver	292	-	-	-	-
Stage 1	475	-	-	-	-
Stage 2	811	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.3	6.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	925	-	441	-	-
HCM Lane V/C Ratio	0.1	-	0.21	-	-
HCM Control Delay (s)	9.3	0	15.3	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.3	-	0.8	-	-

Lanes, Volumes, Timings  
 21: George Washington Boulevard & Wharf Avenue

2032 Future Year Existing Flow Conditions  
 Saturday Afternoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	10	25	85	10	35	30	835	115	30	590	20
Future Volume (vph)	15	10	25	85	10	35	30	835	115	30	590	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	11	11	11	11	11	11
Right Turn on Red			Yes			No			Yes			No
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		219			213			784			515	
Travel Time (s)		6.0			5.8			13.4			8.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	4%	0%	4%	0%	1%	1%	0%	1%	5%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Detector Phase	2	2		2	2		1	1		1	1	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		32.0	32.0		32.0	32.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		37.0	37.0		37.0	37.0	
Total Split (s)	15.0	15.0		15.0	15.0		37.0	37.0		37.0	37.0	
Total Split (%)	21.7%	21.7%		21.7%	21.7%		53.6%	53.6%		53.6%	53.6%	
Maximum Green (s)	10.0	10.0		10.0	10.0		32.0	32.0		32.0	32.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lead		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Max	Max		Max	Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other  
 Cycle Length: 69  
 Actuated Cycle Length: 55.4  
 Natural Cycle: 70  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 21: George Washington Boulevard & Wharf Avenue



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Lane Group	Ø3
<hr/>	
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	6.0
Minimum Split (s)	17.0
Total Split (s)	17.0
Total Split (%)	25%
Maximum Green (s)	12.0
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	6.0
Flash Dont Walk (s)	6.0
Pedestrian Calls (#/hr)	15
<hr/>	
Intersection Summary	
<hr/>	



Queues  
 21: George Washington Boulevard & Wharf Avenue

2032 Future Year Existing Flow Conditions  
 Saturday Afternoon

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	54	141	1066	696
v/c Ratio	0.15	0.50	0.58	0.40
Control Delay	15.1	30.2	9.9	8.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.1	30.2	9.9	8.2
Queue Length 50th (ft)	7	39	79	46
Queue Length 95th (ft)	39	#129	248	147
Internal Link Dist (ft)	139	133	704	435
Turn Bay Length (ft)				
Base Capacity (vph)	353	281	1838	1758
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.15	0.50	0.58	0.40

















Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
 21: George Washington Boulevard & Wharf Avenue










2032 Future Year Existing Flow Conditions

Saturday Afternoon

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	15	10	25	85	10	35	30	835	115	30	590	20	
Future Volume (vph)	15	10	25	85	10	35	30	835	115	30	590	20	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	16	16	16	16	16	16	11	11	11	11	11	11	
Total Lost time (s)		5.0			5.0			5.0			5.0		
Lane Util. Factor		1.00			1.00			0.95			0.95		
Frt		0.93			0.96			0.98			1.00		
Flt Protected		0.99			0.97			1.00			1.00		
Satd. Flow (prot)		1979			1938			3390			3428		
Flt Permitted		0.90			0.77			0.92			0.87		
Satd. Flow (perm)		1813			1542			3122			3006		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	16	11	27	92	11	38	33	908	125	33	641	22	
RTOR Reduction (vph)	0	22	0	0	0	0	0	13	0	0	0	0	
Lane Group Flow (vph)	0	32	0	0	141	0	0	1053	0	0	696	0	
Heavy Vehicles (%)	0%	0%	0%	4%	0%	4%	0%	1%	1%	0%	1%	5%	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA		
Protected Phases		2			2			1			1		
Permitted Phases	2			2			1			1			
Actuated Green, G (s)		10.1			10.1			32.4			32.4		
Effective Green, g (s)		10.1			10.1			32.4			32.4		
Actuated g/C Ratio		0.17			0.17			0.55			0.55		
Clearance Time (s)		5.0			5.0			5.0			5.0		
Vehicle Extension (s)		3.0			3.0			3.0			3.0		
Lane Grp Cap (vph)		308			262			1702			1639		
v/s Ratio Prot													
v/s Ratio Perm		0.02			0.09			0.34			0.23		
v/c Ratio		0.10			0.54			0.62			0.42		
Uniform Delay, d1		20.8			22.5			9.3			8.0		
Progression Factor		1.00			1.00			1.00			1.00		
Incremental Delay, d2		0.1			2.1			1.7			0.8		
Delay (s)		21.0			24.6			11.0			8.8		
Level of Service		C			C			B			A		
Approach Delay (s)		21.0			24.6			11.0			8.8		
Approach LOS		C			C			B			A		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			11.5									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.57										
Actuated Cycle Length (s)			59.4									Sum of lost time (s)	15.0
Intersection Capacity Utilization			71.2%									ICU Level of Service	C
Analysis Period (min)			15										
c Critical Lane Group													

Lanes, Volumes, Timings  
 2: Hull Shore Drive & Phipps Street

2032 Future Year Two Way Condition  
 Weekday Evening

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	23	108	48	32	151	44
Future Volume (vph)	23	108	48	32	151	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	0		0	75
Storage Lanes		0	0		1	0
Taper Length (ft)			25		25	
Link Speed (mph)	30			30	30	
Link Distance (ft)	223			249	458	
Travel Time (s)	5.1			5.7	10.4	
Confl. Peds. (#/hr)		5	5		5	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh 6.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
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Lane Configurations						
Traffic Vol, veh/h	23	108	48	32	151	44
Future Vol, veh/h	23	108	48	32	151	44
Conflicting Peds, #/hr	0	5	5	0	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	117	52	35	164	48

Major/Minor	Major1	Major2	Minor1
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Conflicting Flow All	0	0	147	0	233	94
Stage 1	-	-	-	-	89	-
Stage 2	-	-	-	-	144	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1435	-	755	963
Stage 1	-	-	-	-	934	-
Stage 2	-	-	-	-	883	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1430	-	721	956
Mov Cap-2 Maneuver	-	-	-	-	721	-
Stage 1	-	-	-	-	930	-
Stage 2	-	-	-	-	847	-

Approach	EB	WB	NB
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HCM Control Delay, s	0	4.6	11.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
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Capacity (veh/h)	763	-	-	1430	-
HCM Lane V/C Ratio	0.278	-	-	0.036	-
HCM Control Delay (s)	11.5	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.1	-	-	0.1	-

Lanes, Volumes, Timings  
 3: Hull Shore Drive & Residence Driveway

2032 Future Year Two Way Condition  
 Weekday Evening

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	1	3	225	156	0
Future Volume (vph)	0	1	3	225	156	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	230			432	458	
Travel Time (s)	5.2			9.8	10.4	
Confl. Peds. (#/hr)	20	20	20			20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Parking (#/hr)			10	10		
Mid-Block Traffic (%)	50%			0%	0%	
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 6th TWSC  
 3: Hull Shore Drive & Residence Driveway

2032 Future Year Two Way Condition  
 Weekday Evening

Intersection

Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1	3	225	156	0
Future Vol, veh/h	0	1	3	225	156	0
Conflicting Peds, #/hr	20	20	20	0	0	20
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	3	245	170	0










Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	461	210	190	0	0
Stage 1	190	-	-	-	-
Stage 2	271	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-
Pot Cap-1 Maneuver	559	830	1384	-	-
Stage 1	842	-	-	-	-
Stage 2	775	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	541	805	1363	-	-
Mov Cap-2 Maneuver	541	-	-	-	-
Stage 1	827	-	-	-	-
Stage 2	763	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	0.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1363	-	805	-	-
HCM Lane V/C Ratio	0.002	-	0.001	-	-
HCM Control Delay (s)	7.6	0	9.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Lanes, Volumes, Timings  
 4: Hull Shore Drive & Edgewater Road Extension

2032 Future Year Two Way Condition  
 Weekday Evening

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	25	72	75	237	148	69
Future Volume (vph)	25	72	75	237	148	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	321			383	432	
Travel Time (s)	7.3			8.7	9.8	
Confl. Peds. (#/hr)	50	50	50			50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Parking (#/hr)	10	10	10	10		
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized



HCM 6th TWSC  
4: Hull Shore Drive & Edgewater Road Extension

2032 Future Year Two Way Condition  
Weekday Evening

Intersection

Int Delay, s/veh 3.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
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Lane Configurations						
Traffic Vol, veh/h	25	72	75	237	148	69
Future Vol, veh/h	25	72	75	237	148	69
Conflicting Peds, #/hr	50	50	50	0	0	50
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	78	82	258	161	75

Major/Minor	Minor2	Major1	Major2
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Conflicting Flow All	721	299	286	0	-	0
Stage 1	249	-	-	-	-	-
Stage 2	472	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	394	741	1276	-	-	-
Stage 1	792	-	-	-	-	-
Stage 2	628	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	336	685	1227	-	-	-
Mov Cap-2 Maneuver	336	-	-	-	-	-
Stage 1	703	-	-	-	-	-
Stage 2	604	-	-	-	-	-

Approach	EB	NB	SB
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HCM Control Delay, s	13.3	2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
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Capacity (veh/h)	1227	-	540	-	-
HCM Lane V/C Ratio	0.066	-	0.195	-	-
HCM Control Delay (s)	8.1	0	13.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.7	-	-

Lanes, Volumes, Timings  
 5: Hull Shore Drive & The Green North

2032 Future Year Two Way Condition  
 Weekday Evening

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	57	314	218	2
Future Volume (vph)	0	0	57	314	218	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	323			392	383	
Travel Time (s)	7.3			8.9	8.7	
Confl. Peds. (#/hr)	50	50	50			50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Parking (#/hr)	10	10	10	10		
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	57	314	218	2
Future Vol, veh/h	0	0	57	314	218	2
Conflicting Peds, #/hr	50	50	50	0	0	50
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	62	341	237	2










Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	803	338	289	0	0
Stage 1	288	-	-	-	-
Stage 2	515	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-
Pot Cap-1 Maneuver	353	704	1273	-	-
Stage 1	761	-	-	-	-
Stage 2	600	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	306	651	1224	-	-
Mov Cap-2 Maneuver	306	-	-	-	-
Stage 1	686	-	-	-	-
Stage 2	577	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	1.2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1224	-	-	-	-
HCM Lane V/C Ratio	0.051	-	-	-	-
HCM Control Delay (s)	8.1	0	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	-	-

Lanes, Volumes, Timings  
 6: Hull Shore Drive & The Green South

2032 Future Year Two Way Condition  
 Weekday Evening

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	30	26	0	339	218	0
Future Volume (vph)	30	26	0	339	218	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	311			363	392	
Travel Time (s)	7.1			8.3	8.9	
Confl. Peds. (#/hr)	50	50	50			50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Parking (#/hr)	10	10	10	10		
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↑	
Traffic Vol, veh/h	30	26	0	339	218	0
Future Vol, veh/h	30	26	0	339	218	0
Conflicting Peds, #/hr	50	50	50	0	0	50
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	33	28	0	368	237	0










Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	655	287	-	0	-
Stage 1	237	-	-	-	-
Stage 2	418	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	-
Pot Cap-1 Maneuver	431	752	0	-	-
Stage 1	802	-	0	-	-
Stage 2	664	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	431	723	-	-	-
Mov Cap-2 Maneuver	431	-	-	-	-
Stage 1	802	-	-	-	-
Stage 2	664	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT EBLn1	SBT
Capacity (veh/h)	- 530	-
HCM Lane V/C Ratio	- 0.115	-
HCM Control Delay (s)	- 12.7	-
HCM Lane LOS	- B	-
HCM 95th %tile Q(veh)	- 0.4	-

Lanes, Volumes, Timings  
7: Hull Shore Drive & Water Street

2032 Future Year Two Way Condition  
Weekday Evening

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	54	69	154	236	220	24
Future Volume (vph)	54	69	154	236	220	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	213			1283	363	
Travel Time (s)	4.8			29.2	8.3	
Confl. Peds. (#/hr)	50	50	50			50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Parking (#/hr)	10	10	10	10		
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
Control Type: Unsignalized

Intersection











Int Delay, s/veh	5.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	54	69	154	236	220	24
Future Vol, veh/h	54	69	154	236	220	24
Conflicting Peds, #/hr	50	50	50	0	0	50
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	59	75	167	257	239	26

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	943	352	315	0	0
Stage 1	302	-	-	-	-
Stage 2	641	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-
Pot Cap-1 Maneuver	291	692	1245	-	-
Stage 1	750	-	-	-	-
Stage 2	525	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	226	640	1197	-	-
Mov Cap-2 Maneuver	226	-	-	-	-
Stage 1	604	-	-	-	-
Stage 2	505	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	21.1	3.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1197	-	355	-	-
HCM Lane V/C Ratio	0.14	-	0.377	-	-
HCM Control Delay (s)	8.5	0	21.1	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.5	-	1.7	-	-



						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	84	31	373	358	22
Future Volume (vph)	3	84	31	373	358	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	10	11	11	11
Link Speed (mph)	30			30	30	
Link Distance (ft)	216			501	429	
Travel Time (s)	4.9			11.4	9.8	
Confl. Peds. (#/hr)	75	75	75			75
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh 1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
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Lane Configurations						
Traffic Vol, veh/h	3	84	31	373	358	22
Future Vol, veh/h	3	84	31	373	358	22
Conflicting Peds, #/hr	75	75	75	0	0	75
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	91	34	405	389	24

Major/Minor	Minor2	Major1	Major2
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Conflicting Flow All	1024	551	488	0	-	0
Stage 1	476	-	-	-	-	-
Stage 2	548	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	261	534	1075	-	-	-
Stage 1	625	-	-	-	-	-
Stage 2	579	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	224	475	1013	-	-	-
Mov Cap-2 Maneuver	224	-	-	-	-	-
Stage 1	569	-	-	-	-	-
Stage 2	546	-	-	-	-	-

Approach	EB	NB	SB
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HCM Control Delay, s	14.9	0.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
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Capacity (veh/h)	1013	-	457	-	-
HCM Lane V/C Ratio	0.033	-	0.207	-	-
HCM Control Delay (s)	8.7	-	14.9	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.8	-	-

Lanes, Volumes, Timings  
 10: Phipps Street & Samoset Avenue

2032 Future Year Two Way Condition  
 Weekday Evening

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	60	67	103	80	64	30
Future Volume (vph)	60	67	103	80	64	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	13	13	13	13	13
Storage Length (ft)	0			0	0	75
Storage Lanes	0			0	1	0
Taper Length (ft)	25				25	
Link Speed (mph)		30	30		30	
Link Distance (ft)		188	223		733	
Travel Time (s)		4.3	5.1		16.7	
Confl. Peds. (#/hr)	20			10	10	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh 3.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Vol, veh/h	60	67	103	80	64	30
Future Vol, veh/h	60	67	103	80	64	30
Conflicting Peds, #/hr	20	0	0	10	10	20
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	65	73	112	87	70	33

















Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	219	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	1350	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1326	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	3.7	0	11.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1326	-	-	-	625
HCM Lane V/C Ratio	0.049	-	-	-	0.163
HCM Control Delay (s)	7.9	0	-	-	11.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.6

Lanes, Volumes, Timings  
 11: Nantasket Avenue & Mountford Road/Phipps Street

2032 Future Year Two Way Condition  
 Weekday Evening

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	15	55	0	78	15	609	63	64	487	10
Future Volume (vph)	10	0	15	55	0	78	15	609	63	64	487	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	13	13	13	11	11	11	11	11	11
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		409			188			485			891	
Travel Time (s)		9.3			4.3			11.0			20.3	
Confl. Peds. (#/hr)	10		20	20		10	20		20	10		10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 6th TWSC  
 11: Nantasket Avenue & Mountford Road/Phipps Street

2032 Future Year Two Way Condition  
 Weekday Evening

Intersection

Int Delay, s/veh	9.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	10	0	15	55	0	78	15	609	63	64	487	10
Future Vol, veh/h	10	0	15	55	0	78	15	609	63	64	487	10
Conflicting Peds, #/hr	10	0	20	20	0	10	20	0	20	10	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	0	16	60	0	85	16	662	68	70	529	11










Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1476	1477	575	1451	1448	726	560	0	0	750	0	0
Stage 1	695	695	-	748	748	-	-	-	-	-	-	-
Stage 2	781	782	-	703	700	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	104	126	518	109	131	425	1011	-	-	859	-	-
Stage 1	433	444	-	404	420	-	-	-	-	-	-	-
Stage 2	388	405	-	428	441	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	72	104	502	91	109	414	996	-	-	843	-	-
Mov Cap-2 Maneuver	72	104	-	91	109	-	-	-	-	-	-	-
Stage 1	415	385	-	386	401	-	-	-	-	-	-	-
Stage 2	298	387	-	359	383	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	34.7		91.4		0.2		1.1	
HCM LOS	D		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	996	-	-	148	168	843	-	-
HCM Lane V/C Ratio	0.016	-	-	0.184	0.861	0.083	-	-
HCM Control Delay (s)	8.7	0	-	34.7	91.4	9.7	0	-
HCM Lane LOS	A	A	-	D	F	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	6	0.3	-	-

Lanes, Volumes, Timings  
 12: Nantasket Avenue & Whitehead Avenue

2032 Future Year Two Way Condition  
 Weekday Evening

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	25	0	687	537	20
Future Volume (vph)	0	25	0	687	537	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	477			258	485	
Travel Time (s)	10.8			5.9	11.0	
Confl. Peds. (#/hr)	10	10	10			10
Confl. Bikes (#/hr)		10				10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Parking (#/hr)			10	10		
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized



Intersection

Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↘	
Traffic Vol, veh/h	0	25	0	687	537	20
Future Vol, veh/h	0	25	0	687	537	20
Conflicting Peds, #/hr	10	10	10	0	0	10
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	27	0	747	584	22

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	-	615	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.22	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.318	-
Pot Cap-1 Maneuver	0	491	0
Stage 1	0	-	0
Stage 2	0	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	484	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 484	-	-
HCM Lane V/C Ratio	- 0.056	-	-
HCM Control Delay (s)	- 12.9	-	-
HCM Lane LOS	- B	-	-
HCM 95th %tile Q(veh)	- 0.2	-	-

Lanes, Volumes, Timings

2032 Future Year Two Way Condition

13: Nantasket Avenue & Edgewater Road/Edgewater Road Extension

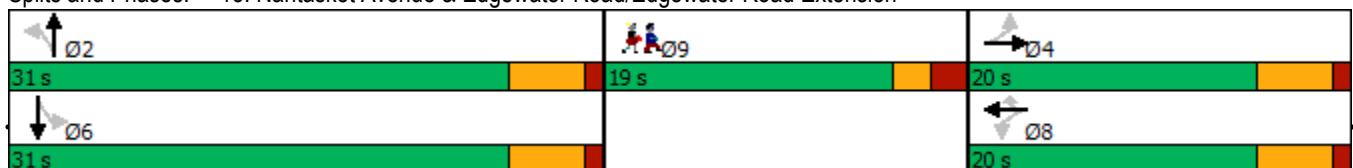
Weekday Evening

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	9	28	71	0	67	53	589	37	63	463	34
Future Volume (vph)	31	9	28	71	0	67	53	589	37	63	463	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	10	11	11	10	11	11
Storage Length (ft)	0		0	0		50	150		0	100		0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		526			321			377			258	
Travel Time (s)		12.0			7.3			8.6			5.9	
Confl. Peds. (#/hr)												20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Parking (#/hr)				10	10	10	10	10	10	10	10	10
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0	11.0	15.0	15.0		15.0	15.0	
Total Split (s)	20.0	20.0		20.0	20.0	20.0	31.0	31.0		31.0	31.0	
Total Split (%)	28.6%	28.6%		28.6%	28.6%	28.6%	44.3%	44.3%		44.3%	44.3%	
Maximum Green (s)	15.0	15.0		15.0	15.0	15.0	26.0	26.0		26.0	26.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Min	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other  
 Cycle Length: 70  
 Actuated Cycle Length: 49.2  
 Natural Cycle: 70  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 13: Nantasket Avenue & Edgewater Road/Edgewater Road Extension










Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Parking (#/hr)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	19.0
Total Split (s)	19.0
Total Split (%)	27%
Maximum Green (s)	15.0
Yellow Time (s)	2.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	8.0
Pedestrian Calls (#/hr)	20
Intersection Summary	

## Queues

2032 Future Year Two Way Condition

## 13: Nantasket Avenue &amp; Edgewater Road/Edgewater Road Extension

Weekday Evening

							
Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	74	77	73	58	680	68	540
v/c Ratio	0.30	0.44	0.25	0.16	0.70	0.25	0.55
Control Delay	16.7	28.4	6.6	10.3	17.6	12.8	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	28.4	6.6	10.3	17.6	12.8	14.1
Queue Length 50th (ft)	10	17	0	5	94	6	63
Queue Length 95th (ft)	48	66	23	44	#541	58	#398
Internal Link Dist (ft)	446	241			297		178
Turn Bay Length (ft)			50	150		100	
Base Capacity (vph)	456	340	473	372	978	275	974
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.23	0.15	0.16	0.70	0.25	0.55

## Intersection Summary




















# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

2032 Future Year Two Way Condition










13: Nantasket Avenue & Edgewater Road/Edgewater Road Extension

Weekday Evening

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	9	28	71	0	67	53	589	37	63	463	34
Future Volume (vph)	31	9	28	71	0	67	53	589	37	63	463	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	10	11	11	10	11	11
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.95			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.98			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1664			1454	1301	1404	1517		1404	1511	
Flt Permitted		0.82			0.71	1.00	0.39	1.00		0.29	1.00	
Satd. Flow (perm)		1388			1085	1301	577	1517		427	1511	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	34	10	30	77	0	73	58	640	40	68	503	37
RTOR Reduction (vph)	0	26	0	0	0	64	0	2	0	0	3	0
Lane Group Flow (vph)	0	48	0	0	77	9	58	678	0	68	537	0
Confl. Peds. (#/hr)												20
Parking (#/hr)				10	10	10	10	10	10	10	10	10
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		6.6			6.6	6.6	30.6	30.6		30.6	30.6	
Effective Green, g (s)		6.6			6.6	6.6	30.6	30.6		30.6	30.6	
Actuated g/C Ratio		0.12			0.12	0.12	0.57	0.57		0.57	0.57	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		2.0			2.0	2.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		171			134	160	330	869		244	865	
v/s Ratio Prot								c0.45			0.36	
v/s Ratio Perm		0.03			c0.07	0.01	0.10			0.16		
v/c Ratio		0.28			0.57	0.06	0.18	0.78		0.28	0.62	
Uniform Delay, d1		21.2			22.1	20.7	5.4	8.8		5.8	7.6	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			3.7	0.1	0.3	4.6		0.6	1.4	
Delay (s)		21.6			25.7	20.7	5.7	13.4		6.4	9.0	
Level of Service		C			C	C	A	B		A	A	
Approach Delay (s)		21.6			23.3			12.8			8.7	
Approach LOS		C			C			B			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			12.6		HCM 2000 Level of Service						B	
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			53.4		Sum of lost time (s)					14.0		
Intersection Capacity Utilization			64.6%		ICU Level of Service					C		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings  
 14: Nantasket Avenue & The Green North

2032 Future Year Two Way Condition  
 Weekday Evening

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	26	36	642	0	0	560
Future Volume (vph)	26	36	642	0	0	560
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30		30			30
Link Distance (ft)	323		386			377
Travel Time (s)	7.3		8.8			8.6
Confl. Peds. (#/hr)	20	20		20	20	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Parking (#/hr)	10	10	10	10	10	10
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 6th TWSC  
 14: Nantasket Avenue & The Green North

2032 Future Year Two Way Condition  
 Weekday Evening

Intersection

Int Delay, s/veh	1.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑			↑
Traffic Vol, veh/h	26	36	642	0	0	560
Future Vol, veh/h	26	36	642	0	0	560
Conflicting Peds, #/hr	20	20	0	20	20	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	28	39	698	0	0	609

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1327	718	0	-	-
Stage 1	698	-	-	-	-
Stage 2	629	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	-
Pot Cap-1 Maneuver	171	429	-	0	0
Stage 1	494	-	-	0	0
Stage 2	531	-	-	0	0
Platoon blocked, %			-		
Mov Cap-1 Maneuver	168	422	-	-	-
Mov Cap-2 Maneuver	168	-	-	-	-
Stage 1	494	-	-	-	-
Stage 2	523	-	-	-	-











Approach	WB	NB	SB
HCM Control Delay, s	23.8	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	- 258	-
HCM Lane V/C Ratio	- 0.261	-
HCM Control Delay (s)	- 23.8	-
HCM Lane LOS	- C	-
HCM 95th %tile Q(veh)	- 1	-



Lanes, Volumes, Timings  
 15: Nantasket Avenue & The Green South

2032 Future Year Two Way Condition  
 Weekday Evening

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	642	40	9	577
Future Volume (vph)	0	0	642	40	9	577
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	50	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Link Speed (mph)	30		30			30
Link Distance (ft)	311		375			386
Travel Time (s)	7.1		8.5			8.8
Confl. Peds. (#/hr)	20	20		20	20	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Parking (#/hr)	10	10	10	10	10	10
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 6th TWSC  
 15: Nantasket Avenue & The Green South

2032 Future Year Two Way Condition  
 Weekday Evening

Intersection

Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	642	40	9	577
Future Vol, veh/h	0	0	642	40	9	577
Conflicting Peds, #/hr	20	20	0	20	20	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	698	43	10	627

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1407	760	0	0	761
Stage 1	740	-	-	-	-
Stage 2	667	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	153	406	-	-	851
Stage 1	472	-	-	-	-
Stage 2	510	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	147	394	-	-	838
Mov Cap-2 Maneuver	147	-	-	-	-
Stage 1	465	-	-	-	-
Stage 2	496	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	838
HCM Lane V/C Ratio	-	-	-	0.012
HCM Control Delay (s)	-	-	0	9.3
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0

Lanes, Volumes, Timings  
 16: Nantasket Avenue & Bay Street/Water Street

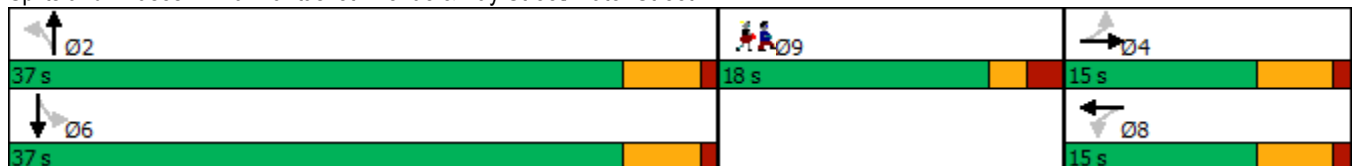
2032 Future Year Two Way Condition  
 Weekday Evening

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	47	34	86	17	83	24	652	16	71	472	35
Future Volume (vph)	0	47	34	86	17	83	24	652	16	71	472	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	11	11	11	11	11	11
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		339			213			1319			375	
Travel Time (s)		7.7			4.8			30.0			8.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Parking (#/hr)				10	10	10				10	10	10
Shared Lane Traffic (%)												
Turn Type		NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		15.0	15.0		15.0	15.0	
Total Split (s)	15.0	15.0		15.0	15.0		37.0	37.0		37.0	37.0	
Total Split (%)	21.4%	21.4%		21.4%	21.4%		52.9%	52.9%		52.9%	52.9%	
Maximum Green (s)	10.0	10.0		10.0	10.0		32.0	32.0		32.0	32.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other  
 Cycle Length: 70  
 Actuated Cycle Length: 58.6  
 Natural Cycle: 90  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 16: Nantasket Avenue & Bay Street/Water Street



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Lane Group	Ø9
<hr/>	
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Parking (#/hr)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	18.0
Total Split (s)	18.0
Total Split (%)	26%
Maximum Green (s)	14.0
Yellow Time (s)	2.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	7.0
Pedestrian Calls (#/hr)	20
<hr/>	
Intersection Summary	
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Queues  
 16: Nantasket Avenue & Bay Street/Water Street

2032 Future Year Two Way Condition  
 Weekday Evening

















	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	88	201	752	628
v/c Ratio	0.26	0.80	0.72	0.80
Control Delay	16.8	45.0	16.2	22.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	16.8	45.0	16.2	22.0
Queue Length 50th (ft)	13	44	129	117
Queue Length 95th (ft)	58	#188	#526	#493
Internal Link Dist (ft)	259	133	1239	295
Turn Bay Length (ft)				
Base Capacity (vph)	335	250	1048	785
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.26	0.80	0.72	0.80










Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
 16: Nantasket Avenue & Bay Street/Water Street

2032 Future Year Two Way Condition  
 Weekday Evening

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	0	47	34	86	17	83	24	652	16	71	472	35	
Future Volume (vph)	0	47	34	86	17	83	24	652	16	71	472	35	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11	
Total Lost time (s)		5.0			5.0			5.0			5.0		
Lane Util. Factor		1.00			1.00			1.00			1.00		
Frt		0.94			0.94			1.00			0.99		
Flt Protected		1.00			0.98			1.00			0.99		
Satd. Flow (prot)		1757			1454			1792			1509		
Flt Permitted		1.00			0.81			0.97			0.86		
Satd. Flow (perm)		1757			1203			1744			1304		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	51	37	93	18	90	26	709	17	77	513	38	
RTOR Reduction (vph)	0	31	0	0	41	0	0	1	0	0	3	0	
Lane Group Flow (vph)	0	57	0	0	160	0	0	751	0	0	625	0	
Parking (#/hr)				10	10	10				10	10	10	
Turn Type		NA		Perm	NA		Perm	NA		Perm	NA		
Protected Phases		4			8			2			6		
Permitted Phases	4			8			2			6			
Actuated Green, G (s)		10.2			10.2			35.2			35.2		
Effective Green, g (s)		10.2			10.2			35.2			35.2		
Actuated g/C Ratio		0.17			0.17			0.57			0.57		
Clearance Time (s)		5.0			5.0			5.0			5.0		
Vehicle Extension (s)		2.0			2.0			3.0			3.0		
Lane Grp Cap (vph)		290			198			994			743		
v/s Ratio Prot		0.03											
v/s Ratio Perm					c0.13			0.43			c0.48		
v/c Ratio		0.20			0.81			0.76			0.84		
Uniform Delay, d1		22.2			24.8			10.0			10.9		
Progression Factor		1.00			1.00			1.00			1.00		
Incremental Delay, d2		0.1			20.0			3.3			8.6		
Delay (s)		22.3			44.8			13.3			19.5		
Level of Service		C			D			B			B		
Approach Delay (s)		22.3			44.8			13.3			19.5		
Approach LOS		C			D			B			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			19.9									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.79										
Actuated Cycle Length (s)			61.7									Sum of lost time (s)	14.0
Intersection Capacity Utilization			84.1%									ICU Level of Service	E
Analysis Period (min)			15										
c Critical Lane Group													

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	65	70	692	642	30
Future Volume (vph)	0	65	70	692	642	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	11	11	11	11
Storage Length (ft)	0	0	0			0
Storage Lanes	0	1	0			0
Taper Length (ft)	25		25			
Link Speed (mph)	30			30	30	
Link Distance (ft)	740			422	1319	
Travel Time (s)	16.8			9.6	30.0	
Confl. Peds. (#/hr)	10	10	10			10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)		10%				
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized



Intersection

Int Delay, s/veh 1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↖	↗	↖
Traffic Vol, veh/h	0	65	70	692	642	30
Future Vol, veh/h	0	65	70	692	642	30
Conflicting Peds, #/hr	10	10	10	0	0	10
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	71	76	752	698	33

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	-	735	741
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.22	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.318	2.218
Pot Cap-1 Maneuver	0	420	866
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	412	857
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.5	0.9	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	857	-	412	-	-
HCM Lane V/C Ratio	0.089	-	0.171	-	-
HCM Control Delay (s)	9.6	0	15.5	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.3	-	0.6	-	-

Lanes, Volumes, Timings

2032 Future Year Two Way Condition

18: Nantasket Avenue & Wharf Avenue/DCR Lot 2 Enter

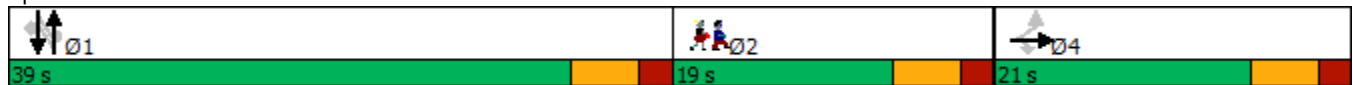
Weekday Evening

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	20	89	0	0	0	141	360	20	5	314	148
Future Volume (vph)	34	20	89	0	0	0	141	360	20	5	314	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	15	15	15	10	10	10
Right Turn on Red			No			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		222			207			361			195	
Travel Time (s)		5.0			4.7			8.2			4.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm				Perm	NA		Perm	NA	Perm
Protected Phases		4						1			1	
Permitted Phases	4		4				1			1		1
Detector Phase	4	4	4				1	1		1	1	1
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0				33.0	33.0		33.0	33.0	33.0
Minimum Split (s)	21.0	21.0	21.0				39.0	39.0		39.0	39.0	39.0
Total Split (s)	21.0	21.0	21.0				39.0	39.0		39.0	39.0	39.0
Total Split (%)	26.6%	26.6%	26.6%				49.4%	49.4%		49.4%	49.4%	49.4%
Maximum Green (s)	15.0	15.0	15.0				33.0	33.0		33.0	33.0	33.0
Yellow Time (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0				2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	0.0
Total Lost Time (s)		6.0	6.0					6.0			6.0	6.0
Lead/Lag							Lead	Lead		Lead	Lead	Lead
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None				Max	Max		Max	Max	Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other  
 Cycle Length: 79  
 Actuated Cycle Length: 62.7  
 Natural Cycle: 80  
 Control Type: Semi Act-Uncoord

Splits and Phases: 18: Nantasket Avenue & Wharf Avenue/DCR Lot 2 Enter



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Lane Group	Ø2
<hr/>	
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	19.0
Total Split (s)	19.0
Total Split (%)	24%
Maximum Green (s)	13.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	6.0
Pedestrian Calls (#/hr)	30
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Intersection Summary	
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Queues

18: Nantasket Avenue & Wharf Avenue/DCR Lot 2 Enter


















	→	↘	↑	↓	↙
Lane Group	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	59	97	566	346	161
v/c Ratio	0.22	0.41	0.56	0.32	0.16
Control Delay	27.7	31.8	16.4	11.9	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	27.7	31.8	16.4	11.9	3.1
Queue Length 50th (ft)	17	28	87	44	0
Queue Length 95th (ft)	57	85	#419	191	33
Internal Link Dist (ft)	142		281	115	
Turn Bay Length (ft)					
Base Capacity (vph)	446	391	1007	1071	978
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.13	0.25	0.56	0.32	0.16

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.











HCM Signalized Intersection Capacity Analysis  
 18: Nantasket Avenue & Wharf Avenue/DCR Lot 2 Enter

2032 Future Year Two Way Condition  
 Weekday Evening

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	34	20	89	0	0	0	141	360	20	5	314	148	
Future Volume (vph)	34	20	89	0	0	0	141	360	20	5	314	148	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	12	12	12	12	12	12	15	15	15	10	10	10	
Total Lost time (s)		6.0	6.0					6.0			6.0	6.0	
Lane Util. Factor		1.00	1.00					1.00			1.00	1.00	
Frt		1.00	0.85					0.99			1.00	0.85	
Flt Protected		0.97	1.00					0.99			1.00	1.00	
Satd. Flow (prot)		1806	1583					2011			1737	1478	
Flt Permitted		0.97	1.00					0.80			0.99	1.00	
Satd. Flow (perm)		1806	1583					1621			1727	1478	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	37	22	97	0	0	0	153	391	22	5	341	161	
RTOR Reduction (vph)	0	0	0	0	0	0	0	1	0	0	0	72	
Lane Group Flow (vph)	0	59	97	0	0	0	0	565	0	0	346	89	
Turn Type	Perm	NA	Perm					Perm	NA		Perm	NA	Perm
Protected Phases		4						1			1		
Permitted Phases	4		4				1			1		1	
Actuated Green, G (s)		8.0	8.0					37.6			37.6	37.6	
Effective Green, g (s)		8.0	8.0					37.6			37.6	37.6	
Actuated g/C Ratio		0.12	0.12					0.55			0.55	0.55	
Clearance Time (s)		6.0	6.0					6.0			6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0			3.0	3.0	
Lane Grp Cap (vph)		213	186					898			957	819	
v/s Ratio Prot													
v/s Ratio Perm		0.03	c0.06					c0.35			0.20	0.06	
v/c Ratio		0.28	0.52					0.63			0.36	0.11	
Uniform Delay, d1		27.3	28.1					10.3			8.4	7.2	
Progression Factor		1.00	1.00					1.00			1.00	1.00	
Incremental Delay, d2		0.7	2.6					3.3			1.1	0.3	
Delay (s)		28.0	30.7					13.7			9.5	7.4	
Level of Service		C	C					B			A	A	
Approach Delay (s)		29.7			0.0			13.7			8.8		
Approach LOS		C			A			B			A		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			13.7									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.56										
Actuated Cycle Length (s)			67.8									Sum of lost time (s)	18.0
Intersection Capacity Utilization			75.5%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

Lanes, Volumes, Timings  
 20: George Washington Boulevard & Nantasket Ave Connector

2032 Future Year Two Way Condition  
 Weekday Evening

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	22	31	731	18	69	638
Future Volume (vph)	22	31	731	18	69	638
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30		30			30
Link Distance (ft)	216		699			422
Travel Time (s)	4.9		15.9			9.6
Confl. Peds. (#/hr)	20	10		10	20	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 6th TWSC  
 20: George Washington Boulevard & Nantasket Ave Connector

2032 Future Year Two Way Condition  
 Weekday Evening

Intersection

Int Delay, s/veh	1.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑	↑		↓
Traffic Vol, veh/h	22	31	731	18	69	638
Future Vol, veh/h	22	31	731	18	69	638
Conflicting Peds, #/hr	20	10	0	10	20	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	34	795	20	75	693

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1678	825	0	0	835
Stage 1	815	-	-	-	-
Stage 2	863	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	104	372	-	-	798
Stage 1	435	-	-	-	-
Stage 2	413	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	85	364	-	-	786
Mov Cap-2 Maneuver	85	-	-	-	-
Stage 1	428	-	-	-	-
Stage 2	344	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	41.7	0	1
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	154	786
HCM Lane V/C Ratio	-	-	0.374	0.095
HCM Control Delay (s)	-	-	41.7	10.1
HCM Lane LOS	-	-	E	B
HCM 95th %tile Q(veh)	-	-	1.6	0.3



Lanes, Volumes, Timings  
 21: George Washington Boulevard & Wharf Avenue

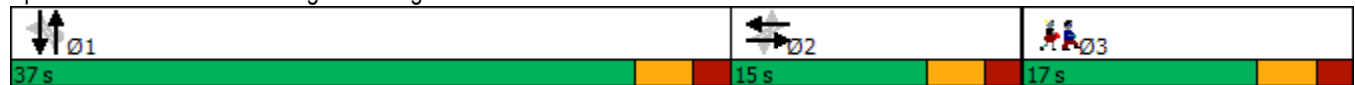
2032 Future Year Two Way Condition  
 Weekday Evening

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	10	10	233	5	51	5	683	24	109	541	10
Future Volume (vph)	15	10	10	233	5	51	5	683	24	109	541	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	12	12	12	11	11	11	11	11	11
Right Turn on Red			Yes			No			Yes			Yes
Link Speed (mph)		30			30			40				40
Link Distance (ft)		219			222			784				699
Travel Time (s)		5.0			5.0			13.4				11.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)				37%								
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			1				1
Permitted Phases	2			2			1			1		
Detector Phase	2	2		2	2		1	1		1		1
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		32.0	32.0		32.0		32.0
Minimum Split (s)	15.0	15.0		15.0	15.0		37.0	37.0		37.0		37.0
Total Split (s)	15.0	15.0		15.0	15.0		37.0	37.0		37.0		37.0
Total Split (%)	21.7%	21.7%		21.7%	21.7%		53.6%	53.6%		53.6%		53.6%
Maximum Green (s)	10.0	10.0		10.0	10.0		32.0	32.0		32.0		32.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0		3.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)		0.0		0.0	0.0			0.0				0.0
Total Lost Time (s)		5.0		5.0	5.0			5.0				5.0
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lead		Lead		Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0		3.0
Recall Mode	Min	Min		Min	Min		Max	Max		Max		Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other  
 Cycle Length: 69  
 Actuated Cycle Length: 55.4  
 Natural Cycle: 70  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 21: George Washington Boulevard & Wharf Avenue



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Lane Group	Ø3
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Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	6.0
Minimum Split (s)	17.0
Total Split (s)	17.0
Total Split (%)	25%
Maximum Green (s)	12.0
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	6.0
Flash Dont Walk (s)	6.0
Pedestrian Calls (#/hr)	15
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Intersection Summary	

Queues  
 21: George Washington Boulevard & Wharf Avenue

2032 Future Year Two Way Condition  
 Weekday Evening


















	→	↙	←	↑	↓
Lane Group	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	38	159	154	773	717
v/c Ratio	0.12	0.67	0.64	0.41	0.50
Control Delay	18.2	40.7	38.3	8.1	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	18.2	40.7	38.3	8.1	9.5
Queue Length 50th (ft)	7	47	46	51	51
Queue Length 95th (ft)	35	#174	#166	161	169
Internal Link Dist (ft)	139		142	704	619
Turn Bay Length (ft)					
Base Capacity (vph)	316	237	241	1896	1443
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.12	0.67	0.64	0.41	0.50

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.










HCM Signalized Intersection Capacity Analysis  
 21: George Washington Boulevard & Wharf Avenue

2032 Future Year Two Way Condition  
 Weekday Evening

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	15	10	10	233	5	51	5	683	24	109	541	10	
Future Volume (vph)	15	10	10	233	5	51	5	683	24	109	541	10	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	16	16	16	12	12	12	11	11	11	11	11	11	
Total Lost time (s)		5.0		5.0	5.0			5.0			5.0		
Lane Util. Factor		1.00		0.95	0.95			0.95			0.95		
Frt		0.96		1.00	0.95			0.99			1.00		
Flt Protected		0.98		0.95	0.97			1.00			0.99		
Satd. Flow (prot)		1987		1681	1625			3403			3386		
Flt Permitted		0.83		0.73	0.79			0.95			0.72		
Satd. Flow (perm)		1685		1296	1325			3238			2466		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	16	11	11	253	5	55	5	742	26	118	588	11	
RTOR Reduction (vph)	0	9	0	0	0	0	0	3	0	0	1	0	
Lane Group Flow (vph)	0	29	0	159	154	0	0	770	0	0	716	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA		
Protected Phases		2			2			1			1		
Permitted Phases	2			2			1			1			
Actuated Green, G (s)		10.1		10.1	10.1			32.4			32.4		
Effective Green, g (s)		10.1		10.1	10.1			32.4			32.4		
Actuated g/C Ratio		0.17		0.17	0.17			0.55			0.55		
Clearance Time (s)		5.0		5.0	5.0			5.0			5.0		
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0		
Lane Grp Cap (vph)		286		220	225			1766			1345		
v/s Ratio Prot													
v/s Ratio Perm		0.02		c0.12	0.12			0.24			c0.29		
v/c Ratio		0.10		0.72	0.68			0.44			0.53		
Uniform Delay, d1		20.8		23.3	23.2			8.1			8.6		
Progression Factor		1.00		1.00	1.00			1.00			1.00		
Incremental Delay, d2		0.2		11.1	8.3			0.8			1.5		
Delay (s)		21.0		34.4	31.5			8.8			10.2		
Level of Service		C		C	C			A			B		
Approach Delay (s)		21.0			33.0			8.8			10.2		
Approach LOS		C			C			A			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			13.7									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.55										
Actuated Cycle Length (s)			59.4									Sum of lost time (s)	15.0
Intersection Capacity Utilization			80.2%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

Lanes, Volumes, Timings  
 2: Hull Shore Drive & Phipps Street

2032 Future Year Two Way Condition  
 Saturday Afternoon

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	69	95	39	57	229	51
Future Volume (vph)	69	95	39	57	229	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	0		0	75
Storage Lanes		0	0		1	0
Taper Length (ft)			25		25	
Link Speed (mph)	30			30	30	
Link Distance (ft)	223			249	458	
Travel Time (s)	5.1			5.7	10.4	
Confl. Peds. (#/hr)		5	5		5	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh 7.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	69	95	39	57	229	51
Future Vol, veh/h	69	95	39	57	229	51
Conflicting Peds, #/hr	0	5	5	0	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	75	103	42	62	249	55










Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	183
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	1392
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1387
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.1	13.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	711	-	-	1387	-
HCM Lane V/C Ratio	0.428	-	-	0.031	-
HCM Control Delay (s)	13.8	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	2.2	-	-	0.1	-

Lanes, Volumes, Timings  
 3: Hull Shore Drive & Residence Driveway

2032 Future Year Two Way Condition  
 Saturday Afternoon

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	3	4	327	133	1
Future Volume (vph)	1	3	4	327	133	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	230			432	458	
Travel Time (s)	5.2			9.8	10.4	
Confl. Peds. (#/hr)	20	20	20			20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Parking (#/hr)			10	10		
Mid-Block Traffic (%)	50%			0%	0%	
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized



HCM 6th TWSC  
 3: Hull Shore Drive & Residence Driveway

2032 Future Year Two Way Condition  
 Saturday Afternoon

Intersection

Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	3	4	327	133	1
Future Vol, veh/h	1	3	4	327	133	1
Conflicting Peds, #/hr	20	20	20	0	0	20
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	3	4	355	145	1










Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	549	186	166	0	0
Stage 1	166	-	-	-	-
Stage 2	383	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-
Pot Cap-1 Maneuver	497	856	1412	-	-
Stage 1	863	-	-	-	-
Stage 2	689	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	480	830	1390	-	-
Mov Cap-2 Maneuver	480	-	-	-	-
Stage 1	847	-	-	-	-
Stage 2	679	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.2	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1390	-	702	-	-
HCM Lane V/C Ratio	0.003	-	0.006	-	-
HCM Control Delay (s)	7.6	0	10.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Lanes, Volumes, Timings  
 4: Hull Shore Drive & Edgewater Road Extension

2032 Future Year Two Way Condition  
 Saturday Afternoon

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	40	67	97	409	131	57
Future Volume (vph)	40	67	97	409	131	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	321			383	432	
Travel Time (s)	7.3			8.7	9.8	
Confl. Peds. (#/hr)	50	50	50			50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Parking (#/hr)	10	10	10	10		
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 6th TWSC  
4: Hull Shore Drive & Edgewater Road Extension

2032 Future Year Two Way Condition  
Saturday Afternoon

Intersection

Int Delay, s/veh 3.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
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Lane Configurations						
Traffic Vol, veh/h	40	67	97	409	131	57
Future Vol, veh/h	40	67	97	409	131	57
Conflicting Peds, #/hr	50	50	50	0	0	50
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	73	105	445	142	62

Major/Minor	Minor2	Major1	Major2
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Conflicting Flow All	928	273	254	0	-	0
Stage 1	223	-	-	-	-	-
Stage 2	705	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	297	766	1311	-	-	-
Stage 1	814	-	-	-	-	-
Stage 2	490	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	244	709	1261	-	-	-
Mov Cap-2 Maneuver	244	-	-	-	-	-
Stage 1	696	-	-	-	-	-
Stage 2	471	-	-	-	-	-

Approach	EB	NB	SB
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HCM Control Delay, s	17.1	1.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
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Capacity (veh/h)	1261	-	414	-	-
HCM Lane V/C Ratio	0.084	-	0.281	-	-
HCM Control Delay (s)	8.1	0	17.1	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.3	-	1.1	-	-

Lanes, Volumes, Timings  
 5: Hull Shore Drive & The Green North

2032 Future Year Two Way Condition  
 Saturday Afternoon

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	70	511	196	2
Future Volume (vph)	0	0	70	511	196	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	323			392	383	
Travel Time (s)	7.3			8.9	8.7	
Confl. Peds. (#/hr)	50	50	50			50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Parking (#/hr)	10	10	10	10		
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh	0.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	70	511	196	2
Future Vol, veh/h	0	0	70	511	196	2
Conflicting Peds, #/hr	50	50	50	0	0	50
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	76	555	213	2










Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	1021	314	265	0	0
Stage 1	264	-	-	-	-
Stage 2	757	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-
Pot Cap-1 Maneuver	262	726	1299	-	-
Stage 1	780	-	-	-	-
Stage 2	463	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	221	672	1249	-	-
Mov Cap-2 Maneuver	221	-	-	-	-
Stage 1	684	-	-	-	-
Stage 2	445	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1249	-	-	-	-
HCM Lane V/C Ratio	0.061	-	-	-	-
HCM Control Delay (s)	8.1	0	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	-	-

Lanes, Volumes, Timings  
 6: Hull Shore Drive & The Green South

2032 Future Year Two Way Condition  
 Saturday Afternoon

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	53	24	0	524	196	0
Future Volume (vph)	53	24	0	524	196	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	311			363	392	
Travel Time (s)	7.1			8.3	8.9	
Confl. Peds. (#/hr)	50	50	50			50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Parking (#/hr)	10	10	10	10		
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh 1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	53	24	0	524	196	0
Future Vol, veh/h	53	24	0	524	196	0
Conflicting Peds, #/hr	50	50	50	0	0	50
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	26	0	570	213	0

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	833	263	0
Stage 1	213	-	-
Stage 2	620	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	339	776	0
Stage 1	823	-	0
Stage 2	536	-	0
Platoon blocked, %			-
Mov Cap-1 Maneuver	339	746	-
Mov Cap-2 Maneuver	339	-	-
Stage 1	823	-	-
Stage 2	536	-	-










Approach	EB	NB	SB
HCM Control Delay, s	16.1	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT EBLn1	SBT
Capacity (veh/h)	- 408	-
HCM Lane V/C Ratio	- 0.205	-
HCM Control Delay (s)	- 16.1	-
HCM Lane LOS	- C	-
HCM 95th %tile Q(veh)	- 0.8	-



Lanes, Volumes, Timings  
 7: Hull Shore Drive & Water Street

2032 Future Year Two Way Condition  
 Saturday Afternoon

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	76	62	174	374	196	24
Future Volume (vph)	76	62	174	374	196	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	213			1283	363	
Travel Time (s)	4.8			29.2	8.3	
Confl. Peds. (#/hr)	50	50	50			50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Parking (#/hr)	10	10	10	10		
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection











Int Delay, s/veh 7.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	76	62	174	374	196	24
Future Vol, veh/h	76	62	174	374	196	24
Conflicting Peds, #/hr	50	50	50	0	0	50
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	83	67	189	407	213	26

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1111	326	289	0	-	0
Stage 1	276	-	-	-	-	-
Stage 2	835	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	231	715	1273	-	-	-
Stage 1	771	-	-	-	-	-
Stage 2	426	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	171	661	1224	-	-	-
Mov Cap-2 Maneuver	171	-	-	-	-	-
Stage 1	594	-	-	-	-	-
Stage 2	410	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	37.2	2.7	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1224	-	256	-	-
HCM Lane V/C Ratio	0.155	-	0.586	-	-
HCM Control Delay (s)	8.5	0	37.2	-	-
HCM Lane LOS	A	A	E	-	-
HCM 95th %tile Q(veh)	0.5	-	3.4	-	-

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	92	35	472	290	11
Future Volume (vph)	3	92	35	472	290	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	10	11	11	11
Link Speed (mph)	30			30	30	
Link Distance (ft)	216			501	429	
Travel Time (s)	4.9			11.4	9.8	
Confl. Peds. (#/hr)	75	75	75			75
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh 1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
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Lane Configurations						
Traffic Vol, veh/h	3	92	35	472	290	11
Future Vol, veh/h	3	92	35	472	290	11
Conflicting Peds, #/hr	75	75	75	0	0	75
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	100	38	513	315	12

Major/Minor	Minor2	Major1	Major2
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Conflicting Flow All	1060	471	402	0	-	0
Stage 1	396	-	-	-	-	-
Stage 2	664	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	248	593	1157	-	-	-
Stage 1	680	-	-	-	-	-
Stage 2	512	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	213	527	1091	-	-	-
Mov Cap-2 Maneuver	213	-	-	-	-	-
Stage 1	619	-	-	-	-	-
Stage 2	483	-	-	-	-	-

Approach	EB	NB	SB
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HCM Control Delay, s	14	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
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Capacity (veh/h)	1091	-	504	-	-
HCM Lane V/C Ratio	0.035	-	0.205	-	-
HCM Control Delay (s)	8.4	-	14	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.8	-	-

Lanes, Volumes, Timings  
 10: Phipps Street & Samoset Avenue

2032 Future Year Two Way Condition  
 Saturday Afternoon

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	115	107	196	90	57	45
Future Volume (vph)	115	107	196	90	57	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	13	13	13	13	13
Storage Length (ft)	0			0	0	75
Storage Lanes	0			0	1	0
Taper Length (ft)	25				25	
Link Speed (mph)		30	30		30	
Link Distance (ft)		188	223		733	
Travel Time (s)		4.3	5.1		16.7	
Confl. Peds. (#/hr)	20			10	10	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh	4.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Vol, veh/h	115	107	196	90	57	45
Future Vol, veh/h	115	107	196	90	57	45
Conflicting Peds, #/hr	20	0	0	10	10	20
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	116	213	98	62	49

















Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	331	0	-	0	658
Stage 1	-	-	-	-	282
Stage 2	-	-	-	-	376
Critical Hdwy	4.12	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.218	-	-	-	3.518
Pot Cap-1 Maneuver	1228	-	-	-	429
Stage 1	-	-	-	-	766
Stage 2	-	-	-	-	694
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1206	-	-	-	368
Mov Cap-2 Maneuver	-	-	-	-	368
Stage 1	-	-	-	-	669
Stage 2	-	-	-	-	682

Approach	EB	WB	SB
HCM Control Delay, s	4.3	0	15.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1206	-	-	-	468
HCM Lane V/C Ratio	0.104	-	-	-	0.237
HCM Control Delay (s)	8.3	0	-	-	15.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.3	-	-	-	0.9

Lanes, Volumes, Timings  
 11: Nantasket Avenue & Mountford Road/Phipps Street

2032 Future Year Two Way Condition  
 Saturday Afternoon

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	15	116	0	125	10	665	164	58	553	15
Future Volume (vph)	10	0	15	116	0	125	10	665	164	58	553	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	13	13	13	11	11	11	11	11	11
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		409			188			485			891	
Travel Time (s)		9.3			4.3			11.0			20.3	
Confl. Peds. (#/hr)	10		20	20		10	20		20	10		9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized



HCM 6th TWSC  
 11: Nantasket Avenue & Mountford Road/Phipps Street

2032 Future Year Two Way Condition  
 Saturday Afternoon

Intersection												
Int Delay, s/veh	91											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	10	0	15	116	0	125	10	665	164	58	553	15
Future Vol, veh/h	10	0	15	116	0	125	10	665	164	58	553	15
Conflicting Peds, #/hr	10	0	20	20	0	10	20	0	20	10	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	0	16	126	0	136	11	723	178	63	601	16

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1667	1698	649	1617	1617	842	637	0	0	921	0	0
Stage 1	755	755	-	854	854	-	-	-	-	-	-	-
Stage 2	912	943	-	763	763	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	77	92	470	~83	103	364	947	-	-	741	-	-
Stage 1	401	417	-	353	375	-	-	-	-	-	-	-
Stage 2	328	341	-	397	413	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	41	75	456	~68	84	355	933	-	-	728	-	-
Mov Cap-2 Maneuver	41	75	-	~68	84	-	-	-	-	-	-	-
Stage 1	385	357	-	338	359	-	-	-	-	-	-	-
Stage 2	196	326	-	327	353	-	-	-	-	-	-	-










Approach	EB	WB	NB	SB
HCM Control Delay, s	61.4	\$ 644.2	0.1	1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	933	-	-	90	117	728	-	-
HCM Lane V/C Ratio	0.012	-	-	0.302	2.239	0.087	-	-
HCM Control Delay (s)	8.9	0	-	61.4	\$ 644.2	10.4	0	-
HCM Lane LOS	A	A	-	F	F	B	A	-
HCM 95th %tile Q(veh)	0	-	-	1.1	22.5	0.3	-	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Lanes, Volumes, Timings  
 12: Nantasket Avenue & Whitehead Avenue

2032 Future Year Two Way Condition  
 Saturday Afternoon

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	25	0	839	664	20
Future Volume (vph)	0	25	0	839	664	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	477			258	485	
Travel Time (s)	10.8			5.9	11.0	
Confl. Peds. (#/hr)	10	10	10			10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Parking (#/hr)			10	10		
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↘	
Traffic Vol, veh/h	0	25	0	839	664	20
Future Vol, veh/h	0	25	0	839	664	20
Conflicting Peds, #/hr	10	10	10	0	0	10
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	27	0	912	722	22

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	753	-	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	410	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	404	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.6	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 404	-	-
HCM Lane V/C Ratio	- 0.067	-	-
HCM Control Delay (s)	- 14.6	-	-
HCM Lane LOS	- B	-	-
HCM 95th %tile Q(veh)	- 0.2	-	-

Lanes, Volumes, Timings

2032 Future Year Two Way Condition

13: Nantasket Avenue & Edgewater Road/Edgewater Road Extension

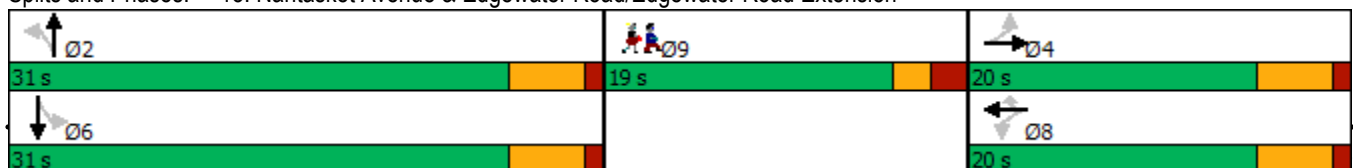
Saturday Afternoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	6	26	70	0	85	46	736	53	71	591	24
Future Volume (vph)	18	6	26	70	0	85	46	736	53	71	591	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	10	11	11	10	11	11
Storage Length (ft)	0		0	0		50	150		0	100		0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30				30
Link Distance (ft)		526			321			377				258
Travel Time (s)		12.0			7.3			8.6				5.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Parking (#/hr)				10	10	10	10	10	10	10	10	10
Mid-Block Traffic (%)		0%			50%			0%			0%	
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0	11.0	15.0	15.0		15.0	15.0	
Total Split (s)	20.0	20.0		20.0	20.0	20.0	31.0	31.0		31.0	31.0	
Total Split (%)	28.6%	28.6%		28.6%	28.6%	28.6%	44.3%	44.3%		44.3%	44.3%	
Maximum Green (s)	15.0	15.0		15.0	15.0	15.0	26.0	26.0		26.0	26.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Min	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other  
 Cycle Length: 70  
 Actuated Cycle Length: 49.6  
 Natural Cycle: 90  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 13: Nantasket Avenue & Edgewater Road/Edgewater Road Extension



Lane Group Ø9

Lane Configurations  
 Traffic Volume (vph)  
 Future Volume (vph)  
 Ideal Flow (vphpl)  
 Lane Width (ft)  
 Storage Length (ft)  
 Storage Lanes  
 Taper Length (ft)  
 Right Turn on Red  
 Link Speed (mph)  
 Link Distance (ft)  
 Travel Time (s)  
 Peak Hour Factor  
 Parking (#/hr)  
 Mid-Block Traffic (%)  
 Shared Lane Traffic (%)  
 Turn Type  
 Protected Phases 9  
 Permitted Phases  
 Detector Phase  
 Switch Phase  
 Minimum Initial (s) 7.0  
 Minimum Split (s) 19.0  
 Total Split (s) 19.0  
 Total Split (%) 27%  
 Maximum Green (s) 15.0  
 Yellow Time (s) 2.0  
 All-Red Time (s) 2.0  
 Lost Time Adjust (s)  
 Total Lost Time (s)  
 Lead/Lag  
 Lead-Lag Optimize?  
 Vehicle Extension (s) 3.0  
 Recall Mode None  
 Walk Time (s) 7.0  
 Flash Dont Walk (s) 8.0  
 Pedestrian Calls (#/hr) 20








Intersection Summary

Queues

13: Nantasket Avenue & Edgewater Road/Edgewater Road Extension

2032 Future Year Two Way Condition

Saturday Afternoon

							
Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	55	76	92	50	858	77	668
v/c Ratio	0.21	0.42	0.31	0.18	0.88	0.50	0.69
Control Delay	14.4	26.9	8.7	11.8	28.2	30.0	17.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.4	26.9	8.7	11.8	28.2	30.0	17.6
Queue Length 50th (ft)	6	17	0	4	154	9	93
Queue Length 95th (ft)	37	65	33	43	#731	#106	#540
Internal Link Dist (ft)	446	241			297		178
Turn Bay Length (ft)			50	150		100	
Base Capacity (vph)	461	343	469	279	973	155	975
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.22	0.20	0.18	0.88	0.50	0.69

Intersection Summary




















# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

2032 Future Year Two Way Condition

13: Nantasket Avenue & Edgewater Road/Edgewater Road Extension










Saturday Afternoon

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	18	6	26	70	0	85	46	736	53	71	591	24	
Future Volume (vph)	18	6	26	70	0	85	46	736	53	71	591	24	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	11	11	11	11	11	11	10	11	11	10	11	11	
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0		
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00		
Frt		0.93			1.00	0.85	1.00	0.99		1.00	0.99		
Flt Protected		0.98			0.95	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)		1647			1454	1301	1404	1515		1404	1522		
Flt Permitted		0.85			0.72	1.00	0.30	1.00		0.16	1.00		
Satd. Flow (perm)		1423			1104	1301	437	1515		243	1522		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	20	7	28	76	0	92	50	800	58	77	642	26	
RTOR Reduction (vph)	0	24	0	0	0	80	0	3	0	0	1	0	
Lane Group Flow (vph)	0	31	0	0	76	12	50	855	0	77	667	0	
Parking (#/hr)				10	10	10	10	10	10	10	10	10	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA		
Protected Phases		4			8			2			6		
Permitted Phases	4			8		8	2			6			
Actuated Green, G (s)		6.9			6.9	6.9	30.7	30.7		30.7	30.7		
Effective Green, g (s)		6.9			6.9	6.9	30.7	30.7		30.7	30.7		
Actuated g/C Ratio		0.13			0.13	0.13	0.57	0.57		0.57	0.57		
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0		
Vehicle Extension (s)		2.0			2.0	2.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)		182			141	166	249	864		138	868		
v/s Ratio Prot								c0.56				0.44	
v/s Ratio Perm		0.02			c0.07	0.01	0.11			0.32			
v/c Ratio		0.17			0.54	0.07	0.20	0.99		0.56	0.77		
Uniform Delay, d1		20.9			22.0	20.6	5.6	11.4		7.3	8.8		
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2		0.2			2.0	0.1	0.4	28.1		4.8	4.1		
Delay (s)		21.1			23.9	20.7	6.0	39.5		12.1	13.0		
Level of Service		C			C	C	A	D		B	B		
Approach Delay (s)		21.1			22.2			37.6			12.9		
Approach LOS		C			C			D			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			25.9									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.86										
Actuated Cycle Length (s)			53.8									Sum of lost time (s)	14.0
Intersection Capacity Utilization			72.4%									ICU Level of Service	C
Analysis Period (min)			15										
c Critical Lane Group													



Lanes, Volumes, Timings  
 14: Nantasket Avenue & The Green North

2032 Future Year Two Way Condition  
 Saturday Afternoon

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	27	46	790	0	0	685
Future Volume (vph)	27	46	790	0	0	685
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30		30			30
Link Distance (ft)	323		386			377
Travel Time (s)	7.3		8.8			8.6
Confl. Peds. (#/hr)	20	20		20	20	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Parking (#/hr)	10	10	10	10	10	10
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh	1.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑			↑
Traffic Vol, veh/h	27	46	790	0	0	685
Future Vol, veh/h	27	46	790	0	0	685
Conflicting Peds, #/hr	20	20	0	20	20	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	50	859	0	0	745











Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1624	879	0	-	-
Stage 1	859	-	-	-	-
Stage 2	765	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	-
Pot Cap-1 Maneuver	113	347	-	0	0
Stage 1	415	-	-	0	0
Stage 2	459	-	-	0	0
Platoon blocked, %			-		
Mov Cap-1 Maneuver	111	342	-	-	-
Mov Cap-2 Maneuver	111	-	-	-	-
Stage 1	415	-	-	-	-
Stage 2	452	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	36.1	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	- 193	-
HCM Lane V/C Ratio	- 0.411	-
HCM Control Delay (s)	- 36.1	-
HCM Lane LOS	- E	-
HCM 95th %tile Q(veh)	- 1.9	-

Lanes, Volumes, Timings  
 15: Nantasket Avenue & The Green South

2032 Future Year Two Way Condition  
 Saturday Afternoon

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	792	53	28	685
Future Volume (vph)	0	0	792	53	28	685
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	50	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Link Speed (mph)	30		30			30
Link Distance (ft)	311		375			386
Travel Time (s)	7.1		8.5			8.8
Confl. Peds. (#/hr)	20	20		20	20	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Parking (#/hr)	10	10	10	10	10	10
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	792	53	28	685
Future Vol, veh/h	0	0	792	53	28	685
Conflicting Peds, #/hr	20	20	0	20	20	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	861	58	30	745

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1735	930	0	0	939
Stage 1	910	-	-	-	-
Stage 2	825	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	96	324	-	-	730
Stage 1	393	-	-	-	-
Stage 2	430	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	89	314	-	-	719
Mov Cap-2 Maneuver	89	-	-	-	-
Stage 1	387	-	-	-	-
Stage 2	405	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	719
HCM Lane V/C Ratio	-	-	-	0.042
HCM Control Delay (s)	-	-	0	10.2
HCM Lane LOS	-	-	A	B
HCM 95th %tile Q(veh)	-	-	-	0.1

Lanes, Volumes, Timings  
 16: Nantasket Avenue & Bay Street/Water Street

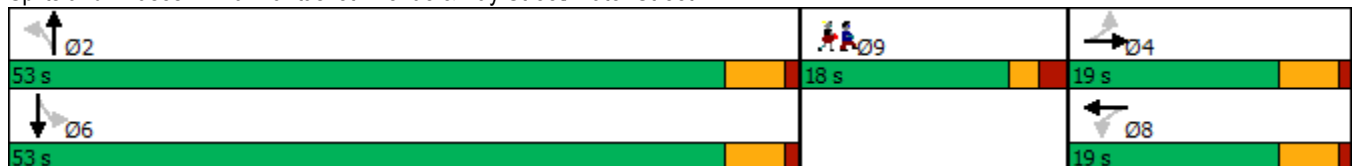
2032 Future Year Two Way Condition  
 Saturday Afternoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	58	40	91	24	92	39	839	19	74	552	51
Future Volume (vph)	0	58	40	91	24	92	39	839	19	74	552	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	11	11	11	11	11	11
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		339			213			1319			375	
Travel Time (s)		7.7			4.8			30.0			8.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Parking (#/hr)				10	10	10				10	10	10
Shared Lane Traffic (%)												
Turn Type		NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		15.0	15.0		15.0	15.0	
Total Split (s)	19.0	19.0		19.0	19.0		53.0	53.0		53.0	53.0	
Total Split (%)	21.1%	21.1%		21.1%	21.1%		58.9%	58.9%		58.9%	58.9%	
Maximum Green (s)	14.0	14.0		14.0	14.0		48.0	48.0		48.0	48.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 79.7  
 Natural Cycle: 120  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 16: Nantasket Avenue & Bay Street/Water Street



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Lane Group	Ø9
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Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Parking (#/hr)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	18.0
Total Split (s)	18.0
Total Split (%)	20%
Maximum Green (s)	14.0
Yellow Time (s)	2.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	7.0
Pedestrian Calls (#/hr)	20
<hr/>	
Intersection Summary	
<hr/>	

Queues  
 16: Nantasket Avenue & Bay Street/Water Street

2032 Future Year Two Way Condition  
 Saturday Afternoon

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	106	225	975	735
v/c Ratio	0.31	0.92	0.93	0.95
Control Delay	25.4	71.5	33.3	41.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	25.4	71.5	33.3	41.9
Queue Length 50th (ft)	28	81	284	221
Queue Length 95th (ft)	86	#262	#861	#698
Internal Link Dist (ft)	259	133	1239	295
Turn Bay Length (ft)				
Base Capacity (vph)	339	245	1050	771
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.31	0.92	0.93	0.95

















Intersection Summary










# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



HCM Signalized Intersection Capacity Analysis  
 16: Nantasket Avenue & Bay Street/Water Street

2032 Future Year Two Way Condition  
 Saturday Afternoon

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	0	58	40	91	24	92	39	839	19	74	552	51	
Future Volume (vph)	0	58	40	91	24	92	39	839	19	74	552	51	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11	
Total Lost time (s)		5.0			5.0			5.0			5.0		
Lane Util. Factor		1.00			1.00			1.00			1.00		
Frt		0.95			0.94			1.00			0.99		
Flt Protected		1.00			0.98			1.00			0.99		
Satd. Flow (prot)		1761			1456			1792			1507		
Flt Permitted		1.00			0.81			0.95			0.82		
Satd. Flow (perm)		1761			1203			1705			1248		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	63	43	99	26	100	42	912	21	80	600	55	
RTOR Reduction (vph)	0	26	0	0	31	0	0	1	0	0	3	0	
Lane Group Flow (vph)	0	80	0	0	194	0	0	974	0	0	732	0	
Parking (#/hr)				10	10	10				10	10	10	
Turn Type		NA		Perm	NA		Perm	NA		Perm	NA		
Protected Phases		4			8			2			6		
Permitted Phases	4			8			2			6			
Actuated Green, G (s)		14.2			14.2			49.0			49.0		
Effective Green, g (s)		14.2			14.2			49.0			49.0		
Actuated g/C Ratio		0.17			0.17			0.60			0.60		
Clearance Time (s)		5.0			5.0			5.0			5.0		
Vehicle Extension (s)		2.0			2.0			3.0			3.0		
Lane Grp Cap (vph)		304			207			1016			743		
v/s Ratio Prot		0.05											
v/s Ratio Perm					c0.16			0.57			c0.59		
v/c Ratio		0.26			0.94			0.96			0.99		
Uniform Delay, d1		29.5			33.5			15.6			16.3		
Progression Factor		1.00			1.00			1.00			1.00		
Incremental Delay, d2		0.2			43.8			18.8			29.1		
Delay (s)		29.6			77.3			34.5			45.4		
Level of Service		C			E			C			D		
Approach Delay (s)		29.6			77.3			34.5			45.4		
Approach LOS		C			E			C			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			42.9									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.90										
Actuated Cycle Length (s)			82.2									Sum of lost time (s)	14.0
Intersection Capacity Utilization			88.0%									ICU Level of Service	E
Analysis Period (min)			15										
c Critical Lane Group													

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	85	85	897	673	30
Future Volume (vph)	0	85	85	897	673	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	11	11	11	11
Storage Length (ft)	0	0	0			0
Storage Lanes	0	1	0			0
Taper Length (ft)	25		25			
Link Speed (mph)	30			30	30	
Link Distance (ft)	740			422	1319	
Travel Time (s)	16.8			9.6	30.0	
Confl. Peds. (#/hr)	10	10	10			10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)		10%				
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

HCM 6th TWSC  
 17: George Washington Boulevard/Nantasket Avenue & Bay Street

2032 Future Year Two Way Condition  
 Saturday Afternoon

Intersection

Int Delay, s/veh 1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↖	↗	↖
Traffic Vol, veh/h	0	85	85	897	673	30
Future Vol, veh/h	0	85	85	897	673	30
Conflicting Peds, #/hr	10	10	10	0	0	10
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	92	92	975	732	33

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	-	769	775
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.22	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.318	2.218
Pot Cap-1 Maneuver	0	401	841
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	394	832
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.9	0.9	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	832	-	394	-	-
HCM Lane V/C Ratio	0.111	-	0.234	-	-
HCM Control Delay (s)	9.9	0	16.9	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.4	-	0.9	-	-

Lanes, Volumes, Timings

2032 Future Year Two Way Condition

18: Nantasket Avenue & Wharf Avenue/DCR Lot 2 Enter

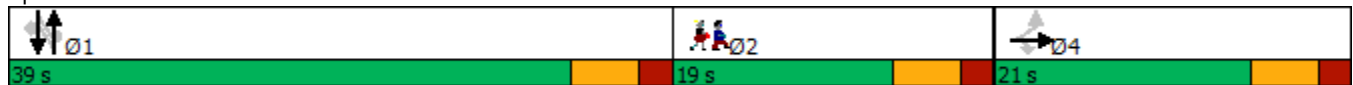
Saturday Afternoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	89	10	107	0	0	0	115	408	15	10	313	84
Future Volume (vph)	89	10	107	0	0	0	115	408	15	10	313	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	15	15	15	10	10	10
Right Turn on Red			No			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		222			207			361			195	
Travel Time (s)		5.0			4.7			8.2			4.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm				Perm	NA		Perm	NA	Perm
Protected Phases		4						1			1	
Permitted Phases	4		4				1			1		1
Detector Phase	4	4	4				1	1		1	1	1
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0				33.0	33.0		33.0	33.0	33.0
Minimum Split (s)	21.0	21.0	21.0				39.0	39.0		39.0	39.0	39.0
Total Split (s)	21.0	21.0	21.0				39.0	39.0		39.0	39.0	39.0
Total Split (%)	26.6%	26.6%	26.6%				49.4%	49.4%		49.4%	49.4%	49.4%
Maximum Green (s)	15.0	15.0	15.0				33.0	33.0		33.0	33.0	33.0
Yellow Time (s)	4.0	4.0	4.0				4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0				2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	0.0
Total Lost Time (s)		6.0	6.0					6.0			6.0	6.0
Lead/Lag							Lead	Lead		Lead	Lead	Lead
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None				Max	Max		Max	Max	Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other  
 Cycle Length: 79  
 Actuated Cycle Length: 66.1  
 Natural Cycle: 80  
 Control Type: Semi Act-Uncoord

Splits and Phases: 18: Nantasket Avenue & Wharf Avenue/DCR Lot 2 Enter



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Lane Group	Ø2
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Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	19.0
Total Split (s)	19.0
Total Split (%)	24%
Maximum Green (s)	13.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	6.0
Pedestrian Calls (#/hr)	40
<hr/>	
Intersection Summary	
<hr/>	

## Queues

2032 Future Year Two Way Condition

18: Nantasket Avenue &amp; Wharf Avenue/DCR Lot 2 Enter

Saturday Afternoon

	→	↘	↑	↓	↙
Lane Group	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	108	116	584	351	91
v/c Ratio	0.38	0.46	0.61	0.37	0.10
Control Delay	29.8	32.5	17.7	12.9	1.8
Queue Delay	0.1	0.1	0.0	0.0	0.0
Total Delay	30.0	32.6	17.7	12.9	1.8
Queue Length 50th (ft)	31	34	103	51	0
Queue Length 95th (ft)	91	99	#428	198	15
Internal Link Dist (ft)	142		281	115	
Turn Bay Length (ft)					
Base Capacity (vph)	415	368	953	949	878
Starvation Cap Reductn	44	21	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.29	0.33	0.61	0.37	0.10

## Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
 18: Nantasket Avenue & Wharf Avenue/DCR Lot 2 Enter











2032 Future Year Two Way Condition  
 Saturday Afternoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	89	10	107	0	0	0	115	408	15	10	313	84	
Future Volume (vph)	89	10	107	0	0	0	115	408	15	10	313	84	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	12	12	12	12	12	12	15	15	15	10	10	10	
Total Lost time (s)		6.0	6.0					6.0			6.0	6.0	
Lane Util. Factor		1.00	1.00					1.00			1.00	1.00	
Frt		1.00	0.85					1.00			1.00	0.85	
Flt Protected		0.96	1.00					0.99			1.00	1.00	
Satd. Flow (prot)		1783	1583					2020			1736	1478	
Flt Permitted		0.96	1.00					0.84			0.98	1.00	
Satd. Flow (perm)		1783	1583					1708			1704	1478	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	97	11	116	0	0	0	125	443	16	11	340	91	
RTOR Reduction (vph)	0	0	0	0	0	0	0	1	0	0	0	43	
Lane Group Flow (vph)	0	108	116	0	0	0	0	583	0	0	351	48	
Turn Type	Perm	NA	Perm					Perm	NA		Perm	NA	
Protected Phases		4						1			1		
Permitted Phases	4		4				1			1		1	
Actuated Green, G (s)		10.5	10.5					36.9			36.9	36.9	
Effective Green, g (s)		10.5	10.5					36.9			36.9	36.9	
Actuated g/C Ratio		0.15	0.15					0.53			0.53	0.53	
Clearance Time (s)		6.0	6.0					6.0			6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0			3.0	3.0	
Lane Grp Cap (vph)		268	238					902			900	781	
v/s Ratio Prot													
v/s Ratio Perm		0.06	c0.07					c0.34			0.21	0.03	
v/c Ratio		0.40	0.49					0.65			0.39	0.06	
Uniform Delay, d1		26.8	27.2					11.8			9.8	8.0	
Progression Factor		1.00	1.00					1.00			1.00	1.00	
Incremental Delay, d2		1.0	1.6					3.6			1.3	0.2	
Delay (s)		27.8	28.8					15.3			11.0	8.2	
Level of Service		C	C					B			B	A	
Approach Delay (s)		28.3			0.0			15.3			10.4		
Approach LOS		C			A			B			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			15.9									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.56										
Actuated Cycle Length (s)			69.8									Sum of lost time (s)	18.0
Intersection Capacity Utilization			76.7%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													



Lanes, Volumes, Timings  
 20: George Washington Boulevard & Nantasket Ave Connector

2032 Future Year Two Way Condition  
 Saturday Afternoon

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	11	35	947	38	57	701
Future Volume (vph)	11	35	947	38	57	701
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30		30			30
Link Distance (ft)	216		699			422
Travel Time (s)	4.9		15.9			9.6
Confl. Peds. (#/hr)	20	10		20	10	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

Intersection

Int Delay, s/veh	1.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	35	947	38	57	701
Future Vol, veh/h	11	35	947	38	57	701
Conflicting Peds, #/hr	20	10	0	20	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	38	1029	41	62	762

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1955	1059	0	0	1090
Stage 1	1049	-	-	-	-
Stage 2	906	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	70	273	-	-	640
Stage 1	337	-	-	-	-
Stage 2	394	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	56	267	-	-	630
Mov Cap-2 Maneuver	56	-	-	-	-
Stage 1	332	-	-	-	-
Stage 2	322	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	44.4	0	0.9
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	140	630
HCM Lane V/C Ratio	-	-	0.357	0.098
HCM Control Delay (s)	-	-	44.4	11.3
HCM Lane LOS	-	-	E	B
HCM 95th %tile Q(veh)	-	-	1.5	0.3

Lanes, Volumes, Timings  
 21: George Washington Boulevard & Wharf Avenue

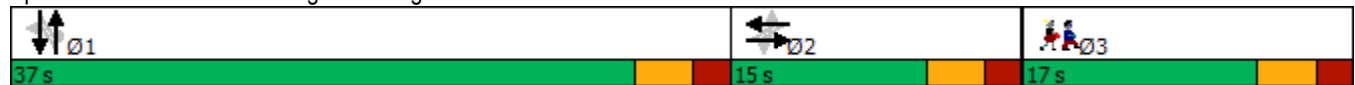
2032 Future Year Two Way Condition  
 Saturday Afternoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	10	25	119	10	70	30	900	119	77	615	20
Future Volume (vph)	15	10	25	119	10	70	30	900	119	77	615	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	12	12	12	11	11	11	11	11	11
Right Turn on Red			Yes			No			Yes			Yes
Link Speed (mph)		30			30			40				40
Link Distance (ft)		219			222			784				699
Travel Time (s)		5.0			5.0			13.4				11.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)				13%								
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			1				1
Permitted Phases	2			2			1			1		
Detector Phase	2	2		2	2		1	1		1		1
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		32.0	32.0		32.0		32.0
Minimum Split (s)	15.0	15.0		15.0	15.0		37.0	37.0		37.0		37.0
Total Split (s)	15.0	15.0		15.0	15.0		37.0	37.0		37.0		37.0
Total Split (%)	21.7%	21.7%		21.7%	21.7%		53.6%	53.6%		53.6%		53.6%
Maximum Green (s)	10.0	10.0		10.0	10.0		32.0	32.0		32.0		32.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0		3.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)		0.0		0.0	0.0			0.0				0.0
Total Lost Time (s)		5.0		5.0	5.0			5.0				5.0
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lead		Lead		Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0		3.0
Recall Mode	Min	Min		Min	Min		Max	Max		Max		Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												

Intersection Summary

Area Type: Other  
 Cycle Length: 69  
 Actuated Cycle Length: 58.8  
 Natural Cycle: 70  
 Control Type: Semi Act-Uncoord

Splits and Phases: 21: George Washington Boulevard & Wharf Avenue



---

Lane Group	Ø3
<hr/>	
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	6.0
Minimum Split (s)	17.0
Total Split (s)	17.0
Total Split (%)	25%
Maximum Green (s)	12.0
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	6.0
Flash Dont Walk (s)	6.0
Pedestrian Calls (#/hr)	35
<hr/>	
Intersection Summary	
<hr/>	

Queues  
 21: George Washington Boulevard & Wharf Avenue

2032 Future Year Two Way Condition  
 Saturday Afternoon


















	→	↙	←	↑	↓
Lane Group	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	54	112	104	1140	774
v/c Ratio	0.17	0.51	0.40	0.66	0.59
Control Delay	16.9	35.0	29.8	13.3	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	16.9	35.0	29.8	13.3	12.9
Queue Length 50th (ft)	7	32	29	89	58
Queue Length 95th (ft)	39	#115	91	278	193
Internal Link Dist (ft)	139		142	704	619
Turn Bay Length (ft)					
Base Capacity (vph)	325	221	257	1722	1316
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.17	0.51	0.40	0.66	0.59

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
 21: George Washington Boulevard & Wharf Avenue

2032 Future Year Two Way Condition  
 Saturday Afternoon

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	15	10	25	119	10	70	30	900	119	77	615	20	
Future Volume (vph)	15	10	25	119	10	70	30	900	119	77	615	20	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	16	16	16	12	12	12	11	11	11	11	11	11	
Total Lost time (s)		5.0		5.0	5.0			5.0			5.0		
Lane Util. Factor		1.00		0.95	0.95			0.95			0.95		
Frt		0.93		1.00	0.89			0.98			1.00		
Flt Protected		0.99		0.95	0.99			1.00			0.99		
Satd. Flow (prot)		1940		1681	1563			3358			3388		
Flt Permitted		0.89		0.72	0.94			0.92			0.69		
Satd. Flow (perm)		1748		1277	1486			3083			2367		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	16	11	27	129	11	76	33	978	129	84	668	22	
RTOR Reduction (vph)	0	23	0	0	0	0	0	13	0	0	3	0	
Lane Group Flow (vph)	0	31	0	112	104	0	0	1127	0	0	771	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA		
Protected Phases		2			2			1			1		
Permitted Phases	2			2			1			1			
Actuated Green, G (s)		10.2		10.2	10.2			32.6			32.6		
Effective Green, g (s)		10.2		10.2	10.2			32.6			32.6		
Actuated g/C Ratio		0.16		0.16	0.16			0.53			0.53		
Clearance Time (s)		5.0		5.0	5.0			5.0			5.0		
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0		
Lane Grp Cap (vph)		288		210	244			1623			1246		
v/s Ratio Prot													
v/s Ratio Perm		0.02		0.09	0.07			0.37			0.33		
v/c Ratio		0.11		0.53	0.43			0.69			0.62		
Uniform Delay, d1		22.0		23.7	23.2			10.9			10.3		
Progression Factor		1.00		1.00	1.00			1.00			1.00		
Incremental Delay, d2		0.2		2.6	1.2			2.5			2.3		
Delay (s)		22.2		26.3	24.4			13.4			12.6		
Level of Service		C		C	C			B			B		
Approach Delay (s)		22.2			25.4			13.4			12.6		
Approach LOS		C			C			B			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			14.5									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.60										
Actuated Cycle Length (s)			61.9									Sum of lost time (s)	15.0
Intersection Capacity Utilization			79.4%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

## **Appendix J**

Queue Diagrams





Figure J1

Queue Diagram  
2022 Base Year  
Weekday Evening Peak Hour

Legend:

- = 50th Percentile Queue
- = 95th Percentile Queue



TEC, Inc.  
282 Merrimack Street  
Lawrence, MA 01843  
978-794-1792  
www.TheEngineeringCorp.com



North  
1" = 100'



Figure J2

Queue Diagrams  
2022 Base Year  
Saturday Afternoon Peak Hour

Legend:

- = 50th Percentile Queue
- = 95th Percentile Queue



TEC, Inc.  
282 Merrimack Street  
Lawrence, MA 01843  
978-794-1792  
www.TheEngineeringCorp.com



North  
1" = 100'



Figure J3

Queue Diagrams  
2030 Future Year One-Way Roadways  
Weekday Evening Peak Hour



TEC, Inc.  
282 Merrimack Street  
Lawrence, MA 01843  
978-794-1792

www.TheEngineeringCorp.com

Legend:

- = 50th Percentile Queue
- = 95th Percentile Queue





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TEC, Inc.  
282 Merrimack Street  
Lawrence, MA 01843  
978-794-1792

www.TheEngineeringCorp.com

Legend:

- = 50th Percentile Queue
- = 95th Percentile Queue

Figure J4

Queue Diagrams  
2030 Future Year One-Way Roadways  
Saturday Afternoon Peak Hour



North ↑  
1" = 100'



Figure J5

Queue Diagrams  
2030 Future Year Two-Way Roadways  
Weekday Evening Peak Hour

Legend:

- = 50th Percentile Queue
- = 95th Percentile Queue
- = Road Build Condition



TEC, Inc.  
282 Merrimack Street  
Lawrence, MA 01843  
978-794-1792  
www.TheEngineeringCorp.com



North  
1" = 100'



Figure J6

Queue Diagrams  
2030 Future Year Two-Way Roadways  
Saturday Afternoon Peak Hour

Legend:

- = 50th Percentile Queue
- = 95th Percentile Queue
- = Road Build Condition



TEC, Inc.  
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Lawrence, MA 01843  
978-794-1792  
www.TheEngineeringCorp.com

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## **Appendix K**

### Clearance Interval Calculations





## CLEARANCE INTERVAL CALCULATIONS

282 MERRIMACK STREET, 2ND FLOOR, LAWRENCE, MA 01843  
 169 OCEAN BOULEVARD, UNIT 101, HAMPTON, NH 03842  
 TEL 978.794.1792 | THEENGINEERINGCORP.COM

JOB: <u>Nantasket Beach Two-Way Conversion</u>	JOB NUMBER: <u>T0597.03</u>
LOCATION: <u>Hull, MA</u>	DATE: <u>8/10/2022</u>
TITLE: <u>Nantasket Avenue at Water Street</u>	SHEET: <u>1</u> OF <u>2</u>
CALCULATED BY: <u>SWG</u>	CHECKED BY: <u>SWG</u>

Assumptions:  $t = 1$  sec (driver reaction time)  
 $g = 32.2$  ft/s<sup>2</sup> (acceleration due to gravity)  
 $a = 10.0$  ft/s<sup>2</sup> (deceleration rate of vehicles)  
 $L = 20$  ft (Length of a standard vehicle)

Definition of Input Values:  $S_{85}$  = (85<sup>th</sup> Percentile Speed of Roadway, mph)  
 $G$  = (Grade of approach, %)  
 $W$  = (distance from the departure STOP line to the far side of the farthest conflicting traffic lane, ft)  
 $P$  = (distance from the departure STOP line to the near side of the farthest conflicting crosswalk, ft)

<u>Approach</u>	<u>Input Values</u>	<u>Calculated Values</u>		
		Yellow Clearance (sec)	All Red Clearance (sec)	
			<small>CW &lt; 40 ft from farthest conflict</small>	<small>CW ≥ 40 ft from farthest conflict</small>
<b>Bay Street EB</b>	$S_{85} = 37$ mph $G = 0$ % $w = 70$ ft $P =$ ft	<b>3.7</b>	<b>1.0</b>	

<u>Approach</u>	<u>Input Values</u>	<u>Calculated Values</u>		
		Yellow Clearance (sec)	All Red Clearance (sec)	
			<small>CW &lt; 40 ft from farthest conflict</small>	<small>CW ≥ 40 ft from farthest conflict</small>
<b>Water Street WB</b>	$S_{85} = 37$ mph $G = 0$ % $w = 60$ ft $P =$ ft	<b>3.7</b>	<b>1.0</b>	

<u>Approach</u>	<u>Input Values</u>	<u>Calculated Values</u>		
		Yellow Clearance (sec)	All Red Clearance (sec)	
			<small>CW &lt; 40 ft from farthest conflict</small>	<small>CW ≥ 40 ft from farthest conflict</small>
<b>Nantasket Ave NB</b>	$S_{85} = 37$ mph $G = 0$ % $w = 55$ ft $P =$ ft	<b>3.7</b>	<b>1.0</b>	

<u>Approach</u>	<u>Input Values</u>	<u>Calculated Values</u>		
		Yellow Clearance (sec)	All Red Clearance (sec)	
			<small>CW &lt; 40 ft from farthest conflict</small>	<small>CW ≥ 40 ft from farthest conflict</small>
<b>Nantasket Ave SB</b>	$S_{85} = 37$ mph $G = 0$ % $w = 60$ ft $P =$ ft	<b>3.7</b>	<b>1.0</b>	

\*Updated based on MassDOT guidelines (January 8, 2013)



## CLEARANCE INTERVAL CALCULATIONS

282 MERRIMACK STREET, 2ND FLOOR, LAWRENCE, MA 01843  
 169 OCEAN BOULEVARD, UNIT 101, HAMPTON, NH 03842  
 TEL 978.794.1792 | THEENGINEERINGCORP.COM

JOB: <u>Nantasket Beach Two-Way Conversion</u>	JOB NUMBER: <u>T0597.03</u>
LOCATION: <u>Hull, MA</u>	DATE: <u>8/10/2022</u>
TITLE: <u>Nantasket Avenue at Edgewater Road</u>	SHEET: <u>2</u> OF <u>2</u>
CALCULATED BY: <u>SWG</u>	CHECKED BY: <u>SWG</u>

Assumptions:  $t = 1$  sec (driver reaction time)  
 $g = 32.2$  ft/s<sup>2</sup> (acceleration due to gravity)  
 $a = 10.0$  ft/s<sup>2</sup> (deceleration rate of vehicles)  
 $L = 20$  ft (Length of a standard vehicle)

Definition of Input Values:  $S_{85}$  = (85<sup>th</sup> Percentile Speed of Roadway, mph)  
 $G$  = (Grade of approach, %)  
 $W$  = (distance from the departure STOP line to the far side of the farthest conflicting traffic lane, ft)  
 $P$  = (distance from the departure STOP line to the near side of the farthest conflicting crosswalk, ft)

<u>Approach</u>	<u>Input Values</u>	<u>Calculated Values</u>		
		Yellow Clearance (sec)	All Red Clearance (sec)	
			<small>CW &lt; 40 ft from farthest conflict</small>	<small>CW ≥ 40 ft from farthest conflict</small>
Edgewater Rd EB	$S_{85} = 37$ mph $G = 0$ % $w = 65$ ft $P =$ ft	<b>3.7</b>	<b>1.0</b>	

<u>Approach</u>	<u>Input Values</u>	<u>Calculated Values</u>		
		Yellow Clearance (sec)	All Red Clearance (sec)	
			<small>CW &lt; 40 ft from farthest conflict</small>	<small>CW ≥ 40 ft from farthest conflict</small>
Edgewater Rd WB	$S_{85} = 37$ mph $G = 0$ % $w = 75$ ft $P =$ ft	<b>3.7</b>	<b>1.0</b>	

<u>Approach</u>	<u>Input Values</u>	<u>Calculated Values</u>		
		Yellow Clearance (sec)	All Red Clearance (sec)	
			<small>CW &lt; 40 ft from farthest conflict</small>	<small>CW ≥ 40 ft from farthest conflict</small>
Nantasket Ave NB	$S_{85} = 37$ mph $G = 0$ % $w = 75$ ft $P =$ ft	<b>3.7</b>	<b>1.0</b>	

<u>Approach</u>	<u>Input Values</u>	<u>Calculated Values</u>		
		Yellow Clearance (sec)	All Red Clearance (sec)	
			<small>CW &lt; 40 ft from farthest conflict</small>	<small>CW ≥ 40 ft from farthest conflict</small>
Nantasket Ave SB	$S_{85} = 37$ mph $G = 0$ % $w = 80$ ft $P =$ ft	<b>3.7</b>	<b>1.0</b>	

\*Updated based on MassDOT guidelines (January 8, 2013)

Lanes, Volumes, Timings

9: Nantasket Avenue/Hull Shore Drive & Nantasket Ave Connector

08/29/2022



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	4	64	24	295	349	20
Future Volume (vph)	4	64	24	295	349	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	10	11	11	11
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.872				0.993	
Flt Protected	0.997		0.950			
Satd. Flow (prot)	1565	0	1652	1801	1788	0
Flt Permitted	0.997		0.950			
Satd. Flow (perm)	1565	0	1652	1801	1788	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	216			501	429	
Travel Time (s)	4.9			11.4	9.8	
Confl. Peds. (#/hr)	75	75	75			75
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	70	26	321	379	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	74	0	26	321	401	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	11			21	21	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.09	1.04	1.04	1.04
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	39.6%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑	↑	
Traffic Vol, veh/h	4	64	24	295	349	20
Future Vol, veh/h	4	64	24	295	349	20
Conflicting Peds, #/hr	75	75	75	0	0	75
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	70	26	321	379	22

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	913	540	476	0	-	0
Stage 1	465	-	-	-	-	-
Stage 2	448	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	304	542	1086	-	-	-
Stage 1	632	-	-	-	-	-
Stage 2	644	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	264	482	1024	-	-	-
Mov Cap-2 Maneuver	264	-	-	-	-	-
Stage 1	581	-	-	-	-	-
Stage 2	607	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.3	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1024	-	460	-	-
HCM Lane V/C Ratio	0.025	-	0.161	-	-
HCM Control Delay (s)	8.6	-	14.3	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	-	-

Lanes, Volumes, Timings

9: Nantasket Avenue/Hull Shore Drive & Nantasket Ave Connector

08/29/2022



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	4	97	22	312	289	13
Future Volume (vph)	4	97	22	312	289	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	10	11	11	11
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.870				0.994	
Flt Protected	0.998		0.950			
Satd. Flow (prot)	1563	0	1652	1801	1790	0
Flt Permitted	0.998		0.950			
Satd. Flow (perm)	1563	0	1652	1801	1790	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	216			501	429	
Travel Time (s)	4.9			11.4	9.8	
Confl. Peds. (#/hr)	75	75	75			75
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	105	24	339	314	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	109	0	24	339	328	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	11			21	21	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.09	1.04	1.04	1.04
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	38.1%
Analysis Period (min)	15
	ICU Level of Service A

Intersection						
Int Delay, s/veh	2.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↑	↑	
Traffic Vol, veh/h	4	97	22	312	289	13
Future Vol, veh/h	4	97	22	312	289	13
Conflicting Peds, #/hr	75	75	75	0	0	75
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	105	24	339	314	14

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	858	471	403	0	-	0
Stage 1	396	-	-	-	-	-
Stage 2	462	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	327	593	1156	-	-	-
Stage 1	680	-	-	-	-	-
Stage 2	634	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	284	527	1090	-	-	-
Mov Cap-2 Maneuver	284	-	-	-	-	-
Stage 1	627	-	-	-	-	-
Stage 2	598	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1090	-	510	-	-
HCM Lane V/C Ratio	0.022	-	0.215	-	-
HCM Control Delay (s)	8.4	-	14	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.8	-	-

## Historical Traffic Volume Comparison

Project: Nantasket Beach Two-Way Conversion  
 Location: Hull, MA  
 Date: August 26, 2022  
 Analyst: TEC, Inc.

June Seasonal Adj (2015):	0.88
August Seasonal Adj (2015):	0.9
August Seasonal Adj (2019):	0.91

### Nantasket Avenue @ Hull Shore Drive / GW Boulevard Conn (Miller's Crossing)

Historical Count Date: Tuesday, August 18, 2015  
 Present Day Count Date: Thursday, August 18, 2022

Time Period	Approach / Movement	Raw 2015 Volume	Seasonal Adj	Annual Adj to 2019	Raw 2022 Volume	Seasonal Adj	% Change
4:00p-5:00p	Nantasket Ave NB	379	341	368	427	389	105.71%
4:00p-5:00p	Nantasket Ave SB	383	345	372	297	270	72.58%
4:00p-5:00p	GW Conn EB	536	482	520	689	627	120.58%
4:00p-5:00p	Total Intersection	1298	1168	1260	1413	1286	102.06%
5:00p-6:00p	Nantasket Ave NB	298	268	289	465	423	146.37%
5:00p-6:00p	Nantasket Ave SB	350	315	340	357	325	95.59%
5:00p-6:00p	GW Conn EB	567	510	550	658	599	108.91%
5:00p-6:00p	Total Intersection	1215	1094	1180	1480	1347	114.15%

### Nantasket Avenue @ Wharf Avenue

Historical Count Date: Tuesday, August 18, 2015  
 Present Day Count Date: Thursday, August 18, 2022

Time Period	Approach / Movement	Raw 2015 Volume	Seasonal Adj	Annual Adj to 2019	Raw 2022 Volume	Seasonal Adj	% Change
4:00p-5:00p	Nantasket Ave NB	437	393	424	349	318	75.00%
4:00p-5:00p	Nantasket Ave SB	394	355	383	303	276	72.06%
4:00p-5:00p	Wharf Ave EB	72	65	70	65	59	84.29%
4:00p-5:00p	Total Intersection	907	816	880	722	657	74.66%
5:00p-6:00p	Nantasket Ave NB	385	347	374	348	317	84.76%
5:00p-6:00p	Nantasket Ave SB	297	267	288	262	238	82.64%
5:00p-6:00p	Wharf Ave EB	63	57	62	57	52	83.87%
5:00p-6:00p	Total Intersection	736	662	714	668	608	85.15%

### George Washington Boulevard @ Wharf Avenue

Historical Count Date: Tuesday, June 4, 2015  
 Present Day Count Date: Thursday, August 18, 2022

Time Period	Approach / Movement	Raw 2015 Volume	Seasonal Adj	Annual Adj to 2019	Raw 2022 Volume	Seasonal Adj	% Change
4:00p-5:00p	GW NB	620	546	589	697	634	107.64%
4:00p-5:00p	GW Ave SB	408	359	387	493	449	116.02%
4:00p-5:00p	Wharf Ave WB	64	56	60	90	82	136.67%
4:00p-5:00p	Total Intersection	1114	980	1057	1295	1178	111.45%
5:00p-6:00p	GW NB	593	522	563	664	604	107.28%
5:00p-6:00p	GW Ave SB	406	357	385	459	418	108.57%
5:00p-6:00p	Wharf Ave WB	50	44	47	83	76	161.70%
5:00p-6:00p	Total Intersection	1074	945	1020	1221	1111	108.92%



## Historical Traffic Volume Comparison

Project: Nantasket Beach Two-Way Conversion  
 Location: Hull, MA  
 Date: August 26, 2022  
 Analyst: TEC, Inc.

June Seasonal Adj (2015):	0.88
August Seasonal Adj (2015):	0.9
August Seasonal Adj (2019):	0.91

### *Nantasket Avenue @ Hull Shore Drive / GW Boulevard Conn (Miller's Crossing)*

Historical Count Date: Saturday August 15, 2015  
 Present Day Count Date: Saturday, August 20, 2022

Time Period	Approach / Movement	Raw 2015 Volume	Seasonal Adj	Annual Adj to 2019	Raw 2022 Volume	Seasonal Adj	% Change
4:00p-5:00p	Nantasket Ave NB	476	428	462	432	393	85.06%
4:00p-5:00p	Nantasket Ave SB	341	307	331	306	278	83.99%
4:00p-5:00p	GW Conn EB	715	644	695	694	632	90.94%
4:00p-5:00p	Total Intersection	1532	1379	1488	1432	1303	87.57%
5:00p-6:00p	Nantasket Ave NB	457	411	443	468	426	96.16%
5:00p-6:00p	Nantasket Ave SB	356	320	345	365	332	96.23%
5:00p-6:00p	GW Conn EB	687	618	667	665	605	90.70%
5:00p-6:00p	Total Intersection	1506	1355	1462	1498	1363	93.23%

### *Nantasket Avenue @ Wharf Avenue*

Historical Count Date: Saturday August 15, 2015  
 Present Day Count Date: Saturday, August 20, 2022

Time Period	Approach / Movement	Raw 2015 Volume	Seasonal Adj	Annual Adj to 2019	Raw 2022 Volume	Seasonal Adj	% Change
4:00p-5:00p	Nantasket Ave NB	455	410	442	432	393	88.91%
4:00p-5:00p	Nantasket Ave SB	332	299	323	303	276	85.45%
4:00p-5:00p	Wharf Ave EB	138	124	134	120	109	81.34%
4:00p-5:00p	Total Intersection	926	833	899	856	779	86.65%
5:00p-6:00p	Nantasket Ave NB	437	393	424	450	410	96.70%
5:00p-6:00p	Nantasket Ave SB	365	329	355	361	329	92.68%
5:00p-6:00p	Wharf Ave EB	131	118	127	143	130	102.36%
5:00p-6:00p	Total Intersection	933	840	906	955	869	95.92%

### *George Washington Boulevard @ Wharf Avenue*

Historical Count Date: Saturday August 15, 2015  
 Present Day Count Date: Saturday, August 20, 2022

Time Period	Approach / Movement	Raw 2015 Volume	Seasonal Adj	Annual Adj to 2019	Raw 2022 Volume	Seasonal Adj	% Change
4:00p-5:00p	GW NB	925	814	878	864	786	89.52%
4:00p-5:00p	GW Ave SB	597	525	566	533	485	85.69%
4:00p-5:00p	Wharf Ave WB	115	101	109	117	106	97.25%
4:00p-5:00p	Total Intersection	1682	1480	1597	1530	1392	87.16%
5:00p-6:00p	GW NB	858	755	815	861	784	96.20%
5:00p-6:00p	GW Ave SB	547	481	519	540	491	94.61%
5:00p-6:00p	Wharf Ave WB	129	114	123	141	128	104.07%
5:00p-6:00p	Total Intersection	1570	1382	1491	1565	1424	95.51%