Appendix D

Transportation Supporting Documentation

Notice of Project Change
Transportation Impact Assessment

Redevelopment of the South Weymouth Naval Air Station (SWNAS)
EEA No. 11085R
Abington, Rockland, and Weymouth, Massachusetts

Prepared for:

BPD Union Point LLC

December 2023

Prepared by:

Vanasse & Associates inc
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Dear Reviewer:

This letter shall certify that this *Transportation Impact Assessment* has been prepared under my direct supervision and responsible charge. I am a Registered Professional Engineer (P.E.) in the Commonwealth of Massachusetts (Massachusetts P.E. No. 38871, Civil) and hold Certification as a Professional Traffic Operations Engineer (PTOE) from the Transportation Professional Certification Board, Inc. (TPCB), an independent affiliate of the Institute of Transportation Engineers (ITE) (PTOE Certificate No. 993). I am also a Fellow of the Institute of Transportation Engineers (FITE).

Sincerely,

VANASSE & ASSOCIATES, INC.

Jeffrey Dirk

Jeffrey S. Dirk, P.E., PTOE, FITE
Managing Partner

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EXECUTIVE SUMMARY

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Assessment (TIA) in support of this Notice of Project Change (NPC) filing documenting the changes to the master plan development program for the mixed-use redevelopment that is being advanced on the site of the former South Weymouth Naval Air Station (hereafter referred to as "SWNAS") in the Towns of Abington, Rockland and Weymouth, Massachusetts (hereafter referred to as the "Project"). This assessment is responsive to the outstanding scope of study that was identified in the Certificate that was issued by the Secretary of Energy and Environmental Affairs in response to the February 28, 2017 *Notice of Project Change* (the "2017 NPC")[1] that was filed for the immediately preceding iteration of the Project, then known as Union Point, if and to the extent such scope is still applicable to the currently proposed development program, which is referred to as the "2023 modified development program" for the purposes of this TIA. As detailed throughout the NPC filing and this TIA, the previous 2017 development program proposed a much more rigid development construct, whereas the Project includes a mix of uses that can evolve over time to respond to changing market conditions provided that impacts of the Project remain within those studied as part of the 2023 modified development program that serves as a baseline preferred build condition.

This TIA was prepared in consultation with the Towns of Abington, Rockland and Weymouth, and the Massachusetts Department of Transportation (MassDOT), and was performed in accordance with MassDOT's *Transportation Impact Assessment (TIA) Guidelines* and the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such reports. The geographic scope of the study area that has been assessed as a part of this TIA is consistent with that evaluated in the June 17, 2007 *Final Environmental Impact Report* (the "2007 FEIR")[2] and 2017 NPC that were filed for prior iterations of the Project.

This assessment has concluded the following with respect to the Project (as measured by analyzing the 2023 modified development program) and the study area roadways and intersections:

1. Using trip-generation statistics published by the ITE[3] and inclusive of diverted-link trips, the Project is expected to generate approximately 53,438 vehicle trips on an average

[1] *Notice of Project Change*, Union Point, Abington, Rockland, Weymouth, Massachusetts (EEA No. 11085R); Epsilon, et al; February, 28, 2017.

[2] *Final Environmental Impact Report*, Union Point, Abington, Rockland, Weymouth, Massachusetts (EEA No. 11085R); Epsilon, et al; June 17, 2007 (date that availability of the document was noticed in the *Environmental Monitor*).

[3] *Trip Generation*, 11th Edition; Institute of Transportation Engineers; Washington, DC; 2021.

weekday and 47,476 vehicle trips on a Saturday (both two-way volume over the operational day of the Project), with approximately 4,148 vehicle trips expected during the weekday morning peak-hour, 4,835 vehicle trips expected during the weekday evening peak-hour and 3,963 vehicle trips expected during the Saturday midday peak-hour. While Saturday midday peak hour vehicle trips were not studied in the 2017 NPC filing, the 2023 modified development program is expected to generate *fewer* average weekday and Saturday vehicle trips than the 2017 NPC development program;

2. The Project will not result in a significant impact (increase) on motorist delays or vehicle queuing over Existing or anticipated future conditions without the Project (No-Build conditions), with 51 of the 73 study area intersections predicted to continue to operate at an overall level of service (LOS) D or better during all three the peak hours with the addition of Project-related traffic, where an LOS of "D" or better is generally defined as "acceptable" operating conditions, and 16 of the 73 intersections shown to drop to a level of service below LOS D during one or more peak hour as a result of the addition of Project-related traffic. Specific improvements have been identified for these intersections that are intended to reduce motorist delays and vehicle queuing, and off-set the predicted impact of the Project (discussion follows);

3. Independent of the Project, 25 of the study area intersections were found to have a motor vehicle crash rate that is above the MassDOT average crash rates and/or were identified as high crash locations for the 2017-2019 reporting period and Highway Safety Improvement Program (HSIP) eligible. Road Safety Audits (RSA) were conducted at 21 of the study area intersections between June 2011 and February 2022, with the majority of the improvements recommended therein since completed. Specific recommendations have been provided to advance safety related improvements at six (6) of the 25 study area intersections where safety enhancements have not yet been advanced (discussion follows); and

4. Lines of sight at the Project access gateway intersections of Route 18 at Shea Memorial Drive, Route 18 at Trotter Road and Weymouth Street at Bill Delahunt Parkway and Reservoir Park Drive intersections were found to exceed the recommended minimum distances for safe and efficient operation based on the appropriate approach speeds.

In consideration of the above, it has been concluded that the Project can be accommodated within the confines of the existing transportation infrastructure in a safe and efficient manner with implementation of the recommendations that follow.

RECOMMENDATIONS

A detailed transportation improvement program has been developed that is designed to provide safe and efficient access to the Project site and address any deficiencies identified at off-site locations evaluated in conjunction with this study. The recommended improvement measures have been classified into four categories: 1) Project Site Access; 2) Off-Site Improvements; 3) Transportation Demand Management (TDM); and 4) Traffic Monitoring; and, where applicable, will be completed in conjunction with the Project subject to receipt of all necessary licenses, permits, and approvals.

Project Site Access

Vehicular access to the Project site is and will continue to be provided by three primary gateways: Shea Memorial Drive (via Route 18); Bill Delahunt Parkway (via Route 228 to Route 3); and Patriot Parkway (via Trotter Road to Route 18). Access to the individual development areas within the Project site will be provided by way of roadways and driveways located within the Project site. The design and location of the specific driveways and roadways will be advanced with the development of the final development plans. The following general recommendations will be used to guide the design plans for the development areas within the Project site:

- Roadways and driveways within the Project site will be designed with consideration of Complete Streets design principles and the following design guidelines based on functional class:

  - ***Major Collectors*** *(Gateway Streets conveying trips to Route 18 and Hingham Street):* Four (4) travel lanes (two lanes per direction) separated by a raised median with separate turn lanes provided at major intersections.

  - ***Minor Collectors*** *(Roadways that convey trips from the individual development areas to the Major Collectors):* Two (2) travel lanes separated by a double-yellow centerline or raised median with separate turn lanes provided at major intersections.

  - ***Local Roadways*** *(Roadways that serve development areas):* Two (2) travel lanes separated by a double-yellow centerline.

  - ***Driveways*** *(Driveways serve individual building areas or a collection of building areas):* Driveways should generally be a minimum of 20-feet in width for minor traffic generators and 24-feet in width for major traffic generators, and should be designed with appropriate corner radii to accommodate turning maneuvers for delivery trucks and emergency vehicles.

- Circulating drives within individual development sites will be a minimum of 24-feet in width where perpendicular parking is proposed adjacent to the drive aisle.

- Intersection spacing should follow the guidelines set forth in the MassDOT *Project Development & Design Guide*.[4]

- Intersections should be placed under STOP-sign control where necessary to regulate traffic or to assign the vehicular right-of-way pursuant to the guidance provided in the *Manual on Uniform Traffic Control Devices* (MUTCD).[5] Modern roundabouts should be considered in lieu of the installation of traffic control signals at major intersections where the installation of a traffic control signal is found to be warranted based on the criteria established in the MUTCD.

[4]*Project Development & Design Guide*; Massachusetts Highway Department; January, 2006.

[5]*Manual on Uniform Traffic Control Devices (MUTCD)*; Federal Highway Administration; Washington, D.C.; 2009.

- All signs and pavement markings to be installed within the Project site shall conform to the applicable standards of the MUTCD.

- Americans with Disabilities Act (ADA) compliant wheelchair ramps should be provided at all pedestrian crossings where sidewalks are present, with driveways designed such that the sidewalk is flush with (i.e., crosses) the driveway.

- Signs and landscaping to be installed within intersection sight triangle areas should be designed and maintained so as not to restrict lines of sight.

- Snow accumulation (windrows) within the sight triangle areas should be promptly removed where such accumulations would impede sightlines.

Off Site Improvements

The recommended off-site improvements have been developed to: i) address existing and predicted future capacity constraints; ii) to off-set the predicted impact of the Project; and iii) to enhance safety at intersections identified as high crash locations. The recommended improvements have been structured to build-upon or expand the improvements that were identified for the Project as a part of the 2007 FEIR,[6] with additional improvements identified where necessary to address the impacts of the 2023 modified development program.

Table 7-12, which is set forth later in this TIA, summarizes the elements of the transportation improvement program for the Project, the schedule for implementation and the responsible party, as well as indicating if the improvement measure was defined in the 2007 FEIR. The schedule for implementation was aggregated into five (5) tiers to coincide with the anticipated build-out of the Project:

- ***Tier 1*** – To be completed prior to the issuance of a Certificate of Occupancy for any new development;

- ***Tier 2*** – To be completed prior to the issuance of a Certificate of Occupancy for any new commercial building that alone or in aggregate exceeds 500,000 sf, or for new residential development that alone or in aggregate exceeds 1,500 dwelling units;

- ***Tier 3*** – To be completed prior to the issuance of a Certificate of Occupancy for any new commercial building that alone or in aggregate exceeds 1,000,000 sf, or for new residential development that alone or in aggregate exceeds 3,000 dwelling units;

- ***Tier 4*** – To be completed prior to the issuance of a Certificate of Occupancy for any new commercial building that alone or in aggregate exceeds 2,000,000 sf, or for new residential development that alone or in aggregate exceeds 6,000 dwelling units; and

- ***Tier 5*** – To be completed if and when warranted based on the results of the annual Traffic Monitoring and Reporting Program (discussion follows).

[6]Epsilon, et al; op. cit. 7-1 June 17, 2007.

The following provides additional detail on the improvements that have been recommended as a part of this assessment.

Traffic Operations

- ***Traffic Signal Installation***

  The addition of Project-related traffic to the following intersections was shown to result in a change in operating conditions that may necessitate the implementation of specific traffic control improvements, including the installation of a traffic control signal:

  - *Columbian Street at Forest Street* (Intersection 11)
  - *Columbian Street at Park Avenue West* (Intersection 12)
  - *Weymouth Street at Sharp Street and Abington Street* (Intersection 40)
  - *Randolph Street at Forest Street* (Intersection 41)
  - *Trotter Road at Patriot Parkway* (Intersection 51)
  - *Memorial Grove Avenue at Snow Bird Avenue* (Intersection 52)
  - *Route 139 at Chestnut Street and Old Randolph Street* (Intersection 55)

  At the present time, the subject intersections do not appear to meet the necessary warrants as defined in the MUTCD for the installation of a traffic signal. As such, the Proponent will monitor traffic volumes, operating conditions and motor vehicle crash data at these intersections as a part of the annual Traffic Monitoring and Reporting Program (discussion follows). If and to the extent that the installation of a traffic signal is found to be warranted and the installation is desirable by the community within which the intersection is located, the Proponent will design and construct a traffic control signal at the intersection pursuant to the suggested schedule of implementation defined in Table 7-12 to the extent that the improvements can be completed within the public right-of-way and subject to receipt of all necessary licenses, permits and approvals.

  With the installation of a traffic control signal and associated geometric improvements (where necessary) at the subject intersections, overall intersection operations were shown to be improved to LOS D or better during the peak hours at six (6) of the seven (7) intersections identified above. Even with these improvements, the Trotter Road/ Patriot Parkway intersection was shown to operate at an overall LOS F during the weekday morning and evening peak-hours, and at LOS E during the Saturday midday peak-hours. That being said, as the final plans are advanced for the development areas within the Project site, the access points can be located in manner to disperse trips within the Project site and lessen impacts at the Trotter Road/Patriot Parkway intersection.

- ***Geometric Improvements***

  In an effort to improve traffic operations and off-set the predicted impact of the Project, the Proponent will design and construct the following geometric improvements at the identified intersections, according to the suggested schedule of implementation defined in Table 7-12:

Roadway Segments

- *Hingham Street* – Widen Hingham Street to provide a general four-lane cross-section between the Route 3 southbound ramps and Reservoir Park Drive. These improvements are being funded through a MassWorks grant to the Town of Rockland.
- *Bill Delahunt Parkway* – Improve the roadway cross-section, if necessary, based on the measured traffic volumes and to facilitate the addition or expansion of pedestrian and bicycle accommodations.
- *Shea Memorial Drive* – Improve the roadway cross-section, if necessary, based on the measured traffic volumes and to facilitate the addition or expansion of pedestrian and bicycle accommodations.
- *Reservoir Park Drive* – Widen Reservoir Park Drive to provide a four-lane cross-section. Outside of the limits of the Hingham Street/Reservoir Park Drive intersection improvements that are being advanced as a part of the Hingham Street MassWorks grant, improve the roadway cross-section, if necessary, based on the measured traffic volumes and to facilitate the addition or expansion of pedestrian and bicycle accommodations.

Intersections

- *Pleasant Street at Pine Street* (Intersection 18) – Widen the Pine Street westbound approach to provide a left-turn lane and a right-turn lane.
- *Pine Street at Ralph Talbot Street* (Intersection 20) – Widen the Pine Street northbound approach to provide a left-turn/through lane and a right-turn lane, and the Ralph Talbot Street westbound approach to provide a left-turn lane and a through/right-turn lane.
- *Weymouth Street at Bill Delahunt Parkway and Reservoir Park Drive* (Intersection 39) – Widen the Bill Delahunt Parkway northeastbound and Reservoir Park Drive southwestbound approaches to provide a left-turn lane, two through lanes and a channelized right-turn lane.
- *Route 18 at Shea Memorial Drive* (Intersection 45) – Widen the Route 18 southbound approach to provide two left-turn lanes and two through lanes, and the Shea Memorial Drive westbound approach to provide a left-turn lane and two right-turn lanes.
- *Shea Memorial Drive at Memorial Grove Avenue* (Intersection 46) – Realign the Shea Memorial Drive/Memorial Grove Avenue intersection to be located to the south of Shea Field Memorial Grove in order to reflect the primary flow of traffic within the Project site.
- *Pond Street at Thicket Street* (Intersection 48) – Widen the Thicket Street northeastbound approach to provide a left-turn lane and a right-turn lane.

- *Route 18 at Trotter Road* (Intersection 49) – Widen the Route 18 northbound approach to provide two through lanes and a right-turn lane, and the Trotter Road westbound approach to provide a left-turn lane and two right-turn lanes.
- *Trotter Road at Patriot Parkway* (Intersection 51) – Widen the Trotter Road eastbound approach to provide a left-turn lane and a through lane, the Trotter Road southbound approach to provide a left-turn lane and a right-turn lane, and the Patriot Parkway westbound approach to provide a through lane and a channelized right-turn lane.
- *Memorial Grove Avenue at Snow Bird Avenue* (Intersection 52) – Widen the Memorial Grove Avenue westbound approach to provide a left-turn lane and a through/right-turn lane, and the Snow Bird Avenue northbound approach to provide a left-turn/through lane and a right-turn lane. In addition, the intersection should be placed under all-way STOP-sign control subject to meeting the necessary warrants as specified in the MUTCD.
- *Shea Memorial Drive at Patriot Parkway and Bill Delahunt Parkway* (Intersection 53) – Widen the Shea Memorial Drive northbound approach to provide a left-turn lane, a left-turn/through lane and a right-turn lane, and the Shea Memorial Drive southbound approach to provide a left-turn/through lane and two right-turn lanes.
- *Route 139 at Lincoln Street* (Intersection 56) – Widen the Lincoln Street northeastbound approach to provide a left-turn lane a right-turn lane.
- *Route 18 at Route 123* (Intersection 71) – Widen the Route 18 northbound approach to provide a left-turn lane, a through lane and a through/right-turn lane, the Route 18 southbound approach to provide a through/left-turn lane, a through lane and a right-turn lane, and the Route 123 eastbound approach to provide a left-turn lane, a through lane and a through/right-turn lane.

o *Future Traffic Signal Control*: In conjunction with the installation of traffic control signals at the previously mentioned intersections, if and when warranted, geometric improvements should be advanced at the following three (3) intersections, subject to receipt of all necessary licenses, permits and approvals:

- *Columbian Street at Forest Street* (Intersection 11) – Widen the Columbian Street eastbound approach to provide a left-turn/through lane and a right-turn lane and the westbound approach to provide a left-turn lane and a through/right-turn lane.
- *Columbian Street at Park Avenue West* (Intersection 12) – Widen the Columbian Street eastbound approach to provide a left-turn/through lane and a right-turn lane.
- *Route 139 at Chestnut Street and Old Randolph Street* (Intersection 55) – Widen the Route 139 northbound approach to provide a left-turn lane and a through/right-turn lane.

With the implementation of the suggested geometric changes, 11 of these 15 intersections were shown to operate at an overall LOS D or better during the peak hours. Of the four (4) intersections that do not achieve this level of service, with the suggested geometric changes: i)the Weymouth Street/Bill Delahunt Parkway/Reservoir Park Drive intersection was shown to improve from an overall LOS F to LOS D during the weekday morning peak-hour; from LOS F to LOS E during the weekday evening peak-hour; and from LOS E to a LOS C during the Saturday midday peak-hour; and ii) the Route 18/Trotter Road, Trotter Road/Patriot Parkway and Patriot Parkway/Shea Memorial Drive/Bill Delahunt Parkway intersections were shown to operate at an overall LOS F during the peak hours; however, vehicle queuing and average motorist delays were shown to be generally reduced.

❖ ***Traffic Signal Timing Improvements***

In an effort to improve traffic operations and off-set the predicted impact of the Project, the Proponent will, subject to receipt of all necessary licenses, permits and approvals, design and implement an optimal traffic signal timing and phasing plan for the following intersections that were identified to be operating at or over capacity pursuant to the suggested schedule of implementation defined in Table 7-12:

- *Route 53 at Middle Street* (Intersection 2)
- *Middle Street at Winter Street* (Intersection 3)
- *Liberty Street at Grove Street* (Intersection 9)
- *Route 18 at West Street and Middle Street* (Intersection 13)
- *Route 18 at Columbian Street* (Intersection 14)
- *Pleasant Street at Park Avenue* (Intersection 16)
- *Pine Street at Ralph Talbot Street* (Intersection 20)
- *Route 53 at Derby Street and Gardner Street* (Intersection 28)
- *Route 228 at Pond Street* (Intersection 35)
- *Route 228 at Hingham Street and the Route 3 Southbound Ramps* (Intersection 36)
- *Hingham Street at Reservoir Park Drive* (Intersection 38)
- *Weymouth Street at Bill Delahunt Parkway and Reservoir Park Drive* (Intersection 39)
- *Pond Street at Hollis Street and Derby Street* (Intersection 42)
- *Route 18 at Pond Street and Pleasant Street* (Intersection 43)
- *Route 18 at Shea Memorial Drive* (Intersection 45)
- *Route 18 at Trotter Road* (Intersection 49)
- *Route 18 at Pond Street* (Intersection 50)
- *Shea Memorial Drive at Patriot Parkway and Bill Delahunt Parkway* (Intersection 53)

- *Route 18 at Route 139* (Intersection 57)
- *Route 58 at Route 139* (Intersection 58)
- *Route 123 at Route 58* (Intersection 69)
- *Route 58 at Summer Street* (Intersection 70)
- *Route 18 at Route 123* (Intersection 71)

The subject intersections will be monitored as a part of the annual Traffic Monitoring and Reporting Program (discussion follows). To the extent that the monitoring program indicates that additional traffic signal timing optimizations are necessary, the Proponent will implement the optimizations, again, subject to receipt of all necessary licenses, permits and approvals.

With the implementation of an optimal traffic signal timing plan, operating conditions at eight (8) of the 15 subject intersections were shown to improve to an overall LOS D or better during the peak hours, with four (4) of the intersections improving to an overall LOS D or better for one or more peak hours, and all intersections predicted to have a reduction in overall motorist delay and vehicle queueing.

Safety

Independent of the Project the following intersections were identified to have a motor vehicle crash rate that exceed the MassDOT average crash rates for similar intersections and/or were designated as HSIP eligible by MassDOT, and have not previously been the subject of a Road Safety Audit (RSA):

- *Middle Street at Winter Street* (Intersection 3)
- *Pleasant Street at Park Avenue* (Intersection 16)
- *Route 53 at Route 228* (Intersection 31)
- *VFW Drive at Pleasant Street and West Pleasant Street* (Intersection 62)
- *Route 58 at Summer Street* (Intersection 70)

In an effort to identify and advance safety improvements at these intersections, the Proponent will: i) facilitate the completion of a RSA for the intersections; and ii) design and construct the short-term, low-cost improvements that are suggested as an outcome of the RSA. The RSAs are currently underway and the construction of the short-term, low-cost improvements will be designed and constructed pursuant to the suggested schedule of implementation defined in Table 7-12 to the extent that the improvements can be completed within the public right-of-way and subject to receipt of all necessary licenses, permits and approvals.

The Pleasant Street/Columbian Street/Union Street intersection (Intersection 15) was found to have a motor vehicle crash rate that exceeds the MassDOT average crash rate for an unsignalized intersection and was designated as a top 200 crash cluster location. This intersection is currently being reconstructed as a part of an intersection improvement project that is being advanced by the Town of Weymouth. No additional improvements are required at this intersection to accommodate the Project.

In addition, the remaining short-term, low-cost improvements identified in the RSAs for the following intersections that have not yet been implemented will be completed:

- *Route 18 at Route 53* (Intersection No. 1)
- *Route 53 at Middle Street* (Intersection No. 2)
- *Route 18 at Winter Street* (Intersection No. 4)
- *Route 18 at West Street and Middle Street* (Intersection No. 7)
- *Route 18 at Park Avenue and Park Avenue West* (Intersection No. 13)
- *Route 18 at Columbian Street* (Intersection No. 14)
- *Derby Street at the Route 3 Southbound Ramps* (Intersection No. 22)
- *Derby Street at the Route 3 Northbound Ramps* (Intersection No. 23)
- *Route 53 at Derby Street and Gardner Street* (Intersection No. 28)
- *Route 228 at Pond Street* (Intersection No. 35)
- *Route 18 at Pond Street and Pleasant Street* (Intersection No. 43)
- *Route 18 at Pond Street* (Intersection No. 50)
- *Route 139 at Hancock Street and Old Hancock Street* (Intersection No. 54)
- *Route 139 at Chestnut Street and Old Randolph Street* (Intersection No. 55)
- *Route 18 at Route 139* (Intersection No. 57)
- *Route 123 at Union Street* (Intersection No. 67)
- *Route 58 at Central Street* (Intersection No. 68)
- *Route 123 at Route 58* (Intersection No. 69)
- *Route 18 at Route 123* (Intersection No. 71)
- *Route 18 at Route 27* (Intersection No. 72)
- *Route 18 at Route 14* (Intersection No. 73)

The short-term, low-cost safety-related improvements that have not yet been implemented will be completed pursuant to the suggested schedule of implementation defined in Table 7-12 to the extent that the improvements can be completed within the public right-of-way and subject to receipt of all necessary licenses, permits and approvals.

With implementation of the aforementioned recommendations, safe and efficient access will be provided to the Project site and the Project can be accommodated within the confines of the existing and improved transportation system.

Transportation Demand Management (TDM)

The Proponent is committed to advancing the Project in a manner that reduces impacts on the transportation infrastructure. This commitment starts with a design that has been purposely configured to facilitate trips between development areas and recreational opportunities within the Project site by non-motorized modes of transportation. In order to reduce single-occupancy (SOV) trips external to the Project site and enhance mobility within the development, the Proponent will develop and implement a comprehensive TDM program, a principal component of which will be

providing initial funding to establish a Tri-Town Transportation Management Association (the "Tri-Town TMA").

The following details the framework of the TDM program for the Project.

TDM Program Management

A full-time Transportation Demand Management Coordinator (TDMC) (who may also have other duties and responsibilities) will be employed to serve as the single point of contact for residents, employees and the Tri-Town TMA, and to lead the TDM program and associated marketing and outreach activities. The TDMC will, as part of the overall TDM program, establish and implement quality control procedures and performance measures to ensure a high level of service, appropriate implementation of alternative transportation incentive programs, and effectiveness of those programs. The email address and phone number of the TDMC will be made available to residents and employees. The TDMC will work with the Tri-Town TMA to compile and distribute up-to-date information concerning available commuting options and the incentive programs available to residents and employees that use alternative commuting modes to SOVs. This information will be included in a "welcome packet" that will be made available to all new residents and employees, and will include the following information:

- MBTA maps, schedules and fare information, including the service schedule and fare information for Commuter Rail service from South Weymouth Station
- Tri-Town TMA shuttle service routes, stops and hours of operation, when established
- Location of bicycle parking areas
- Location of bikeshare stations
- Map of local and regional bicycle and pedestrian routes
- Location and contact information for carsharing services
- Details of any Emergency Ride Home (ERH) offered through the Tri-Town TMA

In addition, the TDMC will coordinate with the Tri-Town TMA to host an annual transportation fair that will focus on the transportation alternatives and incentive programs that are available to residents and employees of the businesses that are located within the Project site, and will include programs focused on pedestrian and bicycle safety.

Tri-Town TMA Shuttle Service

A shuttle service will be operated by the Tri-Town TMA that will connect the development areas within the Project site with continued service to the MBTA South Weymouth Commuter Rail Station. Initial funding for this service will be provided by the Proponent and will be offered at no ($0) cost to residents and employees of businesses that are located within the Project site for the first year of operation. The service will be expanded to include other destinations and routes outside of the Project site as membership in the Tri-Town TMA increases and as demand warrants, and will be funded through the dues assessment to members of the TMA as a means of subsidizing the service.

Promotional and Incentive Programs

This Project site is situated adjacent to South Weymouth Station on the Kingston Line of the MBTA Commuter Rail system, which is located at 89 Trotter Road, and is connected to the Project site by way of Trotter Road and Patriot Parkway, and the interconnected network of sidewalks, bicycle accommodations and pathways within the Project site. The Project has also been designed to promote walking and bicycling, with sidewalks provided along one or both sides of the roadways within the development, pedestrian paths to connect development areas and recreational amenities, and bicycle accommodations that include both on- and off-road facilities. This network of pedestrian and bicycle accommodations will be extended as a part of the Project along the gateway roadways (Shea Memorial Drive, Bill Delahunt Parkway and Patriot Parkway/Trotter Road) to connect to Route 18, Weymouth Street and Hingham Street (via Reservoir Park Drive). The TDMC will promote the use of alternative modes of transportation to SOVs through promotional and public awareness programs that will be developed in conjunction with the Tri-Town TMA and will focus on the following factors/programs to incentivize travel mode changes:

❖ **Cost Savings**

Ridesharing can reduce transportation costs; employees can typically deduct use of public transit from pre-tax or post-tax income; car insurance companies may offer discounts to employees that use public transportation as their primary commuting mode directly or through an annual mileage discount; and employers may have incentive programs that provide employees with rewards for use of non-SOV modes. Increased fuel prices can be avoided or minimized by increasing the use of non-motorized modes.

❖ **Public Transportation**

The following services will be provided to encourage the use of public transportation and will be managed by the TDMC:

- Information on MBTA schedules and fares, and the schedule for the Tri-Town TMA shuttle, when established, will be made available to residents and employees, included in resident and employee informational packets and marketing information, and provided on the website for the Project.
- Commercial tenant(s) will be encouraged to allow employees to set aside pre-tax funds as allowable under the Commuter Choice provisions of the Federal Tax Code, including the MBTA "Perq for Work" program (formerly known as the Corporate Pass Program), which provides employees the opportunity to buy MBTA passes as a pre-tax exemption.
- Transit screens or other equivalent displays will be provided in the lobby areas of multifamily residential buildings and commercial buildings (as appropriate) to display real-time traffic and bus location information (similar to https://transitscreen.com/).

❖ **Public Transportation Benefit**

Lease agreements with commercial tenants will require that they become a member of the Tri-Town TMA and that they offer a monthly transportation benefit, capped at the cost of an unlimited bus/subway pass (Monthly LinkPass), to all employees who commute by a

non-SOV mode for a minimum of three (3) days per week and register with the TDMC. The cost of this pass is currently $90 per month, and this cap will increase with each fare increase that is initiated by the MBTA to ensure that the benefit will allow employees to purchase an unlimited bus/subway pass each month. Eligible employees will have the freedom to spend the monthly transportation benefit in any way that they prefer – on transit fares, bicycle maintenance, gas for carpools, vanpool fees, walking shoes, etc.

The Proponent will coordinate with the MBTA to endeavor to locate CharlieCard purchase/recharge kiosks or other such system for the purchase or replenishment of public transit fares at appropriate locations within the Project site defined in consultation with the MBTA that are accessible to employees and the public, and that meet the MBTA's customer service standards.

❖ **Ridesharing**

The TDMC will market a ridematching program to facilitate carpooling by residents and employees. Information on ridematching services will be made available to residents and employees, included in the new employee and resident "welcome packets" and provided on corporate and residential community websites. In addition, preferential parking will be reserved or provided by commercial tenants for carpools and vanpools.

❖ **Car Sharing**

The Proponent will work with a car-share provider to stage car-share vehicles at accessible locations within the Project site for use by residents and by employees.

❖ **Pedestrian/Bicycle Program**

In order to encourage walking and the use of bicycles as an alternative to the use of SOVs by residents and employees of the Project, the Proponent will implement the following measures:

- As appropriate, the Proponent will work with a bikeshare provider to establish a bikeshare program for the Project. Access to the bikeshare program will be made available at no ($0) cost to residents and employees of commercial tenants within the Project site that register with the TDMC for the first year of residency or employment. Thereafter, a bikeshare fee structure will be established by the Tri-Town TMA that will be included in the dues assessment to members of the TMA as a means of subsidizing the service.
- Secure bicycle parking will be provided at appropriate locations within individual development sites. Bicycle parking will include both interior (covered) and exterior bicycle parking. It is anticipated that a minimum of one (1) bicycle parking space per 15 vehicle parking spaces will be provided for commercial uses and one (1) bicycle parking space for every five (5) automobile parking spaces will be provided for a multifamily residential or mixed-use development. It is anticipated that a minimum of six (6) bicycle parking spaces will be provided for any individual use or development area.

- Bicycle and pedestrian commuting options will be encouraged and marketed to residents and employees by the TDMC, including making available up-to-date pedestrian and bicycle maps for local and regional facilities, and the location of bicycle parking within the Project.
- Employees that walk or bicycle to work will have access to a shower, changing area and locker located within individual buildings subject to tenant fit-out requirements or in shared amenities buildings.
- To encourage safety, commercial tenants will be encouraged to offer reflective vests at no cost to all employees who walk or bicycle to work.

❖ **Emergency Ride Home**

An Emergency Ride Home (ERH) program will be provided to all employees who commute to work by a non-SOV mode at least three (3) days per week. The ERH program will be coordinated by the TDMC and offered through the Tri-Town TMA, and will allow for a maximum of four (4) ERH per year per participating employee.

❖ **Flexible Work Schedules**

In order to encourage the use of public transportation, the Proponent will encourage commercial tenants to offer employee work schedules that are flexible so as to be consistent with public transportation schedules and, to the extent permitted by corporate policies, allow employees the opportunity to work from home as a way to eliminate vehicle trips to the buildings.

Traffic Monitoring and Reporting Program

The Proponent will conduct post-development traffic and parking monitoring, and an employee survey program in order to evaluate the success and to refine the elements of the TDM program, and to validate the trip projections for the Project. The monitoring program will include the following:

i) Obtaining traffic volume information over a continuous seven day, weeklong period on the gateway roadways that serve the Project site (Shea Memorial Drive, Bill Delahunt Parkway, Reservoir Park Drive and Patriot Parkway/Trotter Road);

ii) Performing turning movement counts and vehicle classification counts the following intersections) during the weekday morning (7:00 to 9:00 AM), weekday evening (4:00 to 6:00 PM) and Saturday midday (11:00 AM to 2:00 PM) peak periods:

- Route 53 at Middle Street (Intersection 2)
- Middle Street at Winter Street (Intersection 3)
- Liberty Street at Grove Street (Intersection 9)
- Route 18 at West Street and Middle Street (Intersection 13)
- Route 18 at Columbian Street (Intersection 14)
- Pleasant Street at Park Avenue (Intersection 16)

- Pine Street at Ralph Talbot Street (Intersection 20)
- Route 53 at Derby Street and Gardner Street (Intersection 28)
- Route 228 at Pond Street (Intersection 35)
- Route 228 at Hingham Street and the Route 3 Southbound Ramps (Intersection 36)
- Hingham Street at Reservoir Park Drive (Intersection 38)
- Weymouth Street at Bill Delahunt Parkway and Reservoir Park Drive (Intersection 39)
- Pond Street at Hollis Street and Derby Street (Intersection 42)
- Route 18 at Pond Street and Pleasant Street (Intersection 43)
- Route 18 at Shea Memorial Drive (Intersection 45)
- Route 18 at Trotter Road (Intersection 49)
- Route 18 at Pond Street (Intersection 50)
- Shea Memorial Drive at Patriot Parkway and Bill Delahunt Parkway (Intersection 53)
- Route 18 at Route 139 (Intersection 57)
- Route 58 at Route 139 (Intersection 58)
- Route 123 at Route 58 (Intersection 69)
- Route 58 at Summer Street (Intersection 70)
- Route 18 at Route 123 (Intersection 71)

iii) Performing a 12-hour (7:00 AM to 7:00 PM) turning movement count and vehicle classification count on an average weekday and Traffic Signal Warrants Analysis (TSWA) at the following intersections:

- Columbian Street at Forest Street (Intersection 11)
- Columbian Street at Park Avenue West (Intersection 12)
- Weymouth Street at Sharp Street and Abington Street (Intersection 40)
- Randolph Street at Forest Street (Intersection 41)
- Trotter Road at Patriot Parkway (Intersection 51)
- Memorial Grove Avenue at Snow Bird Avenue (Intersection 52)
- Route 139 at Chestnut Street and Old Randolph Street (Intersection 55)

iv) Evaluating motor vehicle crash data at the monitored intersections;

v) Performing a survey of resident and employee commuting modes; and

vi) Providing ridership information for the Tri-Town TMA shuttle service.

The traffic volume data that forms the basis of this TIA will be used as the baseline for measuring changes in vehicle dependent data. The monitoring program will commence within six (6) months after the earlier to occur of completion of 1,500 new dwelling units or 500,000 sf of new commercial space at the Project and will continue on an annual basis thereafter for a period not to exceed 10-years. The results of the monitoring program will be summarized in a report to be provided to MassDOT, the Metropolitan Area Planning Council (MAPC), the Old Colony Planning Council, and the towns of Abington, Rockland and Weymouth within 2-months after the completion of the data collection effort. The report will document: i) traffic volumes associated with the constructed portions of Project; ii) traffic operations (i.e., motorist delays, vehicle queuing and LOS), crash severity and calculated crash rates at the monitored intersections; iii) the results of the TSWA for the identified intersections; iv) the elements of the TDM program that have been implemented and use of alternative modes of transportation to single-occupant vehicles by residents and employees of the Project; and v) Tri-Town TMA shuttle service utilization.

If any of the following conditions are documented as a part of the monitoring program: i) the measured traffic volumes exceed the predicted traffic volumes for the constructed land uses as defined using trip-generation data published by the ITE for the appropriate land use(s) by more than 10 percent on a regular and sustained basis during the monitoring period; ii) there is a material increase in the number of motor vehicle crashes occurring at the gateway intersections that are attributable to the Project; or iii) the overall directional distribution of Project-related traffic as measured on the gateway roadways varies by more than 10 percent from the directional distributions that form the basis of this assessment; the Proponent will identify and undertake corrective measures in conjunction with the appropriate parties and subject to receipt of all necessary licenses, permits and approvals. These measures may include without limitation:

- Traffic signal timing modifications
- Sign and pavement marking improvements
- Wayfinding sign program to disperse trips between the gateway roadways
- On-site operation and management strategies that are designed to reduce overall and peak traffic volumes and parking demands
- Providing financial incentives for employees to carpool or use alternative modes of transportation to SOVs
- Offering free or reduced fees for bikeshare membership, carshare use and/or ridership fees for the Tri-Town TMA shuttle
- Expanding the Tri-Town TMA shuttle service to include service to other commuter hubs (Braintree Station, Logan Express, etc.) and employment centers

The identified corrective measures, if any, will be documented in the transportation monitoring program report, and will identify the appropriate parties responsible for implementation (assumed to be the Proponent unless the corrective measure(s) are a part of a committed improvement project or plan that is scheduled to be implemented by others), required approvals, and the timeline for implementation. The status of implementation of the identified improvement measure(s) will be documented in the subsequent monitoring report.

As detailed throughout this TIA, with implementation of the aforementioned recommendations, safe and efficient access will be provided to the Project site and the Project can be accommodated within the confines of the existing and improved transportation system.

INTRODUCTION

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Assessment (TIA) in support of this Notice of Project Change (NPC) filing documenting the changes to the master plan development program for the mixed-use redevelopment that is being advanced on the site of the former South Weymouth Naval Air Station (hereafter referred to as "SWNAS") in the Towns of Abington, Rockland and Weymouth, Massachusetts (hereafter referred to as the "Project"). This assessment is responsive to the outstanding scope of study that was identified in the Certificate that was issued by the Secretary of Energy and Environmental Affairs that was issued on the February 28, 2017 *Notice of Project Change* (the "2017 NPC")[7] that was filed for the immediately preceding iteration of the Project, then known as Union Point, if and to the extent such scope is still applicable to the currently proposed development program, which is referred to as the "2023 modified development program" for the purposes of this TIA. As detailed throughout the NPC filing and this TIA, the previous 2017 development program proposed a much more rigid development construct, whereas the Project includes a mix of uses that can evolve over time to respond to changing market conditions provided that impacts of the Project remain within those studied as part of the 2023 modified development program that serves as a baseline preferred build condition. This assessment evaluates the following specific areas as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; and identifies and analyzes existing traffic conditions and future traffic conditions, both with and without the Project, along Main Street (Route 18), Bill Delahunt Parkway, Shea Memorial Drive, Trotter Road and Hingham Street, and at 73 major intersections located along these roadways through which Project-related traffic will travel.

PROJECT DESCRIPTION

The Project entails the redevelopment of the former South Weymouth Naval Air Station (SWNAS), a tract of approximately 1,440 acres of land located in the Towns of Abington, Rockland, and Weymouth, as a mixed-use residential, commercial and recreational uses, with both active and passive open space. Vehicular access is supported by three primary gateways: Shea Memorial Drive (via Route 18); Bill Delahunt Parkway (via Route 228 to Route 3); and Patriot Parkway (via Trotter Road to Route 18). In addition, the South Weymouth Station on the Massachusetts Bay Transportation Authority (MBTA) Commuter Rail system (Kingston Line) is situated off Trotter Road and immediately adjacent to the Project, offering commuting options for residents and employees of the Project, with service between Kingston and South Station in Boston. Also,

[7]Epsilon, et al; op. cit. 7-1; February, 28, 2017.

within SWNAS, an interconnected network of sidewalks, pathways and bicycle accommodations continues to evolve to support multimodal access to and within the Project site. Figure 7-1 depicts the location of the Project in relation to the existing transportation infrastructure network, with Figure 7-2 displaying roadway functional classification and jurisdiction, and the location of railroads and sensitive receptors.

Development Program

Prior zoning at SWNAS set very specific allowed uses by areas and phases. The rigidity of these controls contributed to the failure of earlier redevelopment attempts. The current proposed zoning provides much greater flexibility in blending commercial and residential uses to respond to prevailing market conditions. This TIA and the current infrastructure planning detailed in the Project's NPC filing study the more flexible 2023 modified development program.

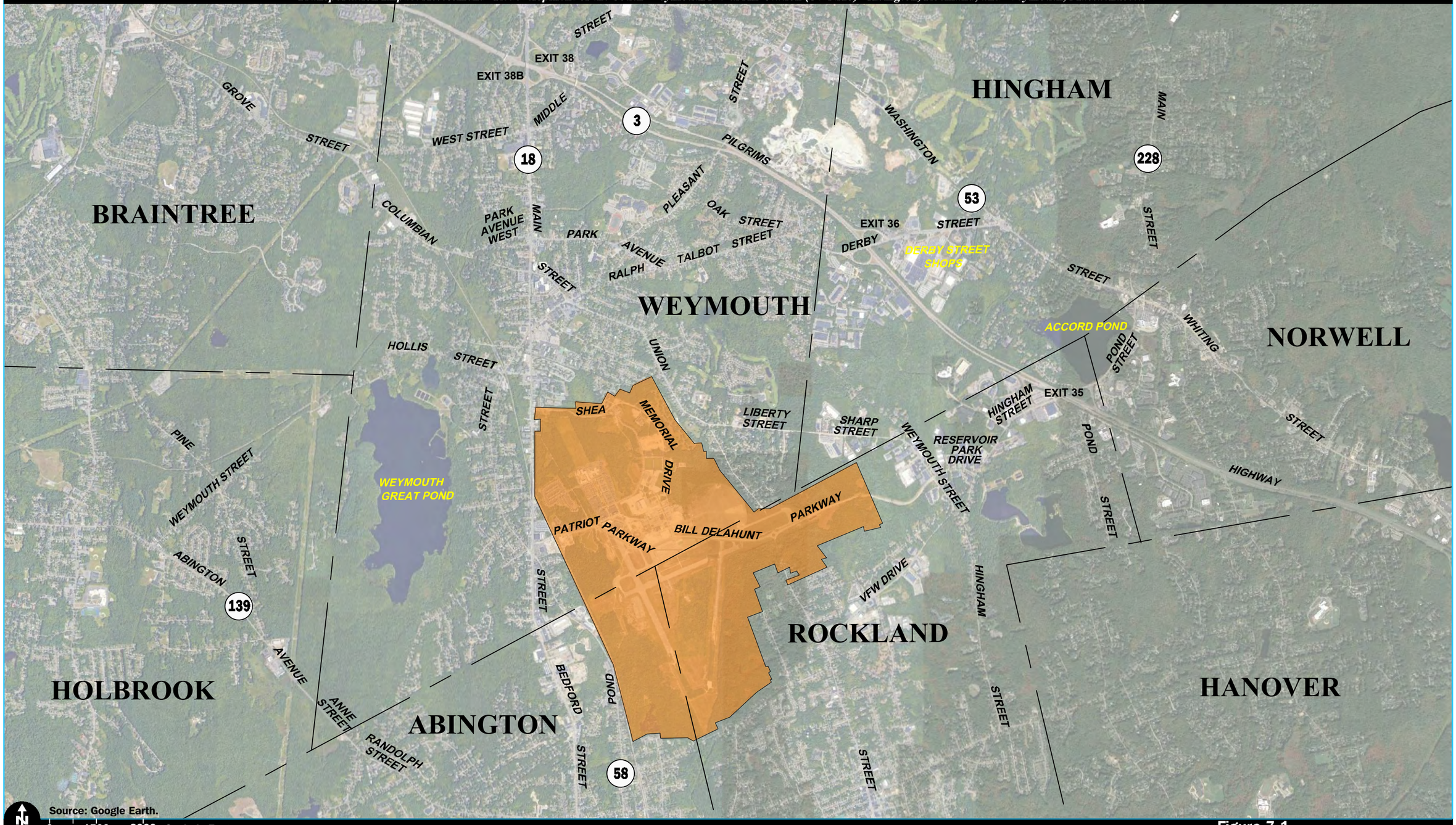
While the 2023 modified development program identifies the current baseline preferred build condition, the development program for the Project will ultimately evolve to reflect market conditions and regional and local housing needs. This focus on being able to meet changing market conditions has resulted in a change in the constituent components of the development program, but not the mixed-use focus, which continues to achieve trip reduction by providing residential, retail and employment opportunities in a centralized area that is supported by an interconnected network of roadways, sidewalks and bicycle facilities. Table 7-1 summarizes and compares the 2023 modified development program to that of the development program that was the subject of the 2007 FEIR and the subsequent 2017 NPC.

Table 7-1
SWNAS MIXED-USE DEVELOPMENT PROGRAM
SUMMARY AND COMPARISON TABLE

Land Use	Development Program		
	2007 FEIR	2017 NPC	2023 Modification
Residential:	***2,855 units***	***3,855 units***	***6,000 units***
Commercial:	***2,060,000 sf***	***8,000,000 sf***	***2,000,000 sf***

Note: Currently, a combination of 774 rental apartments and 500 homes, as well as 73,000 SF of mixed-use commercial has been built at SWNAS, and those existing uses are included in the 2022 existing condition traffic volumes and the associated analyses that are presented as a part of this assessment.

As identified in Table 7-1, the modified 2023 development program reflects the desire and need to create additional housing opportunities, to include rental and homeownership options, of a scale to support the commercial component of the mixed-use development. As evidenced by the 2019 foreclosure, the 8 million square foot scale of the commercial component contemplated in 2017 was not then, and is not today, supported by the marketplace. As stated above, although the 2023 modified development program is being analyzed to determine baseline impacts of the Project, the Project team anticipates that the development program will adapt over time in order to respond to changing market conditions and to best serve the needs of Weymouth, Abington and Rockland over time.



Source: Google Earth.

0 1500 3000 Scale in Feet

Figure 7-1

Site Location Map

Vanasse & Associates inc

Transportation Impact Assessment - Redevelopment of the South Weymouth Naval Air Station (SWNAS) - Abington, Rockland, and Weymouth, Massachusetts

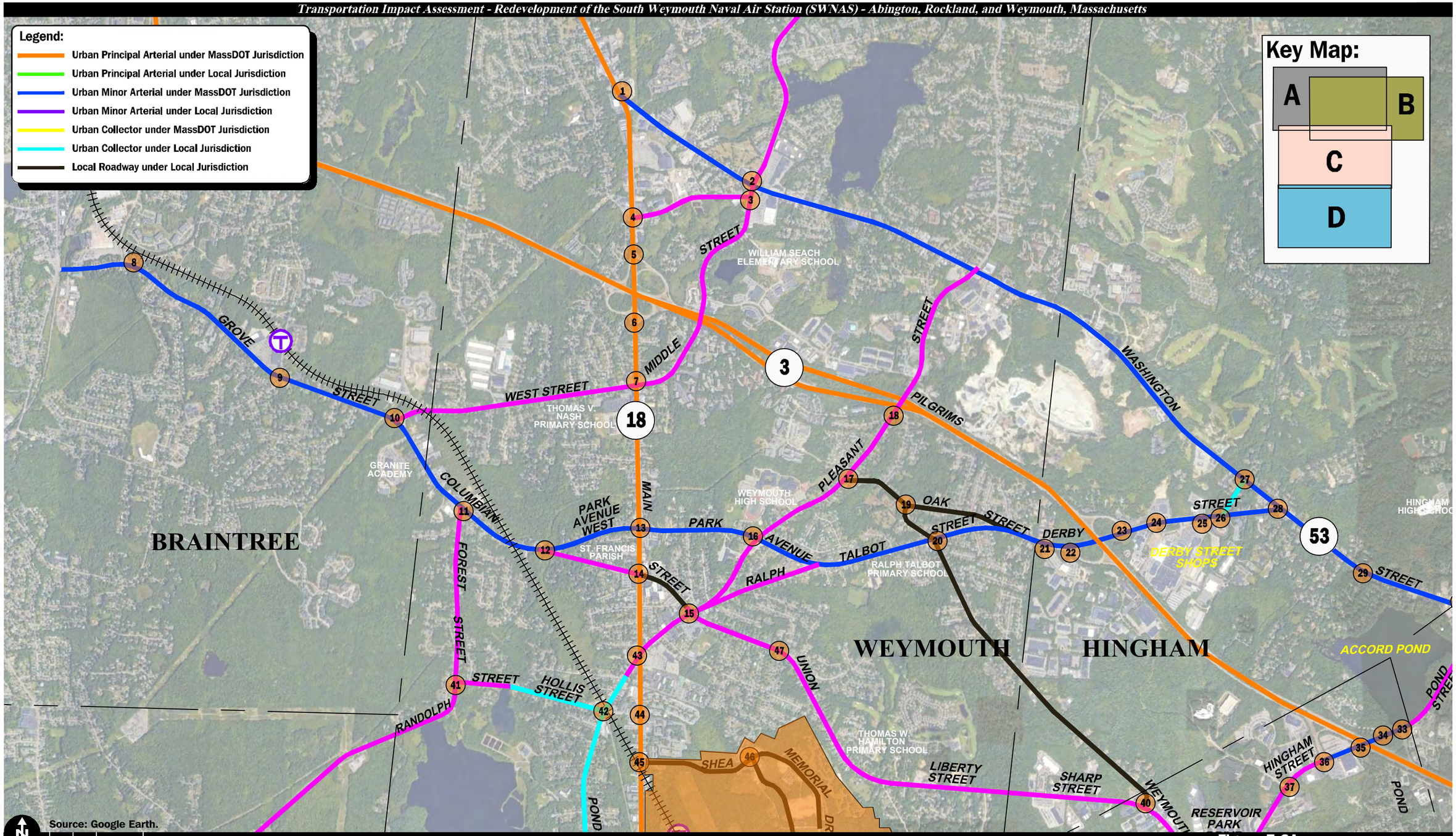


Figure 7-2A

Roadway Jurisdiction, Railroads, and Sensitive Receptors

Vanasse & Associates inc

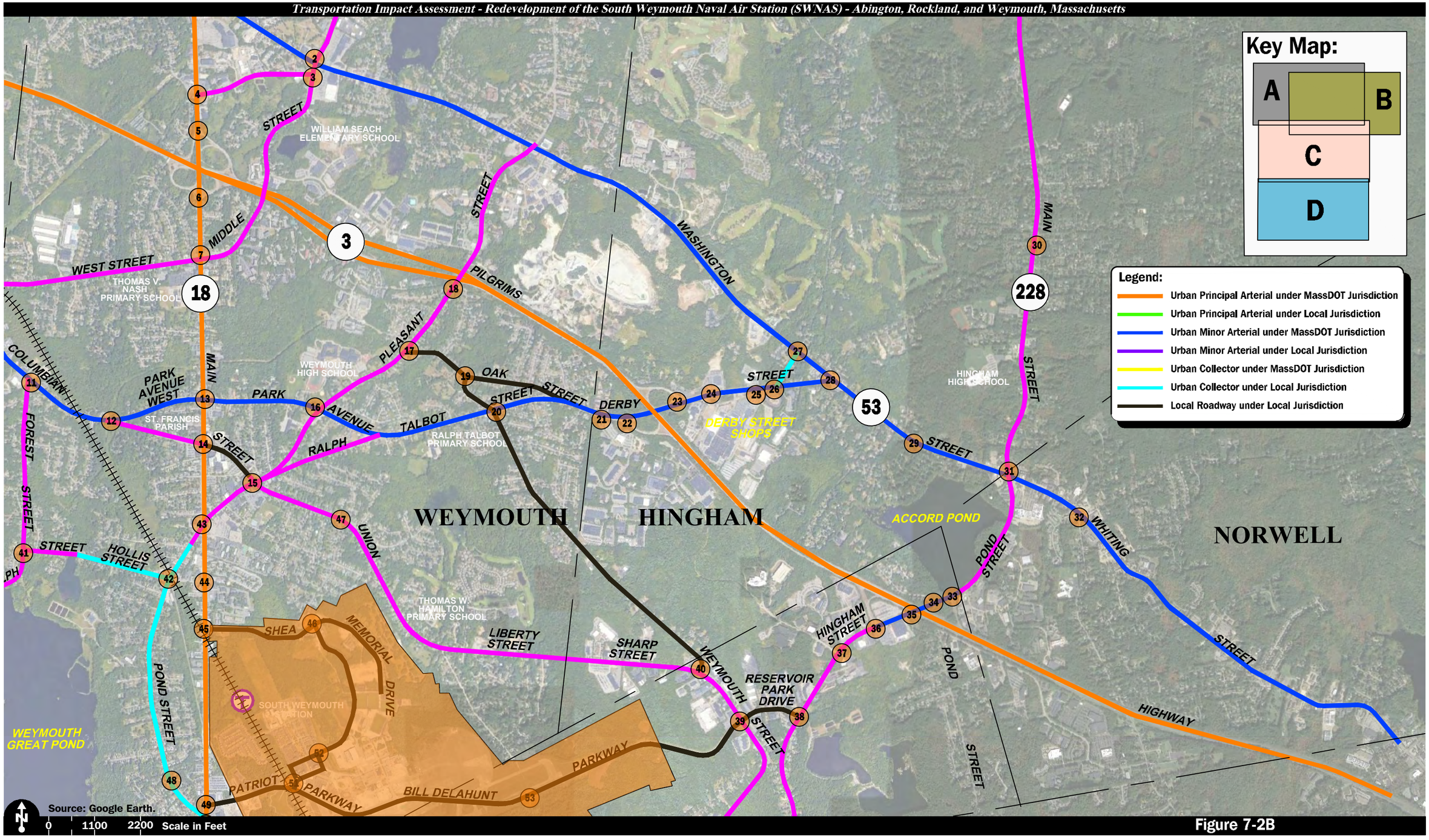


Figure 7-2B

Roadway Jurisdiction, Railroads, and Sensitive Receptors

Vanasse & Associates inc

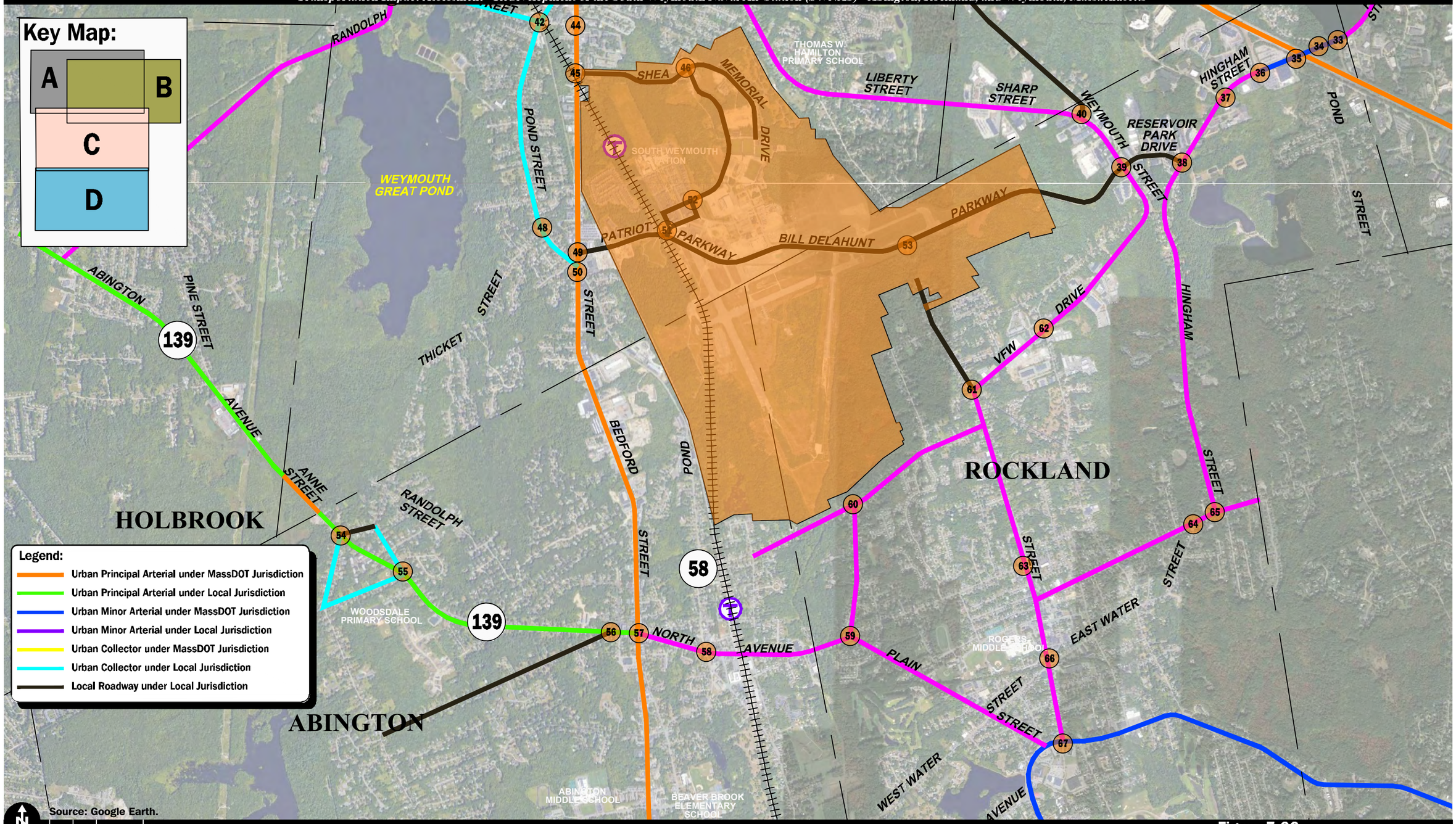


Figure 7-2C

Roadway Jurisdiction, Railroads, and Sensitive Receptors

Vanasse & Associates inc

Legend:

- Urban Principal Arterial under MassDOT Jurisdiction
- Urban Principal Arterial under Local Jurisdiction
- Urban Minor Arterial under MassDOT Jurisdiction
- Urban Minor Arterial under Local Jurisdiction
- Urban Collector under MassDOT Jurisdiction
- Urban Collector under Local Jurisdiction
- Local Roadway under Local Jurisdiction

Key Map:

A B C D

ABINGTON
BROCKTON
WHITMAN
HANSON

STREET
CENTRE
CENTER SCHOOL
SUMMER
BEDFORD
WASHINGTON
JOHN DUVAL ELEMENTARY SCHOOL
AVENUE
SOUTH
WHITMAN STATION
TEMPLE
STREET
WHITMAN MIDDLE SCHOOL
MASSASOIT COMMUNITY COLLEGE
AUBURN
WHITMAN HANSON REGIONAL HIGH SCHOOL

69 71 70 18 27 72 14 73

Source: Google Earth.

0 1100 2200 Scale in Feet

Figure 7-2D

Roadway Jurisdiction, Railroads, and Sensitive Receptors

Vanasse & Associates inc

STUDY METHODOLOGY

This study is responsive to the scope of work that was identified in the Certificate that was issued by the Secretary of Energy and Environmental Affairs that was issued on the 2017 NPC[8] that was filed for the Project and was: i) prepared in consultation with MassDOT and the Towns of Abington, Braintree, Hanover, Hingham, Holbrook, Norwell, Rockland, Weymouth, Whitman; ii) performed in accordance with MassDOT's *Transportation Impact Assessment (TIA) Guidelines* and the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such reports; and iii) conducted in three distinct stages.

The first stage involved an assessment of existing conditions in the study area and included an inventory of roadway geometrics; pedestrian and bicycle facilities; on-street parking; public transportation services; observations of traffic flow; and collection of pedestrian, bicycle and vehicle counts.

In the second stage of the study, future traffic conditions were projected and analyzed. Specific travel demand forecasts for the Project were assessed along with future traffic demands due to expected traffic growth independent of the Project. A 20-year time horizon was selected for analyses to reflect the long-term build-out and occupancy that is contemplated for the Project consistent with MassDOT's *Transportation Impact Assessment (TIA) Guidelines*. The traffic analysis conducted in stage two identifies existing or projected future roadway capacity, traffic safety, and site access issues.

The third stage of the study presents and evaluates measures to address traffic and safety issues, if any, identified in stage two of the study.

[8]Epsilon, et al; op. cit. 7-1; February, 28, 2017.

EXISTING CONDITIONS

A comprehensive field inventory of existing conditions within the study area was conducted in 2022. The field investigation consisted of an inventory of existing roadway geometrics; pedestrian and bicycle facilities; public transportation services; traffic volumes; and operating characteristics; as well as posted speed limits and land use information within the study area. The study area that was assessed for the Project is consistent with that evaluated in the 2007 FEIR[9] and 2017 NPC that were filed for prior iterations of the Project, and consisted of Route 18, Hingham Street, Bill Delahunt Parkway, Shea Memorial Drive and Trotter Road, and 73 specific intersections located along these roadways which are depicted graphically on Figure 7-3.

The following describes the study area roadways and intersections.

ROADWAYS

Route 18

- Two-lane, urban principal arterial roadway under MassDOT jurisdiction north of Winter Street; four-lane, urban principal arterial roadway under MassDOT jurisdiction between Winter Street and Route 139; two-lane, urban principal arterial roadway under MassDOT jurisdiction south of Route 139.
- Traverses the study area in a general north-south direction providing a full-access interchange with Route 3 (Pilgrim Highway) to the north of the Project site.
- Generally provides four 11 to 13-foot-wide travel lanes that are separated by a double-yellow centerline with 1 to 6-foot wide marked shoulders and additional turning lanes provided at major intersections in the vicinity of the Project site.
- The posted speed limit is 35 miles per hour (mph) in the vicinity of the Project site.
- Sidewalks are generally provided along both sides of the roadway.
- Illumination is generally provided by way of street-lights mounted on wood poles.

[9]Epsilon, et al; op. cit. 7-1; June 17, 2007.

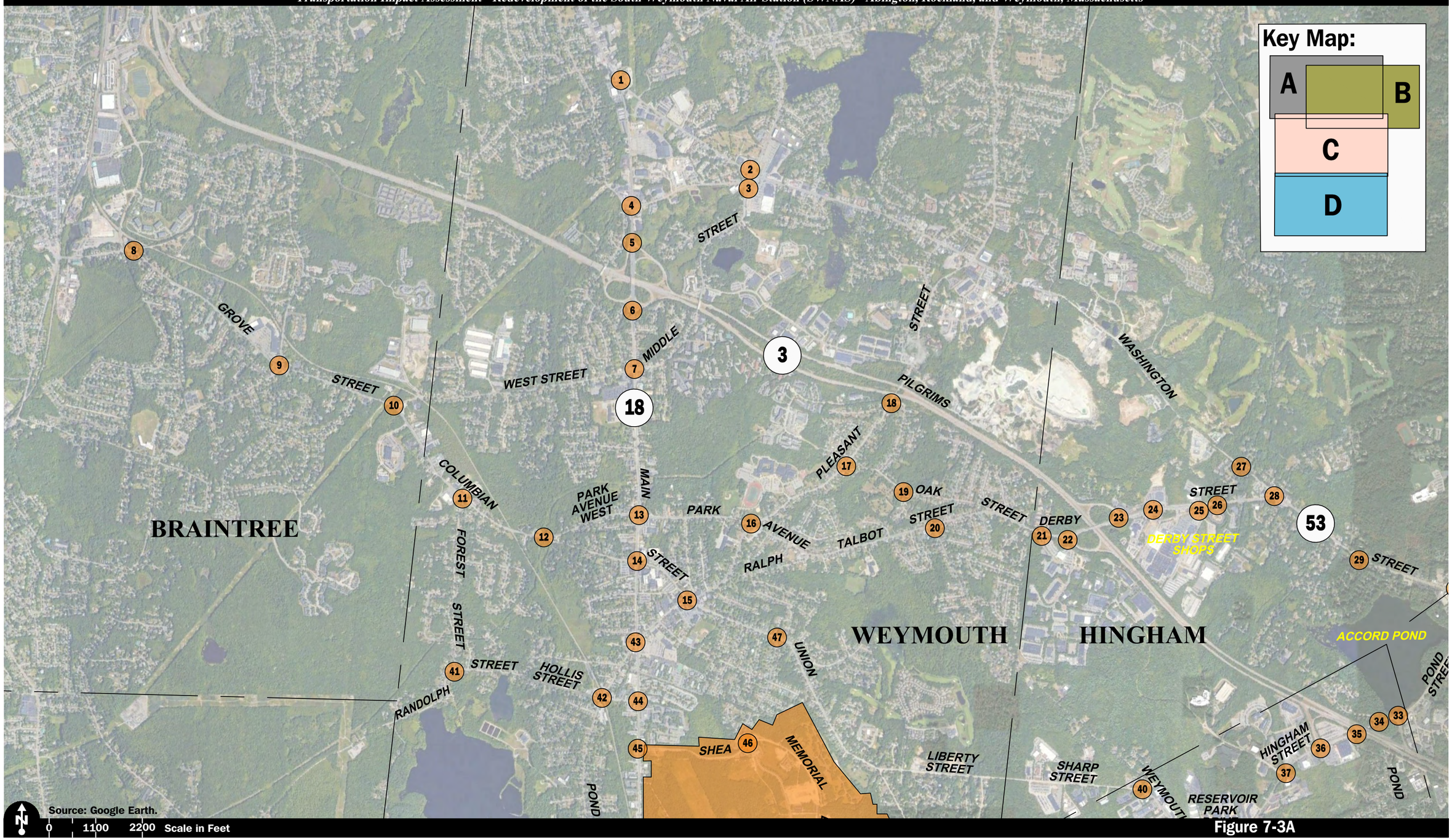


Figure 7-3A

Study Area Intersections

Vanasse & Associates inc

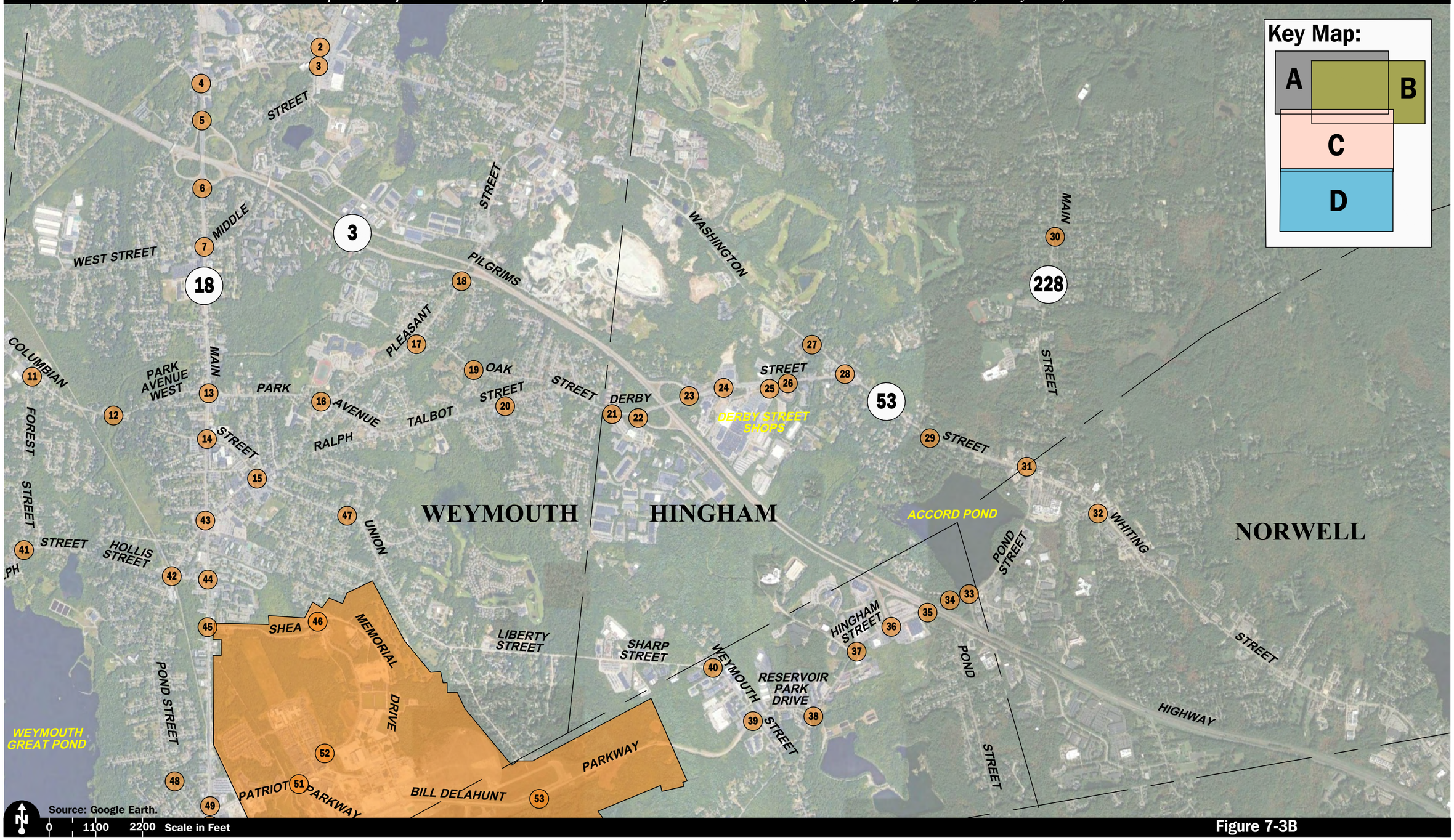


Figure 7-3B

Study Area Intersections

Vanasse & Associates inc

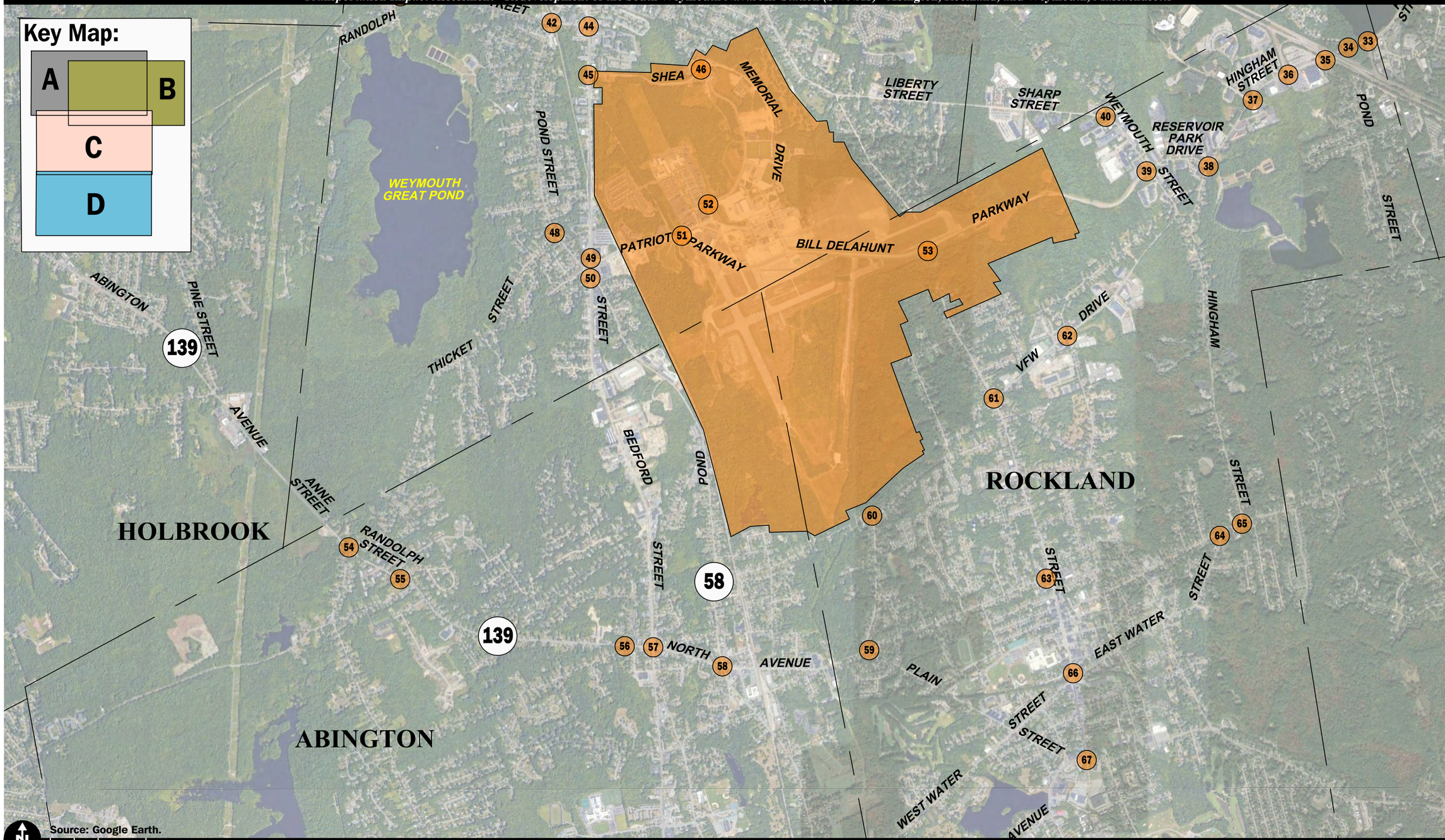


Figure 7-3C

Study Area Intersections

Vanasse & Associates inc

Figure 7-3D

Study Area Intersections

Vanasse & Associates inc

- Land use within the study area consists of the Project site, the South Shore Hospital, Abington High School, residential and commercial properties.

Hingham Street

- Four-lane, urban minor arterial roadway under MassDOT jurisdiction north of the Route 3 Southbound Ramps; four-lane, urban minor arterial roadway under local jurisdiction between the Route 3 Southbound Ramps and Commerce Road; two-lane, urban minor arterial roadway under local jurisdiction south of Commerce Road.
- Designated as Route 228 north of the Route 3 Southbound Ramps.
- Traverses the study area in a general north-south direction between the Norwell town line where Hingham Street becomes Pond Street and Route 123.
- Provides four 10 to 12-foot wide travel lanes that are separated by a double-yellow centerline with 1 to 4-foot wide marked shoulders and additional turning lanes provided at major intersections north of Commerce Road.
- Provides two 11 to 12-foot wide travel lanes that are separated by a double-yellow centerline with 1 to 2-foot wide marked shoulders and additional turning lanes provided at major intersections south of Commerce Road.
- The posted speed limit is 45 mph north of the Route 3 Southbound Ramps and 25 mph south of the Route 3 Southbound Ramps.
- Sidewalks are provided intermittently along the west side of the roadway south of Weymouth Street.
- Illumination is provided by way of street-lights mounted on wood poles.
- Land use within the study area consists of the Project site and commercial and residential properties and areas of open and wooded space.

Bill Delahunt Parkway

- Two-lane, local roadway under local jurisdiction east of Union Street; four-lane, local roadway under local jurisdiction west of Union Street.
- Traverses the study area in a general east-west direction between Weymouth Street and Shea Memorial Drive.
- Provides two 11-foot-wide travel lanes that are separated by a double-yellow centerline with 4-foot wide marked shoulders provided east of Union Street.
- Provides four 11-foot wide travel lanes that are separated by a double-yellow centerline with 4-foot wide marked shoulders provided west of Union Street.
- The posted speed limit is 30 mph within the study area.
- Sidewalks are provided along the north side of the roadway east of Union Street and both sides of the roadway west of Union Street.
- Illumination is provided by way of street-lights mounted on metal poles.
- Land use within the study area consists of the Project site and areas of open and wooded space.

Shea Memorial Drive

- Two-lane, local collector roadway under the jurisdiction of the South Shore Tri-Town Development Corporation (SSTTDC).
- Traverses the study area in a general east-west direction for a distance of approximately 2,500 feet east of Route 18 before closing to public travel at the Memorial Grove Avenue intersection; and in a general north-south direction for a distance of approximately 1,500 feet north of Bill Delahunt Parkway before closing to public travel at the Redfield Road intersection.
- Provides two 12-foot-wide travel lanes that are separated by a double-yellow centerline with 6-foot wide bicycle lanes and additional turning lanes provided at major intersections between Route 18 and Memorial Grove Avenue.
- Provides two 11 to 13-foot wide travel lanes that are separated by a double-yellow centerline with 1 to 13-foot wide marked shoulders and additional turning lanes provided at major intersections between Bill Delahunt Parkway and Redfield Road.
- A posted speed limit is not provided and, as such, the statutory of "prima facie" speed limit pursuant to M.G.L. c. 90 § 17 is 30 mph.[10]
- Sidewalks are provided along the south side of the roadway between Route 18 and Memorial Grove Avenue and both sides of the roadway between Bill Delahunt Parkway and Redfield Road.
- Illumination is provided by way of street-lights mounted on metal poles.
- Land use within the study area consists of the Project site and areas of open and wooded space.

Trotter Road

- Two-lane, local collector roadway under Town of Weymouth jurisdiction between Route 18 and a point just east of the Massachusetts Bay Transportation Authority (MBTA) Commuter Rail tracks, after which the roadway is under the jurisdiction of the SSTTDC.
- Traverses the study area in a general east-west direction between Snow Bird Avenue and Route 18.
- Provides two 10-foot-wide travel lanes that are separated by a double-yellow centerline with 2-foot wide marked shoulders and on-street parking provided east of Patriot Parkway; provides two 11 to 16-foot-wide travel lanes that are separated by a double-yellow centerline with 5-foot wide bicycle lanes and additional tuning lanes provided at major intersections west of Patriot Parkway.
- A posted speed limit is not provided and, as such, the statutory speed limit is 30 mph.
- Sidewalks are provided intermittently along both sides of the roadway.
- Illumination is provided by way of street-lights mounted on wood and metal poles.
- Land use within the study area consists of the Project site and commercial and residential properties.

[10]The statutory or "prima facie" speed is defined in M.G.L. Chapter 90, Section 17, as the speed which would be deemed reasonable and proper to operate a motor vehicle.

INTERSECTIONS

Table 7-2 and Figure 7-4 summarize existing lane use, traffic control, and pedestrian and bicycle accommodations at the study area intersections as observed in 2022.

Table 7-2
STUDY AREA INTERSECTION DESCRIPTION

No.	Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
1	Rte. 18/ Rte. 53	TS	1 left-turn lane and 1 general purpose travel lane on Rte. 18; 1 shared left-turn/through lane and 1 channelized right-turn lane on Rte. 53 eastbound; 1 left-turn lane and 1 through/right-turn lane on Rte. 53 westbound; 1 general purpose travel lane on the private driveway	Yes; 2 to 3-feet on Rte. 18; 2-feet on Rte. 53; 1-foot on the private driveway	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across Rte. 53 and the private driveway; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; shared traveled-way[b] on Rte. 18, Rte. 53 and the private driveway
2	Rte. 53/ Middle St.	TS	1 left-turn lane, 1 through lane and 1 shared through/right-turn lane on Rte. 53 and Middle St. southbound; 1 left-turn lane, 2 through lanes and 1 right-turn lane on Middle St. northbound	Yes; 4-feet on Rte. 53; 1-foot on Middle St.	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; bicycle lanes along Middle St. south of the intersection; "sharrow" markings along Middle St. north of the intersection; shared traveled-way along Rte. 53
3	Middle St./ Winter St.	TS	1 left-turn lane and 2 through lanes on Middle St. northbound; 2 through lanes and 1 right-turn lane on Middle St. southbound; 2 left-turn lanes and 1 right-turn lane on Winter St.	Yes; 1 to 4-feet on Middle St. and Winter St.	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across the Middle St. south leg and Winter St.; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; bicycle lanes along Middle St. north of the intersection and Winter St. eastbound; shared traveled-way along Middle St. south of the intersection and Winter St. westbound
4	Rte. 18/ Winter St.	TS	1 left-turn/through lane, 1 through lane and 1 channelized right-turn lane on Rte. 18 northbound; 1 left-turn/through lane and 1 through/right-turn lane on Rte. 18 southbound ; 1 left-turn lane, 1 through lane and 1 right-turn lane on Winter St. eastbound; 2 left-turn lanes and 1 through/right-turn lane on Winter St. westbound	Yes; 2 to 4-feet on Rte. 18; 1 to 4-feet on Winter St.	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; shared traveled-way along Rte. 18 south of the intersection

See notes at end of table.

Table 7-2 (Continued)
STUDY AREA INTERSECTION DESCRIPTION

No.	Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
5	Rte. 18/ Rte. 3 NB Ramps	Y	1 through lane and 1 through/right-turn lane on Rte. 18; 1 left-turn lane and 1 channelized right-turn lane on the Rte. 3 NB off-ramp	Yes; 1 to 8-feet on Rte. 18; 2-feet on the Rte. 3 NB Ramps	Yes; sidewalks along both sides of Rte. 18; crosswalks provided across the Rte. 3 NB Ramps	Yes; shared traveled-way along Rte. 18
6	Rte. 18/ Rte. 3 SB Ramps	Y	1 through lane and 1 through/right-turn lane on Rte. 18; 1 right-turn lane on the Rte. 3 SB off-ramps	Yes; 4 to 10-feet on Rte. 18; 2-feet on the Rte. 3 SB Ramps	Yes; sidewalks along both sides of Rte. 18; crosswalks provided across the Rte. 3 NB Ramps	Yes; shared traveled-way along Rte. 18
7	Rte. 18/ West St./ Middle St.	TS	1 left-turn lane, 2 through lanes and 1 right-turn lane on all approaches	Yes; 1 to 3-feet on Rte. 18; 4-feet on West St. and Middle St.	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; bicycle lanes along Rte. 18, West St. and Middle St.
8	Grove St./ Plain St.	S	1 general purpose travel lane on all approaches	Yes; 2 to 3-feet on Grove St.; 1 to 2-feet on Plain St.	Yes; sidewalks along both sides of the intersecting roadways; crosswalk provided across the Plain St. north leg	Yes; shared traveled-way along Grove St. and Plain St.
9	Liberty St./ Grove St.	TS	1 left-turn/through lane and 1 through/right-turn lane on Liberty St. and Grove St.	Yes; 1 to 4-feet on Liberty St.; 1 to 2-feet on Grove St.	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; shared traveled-way along Grove St.
10	Grove St./ Columbian St.	TS	1 left-turn/through lane on 1 through lane on Grove St. eastbound	Yes; 1 to 2-feet on Grove St.; 1-foot on Columbian St.	No	Yes; shared traveled-way along Grove St. west of the intersection
11	Columbian St./ Forest St.	S	1 general purpose travel lane on all approaches	Yes; 2 to 5-feet on Columbian St.; 1-foot on Forest St.	Yes; sidewalks along the south side of Columbian St. and the west side of Forest St.; crosswalk provided across Forest St.	Yes; shared traveled-way along Columbian St.

See notes at end of table.

Table 7-2 (Continued)
STUDY AREA INTERSECTION DESCRIPTION

No.	Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
12	Columbian St./ Park Ave. West	S	1 general purpose travel lane on all approaches	Yes; 3 to 10-feet on Columbian St.	Yes; sidewalks along the south side of Columbian St. and the southeast side of Park Ave. West; crosswalk provided across the Columbian St. west leg	Yes; bicycle lanes along Park Ave. West; shared traveled-way along Columbian St.
13	Rte. 18/ Park Ave./ Park Ave. West	TS	1 left-turn lane, 1 through lane and 1 through/ right-turn lane on Rte. 18 and Park Ave. West; 1 left-turn lane, 1 through lane and 1 right-turn lane on Park Ave.	Yes; 3 to 4-feet on Rte. 18; 4-feet on Park Ave. and Park Ave. West	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; bicycle lanes along Park Ave. westbound and Park Ave. West westbound; shared traveled-way along Rte. 18, Park Ave. eastbound and Park Ave. West eastbound
14	Rte. 18/ Columbian St.	TS	1 left-turn lane, 1 through lane and 1 through/ right-turn lane on Rte. 18; 1 left-turn/through lane and 1 right-turn lane on Columbian St.	Yes; 3 to 4-feet on Rte. 18; 1 to 4-feet on Columbian St.	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; bicycle lane along Columbian St. eastbound west of the intersection; shared traveled-way along Rte. 18 and Columbian St. eastbound east of the intersection and Columbian St. westbound west of the intersection
15	Pleasant St./ Columbian St./ Union St.	S	1 general purpose travel lane on Pleasant St. eastbound; 1 left-turn lane, 1 through lane and 1 right-turn lane on Pleasant St. westbound and Columbian St. 1 left-turn lane, 1 through lane and 1 channelized right-turn lane on Union St.	No	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across all legs	Yes; shared traveled-way along Pleasant St. eastbound and Columbian St northwestbound northwest of the intersection
16	Pleasant St./ Park Ave.	TS	1 left-turn/through lane and 1 through/right-turn lane on Pleasant St.; 1 left-turn lane and 1 through/ right-turn lane on Park Ave.	Yes; 1 to 5-feet on Pleasant St.; 1 to 4-feet on Park Ave.	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; bicycle lane along Pleasant St. northbound north of the intersection; shared traveled-way along Park Ave. west of the intersection

See notes at end of table.

Table 7-2 (Continued)
STUDY AREA INTERSECTION DESCRIPTION

No.	Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
17	Pleasant St./ Elm St.	S	1 general purpose travel lane on all approaches	No	Yes; sidewalks along both sides of Pleasant St. southwest of the intersection, northwest side of Pleasant St. northeast of the intersection, south side of Elm St. crosswalks provided across the Pleasant St. northeast leg and Elm St.	Yes; bicycle lanes along Pleasant St.
18	Pleasant St./ Pine St.	S	1 general purpose travel lane on all approaches	No	Yes; sidewalks along both sides of Pleasant St., north side of Pond St.; crosswalk provided across Pine St.	Yes; bicycle lanes along Pleasant St.
19	Pine St./ Oak St.	S	1 general purpose travel lane on all approaches	No	Yes; sidewalks along north side of Pine St. west of the intersection, west side of Pond St. south of the intersection, north side of Oak St.; crosswalk provided across the Pine St. west leg	Yes; shared traveled-way along Pine St. west of the intersection
20	Pine St./ Ralph Talbot St.	TS	1 general purpose travel lane on all approaches	Yes; 1-foot on Pine St. south of the intersection; 4 to 5-feet on Ralph Talbot St.	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across both Pine St. legs and the Ralph Talbot St. west leg; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; shared traveled-way along Ralph Talbot St.
21	Pond Park Rd./ Derby St.	TS	1 left-turn/through lane and 1 through/right-turn lane on Derby St. eastbound; 1 left-turn lane and 1 through/right-turn lane on Derby St. westbound; 1 left-turn/through lane and 1 right-turn lane on Pond Park Rd. and the private driveway	Yes; 4 to 5-feet on Derby St.; 1-foot on Pond Park Rd.	Yes; sidewalks along both sides of Derby St. west of the intersection, north side of Derby St. east of the intersection, west side of Pond Park Rd.; crosswalks provided across the Derby St. west leg and the private driveway; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; shared traveled-way along Derby St.

See notes at end of table.

Table 7-2 (Continued)
STUDY AREA INTERSECTION DESCRIPTION

No.	Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
22	Derby St./ Rte. 3 SB Ramps	TS	2 through lanes and 1 channelized right-turn lane on Derby St. eastbound; 1 left-turn lane and 1 through lane on Derby St. westbound; 1 left-turn lane and 2 channelized right-turn lanes on the Rte. 3 SB off-ramp	Yes; 2-feet on the Rte. 3 Ramps	Yes; sidewalk along the north side of Debry St.	Yes; bicycle lanes along Derby St.
23	Derby St./ Rte. 3 NB Ramps	TS	1 left-turn lane and 2 through lanes on Derby St. eastbound; 2 through lanes and 1 channelized right-turn lane on Derby St. westbound; 2 left-turn lanes and 1 channelized right-turn lane on the Rte. 3 NB off-ramp	Yes; 2-feet on the Rte. 3 Ramps	Yes; sidewalk along the north side of Derby St.; crosswalks provided across the Rte. 3 Ramps; pedestrian traffic signal equipment and phasing (concurrent) provided	Yes; bicycle lanes along Derby St.
24	Derby St./ Old Derby St.	TS	2 left-turn lanes, 2 through lanes and 1 right-turn lane on Derby St eastbound; 1 left-turn lane, 2 through lanes and 1 right-turn lane on Derby St. westbound; 1 left-turn lane and 1 through/right-turn lane on Old Derby St. northbound; 1 left-turn/through lane and 1 right-turn lane on Old Derby St. southbound	No	Yes; sidewalks along both sides of Derby St. east of the intersection and Old Derby St., north side of Derby St. west of the intersection; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; bicycle lanes along Derby St. and Old Derby St.
25	Derby St./ Derby St. Shops Driveway	TS	1 through lane and 1 through/right-tun lane on Derby St. eastbound; 1 left-turn lane and 2 through lanes on Derby St. westbound; 1 left-turn lane and 1 left-turn/right-turn lane on the Derby St. Shops Driveway	No	Yes; sidewalks along both sides of Derby St.; crosswalks provided across the Derby St. west leg and the Derby St. Shops Driveway; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; bicycle lanes along Derby St.

See notes at end of table.

Table 7-2 (Continued)
STUDY AREA INTERSECTION DESCRIPTION

No.	Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
26	Derby St./ Cushing St.	TS	1 left-turn lane, 1 through lane, and 1 through/ right-turn lane on Derby St.; 1 left-turn/through lane and 1 right-turn lane on Cushing St.; 1 general purpose travel lane on the private driveway	No	Yes; sidewalks along both sides of Derby St.; crosswalks provided across the Derby St. east leg, Cushing St. and the private driveway; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; bicycle lanes along Derby St.; shared traveled-way along Cushing St. northbound and the private driveway
27	Rte. 53/ Cushing St.	TS	1 left-turn/through lane and 1 right-turn lane on Rte. 53 southeastbound; 1 general purpose travel lane on Rte. 53 northwestbound; 1 left-turn lane and 1 through/right-turn on Cushing St.	Yes; 1 to 4-feet on Rte. 53; 1 to 2-feet on Cushing St.	Yes; sidewalks along both sides of Rte. 53 southeast of the intersection, west side of Cushing St. north of the intersection, east side of Cushing St. south of the intersection; crosswalks provided across the Rte. 53 southeast leg and the Cushing St. north leg; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; shared traveled-way along Rte. 53 and Cushing St. departing the intersection
28	Rte. 53/ Derby St./ Gardner St.	TS	1 left-turn lane and 1 through/right-turn lane on Rte. 53 southbound; 2 through lanes and 1 right-turn lane on Rte. 53 northwestbound; 1 left-turn lane, 1 through lane and 1 through/ right-turn lane on Derby St.; 1 general purpose travel lane on Gardner St. northbound; 1 left-turn/through lane and through/right-turn lane on Gardner St southwestbound	Yes; 1-foot on Gardner St.	Yes; sidewalks provided along both sides of Rte. 53, Derby St. and Gardner St. northeast of the intersection; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; bicycle lanes along Rte. 53 and Derby St.; "sharrow" markings along Gardner St.
29	Rte. 53/ Farm Hills Ln.	S	1 through lane and 1 through/right-turn lane along Rte. 53 eastbound; 1 left-turn/through lane and 1 through along Rte. 53 westbound; 1 left-turn/right-turn lane on Farm Hills Ln.	No	Yes; sidewalk provided along the south side of Rte. 53; crosswalk provided across Farm Hills Ln.	No

See notes at end of table.

Table 7-2 (Continued)
STUDY AREA INTERSECTION DESCRIPTION

No.	Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
30	Rte. 228/ Gardner St./ Scotland St.	S	1 general purpose travel lane on all approaches	Yes; 2 to 4-feet on Rte. 228	Yes; sidewalks provided along both sides of Rte. 228, north side of Gardner St., south side of Scotland St.; crosswalks provided across Gardner St. and Scotland St.	Yes; shared traveled-way along Rte. 228 and Gardner St. departing the intersection
31	Rte. 53/ Rte. 228	TS	1 left-turn lane, 1 through lane and 1 through/right-turn lane on Rte. 53; 1 left-turn lane, 1 through lane and 1 right-turn lane on Rte. 228 northbound; 1 left-turn lane, 2 through lanes and 1 right-turn lane on Rte. 228 southbound	Yes; 2 to 3-feet on Rte. 53; 1 to 2-feet on Rte. 228	Yes; sidewalks provided along both sides of Rte. 53 east of the intersection and Rte. 228, along the south side of Rte. 53 west of the intersection; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (concurrent) provided	Yes; shared traveled-way along Rte. 53
32	Rte. 53/ High St./ Grove St.	TS	1 left-turn lane, 1 through lane and 1 channelized right-turn on Rte. 53 southeastbound and Grove St.; 1 left-turn lane, 1 through lane and 1 through/right-turn lane on Rte. 53 northwestbound; 1 left-turn lane and 1 through/right-turn lane on High St.	Yes; 2-feet on Rte. 53; 1 to 2-feet on High St. and Grove St.	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across the Rte. 53 southeast leg, High St. and Grove St.; pedestrian traffic signal equipment and phasing (concurrent) provided	Yes; shared traveled-way along Rte. 53, High St. and Grove St.
33	Rte. 228/ Rte. 3 NB Ramps	TS	2 through lanes and 1 channelized right-turn lane on Rte. 228 eastbound; 1 left-turn/through lane and 1 through lane on Rte. 228 westbound; 2 left-turn lanes and 1 channelized right-turn lane on the Rte. 3 NB off-ramp	Yes; 1 to 2-feet on Rte. 228; 2-feet on the Rte. 3 NB ramps	No	Yes; shared traveled-way along Rte. 228 eastbound
34	Rte. 228/ Gardner St.	S	1 left-turn/through lane and 1 through lane on Rte. 228 eastbound; 1 through lane and 1 through/right-turn lane on Rte. 228 westbound; 1 general purpose travel lane on Gardner St.	Yes; 1 to 2-feet on Rte. 228	No	Yes; shared traveled-way along Rte. 228 eastbound

See notes at end of table.

Table 7-2 (Continued)
STUDY AREA INTERSECTION DESCRIPTION

No.	Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
35	Rte. 228/ Pond St.	TS	1 left-turn/through lane, 1 through lane and 1 right-turn lane on Rte. 228 eastbound; 1 left-turn/through lane and 1 through/right-turn lane on Rte. 228 westbound; 1 left-turn/through lane and 1 right-turn lane on Pond St. and the Park and Ride driveway	Yes; 1 to 2-feet on Rte. 228 and the Park and Ride driveway; 1-foot on Pond St.	No	Yes; shared traveled-way along Rte. 228 westbound west of the intersection
36	Rte. 228/ Hingham St./ Rte. 3 SB Ramps	TS	2 left-turn lanes, 1 through lane and 1 through/right-turn lane on Rte. 228 eastbound; 2 left-turn lanes, 2 through lanes and 1 channelized right-turn lane on Rte. 228 westbound; 1 left-turn lane, 1 left-turn/through lane and 1 channelized right-turn lane on the Rte. 3 SB off-ramp; 1 left-turn lane, 1 through lane and 1 right-turn lane on the private driveway	Yes; 2 to 4-feet on Rte. 228; 1 to 2-feet on the Rte. 3 SB ramps; 2-feet on the private driveway	No	Yes; shared traveled-way along Rte. 228
37	Hingham St./ Commerce Rd.	TS	1 left-turn/through lane and 1 through/right-turn lane on Hingham St. northbound; 1 left-turn/through lane, 1 through lane and 1 channelized right-turn lane on Hingham St. southbound; 1 left-turn lane, 1 left-turn/through lane and 1 channelized right-turn lane on Commerce Rd.; 1 general purpose travel lane on the private driveway	Yes; 1 to 3-feet on Hingham St.; 1 to 2-feet on Commerce Rd.	No	Yes; shared traveled-way along Hingham St. and Commerce Rd.
38	Hingham St./ Reservoir Park Dr.	TS	1 left-turn lane and 1 through lane on Hingham St. northbound; 1 through lane and 1 right-turn on Hingham St. southbound; 1 left-turn lane and 1 right-turn lane on Reservoir Park Dr.	Yes; 1 to 2-feet on Hingham St.; 2-feet on Reservoir Park Dr.	Yes; sidewalk along the north side of Reservoir Park Dr.	Yes; shared traveled-way along Hingham St. and Reservoir Park Dr.

See notes at end of table.

Table 7-2 (Continued)
STUDY AREA INTERSECTION DESCRIPTION

No.	Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
39	Weymouth St./ Bill Delahunt Pkwy./Reservoir Park Dr.	TS	1 left-turn lane and 1 through/right-turn lane on Weymouth St. southeastbound and Reservoir Park Dr.; 1 left-turn/through lane and 1 right-turn lane on Weymouth St. northwestbound; 1 left-turn lane, 1 through lane and 1 right-turn lane on Bill Delahunt Pkwy.	Yes; 1 to 5-feet on Weymouth St.; 4-feet on Bill Delahunt Pkwy.; 1-foot Reservoir Park Dr.	Yes; sidewalks along the northwest side of Weymouth St. and the northeast side of Bill Delahunt Pkwy. and Reservoir Park Dr.; crosswalks provided across the Weymouth St. northeast leg and Bill Delahunt Pkwy.; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; "sharrow" markings along Weymouth St. southwest of the intersection; shared traveled-way along Weymouth St. northeast of the intersection and Bill Delahunt Pkwy.
40	Weymouth St./ Sharp St./ Abington St.	S	1 general purpose travel lane on all approaches	Yes; 7-feet on Weymouth St.; 6 to 8-feet on Sharp St.	Yes; sidewalk along the southwest side of Sharp St.	Yes; shared traveled-way along Weymouth St., Sharp St. and Abington St.
41	Randolph St./ Forest St.	S	1 general purpose travel lane on all approaches	Yes; 4-feet on Randolph St.; 1 to 2-feet on Forest St.	Yes; sidewalks along both sides of Randolph St. west of the intersection, south side of Randolph St. east of the intersection and east side of Forest St.	Yes; shared traveled-way along Randolph St.
42	Pond St./ Hollis St./ Derby St.	TS	1 left-turn lane and 1 through/right-turn lane on Pond St. northbound; 1 left-turn/through lane and 1 right-turn lane on Pond St. southbound; 1 left-turn/through lane and 1 channelized right-turn lane on Hollis St.; 1 general purpose travel lane on Derby St.	Yes; 1 to 2-feet on Pond St.; 1-foot on Hollis St. and Derby St.	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across the Pond St. north leg, and Hollis St.	Yes; shared traveled-way along Pond St., Hollis St. and Derby St.
43	Rte. 18/ Pond St./ Pleasant St.	TS	2 through lanes and 1 right-turn lane on Rte. 18; 1 left-turn lane, 1 left-turn/through lane, 1 through lane and 1 channelized right-turn lane on Pond St. and Pleasant St.	Yes; 4-feet on Rte. 18 and Pleasant St., 3 to 4-feet on Pond St.	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; bicycle lanes along Rte. 18; shared traveled-way along Pond St. and Pleasant St.
44	Rte. 18/ Derby St.	S	1 left-turn/through lane and 1 through/right-turn lane on Rte. 18; 1 general purpose travel lane on Derby St. and the private driveway	Yes; 5-feet on Rte. 18 and Derby St.	Yes; sidewalks along both sides of Rte. 18; crosswalk provided across Derby St.	Yes; shared traveled-way along Rte. 18 and Derby St.

See notes at end of table.

Table 7-2 (Continued)
STUDY AREA INTERSECTION DESCRIPTION

No.	Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
45	Rte. 18/Shea Memorial Dr.	TS	1 through lane and 1 through/right-turn lane on Rte. 18 northbound; 1 left-turn lane and 2 through lanes on Rte. 18 southbound; 1 left-turn lane and 1 right-turn lane on Shea Memorial Dr.	Yes; 2 to 6-feet on Rte. 18	Yes; sidewalks along both sides of Rte. 18 and south side of Shea Memorial Dr.; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (concurrent) provided	Yes; shared traveled-way along Rte. 18
46	Shea Memorial Dr./Memorial Grove Ave.	S	1 general purpose travel lane on all approaches	No	Yes; sidewalks provided along the southeast side of Shea Memorial Dr. and both sides of Memorial Grove Ave.; crosswalk provided across Memorial Grove Ave.	Yes; bicycle lanes along Shea Memorial Dr. and Memorial Grove Ave.
47	Union St./ White St./	S	1 general purpose travel lane on all approaches	Yes; 8 to 13-feet on Union St.	Yes; sidewalks along both sides of the intersecting roadways; crosswalk provided across White St.	Yes; shared traveled-way along Union St. and White St.
48	Pond St./ Thicket St.	S	1 general purpose travel lane on all approaches	Yes; 6 to 7-feet on Pond St.; 1 to 3-feet on Thicket St.	Yes; sidewalks along the southwest side of Pond St. and the northwest side of Thicket St.; crosswalk provided across Thicket St.	Yes; shared traveled-way along Pond St. and Thicket St.
49	Rte. 18/ Trotter Rd.	TS	1 through lane and 1 through/right-turn lane on Rte. 18 northbound; 1 left-turn lane and 2 through lanes on Rte. 18 southbound; 1 left-turn lane and 1 right-turn lane on Trotter Rd.	Yes; 1-foot on Trotter Rd.	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across the Rte. 18 north leg and Trotter Rd.; pedestrian traffic signal equipment and phasing (concurrent) provided	Yes; bicycle lanes along Rte. 18 northbound, Rte. 18 southbound north of the intersection and Trotter Rd. westbound; "sharrow" markings along Rte. 18 southbound south of the intersection
50	Rte. 18/ Pond St.	TS	1 left-turn lane, 2 through lanes and 1 channelized right-turn lane on Rte. 18; 1 left-turn lane and 1 through/ right-turn lane on Pond St. southeastbound; 1 left-turn/through lane and 1 right-turn lane on Pond St. northwestbound	Yes; 4-feet on Pond St.	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; bicycle lanes along Rte. 18 northbound and Rte. 18 southbound south of the intersection; "sharrow" markings along Rte. 18 southbound north of the intersection; shared traveled-way along Pond St.

See notes at end of table.

Table 7-2 (Continued)
STUDY AREA INTERSECTION DESCRIPTION

No.	Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
51	Trotter Rd./ Patriot Pkwy.	S	1 general purpose travel lane on all approaches	Yes; 2-feet on Trotter Rd. north of the intersection	Yes; sidewalks along both sides of the intersecting roadways; crosswalk provided across the Trotter Rd. north leg	Yes; bicycle lanes along Trotter Rd. west of the intersection and Patriot Pkwy.
52	Memorial Grove Ave./ Snow Bird Ave.	S	1 general purpose travel lane on all approaches	No	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided along Snow Bird Ave.	Yes; bicycle lanes along Memorial Grove Ave.
53	Shea Memorial Dr./Patriot Pkwy./Bill Delahunt Pkwy.	TS	1 general purpose travel lane on Shea Memorial Dr. northbound; 1 left-turn/through lane and 1 right-turn lane on Shea Memorial Dr. southbound; 1 left-turn lane, 1 through lane and 1 through/right-turn lane on Patriot Pkwy. and Bill Delahunt Pkwy.	Yes; 1 to 13-feet on Shea Memorial Dr.; 5-feet on Patriot Pkwy.; 4-feet on Bill Delahunt Pkwy.	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; bicycle lanes along Patriot Pkwy. westbound
54	Rte. 139/ Hancock St./ Old Randolph St.	S	1 general purpose travel lane on Rte. 139 and Hancock St.; Old Randolph St. is one-way eastbound (departing the intersection)	Yes; 6 to 10-feet on Rte. 139; 1-foot on Hancock St.	Yes; sidewalks along the northeast side of Rte. 139, east side of Hancock St and north side of Old Randolph St.	Yes; shared traveled-way along Rte. 139 and Old Randolph St.
55	Rte. 139/ Chestnut St./ Old Randolph St.	S	1 general purpose travel lane on all approaches	Yes; 9-feet on Rte. 139; 3 to 4-feet on Chestnut St.; 1-foot on Randolph St.	Yes; both sides of Rte. 139 south of the intersection and Old Randolph St., east side of Rte. 139 north of the intersection, south side of Chestnut St.; crosswalks provided along the Rte. 139 south leg and Old Randolph St.	Yes; shared traveled-way along Rte. 139 and Chestnut St.
56	Rte. 139/ Lincoln St.	S	1 general purpose travel lane on all approaches	Yes; 9 to 10-feet on Rte. 139; 1 to 2-feet on Lincoln St.	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across the Rte. 139 west leg and Lincoln St.	Yes; shared traveled-way along Rte. 139

See notes at end of table.

Table 7-2 (Continued)
STUDY AREA INTERSECTION DESCRIPTION

No.	Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
57	Rte. 18/ Rte. 139	TS	1 left-turn lane, 1 through lane and 1 through/ right-turn lane on Rte. 18; 1 left-turn lane, 1 through lane and 1 right-turn lane on Rte. 139 eastbound; 1 left-turn lane, 1 through lane and 1 through/ right-turn lane on Rte. 139 westbound	Yes; 1-foot on Rte. 18; 1 to 3-feet on Rte. 139	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	No
58	Rte. 58/ Rte. 139	TS	1 general purpose travel lane on all approaches	Yes; 4 to 5-feet on Rte. 58; 1 to 2-feet on Rte. 139	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; shared traveled-way along Rte. 58 and Rte. 139
59	Rte. 139/ North Ave./ Salem St.	S	1 general purpose travel lane on all approaches	Yes; 2 to 3-feet on Rte. 139; 3 to 4-feet on North Ave.; 2-feet Salem St.	Yes; both sides of Rte. 139 west of the intersection, west side of Rte. 139 south of the intersection, north side of North St. and west side of Salem St.	Yes; shared traveled-way along Rte. 139, North Ave. and Salem St.
60	Salem St./ Spruce St.	S	1 general purpose travel lane on Salem St.; 1 left-turn lane and 1 right-turn lane separated by a raised island on Spruce Street	Yes; 1 to 2-feet Salem St.	No	Yes; shared traveled-way along Salem St.
61	Union St./ VFW Dr./ Hatherly Rd.	S	1 left-turn/through lane and 1 channelized right-turn lane on Union St. northbound; 1 general purpose travel lane on Union St. southbound, VFW Dr. and Hatherly Rd.	Yes; 6 to 7-feet on Union St.; 2 to 4-feet on VFW Dr.	Yes; both sides of Union St. south of the intersection, west side of Union St. north of the intersection, southeast side of VFW Dr.	Yes; shared traveled-way along Union St. and VFW Dr.
62	VFW Dr./ Pleasant St./ West Pleasant St.	S	1 general purpose travel lane on all approaches	Yes; 5 to 7-feet on VFW Dr.; 1 to 2-feet on Pleasant St.	Yes; sidewalks along the southeast side of VFW Dr. and the east side of Pleasant St.	Yes; shared traveled-way along VFW Dr.

See notes at end of table.

Table 7-2 (Continued)
STUDY AREA INTERSECTION DESCRIPTION

No.	Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
63	Union St./ North Ave.	TS	1 left-turn lane and 1 through lane on Union St. northbound; 1 general purpose travel lane on Union St. southbound and North Ave.	Yes; 1 to 8-feet on Union St.	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; "sharrow" markings along Union St. northbound north of the intersection; shared traveled-way along Union St. southbound and North Ave.
64	Rte. 123/ Webster St.	TS	1 left-turn lane and 1 right-turn lane on Rte. 123 northbound; 1 left-turn lane and 1 through lane on Rte. 123 westbound; 1 through lane and 1 channelized right-turn lane on Webster St.	Yes; 1 to 2-feet on Rte. 123; 3-feet on Webster St.	Yes; sidewalks along both sides of Rte. 123 east of the intersection and Webster St.; east side of Rte. 123 south of the intersection; crosswalks provided across Rte. 123; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; shared traveled-way along Rte. 123 and Webster St.
65	Rte. 123/ Hingham St.	TS	1 left-turn lane and 1 through lane on Rte. 123 eastbound; 1 through lane and 1 channelized right-turn lane on Rte. 123 westbound; 1 left-turn lane and 1 right-turn lane on Hingham St.	Yes; 1 to 2-feet on Rte. 123; 2-feet on Hingham St.	Yes; sidewalks along both sides of Rte. 123 and west side of Hingham St.; crosswalks provided across the Rte. 123 east leg and Hingham St. ; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; shared traveled-way along Rte. 123 and Hingham St.
66	Union St./ East Water St./ West Water St.	TS	1 left-turn/through lane and 1 right-turn lane on Union St.; 1 left-turn/ though lane and 1 channelized right-turn lane on East Water St.; 1 general purpose travel lane on West Water St.	Yes; 5-feet on West Water St.; 2 to 4-feet on East Water St.	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; shared traveled-way along Union St., East Water St. and West Water St.
67	Rte. 123/ Union St.	TS	1 left-turn lane and 1 through/right-turn lane on Rte. 123; 1 general purpose travel lane on the private driveway; 1 left-turn/through lane and 1 right-turn lane on Union St.	Yes; 1 to 2-feet on Rte. 123 and Union St.	Yes; sidewalks along both sides of Rte. 123 and Union St. and the east side of the private driveway; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; shared traveled-way along Rte. 123 and Union St.

See notes at end of table.

Table 7-2 (Continued)
STUDY AREA INTERSECTION DESCRIPTION

No.	Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
68	Rte. 58/ Central St.	TS	1 general purpose travel lane on all approaches	Yes; 1 to 4-feet on Rte. 58; 2 to 6-feet on Central St.	Yes; sidewalks along the west side of Rte. 58, both sides of Central St. west of the intersection and the north side of Central St. east of the intersection; crosswalks provided across the Rte. 53 north leg and the Central St west leg; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; shared traveled-way along Rte. 58 and Central St.
69	Rte. 123/ Rte. 58	TS	1 left-turn lane and 1 through/right-turn lane on all approaches	Yes; 1-foot on Rte. 123 and Rte. 58	Yes; sidewalks along both sides of Rte. 123 and Rte. 58 northwest of the intersection, southwest side of Rte. 58 southeast of the intersection; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; shared traveled-way along Rte. 123 and Rte. 53 departing the intersection
70	Rte. 58/ Summer St.	TS	1 general purpose travel lane on all approaches	Yes; 2-feet on Rte. 58; 1 to 2-feet on Summer St.	Yes; sidewalks along the west side of Rte. 58 and the north side of Summer St.; crosswalks provided across the Rte. 58 north leg and the Summer St. west leg; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; shared traveled-way along Rte. 53 and Summer St.
71	Rte. 18/ Rte. 123	TS	1 left-turn/though lane and 1 through/right-turn lane on all approaches	Yes; 1 to 2-feet on Rte. 18; 2 to 3-feet on Rte. 123 west of the intersection	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	No

See notes at end of table.

Table 7-2 (Continued)
STUDY AREA INTERSECTION DESCRIPTION

No.	Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
72	Rte. 18/ Rte. 27	TS	1 left-turn lane, 1 through lane and 1 through/ right-turn lane on Rte. 18 and Rte. 27 westbound; 1 left-turn lane and 1 through/right-turn lane on Rte. 27 eastbound	Yes; 2-feet on Rte. 18	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; bicycle lanes along Rte. 27; "sharrow" markings along Rte. 18
73	Rte. 18/ Rte. 14	TS	1 left-turn lane, 1 through lane and 1 through/ right-turn lane on Rte. 18; 1 left-turn lane, 1 through lane and 1 right-turn lane on Rte. 14 eastbound; 1 left-turn lane and 1 through/right-turn lane on Rte. 14 westbound	No	Yes; sidewalks along both sides of the intersecting roadways; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; bicycle lanes along Rte. 18 and Rte. 14

[a]TS = traffic signal control; S = STOP control; Y = Yield control.
[b]Combined shoulder and travel lane width equal to or exceed 14 feet.

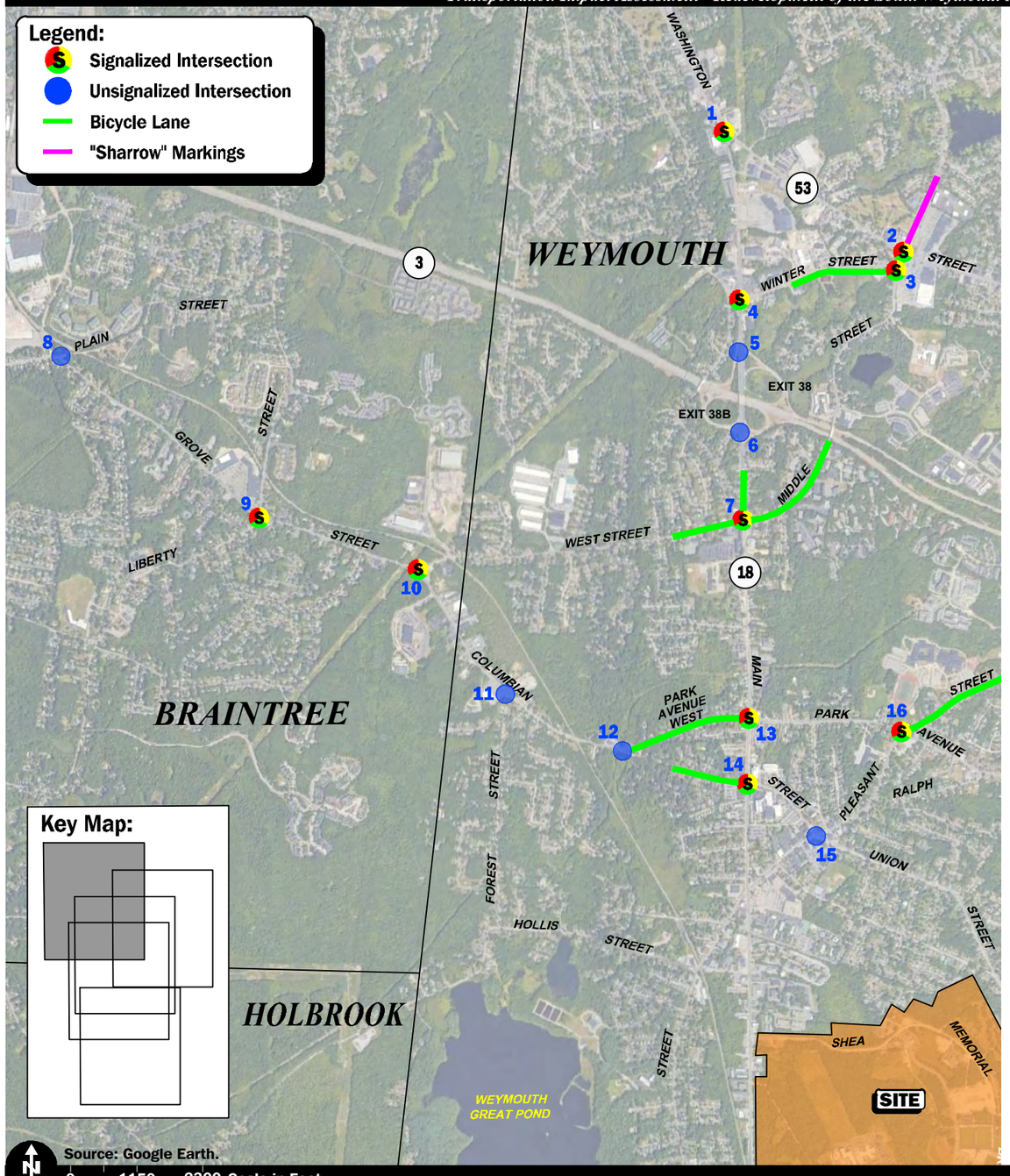
TRAFFIC VOLUMES

In order to determine existing traffic-volume demands and flow patterns within the study area, automatic traffic recorder (ATR) counts, turning movement counts (TMCs) and vehicle classification counts were completed in June and July 2022. The ATR counts were conducted on Route 18, Hingham Street, Bill Delahunt Parkway, Shea Memorial Drive and Trotter Road in the vicinity of the Project site on July 7th through 9th, 2022, and on July 14th through 16th, 2022 (both Thursday through Saturday, inclusive) in order to record weekday traffic conditions over an extended period, with peak period TMCs performed at the study intersections during the weekday morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak periods on Thursday, June 23, 2022; Thursday July 7, 2022; and Thursday July 14, 2022; and during the Saturday midday peak period (11:00 AM to 2:00 PM) on June 25, 2022; July 9, 2022; and July 16, 2022. These time periods were selected for analysis purposes as they are representative of the peak-traffic-volume hours for both the Project and the adjacent roadway network.

Traffic-Volume Adjustments

In order to evaluate the potential for seasonal fluctuation of traffic volumes within the study area, MassDOT weekday seasonal factors for Urban Group 3 roadways (principal arterials, the functional classification of Route 18) and Urban Group 4-7 roadways (minor arterials, major collectors, minor collectors and local roadways, the functional classifications of the remaining study area roadways) were reviewed.[11] Based on a review of this data, it was determined that traffic volumes for the month of June are between 9.0 and 14.0 percent *above* average-month conditions for the respective groups, with the traffic volumes for the month of July between 5.0 and 8.0 percent *above*

[11]MassDOT Statewide Traffic Data Collection; 2019 Weekday Seasonal Factors, Group U3 & U4-7.



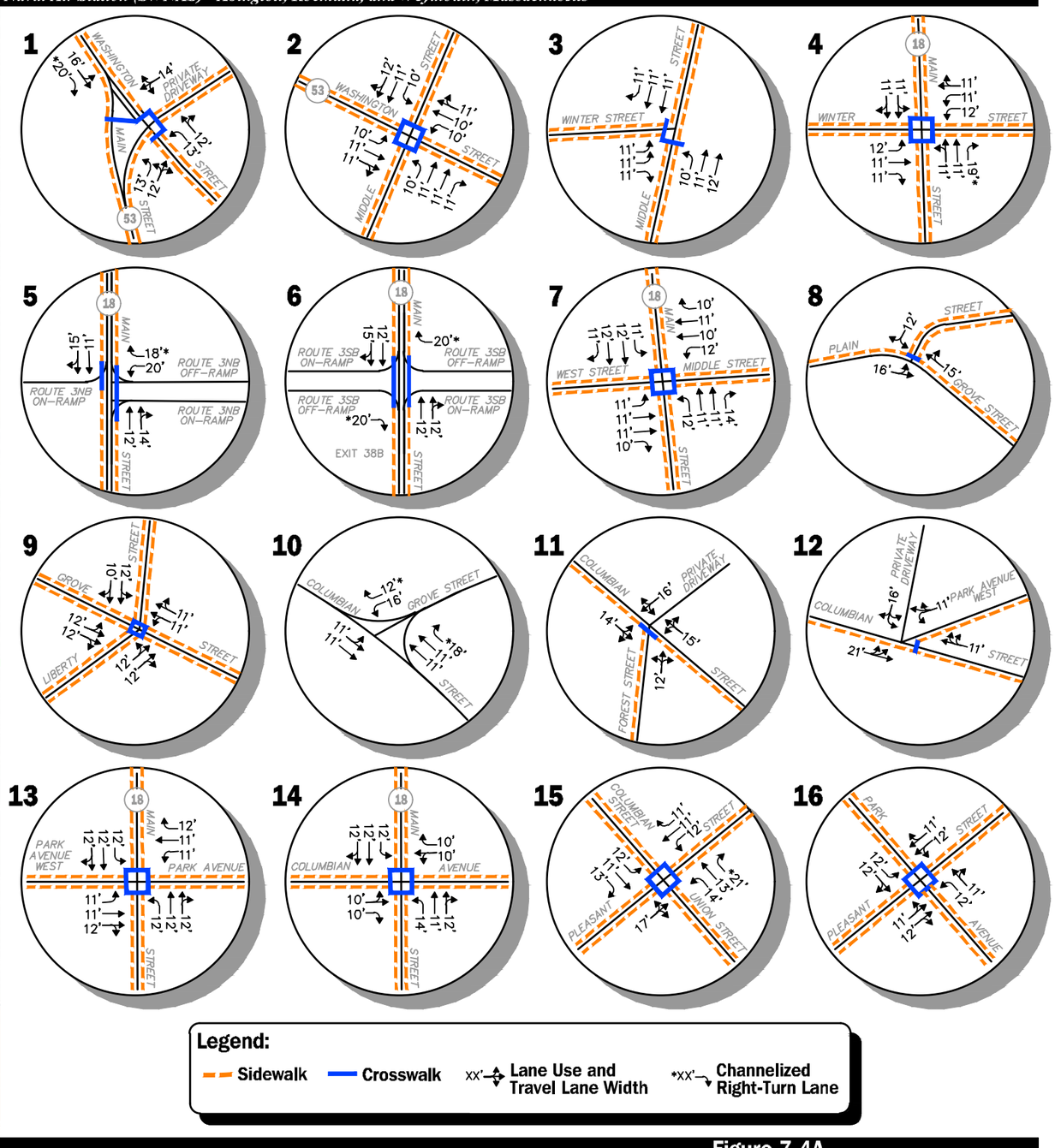


Figure 7-4A

Existing Intersection Lane Use, Travel Lane Width, and Pedestrian Facilities

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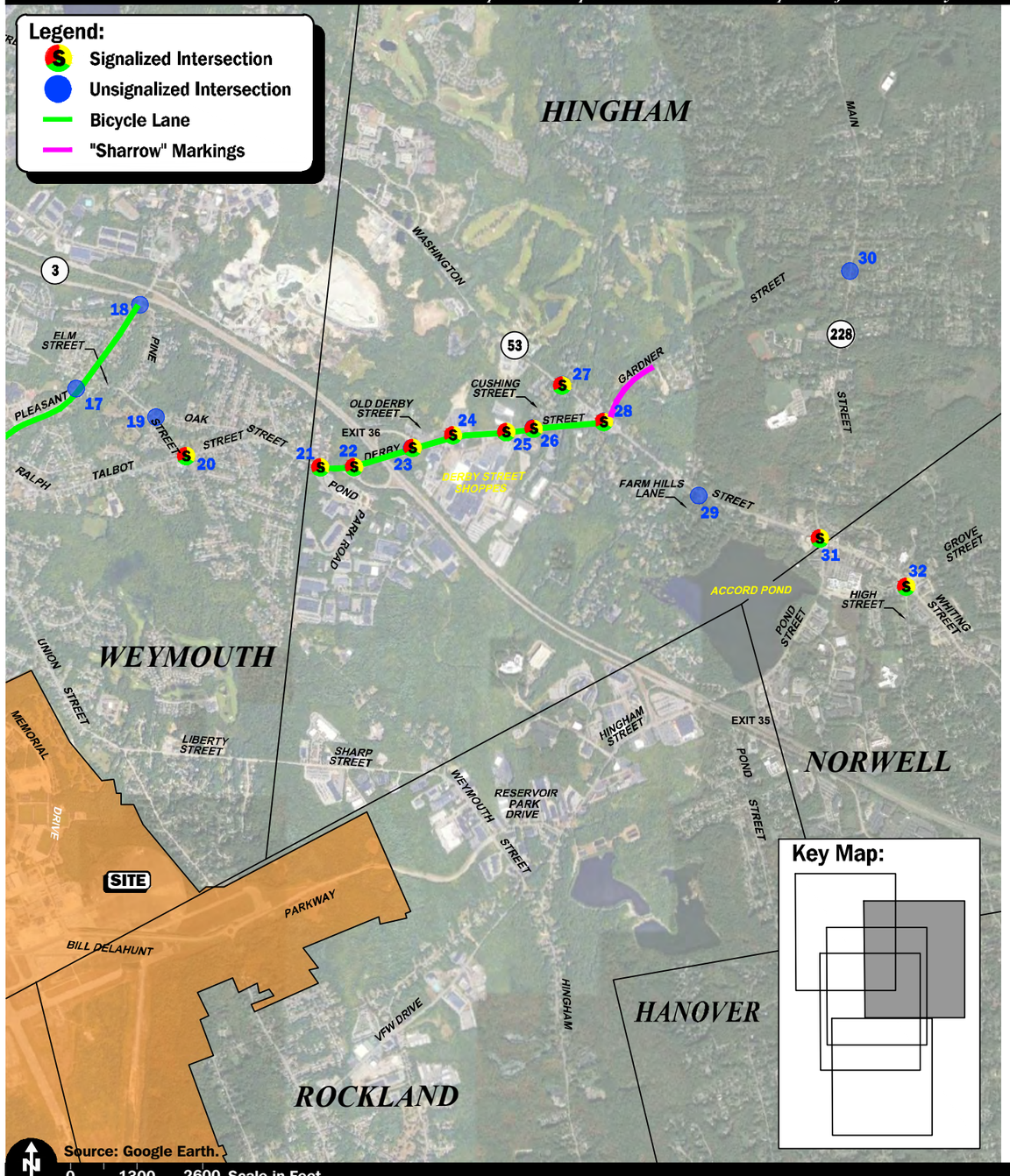


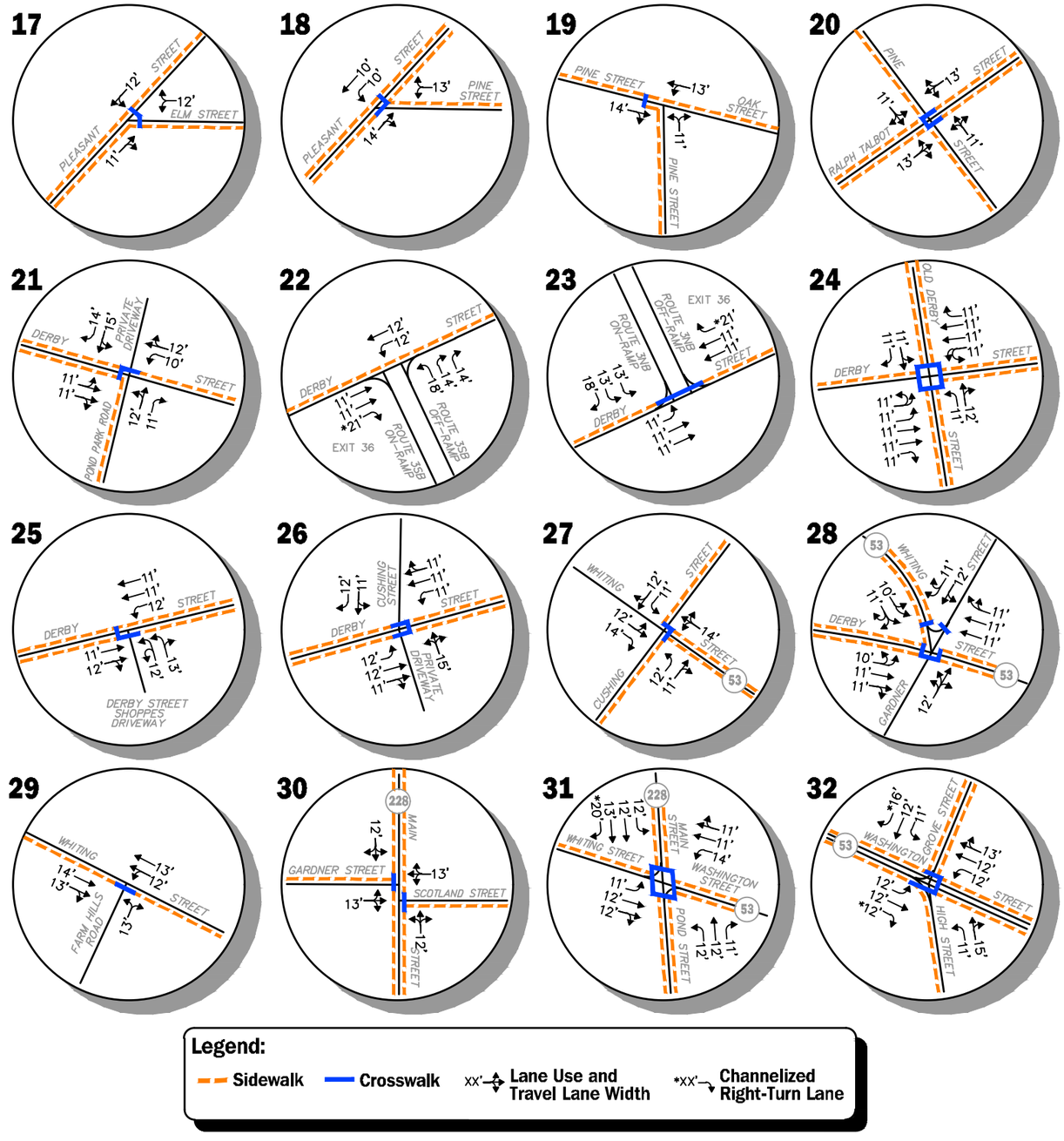
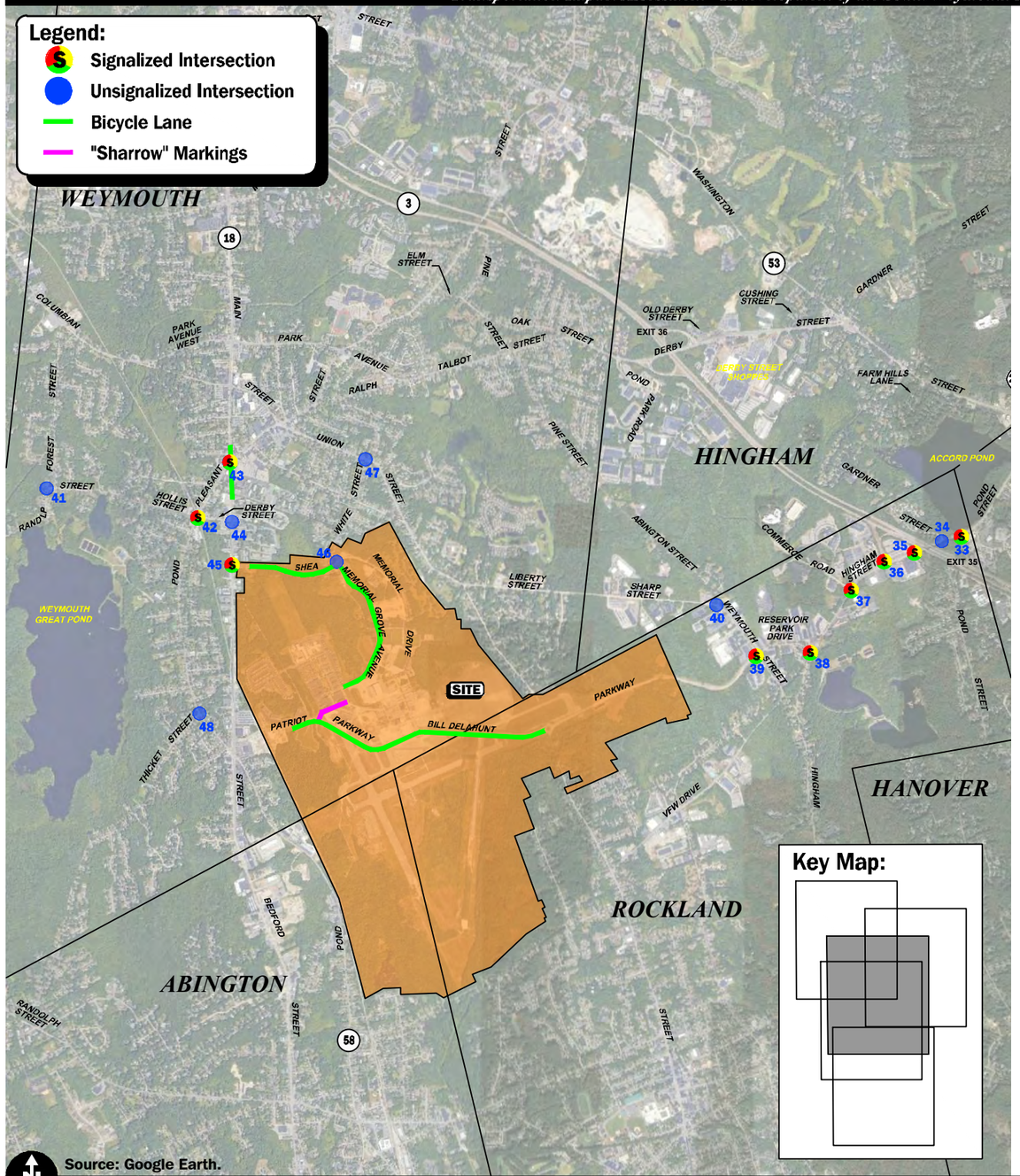
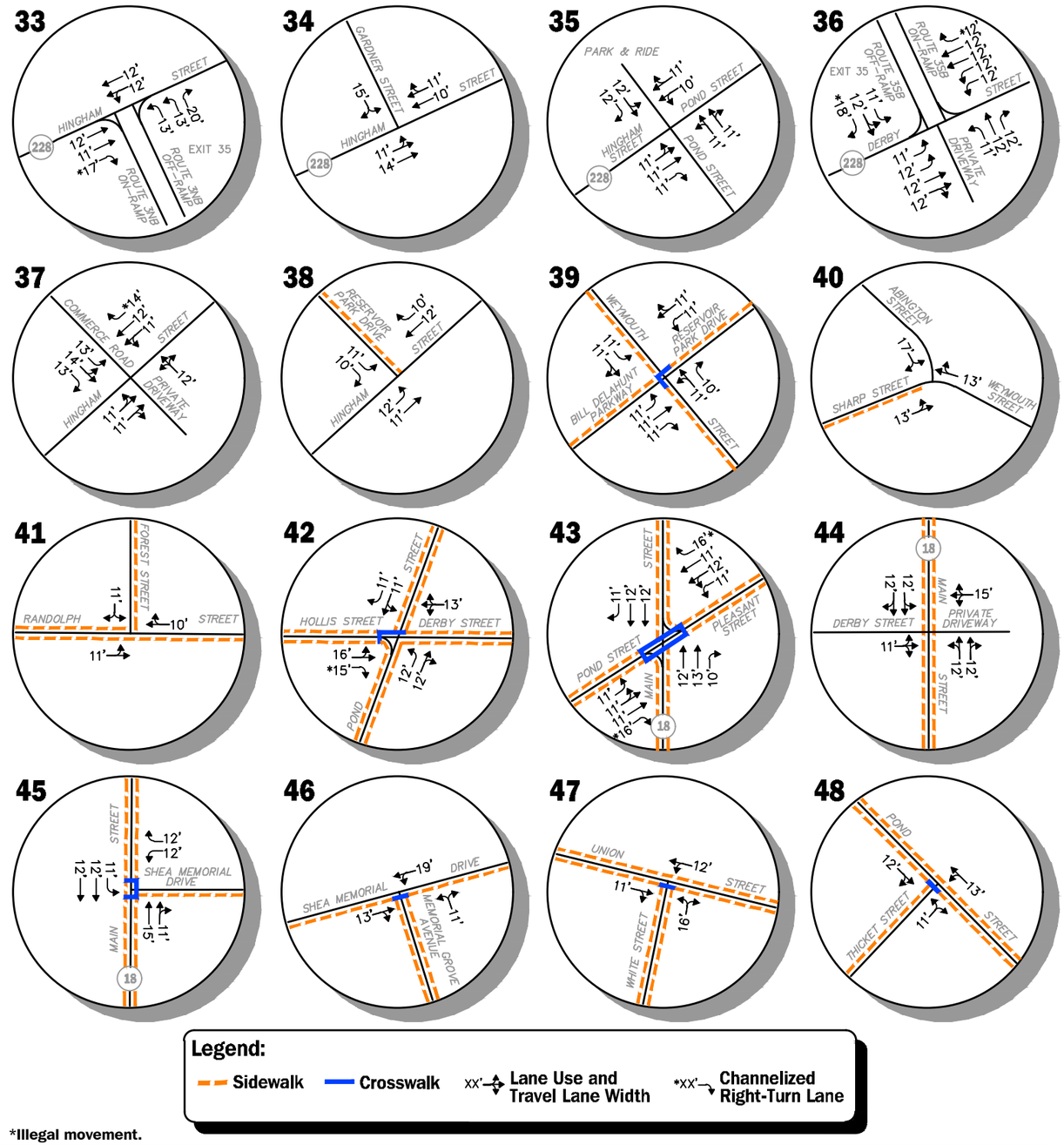


Figure 7-4B

Existing Intersection Lane Use, Travel Lane Width, and Pedestrian Facilities

Vanasse & Associates inc



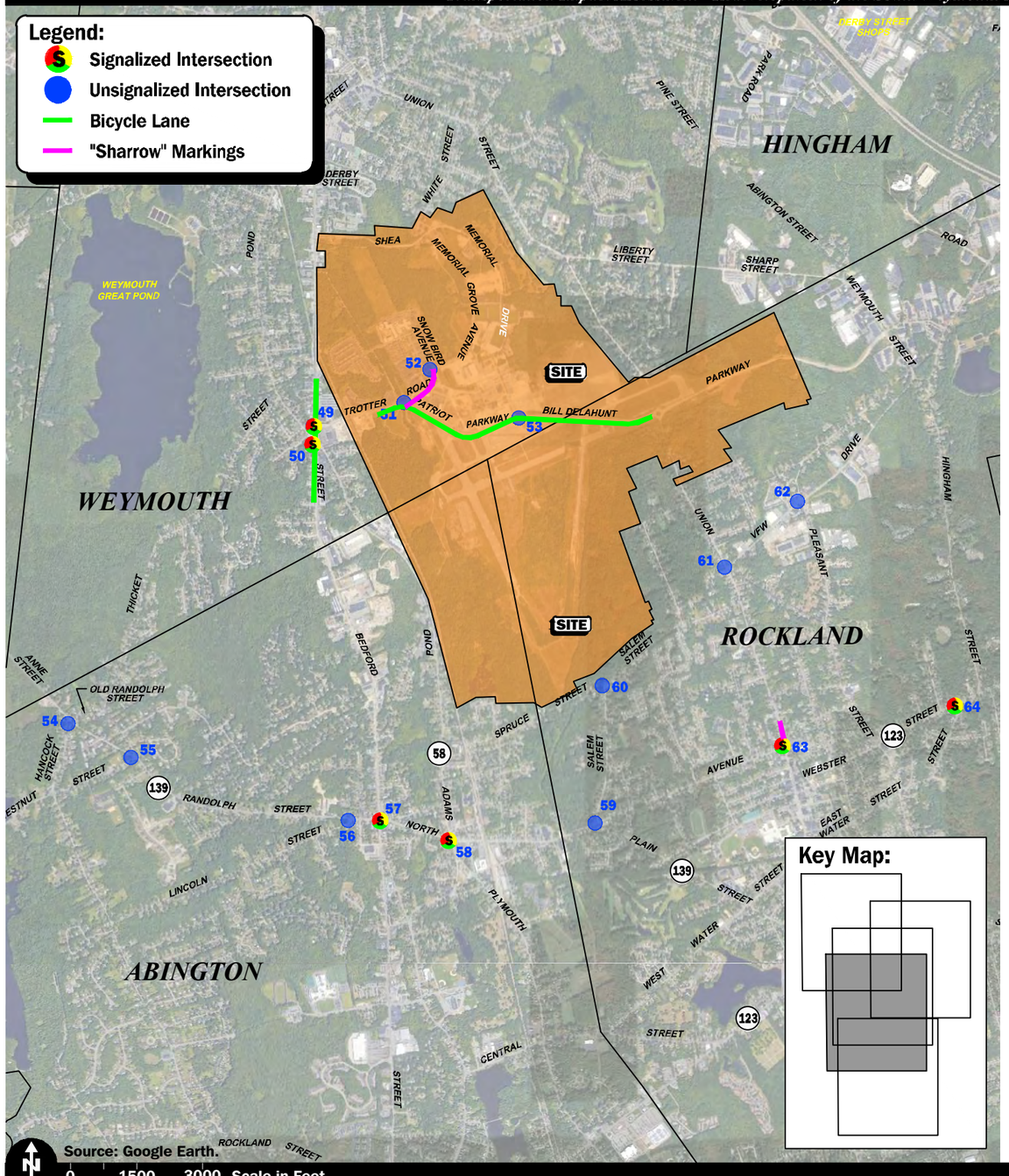


*Illegal movement.

Figure 7-4C

Existing Intersection Lane Use, Travel Lane Width, and Pedestrian Facilities

Vanasse & Associates inc



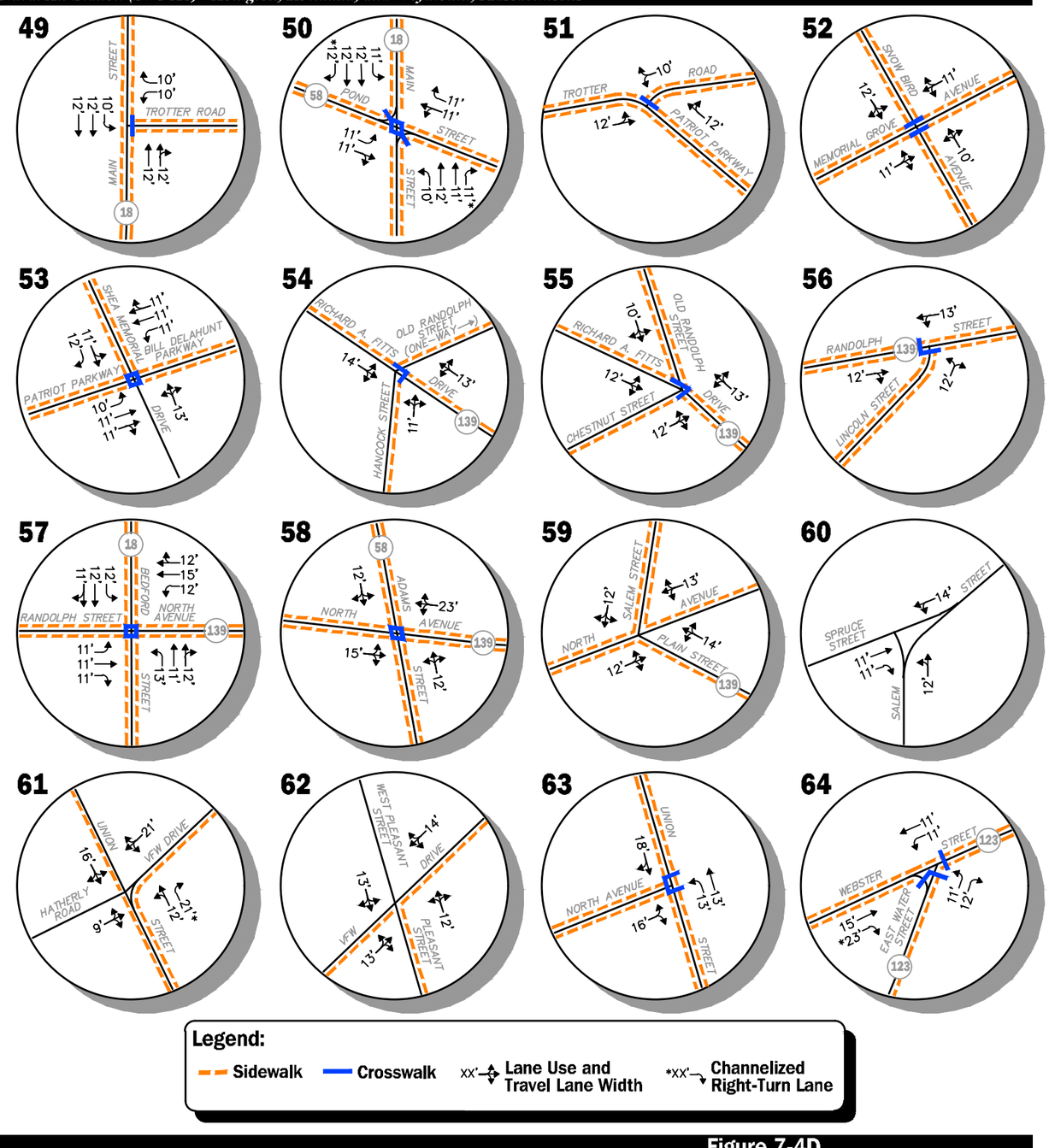


Figure 7-4D

Existing Intersection Lane Use, Travel Lane Width, and Pedestrian Facilities

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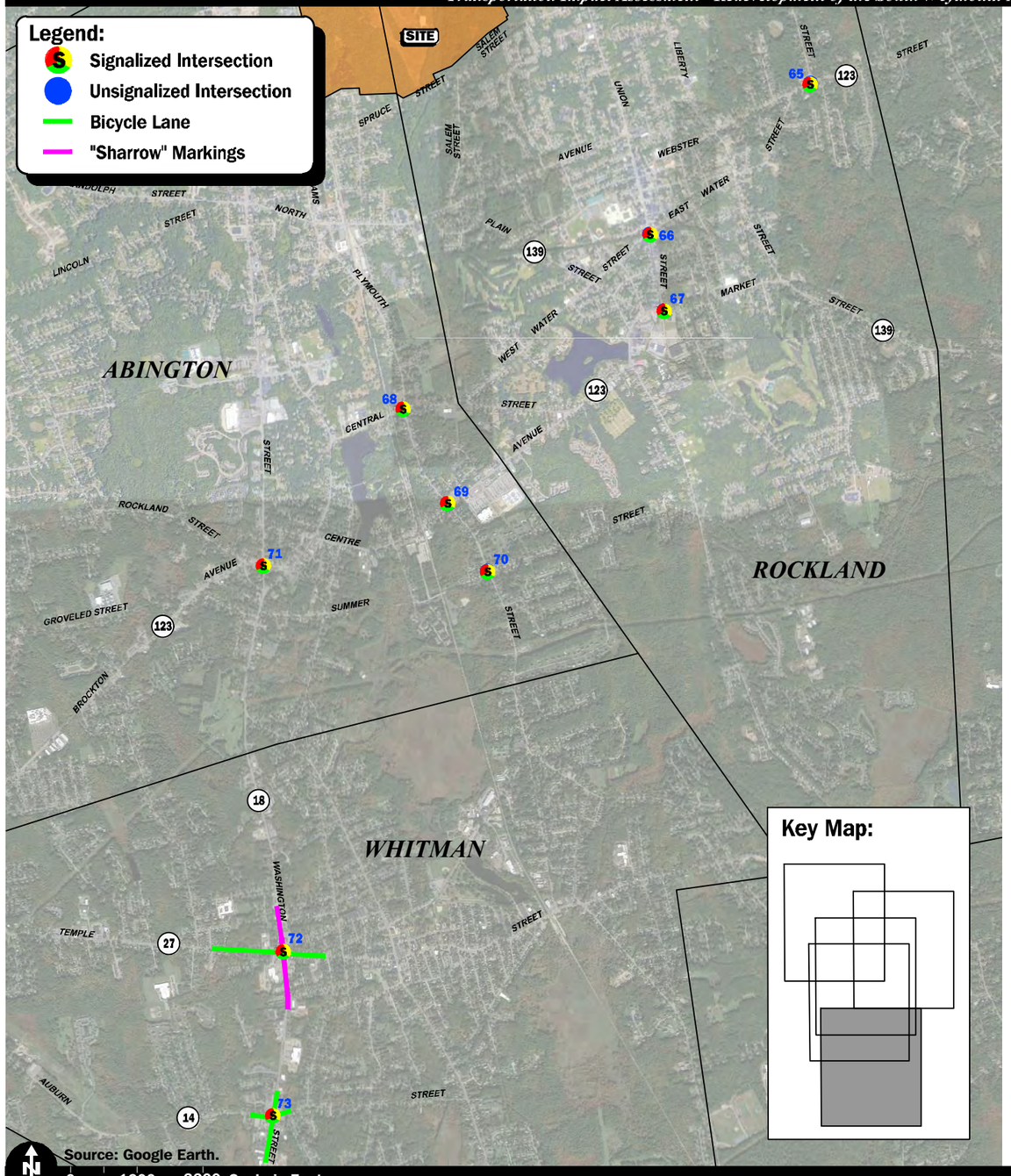


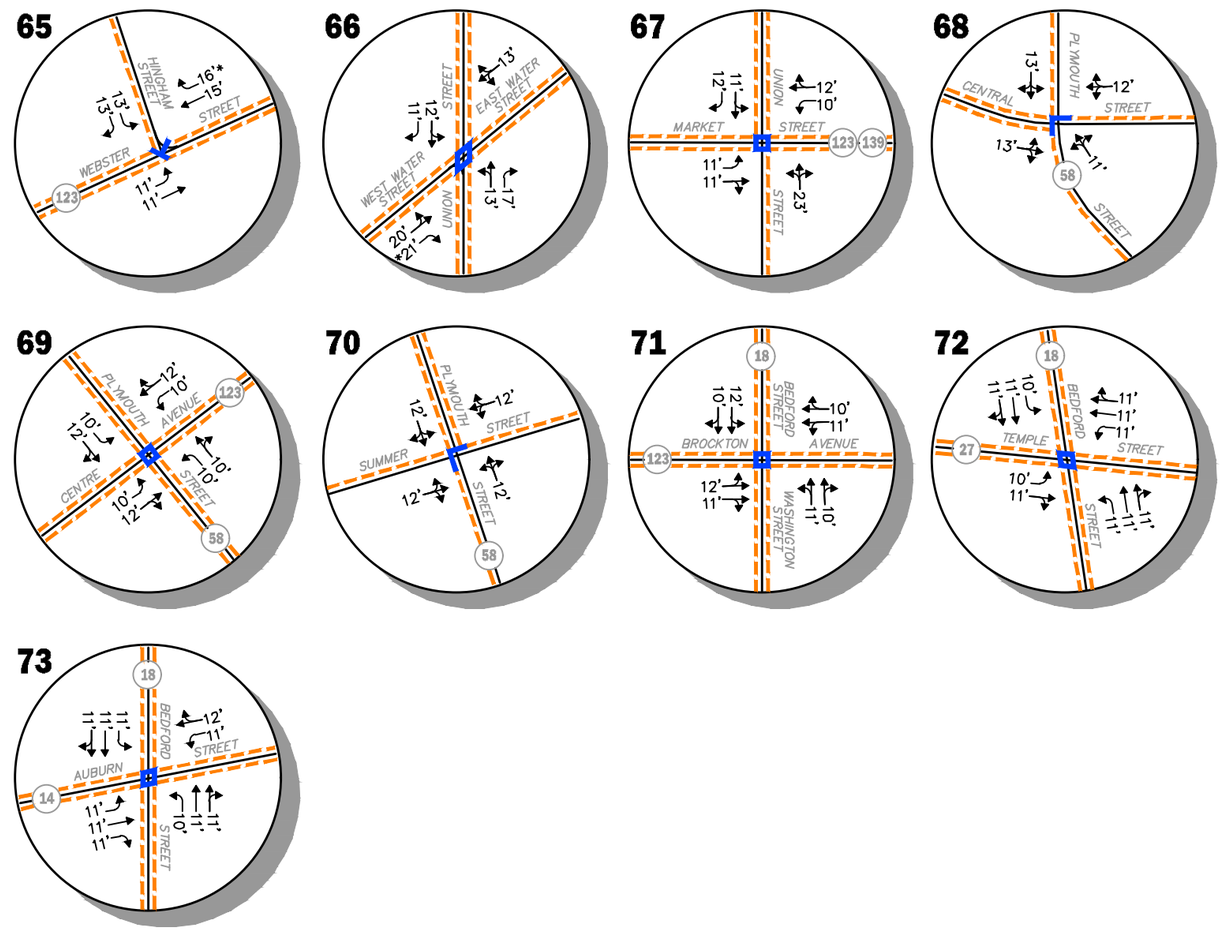


Figure 7-4E

Existing Intersection Lane Use, Travel Lane Width, and Pedestrian Facilities

Vanasse & Associates inc

average-month conditions for the respective groups. As such, no adjustment was made to the June and July traffic volumes as they are representative of above average-month conditions.

Based on updated guidance from MassDOT,[12] adjustments to account for the impact on traffic volumes and trip patterns resulting from the COVID-19 pandemic for traffic counts taken on or after March 1, 2022 are *not recommended* in areas where the adjacent land uses are not predominantly office properties. As the study area roadway and intersections serve a diverse range of land uses (residential, medical, retail, restaurant and office), further adjustment of the traffic-volume data was not required.

The 2022 Existing traffic volumes are summarized in Table 3, with the weekday morning, weekday evening and Saturday midday peak-hour traffic volumes graphically depicted on Figures 7-5, 7-6 and 7-7, respectively. Note that the peak-hour traffic volumes that are presented in Table 7-3 were obtained from the aforementioned figures.

Table 7-3
2022 EXISTING TRAFFIC VOLUMES

Location/Peak Hour	AWT[a]	Saturday[b]	VPH[c]	K Factor[d]	Directional Distribution[e]
Route 18, north of Park Avenue:	30,650	28,510	--	--	--
Weekday Morning (8:00 – 9:00 AM)	--	--	2,107	6.9	61.3% NB
Weekday Evening (4:30 – 5:30 PM)	--	--	2,351	7.7	54.7% SB
Saturday Midday (11:45 AM – 12:45 PM)	--	--	2,404	8.4	56.1% SB
Route 18, south of Columbian Street:	24,620	23,160	--	--	--
Weekday Morning (8:00 – 9:00 AM)	--	--	1,807	7.3	68.7% NB
Weekday Evening (4:30 – 5:30 PM)	--	--	2,136	8.7	57.2% SB
Saturday Midday (11:45 AM – 12:45 PM)	--	--	2,604	11.2	50.1% SB
Route 18, south of Derby Street:	27,625	25,735	--	--	--
Weekday Morning (8:00 – 9:00 AM)	--	--	2,254	8.2	59.3% NB
Weekday Evening (4:30 – 5:30 PM)	--	--	2,362	8.6	54.1% SB
Saturday Midday (11:45 AM – 12:45 PM)	--	--	2,228	8.7	50.5% NB
Route 18, north of Trotter Road:	27,655	25,610	--	--	--
Weekday Morning (8:00 – 9:00 AM)	--	--	1,819	6.6	65.0% NB
Weekday Evening (4:30 – 5:30 PM)	--	--	2,083	7.5	55.1% SB
Saturday Midday (11:45 AM – 12:45 PM)	--	--	1,972	7.7	51.4% SB
Route 18, south of Pond Street:	21,335	19,825	--	--	--
Weekday Morning (8:00 – 9:00 AM)	--	--	1,349	6.3	60.4% NB
Weekday Evening (4:30 – 5:30 PM)	--	--	1,739	8.2	58.3% SB
Saturday Midday (11:45 AM – 12:45 PM)	--	--	1,624	8.2	53.9% SB

See notes at end of table.

[12] *Traffic and Safety Engineering 25% Design Submission Guidelines*; MassDOT; Revised March 31, 2022.

Table 7-3 (Continued)
2022 EXISTING TRAFFIC VOLUMES

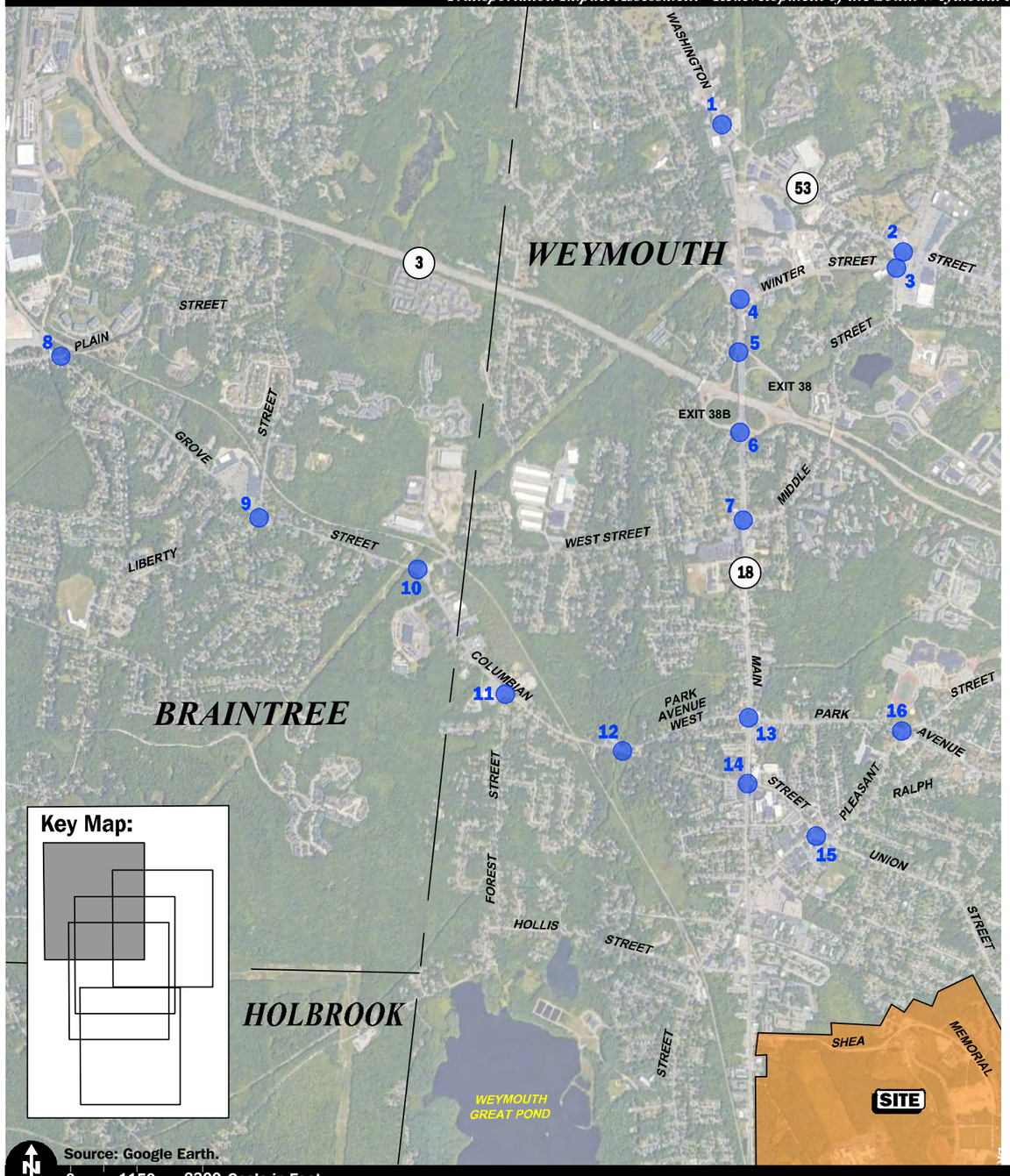
Location/Peak Hour	AWT[a]	Saturday[b]	VPH[c]	K Factor[d]	Directional Distribution[e]
Hingham Street, west of Route 3 SB Ramps:	23,710	16,785	--	--	--
Weekday Morning (8:00 – 9:00 AM)	--	--	2,156	9.1	55.2% EB
Weekday Evening (4:30 – 5:30 PM)	--	--	2,370	10.0	55.9% WB
Saturday Midday (11:45 AM – 12:45 PM)	--	--	1,687	10.1	54.4% EB
Hingham Street, south of Commerce Road:	27,585	19,370	--	--	--
Weekday Morning (8:00 – 9:00 AM)	--	--	2,068	7.5	60.8% NB
Weekday Evening (4:30 – 5:30 PM)	--	--	2,316	8.4	58.2% SB
Saturday Midday (11:45 AM – 12:45 PM)	--	--	1,573	8.1	54.2% NB
Bill Delahunt Parkway, east of Patriot Parkway:	4,920	3,610	--	--	--
Weekday Morning (8:00 – 9:00 AM)	--	--	351	7.1	57.0% EB
Weekday Evening (4:30 – 5:30 PM)	--	--	436	8.9	69.3% WB
Saturday Midday (11:45 AM – 12:45 PM)	--	--	357	9.9	52.1% EB
Shea Memorial Drive, east of Route 18:	2,410	2,360	--	--	--
Weekday Morning (8:00 – 9:00 AM)	--	--	171	7.1	74.3% WB
Weekday Evening (4:30 – 5:30 PM)	--	--	193	8.0	57.0% WB
Saturday Midday (11:45 AM – 12:45 PM)	--	--	212	9.0	50.9% WB
Trotter Road, east of Route 18:	6,620	5,195	--	--	--
Weekday Morning (8:00 – 9:00 AM)	--	--	420	6.3	54.5% EB
Weekday Evening (4:30 – 5:30 PM)	--	--	651	9.8	62.5% WB
Saturday Midday (11:45 AM – 12:45 PM)	--	--	571	11.0	53.1% WB

[a]Average weekday traffic in vehicles per day.
[b]Saturday traffic in vehicles.
[c]Vehicles per hour.
[d]Percent of daily traffic occurring during the peak hour.
[e]Percent traveling in peak direction.
NB = northbound; SB = southbound; EB = eastbound; WB = westbound.

As can be seen in Table 7-3, within the study area, Route 18 was found to accommodate between 21,335 and 30,650 vehicles on an average weekday and between 19,825 to 28,510 vehicles on a Saturday (two-way, 24-hour volumes), with between 1,349 to 2,254 vehicles per hour (vph) during the weekday morning peak-hour, between 1,739 to 2,362 vph during the weekday evening peak-hour and between 1,624 to 2,604 vph during the Saturday midday peak-hour.

Hingham Street was found to accommodate between 23,710 to 27,585 vehicles on an average weekday and between 16,785 to 19,370 vehicles on a Saturday, with between 2,068 to 2,156 vph during the weekday morning peak-hour, between 2,316 to 2,370 vph during the weekday evening peak-hour and between 1,573 to 1,687 vph during the Saturday midday peak-hour.

Within the Project site, Bill Delahunt Parkway was found to accommodate approximately 4,920 vehicles on an average weekday and approximately 3,610 vehicles on a Saturday, with



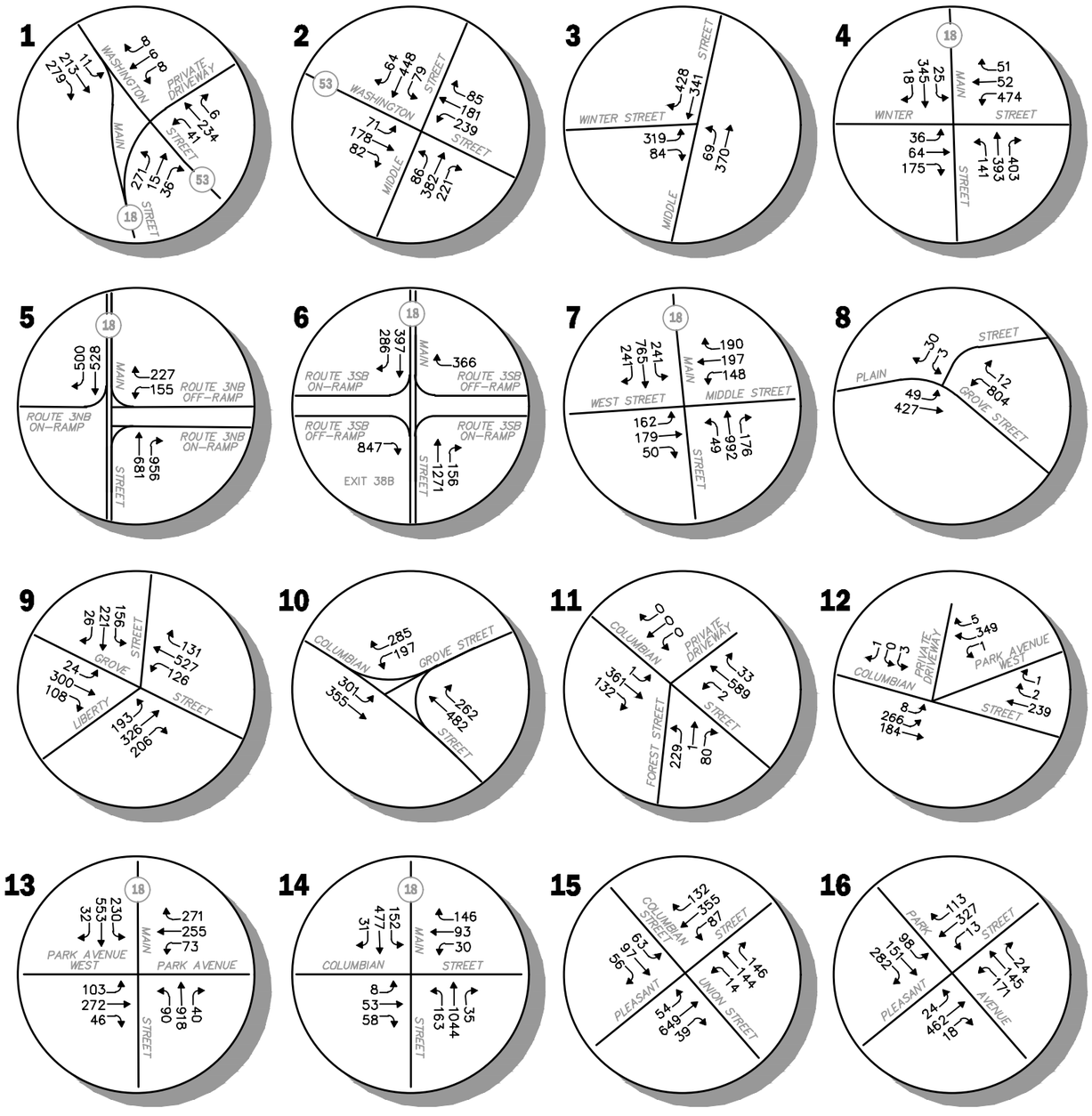
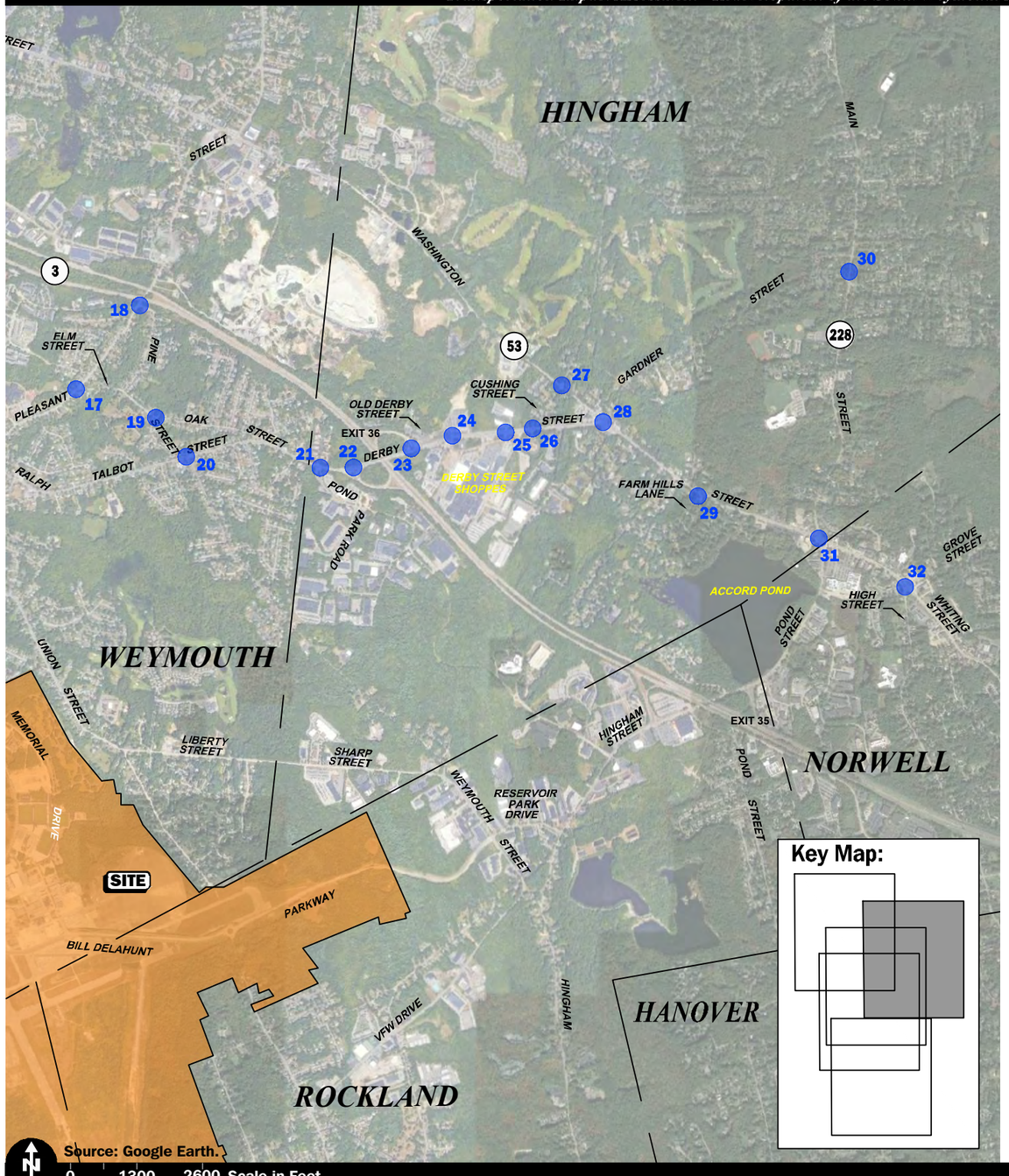


Figure 7-5A

2022 Existing
Weekday Morning
Peak-Hour Traffic Volumes

Vanasse & Associates inc



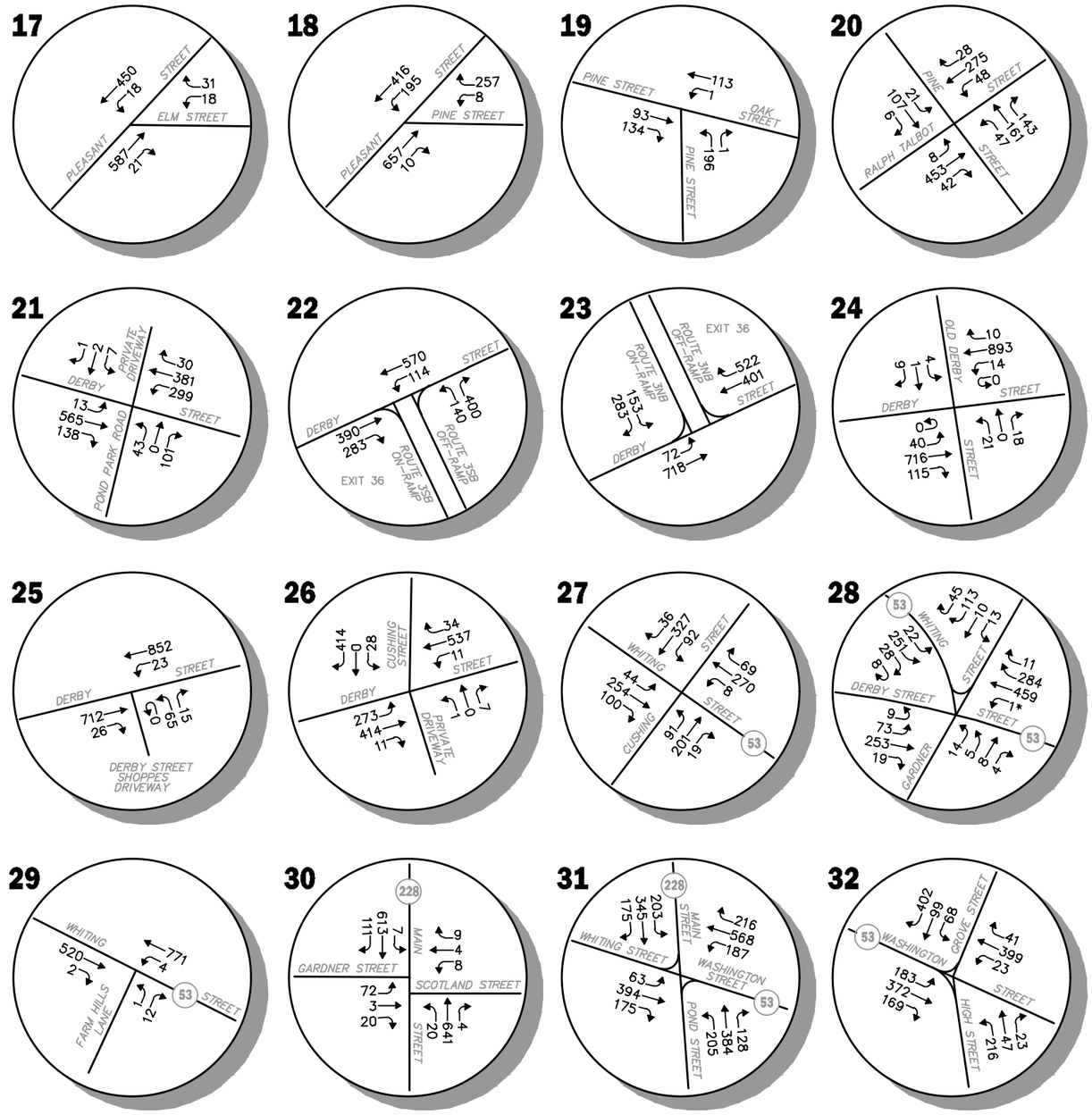
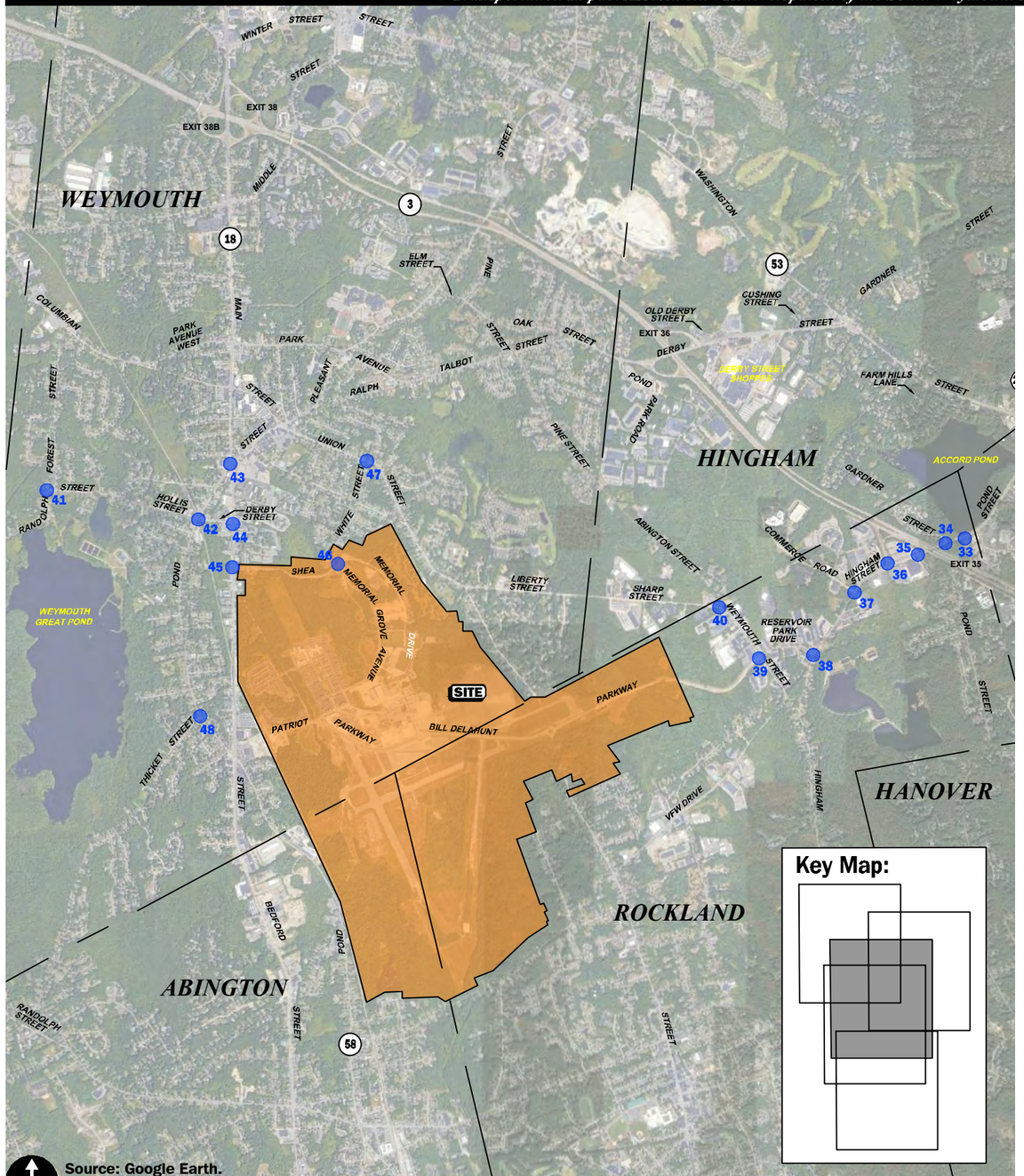
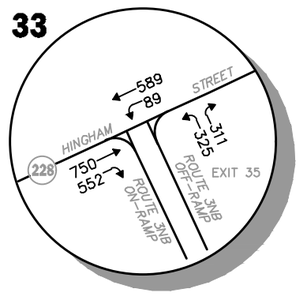


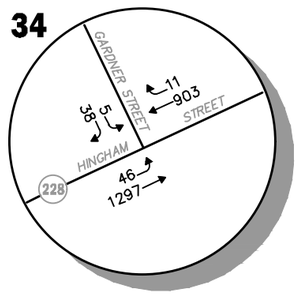
Figure 7-5B

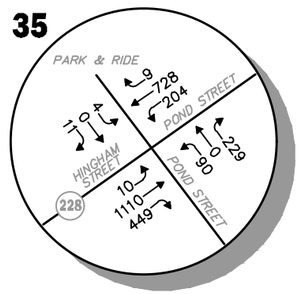
2022 Existing
Weekday Morning
Peak-Hour Traffic Volumes

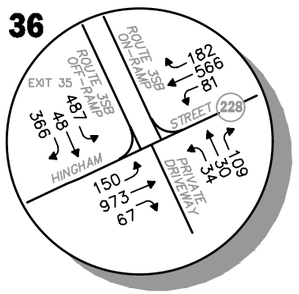
Vanasse & Associates inc

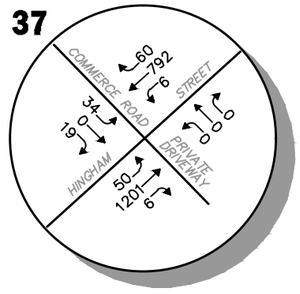


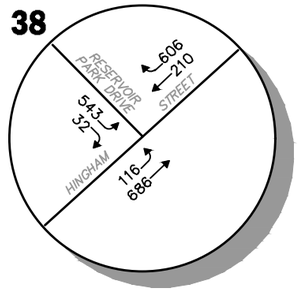


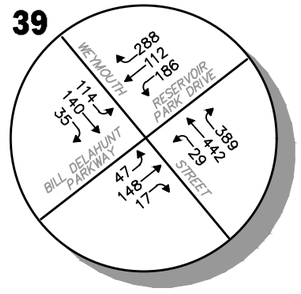


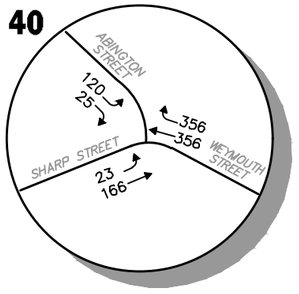


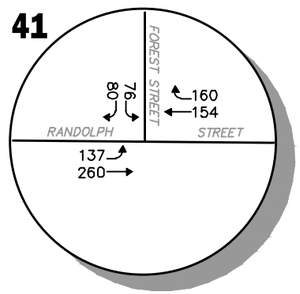


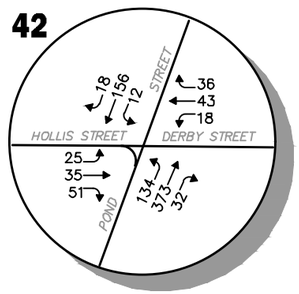


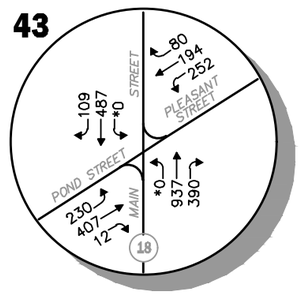


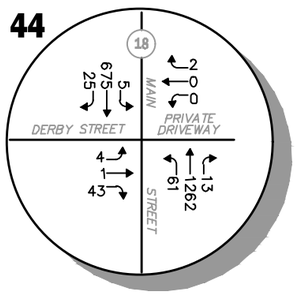


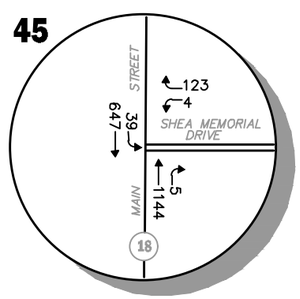


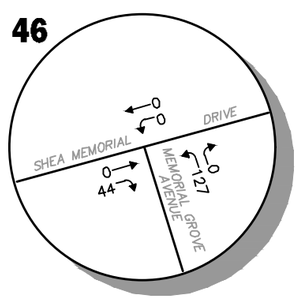


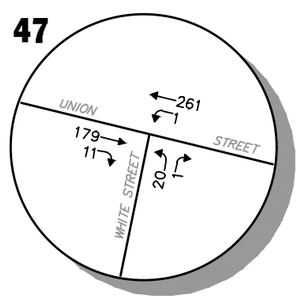


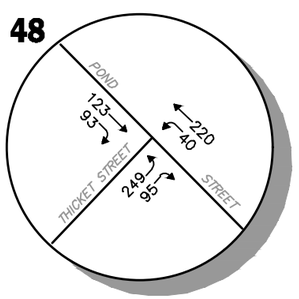












*Illegal movement.

Figure 7-5C

**2022 Existing
Weekday Morning
Peak-Hour Traffic Volumes**

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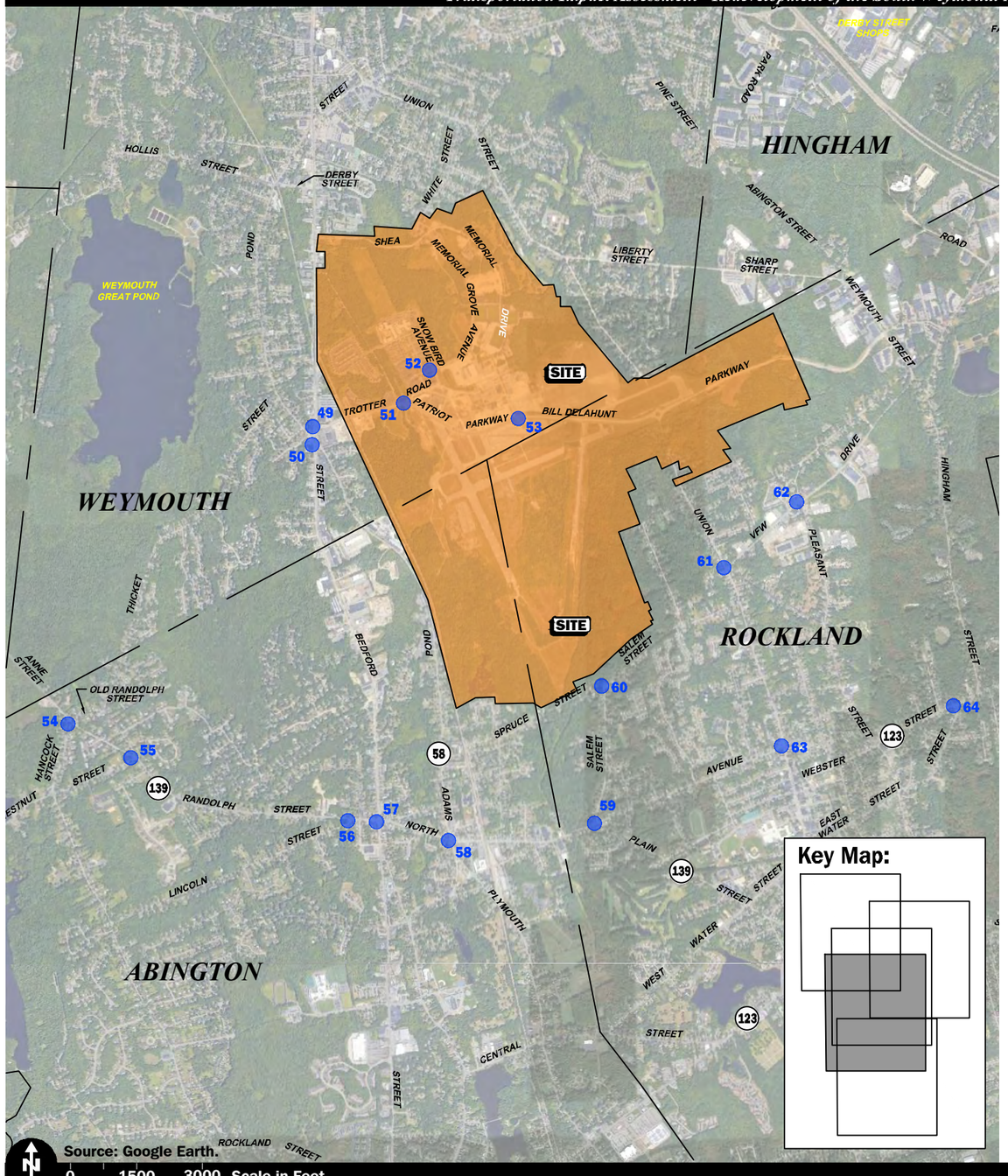
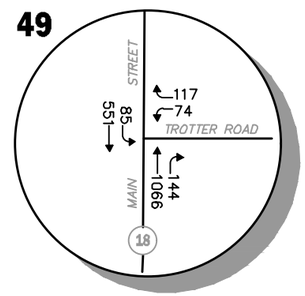
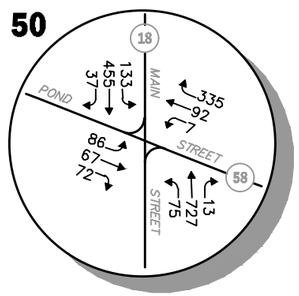
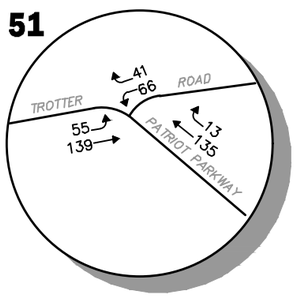
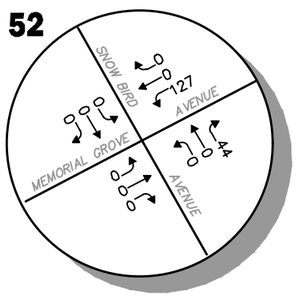
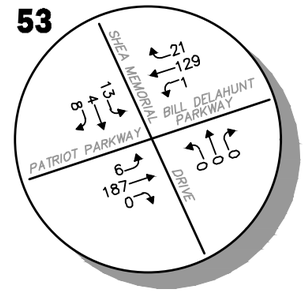


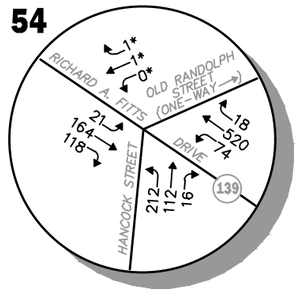


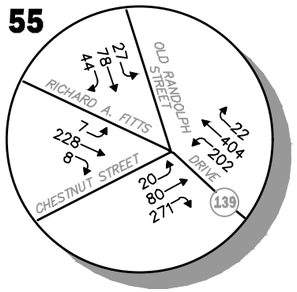


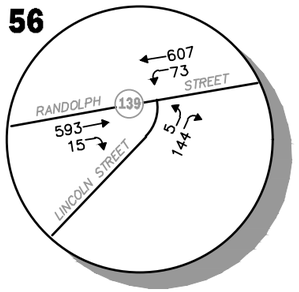


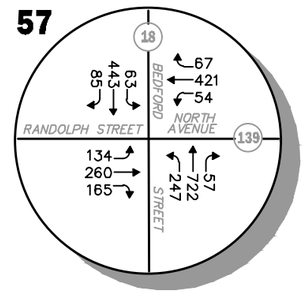


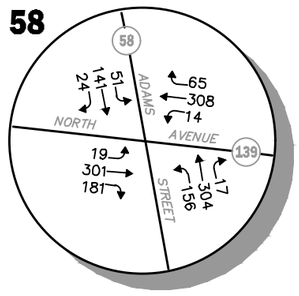


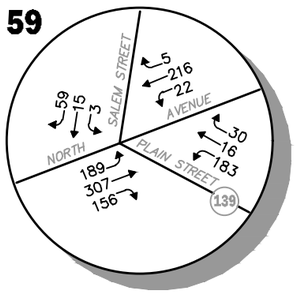


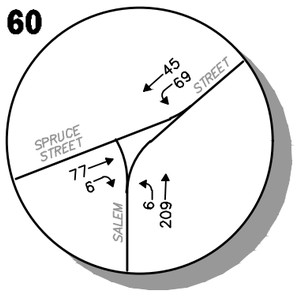


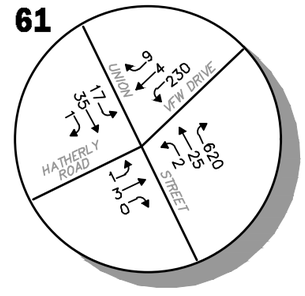


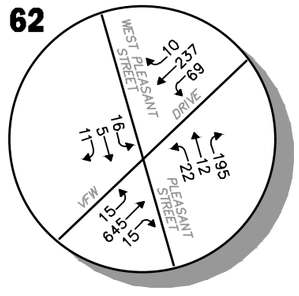


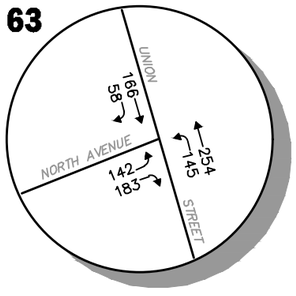


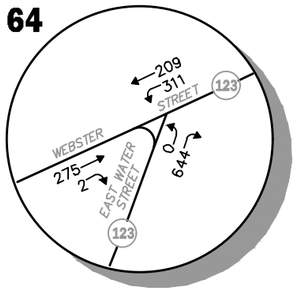










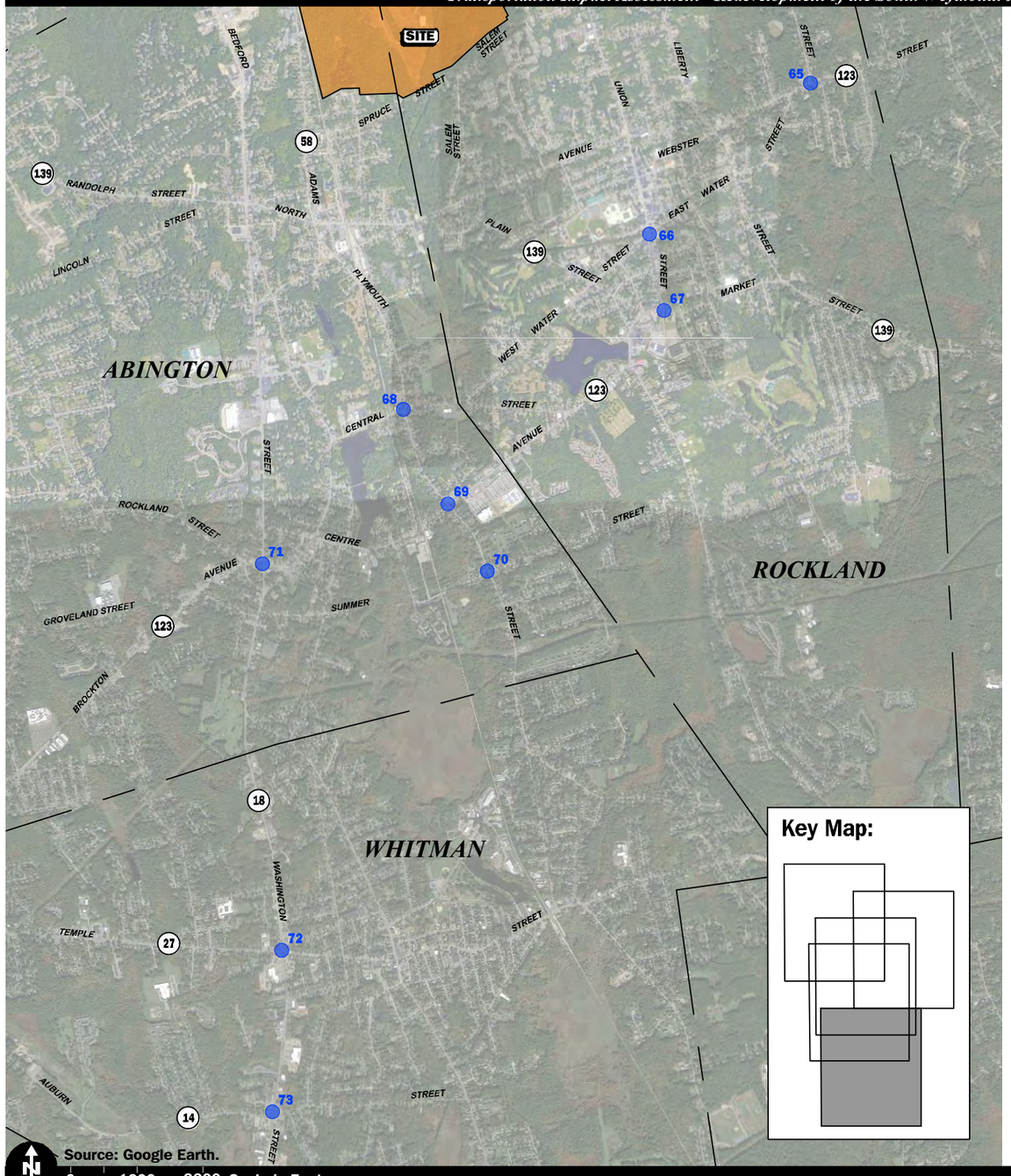


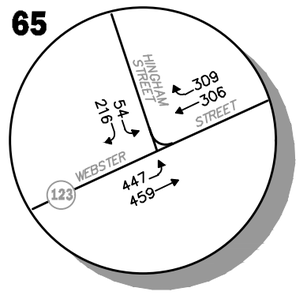
*Illegal movement.

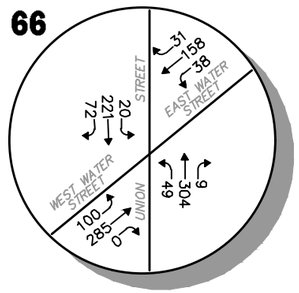
Figure 7-5D

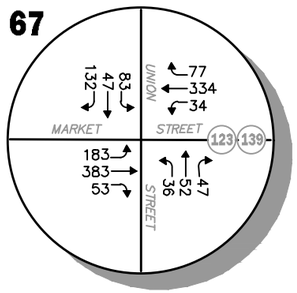
**2022 Existing
Weekday Morning
Peak-Hour Traffic Volumes**

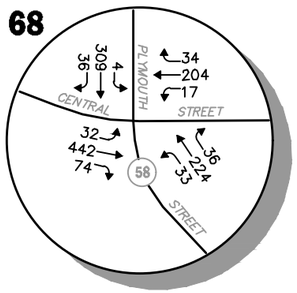
Vanasse & Associates inc

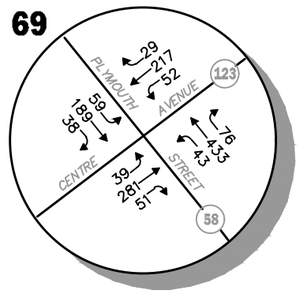


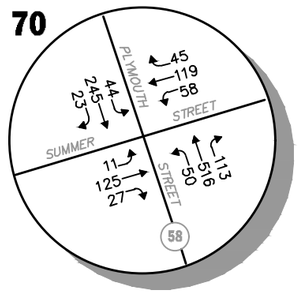


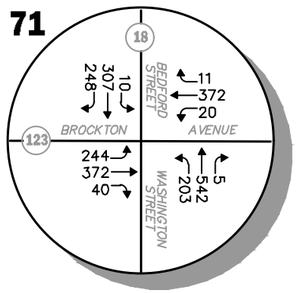


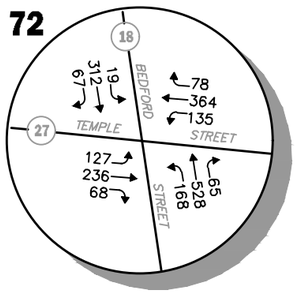












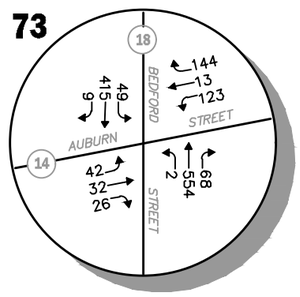


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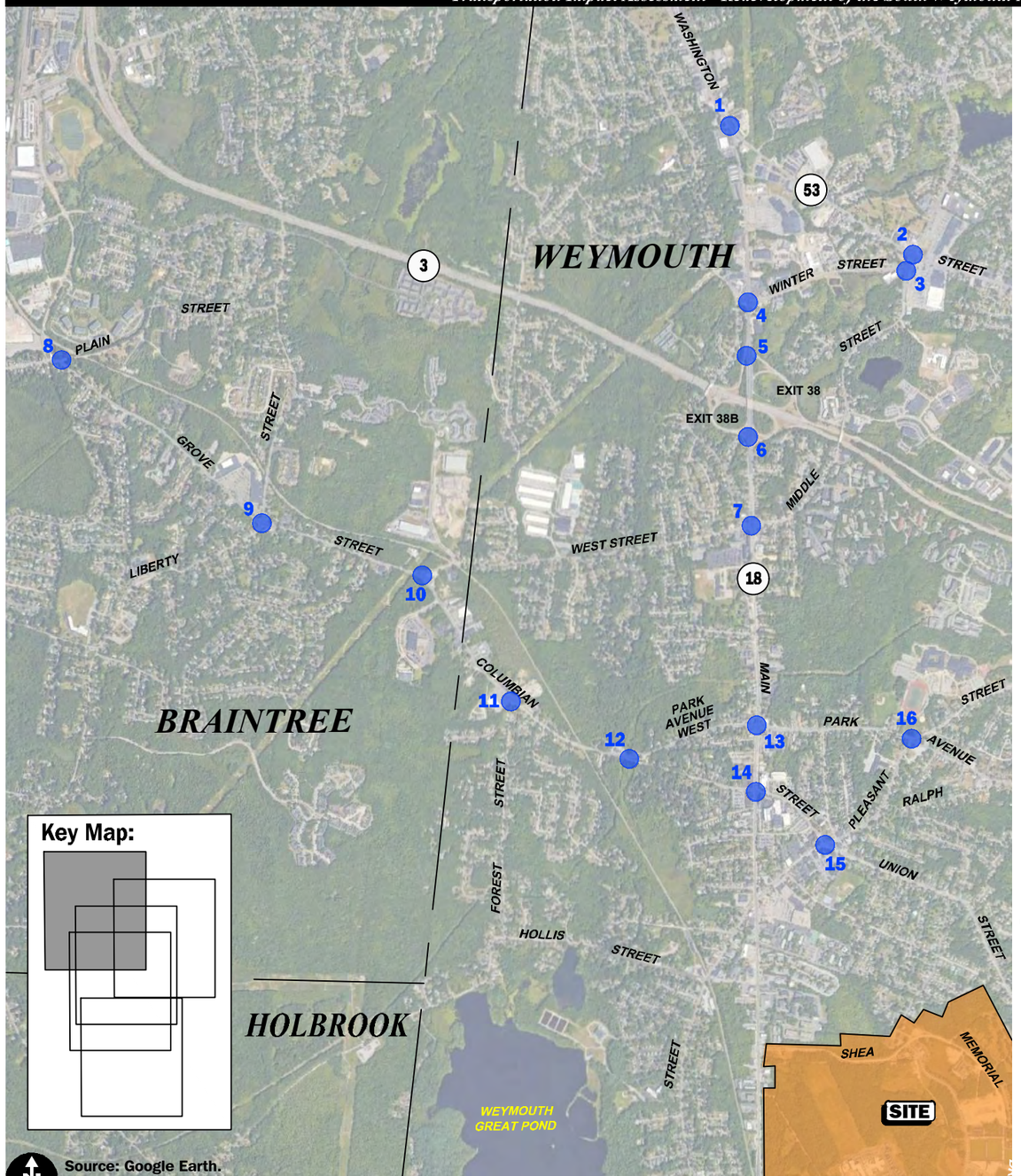
Figure 7-5E

2022 Existing
Weekday Morning
Peak-Hour Traffic Volumes



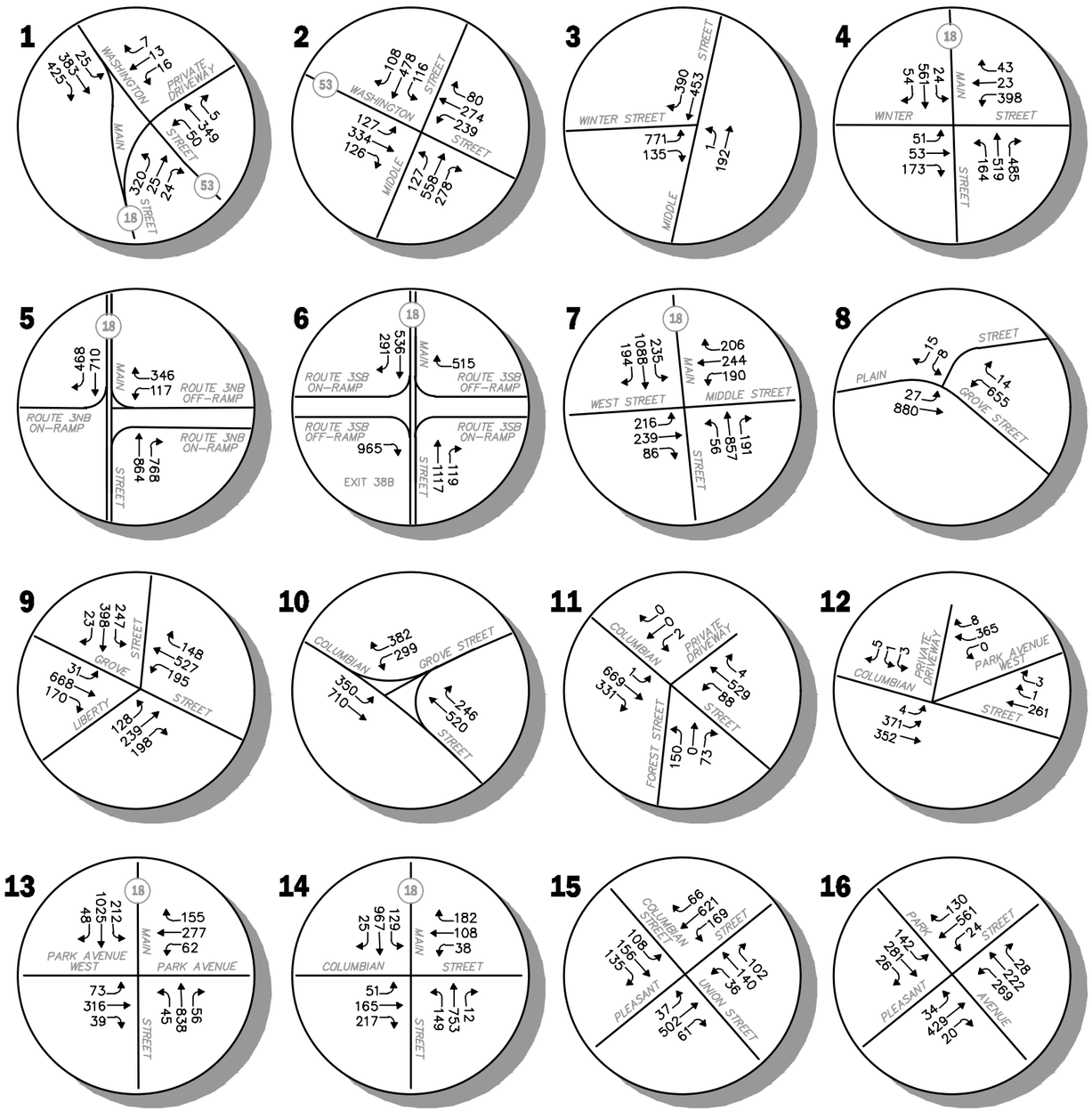
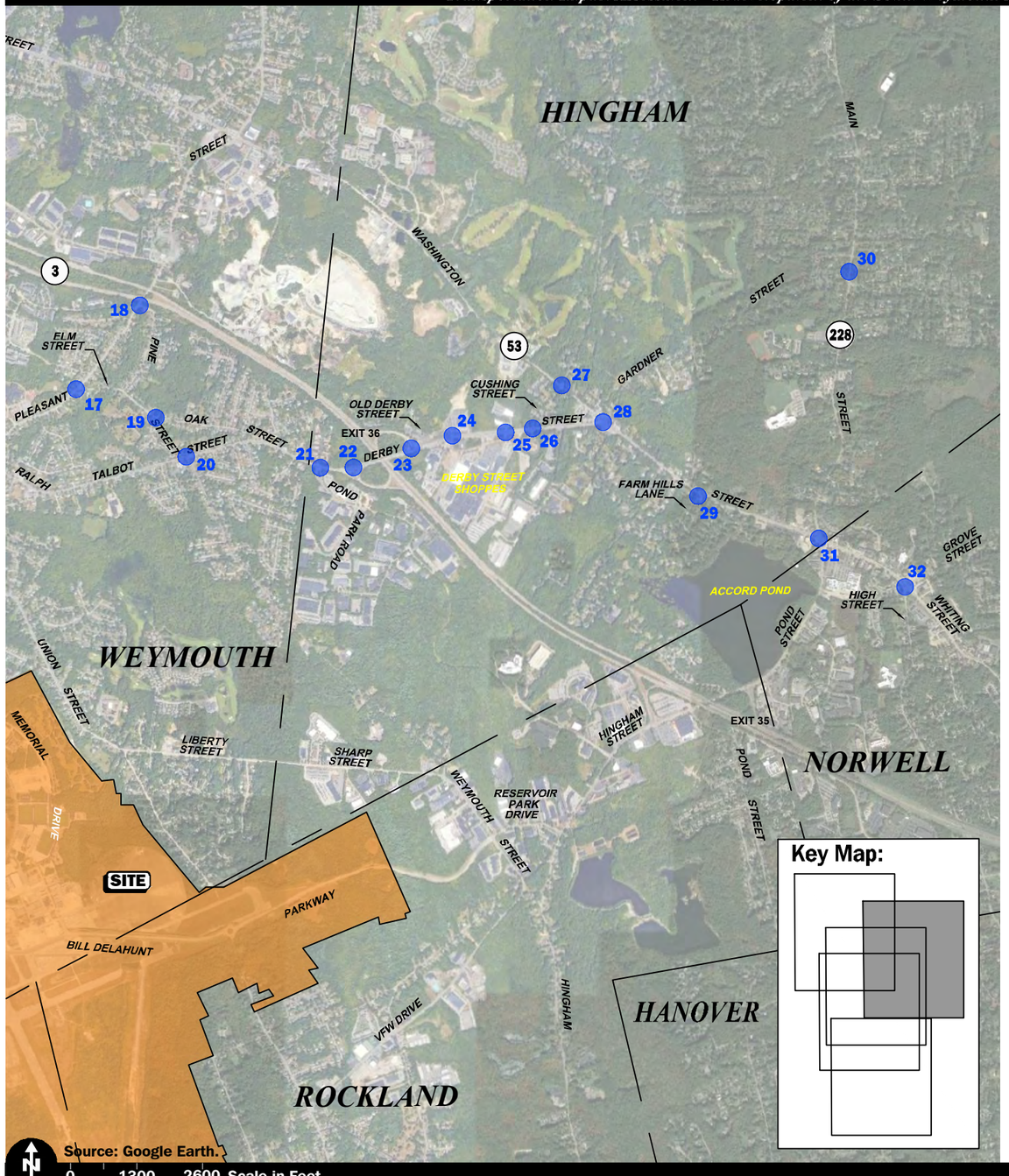


Figure 7-6A

2022 Existing
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc



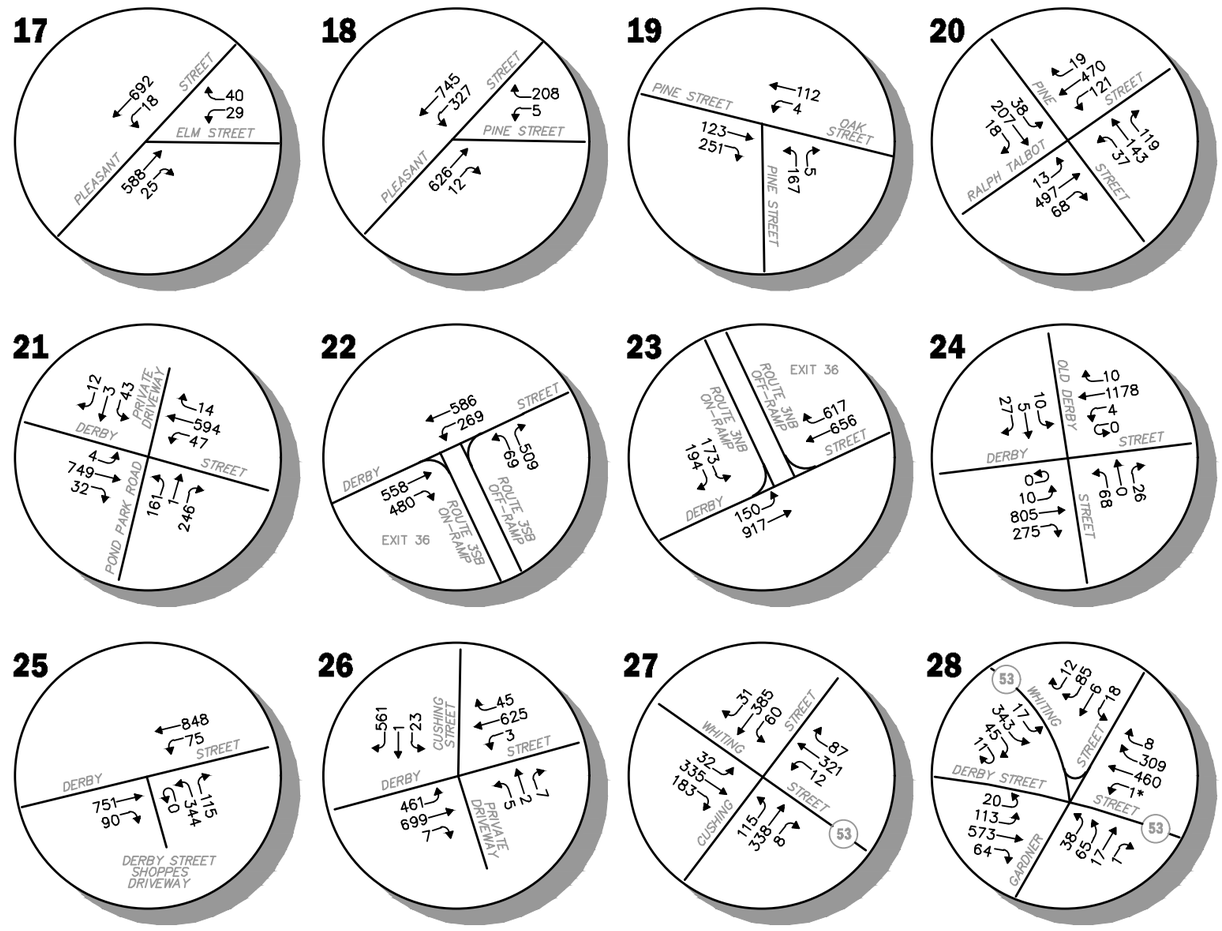
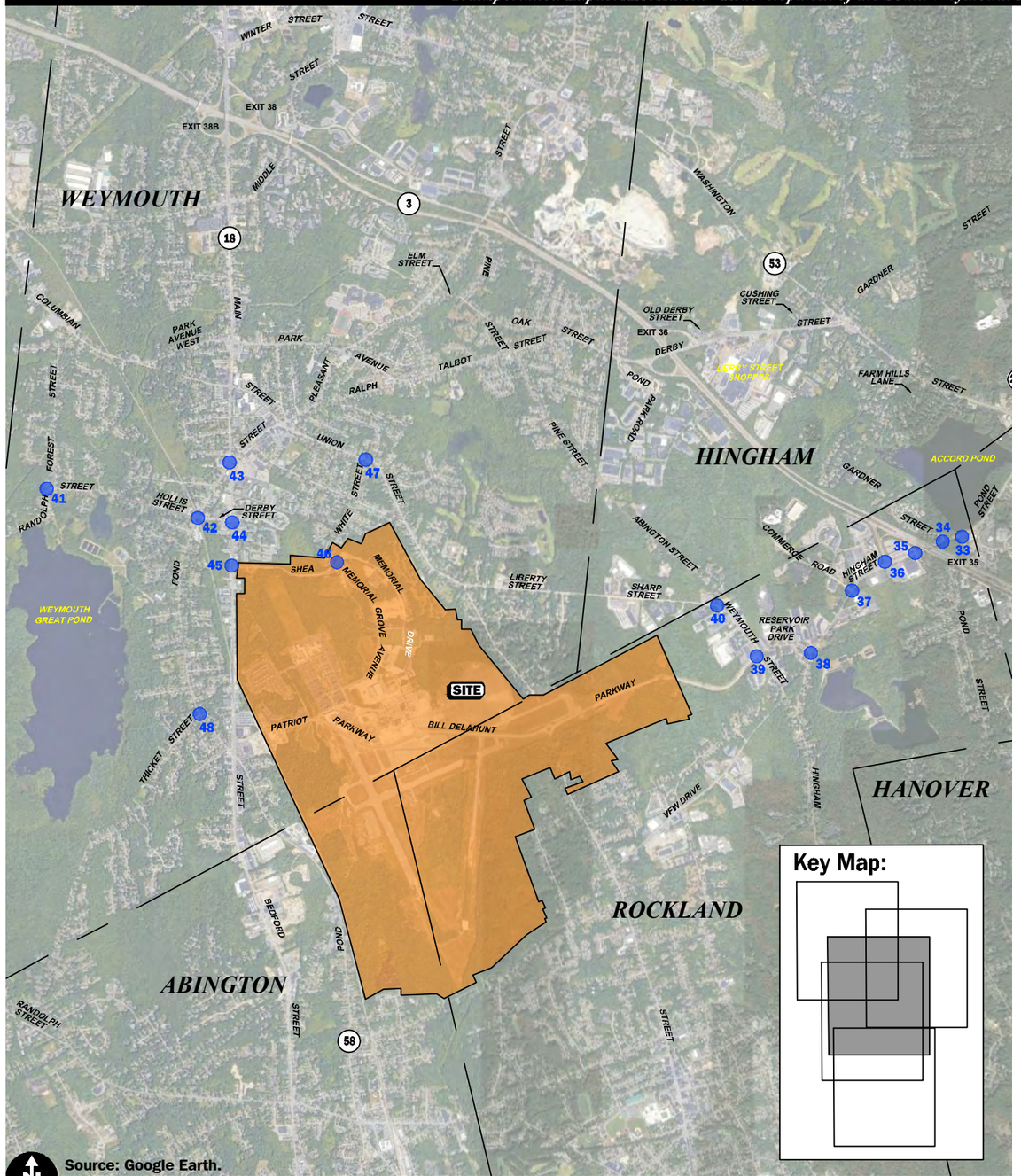
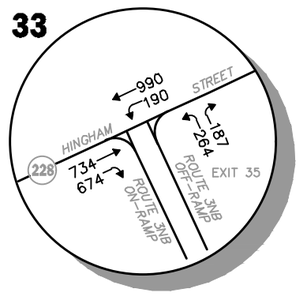


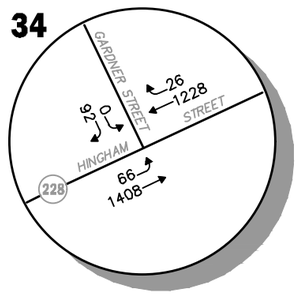
Figure 7-6B

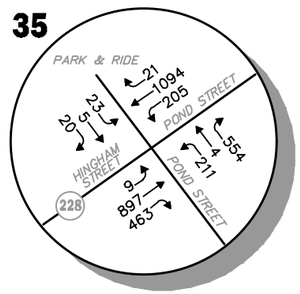
2022 Existing
Weekday Evening
Peak-Hour Traffic Volumes

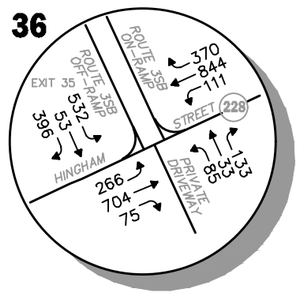
Vanasse & Associates inc

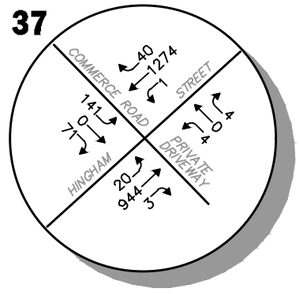


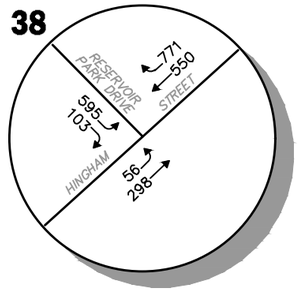


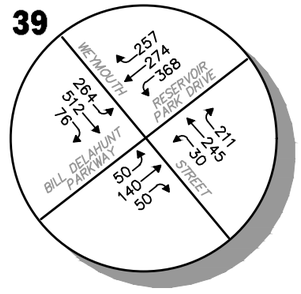


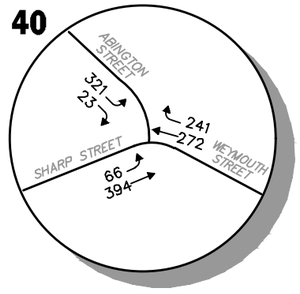


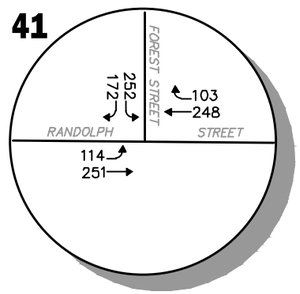


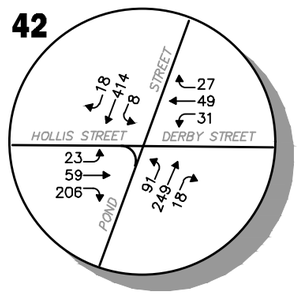


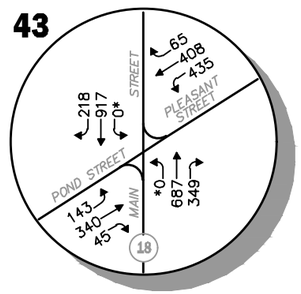


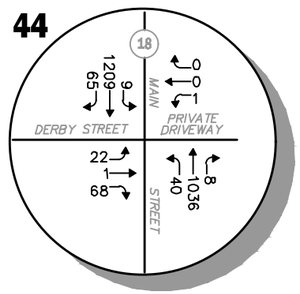


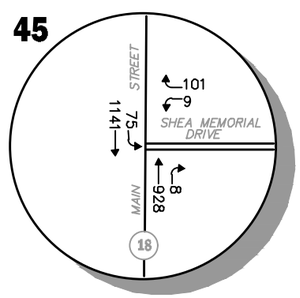


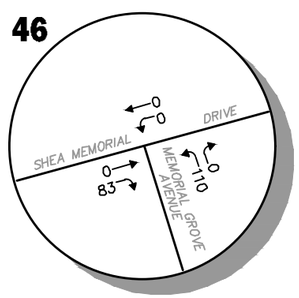


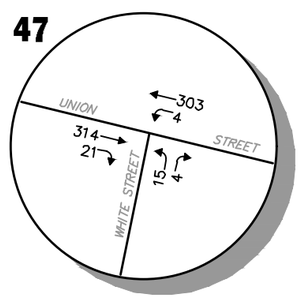


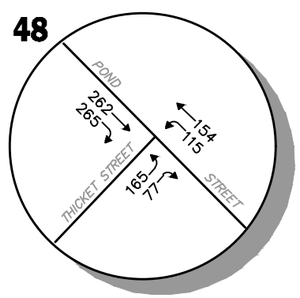










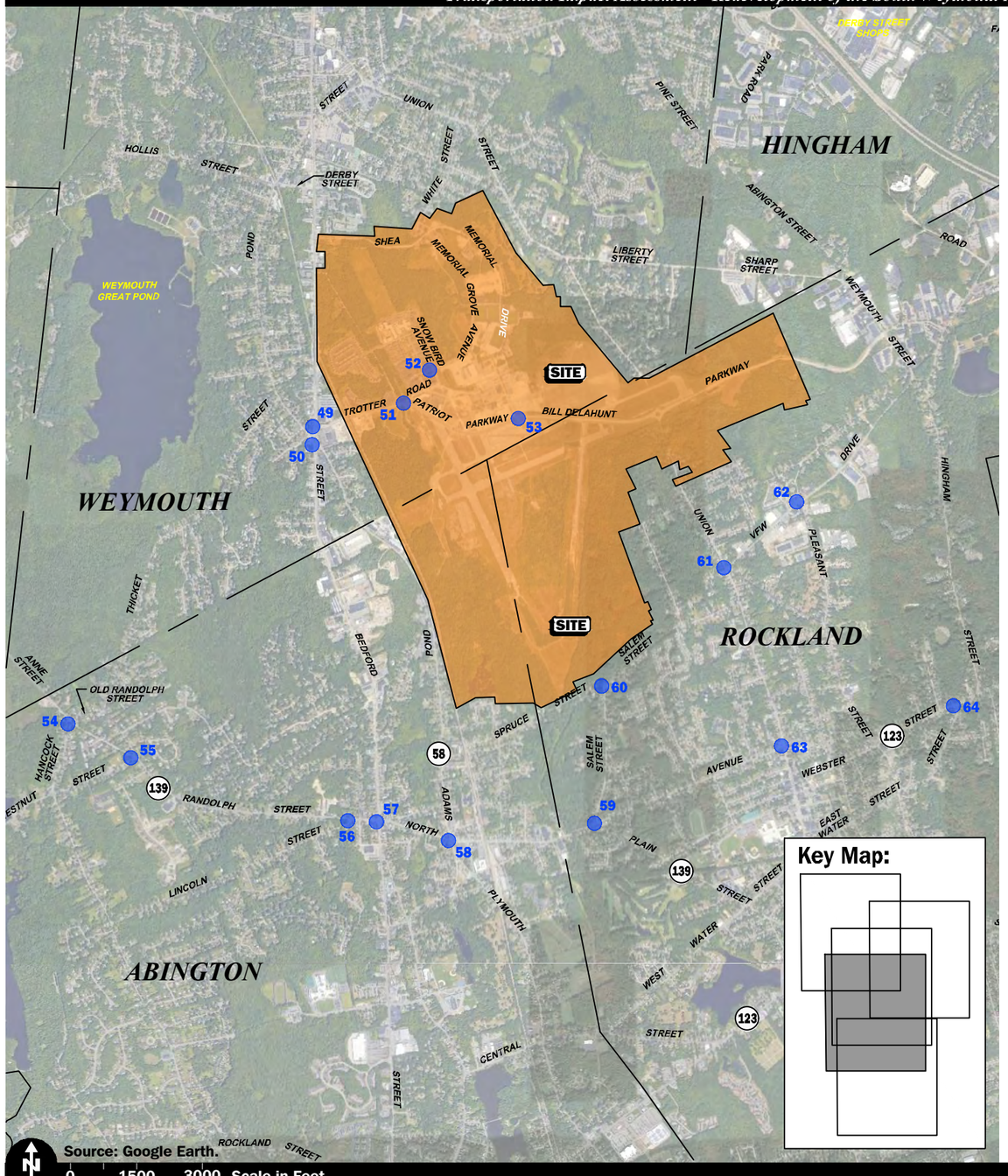


*Illegal movement.

Figure 7-6C

**2022 Existing
Weekday Evening
Peak-Hour Traffic Volumes**

Vanasse & Associates inc



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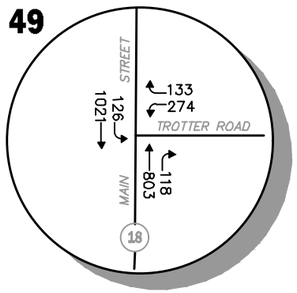

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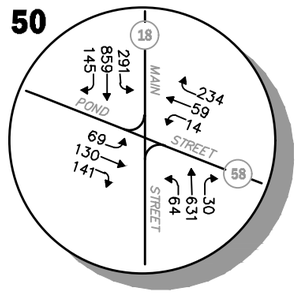

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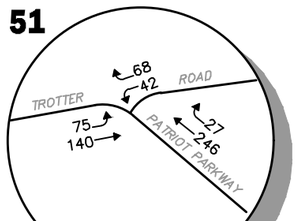

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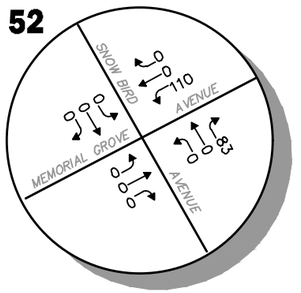

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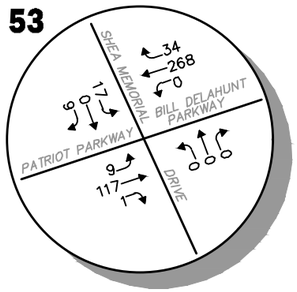

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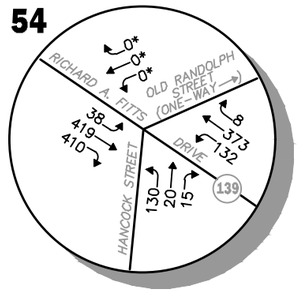

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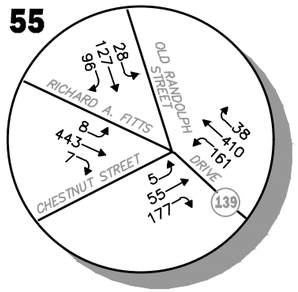

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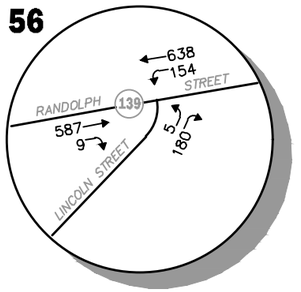

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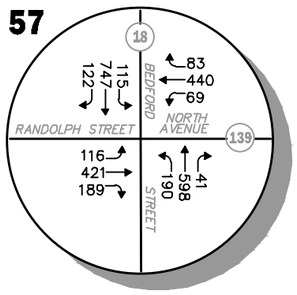

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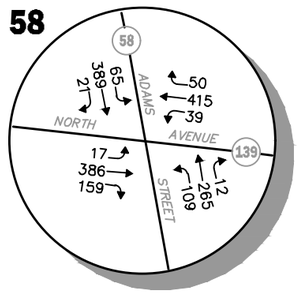

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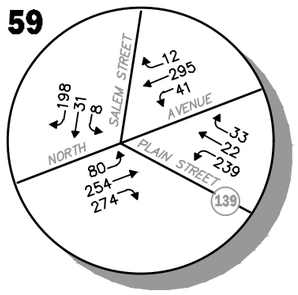

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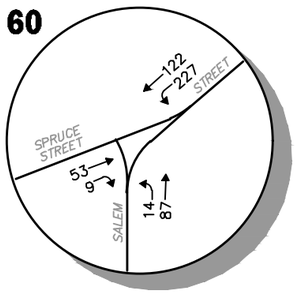

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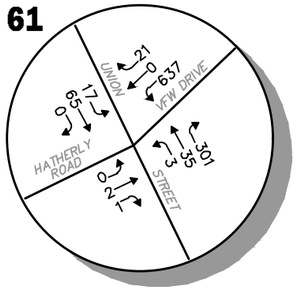

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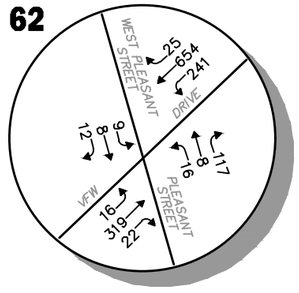

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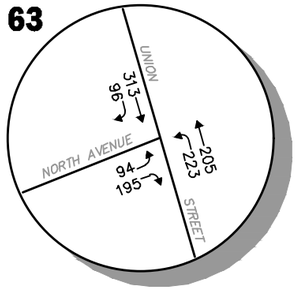

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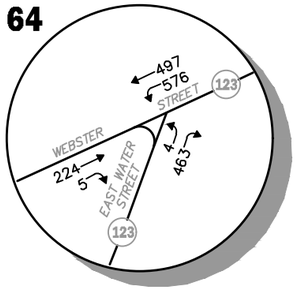
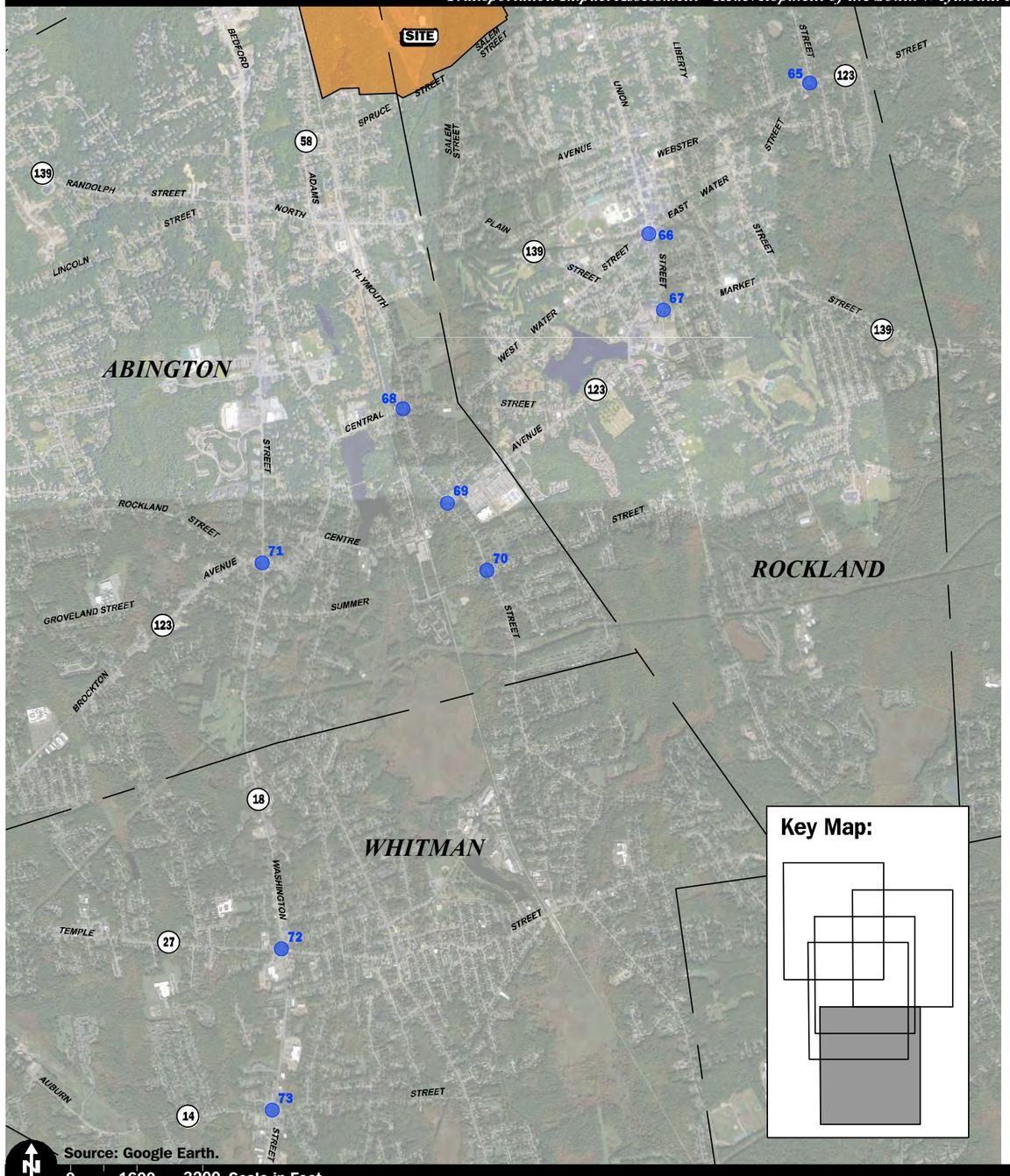


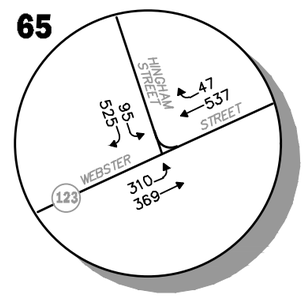
*Illegal movement.

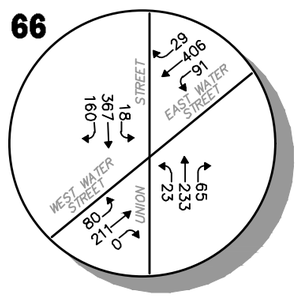
Figure 7-6D

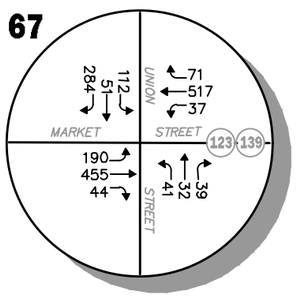
**2022 Existing
Weekday Evening
Peak-Hour Traffic Volumes**

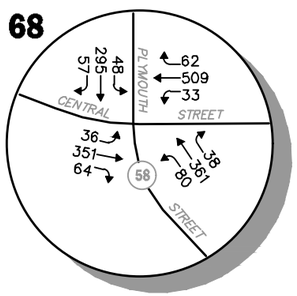
Vanasse & Associates inc

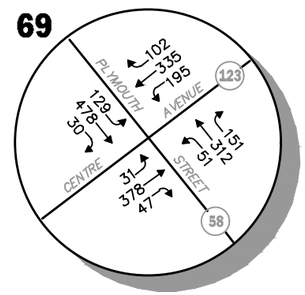


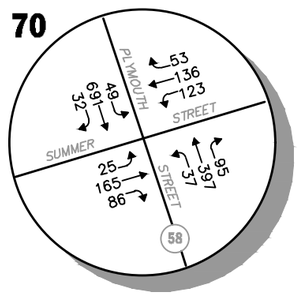


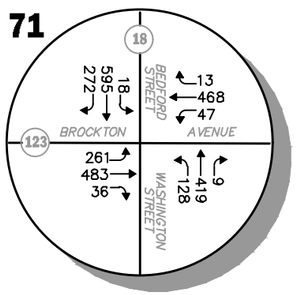


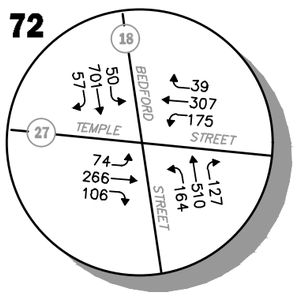












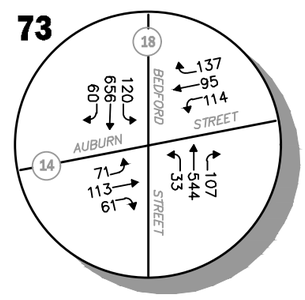


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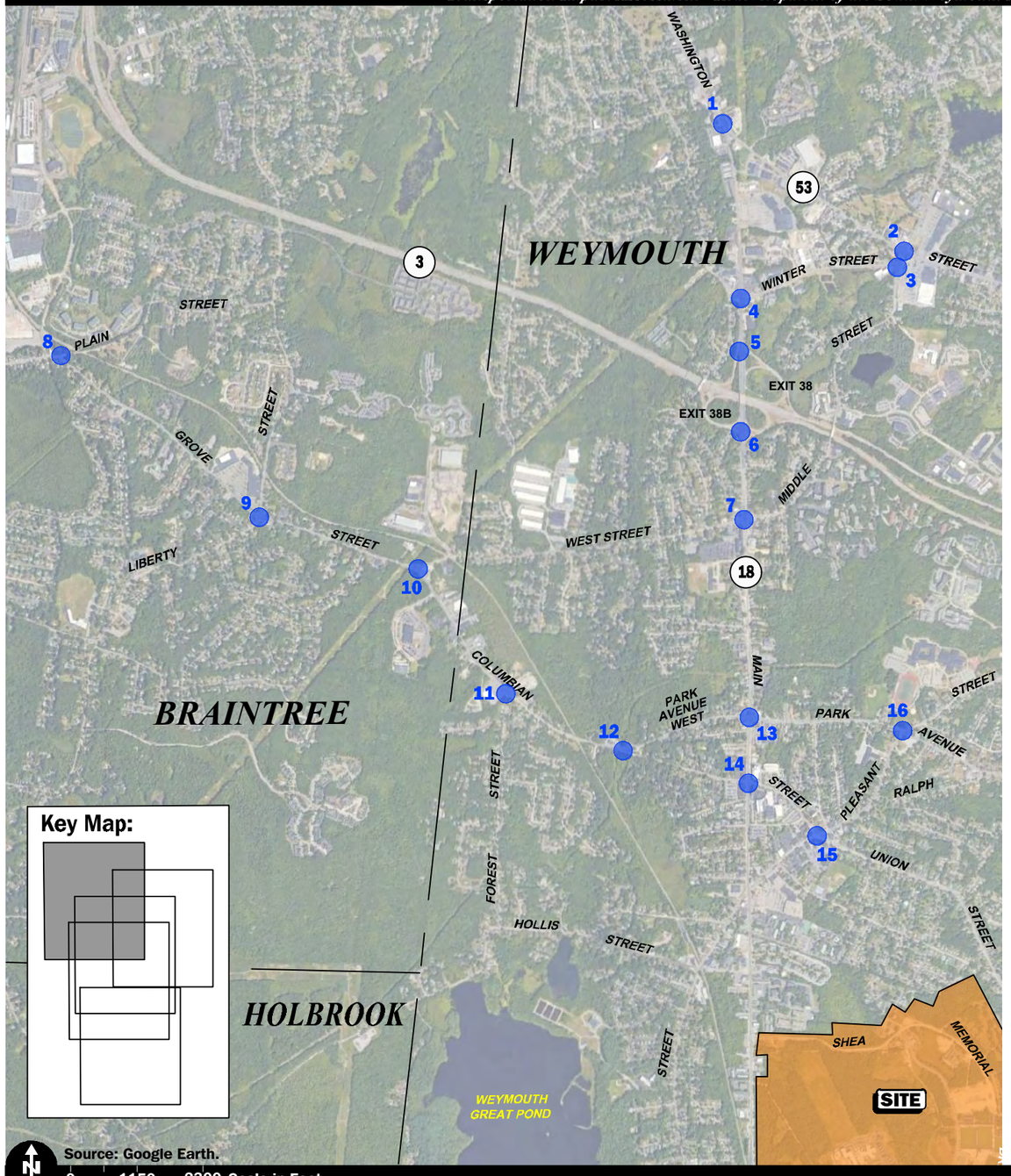
Figure 7-6E

2022 Existing
Weekday Evening
Peak-Hour Traffic Volumes



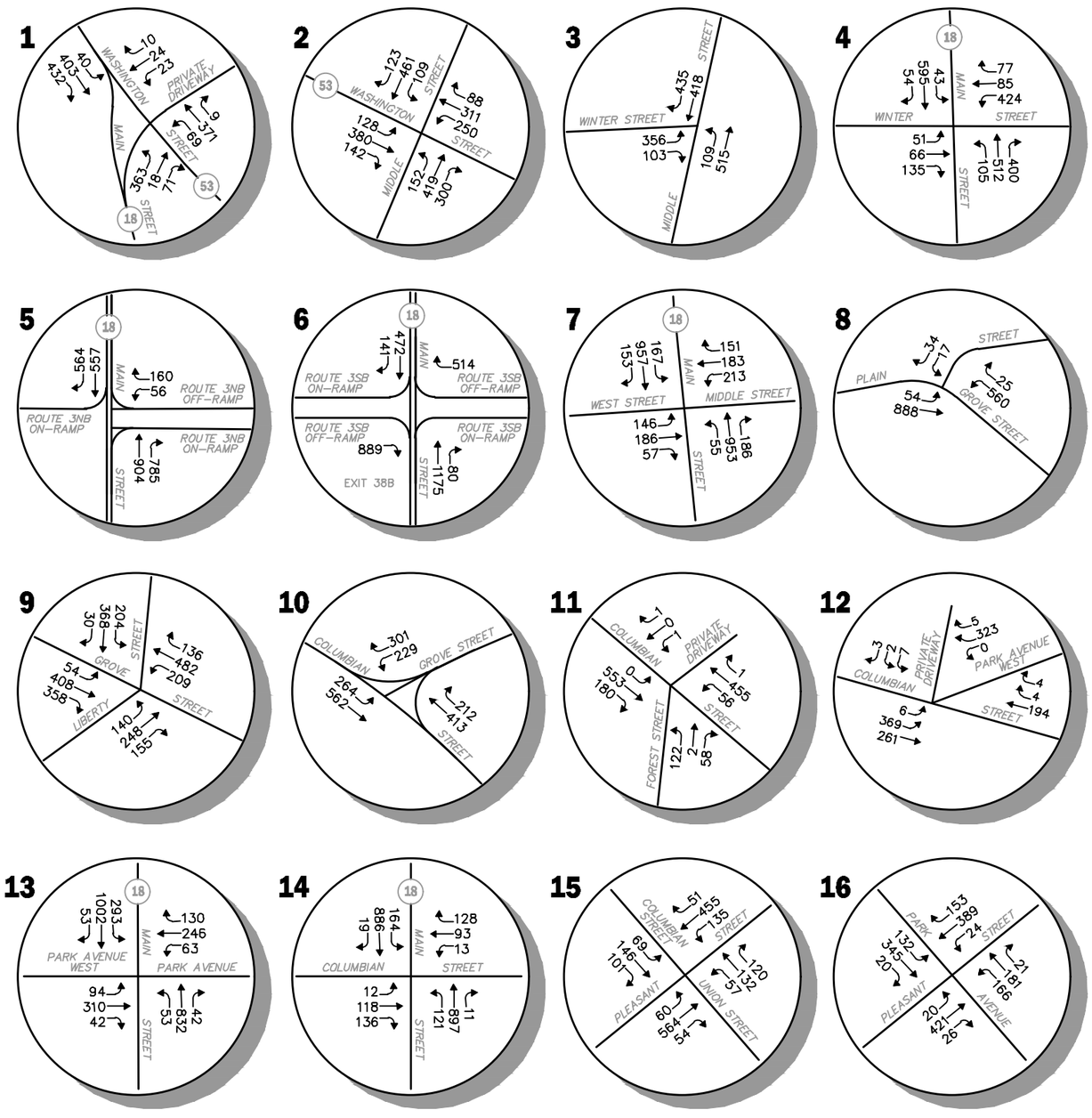
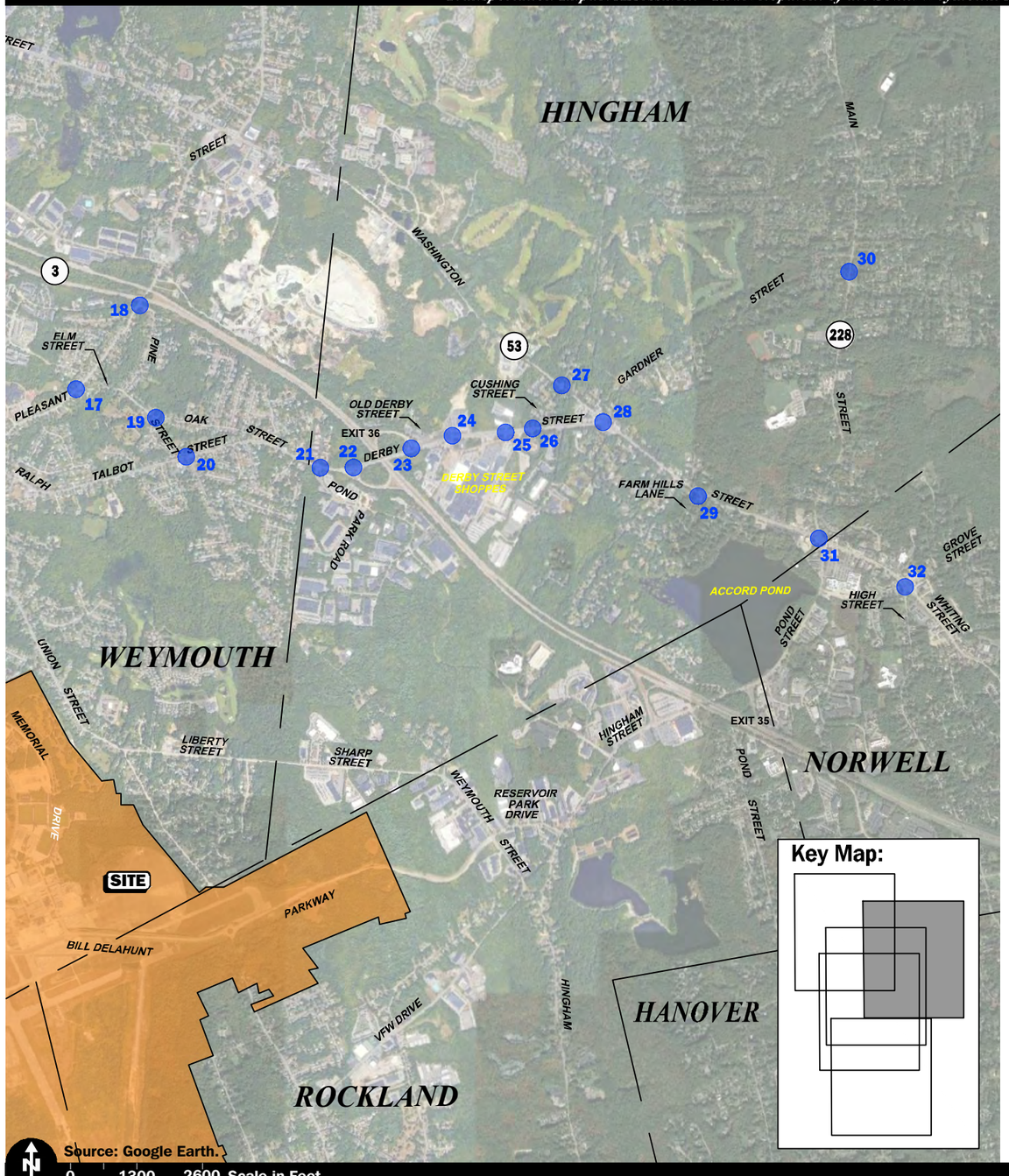


Figure 7-7A

2022 Existing
Saturday Midday
Peak-Hour Traffic Volumes

Vanasse & Associates inc



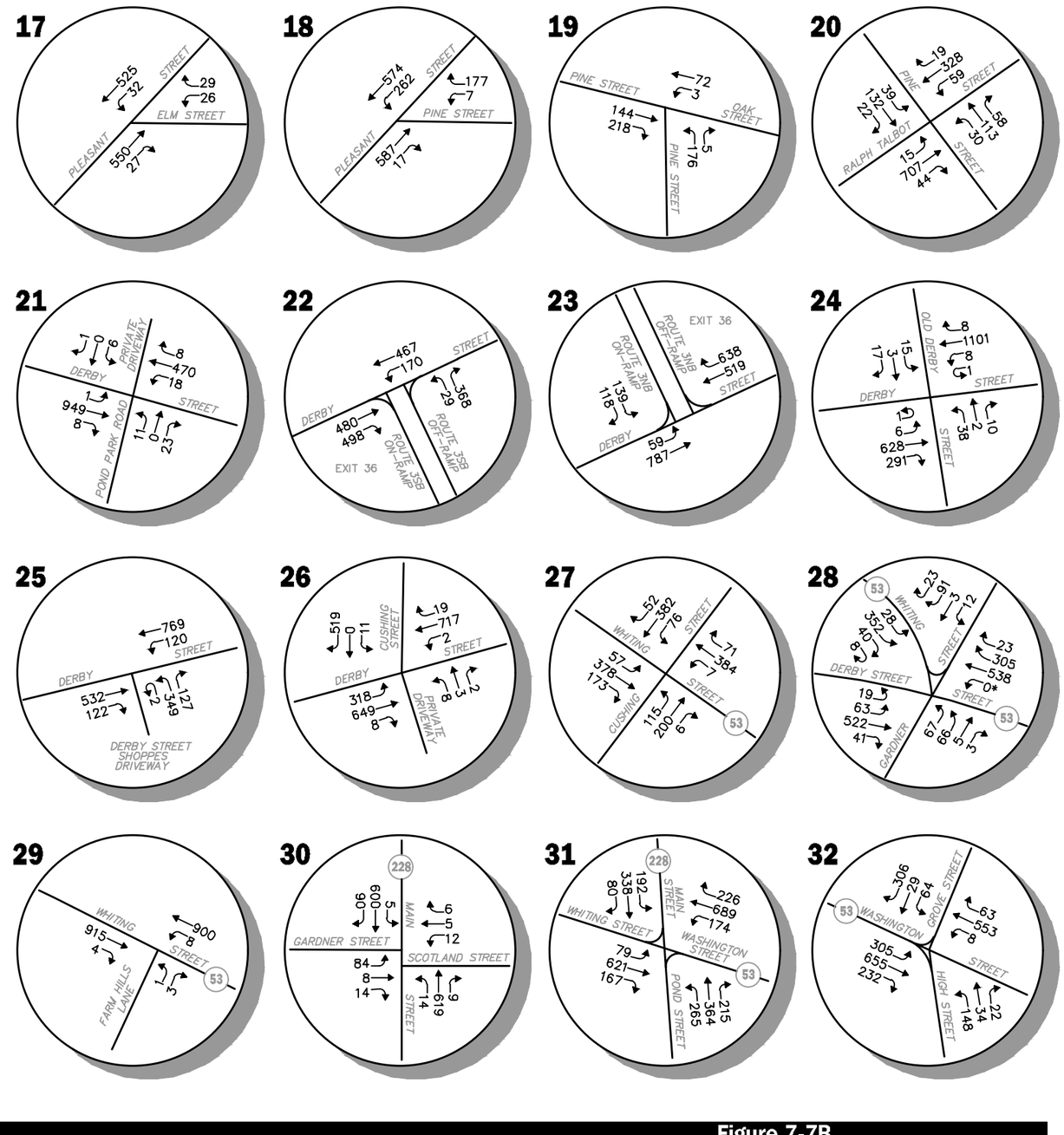
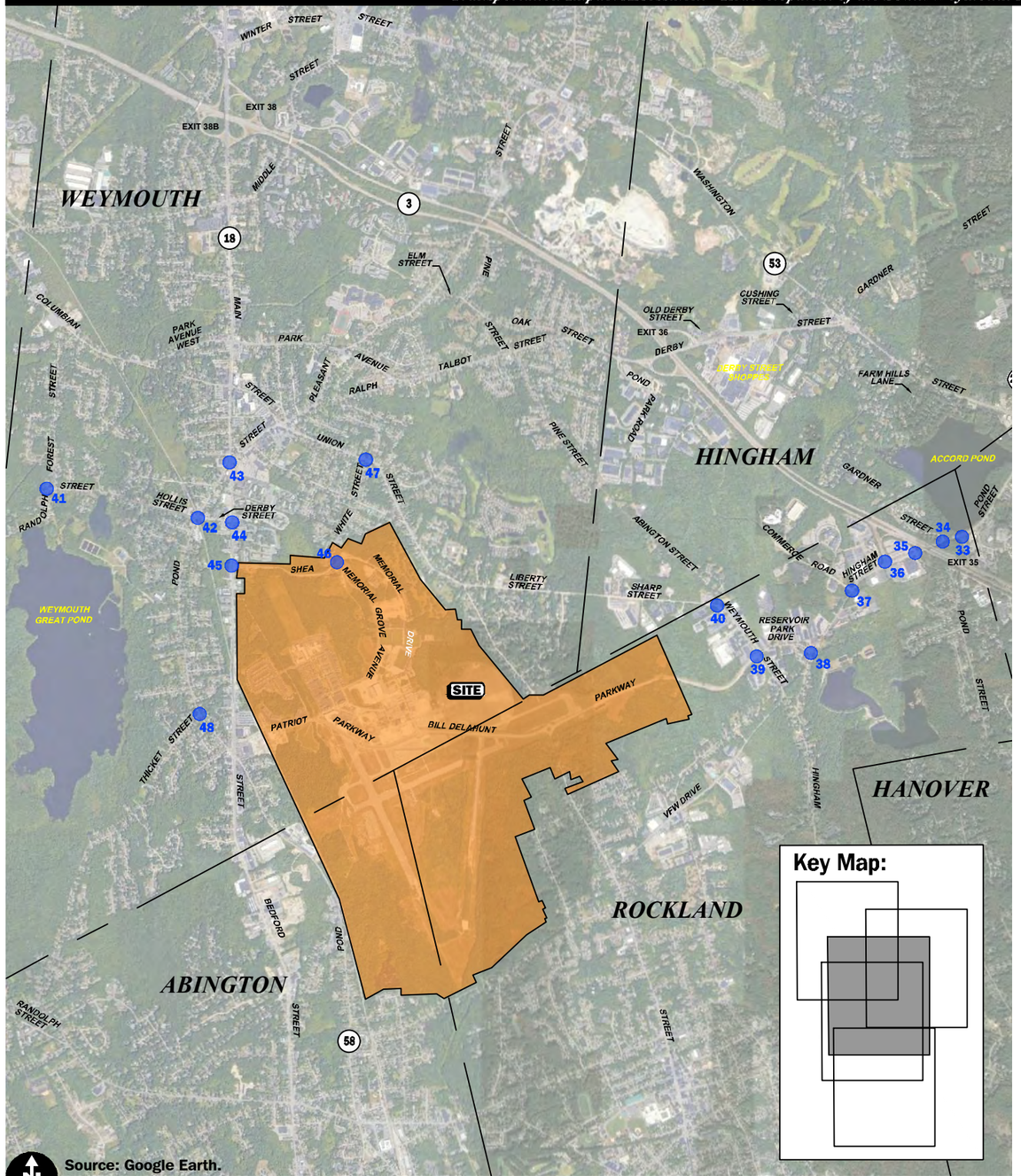
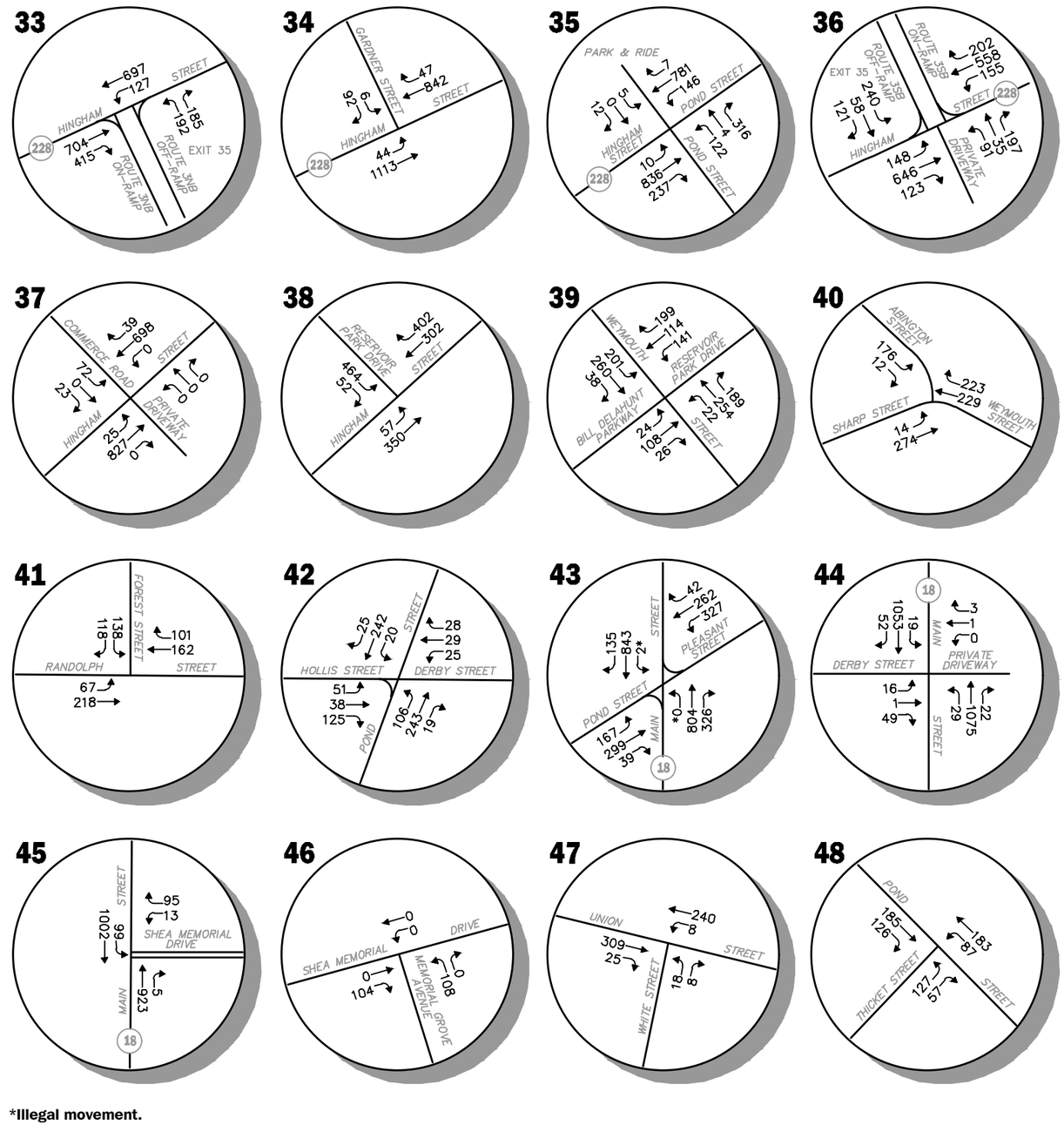


Figure 7-7B

2022 Existing
Saturday Midday
Peak-Hour Traffic Volumes

Vanasse & Associates inc



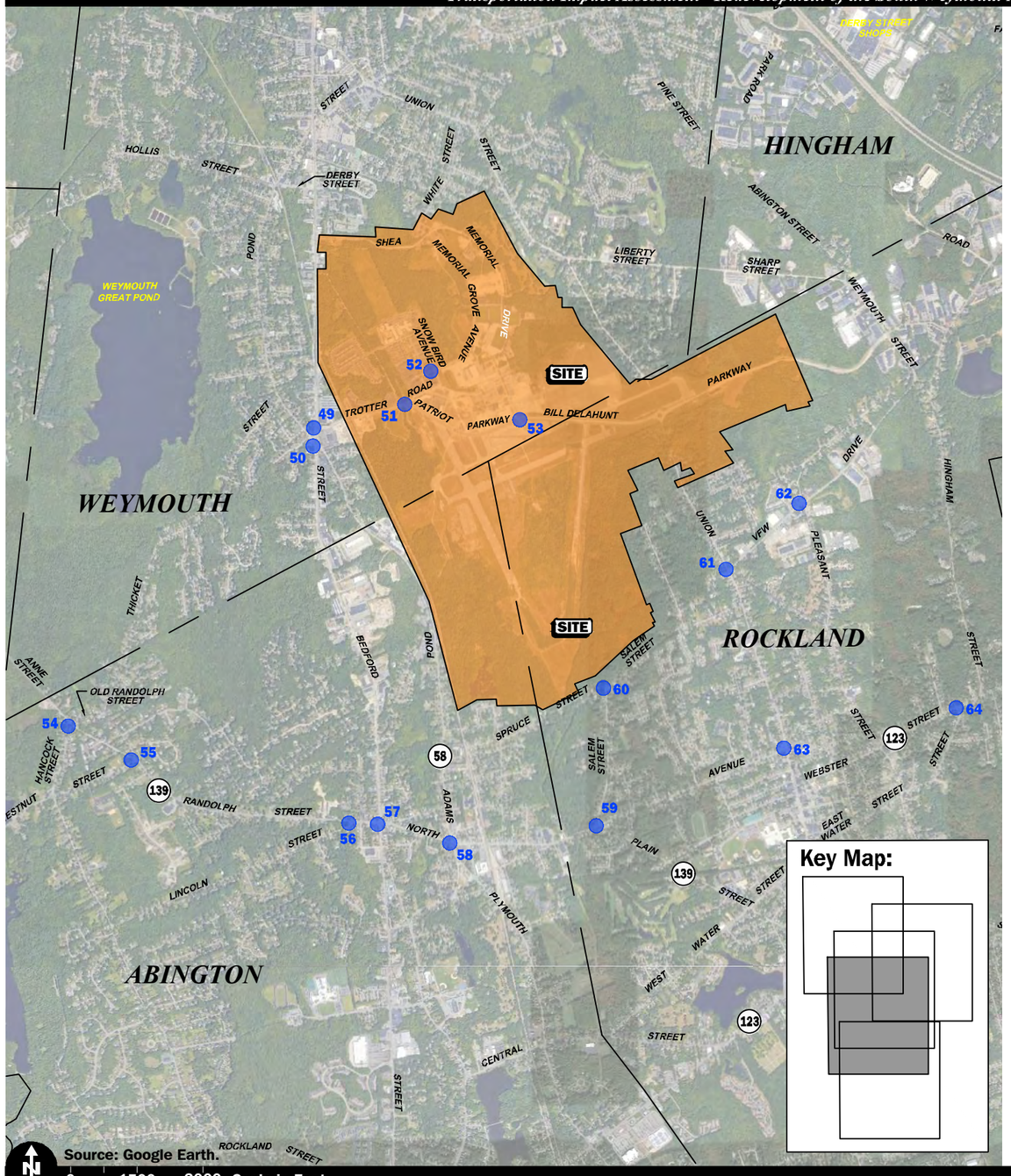


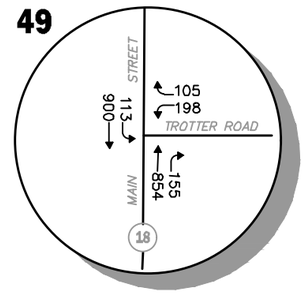
*Illegal movement.

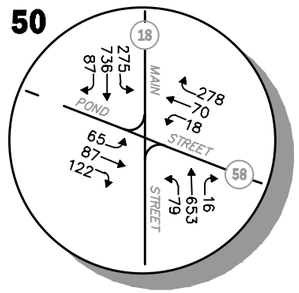
Figure 7-7C

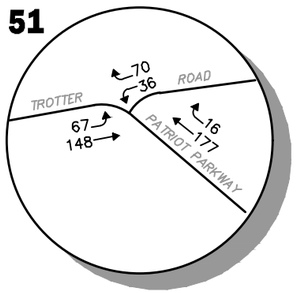
2022 Existing
Saturday Midday
Peak-Hour Traffic Volumes

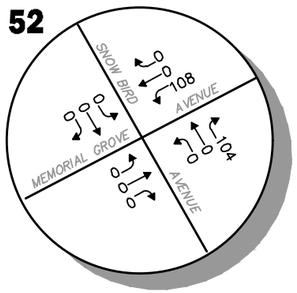
Vanasse & Associates inc

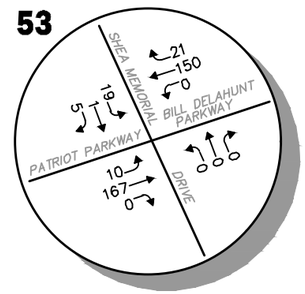


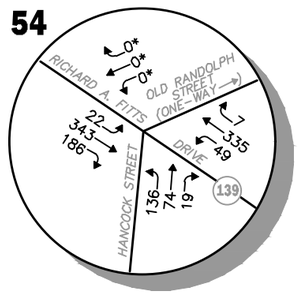


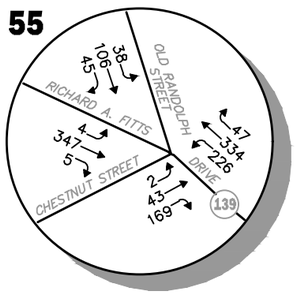


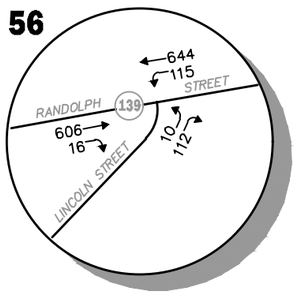


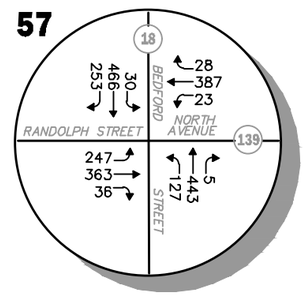


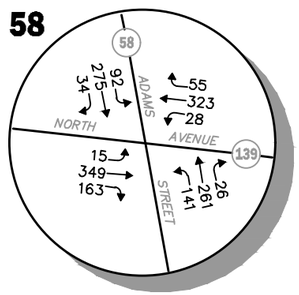


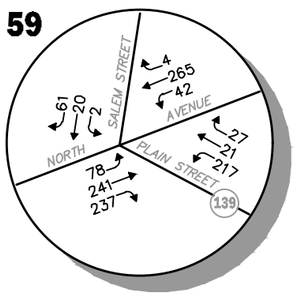


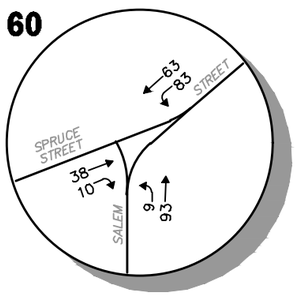


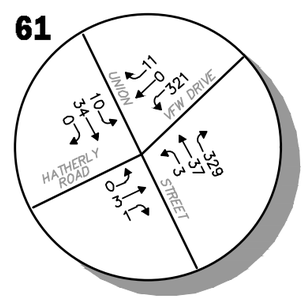


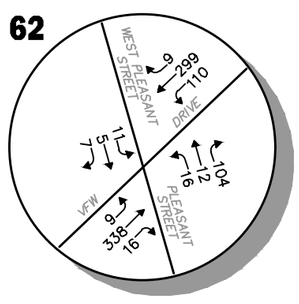


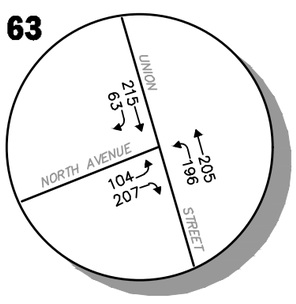


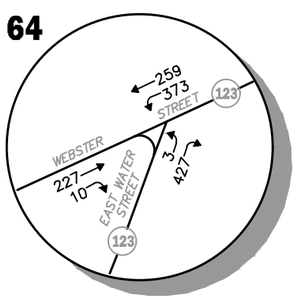










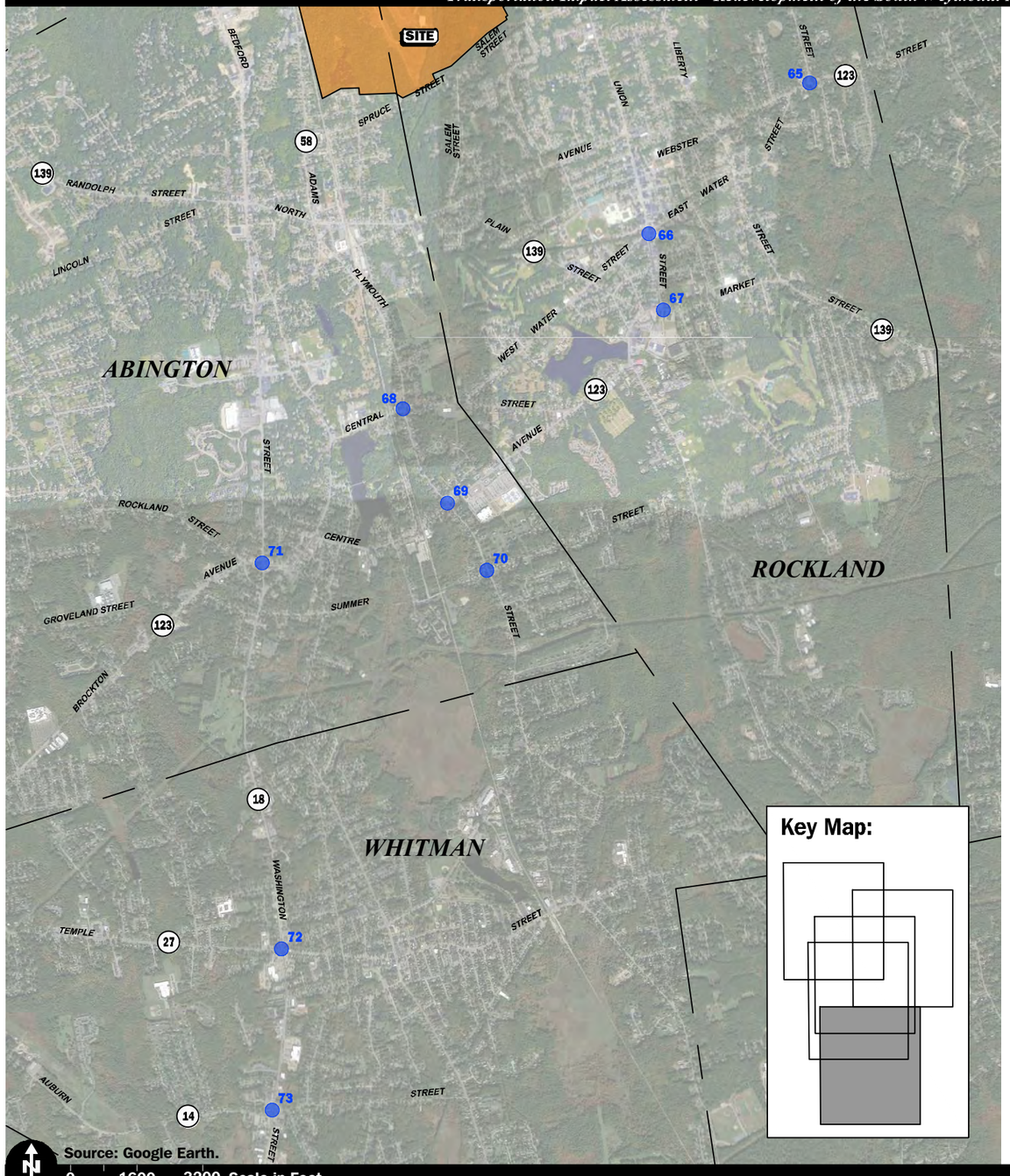


*Illegal movement.

Figure 7-7D

2022 Existing
Saturday Midday
Peak-Hour Traffic Volumes

Vanasse & Associates inc



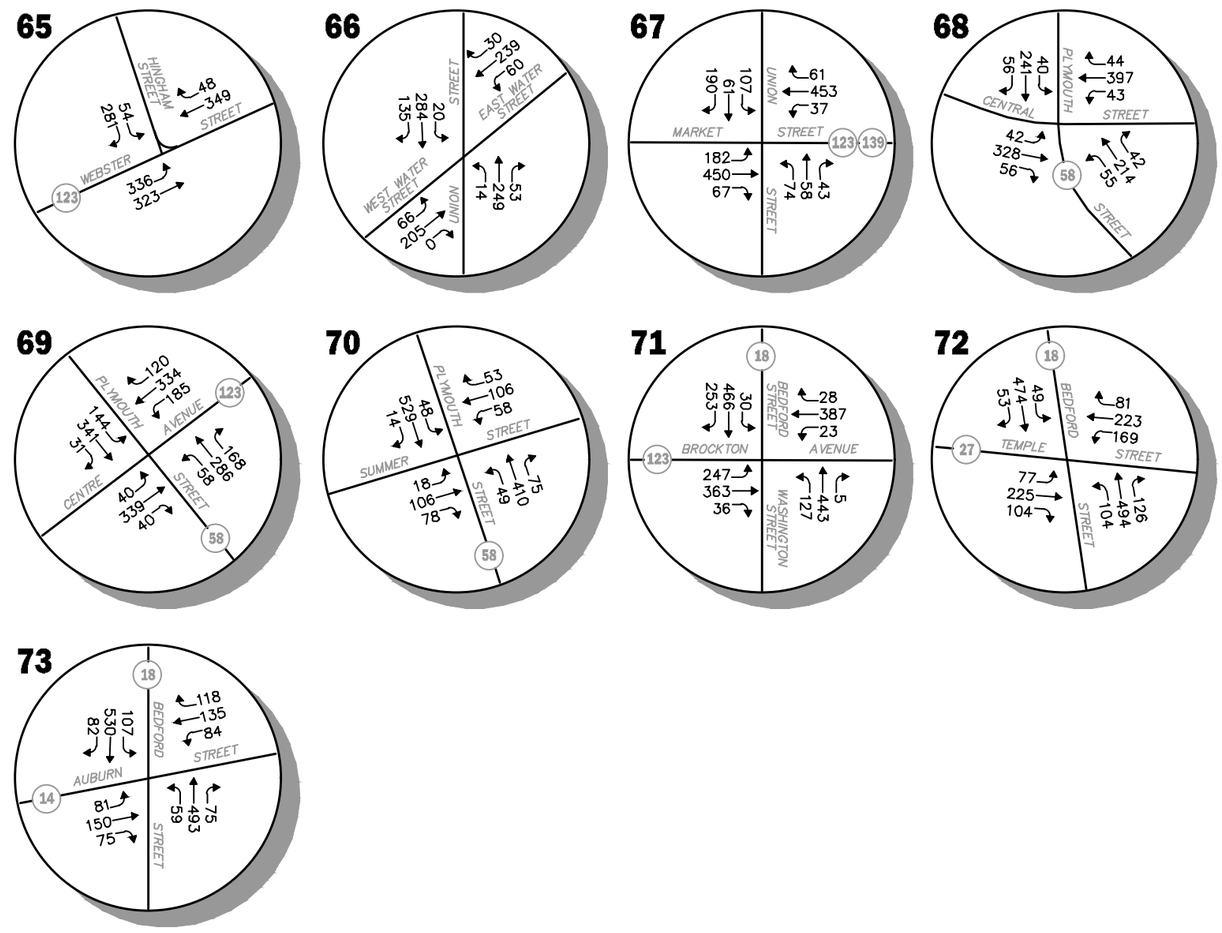


Figure 7-7E

2022 Existing
Saturday Midday
Peak-Hour Traffic Volumes

Vanasse & Associates inc

approximately 351 vph during the weekday morning peak-hour, 436 vph during the weekday evening peak-hour and 357 vph during the Saturday midday peak-hour.

Shea Memorial Drive was found to accommodate approximately 2,410 vehicles on an average weekday and approximately 2,360 vehicles on a Saturday, with approximately 171 vph during the weekday morning peak-hour, 193 vph during weekday evening peak-hour and 212 vph during the Saturday midday peak-hour.

Trotter Road was found to accommodate approximately 6,620 vehicles on an average weekday and approximately 5,195 vehicles on a Saturday, with approximately 420 vph during the weekday morning peak-hour, 651 vph during weekday evening peak-hour and 571 vph during the Saturday midday peak-hour.

PEDESTRIAN AND BICYCLE FACILITIES

A comprehensive field inventory of pedestrian and bicycle facilities within the study area was undertaken in 2022. The field inventory consisted of a review of the location of sidewalks and pedestrian crossing locations along the study roadways and at the study area intersections. With the exception of Hingham Street between the Route 3 northbound ramps and Weymouth Street, the Columbian Street/Grove Street intersection and the Salem Street/Spruce Street intersection, sidewalks are provided along one or both sides of the study area roadways, with marked crosswalks generally provided across one or more legs of the intersections, and pedestrian traffic signal equipment and phasing generally provided as a part of the traffic signal systems at the study area intersections that operate under traffic signal control.

Marked bicycle facilities (defined by bicycle lanes or "sharrows") are not provided on a continuous basis within the study area; however, the study area roadways generally provide sufficient width to accommodate bicycle travel in a shared traveled-way condition (i.e., bicyclists and motor vehicles sharing the traveled-way).[13] A combination of on-street bicycle lanes and "sharrow" pavement markings are provided along the following roadway segments within the study area:

- *Route 18*:
  - both directions approaching the West Street and Middle Street intersection;
  - both directions approaching the Pond Street and Pleasant Street intersection;
  - both directions approaching Trotter Road and Pond Street ("sharrows" provided southbound between Trotter Road and Pond Street);
  - "sharrows" provided both directions approaching Route 27; and
  - both directions approaching Route 14
- *Winter Street*, eastbound approaching Middle Street
- *Middle Street*:
  - both directions between Winter Street and Route 53 ("sharrows" provided north of Route 53); and
  - westbound approaching Route 18
- *West Street*, eastbound approaching Route 18
- *Pleasant Street*, both directions between Park Avenue and Pine Street

[13] A minimum combined travel lane and paved shoulder width of 14-feet is required to support bicycle travel in a shared traveled-way condition.

- *Derby Street*, both directions between Pond Park Road and Route 53 ("sharrows" provided northeast of Route 53)
- *Shea Memorial Drive*, both directions between Route 18 and Memorial Grove Avenue
- *Memorial Grove Avenue*, both directions between Shea Memorial Drive and Parkview Street
- *Trotter Road*, both directions between the MBTA Commuter Rail Station and Patriot Parkway ("sharrows" provided east of Patriot Parkway)
- *Patriot Parkway*, both directions between Trotter Road and Shea Memorial Drive
- *Union Street*, "sharrows" provided northbound at the North Avenue intersection
- *Route 27*, both directions approaching Route 18
- *Route 14*, both directions approaching Route 18

PUBLIC TRANSPORTATION

Public transportation services are provided within the study area by the MBTA (Commuter Rail and fixed-route bus service) and are accessible to residents and employees of the Project. South Weymouth Station on the Kingston Line of the MBTA Commuter Rail system is located at 89 Trotter Road, adjacent and connected by existing parking and pedestrian pathways within the Project site. MBTA bus Route 226 provides fixed-route bus service along Route 18 with a stop at the Route 18/Pleasant Street intersection approximately 1 to 2 miles to the northeast of the Project site. The Route 226 bus provides service to Braintree Station on the MBTA Red Line rapid transit system and the Middleborough/Lakeville and Kingston Lines of the MBTA Commuter Rail system, where connections can also be made to other MBTA bus routes.

In addition, the MBTA provides The RIDE paratransit services to eligible persons who cannot use fixed-route transit (bus, subway, trolley) due to a physical, cognitive or mental disability in compliance with Americans with Disabilities Act (ADA) requirements.

The public transportation schedules and fare information are provided in the Appendix.

SPOT SPEED MEASUREMENTS

Vehicle travel speed measurements were performed on Route 18, Bill Delahunt Parkway, Shea Memorial Drive, Trotter Road and Hingham Street in the vicinity of the Project site in conjunction with the ATR counts. Table 7-4 summarizes the vehicle travel speed measurements.

Table 7-4
VEHICLE TRAVEL SPEED MEASUREMENTS

	Mean Travel Speed (mph)	85th Percentile Speed (mph)	Posted/Statutory Speed Limit (mph)
Route 18, north of Park Avenue			
Northbound	37	43	35
Southbound	38	44	35
Route 18, south of Columbian Street			
Northbound	33	40	35
Southbound	31	38	35
Route 18, south of Derby Street			
Northbound	38	44	35
Southbound	38	44	35
Route 18, north of Trotter Road			
Northbound	38	45	35
Southbound	40	46	35
Route 18, south of Pond Street			
Northbound	39	46	35
Southbound	34	41	35
Hingham Street, south of the Route 3 Southbound Ramps			
Eastbound	30	37	25
Westbound	32	37	25
Hingham Street, south of Commerce Road			
Northbound	32	37	25
Southbound	29	36	25
Bill Delahunt Parkway, east of Patriot Parkway			
Eastbound	41	46	30
Westbound	42	47	30
Shea Memorial Drive, east of Route 18			
Eastbound	27	32	30
Westbound	32	35	30
Trotter Road, east of Route 18			
Eastbound	27	30	30
Westbound	26	30	30

mph = miles per hour.

As can be seen in Table 7-4, the mean vehicle travel speed along Route 18 within the study area was found to range between 33 and 39 mph in the northbound direction and between 31 and 40 mph southbound. The measured 85th percentile vehicle travel speed, or the speed at which 85 percent of the observed vehicles traveled at or below, was found to range between 40 and 46 mph in the

northbound direction and between 38 and 46 mph westbound, which is 3 to 11 mph above the posted speed limit along the roadway (35 mph). The 85th percentile speed is used as the basis of engineering design and in the evaluation of sight distances and is often used in establishing posted speed limits.

The mean vehicle travel speed along Hingham Street within the study area was found to range between 30 and 32 mph in the eastbound direction and between 29 and 32 mph westbound, with the measured 85th percentile vehicle travel speed found to be 37 mph in the eastbound direction and to range between 36 and 37 mph westbound, which is 11 to 12 mph above the posted speed limit (25 mph).

Within the Project site, the mean vehicle travel speed along Bill Delahunt Parkway was found to be 41 mph in the eastbound direction and 42 mph westbound, with the measured 85th percentile vehicle travel speed found to be 46 mph in the eastbound direction and 47 mph westbound, which is 16 to 17 mph above the posted speed limit (30 mph). The observed speeds may be influenced by the relative lack of motor vehicle traffic along the roadway infrastructure, which was constructed to accommodate the full-build out of the Project as envisioned in the 2007 FEIR.

The mean vehicle travel speed along Shea Memorial Drive within the Project site was found to be 27 mph in the eastbound direction and 32 mph westbound, with the measured 85th percentile vehicle travel speed found to be 32 mph in the eastbound direction and 35 mph westbound, which is 2 to 5 mph above the statutory speed limit (30 mph).

The mean vehicle travel speed along Trotter Road within the Project site was found to be 27 mph in the eastbound direction and 26 mph westbound, with the measured 85th percentile vehicle travel speed found to be 30 mph in both the east and westbound directions, which is consistent with the statutory speed limit (30 mph).

MOTOR VEHICLE CRASH DATA

Motor vehicle crash information for the study area intersections was provided by the MassDOT Highway Division Safety Management/Traffic Operations Unit for the most recent five-year period available (2016 through 2020, inclusive) in order to examine motor vehicle crash trends occurring within the study area.

The intersections which experienced crash rates higher than the MassDOT statewide and/or District averages for the MassDOT Highway Division District in which the intersections are located (Districts 5 and 6), or that are included on MassDOT's Highway Safety Improvement Program (HSIP) listing as a high crash cluster location, are depicted on Figure 7-8 and listed below.

- *Route 18 at Route 53* (Intersection No. 1) - higher than average crash rate
- *Route 53 at Middle Street* (Intersection No. 2) - higher than average crash rate and top 5% intersection crash cluster location
- *Middle Street at Winter Street* (Intersection No. 3) - higher than average crash rate and top 5% intersection crash cluster location
- *Route 18 at Winter Street* (Intersection No. 4) - higher than average crash rate and top 5% intersection crash cluster location

Legend:

- Top 200 Crash Cluster (2017-2019)
- Top 5% Intersection Crash Cluster (2017-2019)
- Crate Rate Exceeds Statewide/District Averages

Key Map:

A B C D

BRAINTREE

WEYMOUTH

HINGHAM

GROVE STREET

WEST STREET

MIDDLE STREET

MAIN STREET

PARK AVENUE WEST

PARK AVENUE

PLEASANT STREET

OAK STREET

TALBOT STREET

DERBY STREET

PILGRIMS WAY

WASHINGTON STREET

COLUMBIAN STREET

FOREST STREET

RALPH STREET

HOLLIS STREET

UNION STREET

RANDOLPH STREET

LIBERTY STREET

SHARP STREET

HINGHAM STREET

POND STREET

DERBY STREET SHOPS

ACCORD POND

SHEA MEMORIAL POND

WEYMOUTH RESERVOIR PARK

Source: Google Earth & MassDOT.

0 1100 2200 Scale in Feet

Figure 7-8A

MassDOT High Crash Locations

Vanasse & Associates inc

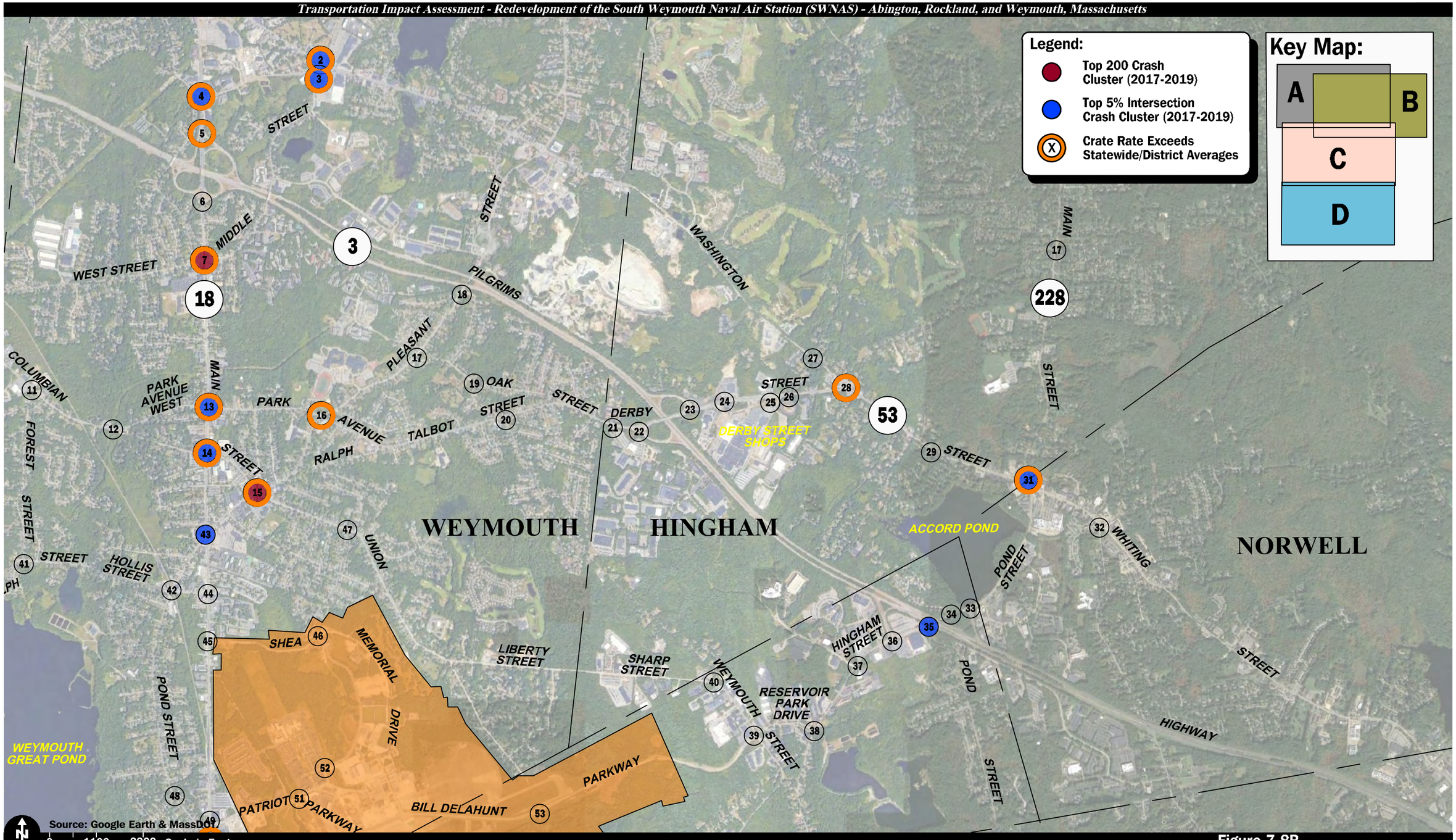


Figure 7-8B

MassDOT High Crash Locations

Vanasse & Associates inc

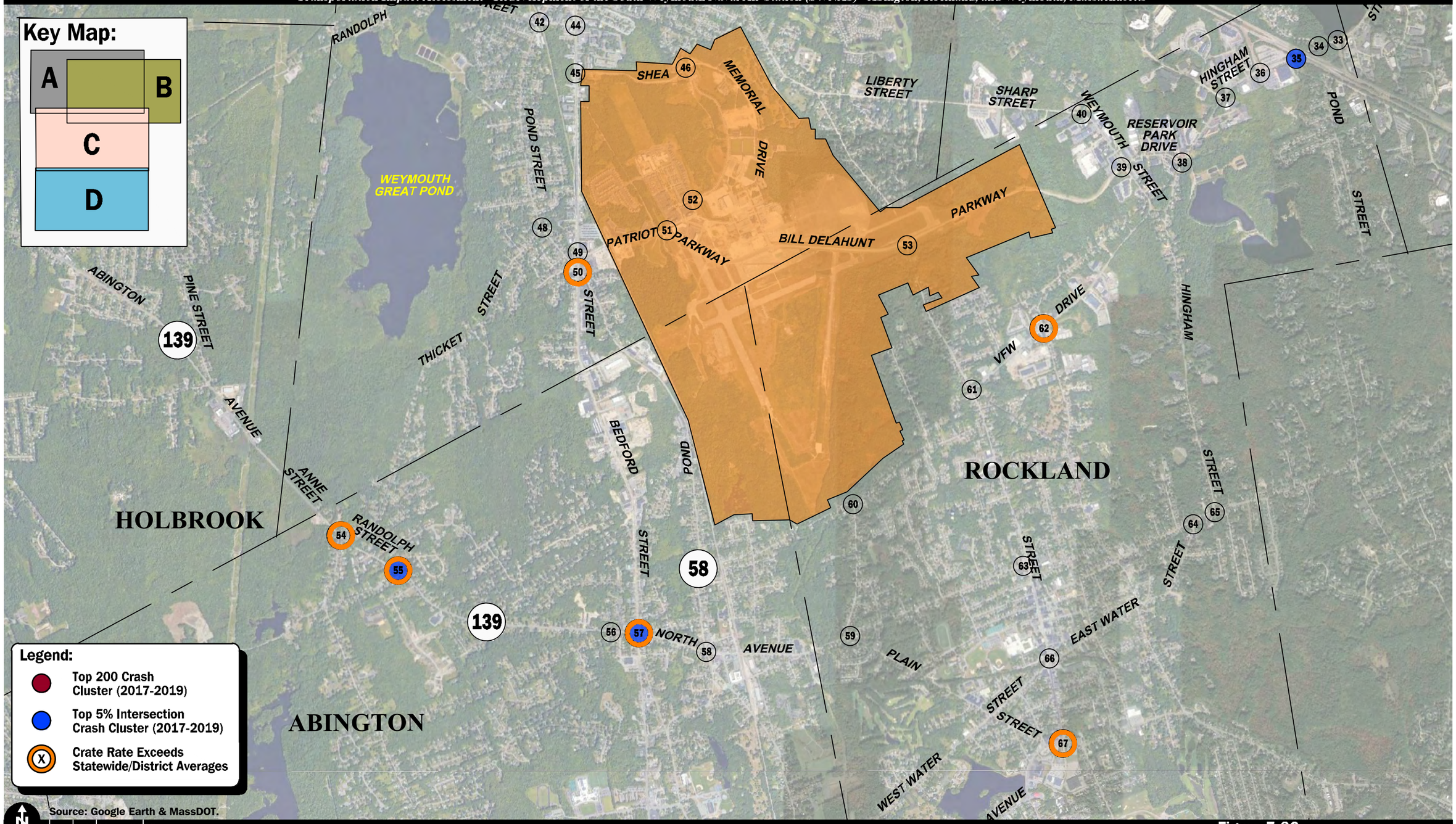


Figure 7-8C

MassDOT High Crash Locations

Vanasse & Associates inc

Legend:

- Top 200 Crash Cluster (2017-2019)
- Top 5% Intersection Crash Cluster (2017-2019)
- Crate Rate Exceeds Statewide/District Averages

Key Map:

A | B | C | D

ABINGTON

BROCKTON

WHITMAN

HANSON

CENTRAL STREET

CENTRE STREET

SUMMER STREET

SOUTH BEDFORD STREET

BEDFORD STREET

WASHINGTON STREET

SOUTH AVENUE

TEMPLE STREET

AUBURN STREET

STREET

123

68

69

70

71

72

73

18

27

14

Source: Google Earth & MassDOT.

0 1100 2200 Scale in Feet

Figure 7-8D

MassDOT High Crash Locations

Vanasse & Associates inc

- *Route 18 at the Route 1 Northbound Ramps* (Intersection No. 5) - higher than average crash rate
- *Route 18 at West Street and Middle Street* (Intersection No. 7) - higher than average crash rate and top 200 crash cluster location
- *Route 18 at Park Avenue and Park Avenue West* (Intersection No. 13) - higher than average crash rate and top 5% intersection crash cluster location
- *Route 18 at Columbian Street* (Intersection No. 14) - higher than average crash rate and top 5% intersection crash cluster location
- *Pleasant Street at Columbian Street and Union Street* (Intersection No. 15) - higher than average crash rate and top 200 crash cluster location
- *Pleasant Street at Park Avenue* (Intersection No. 16) - higher than average crash rate
- *Route 53 at Derby Street and Gardner Street* (Intersection No. 28) - higher than average crash rate
- *Route 53 at Route 228* (Intersection No. 31) - higher than average crash rate and top 5% intersection crash cluster location
- *Route 228 at Pond Street* (Intersection No. 35) - top 5% intersection crash cluster location
- *Route 18 at Pond Street and Pleasant Street* (Intersection No. 43) - top 5% intersection crash cluster location
- *Route 18 at Pond Street* (Intersection No. 50) - higher than average crash rate
- *Route 139 at Hancock Street and Old Hancock Street* (Intersection No. 54) - higher than average crash rate
- *Route 139 at Chestnut Street and Old Randolph Street* (Intersection No. 55) - higher than average crash rate and top 5% intersection crash cluster location
- *Route 18 at Route 139* (Intersection No. 57) - higher than average crash rate and top 5% intersection crash cluster location
- *VFW Drive at Pleasant Street and West Pleasant Street* (Intersection No. 62) - higher than average crash rate
- *Route 123 at Union Street* (Intersection No. 67) - higher than average crash rate
- *Route 58 at Central Street* (Intersection No. 68) - higher than average crash rate
- *Route 58 at Summer Street* (Intersection No. 70) - higher than average crash rate
- *Route 18 at Route 123* (Intersection No. 71) - higher than average crash rate
- *Route 18 at Route 27* (Intersection No. 72) - higher than average crash rate and top 200 crash cluster location
- *Route 18 at Route 14* (Intersection No. 73) - higher than average crash rate

Road Safety Audits (RSAs) have been conducted at the following study area intersections that identified potential safety enhancements:

- *Route 18 at Route 53* (Intersection No. 1)
- *Route 53 at Middle Street* (Intersection No. 2)
- *Route 18 at Winter Street* (Intersection No. 4)
- *Route 18 at West Street and Middle Street* (Intersection No. 7)
- *Route 18 at Park Avenue and Park Avenue West* (Intersection No. 13)

- *Route 18 at Columbian Street* (Intersection No. 14)
- *Derby Street at the Route 3 Southbound Ramps* (Intersection No. 22)
- *Derby Street at the Route 3 Northbound Ramps* (Intersection No. 23)
- *Route 53 at Derby Street and Gardner Street* (Intersection No. 28)
- *Route 228 at Pond Street* (Intersection No. 35)
- *Route 18 at Pond Street and Pleasant Street* (Intersection No. 43)
- *Route 18 at Pond Street* (Intersection No. 50)
- *Route 139 at Hancock Street and Old Hancock Street* (Intersection No. 54)
- *Route 139 at Chestnut Street and Old Randolph Street* (Intersection No. 55)
- *Route 18 at Route 139* (Intersection No. 57)
- *Route 123 at Union Street* (Intersection No. 67)
- *Route 58 at Central Street* (Intersection No. 68)
- *Route 123 at Route 58* (Intersection No. 69)
- *Route 18 at Route 123* (Intersection No. 71)
- *Route 18 at Route 27* (Intersection No. 72)
- *Route 18 at Route 14* (Intersection No. 73)

The RSAs were conducted between June 2011 and February 2022. In general, the majority of the improvements that were identified in the RSA's have been completed, with the benefits of the most recently completed improvements (i.e. those completed during or after the 2016 to 2020 MassDOT crash reporting period) not yet fully reflected in the MassDOT motor vehicle crash data.

No fatal motor vehicle crashes were reported to have occurred at the study area intersections over the five-year review period.

The detailed MassDOT Crash Rate Worksheets, the RSA recommendations, and a table of the crash data summarized by intersection, type, severity, roadway and weather conditions, and day of occurrence, are provided in the Appendix.

FUTURE CONDITIONS

Traffic volumes in the study area were projected to the year 2043, which reflects a 20 year planning horizon from the date of publication of this assessment and reflects the long-term build-out and occupancy that is contemplated for the Project. Independent of the Project, traffic volumes on the roadway network in the year 2043 under No-Build conditions include all existing traffic and new traffic resulting from background traffic growth. Anticipated Project-generated traffic volumes superimposed upon the 2043 No-Build traffic volumes reflect 2043 Build traffic-volume conditions with the Project.

FUTURE TRAFFIC GROWTH

Future 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 annual percentage increase in traffic growth and applies that percentage to all traffic volumes under study. The drawback to such a procedure is that some turning volumes may actually grow at either a higher or a lower rate at particular intersections.

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, potential population growth and development external to the study area would not be accounted for in the resulting traffic projections.

To provide a conservative analysis framework, both procedures were used, the salient components of which are described below.

Specific Development by Others

The planning officials for the Towns of Abington, Braintree, Hanover, Hingham, Holbrook, Norwell, Rockland, Weymouth, and Whitman were contacted in order to determine if there were any projects planned within the study area that would have an impact on future traffic volumes at the study intersections. Based on this discussion, the following projects were identified for review in conjunction with this assessment:

- ***Adult-Use Marijuana Dispensary,[14] 1410 Bedford Street (Route 18), Abington, Massachusetts.*** This project entails the renovation of 1,700± sf of commercial space to accommodate a marijuana dispensary located at 1410 Bedford Street, south of the Project site.

- ***Adult-Use Marijuana Dispensary, 1437 Bedford Street (Route 18), Abington, Massachusetts.*** This project entails the construction of a 3,000± sf marijuana dispensary and an associated 24,000± sf marijuana cultivation facility to be located at 1437 Bedford Street, south of the Project site.

- ***Adult-Use Marijuana Dispensary, 1423 Bedford Street (Route 18), Abington, Massachusetts.*** This proposed project entails the construction of a marijuana dispensary to be located at 1423 Bedford Street, south of the Project site. This project is in the initial planning stages and, as such, traffic volumes associated with this project within the study were assumed to be reflected in the general background traffic growth rate (discussion follows).

- ***Abington Crossing Development,[15] Summer Street, Abington, Massachusetts.*** This project entails the construction of a 156-unit multifamily residential community to be located off Summer Street, south of the Project site.

- ***Multifamily Residential Development, Plymouth Street, Abington, Massachusetts.*** This project entails the construction of a 187-unit multifamily residential community to be located off Plymouth Street, south of the Project site.

- ***Primrose School, Hingham Street,[16] Rockland, Massachusetts.*** This project entails the construction of a 13,000± sf childcare facility to be located off Hingham Street, east of Reservoir Park Drive and south of the Project site.

- ***Proposed Childcare Facility, 739 Pleasant Street, [17] Weymouth, Massachusetts.*** This project entails the construction of a 16,207± square foot (sf) childcare facility to be located at 739 Pleasant Street in Weymouth, northeast of the Project site.

- ***Medical Office Building, 200 Libbey Industrial Parkway,[18] Weymouth, Massachusetts.*** This project entails the construction of a 69,000± sf medical office building to be located at 200 Libbey Industrial Parkway, northeast of the Project site

- ***Mixed-Use Commercial Development, 505 Pond Street (Route 58),[19] Weymouth, Massachusetts.*** This project entails the construction of a 17,226± sf mixed-use

[14]*Transportation Impact Assessment;* Proposed Marijuana Dispensary – 1410 Bedford Street (Route 18), Abington, Massachusetts; VAI; January 28, 2020.

[15]*Traffic Impact and Access Study;* Abington Crossing Development, Summer Street, Abington, Massachusetts; Green International Affiliates; April 2020.

[16]*Transportation Impact Assessment;* Proposed Preschool School, Hingham Street, Rockland, Massachusetts; VAI; April 2020.

[17]*Transportation Impact Assessment*, Proposed Childcare Facility, 739 Pleasant Street, Weymouth, Massachusetts; VAI; July 2023.

[18]*Traffic Impact and Access Study;* Proposed Medical Office Building, 200 Libbey Industrial Parkway, Weymouth, Massachusetts; TetraTech; February 11, 2021.

[19]*Transportation Impact Assessment;* Proposed Mixed-Use Commercial Development, 505 Pond Street (Route 58), Weymouth, Massachusetts; VAI; July 2022.

commercial development containing a coffee shop with a drive-through window, a quick-serve restaurant with a drive-through window, a retail building that will contain multiple tenant spaces to be located at 505 Pond Street, south of the Project site.

- ***McDonald-Keohane Funeral Home Expansion, 809 Main Street (Route 18),[20] Weymouth, Massachusetts.*** This project entails the expansion of an existing funeral home located at 809 Main Street (Route 18), north of the Project site. Traffic volumes associated with this project within the study area are expected to be relatively minor and would be reflected in the general background traffic growth rate.

- ***Congregate Care Facility, 1431-1449 Main Street,[21] Weymouth, Massachusetts.*** This project entails the construction of a 165-unit congregate care facility containing independent living, assisted living and memory care units to be located at 1431-1449 Main Street, west of the Project site.

- ***Multifamily Residential Development, 125 Broad Street,[22] Weymouth, Massachusetts.*** This project entails the redevelopment of a former assisted living facility into a 80-unit multifamily residential community to be located at 125 Broad Street, north of the Project site. Traffic volumes associated with this project within the study area are expected to be relatively minor and would be reflected in the general background traffic growth rate.

- ***Mixed-Use Development, Washington Street (Route 53),[23] Weymouth, Massachusetts.*** This project entails the construction of a mixed-use development containing a 270-unit multifamily residential community and 4,200± sf of ground floor retail space to be located along the south side of Washington Street and east of Argyle Court, north of the Project site.

- ***Mixed-Use Development, 655 Washington Street (Route 53),[24] Weymouth, Massachusetts.*** This project entails the construction of a mixed-use development containing a 160-unit multifamily residential community and 6,000± sf of ground floor retail space to be located at 655 Washington Street, north of the Project site.

- ***Multifamily Residential Development, 881 & 897 Pleasant Street, Weymouth, Massachusetts.*** This project entails the construction of a 34-unit multifamily residential community to be located at 881 & 897 Pleasant Street, north of the Project site. Traffic volumes associated with this project within the study area are expected to be relatively minor and would be reflected in the general background traffic growth rate.

[20] *Supplemental Transportation Impact Assessment;* McDonald-Keohane Funeral Home Expansion, 809 Main Street, Weymouth, Massachusetts; VAI; October 25, 2022.

[21] *Traffic Assessment;* Congregate Care Facility, 1431-1449 Main Street, Weymouth, Massachusetts; Ron Müller & Associates; November 20, 2020.

[22] *Supplemental Transportation Impact Assessment;* Proposed Multifamily Residential Development, 125 Broad Street, Weymouth, Massachusetts; VAI; July 2021.

[23] *Transportation Impact Assessment;* Proposed Mixed-Use Development, Washington Street (Route 53), Weymouth, Massachusetts; VAI; March 2021.

[24] *Transportation Impact Assessment;* Proposed Mixed-Use Development, 655 Washington Street (Route 53), Weymouth, Massachusetts; VAI; March 2021.

- ***cGMP/Industrial Development, 60 Columbian Street,[25] Braintree, Massachusetts.*** This project entails the construction of 272,550± sf of cGMP/Industrial space to be located at 60 Columbian Street, west of the Project site.

- ***Brigham & Women's Physician Organization, 60 Columbian Street,[26] Braintree, Massachusetts.*** This project consists of the renovation and retenanting of the existing, partially occupied, 112,842± sf of office space formerly used as the Massachusetts State Lottery Headquarters and located at 60 Columbian Street, west of the Project site.

- ***Warehouse Building, 201 Commerce Drive, Braintree, Massachusetts.*** This project entails the construction of a 40,800 sf warehouse building to be located at 201 Commerce Drive, west of the Project site. Traffic volumes associated with this project within the study area are expected to be relatively minor and would be reflected in the general background traffic growth rate.

- ***Multifamily Residential Development, 107 Hancock Street, Braintree, Massachusetts.*** This project entails the construction of a 30-unit multifamily residential community to be located at 107 Hancock Street, west of the Project site. Traffic volumes associated with this project within the study area are expected to be relatively minor and would be reflected in the general background traffic growth rate.

- ***CVS Pharmacy, 357-365 Grove Street,[27] Braintree, Massachusetts.*** This project entails the construction of a 13,000± sf pharmacy to be located at 357-365 Grove Street, west of the Project site.

- ***Hanover Crossing, 1775 Washington Street,[28] Hanover, Massachusetts.*** This project entails the re-envisioning of the existing 833,481± sf Hanover Mall into a mixed-use development consisting of a 297-unit multifamily residential community and 598,535± sf of retail, restaurant, grocery and entertainment space to be located at 1775 Washington Street, east of the Project site. Traffic volumes associated with this project within the study area are expected to be relatively minor and would be reflected in the general background traffic growth rate.

Traffic volumes associated with the aforementioned development projects by others were either estimated using trip generation statistics published by the Institute of Transportation Engineers (ITE)[29] for the appropriate land use(s) or were obtained from the traffic studies conducted for the specific development, and were assigned onto the study area roadway network based on existing traffic patterns where no other information was available. No other developments were identified at this time that are expected to result in an increase in traffic within the study area beyond the general background traffic growth rate.

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[25] *Transportation Impact Assessment;* Proposed cGMP/Industrial Development, 60 Columbian Street, Braintree, Massachusetts; VAI; November 2022.

[26] *Transportation Impact Assessment;* 60 Columbian Street; Braintree, Massachusetts; VHB; May 2019.

[27] *Transportation Impact Assessment;* Proposed CVS Pharmacy; Braintree, Massachusetts; VHB; February 2022.

[28] *Supplemental Transportation Impact Assessment;* Proposed Multifamily Residential Development, 125 Broad Street, Weymouth, Massachusetts; VAI; July 2021.

[29] Institute of Transportation Engineers; op. cit. 7-1.

General Background Traffic Growth

In order to estimate potential future traffic growth in the region over the 20-year planning horizon, long-range statewide population projection data compiled by the University of Massachusetts (UMass) Donohue Institute (UMDI)[30] was reviewed. This data was developed in coordination with MassDOT, the 14 Massachusetts regional planning agencies, and other associated stakeholders. The data provides future projections of population, households and employment growth to the year 2040, and is produced in five-year intervals and summarized by regional planning area. This data includes specific development projects within the regions studied and, therefore, would include at least a portion of the identified specific development projects by others described in the immediately preceding section.

The UMDI data indicates that traffic volumes are projected to increase by 0.6 percent per year (compounded annually) for the Boston Metropolitan Planning Organization (MPO) and by 0.3 percent per year for the Old Colony MPO, both of which contain the municipalities that comprise the study area.

In addition, municipal level traffic growth rates for the Towns of Abington, Rockland and Weymouth were obtained from the Central Transportation Planning Staff (CTPS). This data, which also includes specific development projects, was found to range from 0.1 percent to 0.4 percent (compounded annually) along local roadways, minor arterials and major arterials in these communities.

Based on a review of the compiled traffic growth data, a 0.25 percent per year compounded annual background traffic growth rate was used in order to account for future traffic growth and presently unforeseen development within the study area over the 20-year planning horizon.

Roadway Improvement Projects

MassDOT and the Towns of Abington, Braintree, Hanover, Hingham, Holbrook, Norwell, Rockland, Weymouth and Whitman were contacted in order to determine if there were any planned future roadway improvement projects expected to be complete by 2043 within the study area. Based on these discussions, the following roadway improvement projects were identified:

- ***Route 18 Traffic Signal Improvements, Braintree***. In order to offset the impact of the Mixed-Use Commercial Development project at 505 Pond Street, the project proponent has committed to the design and implementation of an optimal traffic signal timing and phasing plan at the Route 18/Pond Street and Route 18/Trotter Road intersections, with further adjustment of the traffic signal timing, phasing and coordination as necessary within 6 months of the completion of the project.

- ***Traffic Signal Improvements, Multiple Locations, Braintree***. In order to offset the impacts of the cGMP/Industrial Development and the Brigham & Women's Physicians Organization development projects, the proponents of these projects have committed to several roadway and intersection improvements, including the following:

    - *Grove Street/Liberty Street* - Widen the south leg to accommodate a left-turn lane, a through travel lane and a right-turn lane; restripe the north leg to accommodate

[30] *Massachusetts Population Projections by Regional Planning Area;* UMass Donahue Institute's Economic & Public Policy Research Group Population Estimates Program; September 12, 2018.

a left-turn lane and a shared through/right-turn lane; and design and implement an optimal traffic signal timing and phasing plan.

- *Grove Street/Columbian Street* – Design and implement an optimal traffic signal timing and phasing plan.
- *Columbian Street/60 Columbian Street Driveway* – Design and construct pedestrian accommodations to include the installation of pedestrian pushbuttons and signal indications and a new sidewalk; and design and implement an optimal traffic signal timing and phasing plan.

- ***Grove Street Corridor in Braintree, Subregional Priority Roadway Study, Braintree.*** The Town of Braintree requested that the Central Transportation Planning Staff (CTPS) of the Boston MPO undertake a study of the Grove Street corridor to identify and develop an approach to advance improvements along the corridor. The result of this effort was the *Grove Street Corridor Study in Braintree* which was published by the CTPS in May 2020.[31] The study recommended advancement of the following improvements within the study area of this assessment:

  - *Grove Street Corridor* – Install and/or improve continuous sidewalks and/or shared use paths along both sides of the roadway between Liberty Street and the Weymouth town line and reduce vehicular travel lanes to 11.5 feet in width.
  - *Grove Street/Liberty Street* – Widen and reconfigure the east and west legs to provide a left-turn lane, a through travel lane and a right-turn lane; provide bicycle lanes along Grove Street; and design and implement an optimal traffic signal timing and phasing plan.
  - *Grove Street/Columbian Street* – Design and implement an optimal traffic signal timing and phasing plan, and reduce the Columbian Street westbound approach to one through travel lane and one channelized right-turn lane.

- ***Columbian Square Improvement Project, Weymouth.*** This project is being undertaken by the Town of Weymouth and will entail roadway geometric and traffic control improvements including the following: sidewalk reconstruction and expansion on each corner of the intersection; removal of channelizing islands; new lane configurations; removal of on-street parking from the interior of the intersection; and the installation of a traffic control signal. Construction is expected to be complete by August 2024.

- ***Corridor Improvements on VFW Drive/Weymouth Street, Rockland (MassDOT Project No. 612605).*** This project is being managed by MassDOT and will entail the reconstruction of portions of VFW Drive and Weymouth Street to include the installation of accessible pedestrian facilities, separated bike facilities, pavement resurfacing, stormwater upgrades, traffic signal and intersection modifications. The proposed VFW Drive/Weymouth Street roadway cross-section will include 11 foot wide travel lanes with 4 foot wide shoulders. Pedestrian and bicycle accommodations will include 5.5 foot wide sidewalks, a 10 foot wide shared-use path, and ADA compliant wheelchair ramps at all crossings. The improvements are funded through the 2023-2027 State Transportation Improvement Program (TIP).

[31] *Grove Street Corridor Study in Braintree*; CTPS: May 2022.

- ***Corridor Improvements on Reservoir Park Drive/Hingham Street, Rockland.*** This project is being advanced by the Town of Rockland and will entail the reconstruction of portions of Reservoir Park Drive and Hingham Street to include geometric improvements including the installation of travel lanes at the Weymouth Street/Reservoir Park Drive/ Bill Delahunt Parkway; Hingham Street/Commerce Road; Hingham Street/ Route 3 Southbound Ramps; and Hingham Street/Pond Street intersections and the realignment of the Hingham Street/Reservoir Park Drive intersection. This project is currently under design, with funding provided through a MassWorks Infrastructure Grant. Conceptual improvement plans for the project have been provided in the Appendix.

- ***Intersection Improvements at Route 130 at Chestnut Street and Old Randolph Street, Abington (MassDOT Project No. 612525).*** This project is being undertaken by the Town of Abington and will entail roadway geometric improvements and will include the evaluation of traffic control improvements. This project is in the preliminary design phase and is included in the 2024-2028 State TIP for the 2027 program year.

- ***Intersection Improvements at Route 18 at Route 123, Abington (MassDOT Project No. 612770).*** This project is being managed by MassDOT and will entail traffic signal upgrades and safety enhancements. This project is in the preliminary design phase and is included in the 2024-2028 State TIP for the 2027 program year.

These improvements are expected to be complete by 2043, the horizon year of this assessment, and are reflected in both the 2043 No-Build and 2043 Build condition analyses. In addition, optimized traffic signal timing and phasing plans were applied to the signalized intersections in the future in order to account for routine maintenance efforts not associated with the specific improvements currently envisioned.

No-Build Traffic Volumes

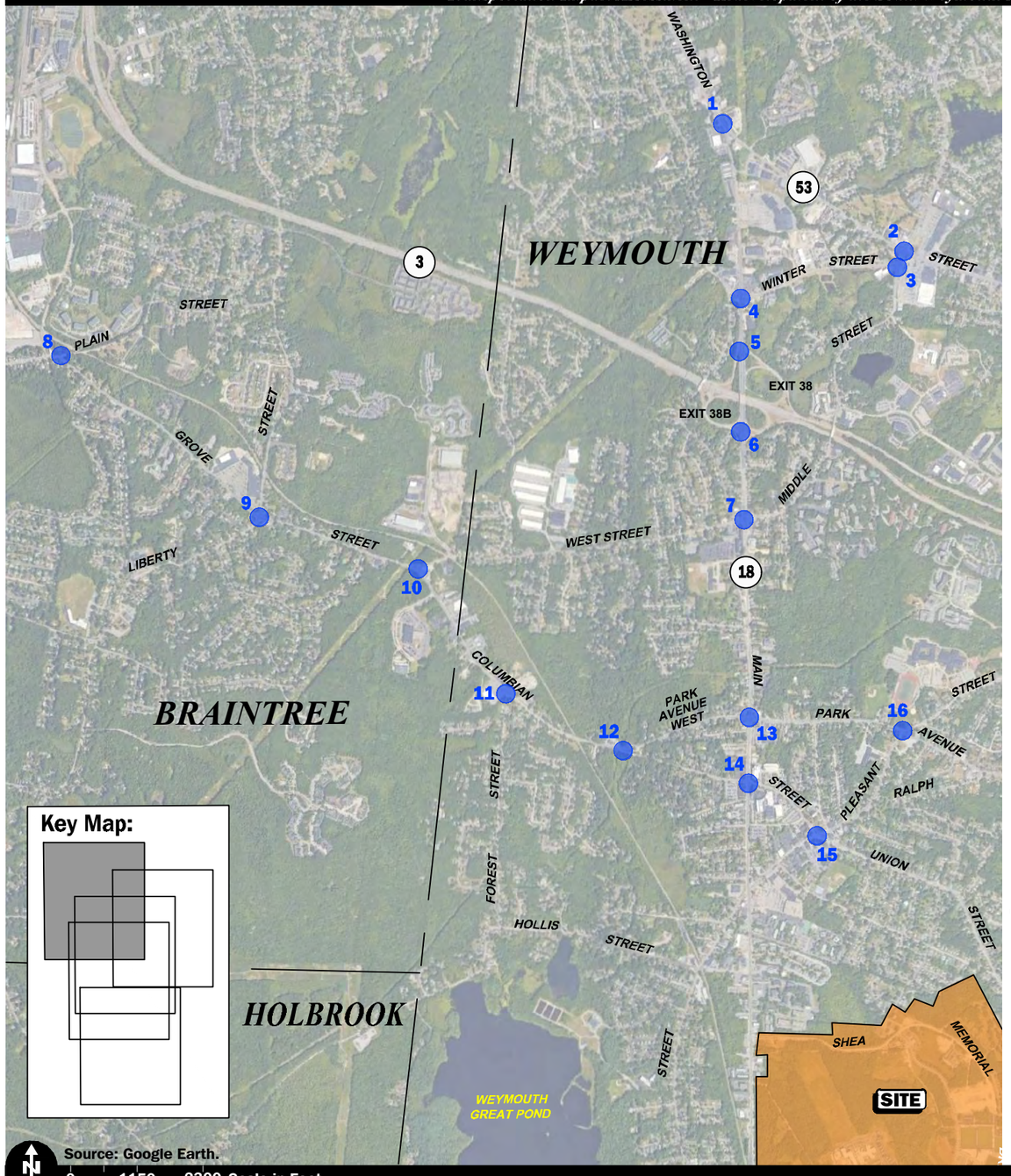
The 2043 No-Build condition peak-hour traffic-volumes were developed by applying the 0.25 percent per year compounded annual background traffic growth rate to the 2022 Existing peak-hour traffic volumes, and applying the traffic volumes associated with the identified specific development projects by others. The resulting 2043 No-Build weekday morning, weekday evening and Saturday midday peak-hour traffic volumes are shown on Figures 7-9, 7-10 and 7-11, respectively.

PROJECT-GENERATED TRAFFIC

Design year (2043 Build) traffic volumes for the study area roadways were determined by estimating Project-generated traffic volumes and assigning those volumes on the study roadways. The following sections describe the methodology used to develop the anticipated traffic characteristics of the Project.

The Project will include a mix of residential and commercial space that will be developed as market conditions warrant. The 2023 modified development program that was studied as a preferred build condition to establish a baseline of impacts for the Project includes:

- 1,460 single-family homes;
- 1,462 single-family attached homes (condominium/townhouse style);
- 2,908 multifamily residential units (apartments);



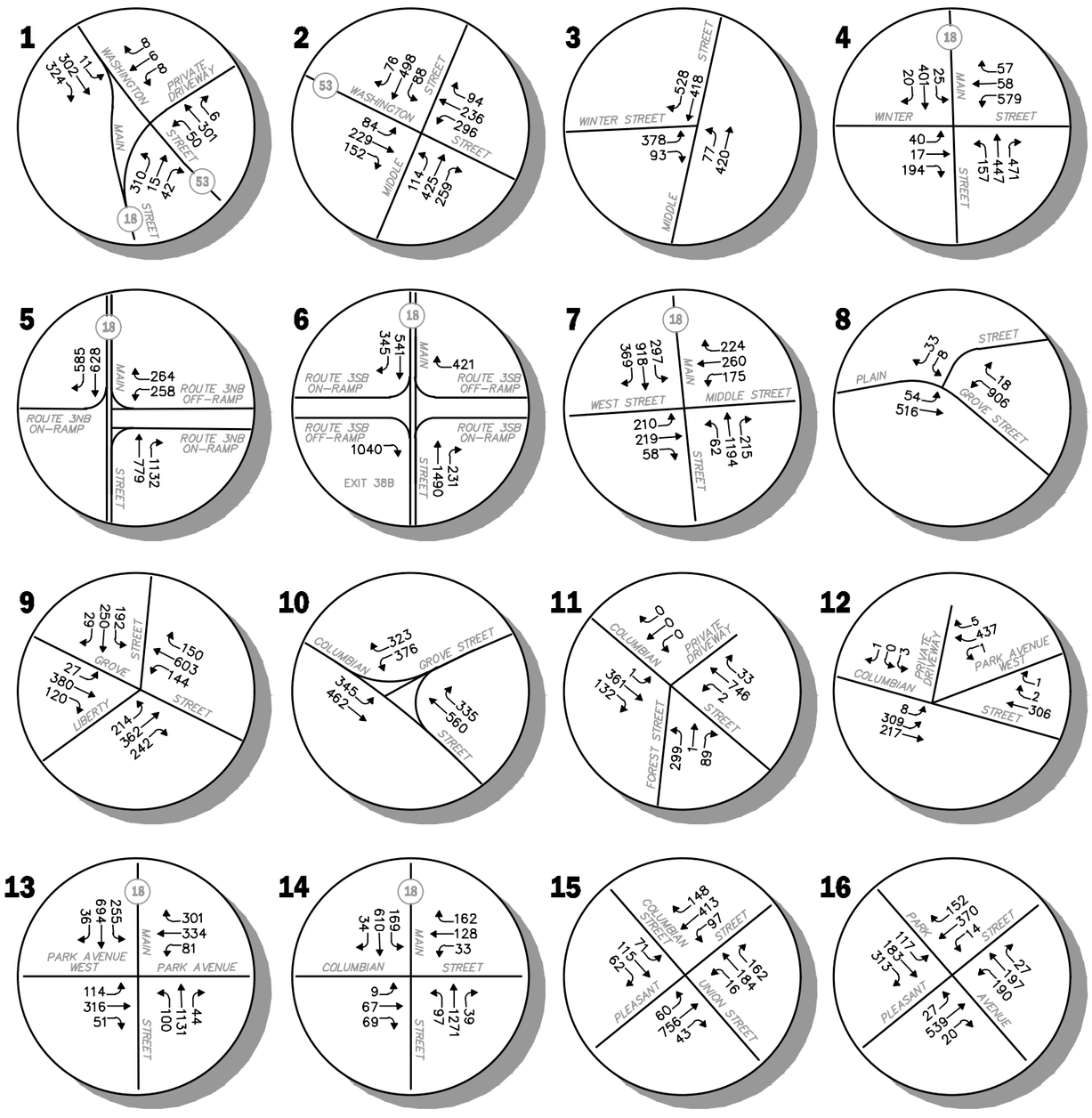
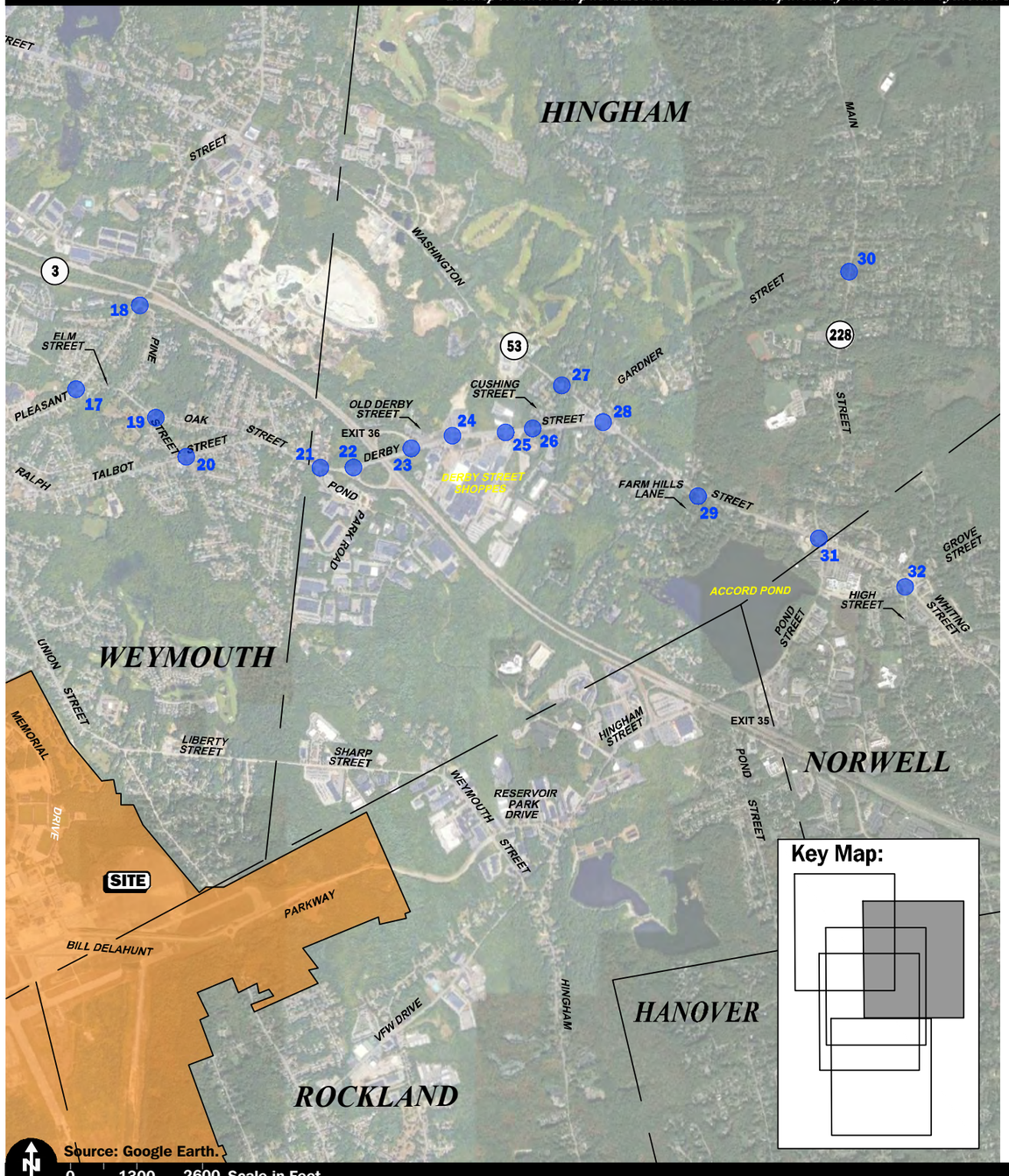
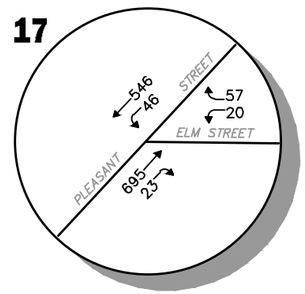


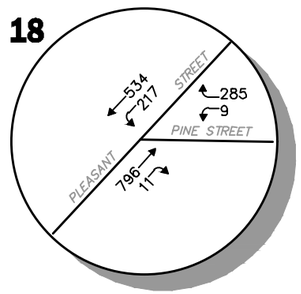
Figure 7-9A

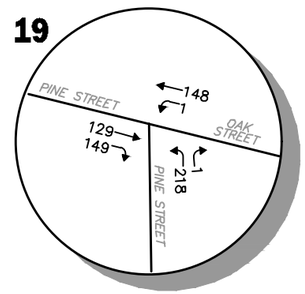
2043 No-Build
Weekday Morning
Peak-Hour Traffic Volumes

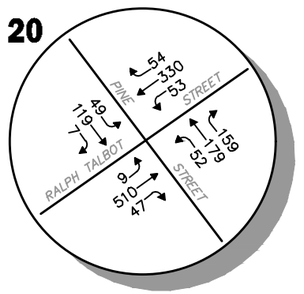
Vanasse & Associates inc

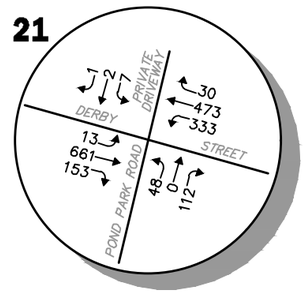


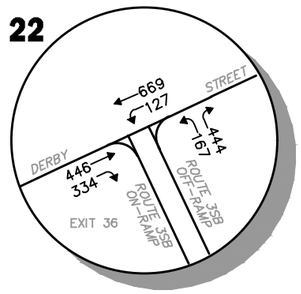


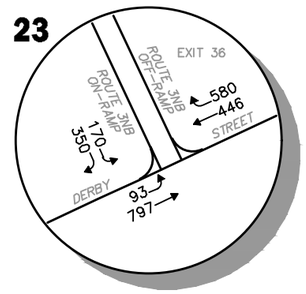


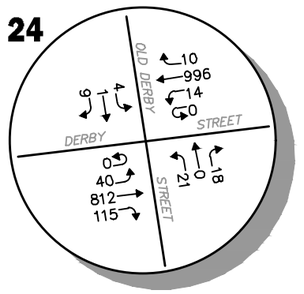


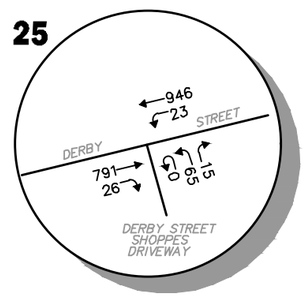


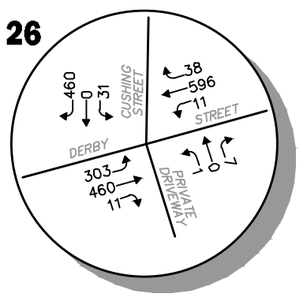


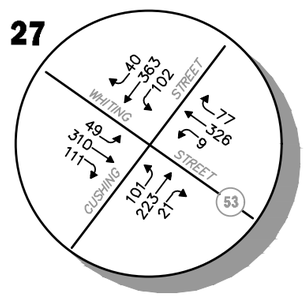


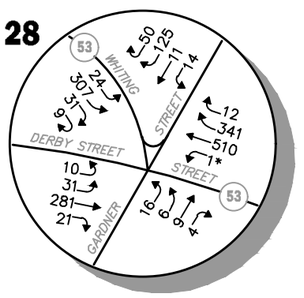


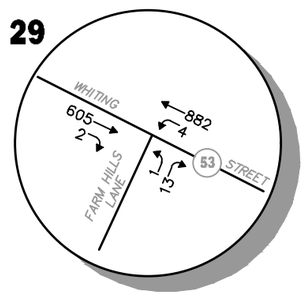


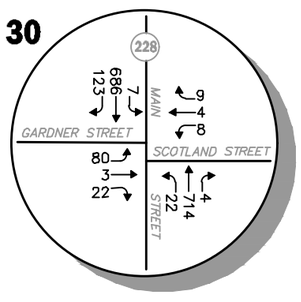


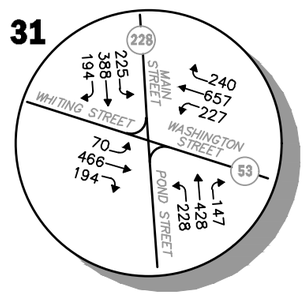












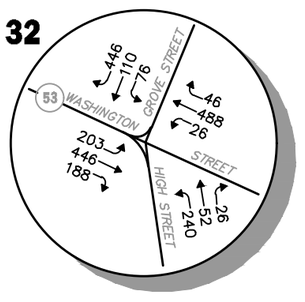
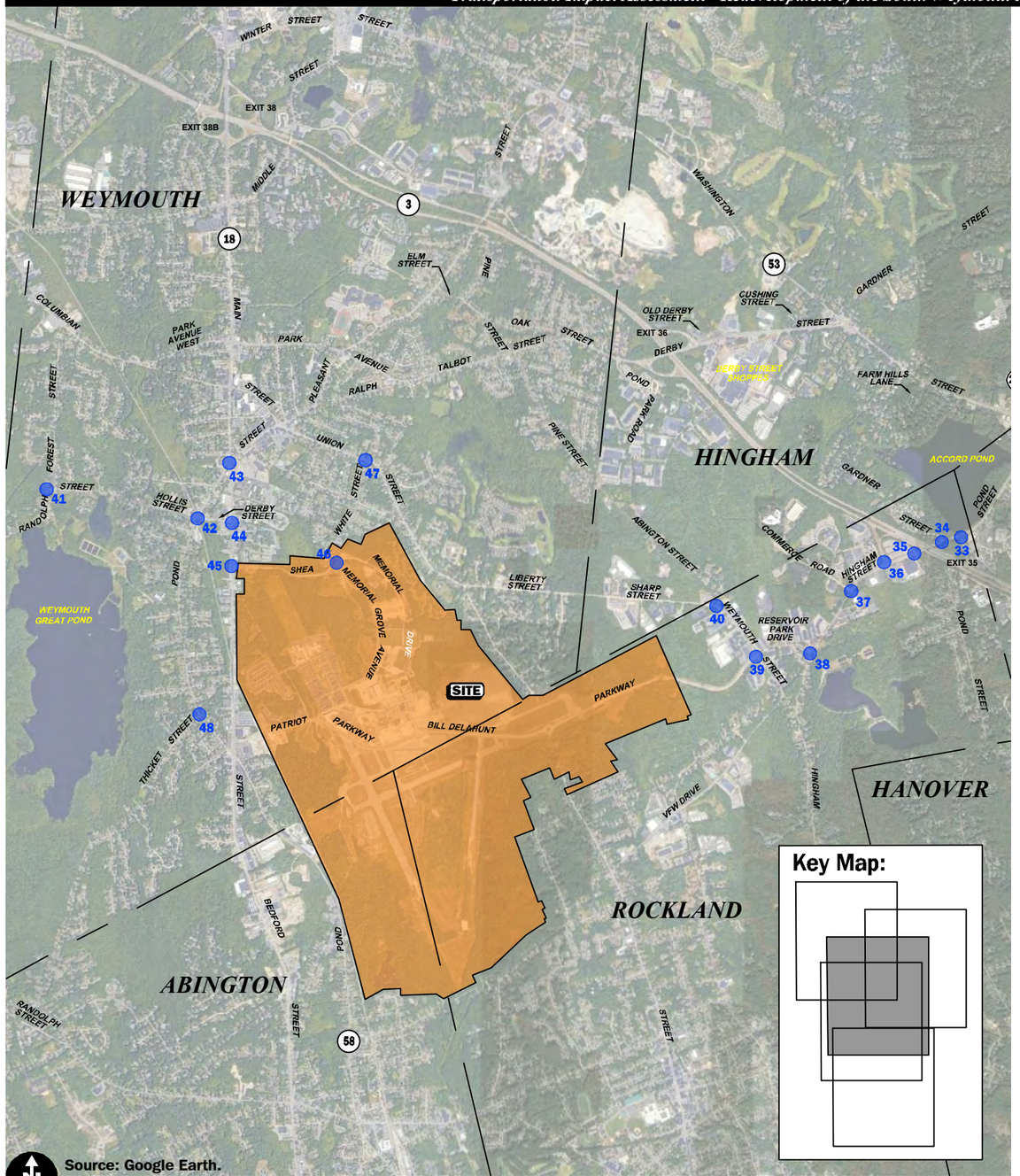
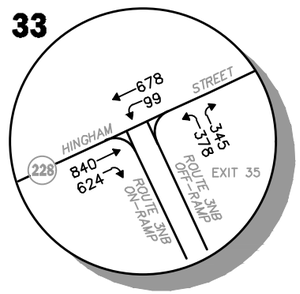


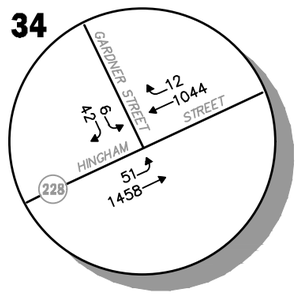
Figure 7-9B

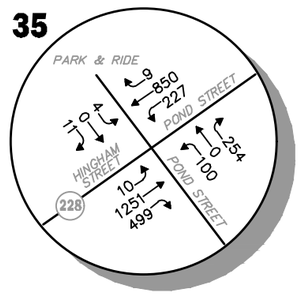
2043 No-Build
Weekday Morning
Peak-Hour Traffic Volumes

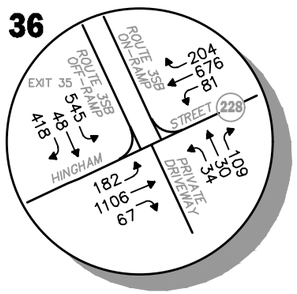
Vanasse & Associates inc

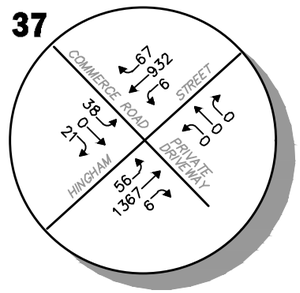


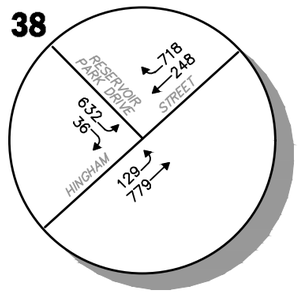


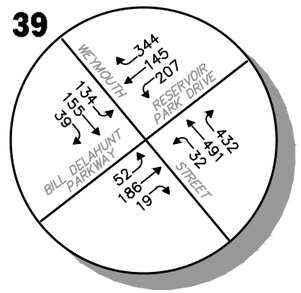


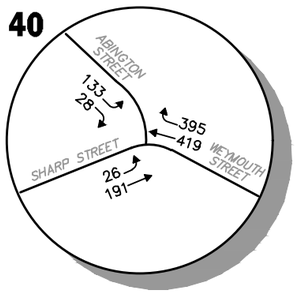


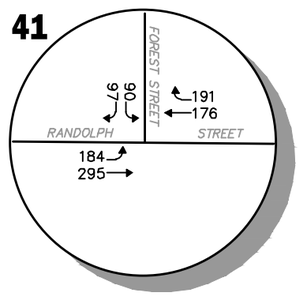


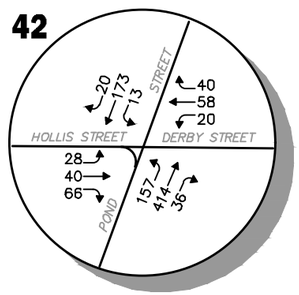


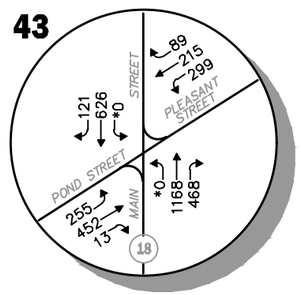


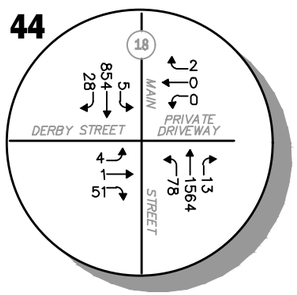


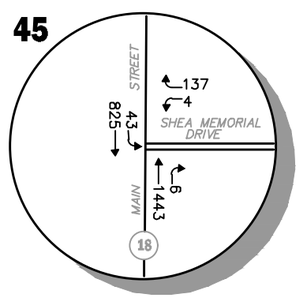


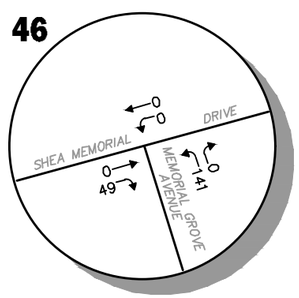


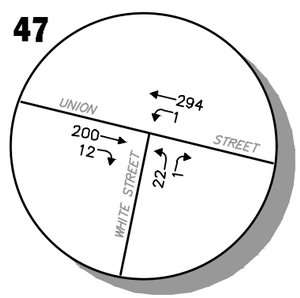


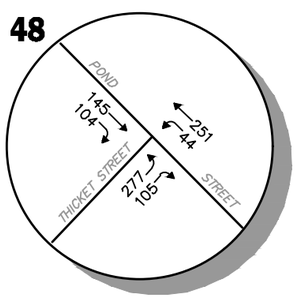












*Illegal movement.

Figure 7-9C

2043 No-Build
Weekday Morning
Peak-Hour Traffic Volumes

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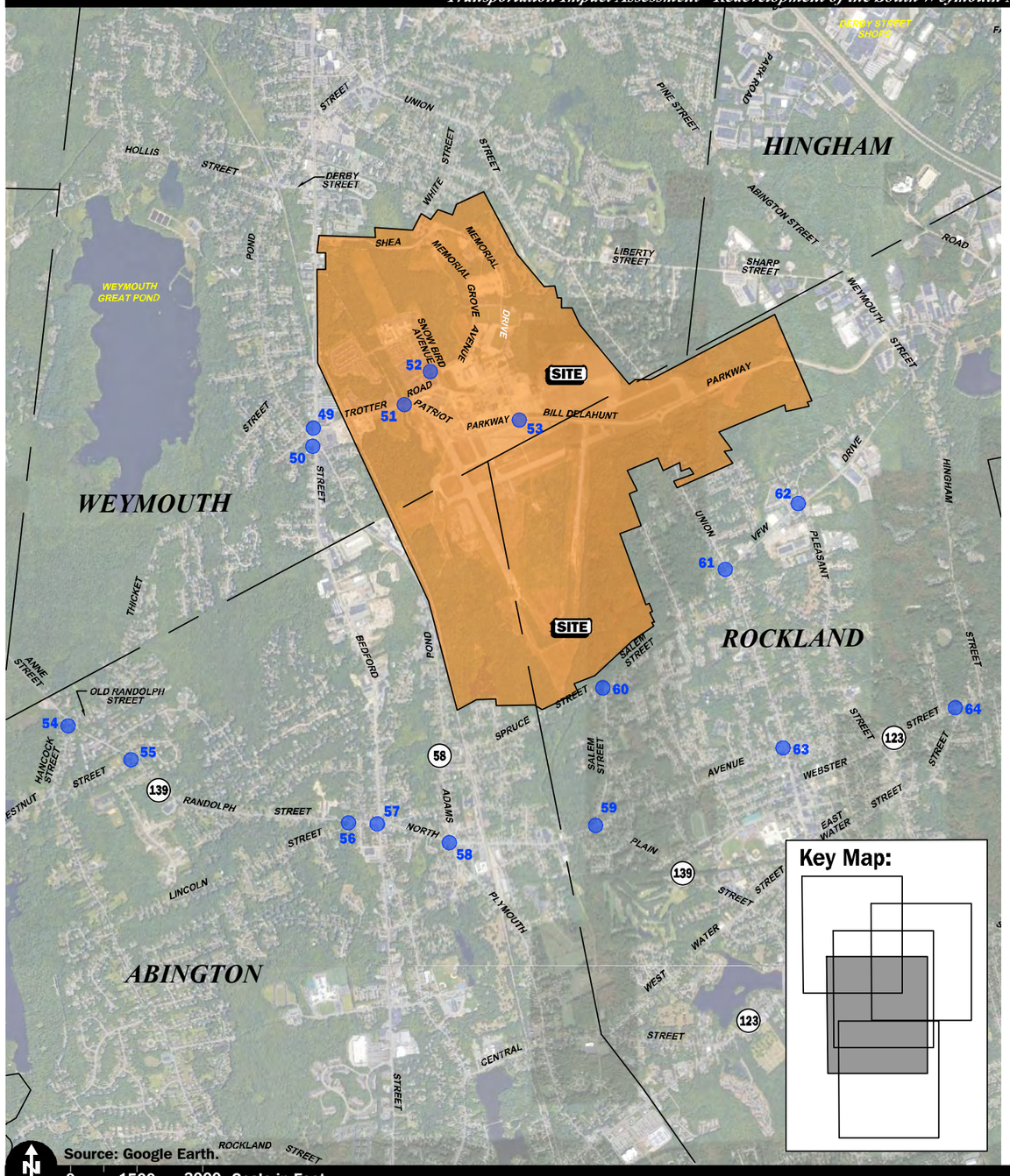

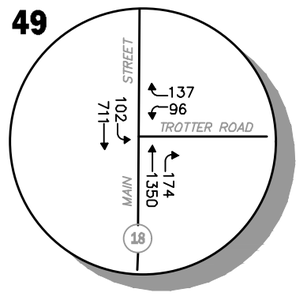

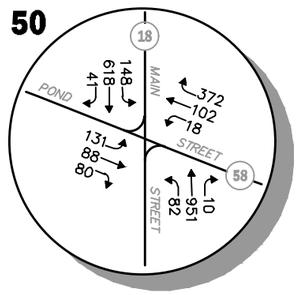

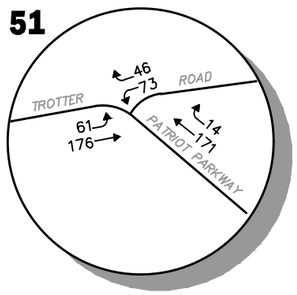

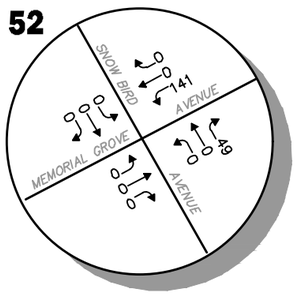

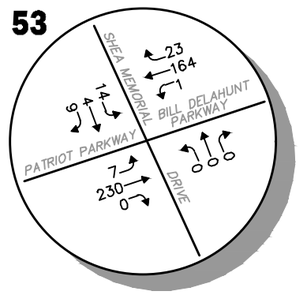

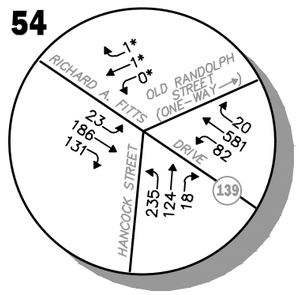

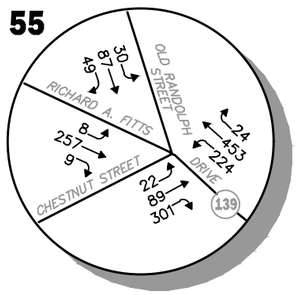

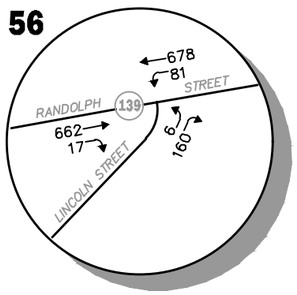

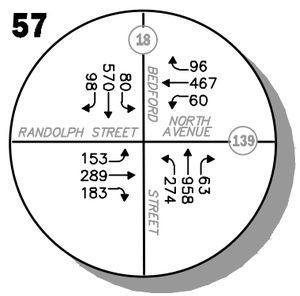

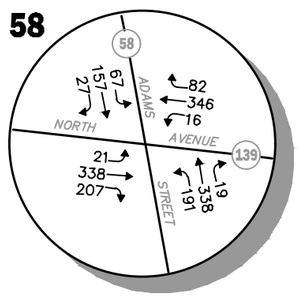

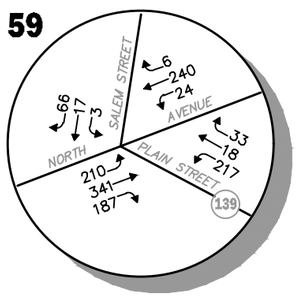

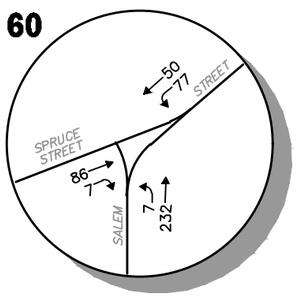

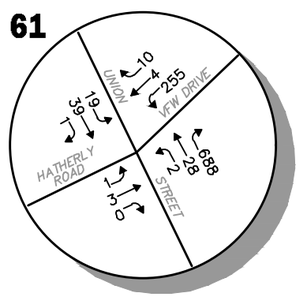

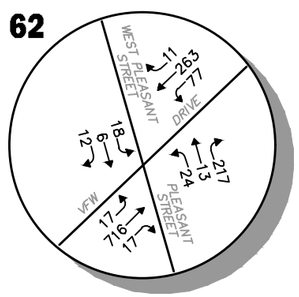

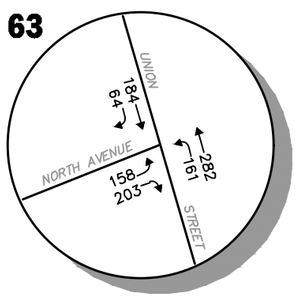

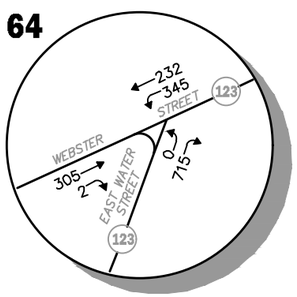

*Illegal movement.

Figure 7-9D

2043 No-Build
Weekday Morning
Peak-Hour Traffic Volumes

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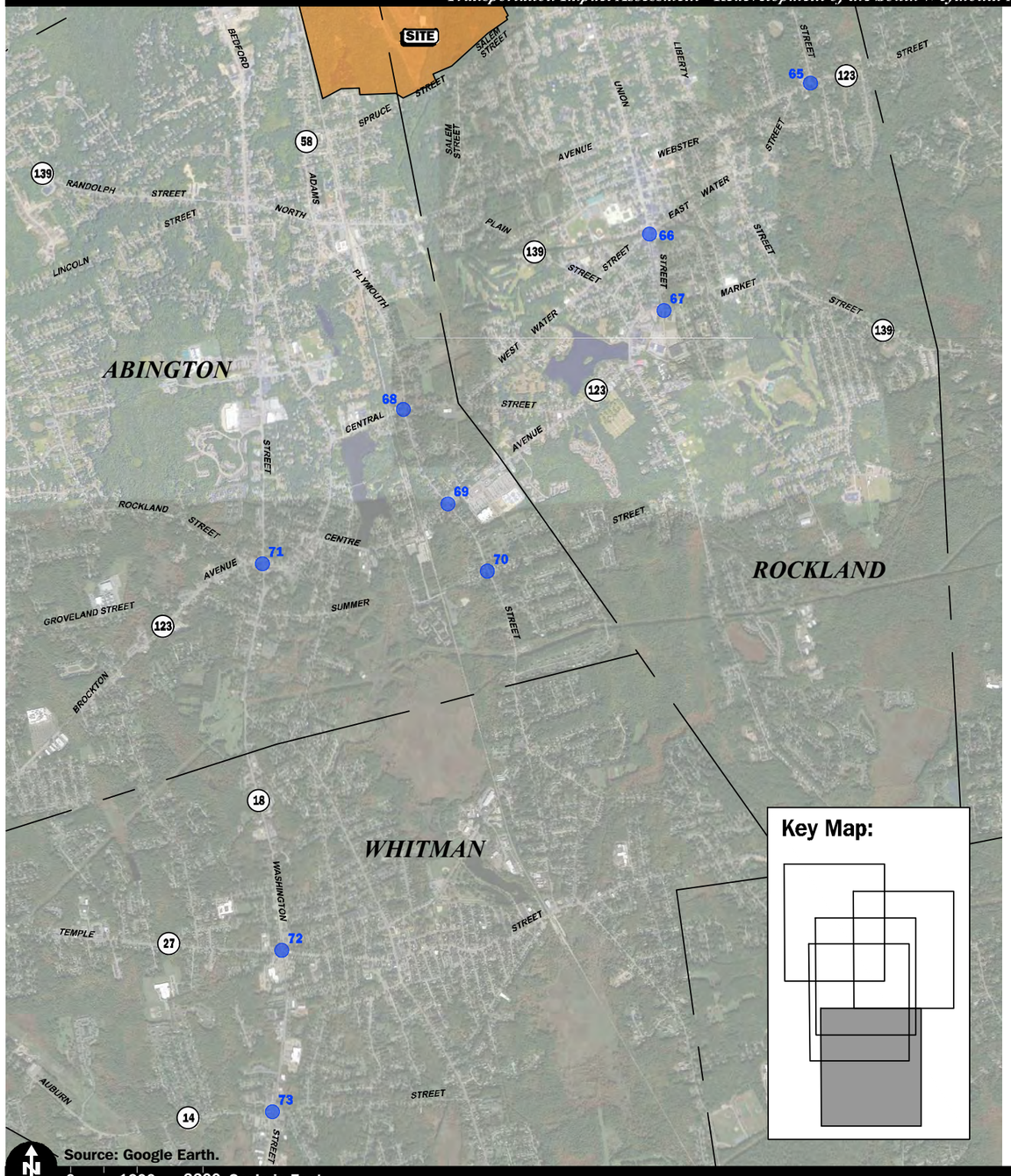

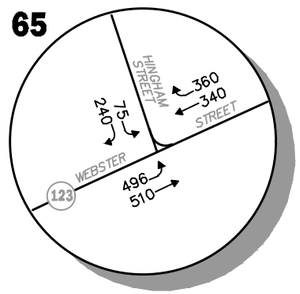

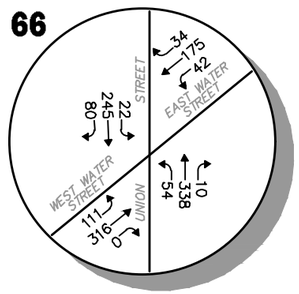

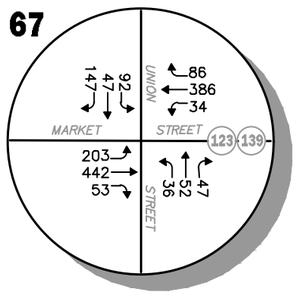

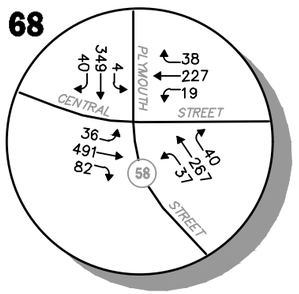

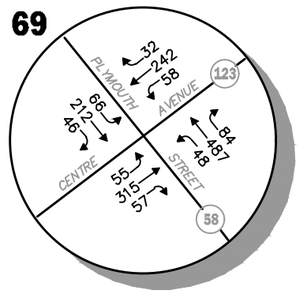

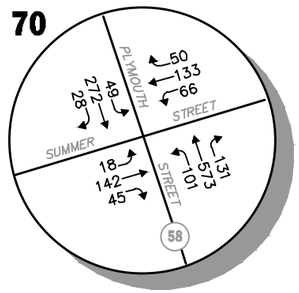

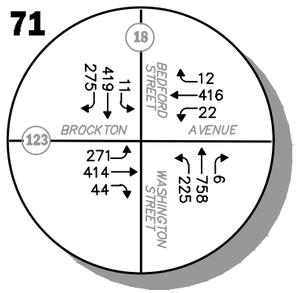

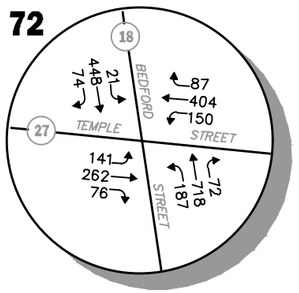

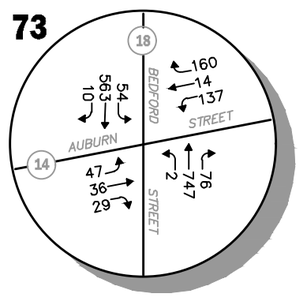

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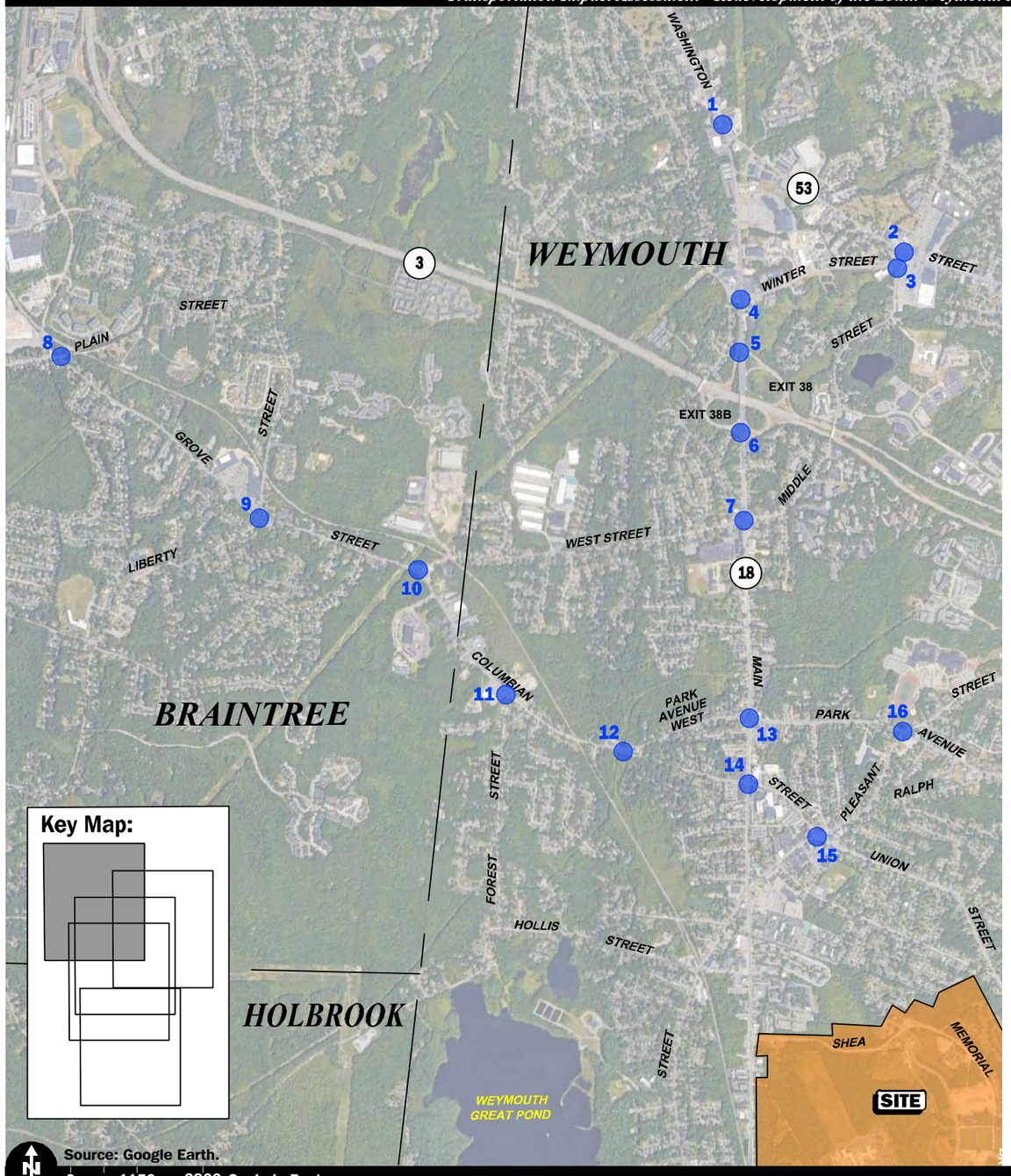
Figure 7-9E

2043 No-Build
Weekday Morning
Peak-Hour Traffic Volumes



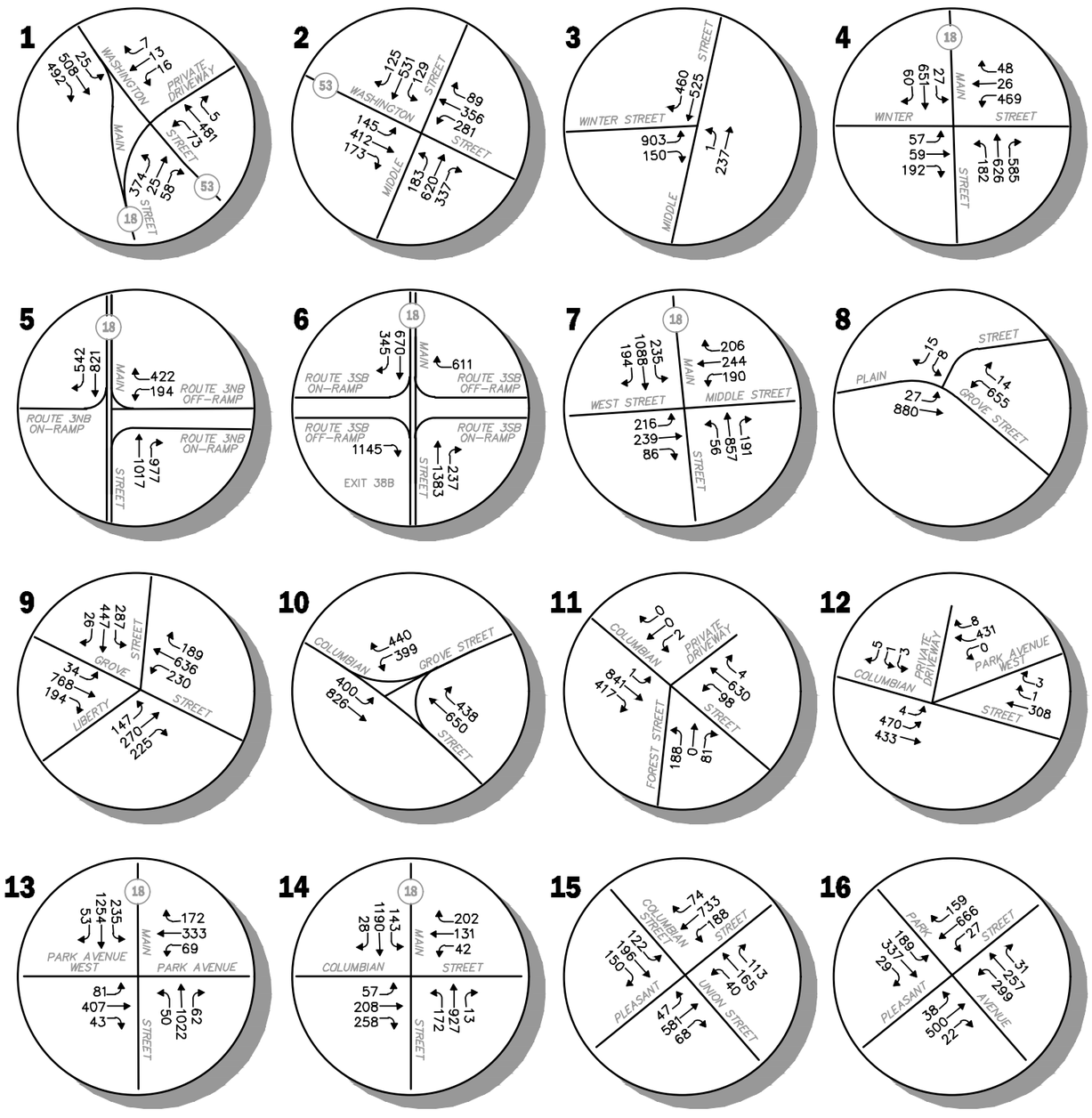


Figure 7-10A

2043 No-Build
Weekday Evening
Peak-Hour Traffic Volumes

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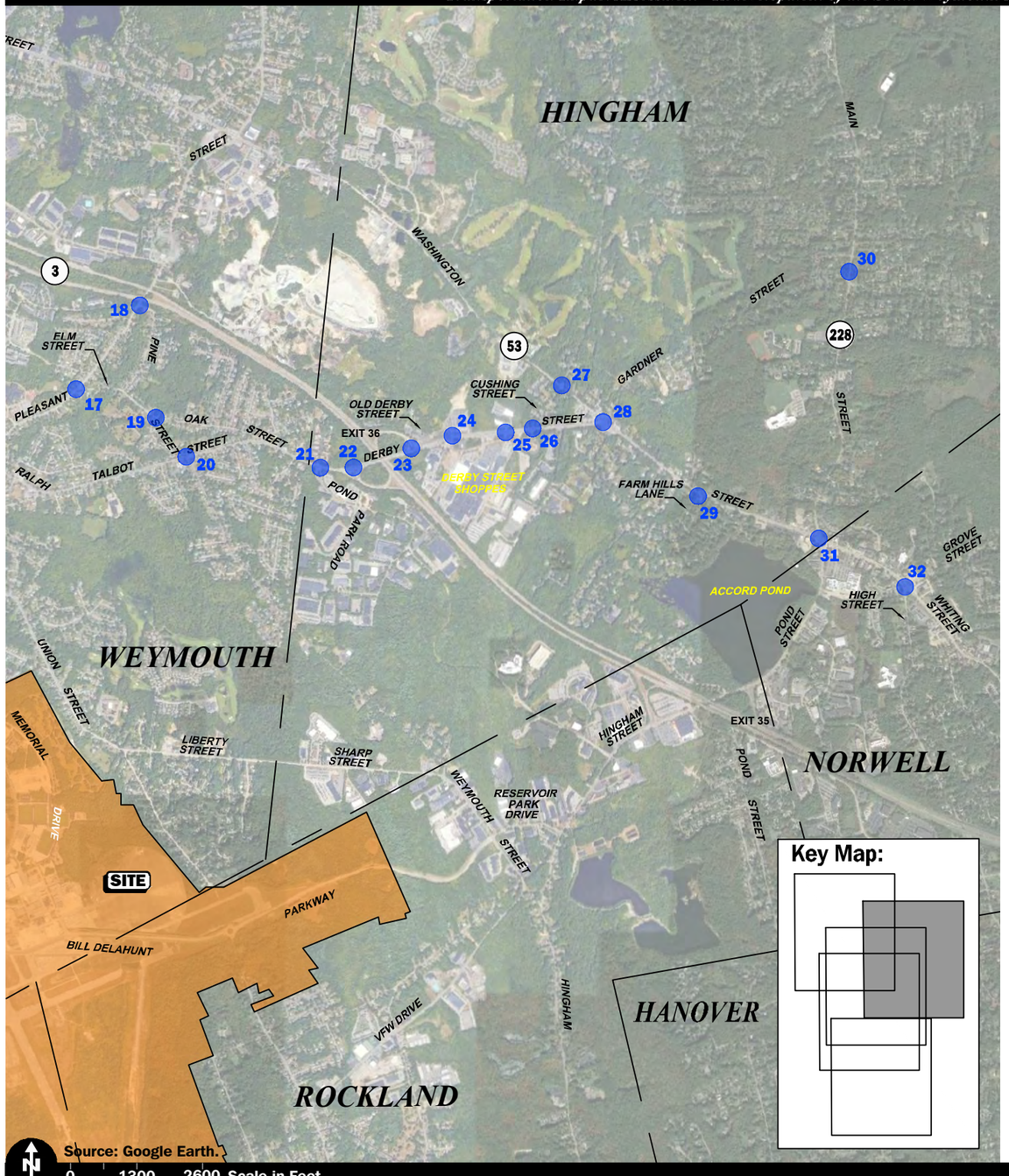


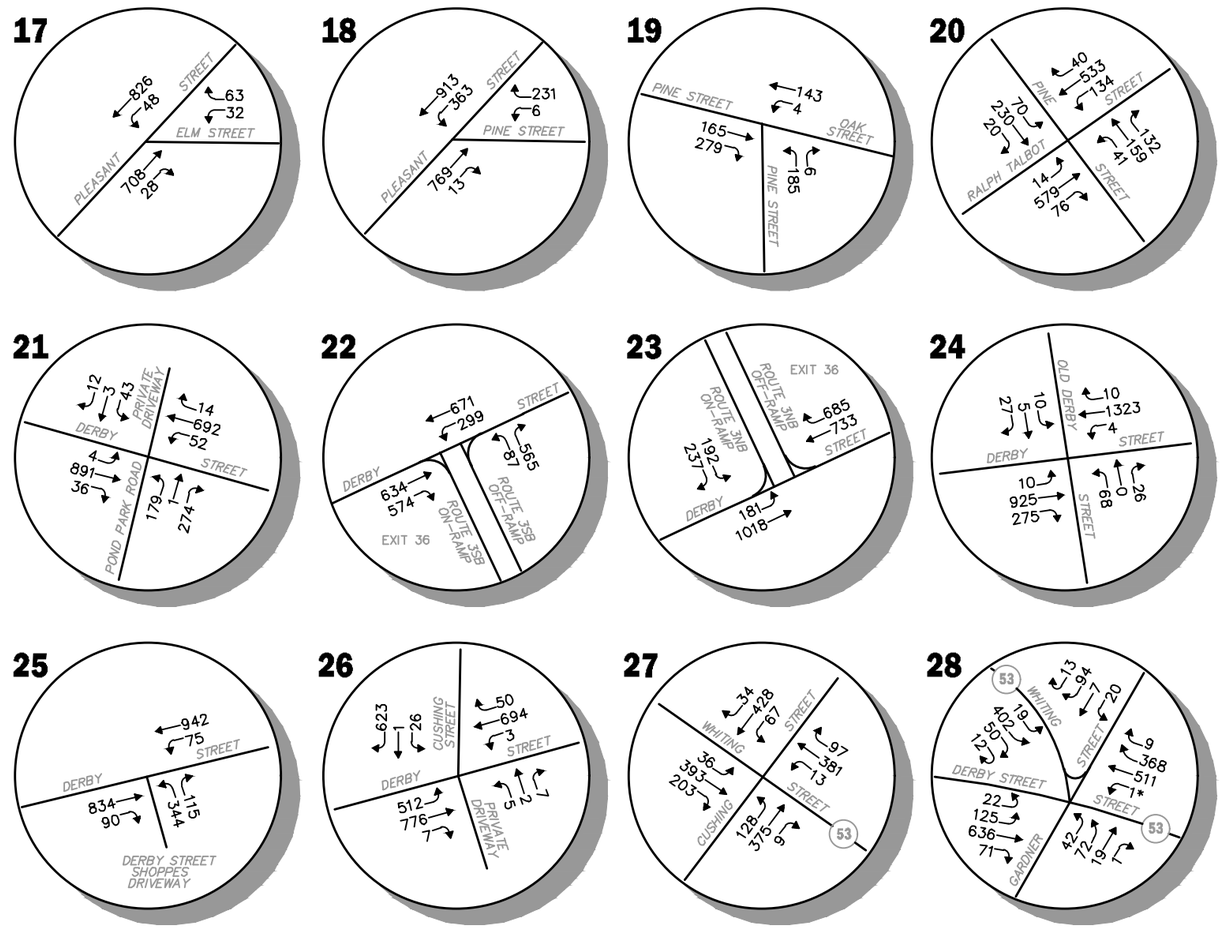
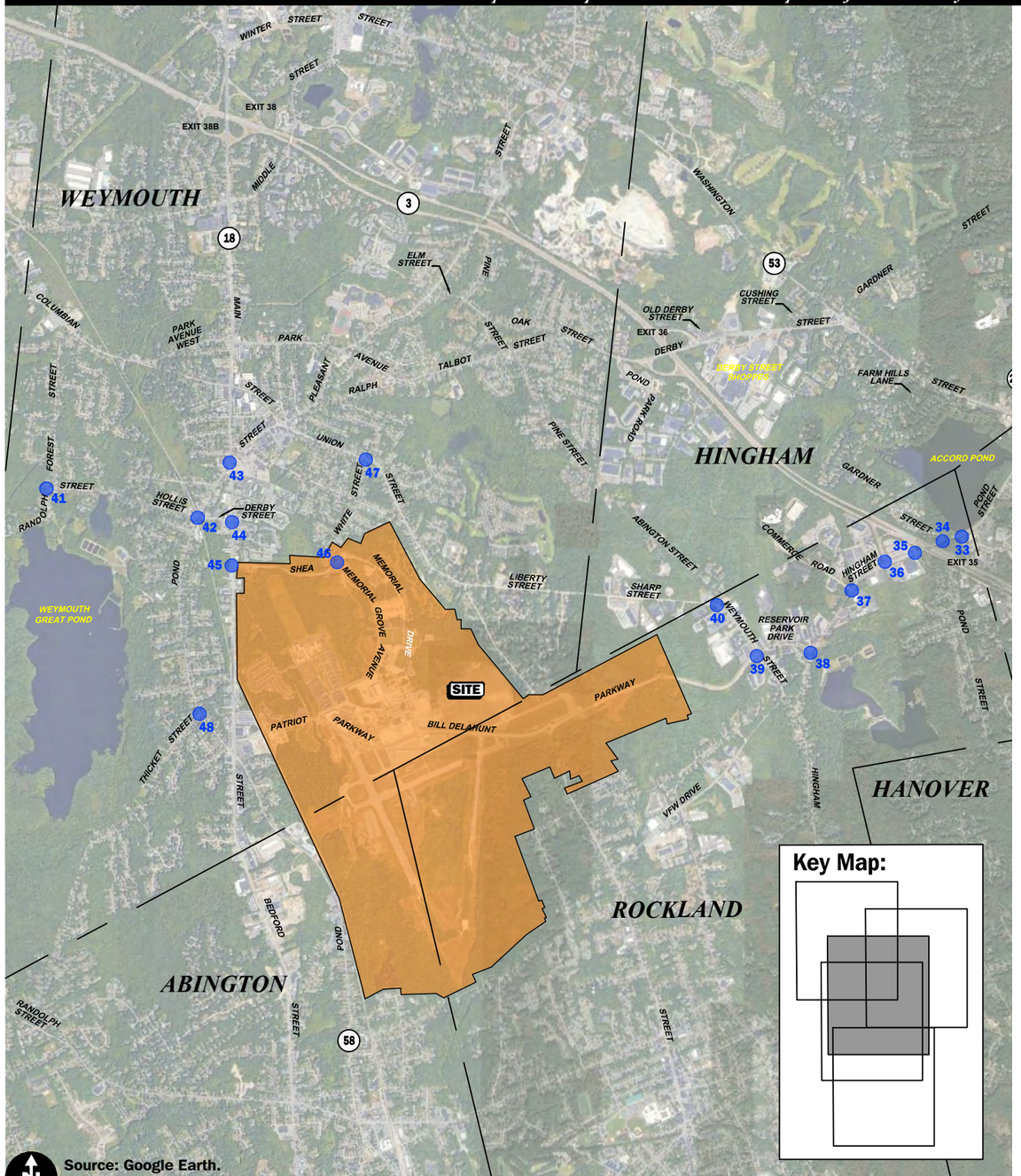
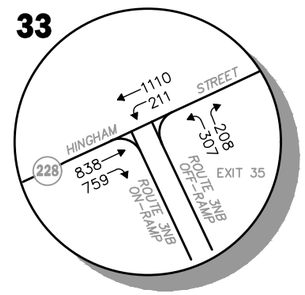


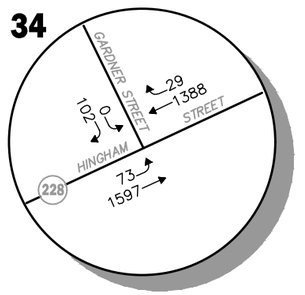
Figure 7-10B

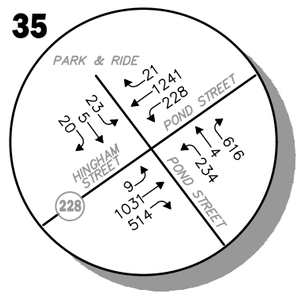
2043 No-Build
Weekday Evening
Peak-Hour Traffic Volumes

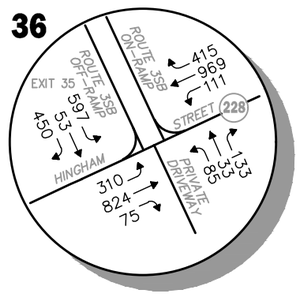
Vanasse & Associates inc

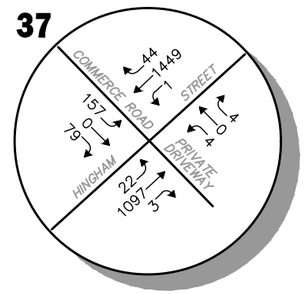


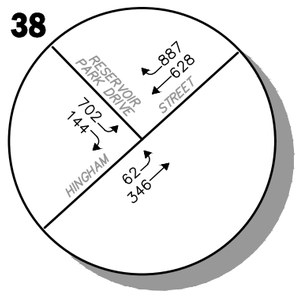


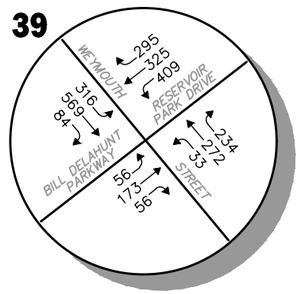


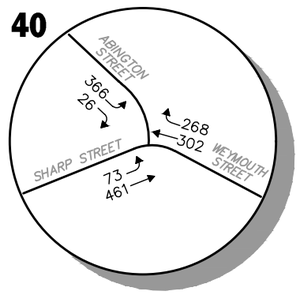


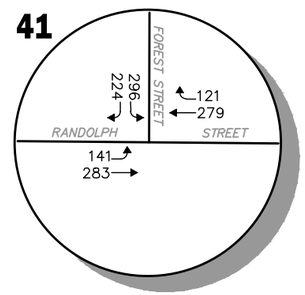


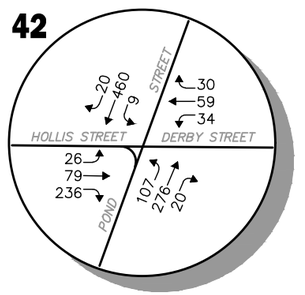


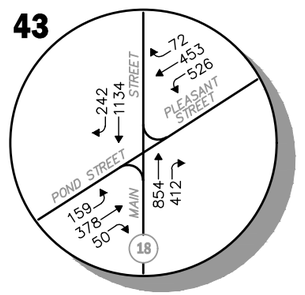


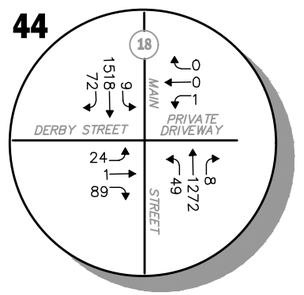


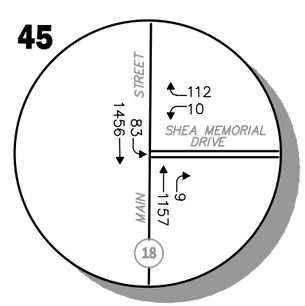


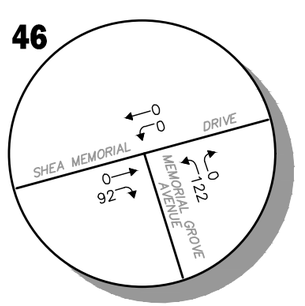


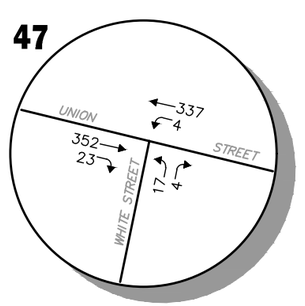


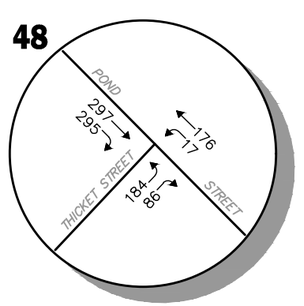










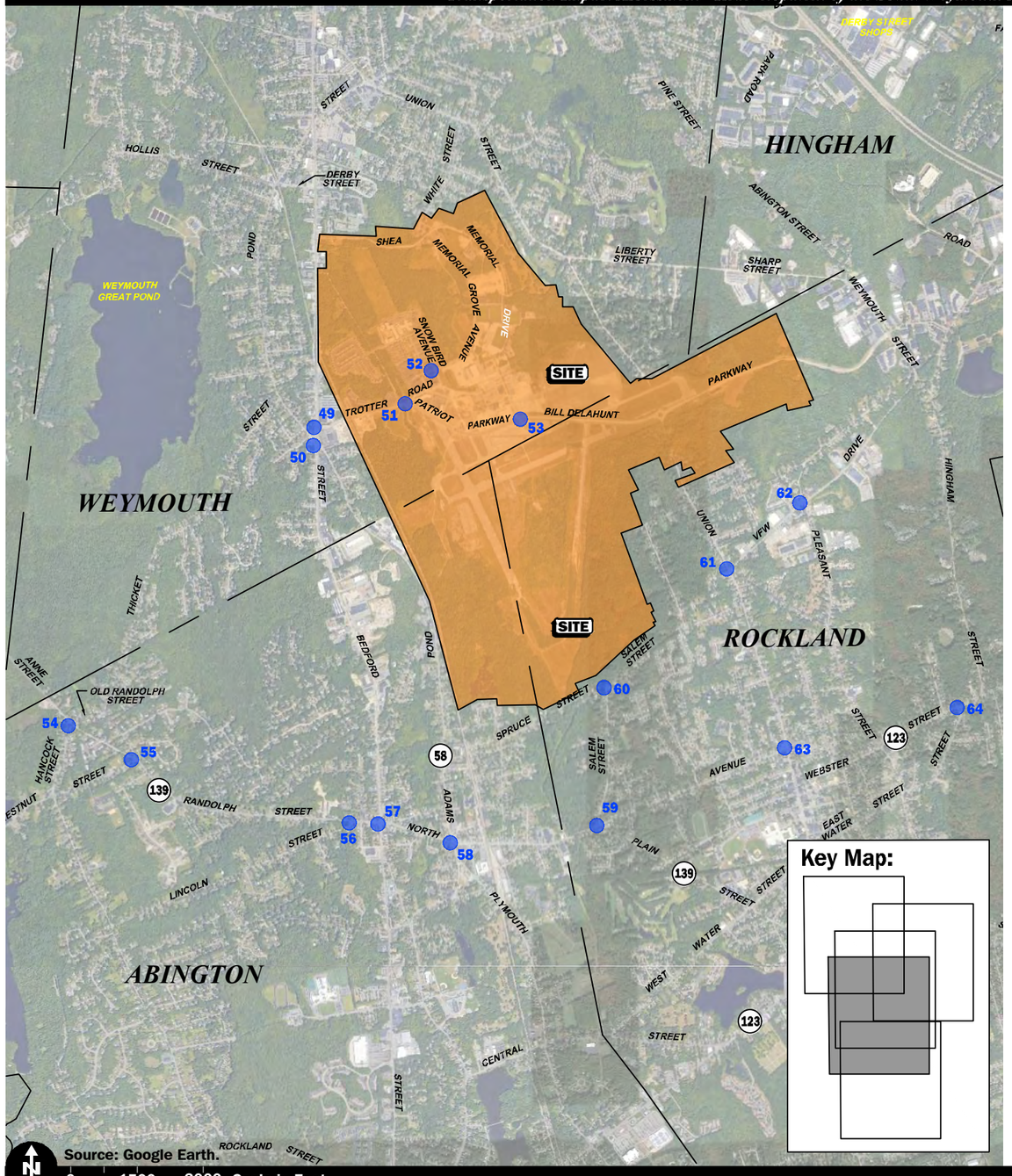


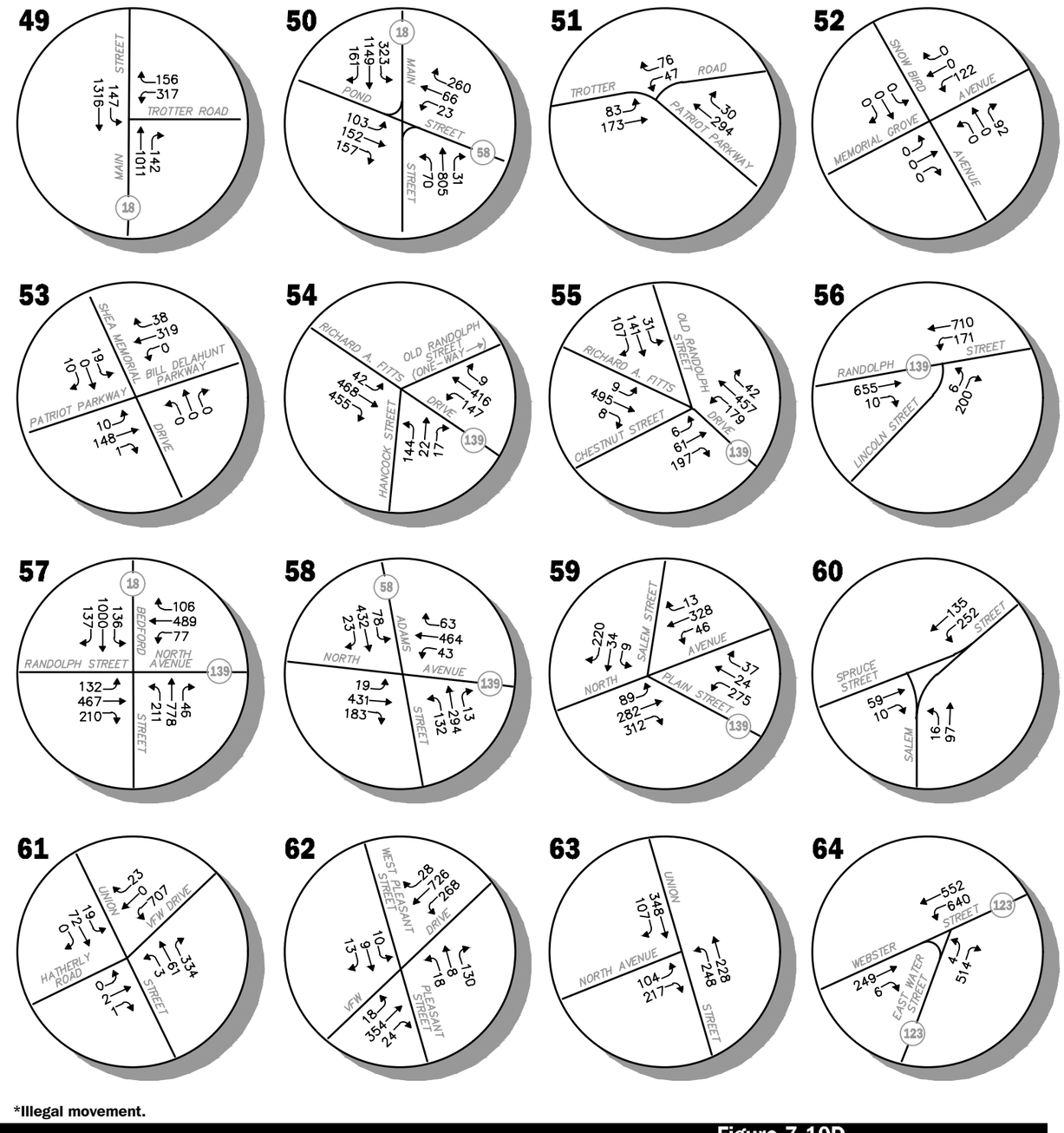
*Illegal movement.

Figure 7-10C

**2043 No-Build
Weekday Evening
Peak-Hour Traffic Volumes**

Vanasse & Associates inc



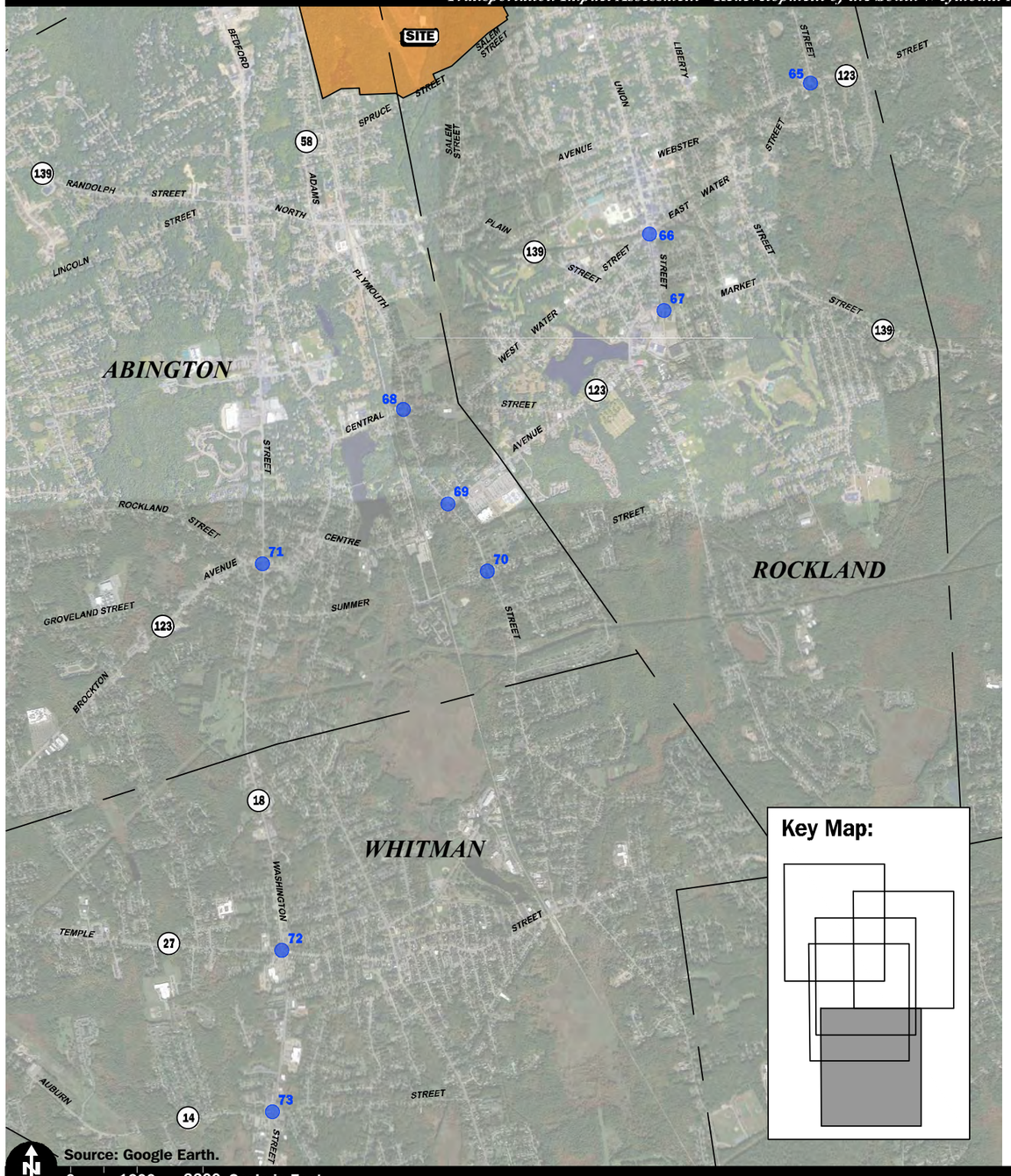


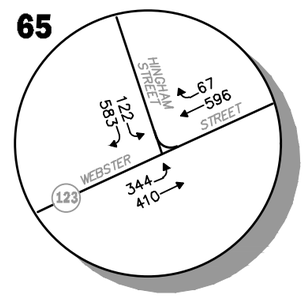
*Illegal movement.

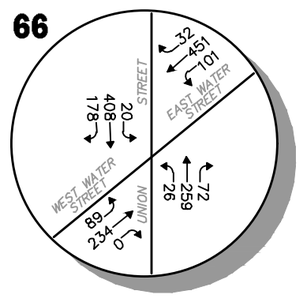
Figure 7-10D

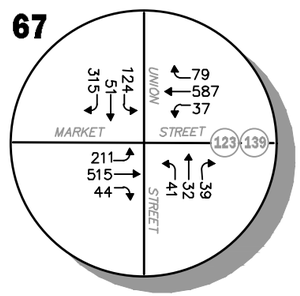
2043 No-Build
Weekday Evening
Peak-Hour Traffic Volumes

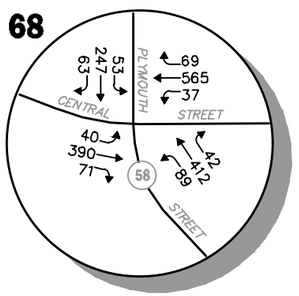
Vanasse & Associates inc

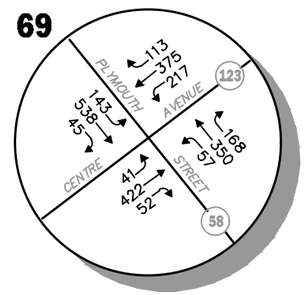


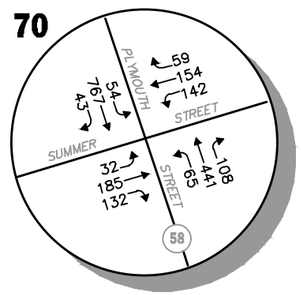


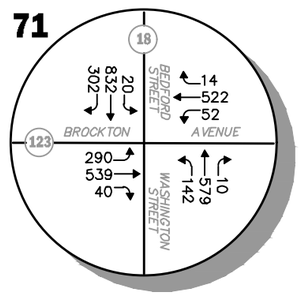


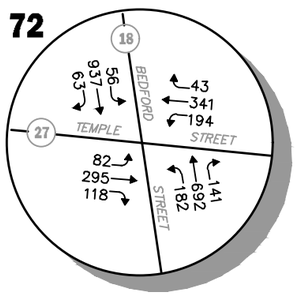












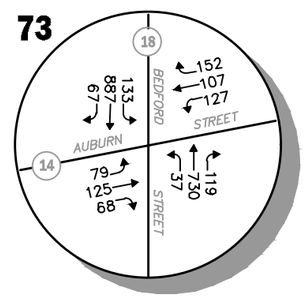


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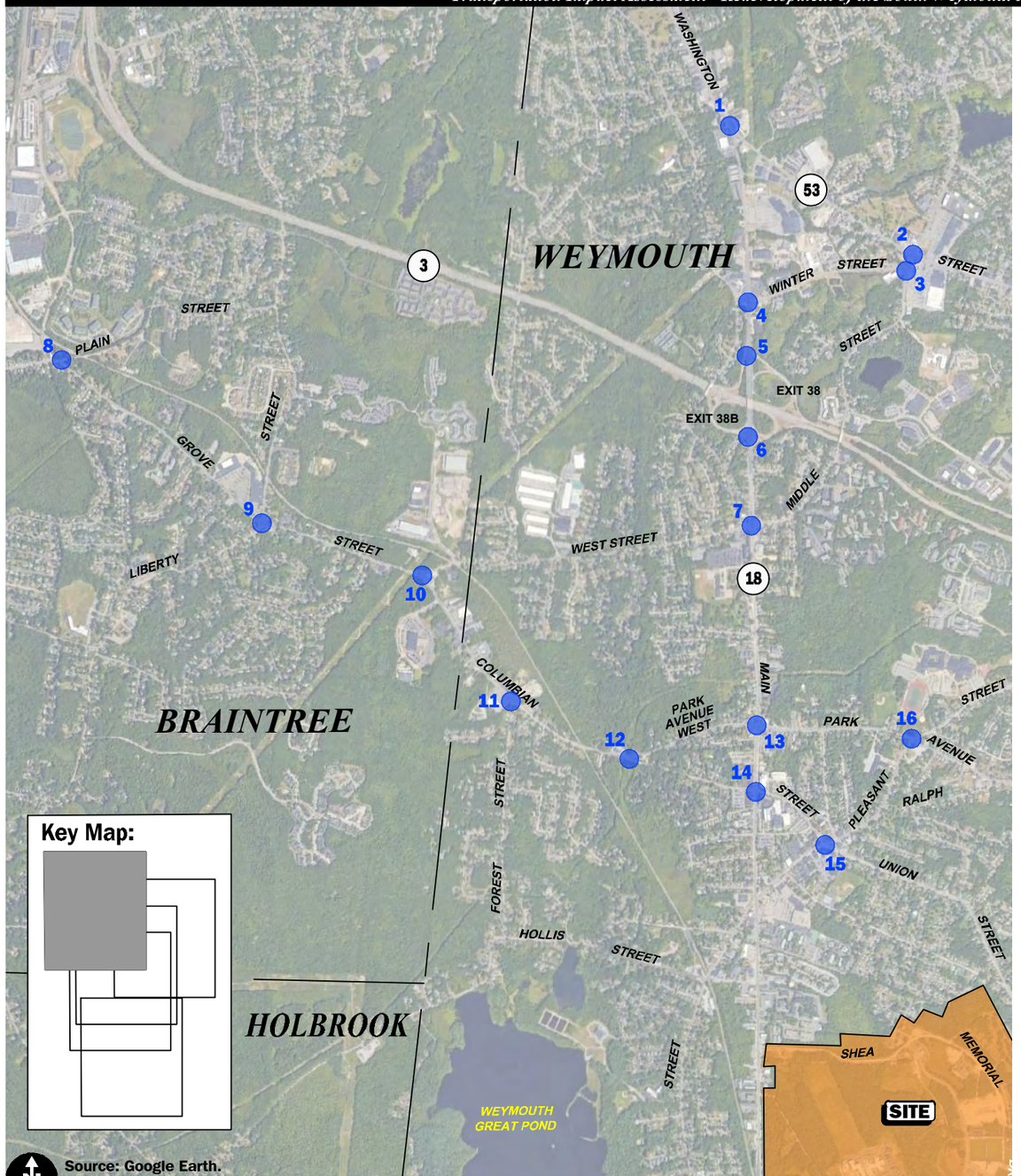
Figure 7-10E

2043 No-Build
Weekday Evening
Peak-Hour Traffic Volumes



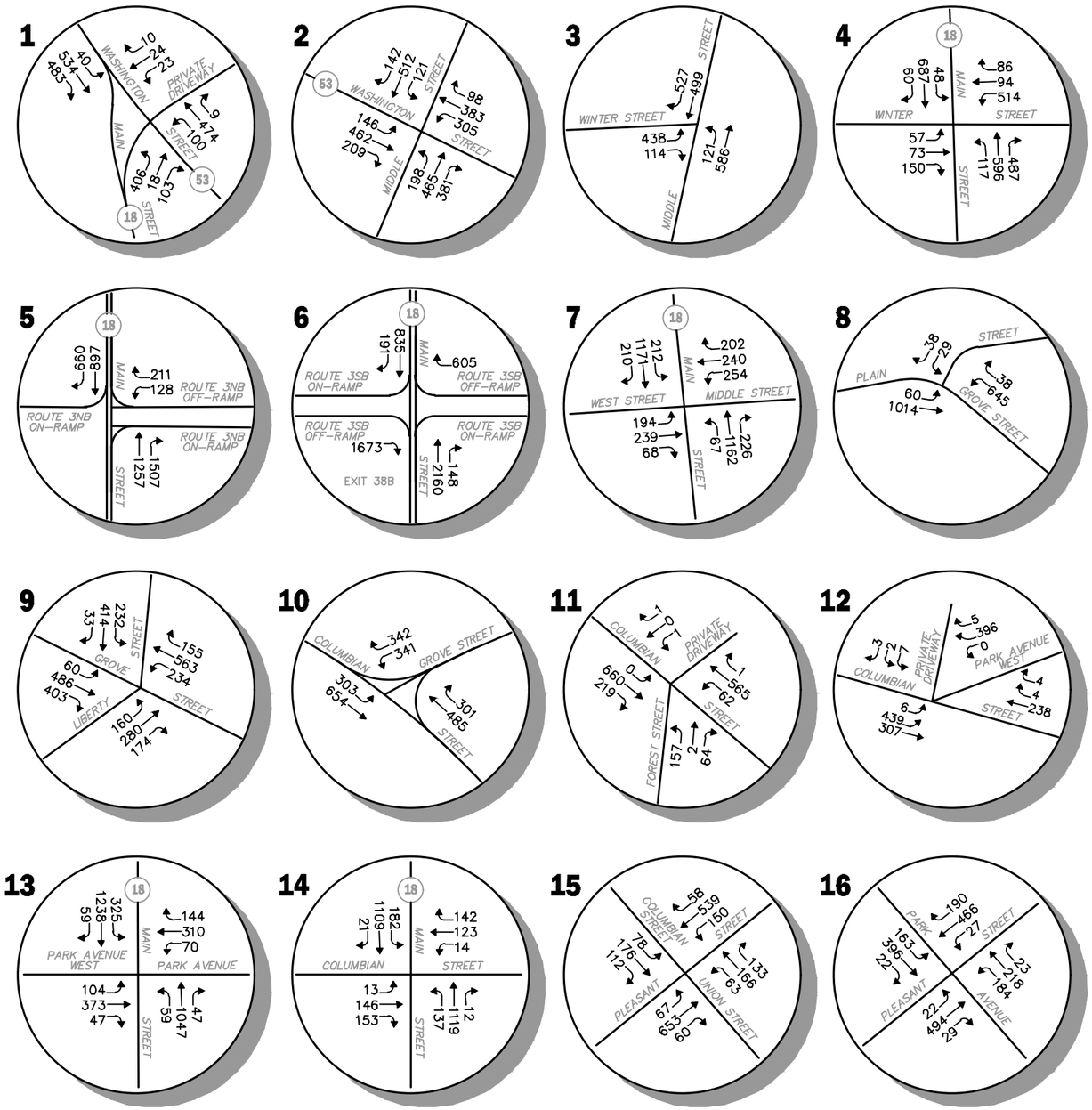
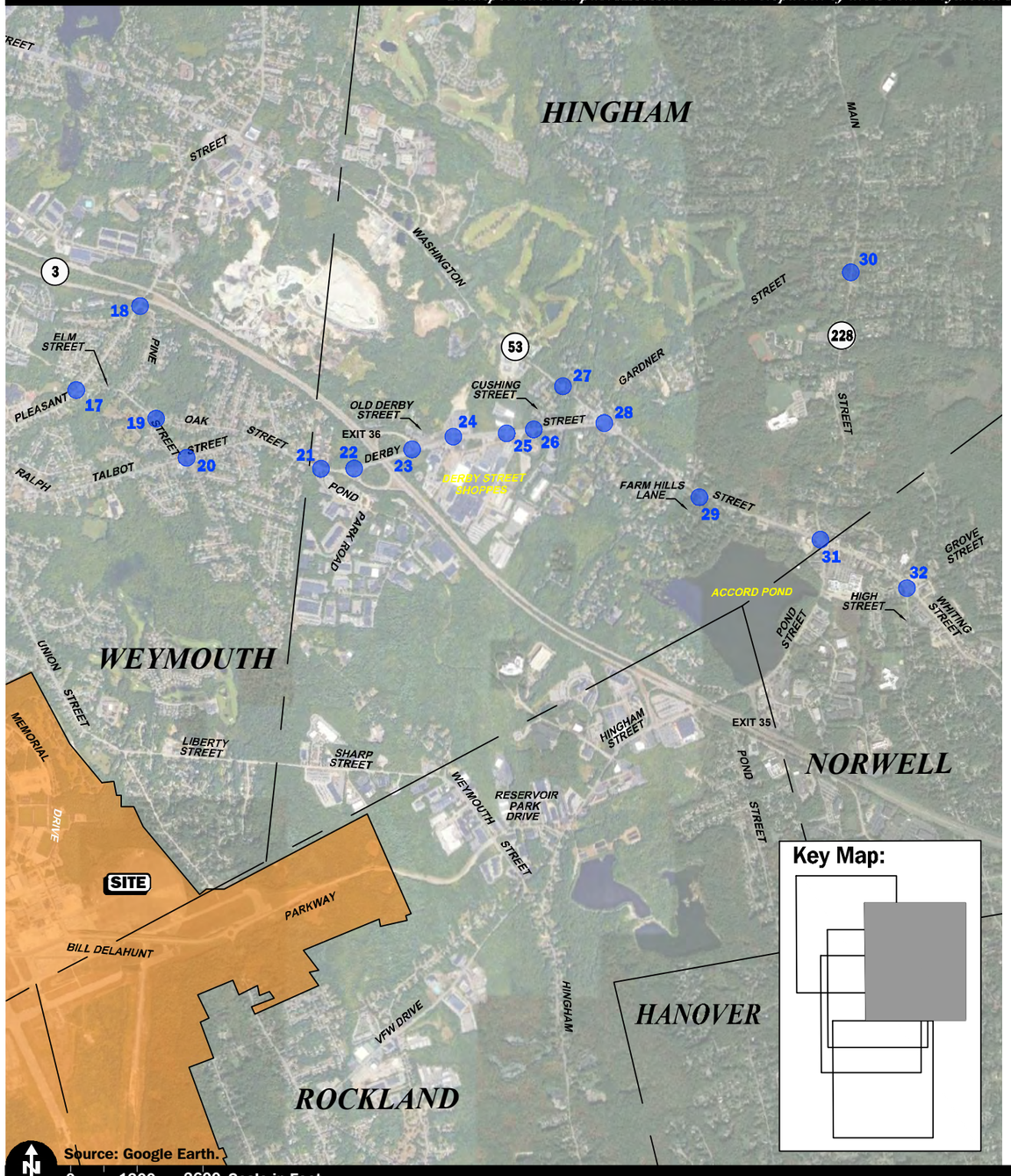
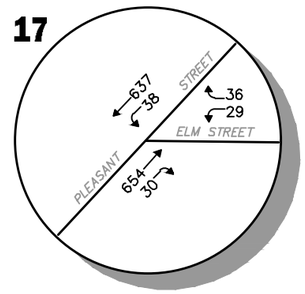


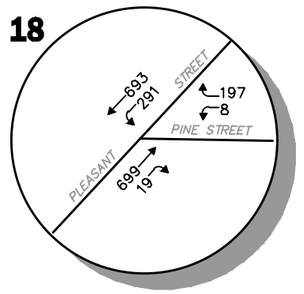
Figure 7-11A

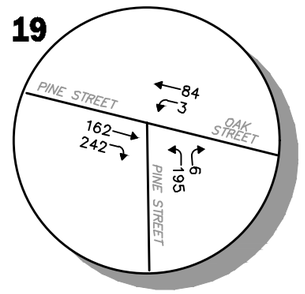
2043 No-Build
Saturday Midday
Peak-Hour Traffic Volumes

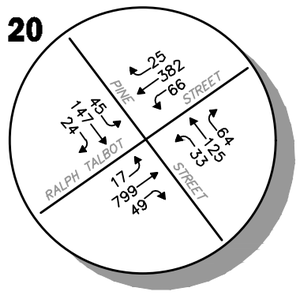
Vanasse & Associates inc

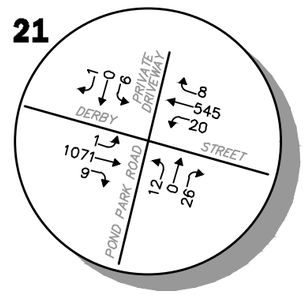


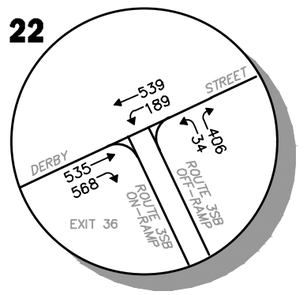


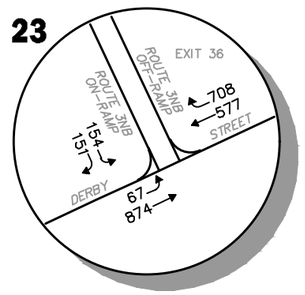


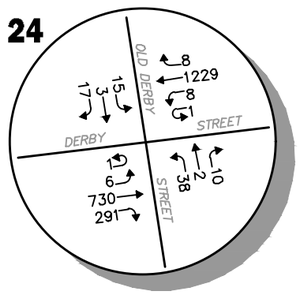


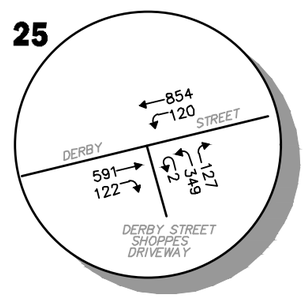


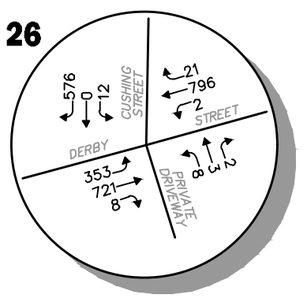


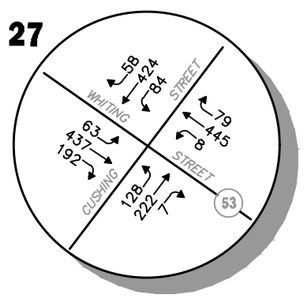


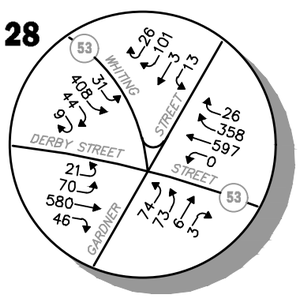


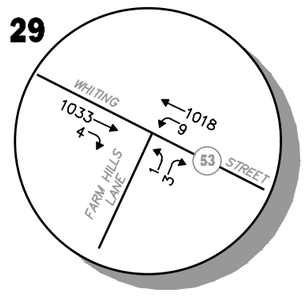


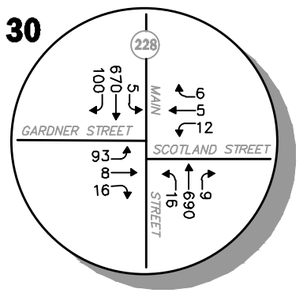


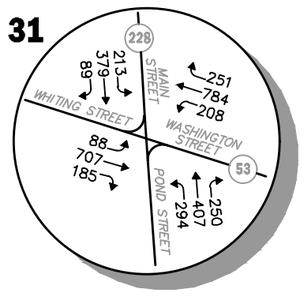












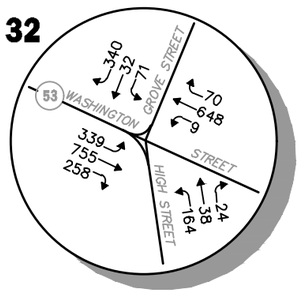
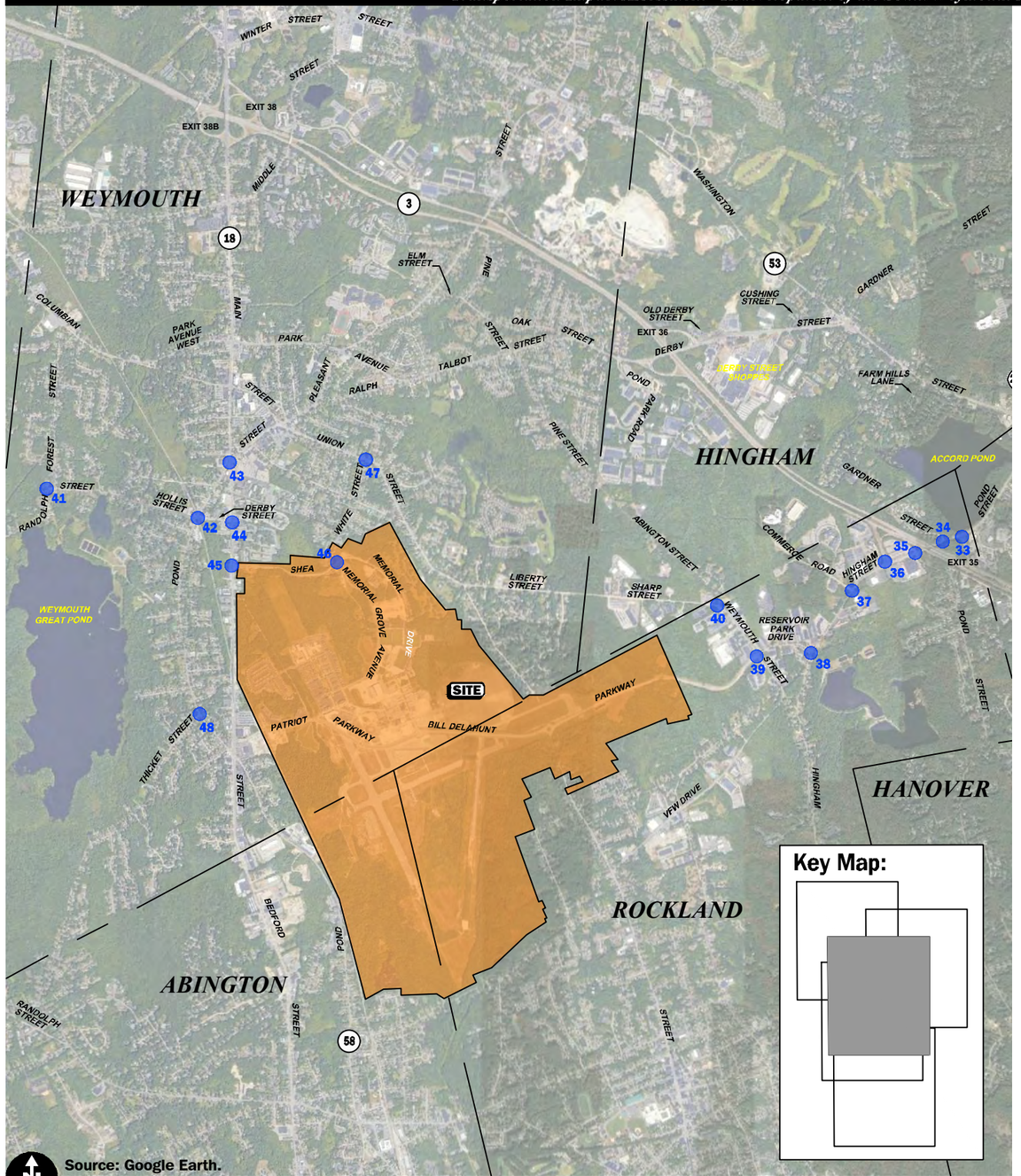
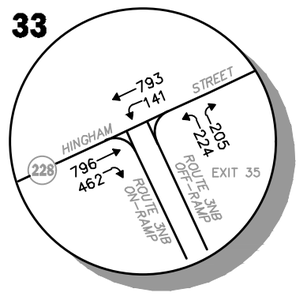


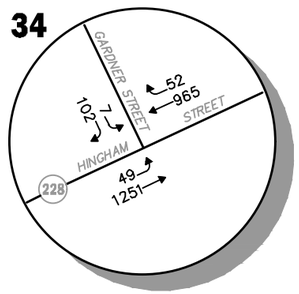
Figure 7-11B

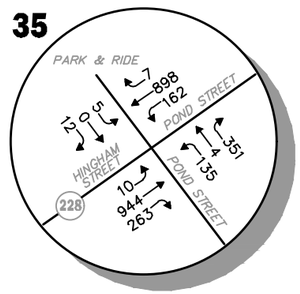
2043 No-Build
Saturday Midday
Peak-Hour Traffic Volumes

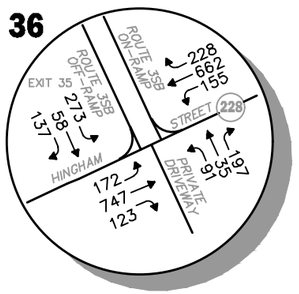
Vanasse & Associates inc

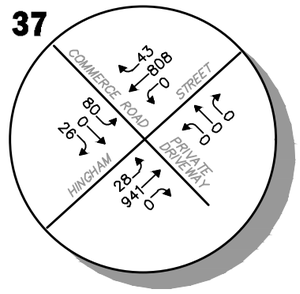


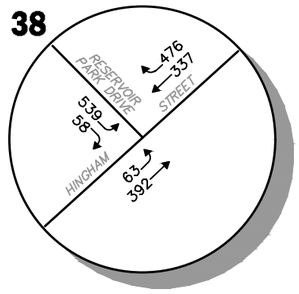


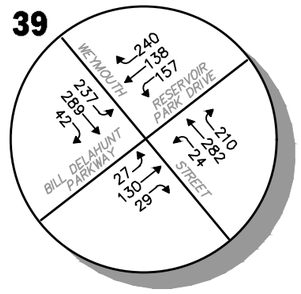


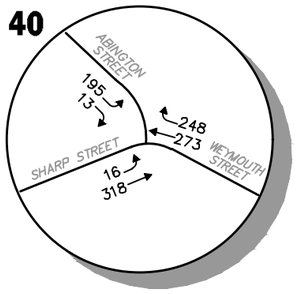


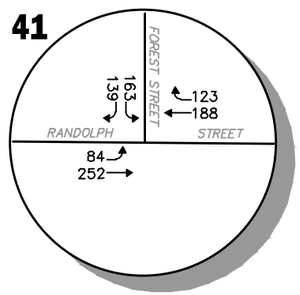


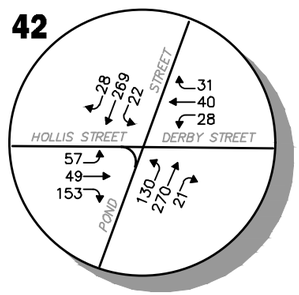


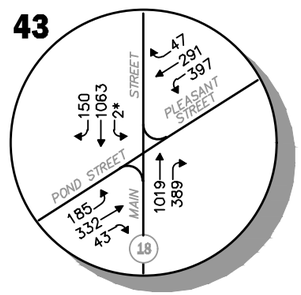


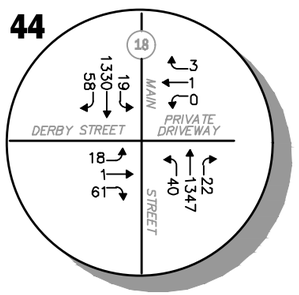


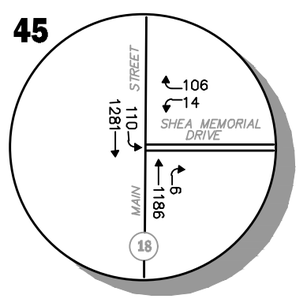


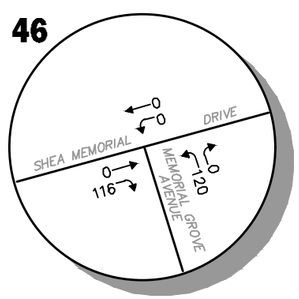


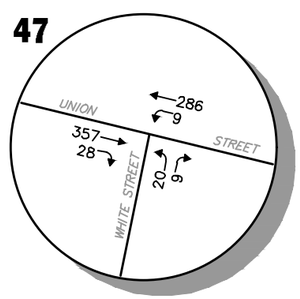


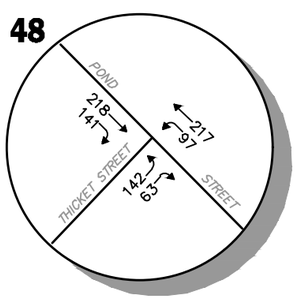










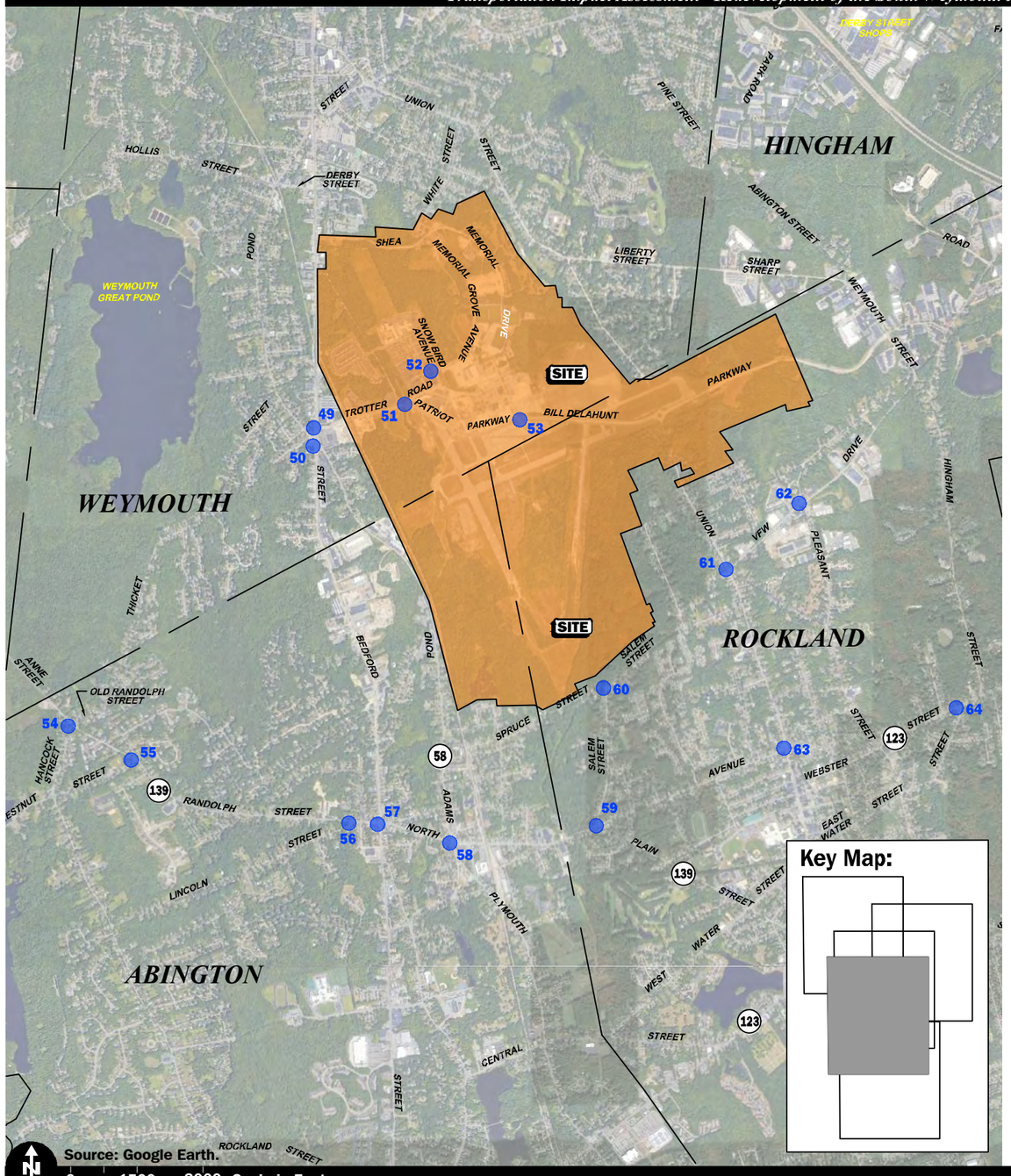


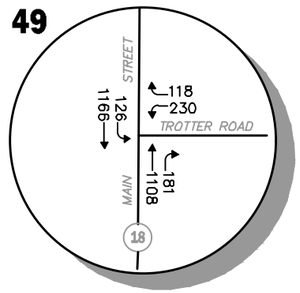
*Illegal movement.

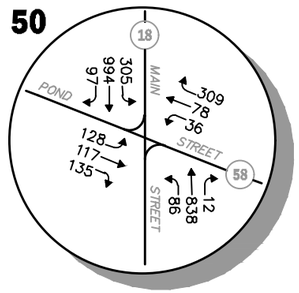
Figure 7-11C

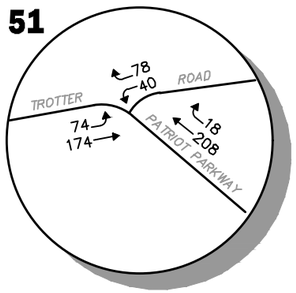
2043 No-Build
Saturday Midday
Peak-Hour Traffic Volumes

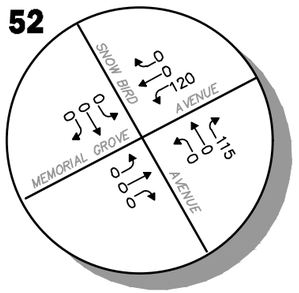
Vanasse & Associates inc

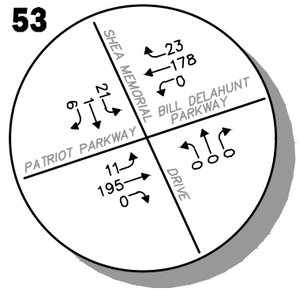


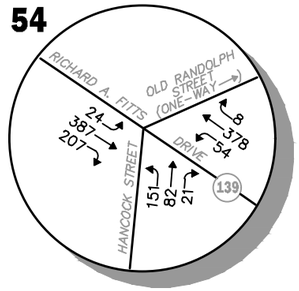


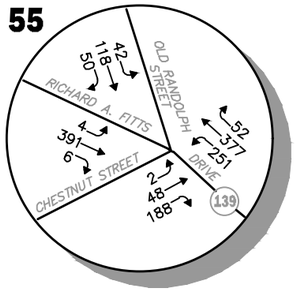


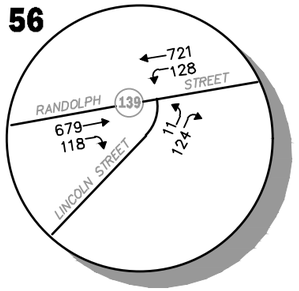


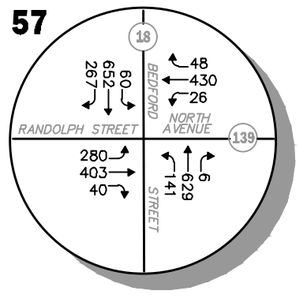


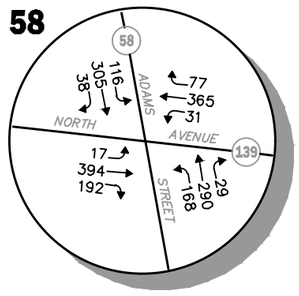


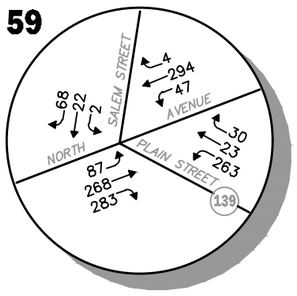


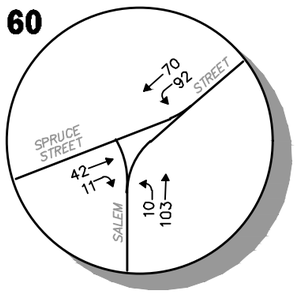


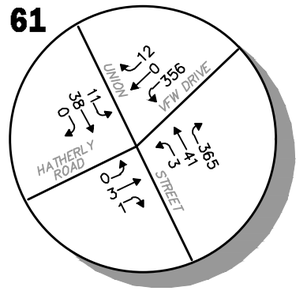


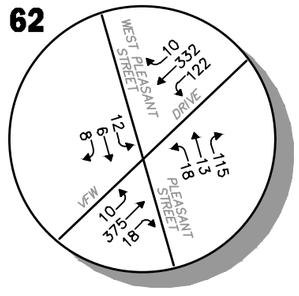


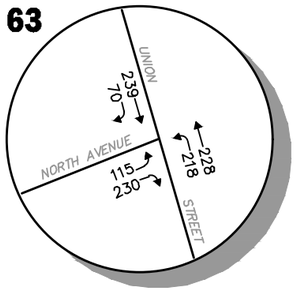


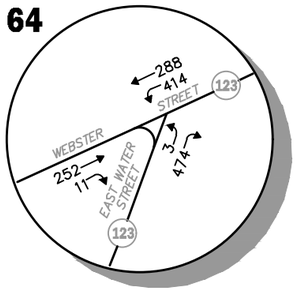










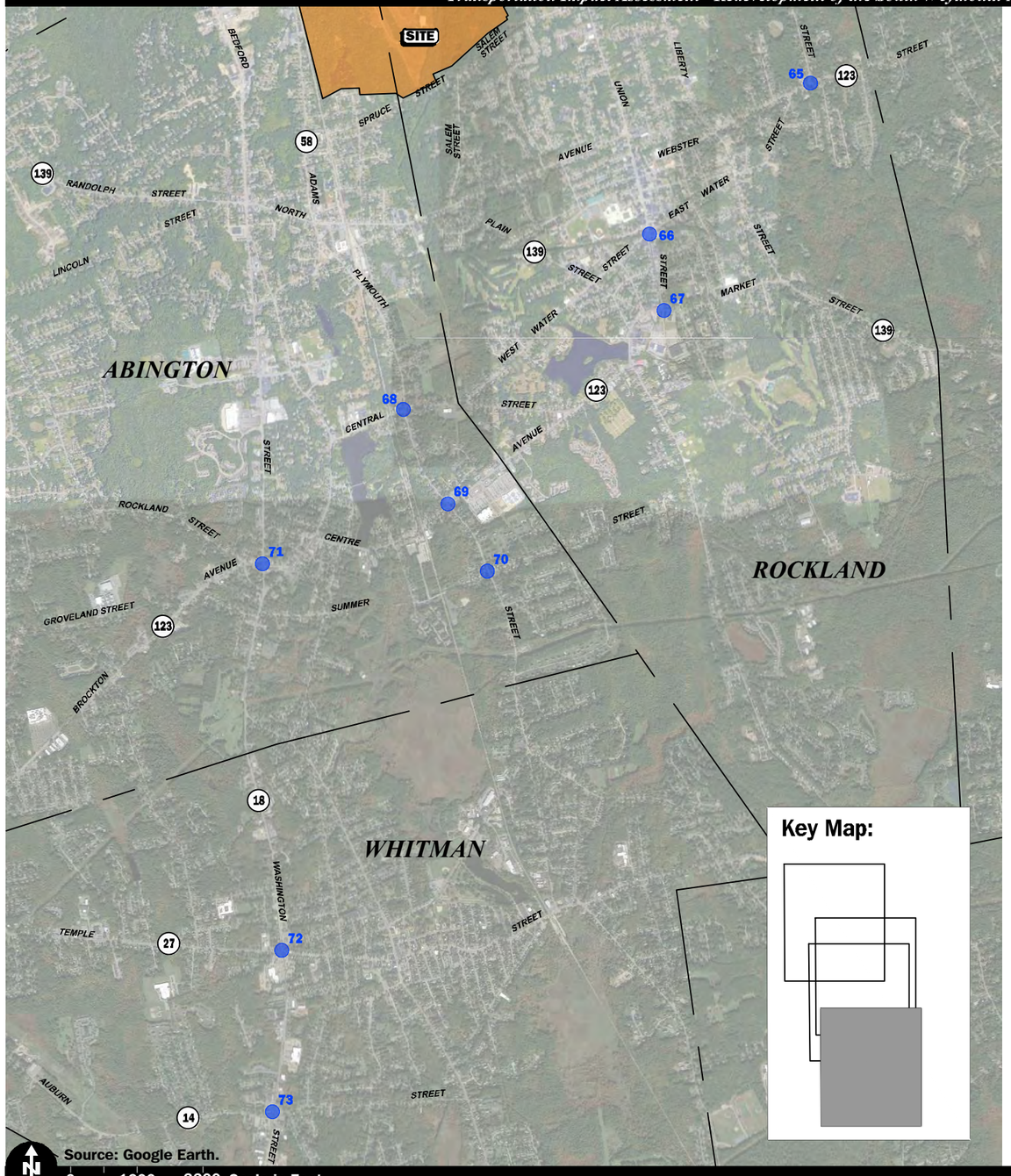


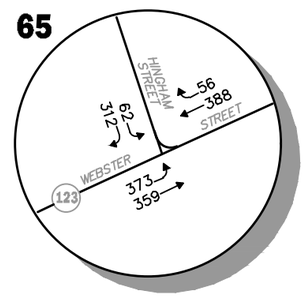
*Illegal movement.

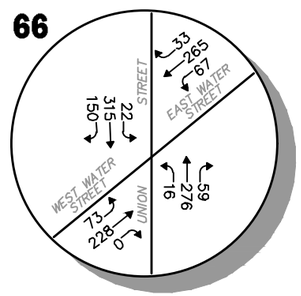
Figure 7-11D

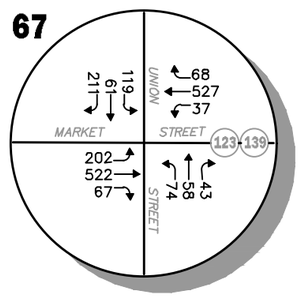
2043 No-Build
Saturday Midday
Peak-Hour Traffic Volumes

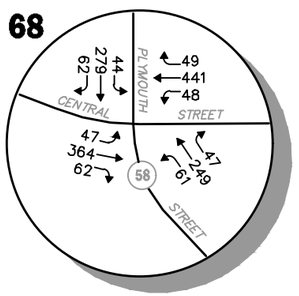
Vanasse & Associates inc

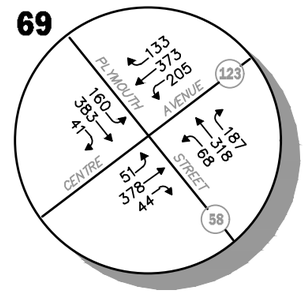


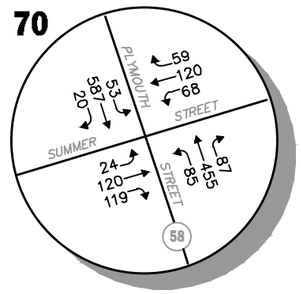


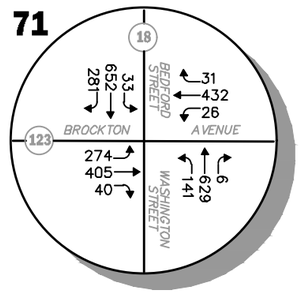


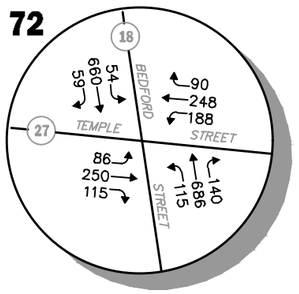












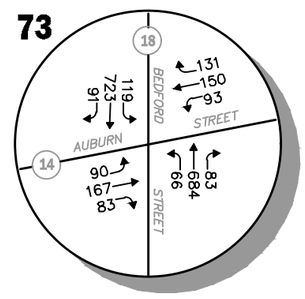


Figure 7-11E

2043 No-Build
Saturday Midday
Peak-Hour Traffic Volumes

Vanasse & Associates inc

- 170 age-qualified residential units;
- 300,000± sf of life science/laboratory space;
- 800,000± sf of warehouse space;
- 800,000± sf of office space; and
- 100,000± sf of retail space.

As noted throughout this study and the accompanying NPC filing, the exact mix of Project uses (including residential unit types and allocation of commercial uses) will likely change overtime in response to market needs; however, it is not anticipated that the Project will, at any time, produce impacts that exceed those studied under the 2023 modified development program and detailed herein.

In order to develop the traffic characteristics of the Project, trip-generation statistics published by the ITE[32] for similar land uses to the proposed Project were used. The following ITE Land Use Codes (LUCs) were used to develop the traffic characteristics for the refined development program for the Project:

Land Use Code	***Land Use Description***
140	Manufacturing
150	Warehousing
210	Single-Family Detached Housing
215	Sigle-Family Attached Housing
221	Multifamily Housing (Mid-Rise)
252	Senior Housing - Multifamily
750	Office Park
760	Research and Development Center
812	Shopping Center (40-150k) – No Supermarket

As noted above, certain uses (e.g., supermarket) may ultimately be added to, or removed from, the Project, depending on market conditions. In the event of any such re-allocation of uses at the Project over time, the Project will not exceed the impacts studied pursuant to the 2023 modified development program and detailed herein.

Internal Trips

A portion of the trips expected to be generated by the Project will consist of internal or dual-purpose trips. An internal trip consists of a resident, employee, and/or customer that patronizes more than one of the uses planned within a development and is common in mixed-use projects with appropriate accommodations to facilitate trips between uses. By way of example, a resident may patronize the retail space that is to be located within the Project site or may be employed by a business located therein. In order to account for this interaction, the multi-use trip-generation calculation methodology promulgated by the ITE[33] was applied to the base ITE trip-generation calculations.

[32]Institute of Transportation Engineers; op. cit. 7-1.
[33]Institute of Transportation Engineers; op. cit. 7-1.

Divert-Link Trips

Not all of the trips expected to be generated by the retail component of the Project will be new trips on the roadway network. A significant portion of these trips may consist of divert-link trips or vehicles already traveling along adjacent roadways for other purposes that will patronize the Project in conjunction with their trip and then continue to their original destination. These trips are not new trips on the roadway network as a result of the Project. Statistics published by the ITE[34] indicate that, on average, up to 40 percent of the trips generated by a retail use may consist of traffic already travelling along the adjacent roadways before continuing to their intended destination. In accordance with MassDOT guidelines which limits pass-by or diverted link trips to the lesser of: i) 15 percent of the adjacent roadway traffic volume; or ii) the ITE pass-by/diverted link trip rate for the specific use; the ITE published diverted link trip rates were applied to the base trip-generation calculations for the retail component of the Project.

Table 7-5 summarizes the anticipated traffic characteristics of the Project using the above methodology with the detailed trip-generation calculations for the individual components of the Project provided in the Appendix.

[34]Institute of Transportation Engineers; op. cit. 7-1.

Table 7-5
TRIP GENERATION SUMMARY[a]

Time Period/Direction	(A) New Automobile Trips	(B) Divert-Link Trips	**(C=A+B) Total Automobile Trips**
Average Weekday Daily:			
Entering	25,567	1,152	**26,719**
Exiting	25,567	1,152	**26,719**
Total	51,134	2,304	**53,438**
Weekday Morning Peak Hour:			
Entering	1,793	17	**1,810**
Exiting	2,321	17	**2,338**
Total	4,114	34	**4,148**
Weekday Evening Peak Hour:			
Entering	2,233	84	**2,317**
Exiting	2,434	84	**2,518**
Total	4,667	168	**4,835**
Saturday:			
Entering	22,317	1,421	**23,738**
Exiting	22,317	1,421	**23,738**
Total	44,634	2,842	**47,476**
Saturday Midday Peak Hour:			
Entering	1,965	109	**2,074**
Exiting	1,780	109	**1,889**
Total	3,745	218	**3,963**

[a]Based on ITE LUC 140, Manufacturing; 150, Warehousing; 210, Single-Family Detached Housing; 215, Single-Family Attached Housing; 221, Multifamily Housing (Mid-Rise); 252, Senior Adult Housing – Multifamily; 750, Office Park; 760, Research and Development Center; 821, Shopping Plaza (40-150k) - Supermarket - No; with adjustments applied for internal trips.

Project-Generated Traffic-Volume Summary

As can be seen in Table 7-5, the Project is expected to generate approximately 53,438 vehicle trips (including divert-link trips) on an average weekday and 47,476 vehicle trips on a Saturday (both two way, 24-hour volumes), with approximately 4,148 vehicle trips (1,810 vehicles entering and 2,338 exiting) expected during the weekday morning peak-hour, 4,835 vehicle trips (2,317 vehicles entering and 2,518 exiting) expected during the weekday evening peak-hour and 3,963 vehicle trips (2,074 vehicles entering and 1,889 exiting) expected during the Saturday midday peak-hour.

Table 7-6 compares the traffic characteristics of the traffic characteristics of currently envisioned development program for the Project to those of the development program that was assessed in the 2007 FEIR[35] and in the 2017 NPC.[36]

[35]Epsilon, et al; op. cit. 7-1; June 17, 2007.

[36]Epsilon, et al; op. cit. 7-1; February, 28, 2017

Table 7-6
TRAFFIC-VOLUME COMPARISON TABLE[37]

Time Period	Vehicle Trips				
	(A) 2007 FEIR Development Program	(B) 2017 NPC Development Program	(C) 2023 Modified Development Program[a]	Difference	
				C – A	C - B
Average Weekday	34,300	79,990	53,438	+19,138	-26,552
Weekday Morning Peak Hour	2,137	4,984[a]	4,148	+2,011	-836
Weekday Evening Peak Hour	3,099	7,227[a]	4,835	+1,736	-2,392

[a]Estimated based on the ratio of the respective weekday peak-hour traffic volume to the average weekday traffic volume for the 2007 FEIR development program applied to the average weekday traffic volume for the 2017 NPC development program.

Traffic-Volume Comparison

As shown in Table 7-6, the 2023 modified development program is predicted to generate *fewer* vehicle trips than the most recently proposed 2017 NPC development program on each of (i) an average weekday and (ii) an average weekday (during both morning and evening peak hours).

TRIP DISTRIBUTION AND ASSIGNMENT

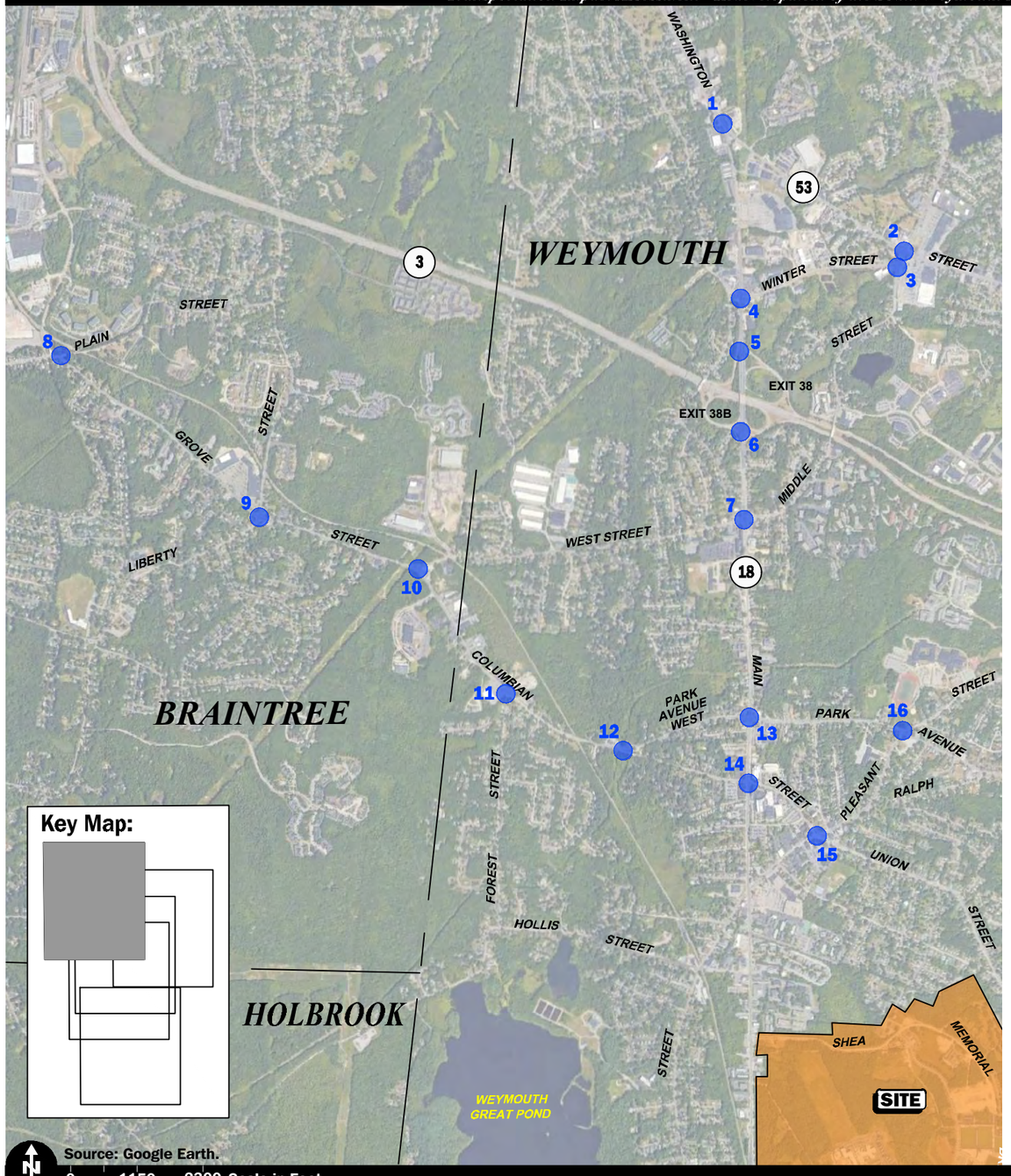
Separate trip-distribution patterns were developed for the residential and commercial components of the Project given the differing nature and purpose of the trips associated with the uses. For the residential component of the Project, the directional distribution was determined based on a review of Journey-to-Work data obtained from the U.S. Census for persons residing or employed within the development area of the Project. For the commercial component of the Project, the directional distribution was determined based on a review of Journey-to-Work data obtained from the U.S. Census for persons *employed* within the Town of Weymouth.

The general trip distribution patterns for the residential and commercial components of the Project are graphically depicted on Figures 7-12 and 7-13, respectively. The additional traffic expected to be generated by the Project was assigned on the study area roadway network as shown on Figures 7-14, 7-15 and 7-16 for the weekday morning, weekday evening and Saturday midday peak-hours, respectively.

FUTURE TRAFFIC VOLUMES - BUILD CONDITION

The 2043 Build condition traffic volumes consist of the 2043 No-Build traffic volumes with the additional traffic expected to be generated by the Project added to them. The 2043 Build weekday morning, weekday evening and Saturday midday peak-hour traffic volumes are graphically depicted on Figures 7-17, 7-18 and 7-19, respectively.

[37]Saturday and Saturday midday peak-hour traffic volumes were not estimated for the 2007 FEIR or the 2017 NPC.



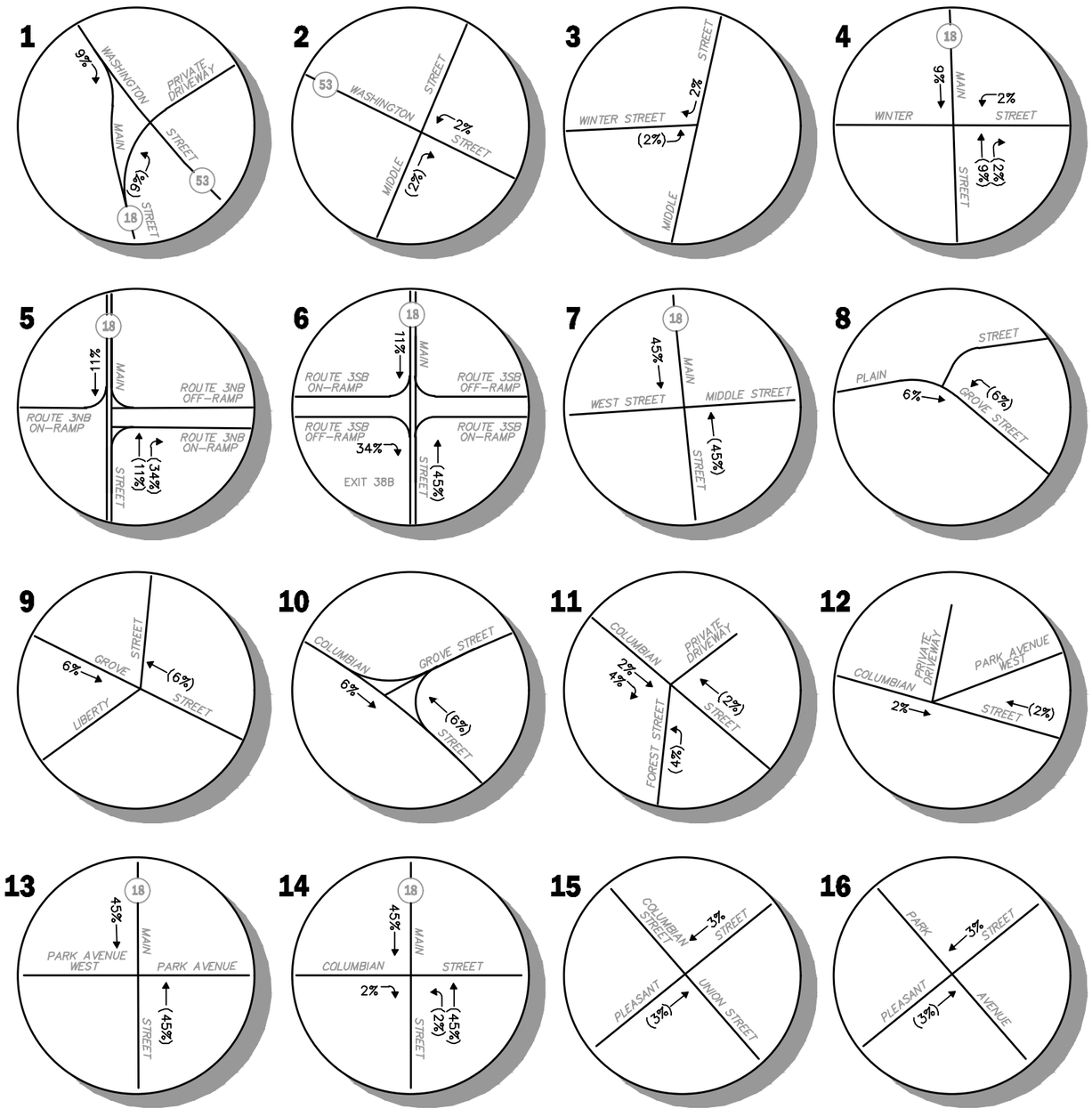
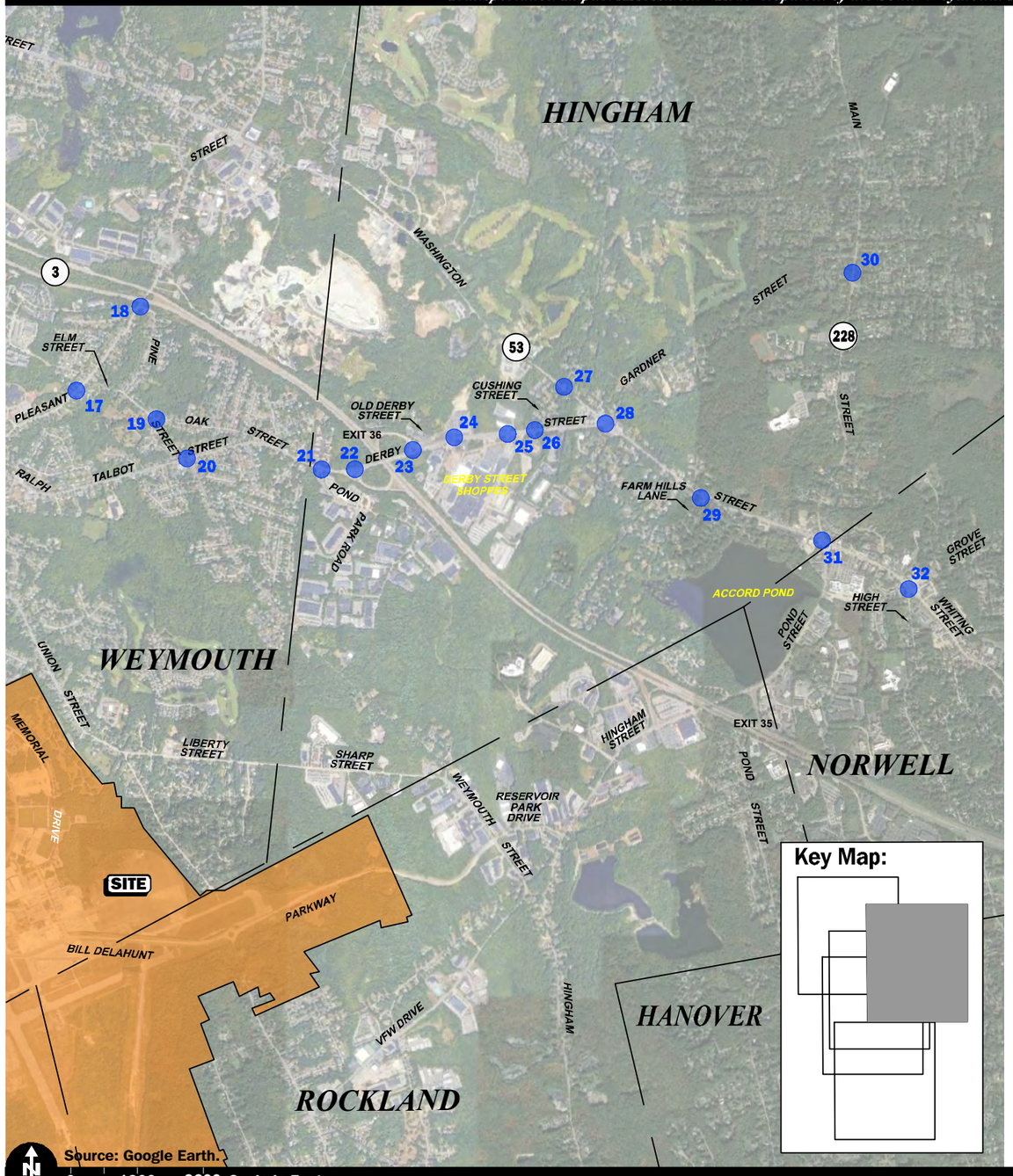


Figure 7-12A

Trip Distribution Map
Residential Trips

Vanasse & Associates inc



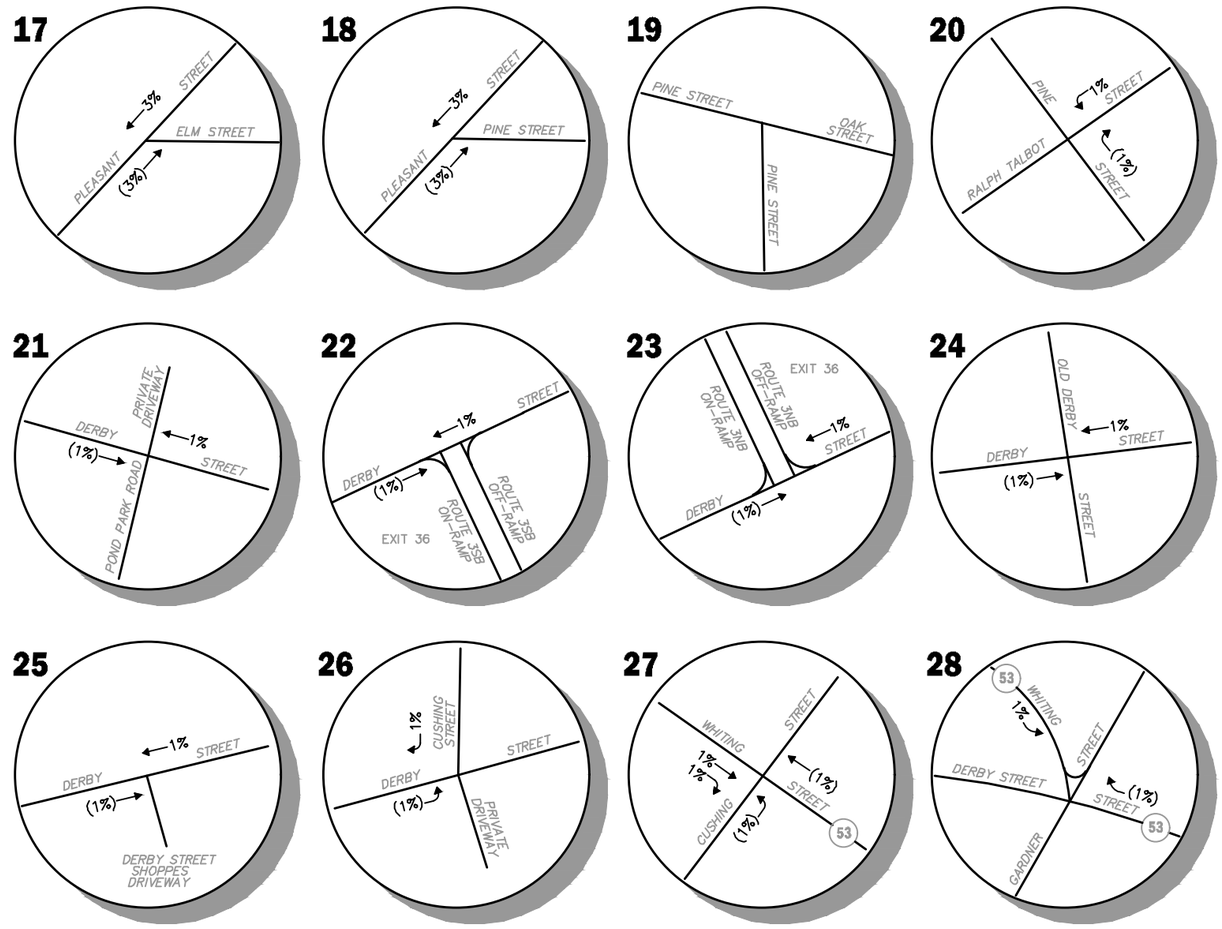
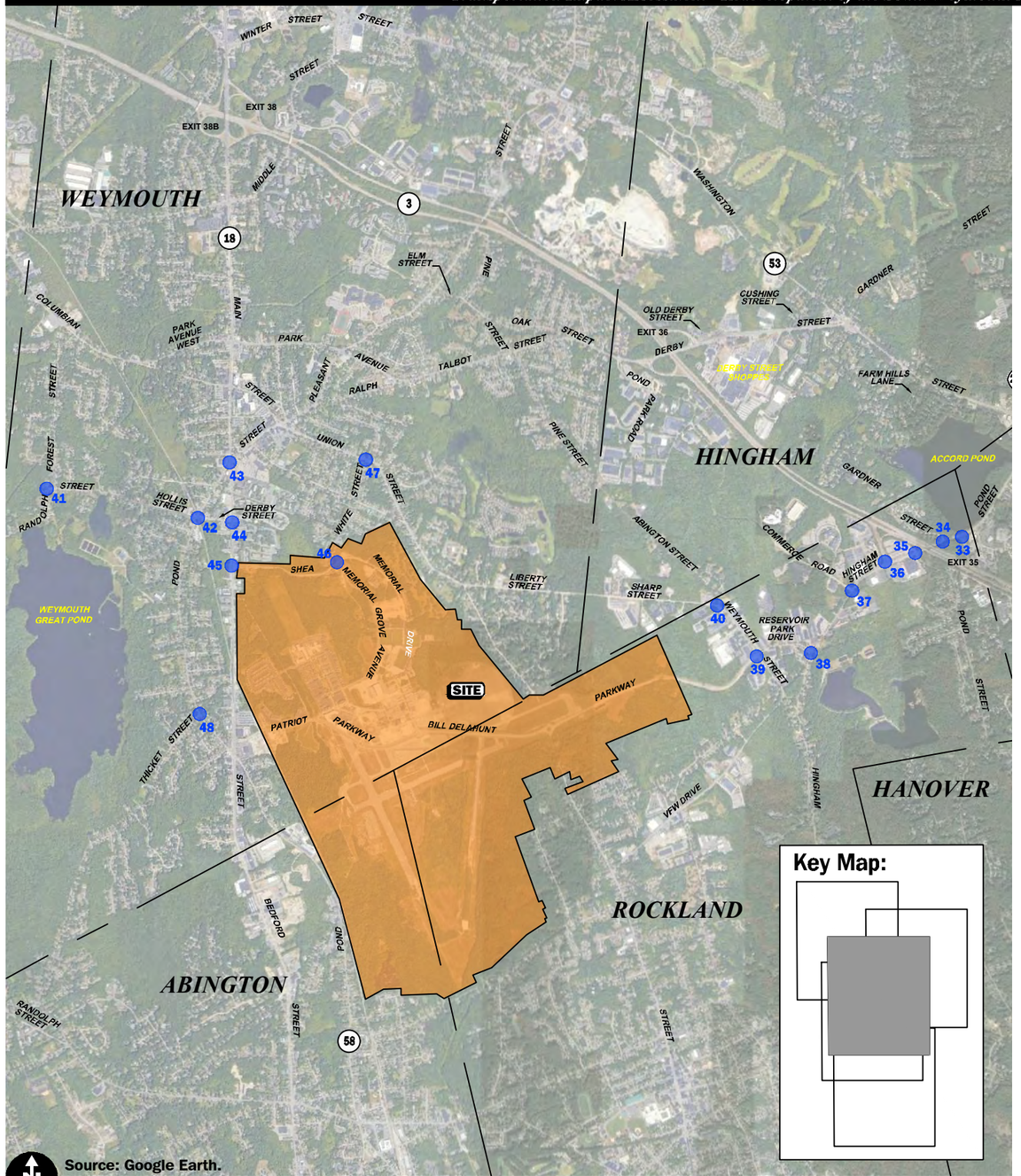
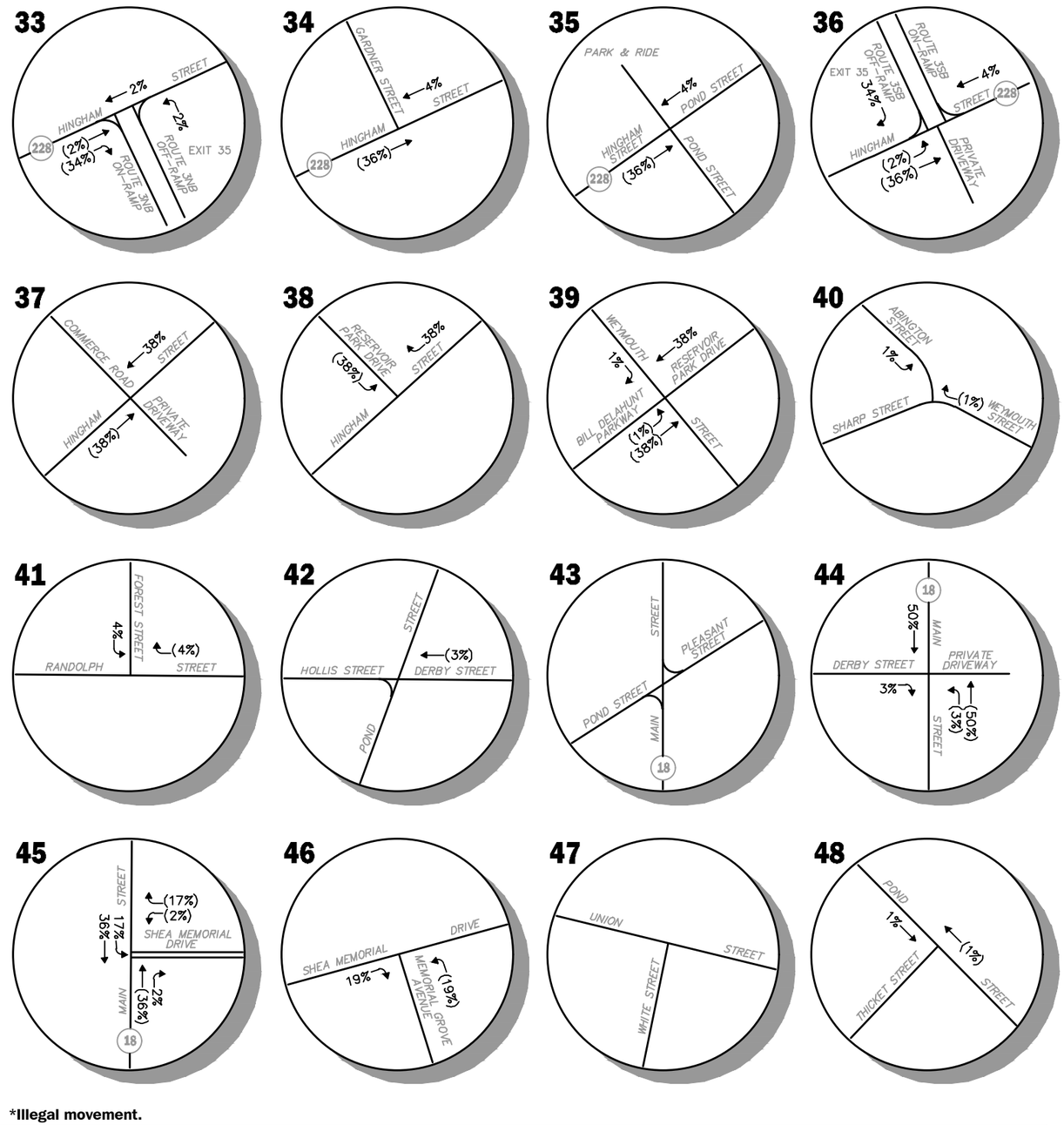


Figure 7-12B

Trip Distribution Map
Residential Trips

Vanasse & Associates inc



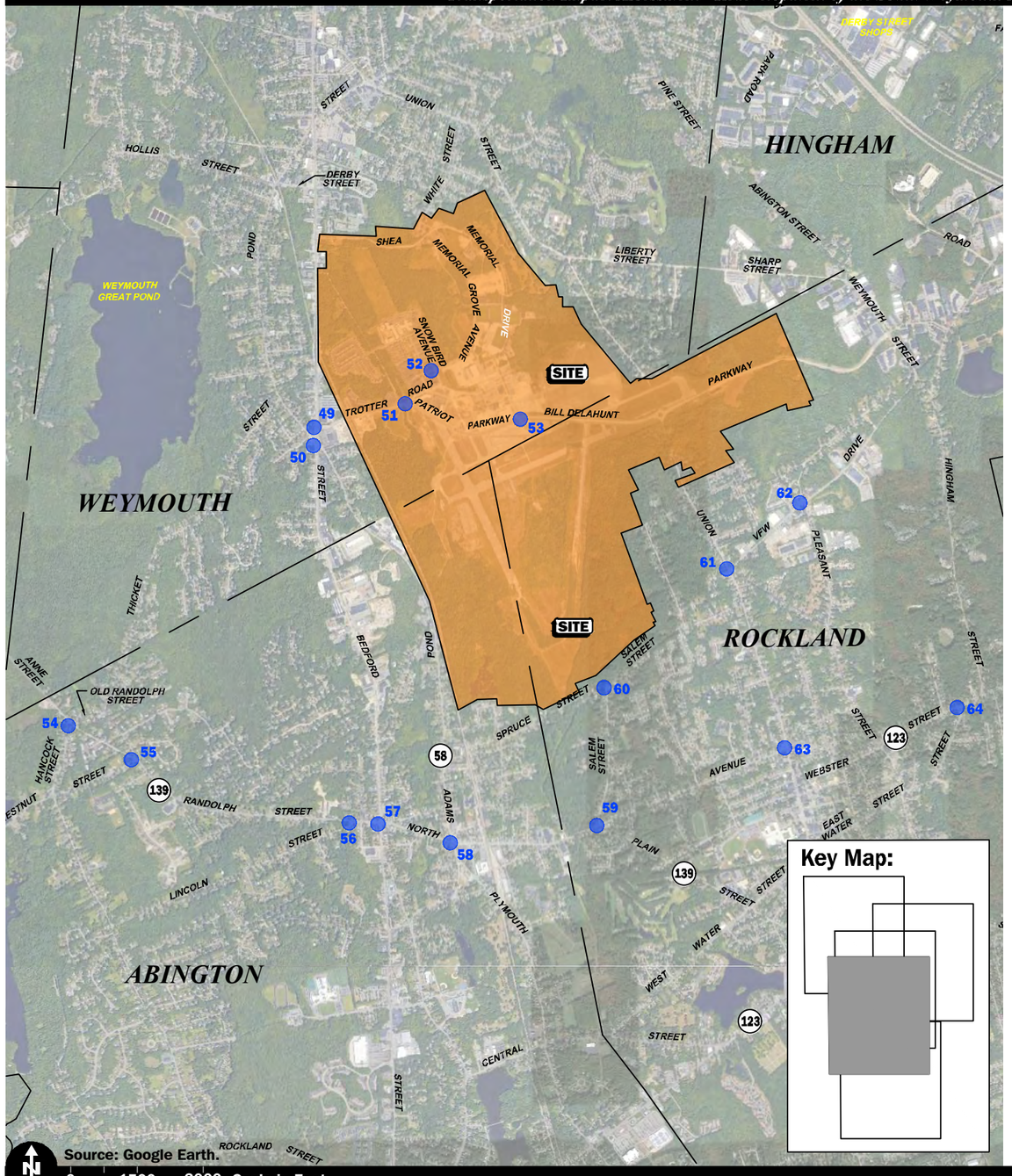


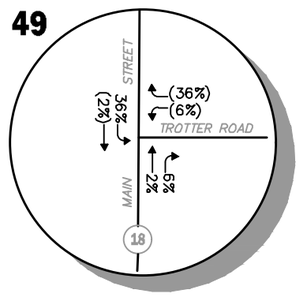
*Illegal movement.

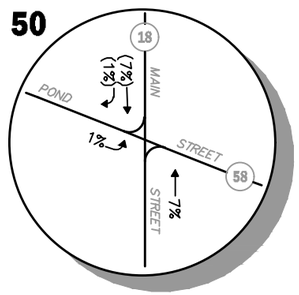
Figure 7-12C

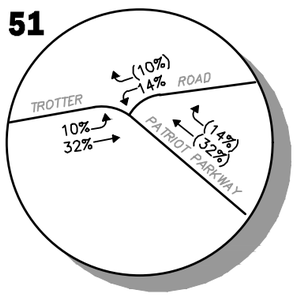
Trip Distribution Map
Residential Trips

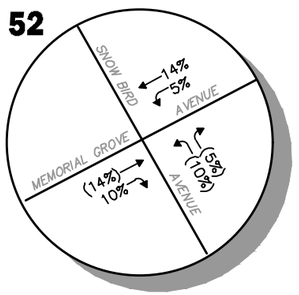
Vanasse & Associates inc

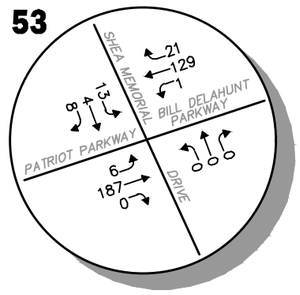


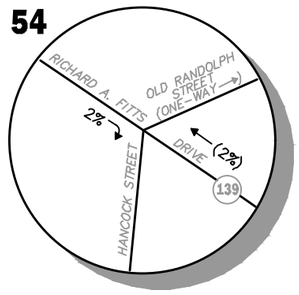


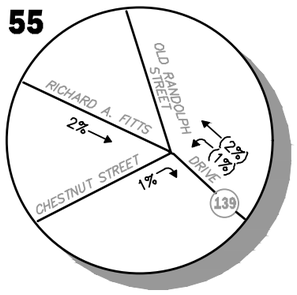


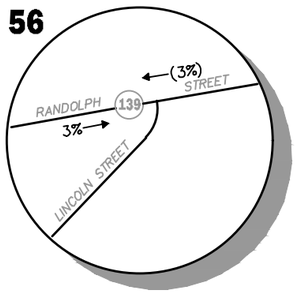


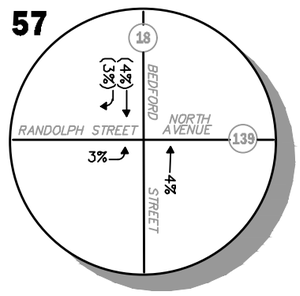


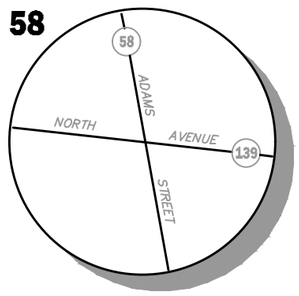


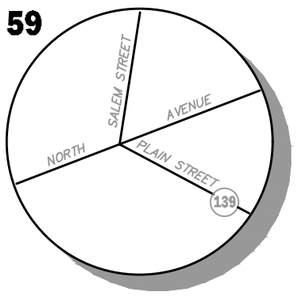


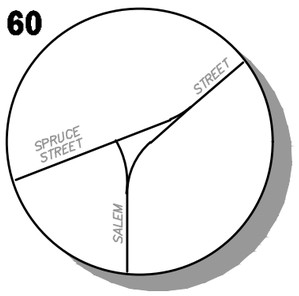


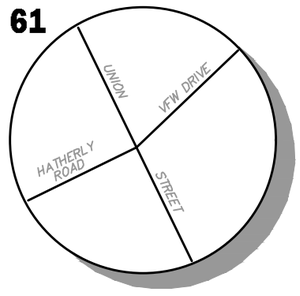


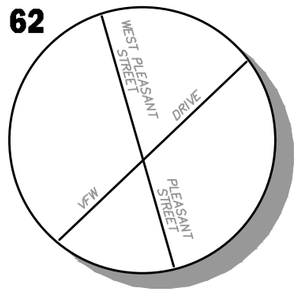


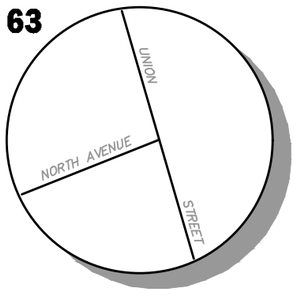


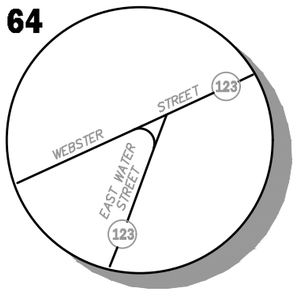










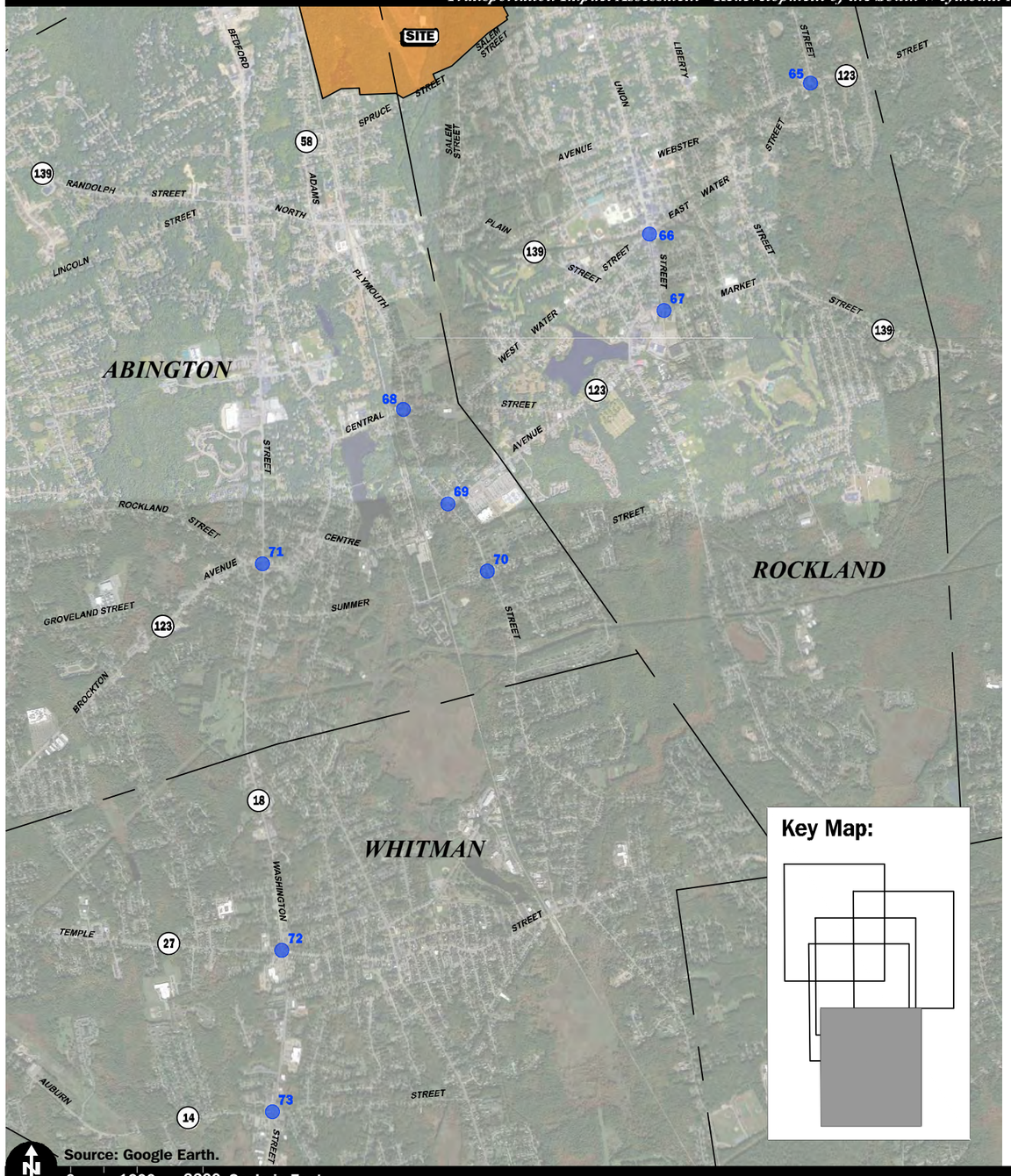


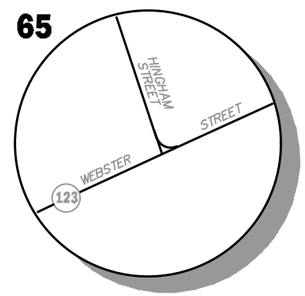
*Illegal movement.

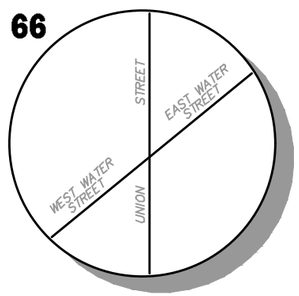
Figure 7-12D

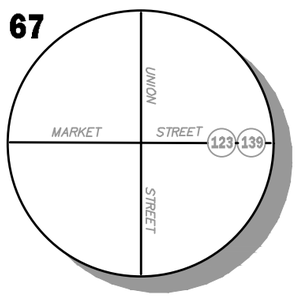
Trip Distribution Map
Residential Trips

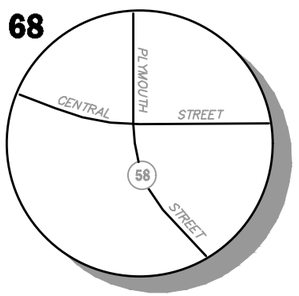
Vanasse & Associates inc

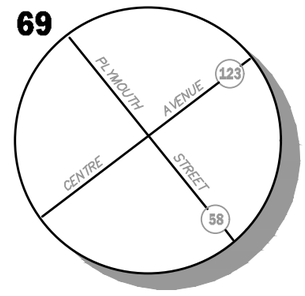


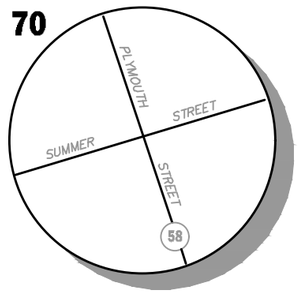


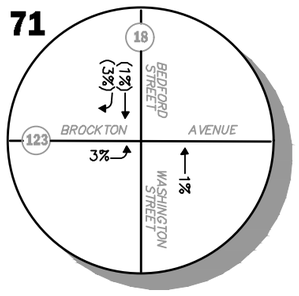


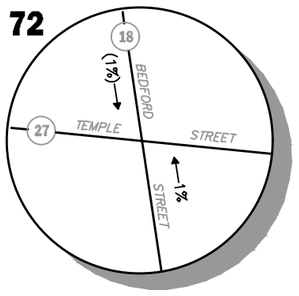


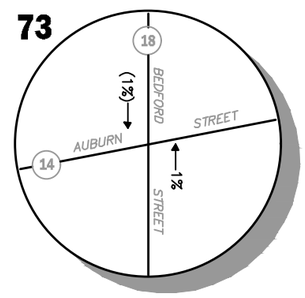










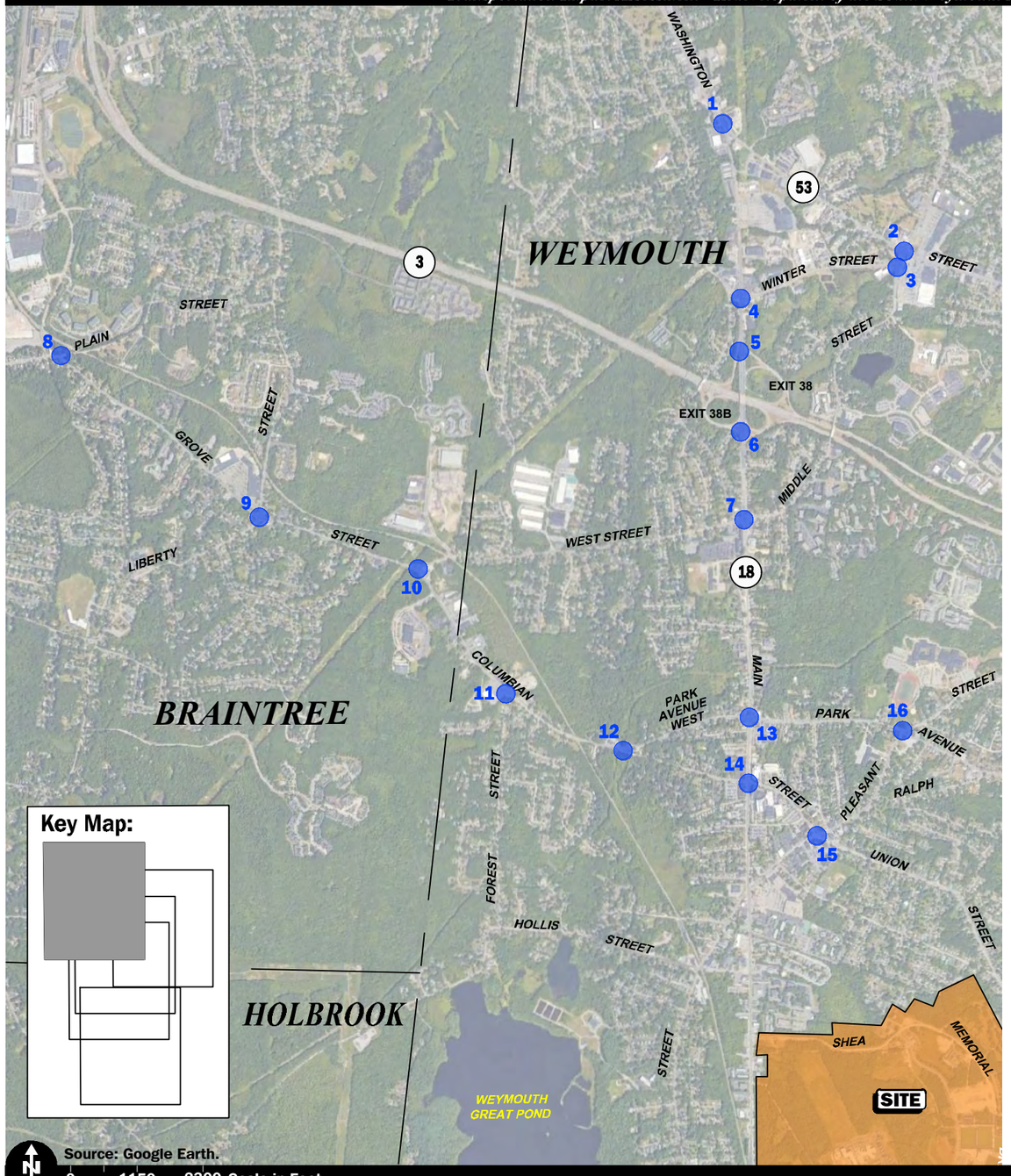


0 1600 3200 Scale in Feet

Figure 7-12E

Trip Distribution Map
Residential Trips

Vanasse & Associates inc



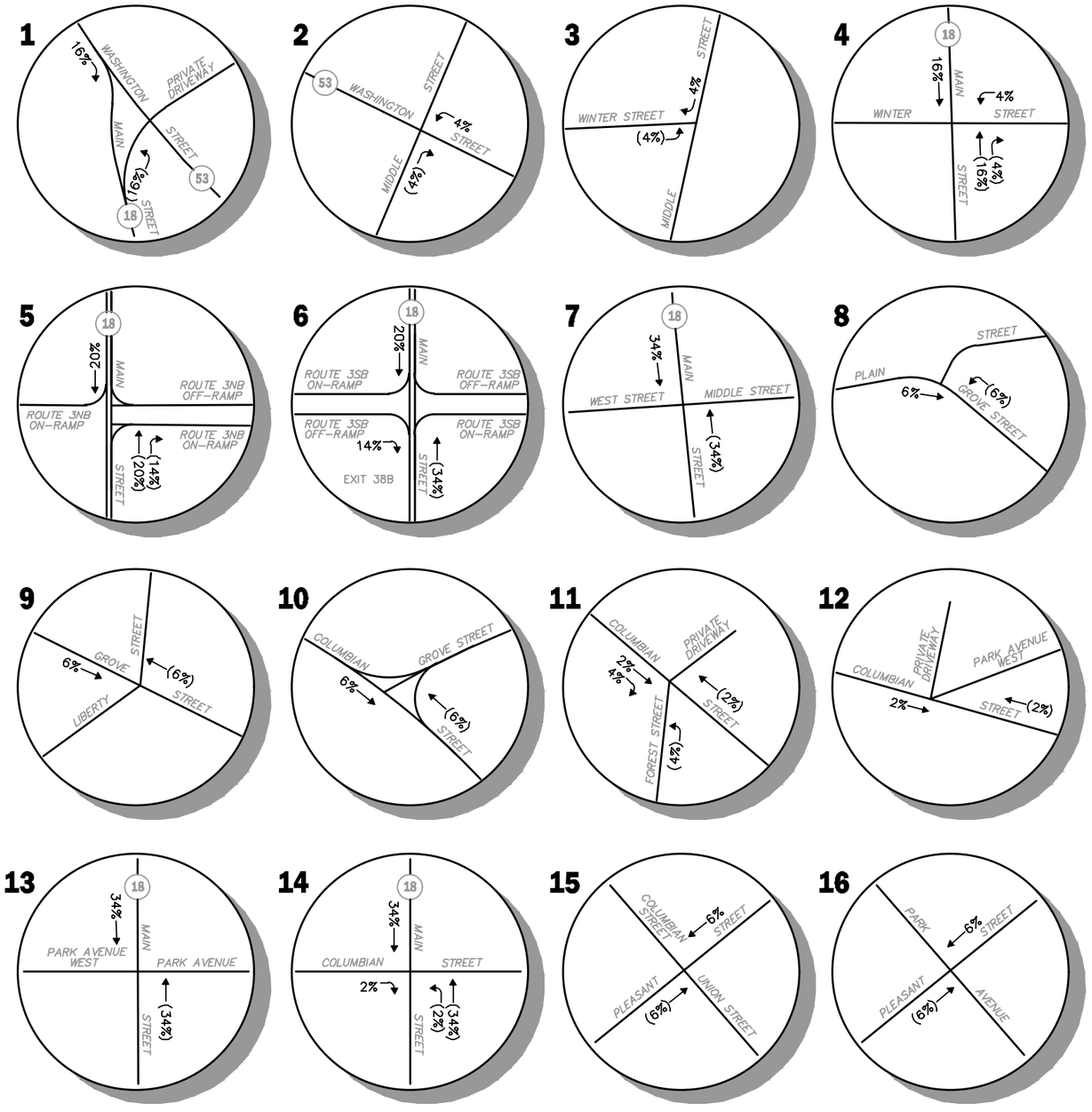
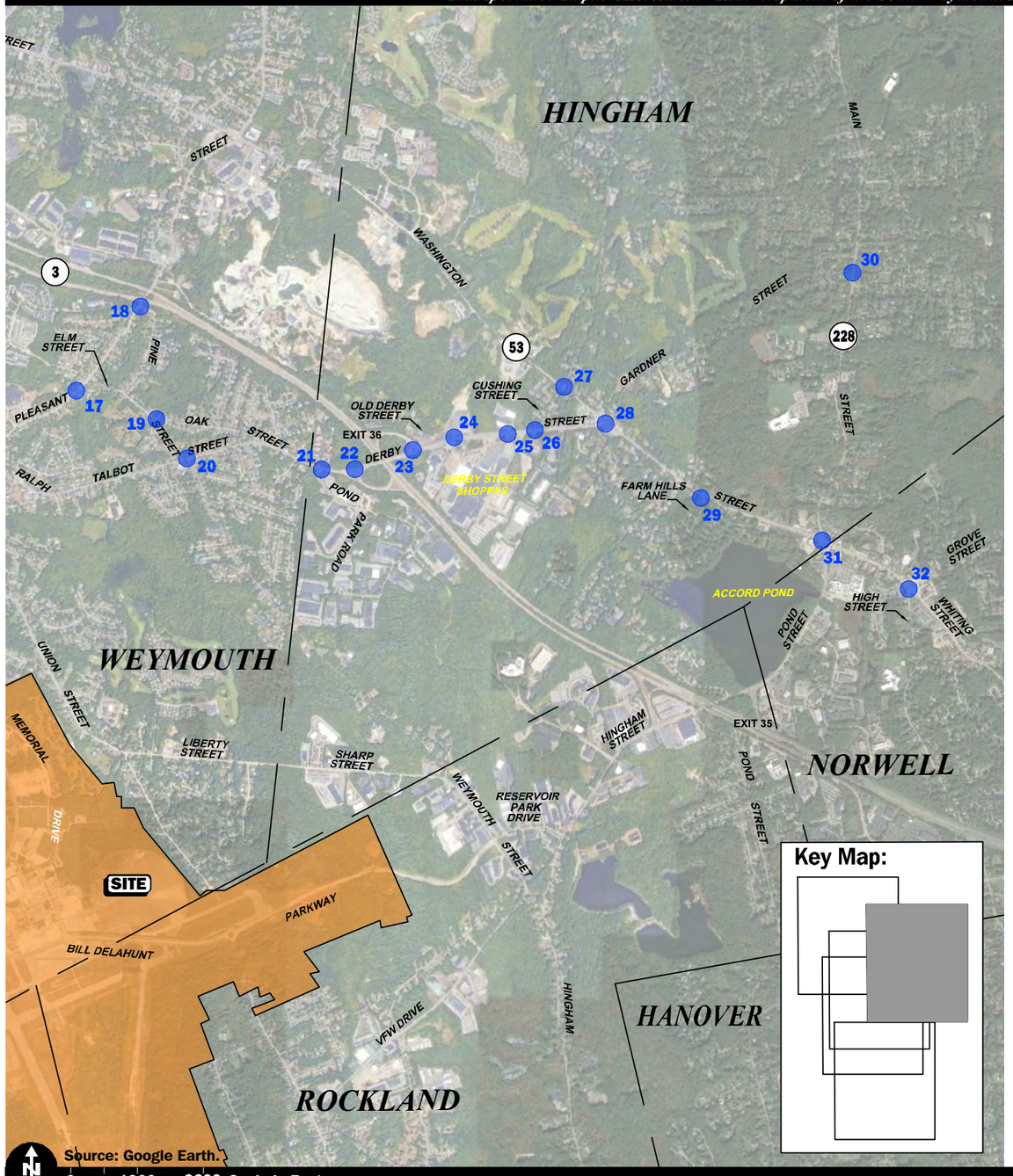


Figure 7-13A

Trip Distribution Map
Commercial Trips

Vanasse & Associates inc



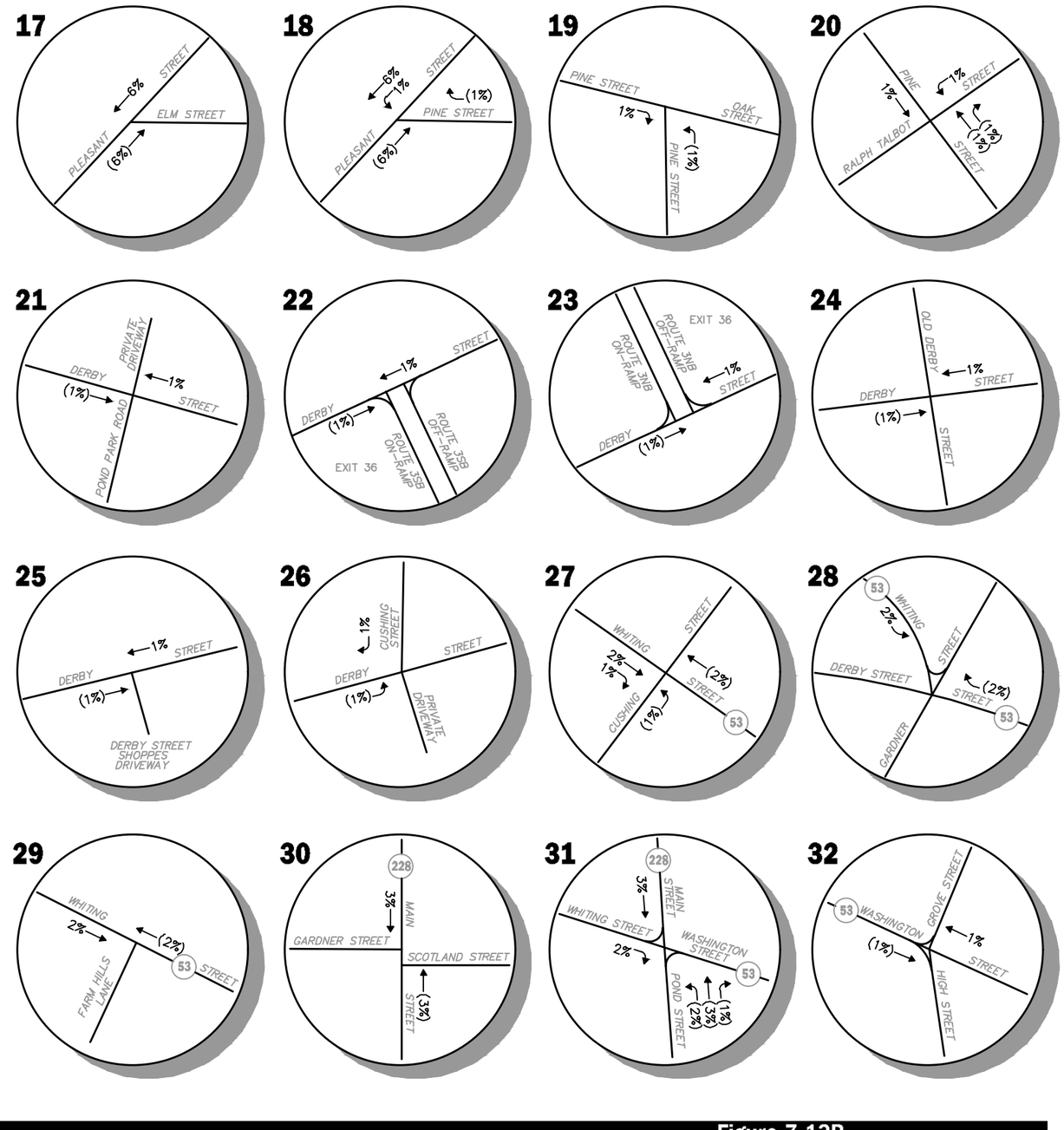
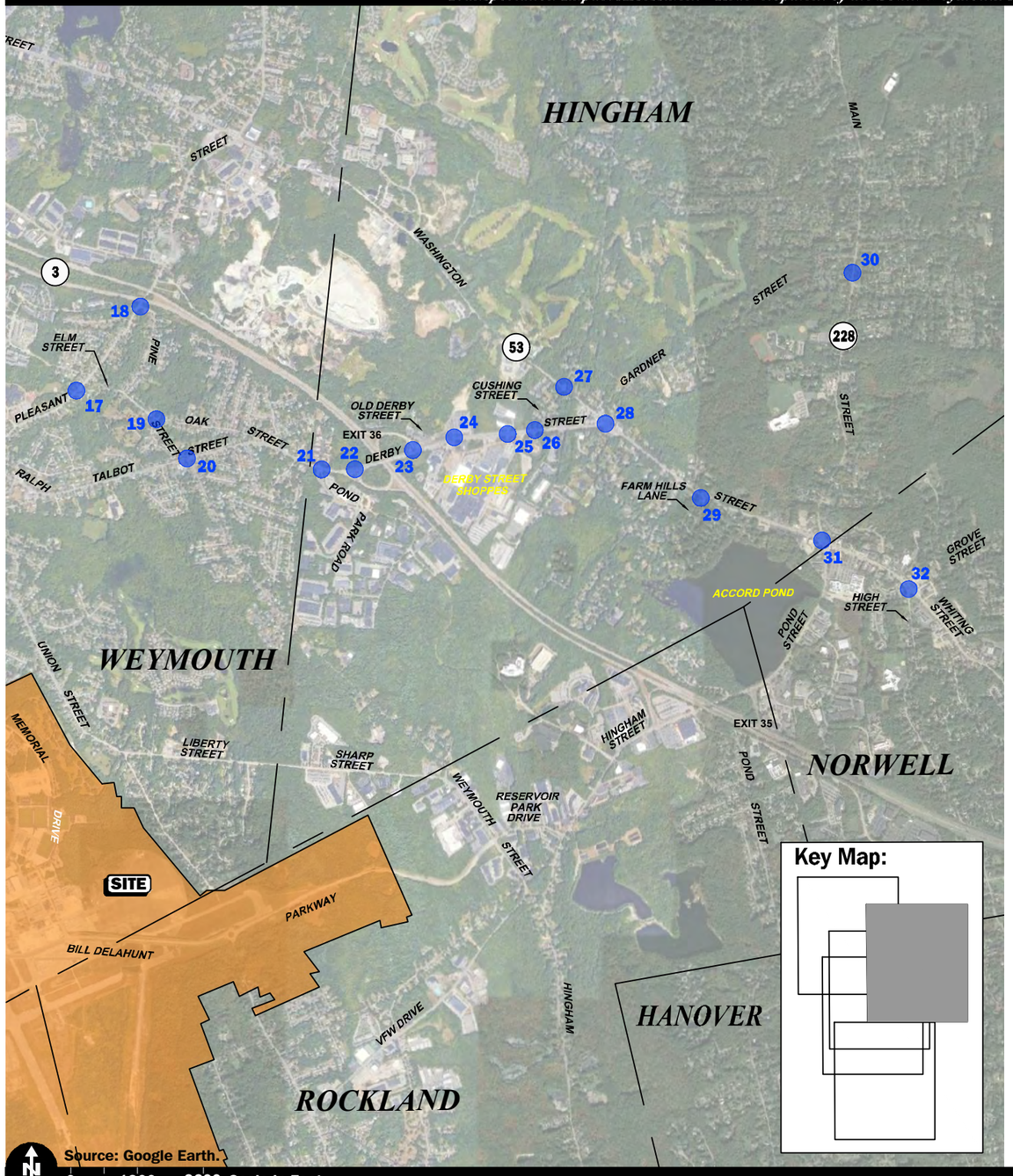


Figure 7-13B

Trip Distribution Map
Commercial Trips

Vanasse & Associates inc



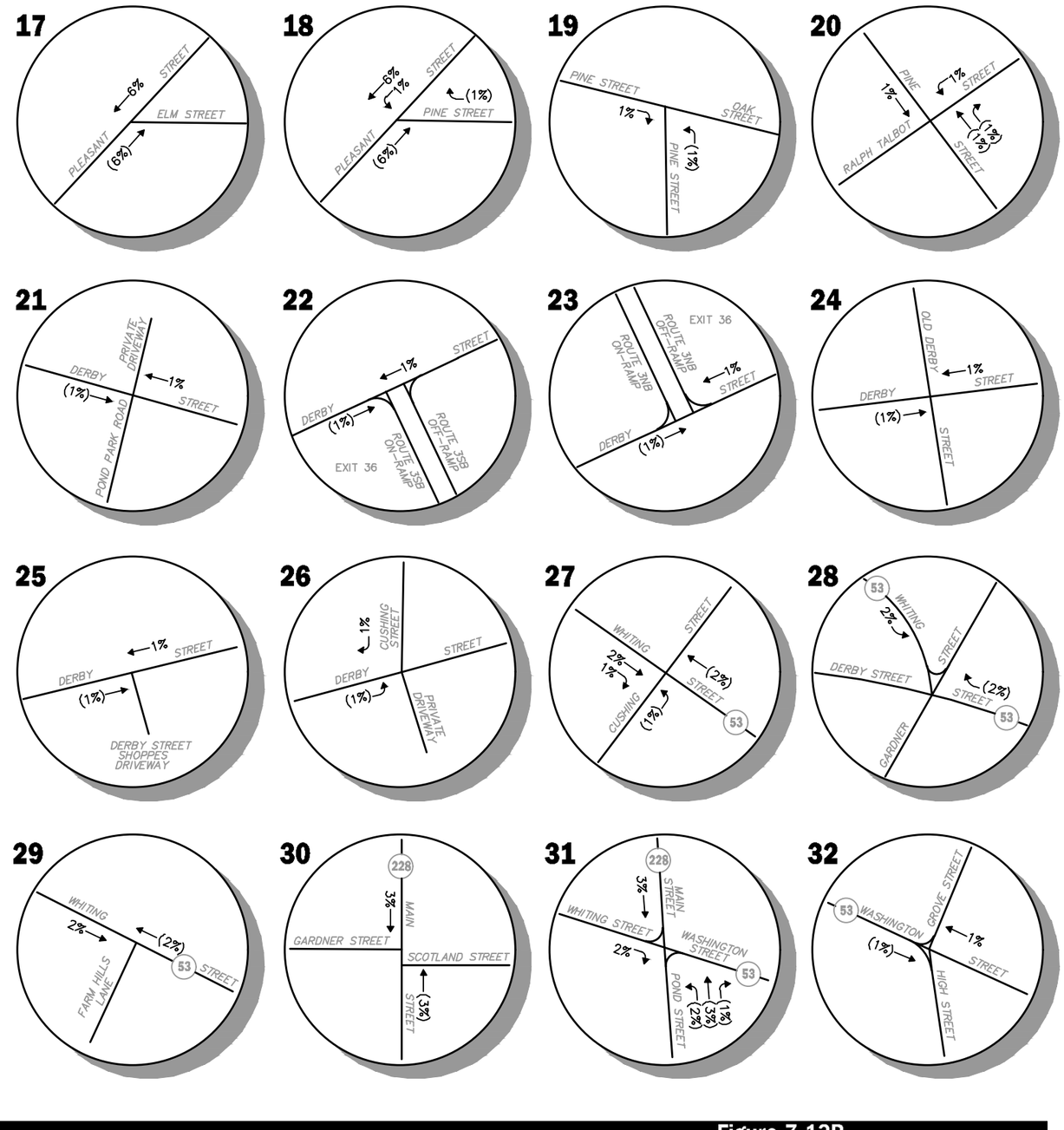
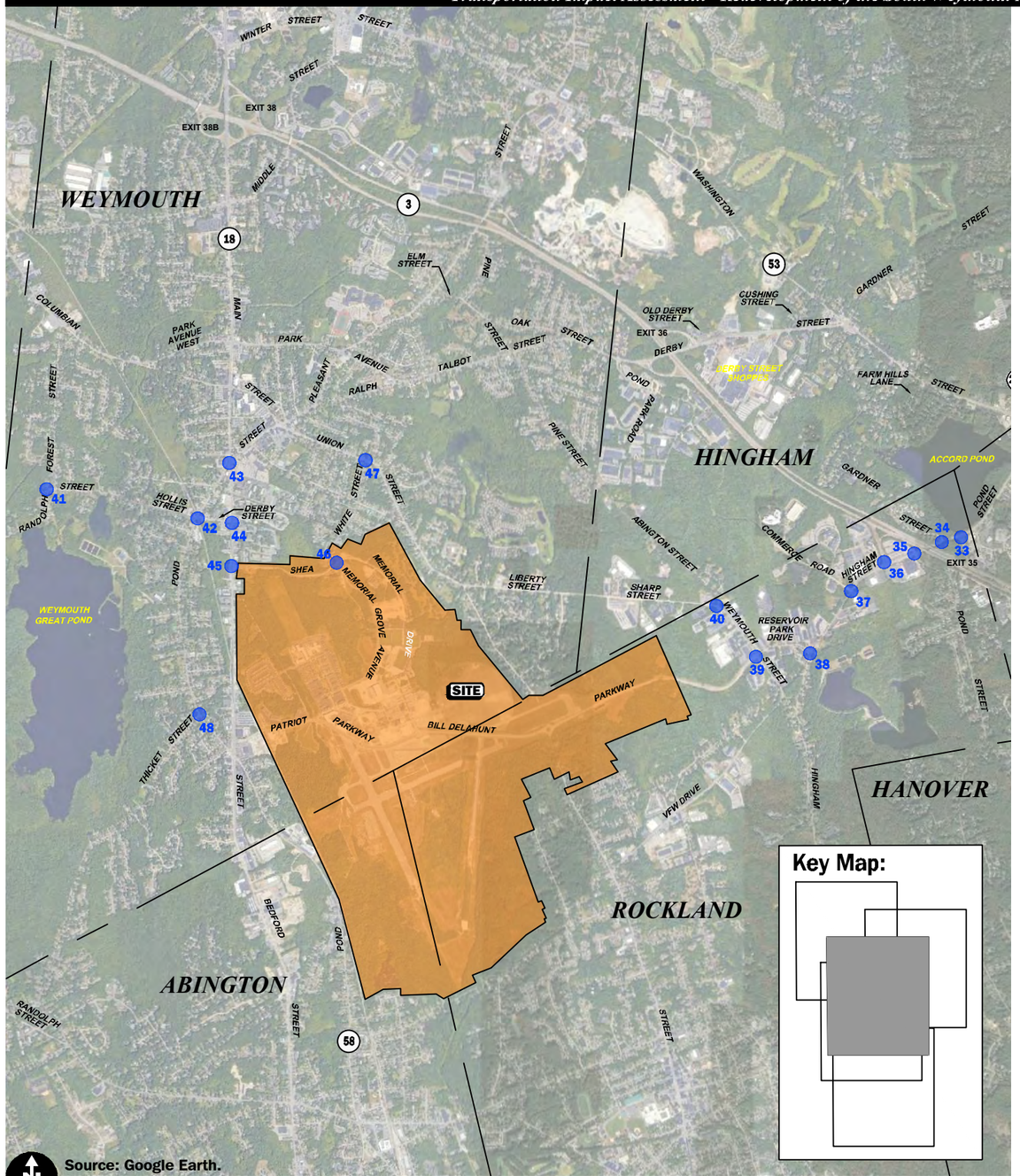
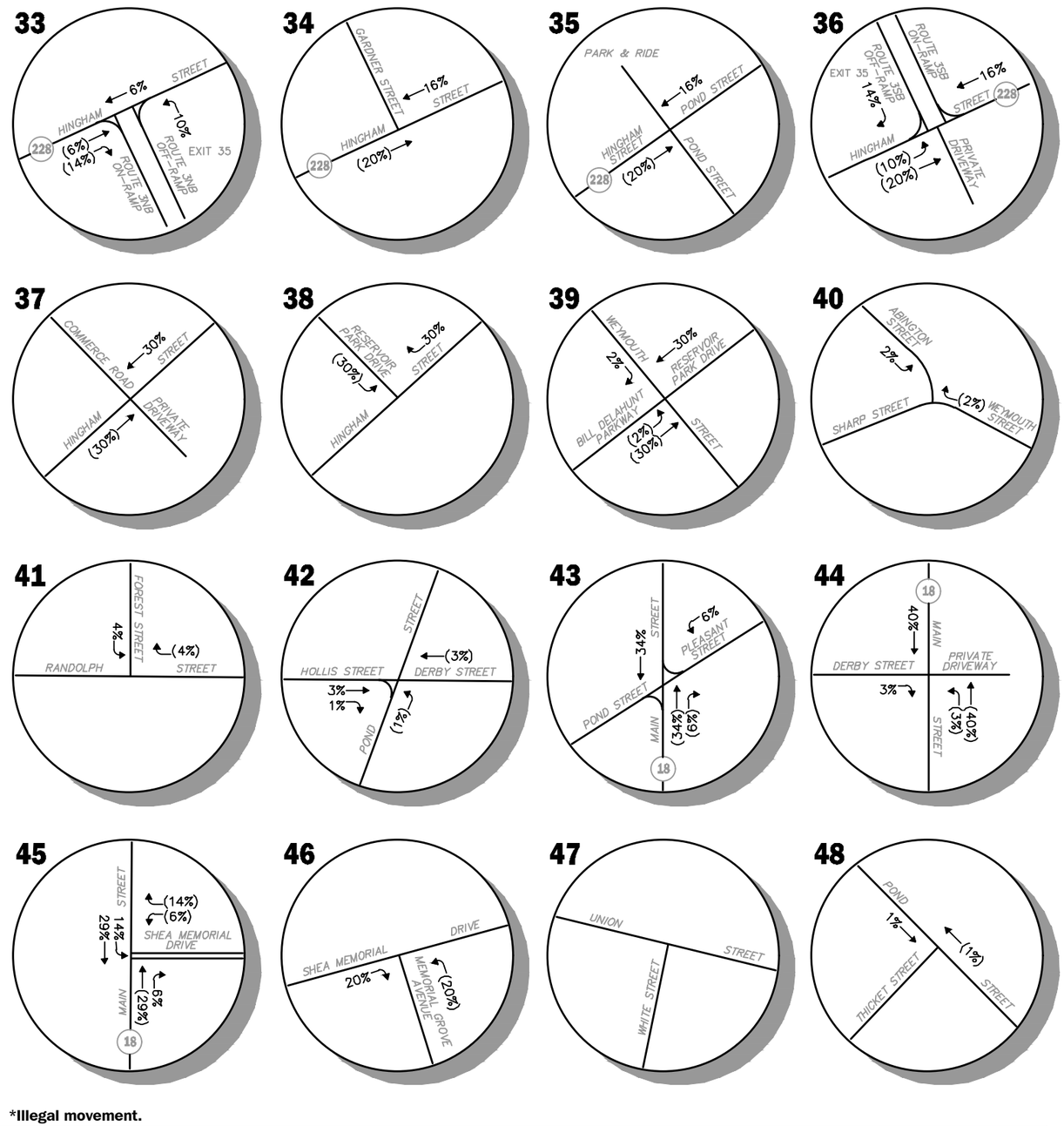


Figure 7-13B

Trip Distribution Map
Commercial Trips

Vanasse & Associates inc



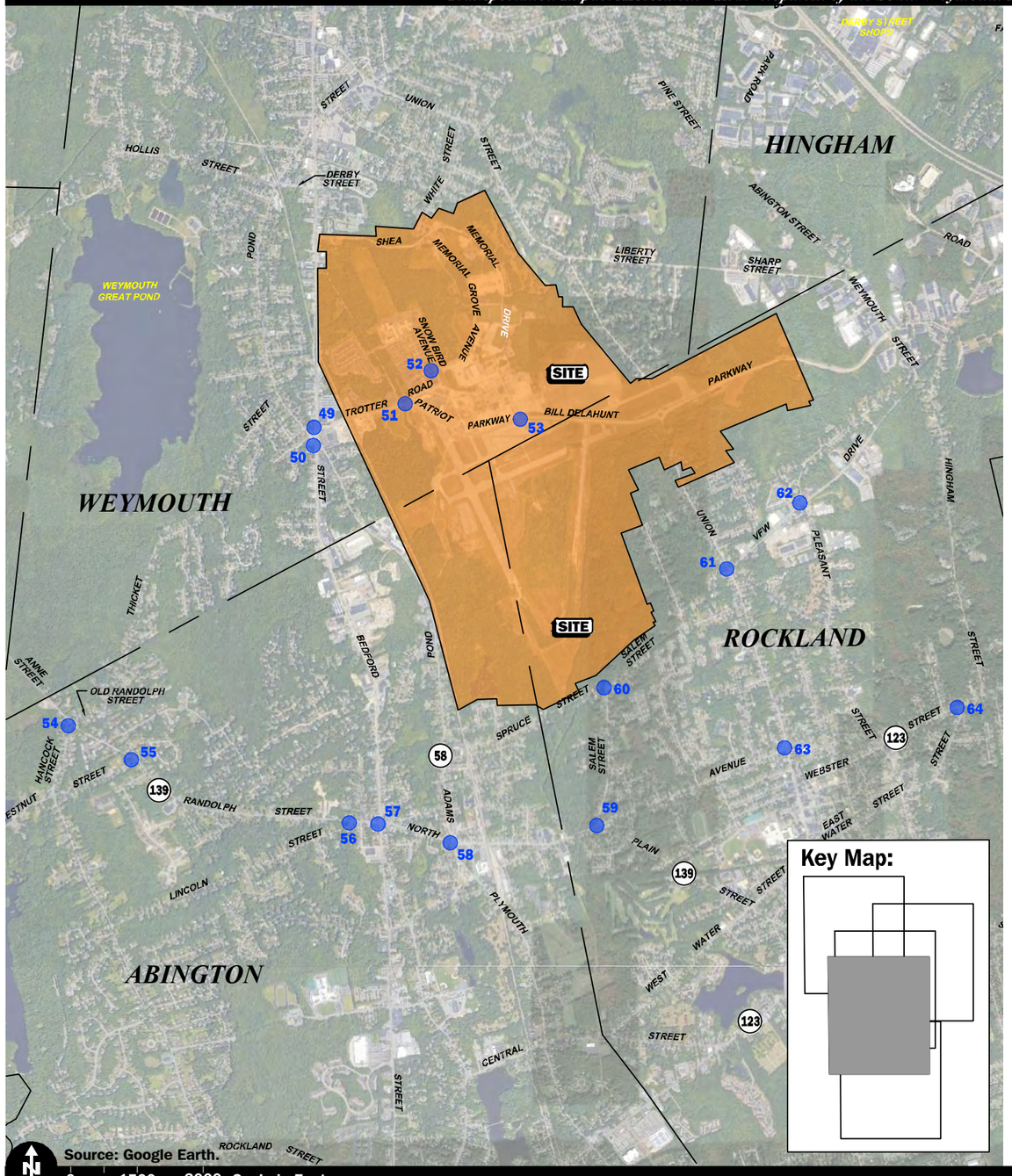


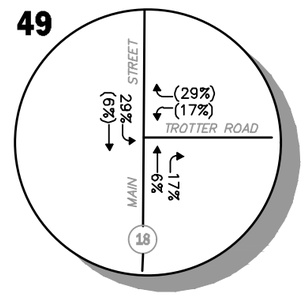
*Illegal movement.

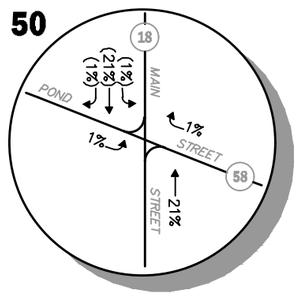
Figure 7-13C

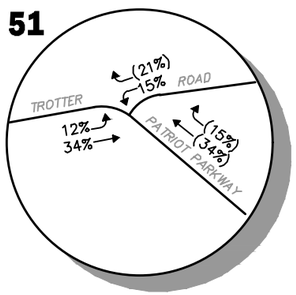
Trip Distribution Map
Commercial Trips

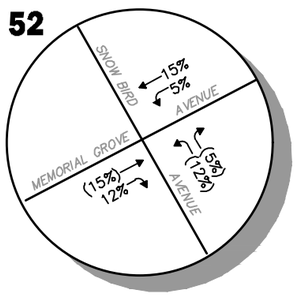
Vanasse & Associates inc

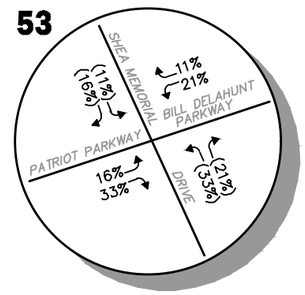


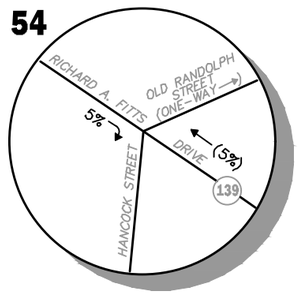


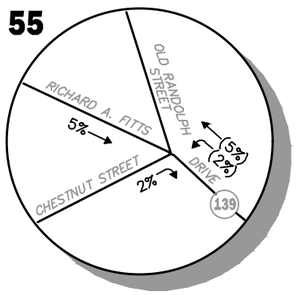


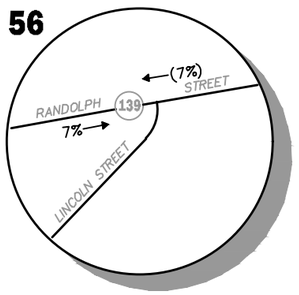


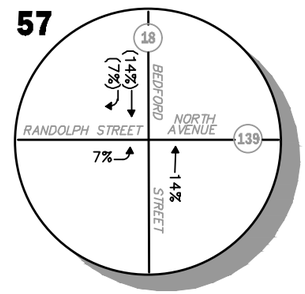


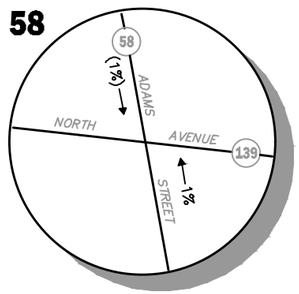


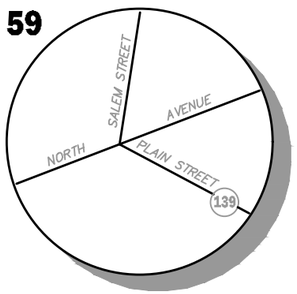


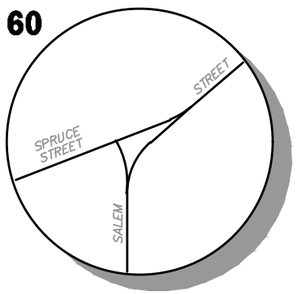


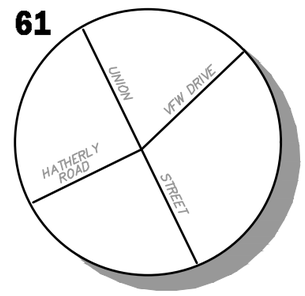


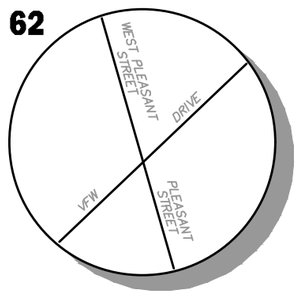


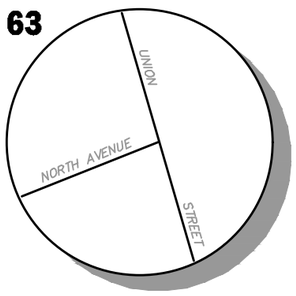


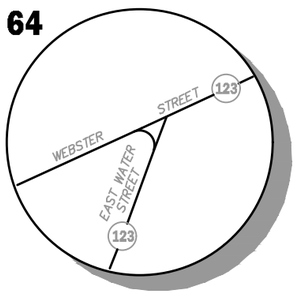










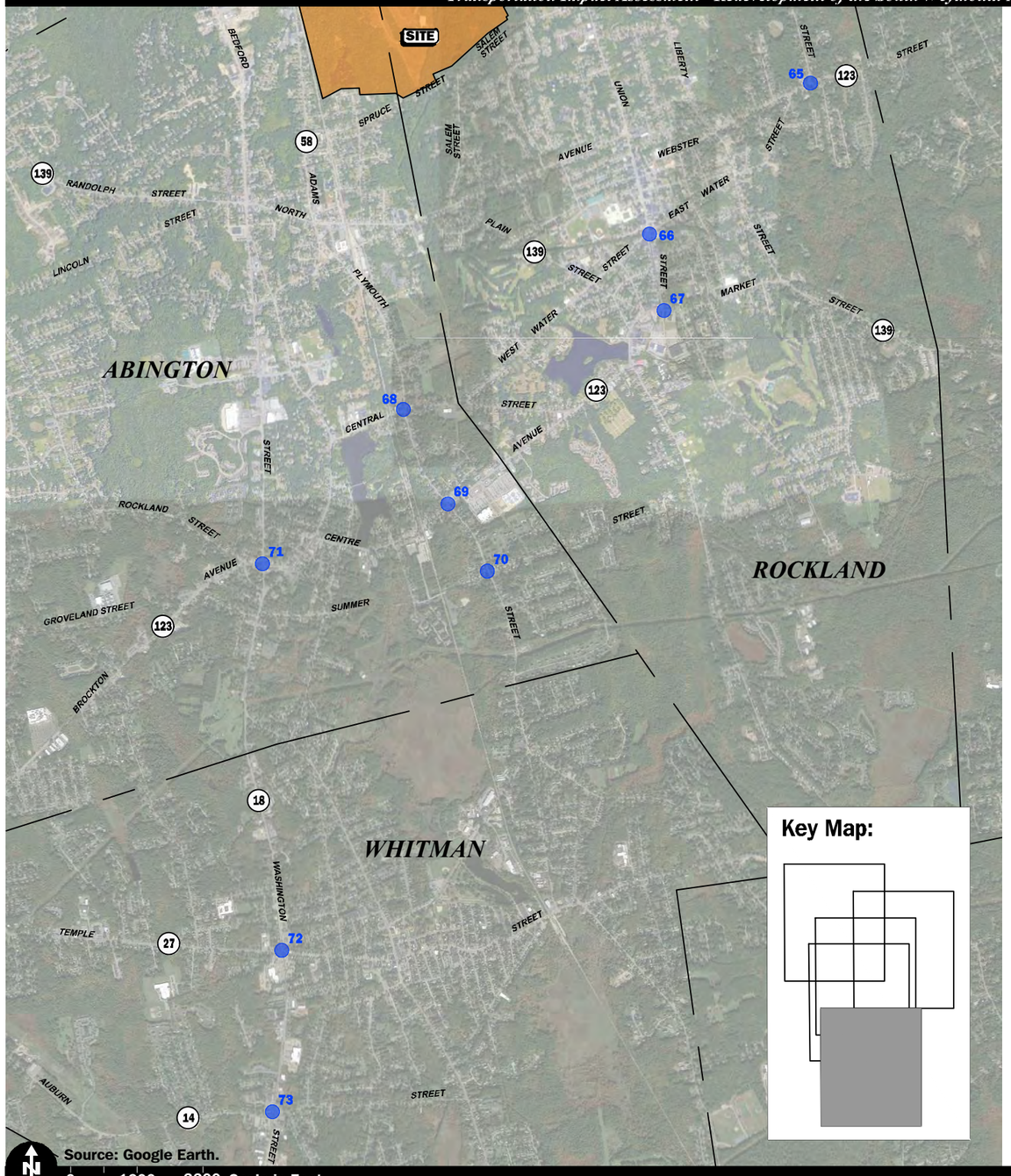


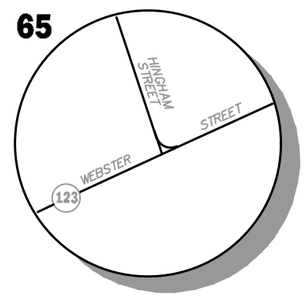
*Illegal movement.

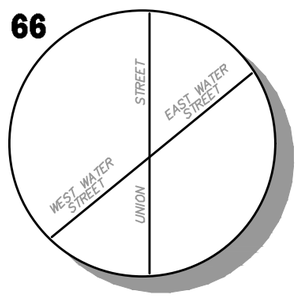
Figure 7-13D

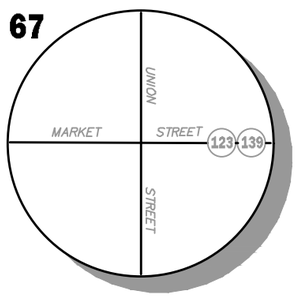
Trip Distribution Map
Commercial Trips

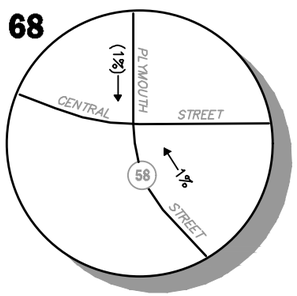
Vanasse & Associates inc

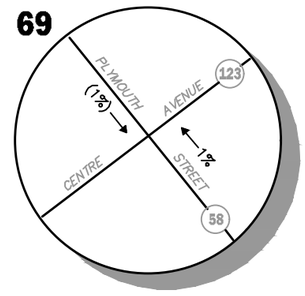


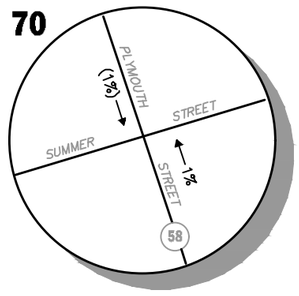


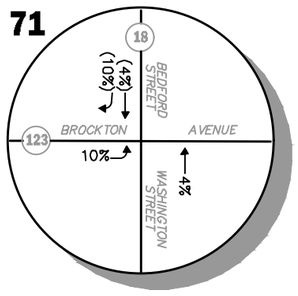


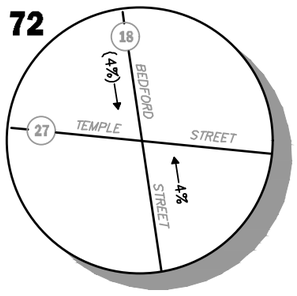












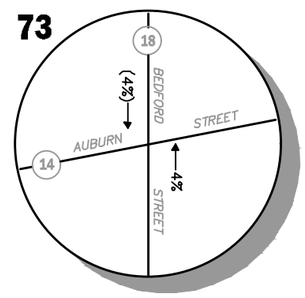
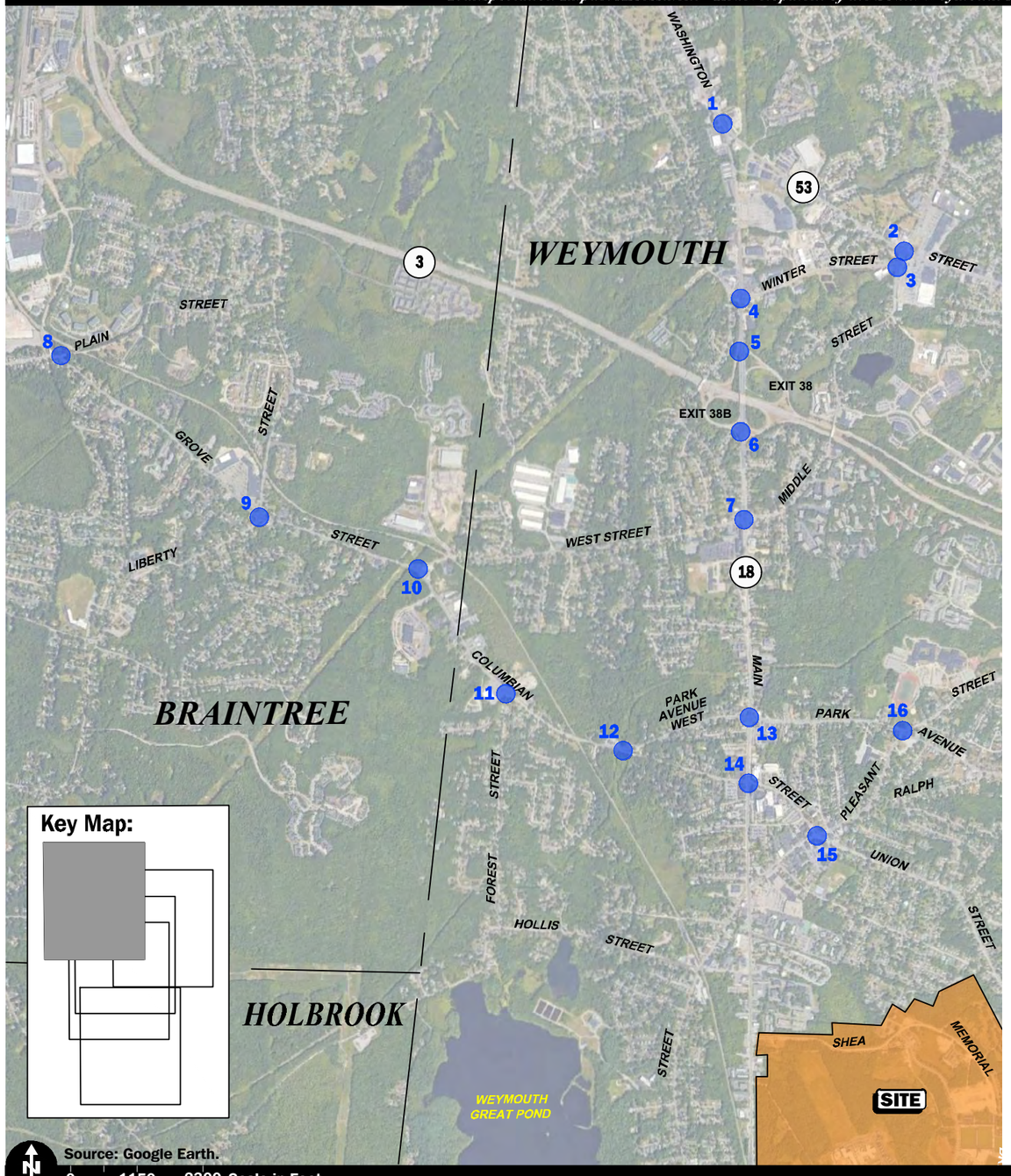


Figure 7-13E

Trip Distribution Map
Commercial Trips

Vanasse & Associates inc



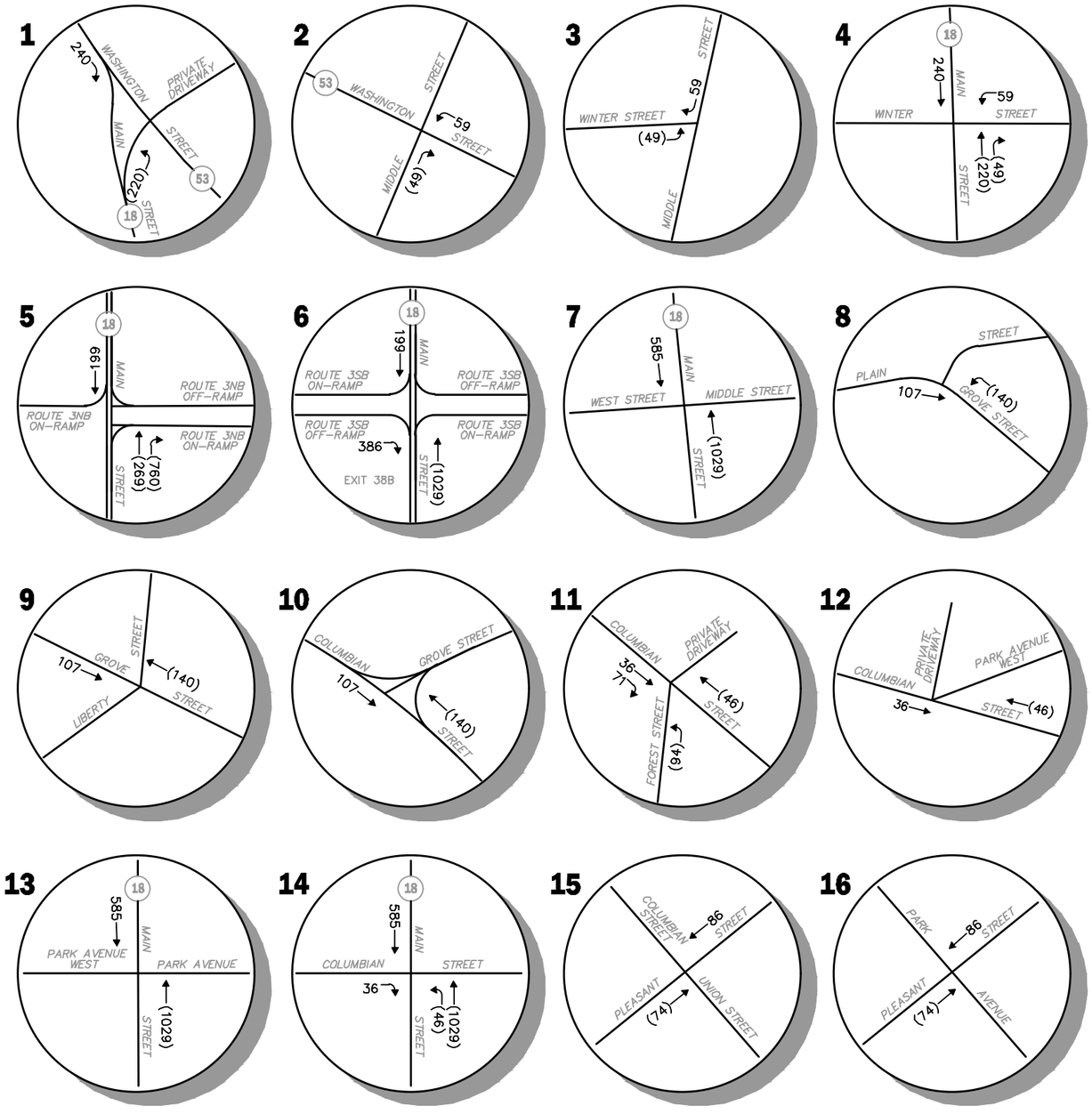
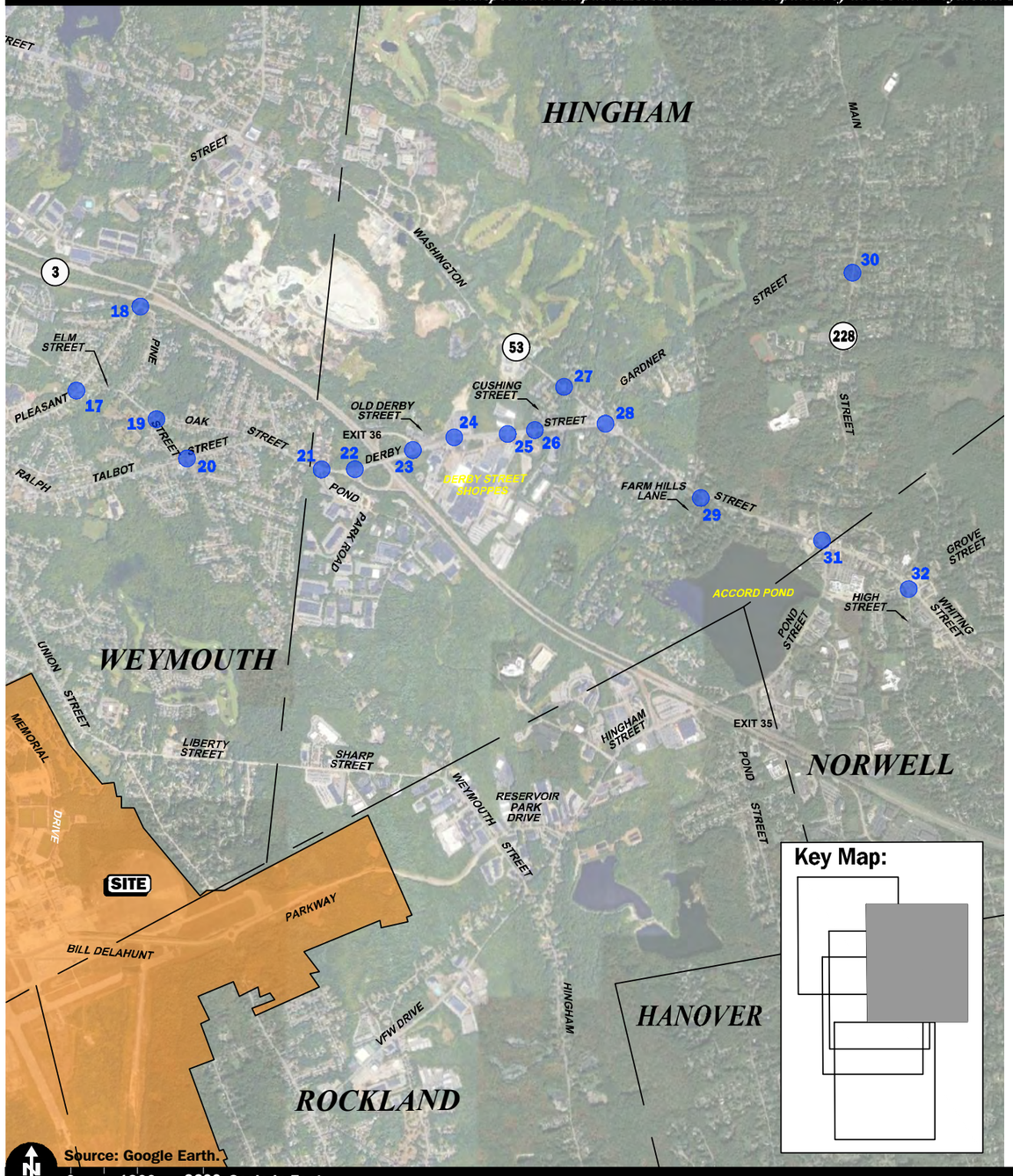
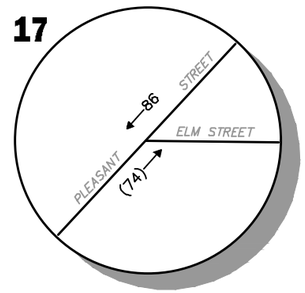


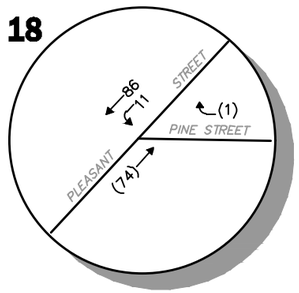
Figure 7-14A

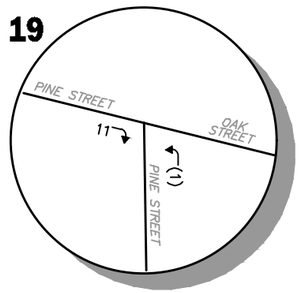
Project-Generated Weekday Morning Peak-Hour Traffic Volumes

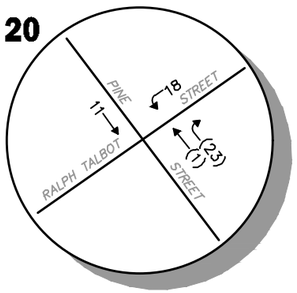
Vanasse & Associates inc

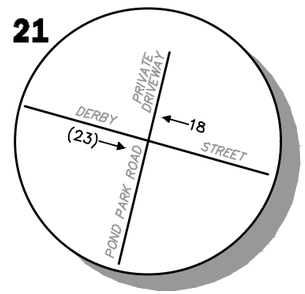


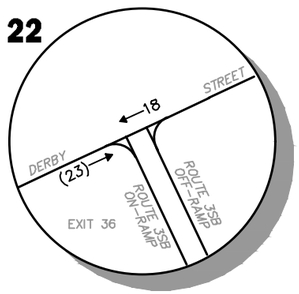


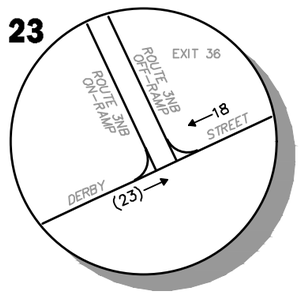


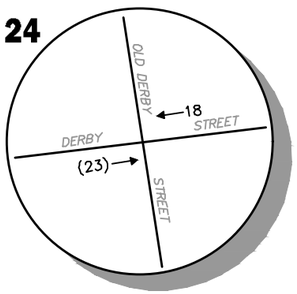


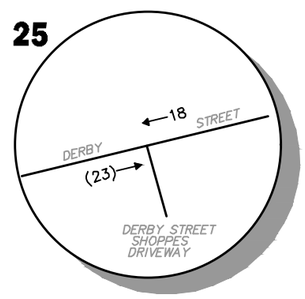


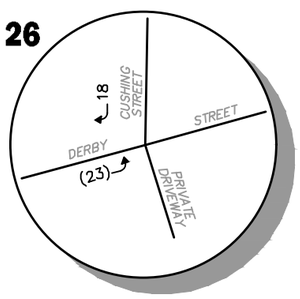


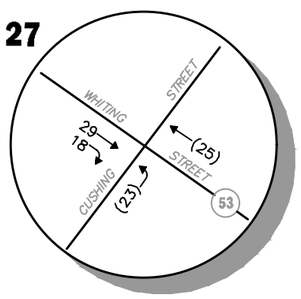


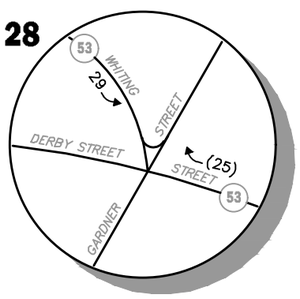


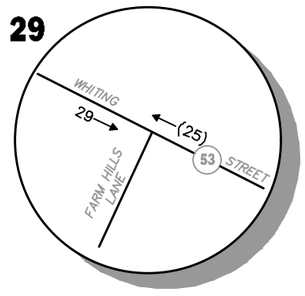


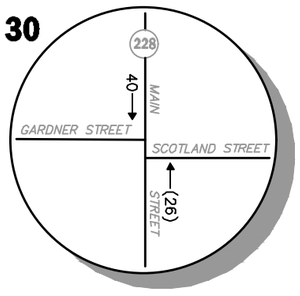


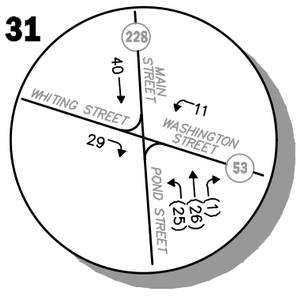












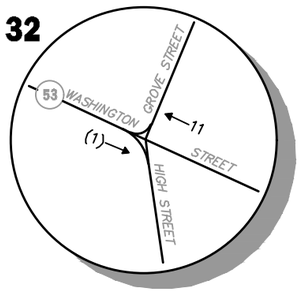
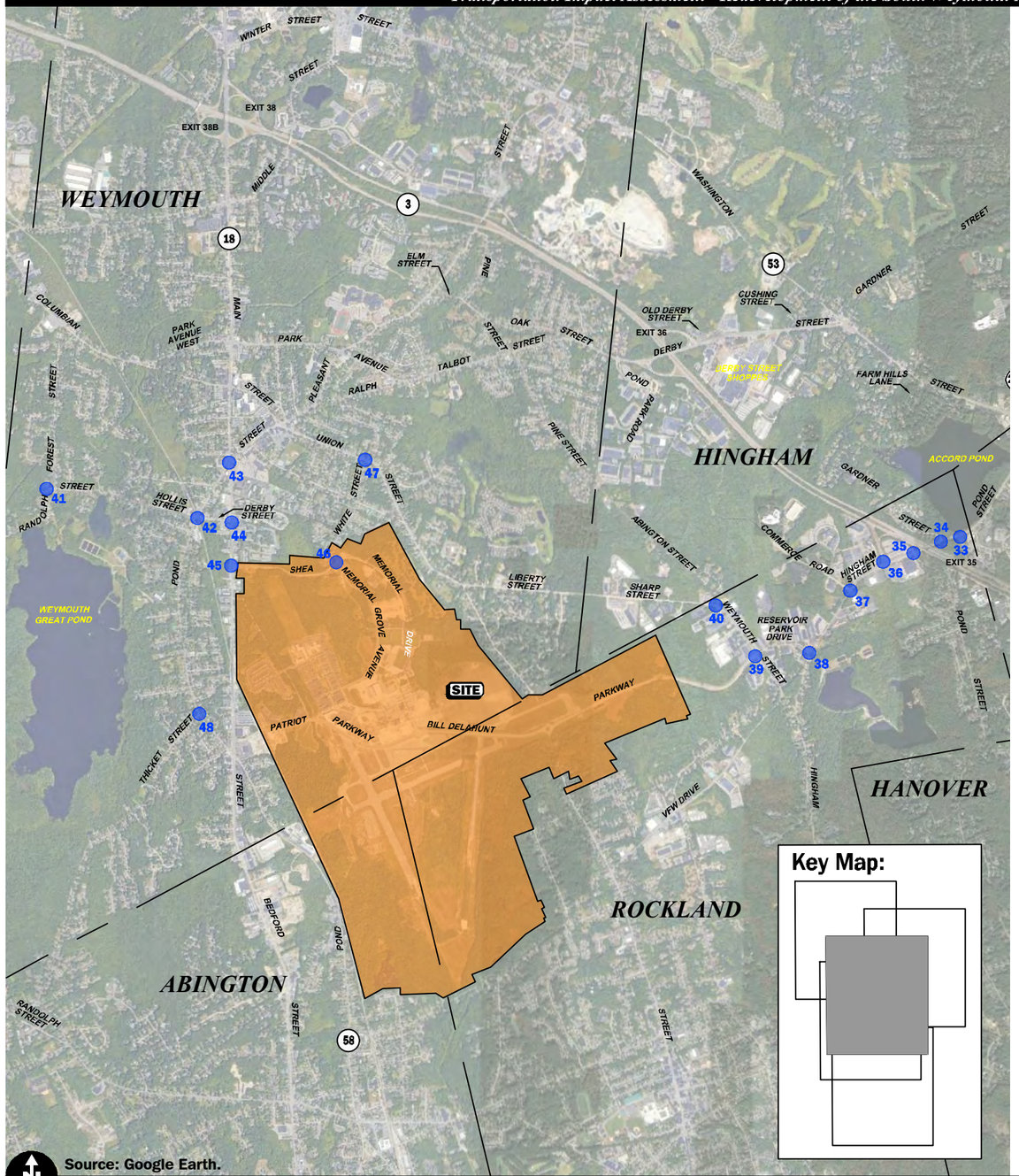
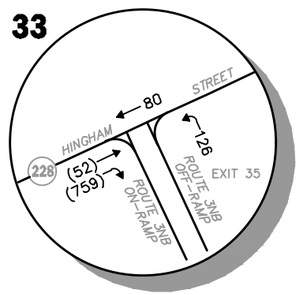


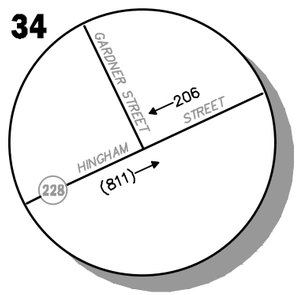
Figure 7-14B

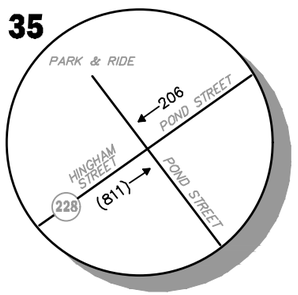
Project-Generated
Weekday Morning
Peak-Hour Traffic Volumes

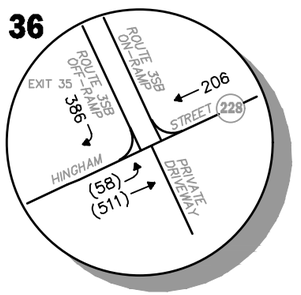
Vanasse & Associates inc

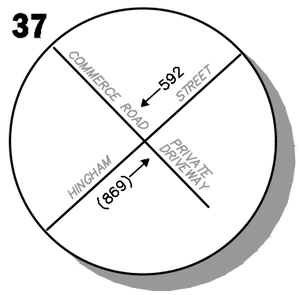


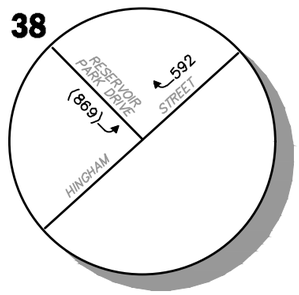


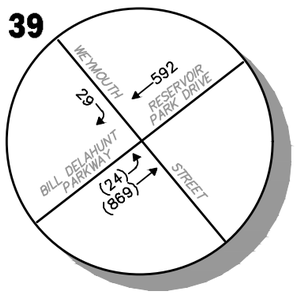


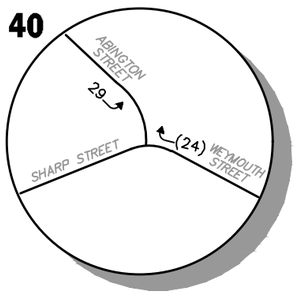


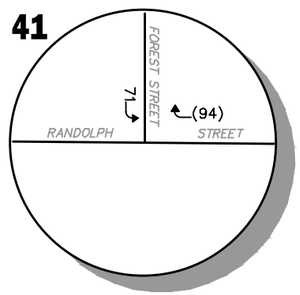


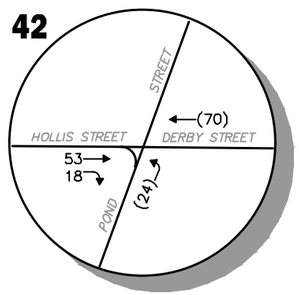


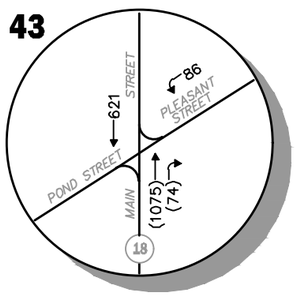


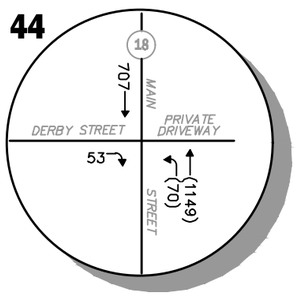


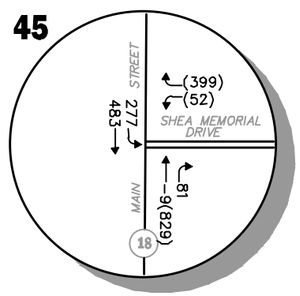


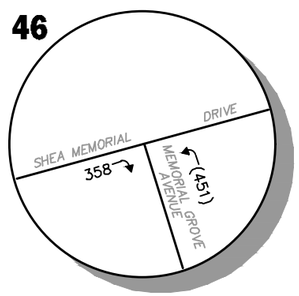


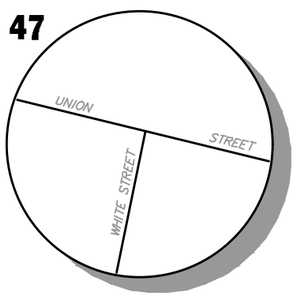












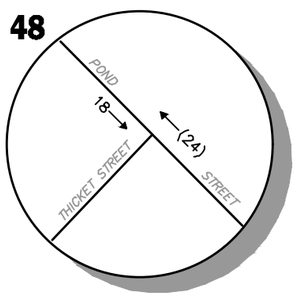
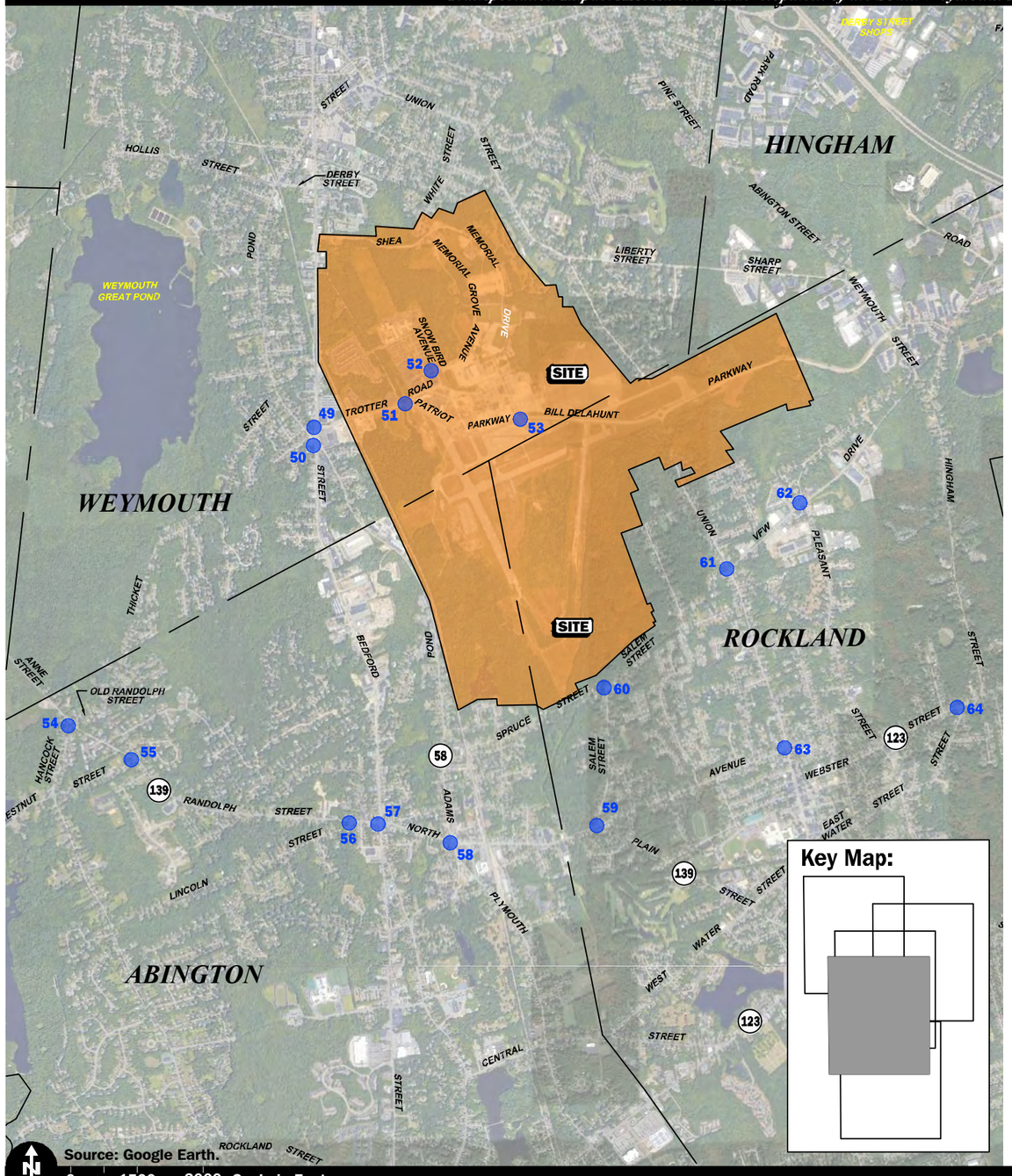


Figure 7-14C

Project-Generated Weekday Morning Peak-Hour Traffic Volumes

Vanasse & Associates inc



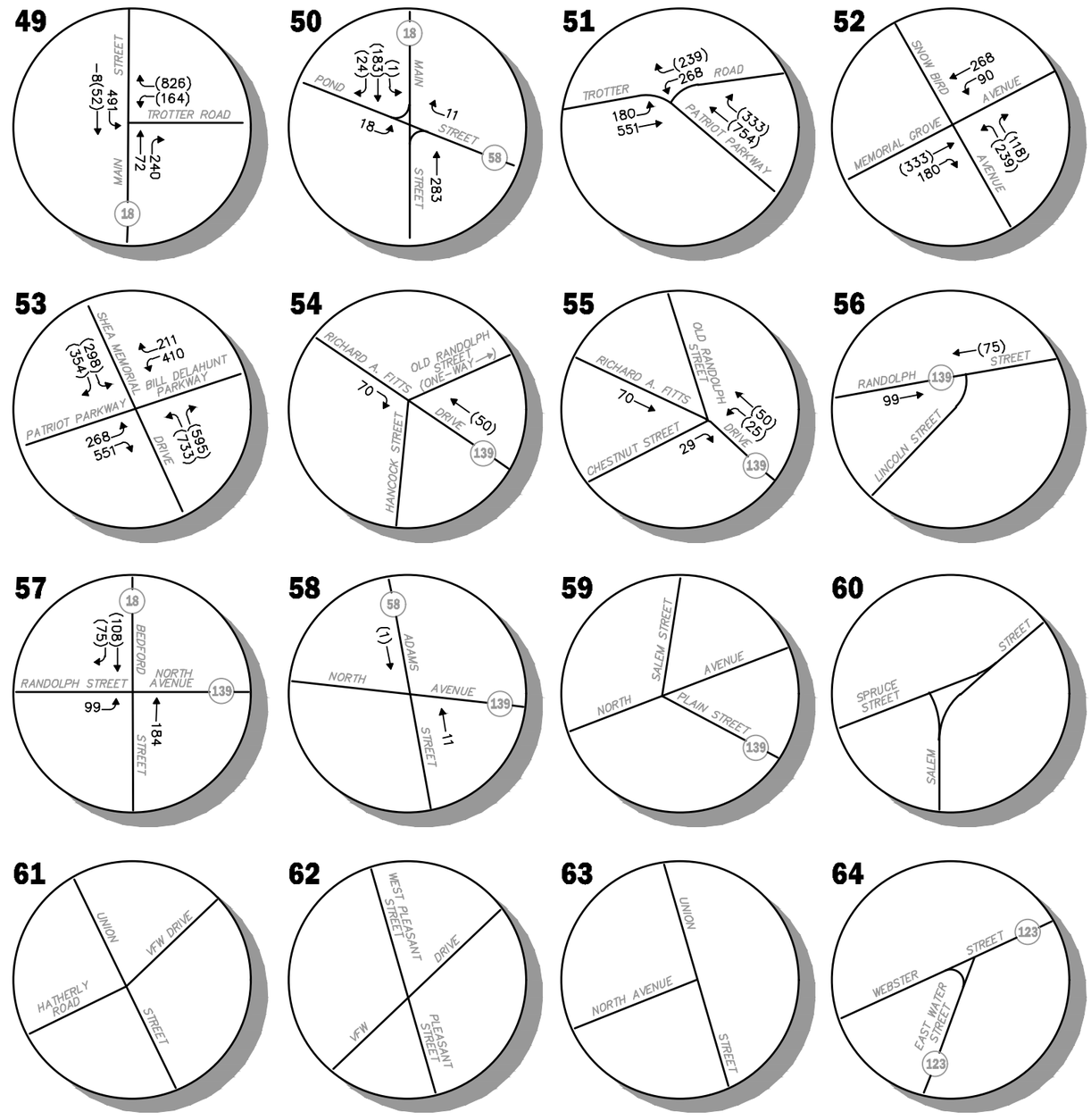
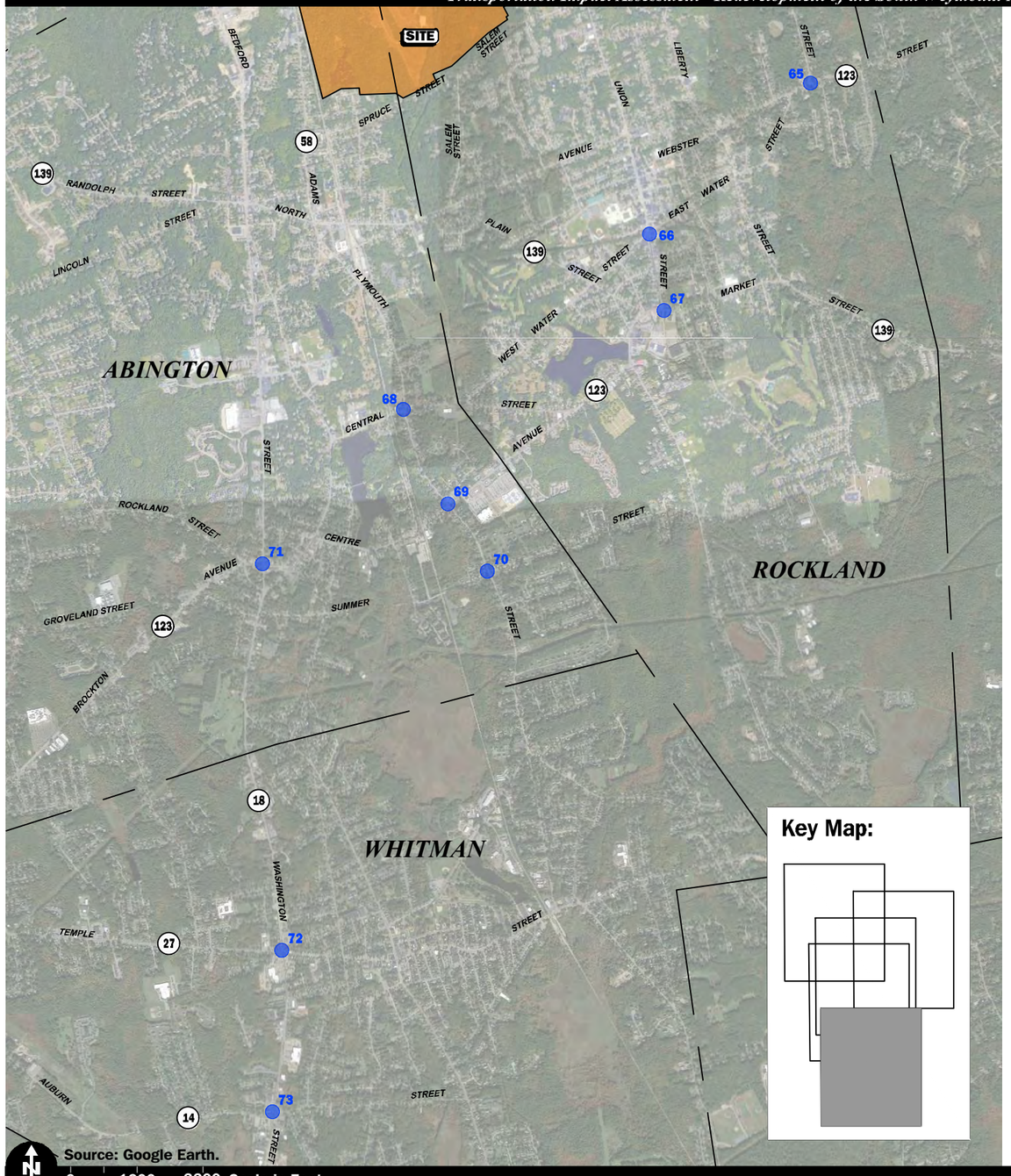
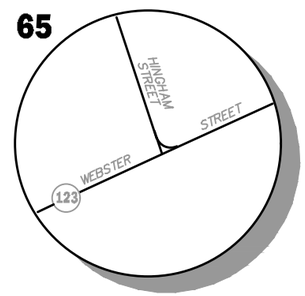


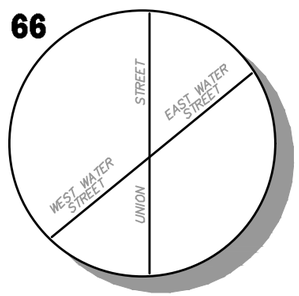
Figure 7-14D

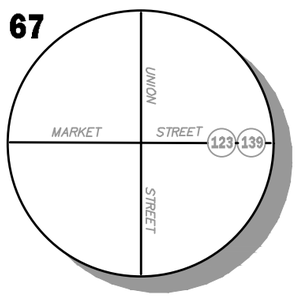
Project-Generated
Weekday Morning
Peak-Hour Traffic Volumes

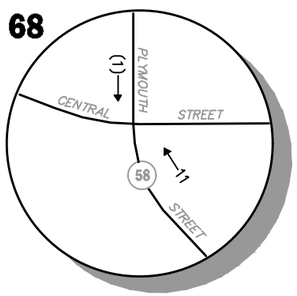
Vanasse & Associates inc

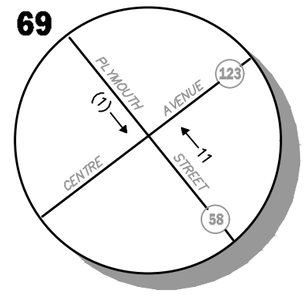


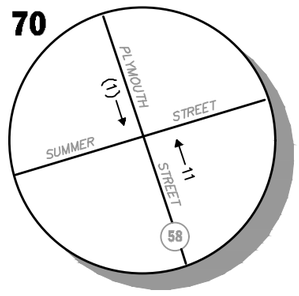


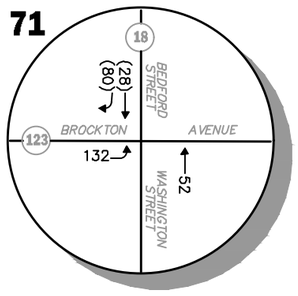


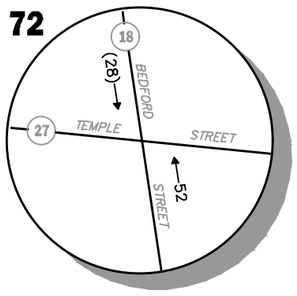


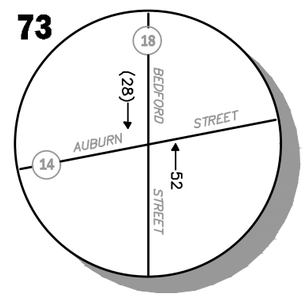










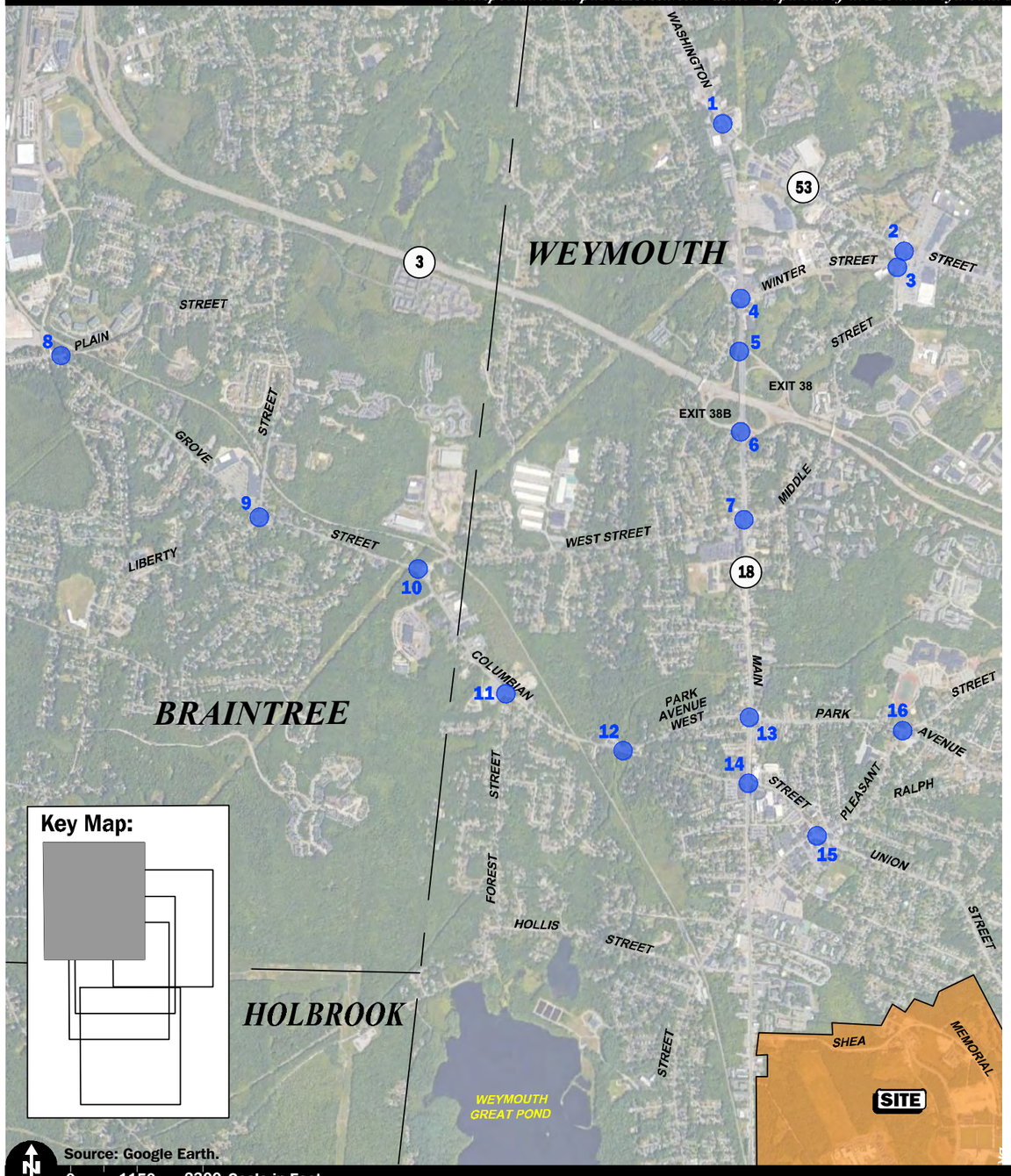


0 1600 3200 Scale in Feet

Figure 7-14E

Project-Generated Weekday Morning Peak-Hour Traffic Volumes

Vanasse & Associates inc



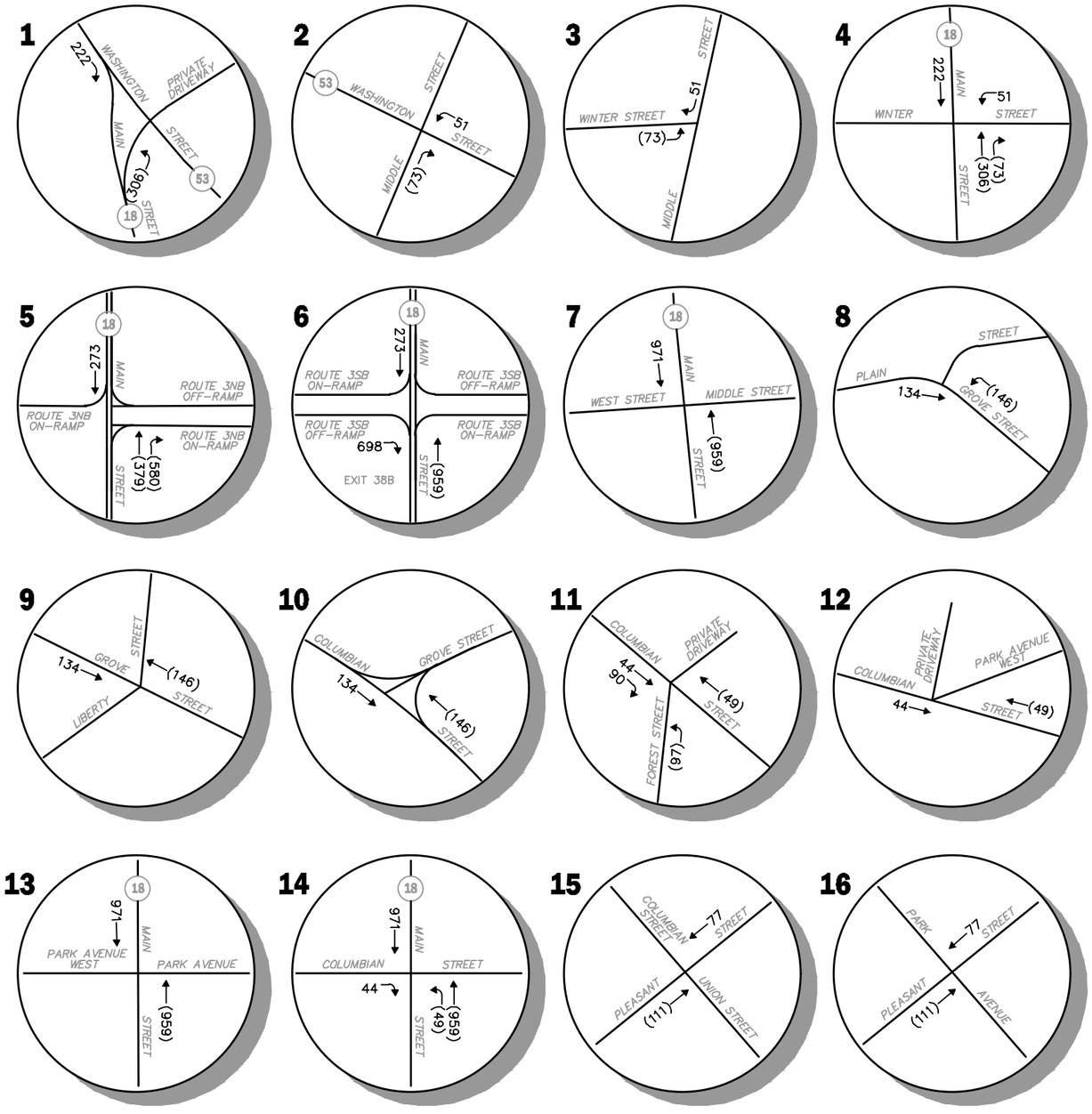
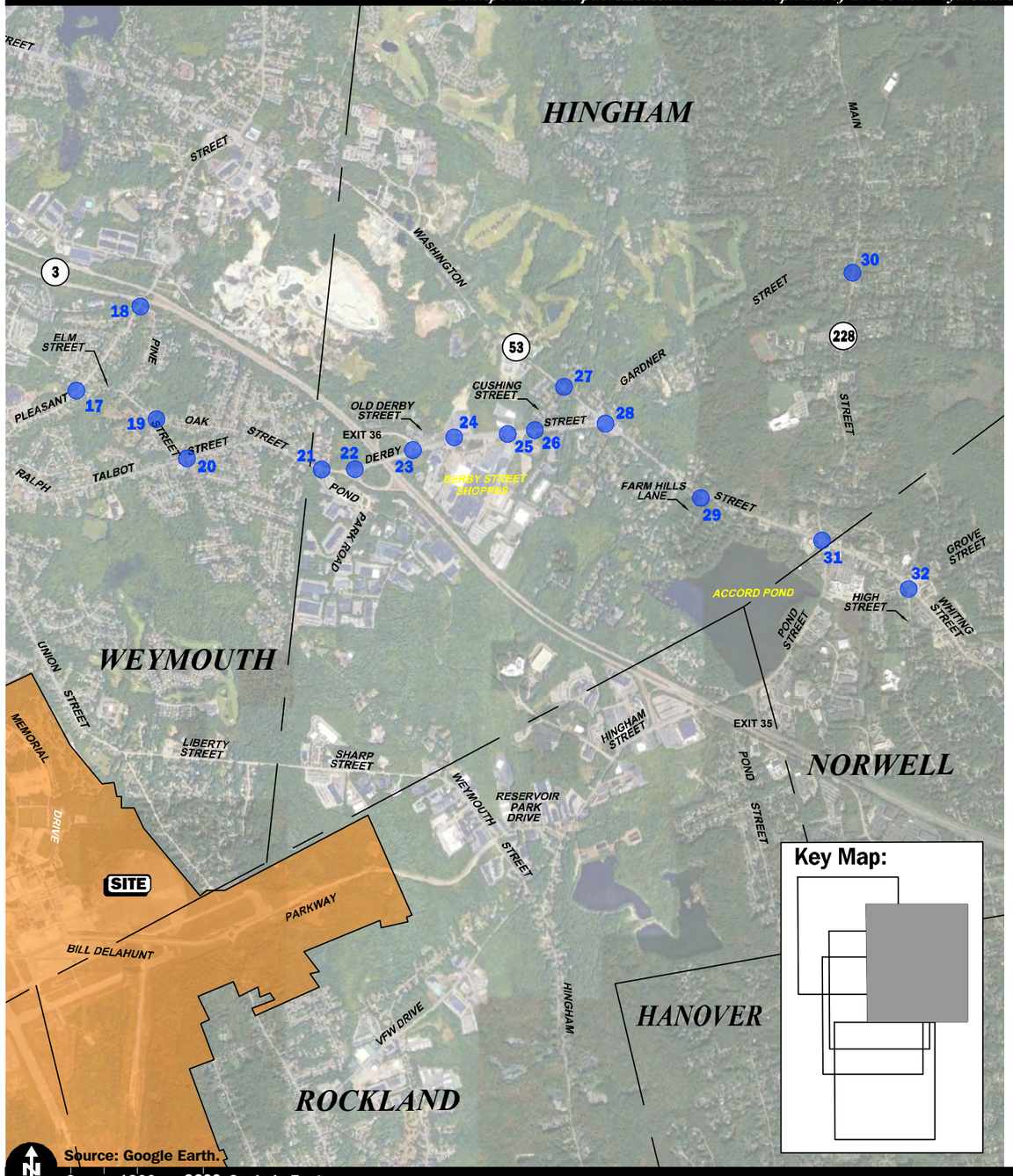
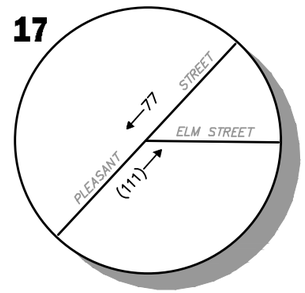


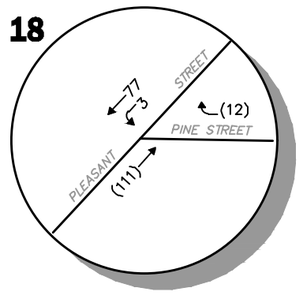
Figure 7-15A

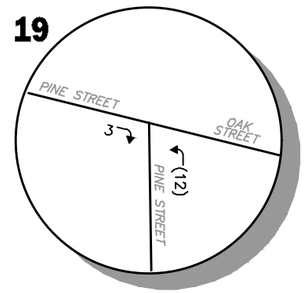
Project-Generated Weekday Evening Peak-Hour Traffic Volumes

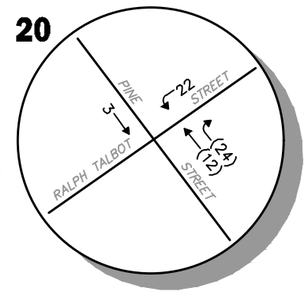
Vanasse & Associates inc

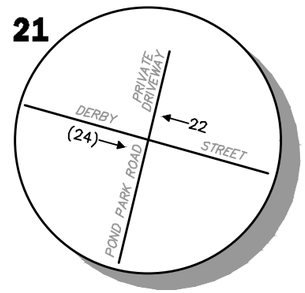


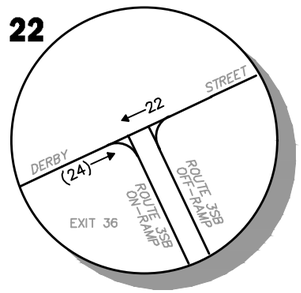


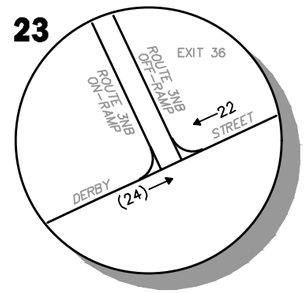


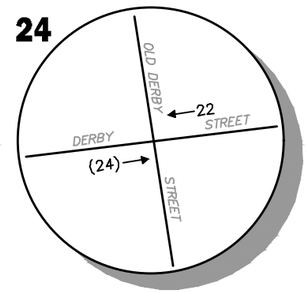


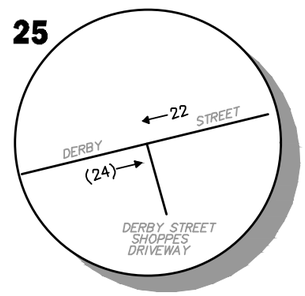


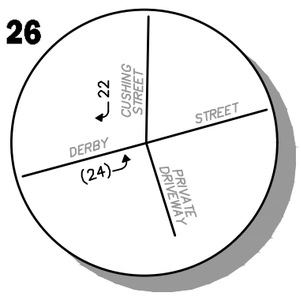


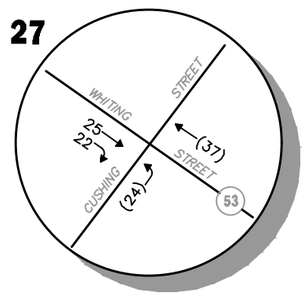


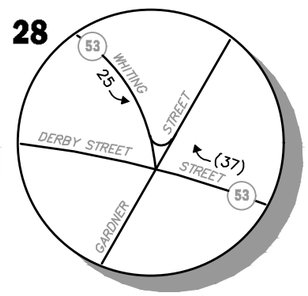


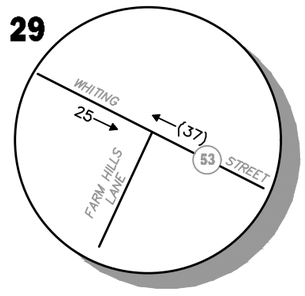


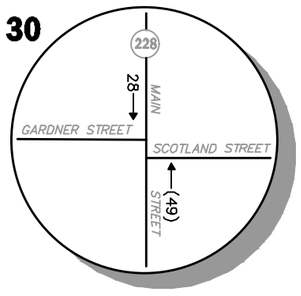


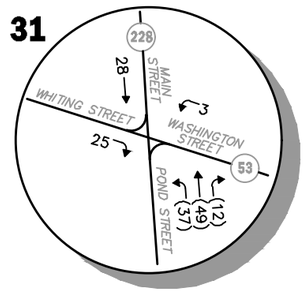












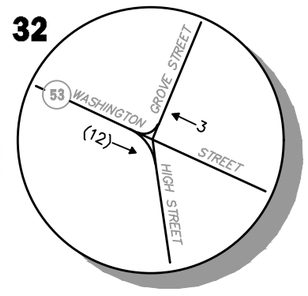
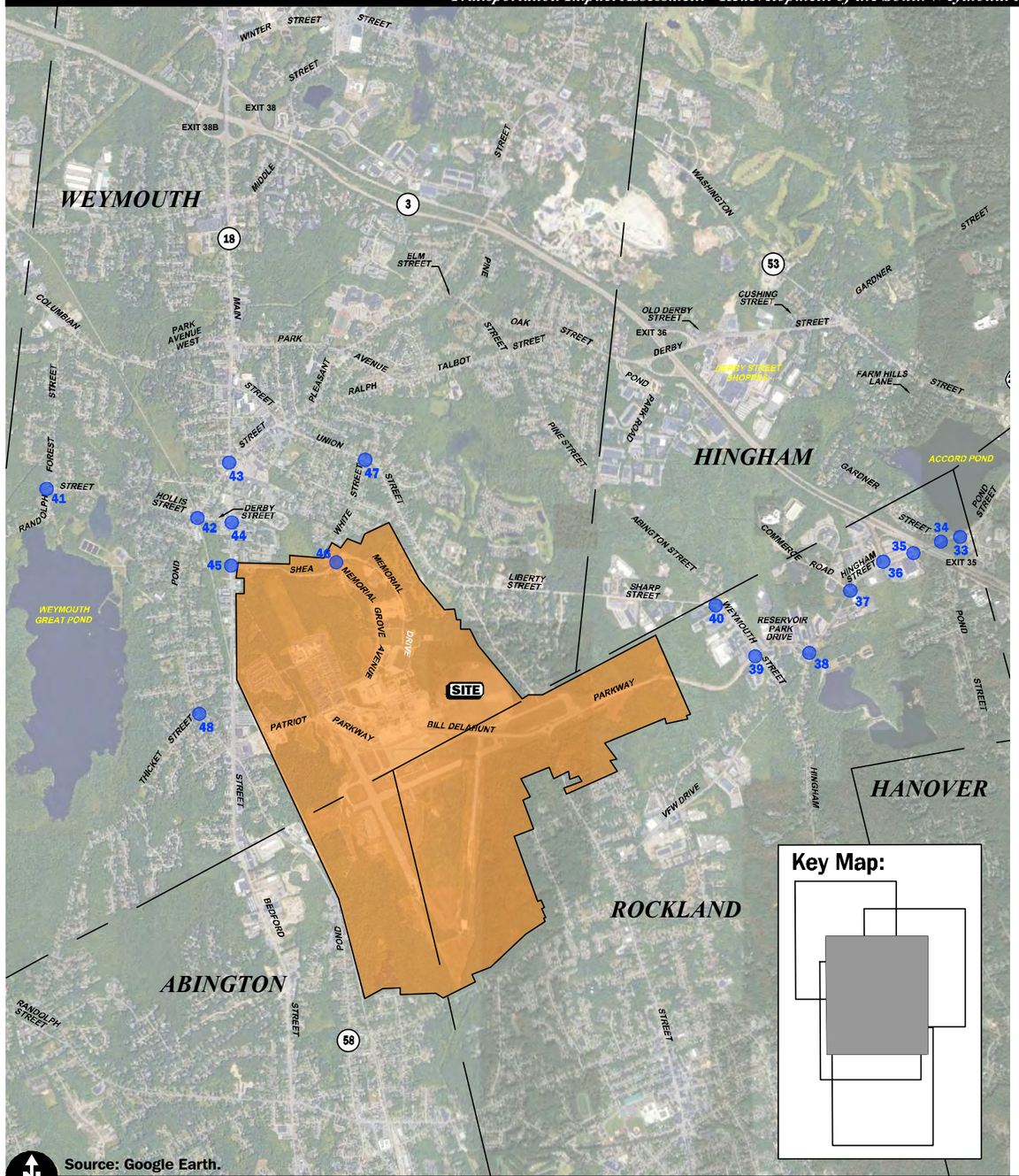


Figure 7-15B

Project-Generated
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc



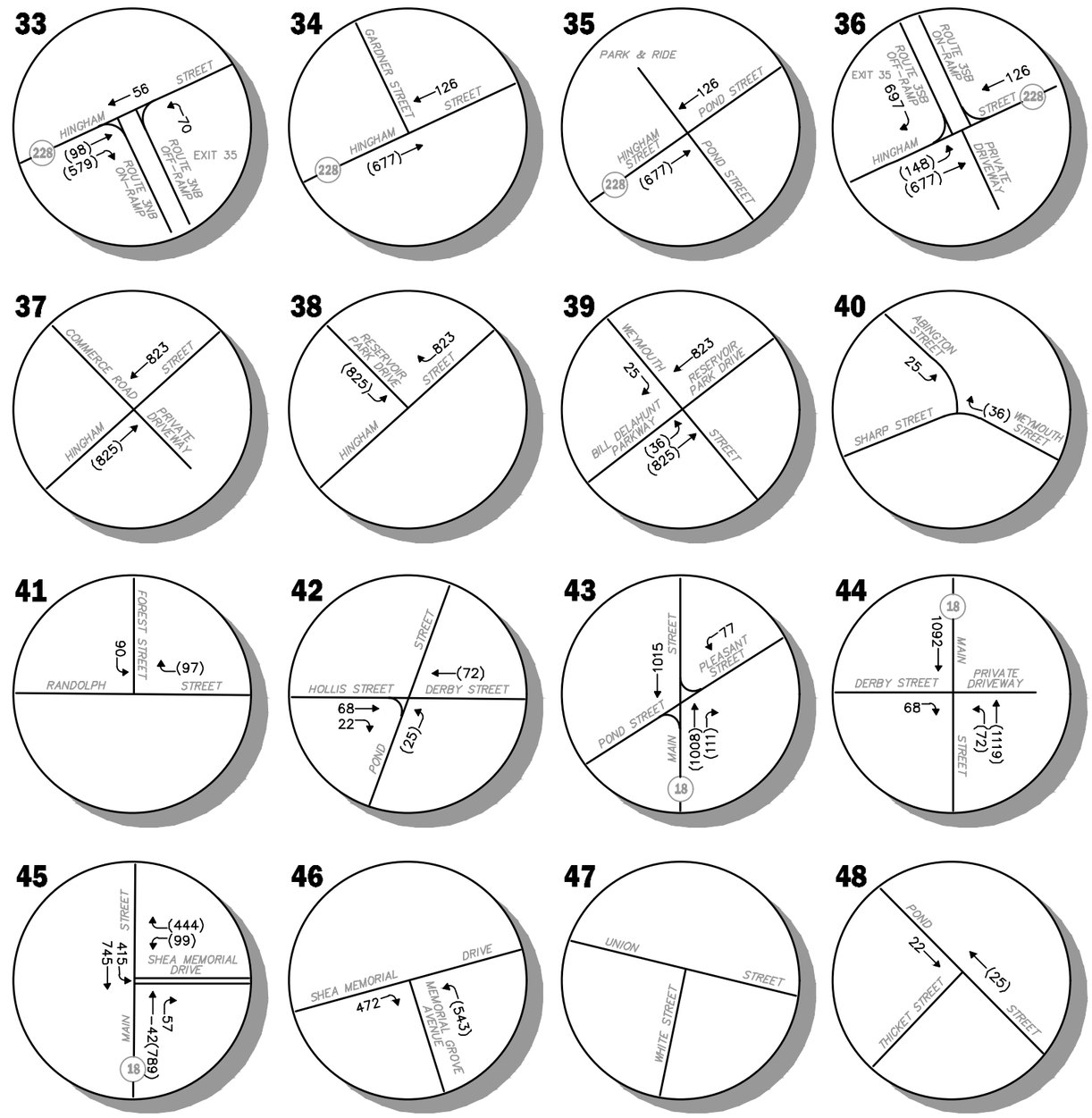
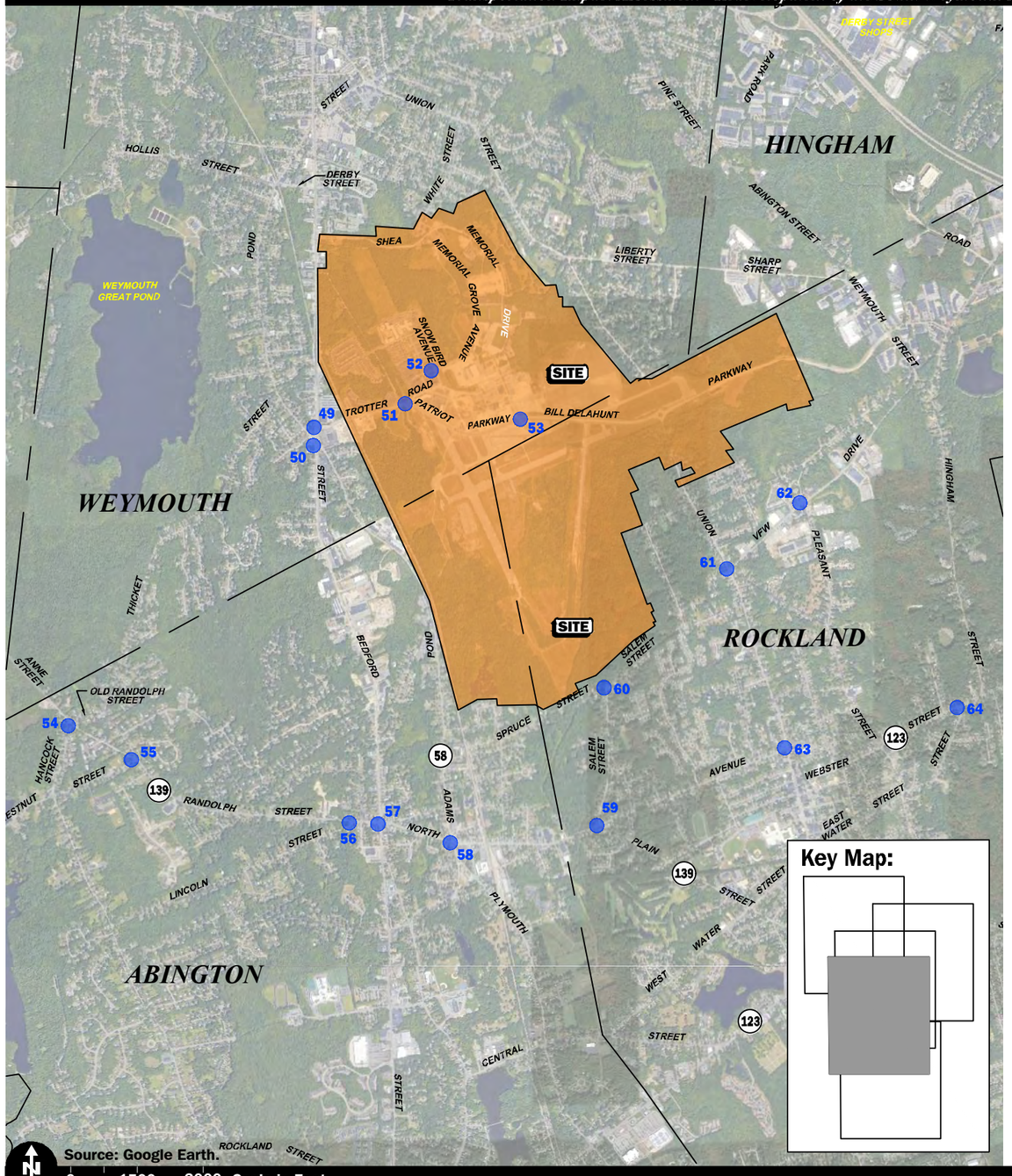
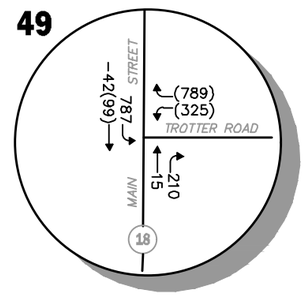


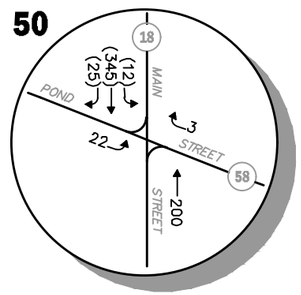
Figure 7-15C

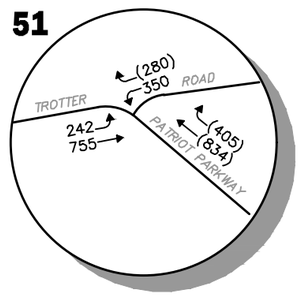
Project-Generated Weekday Evening Peak-Hour Traffic Volumes

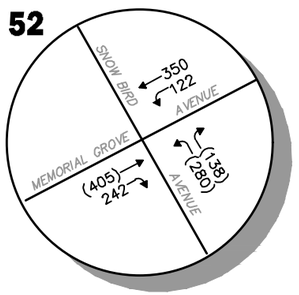
Vanasse & Associates inc

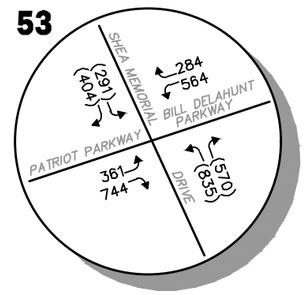


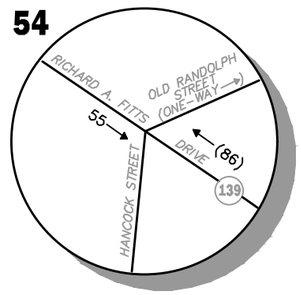


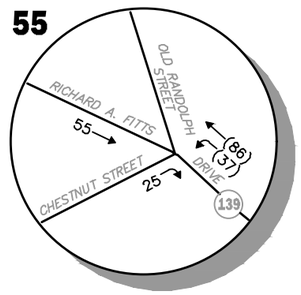


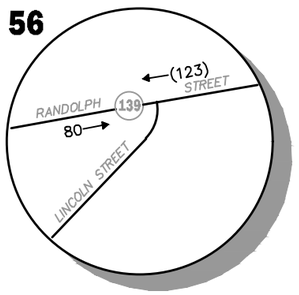


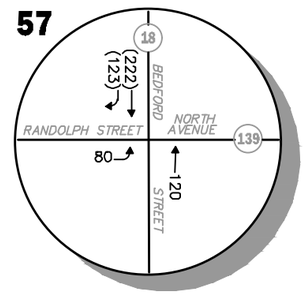


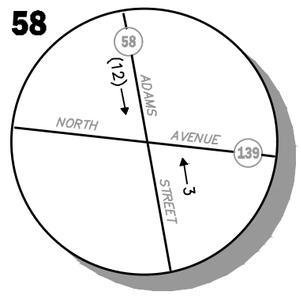


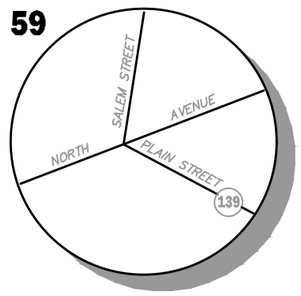


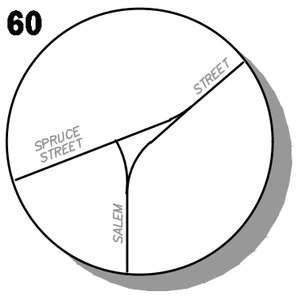


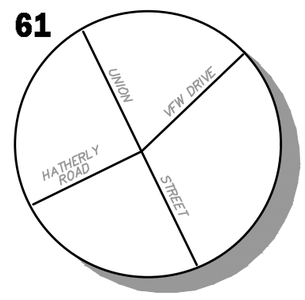


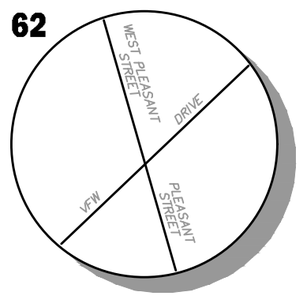


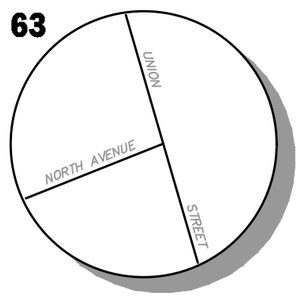












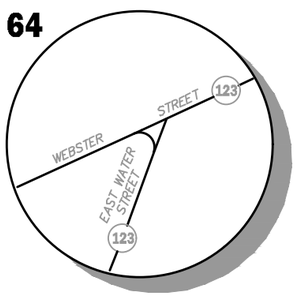
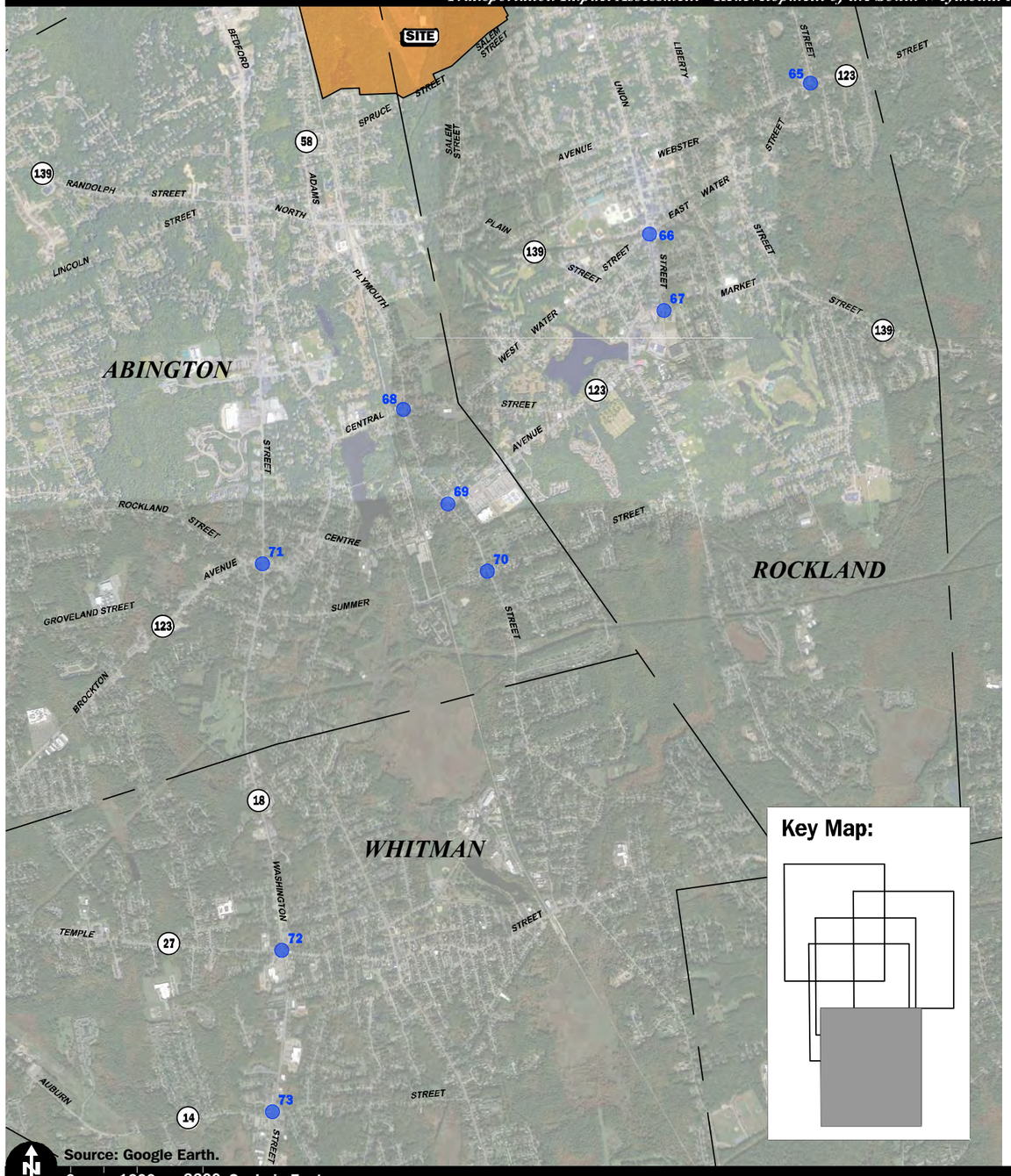
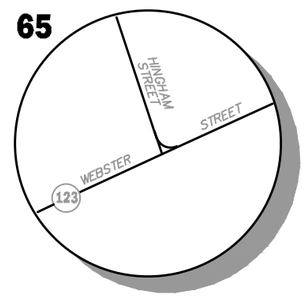


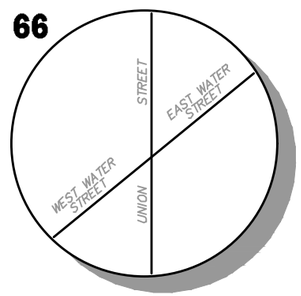
Figure 7-15D

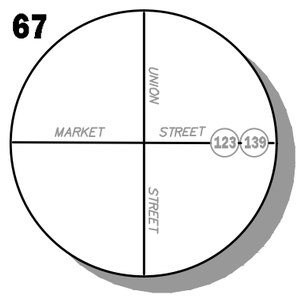
Project-Generated
Weekday Evening
Peak-Hour Traffic Volumes

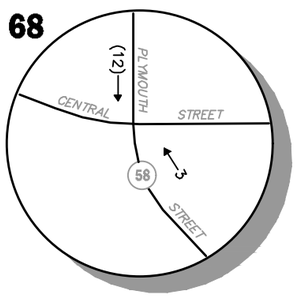
Vanasse & Associates inc

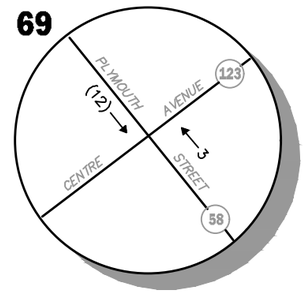


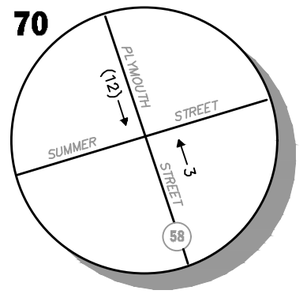


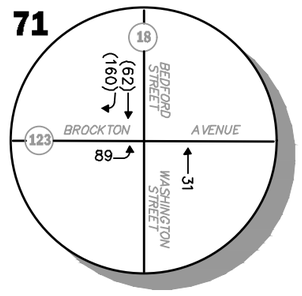


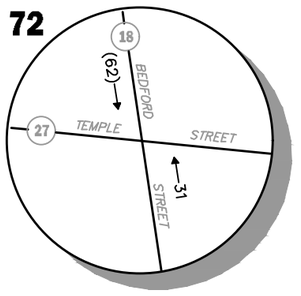












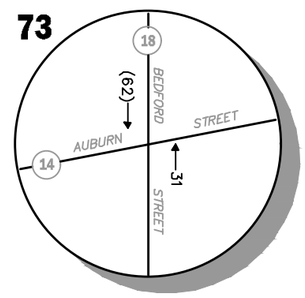
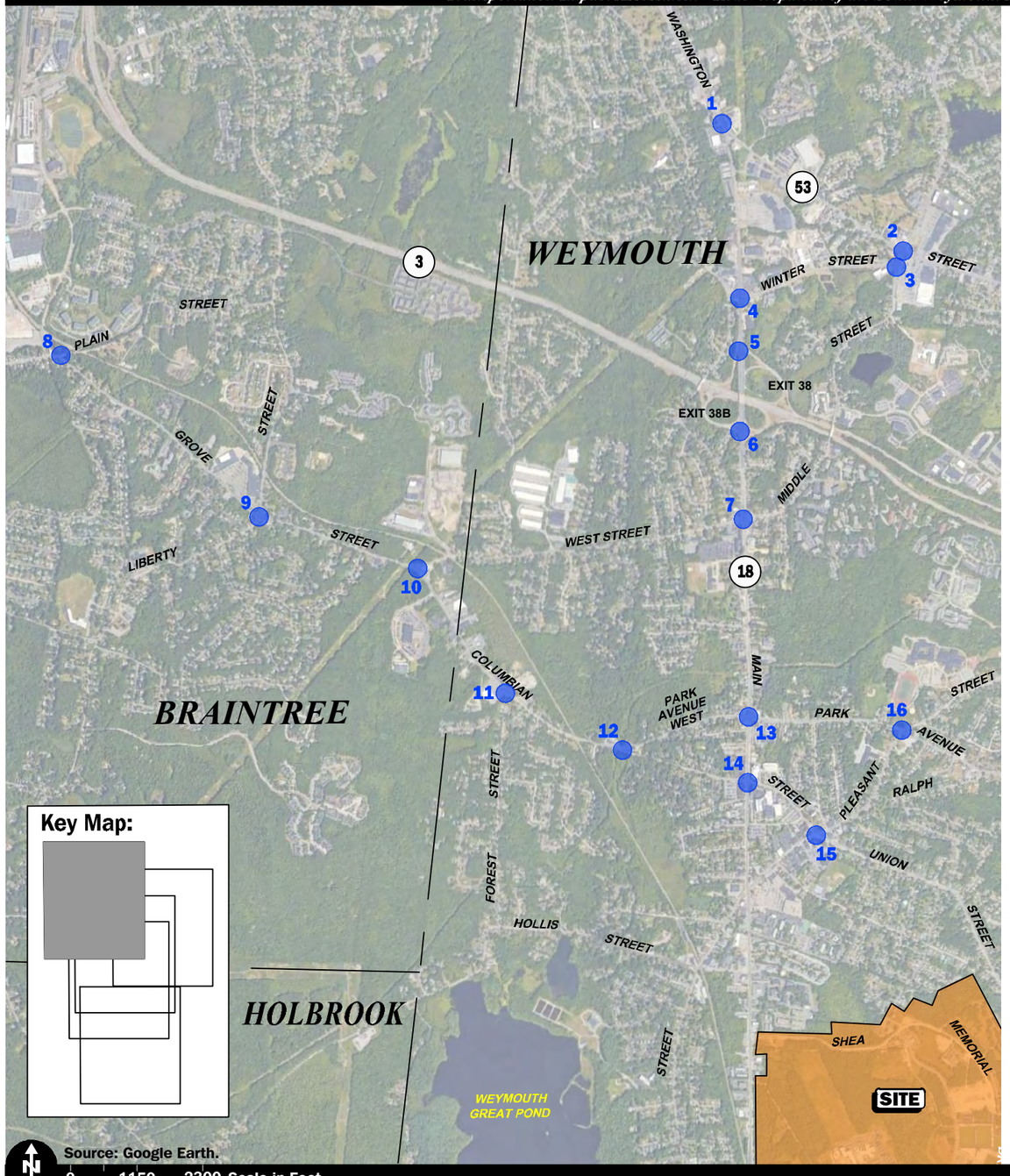


Figure 7-15E

Project-Generated
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc



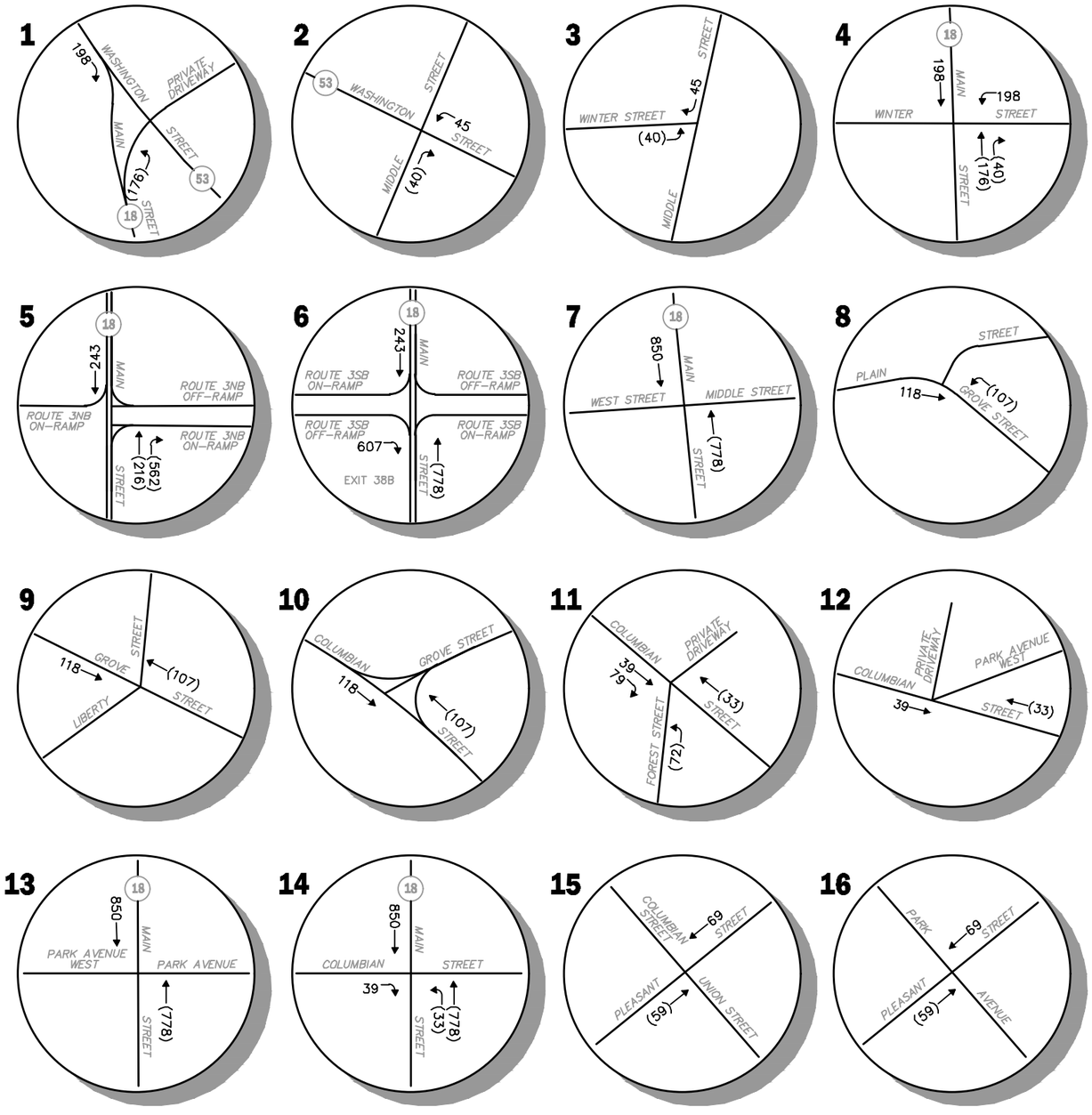
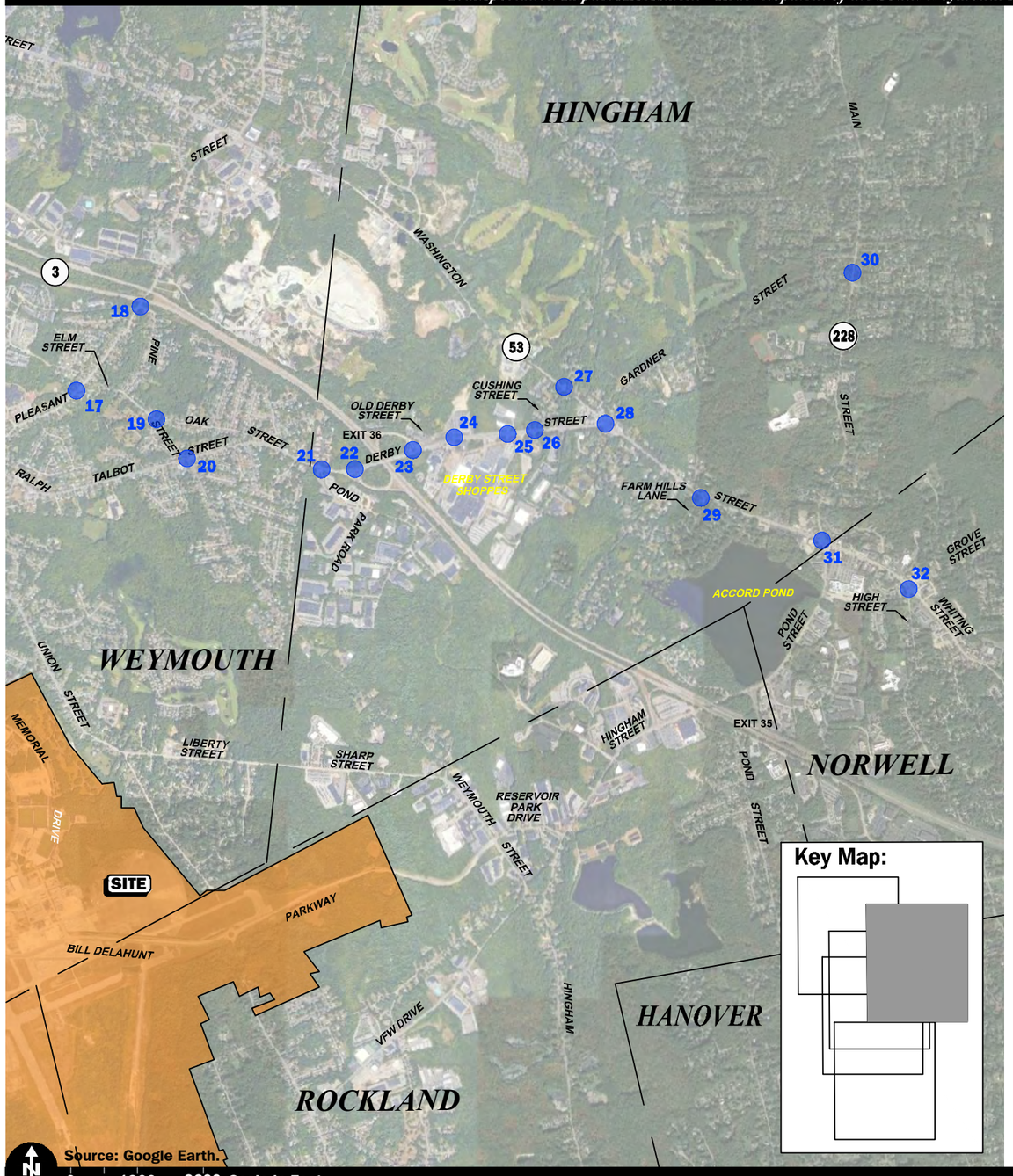
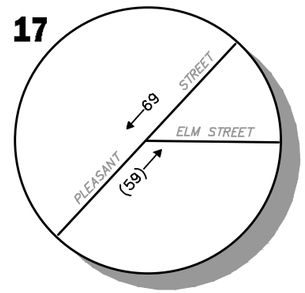


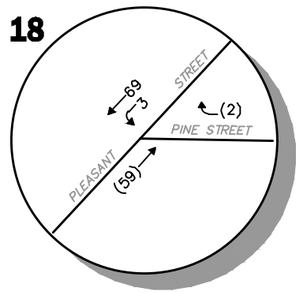
Figure 7-16A

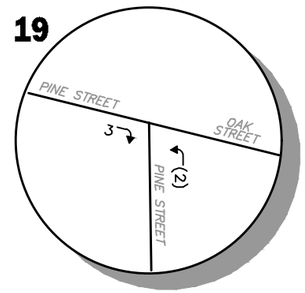
Project-Generated Saturday Midday Peak-Hour Traffic Volumes

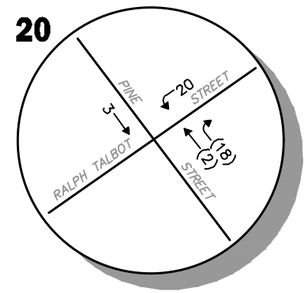
Vanasse & Associates inc

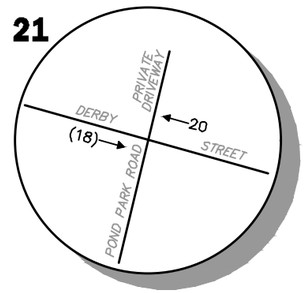


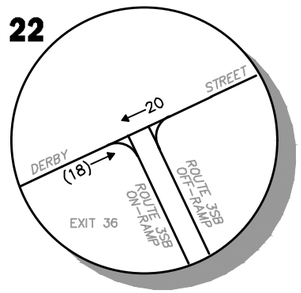


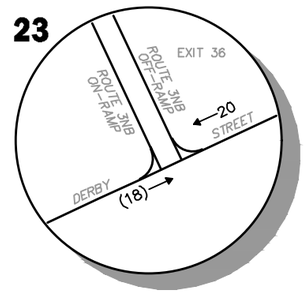


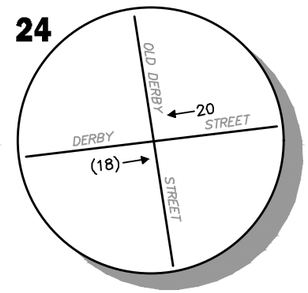


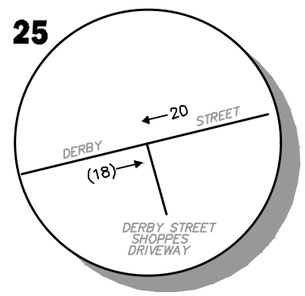


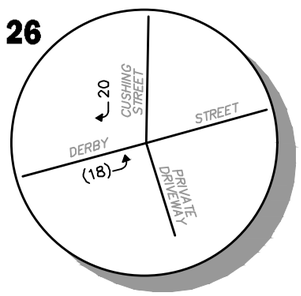


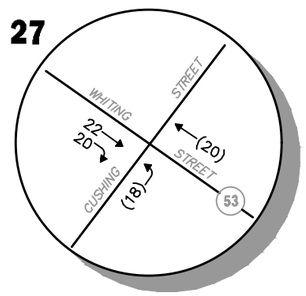


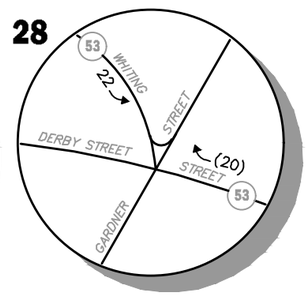


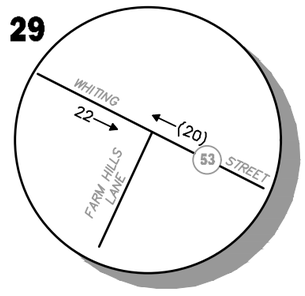


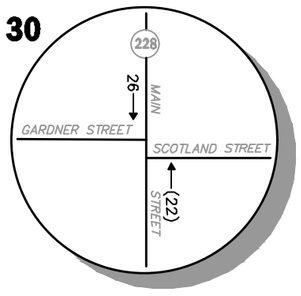


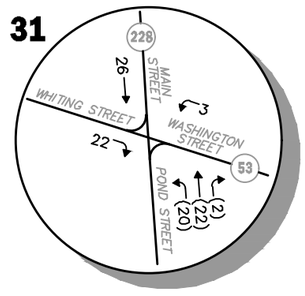












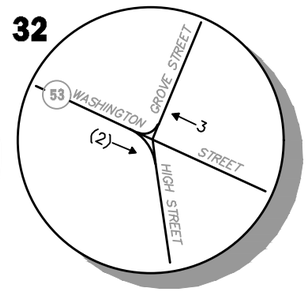
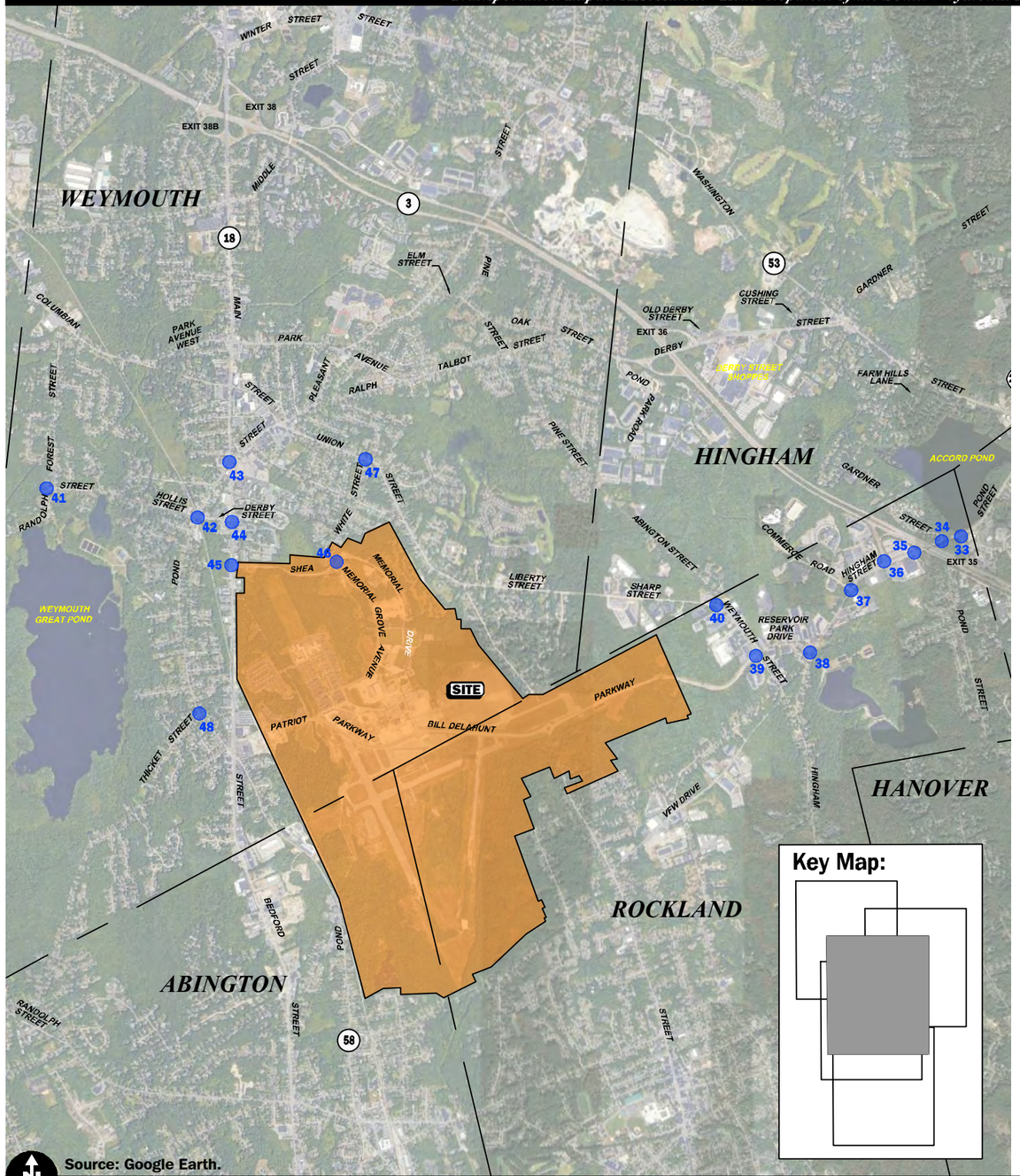
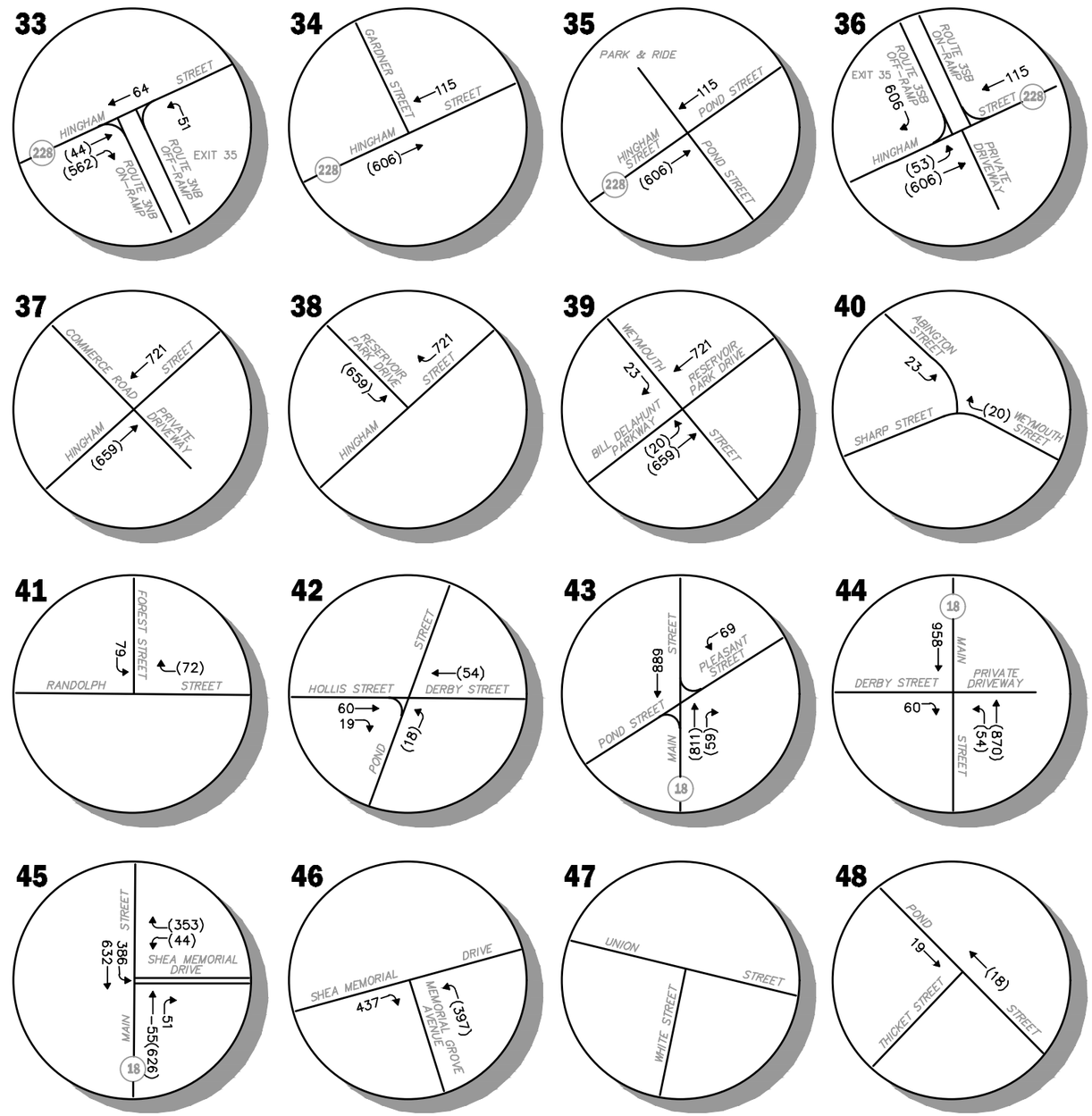


Figure 7-16B

Project-Generated
Saturday Midday
Peak-Hour Traffic Volumes

Vanasse & Associates inc



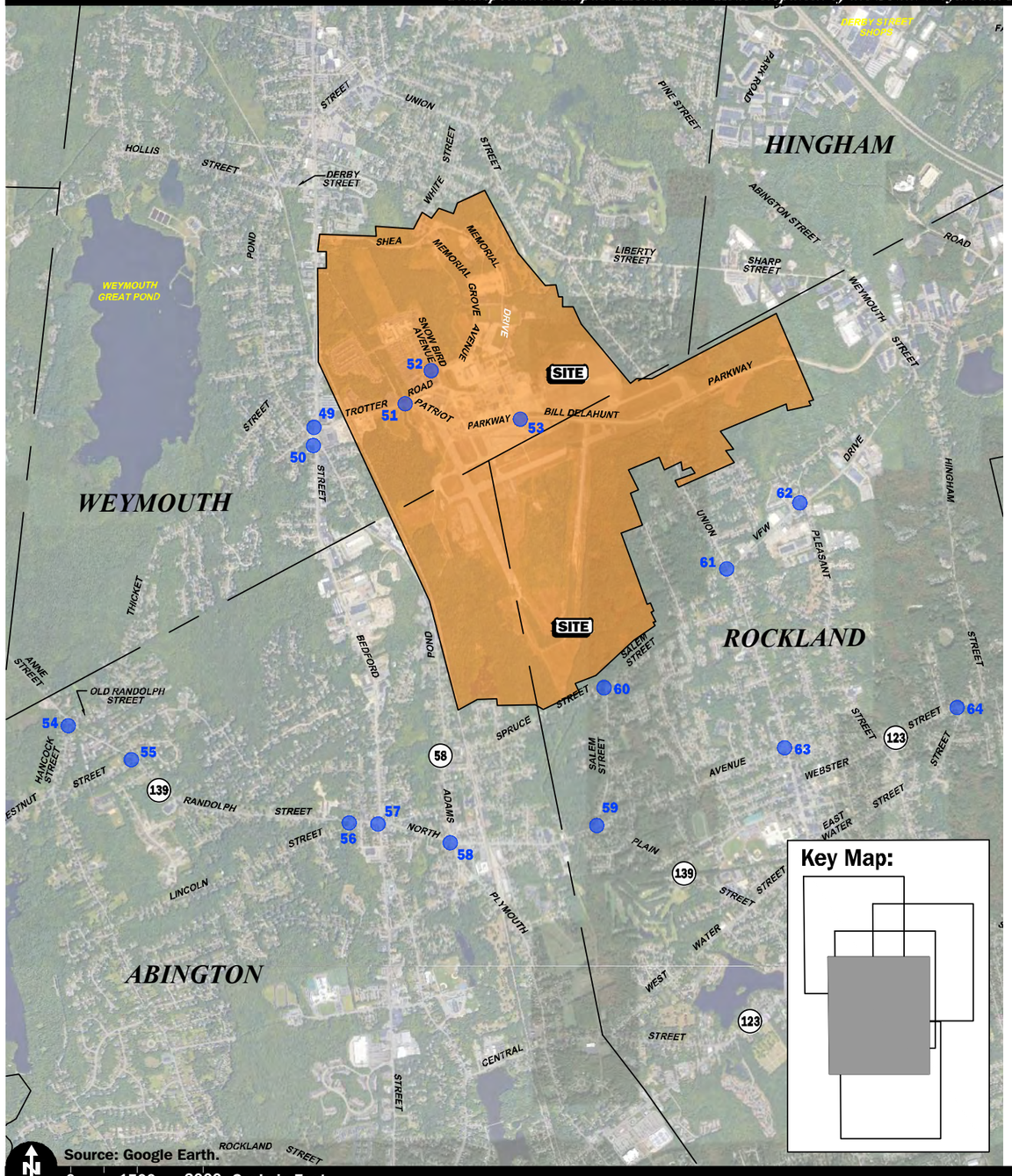


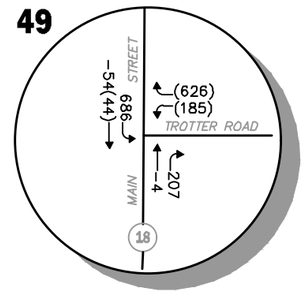
*Illegal movement.

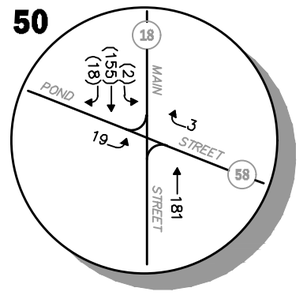
Figure 7-16C

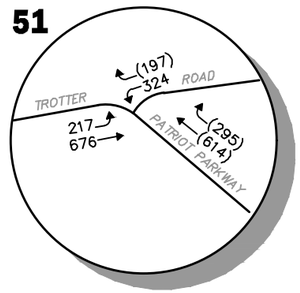
Project-Generated Saturday Midday Peak-Hour Traffic Volumes

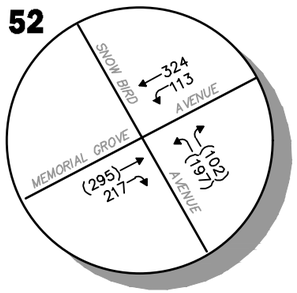
Vanasse & Associates inc

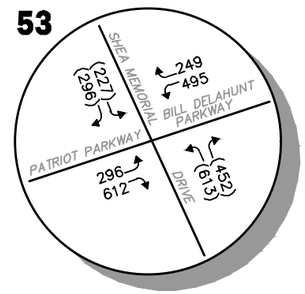


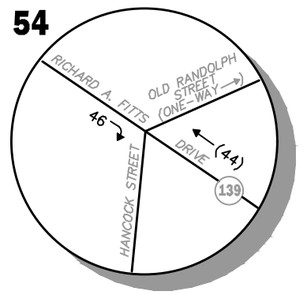


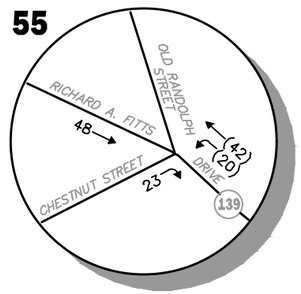


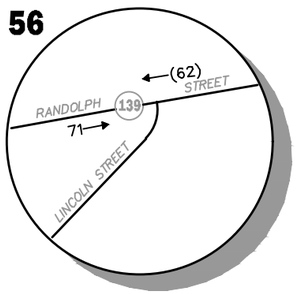


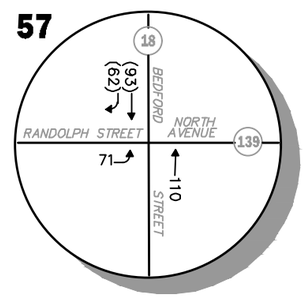


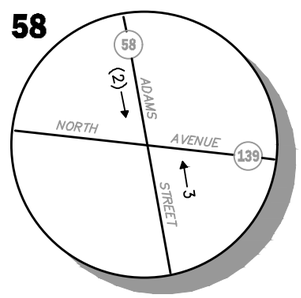


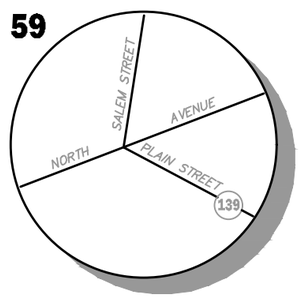


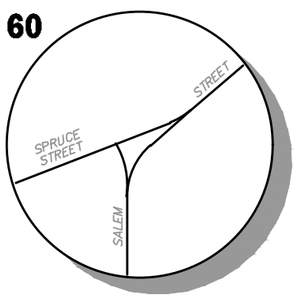


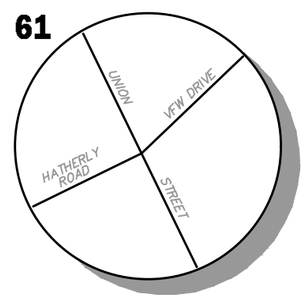


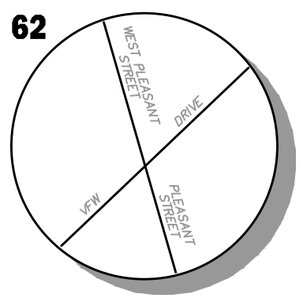


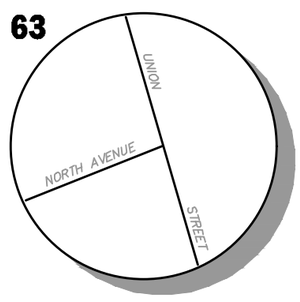












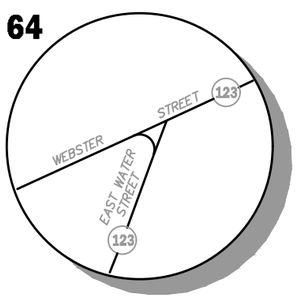
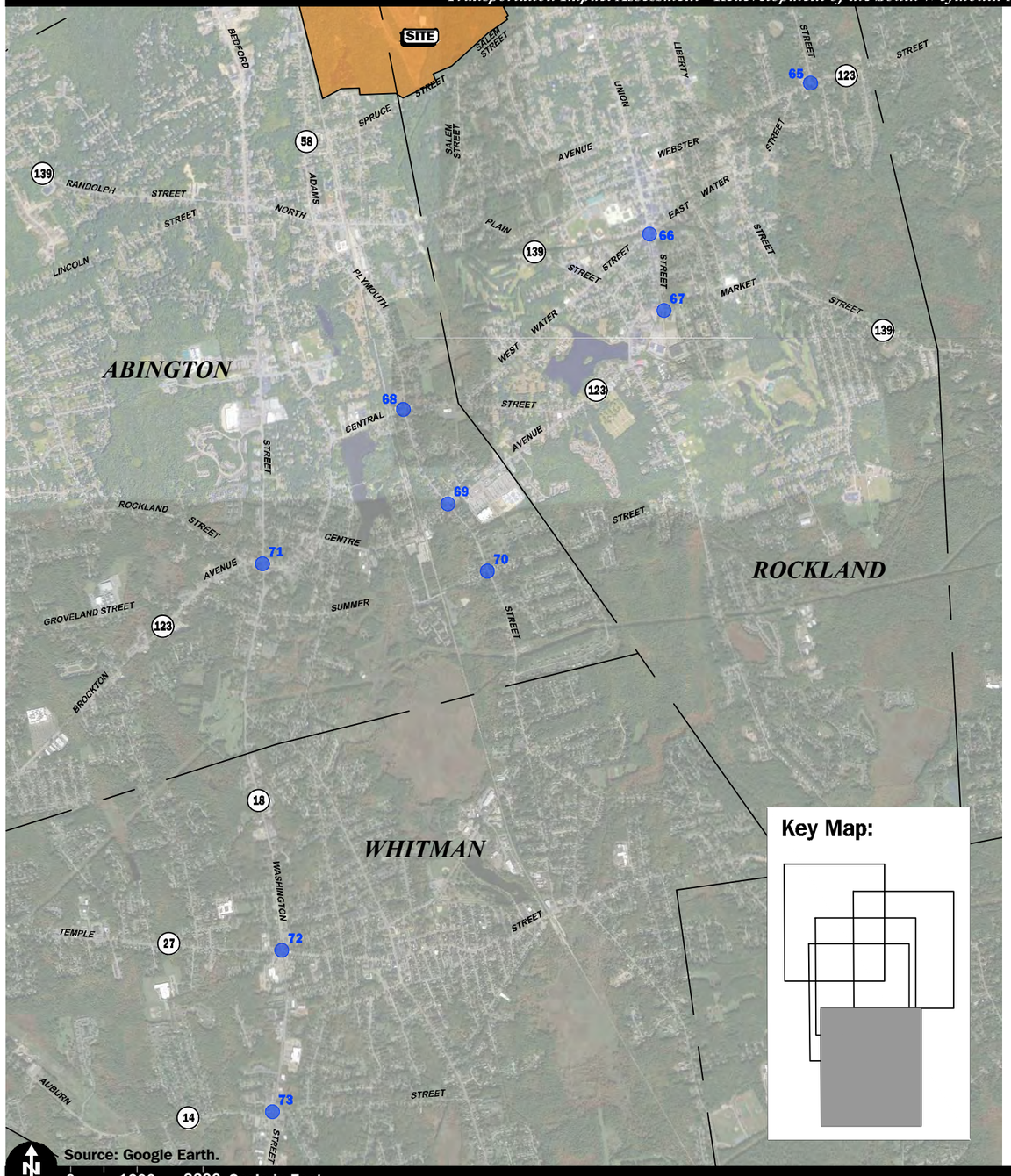
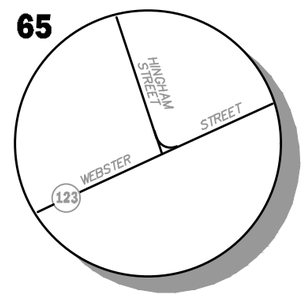


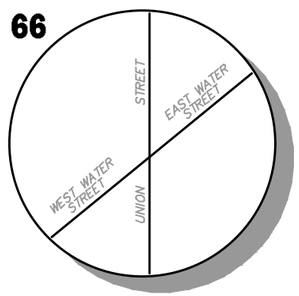
Figure 7-16D

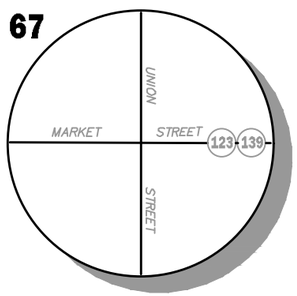
Project-Generated
Saturday Midday
Peak-Hour Traffic Volumes

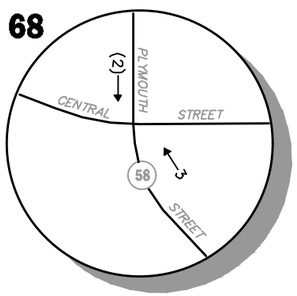
Vanasse & Associates inc

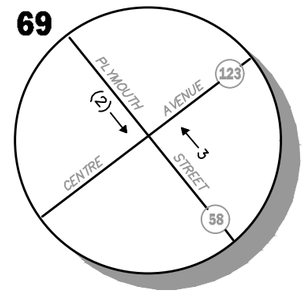


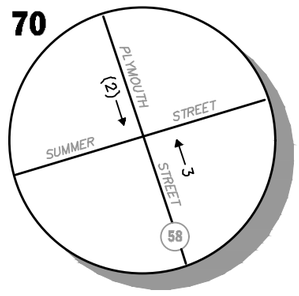


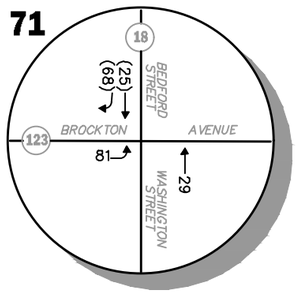


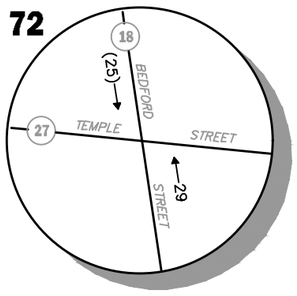












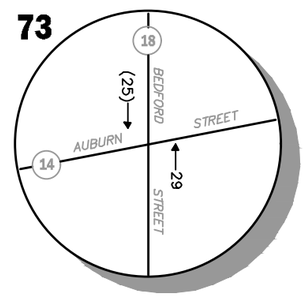
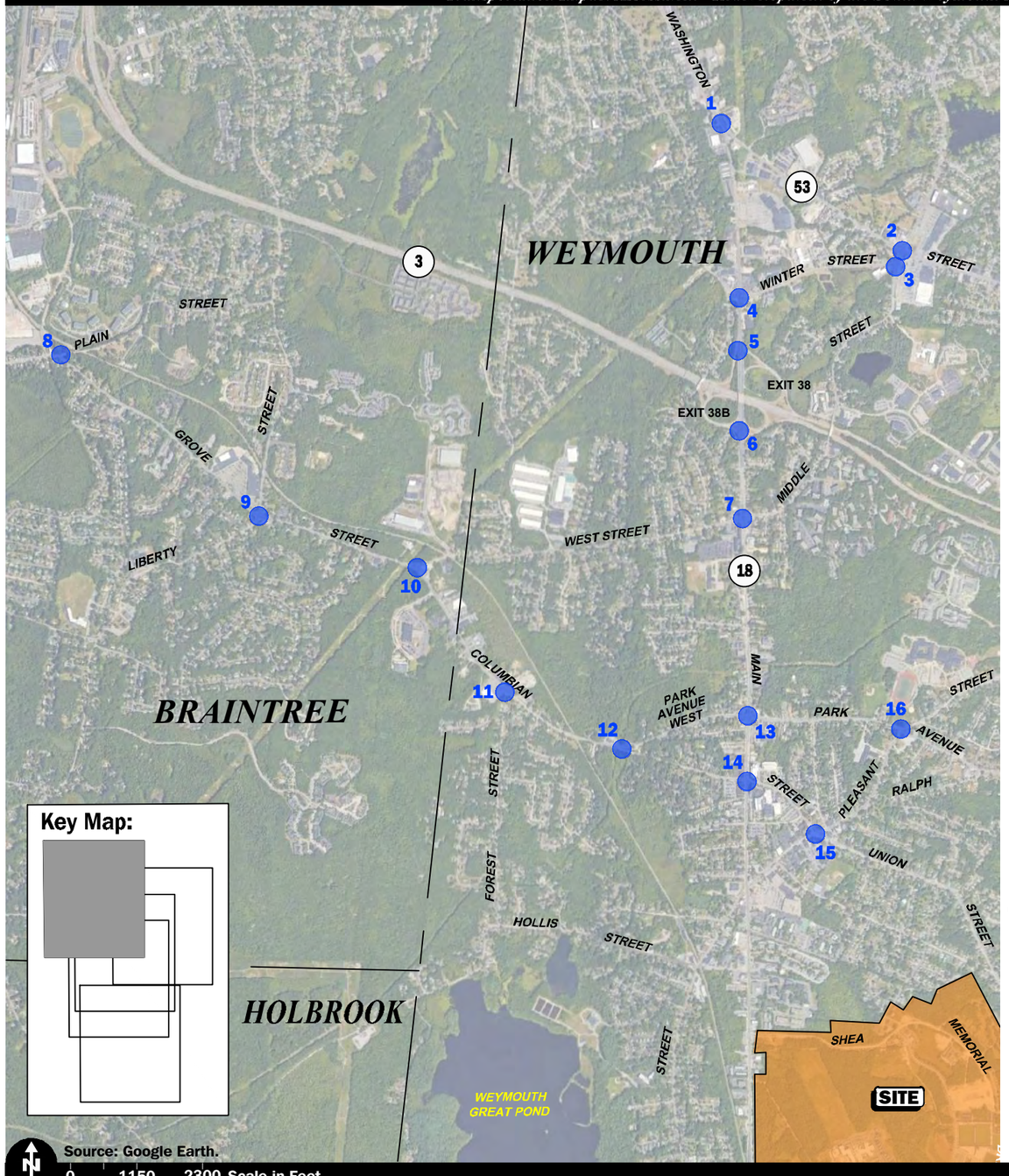


Figure 7-16E

Project-Generated
Saturday Midday
Peak-Hour Traffic Volumes

Vanasse & Associates inc



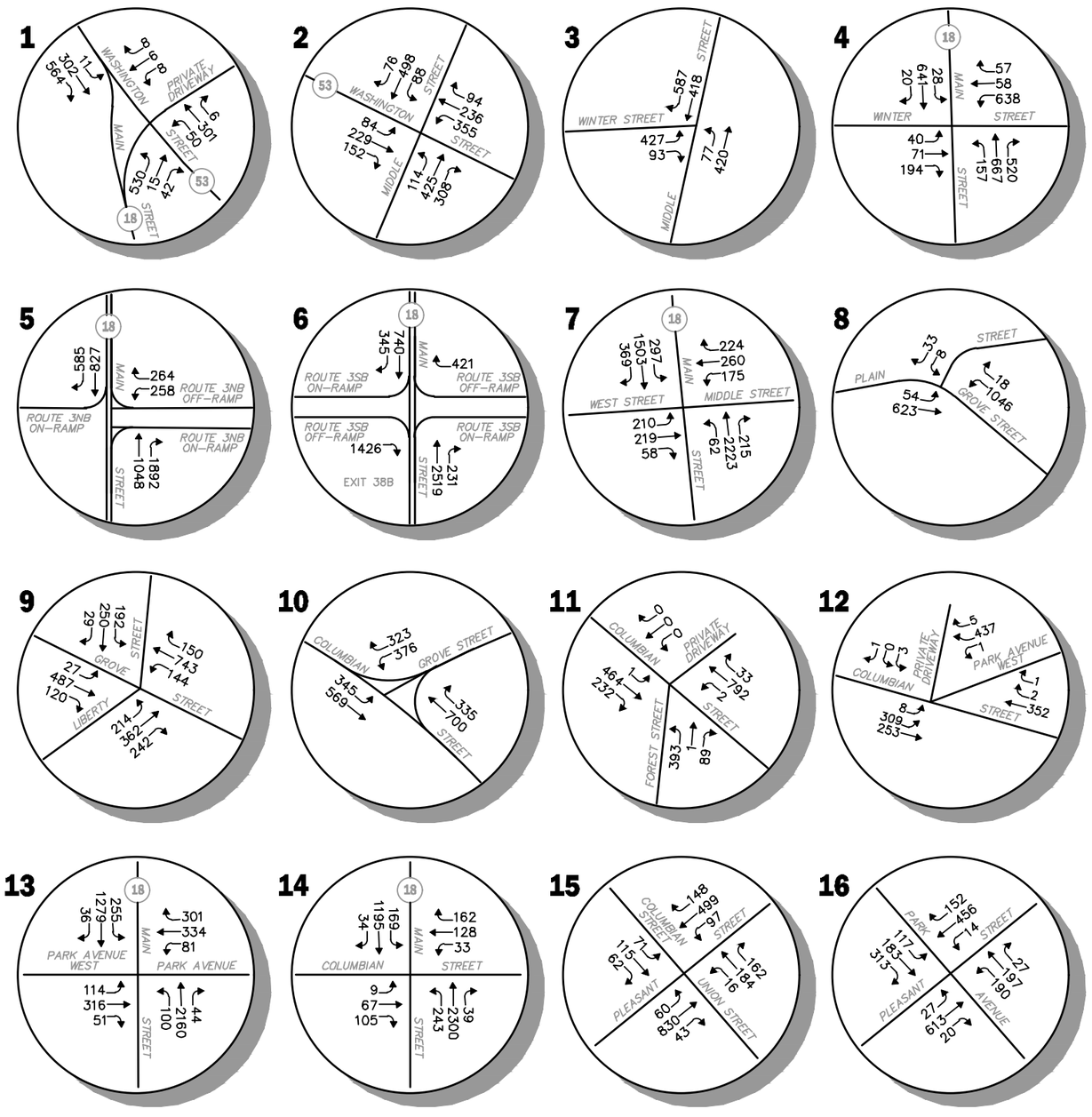
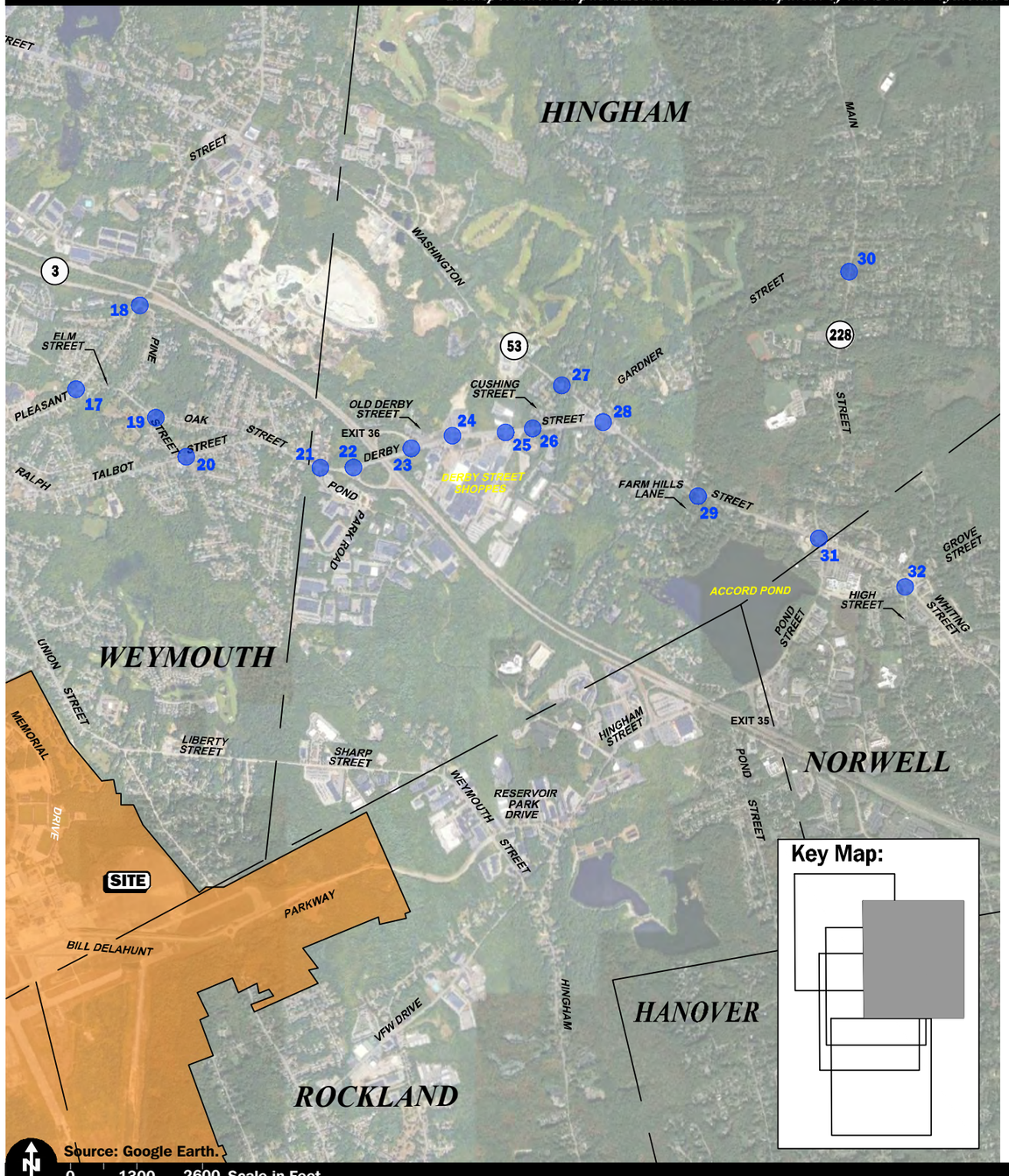
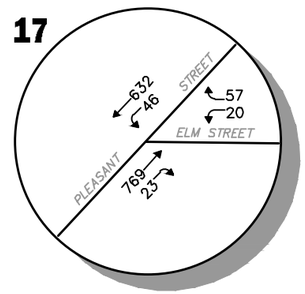


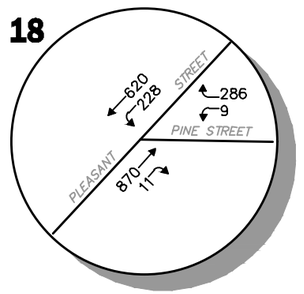
Figure 7-17A

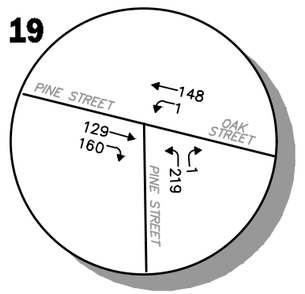
2043 Build
Weekday Morning
Peak-Hour Traffic Volumes

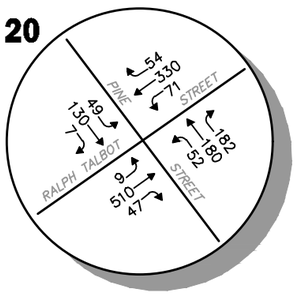
Vanasse & Associates inc

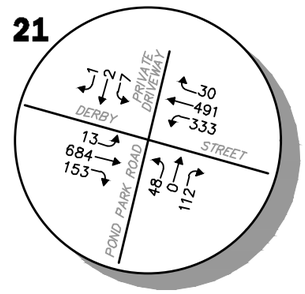


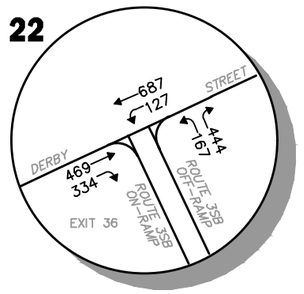


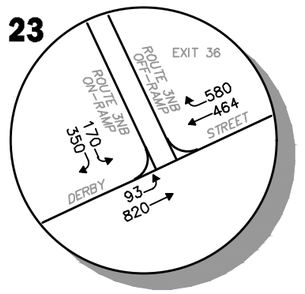


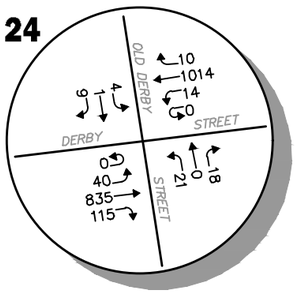


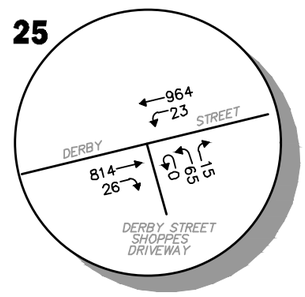


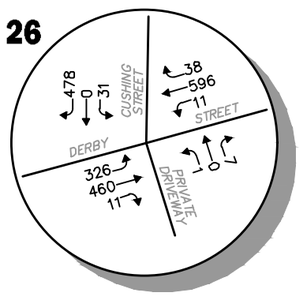


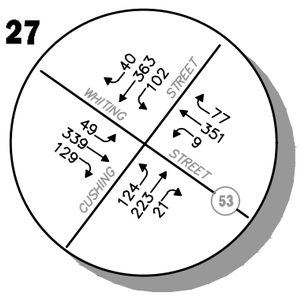


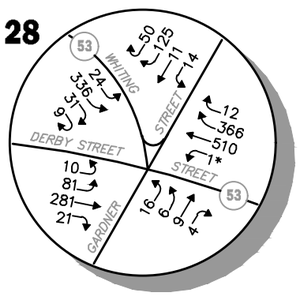


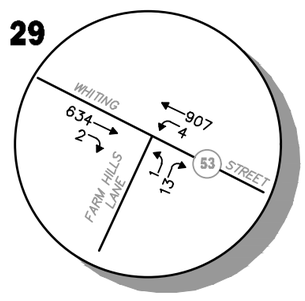


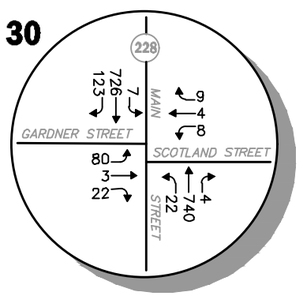


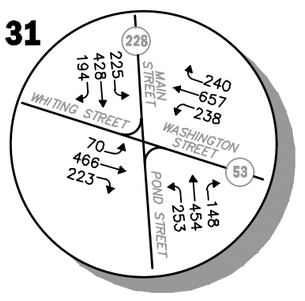












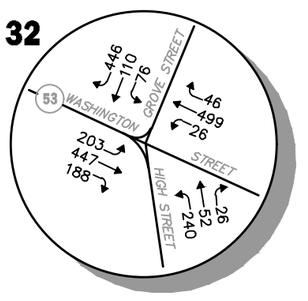
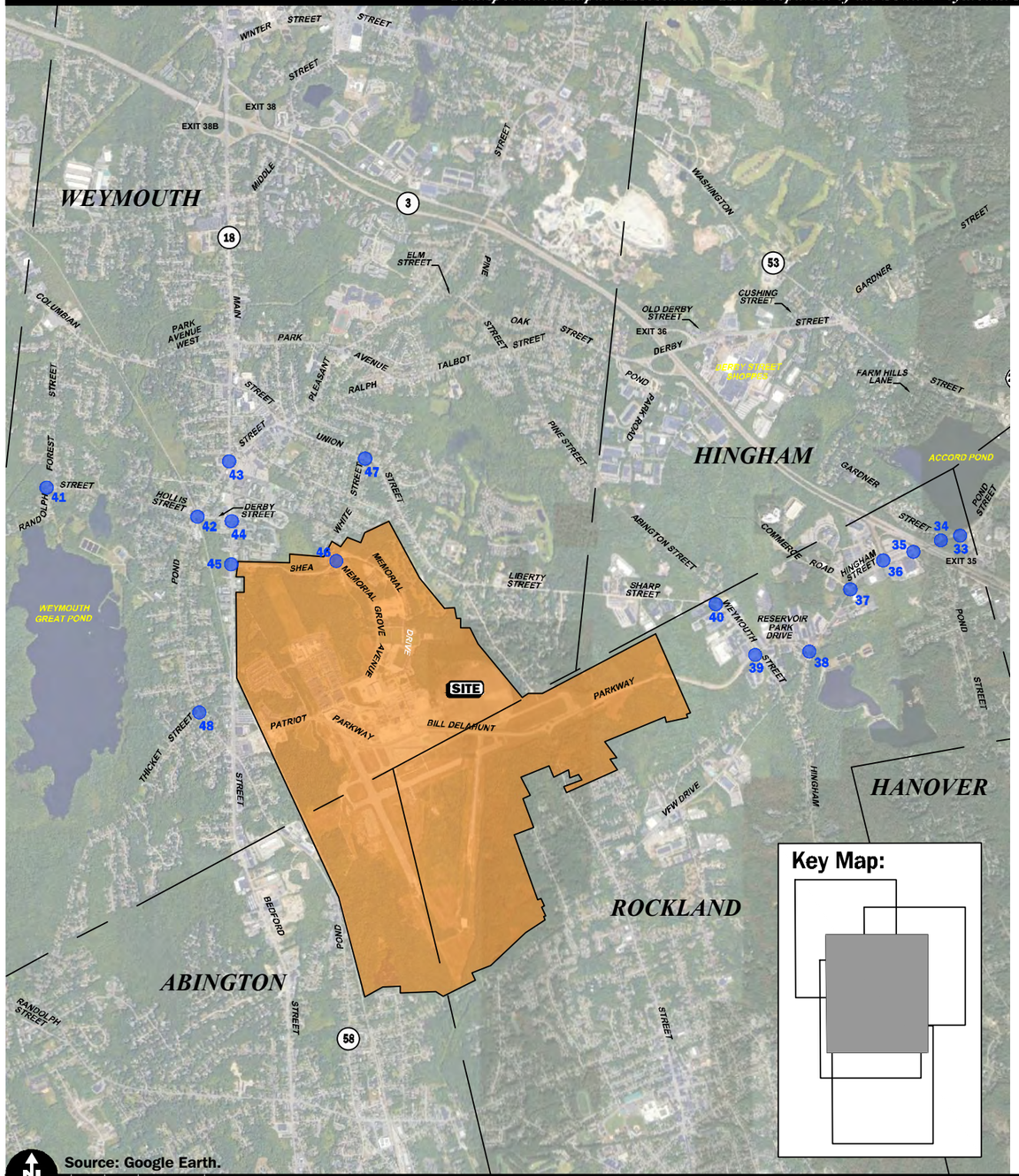
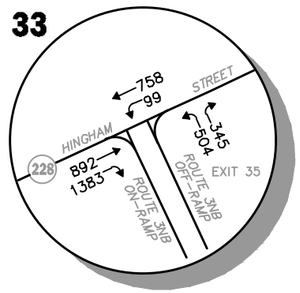


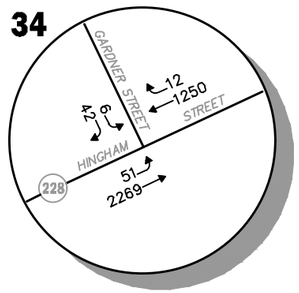
Figure 7-17B

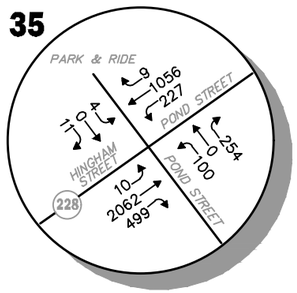
2043 Build
Weekday Morning
Peak-Hour Traffic Volumes

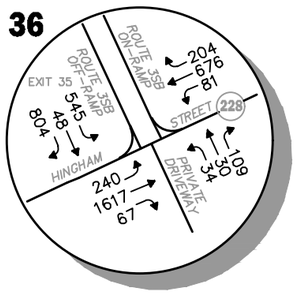
Vanasse & Associates inc

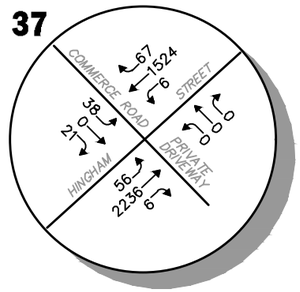


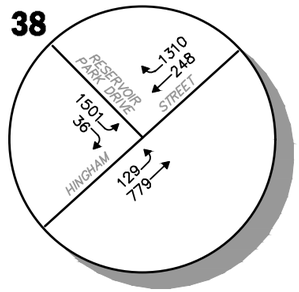


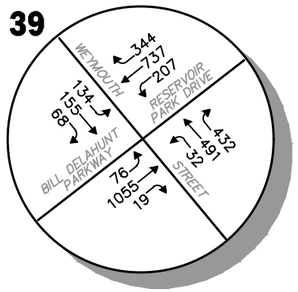


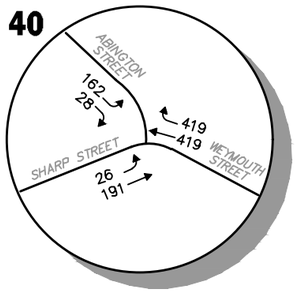


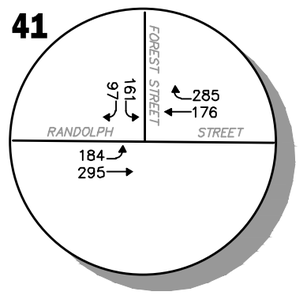


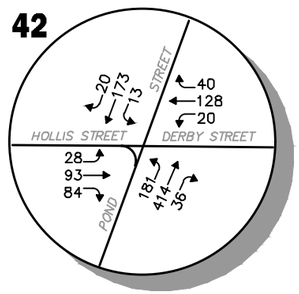


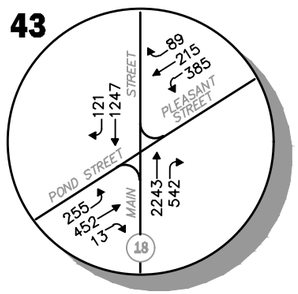


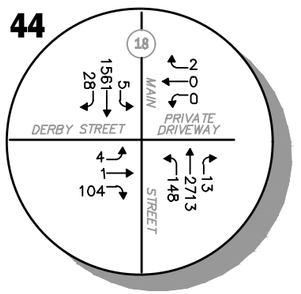


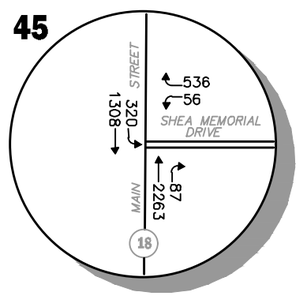


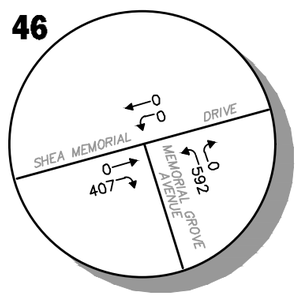


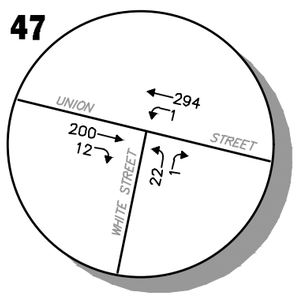


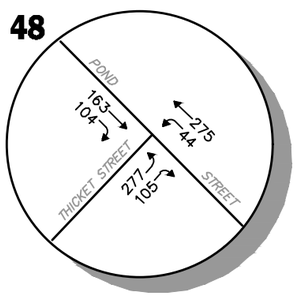










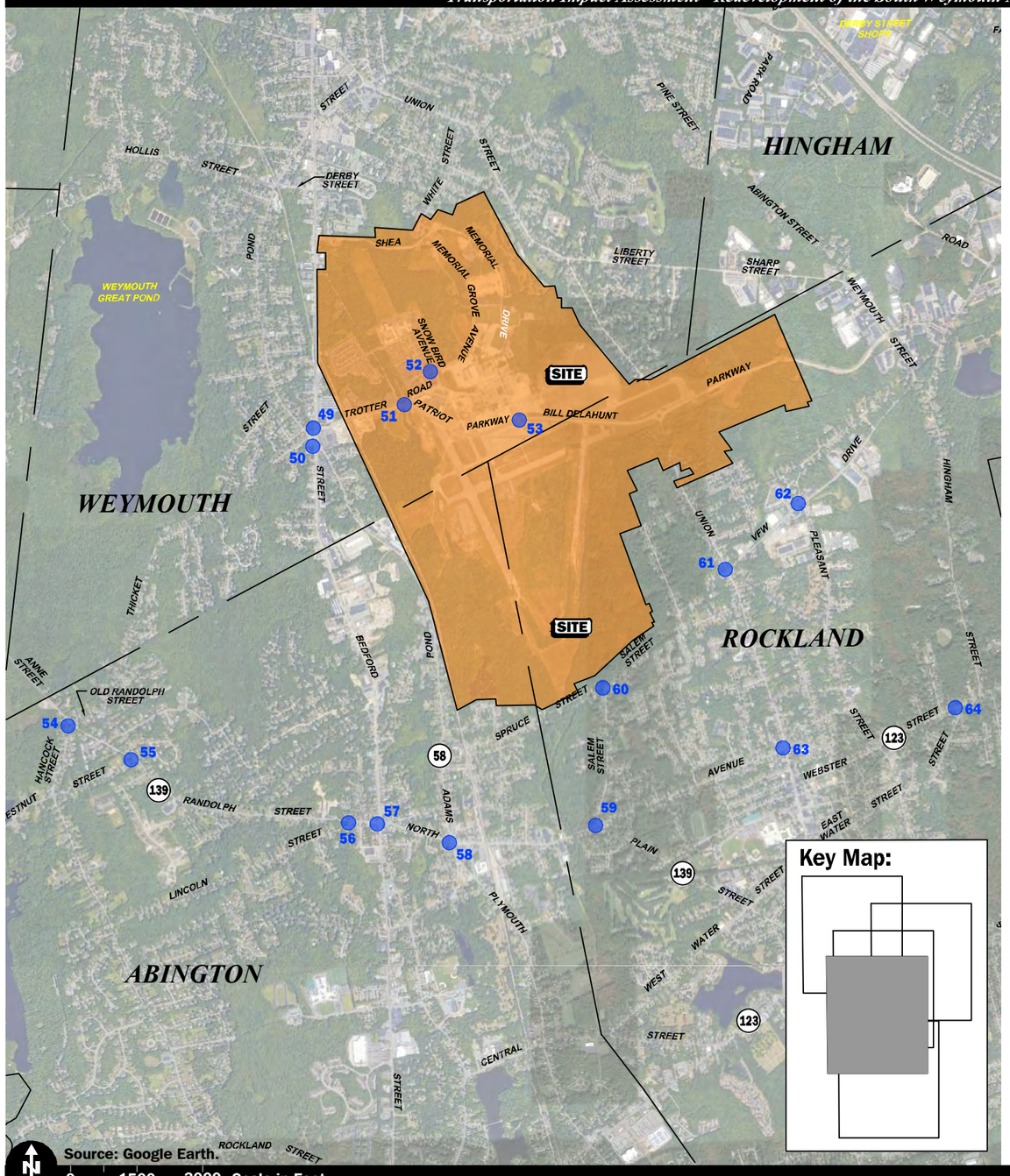


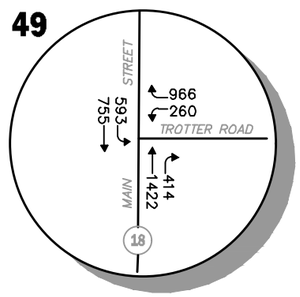
*Illegal movement.

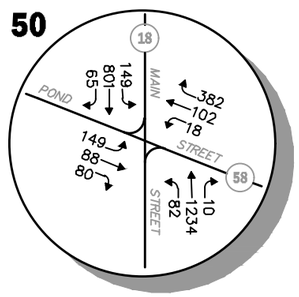
Figure 7-17C

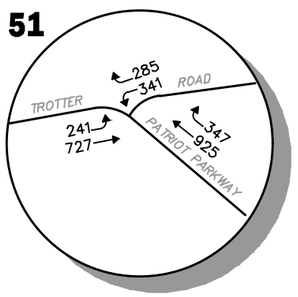
2043 Build
Weekday Morning
Peak-Hour Traffic Volumes

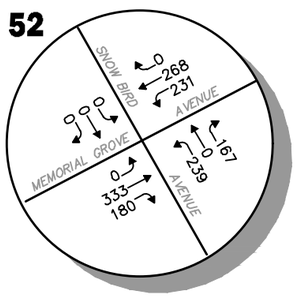
Vanasse & Associates inc

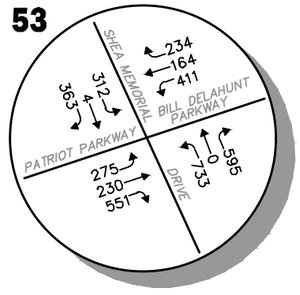


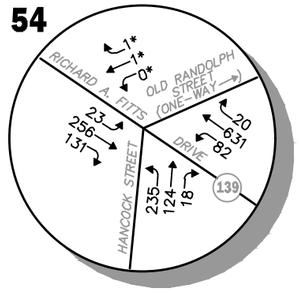


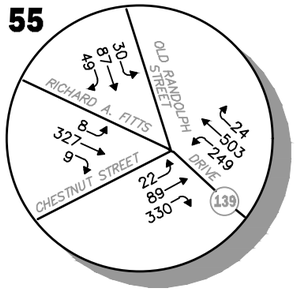


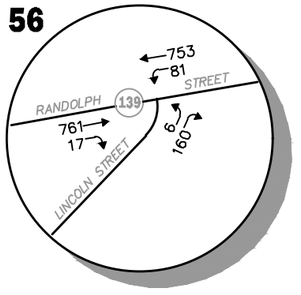


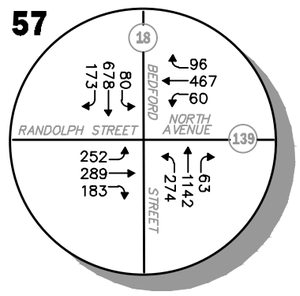


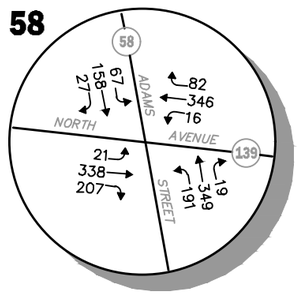


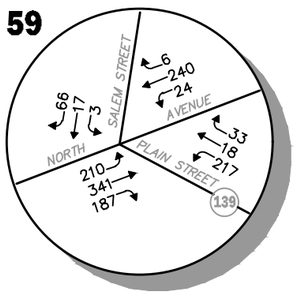


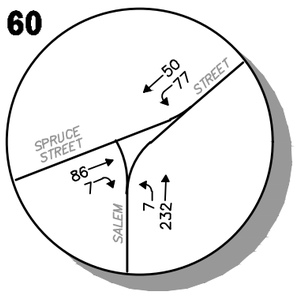


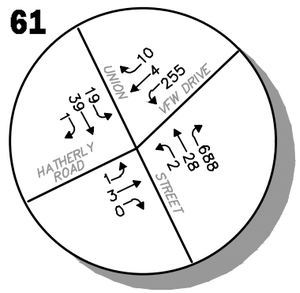


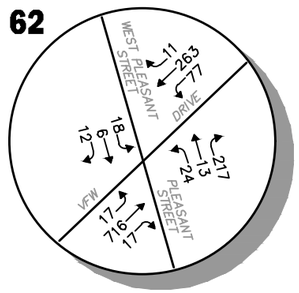


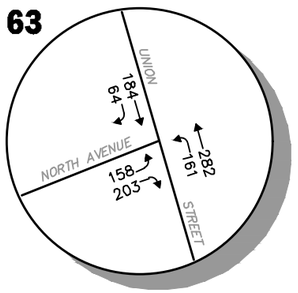


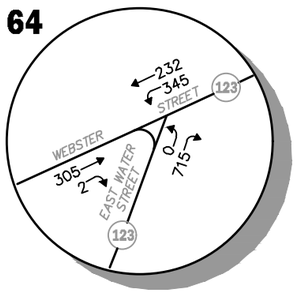










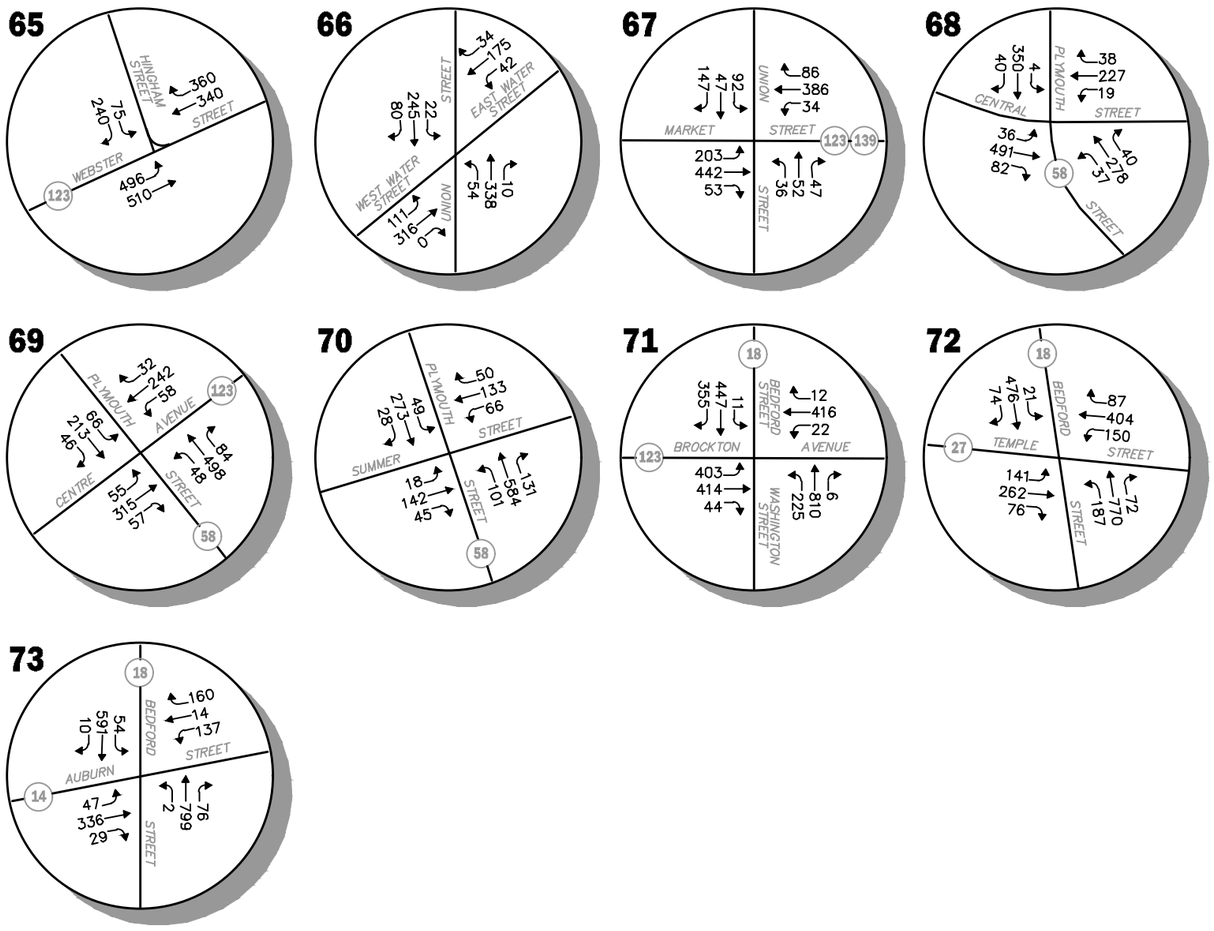


*Illegal movement.

Figure 7-17D

2043 Build
Weekday Morning
Peak-Hour Traffic Volumes

Vanasse & Associates inc



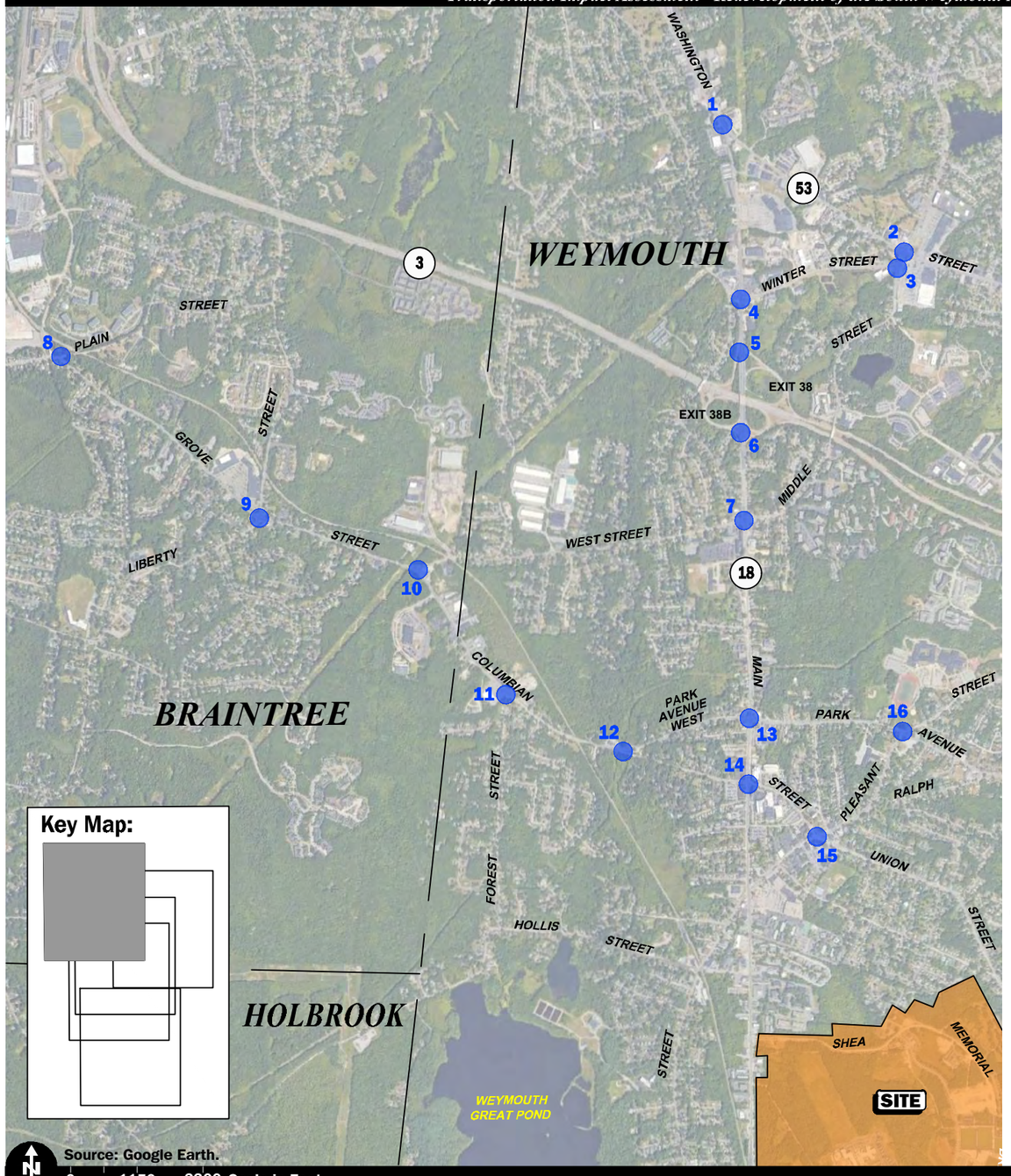
Source: Google Earth.

0 1600 3200 Scale in Feet

Figure 7-17E

2043 Build
Weekday Morning
Peak-Hour Traffic Volumes

Vanasse & Associates inc



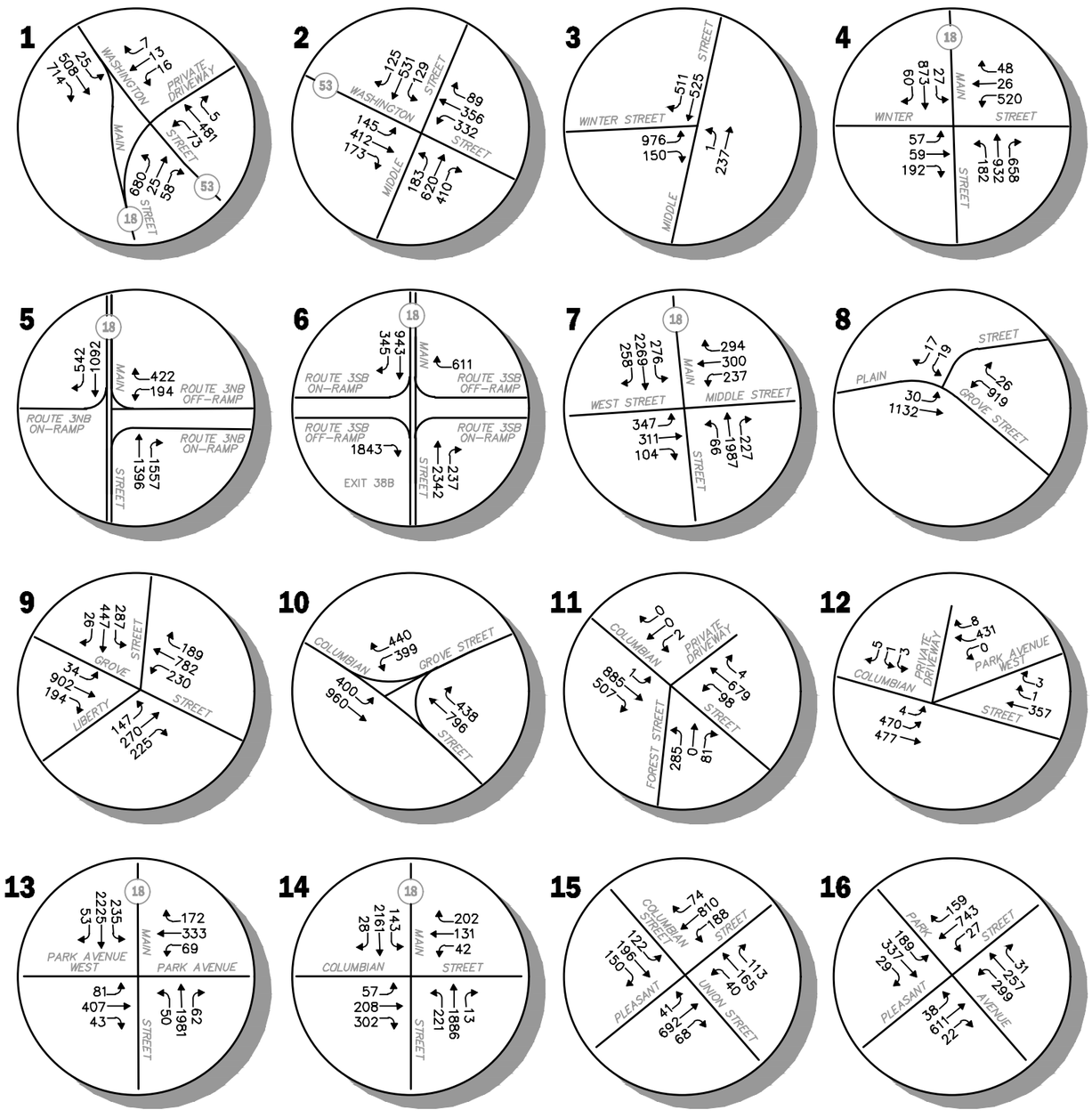
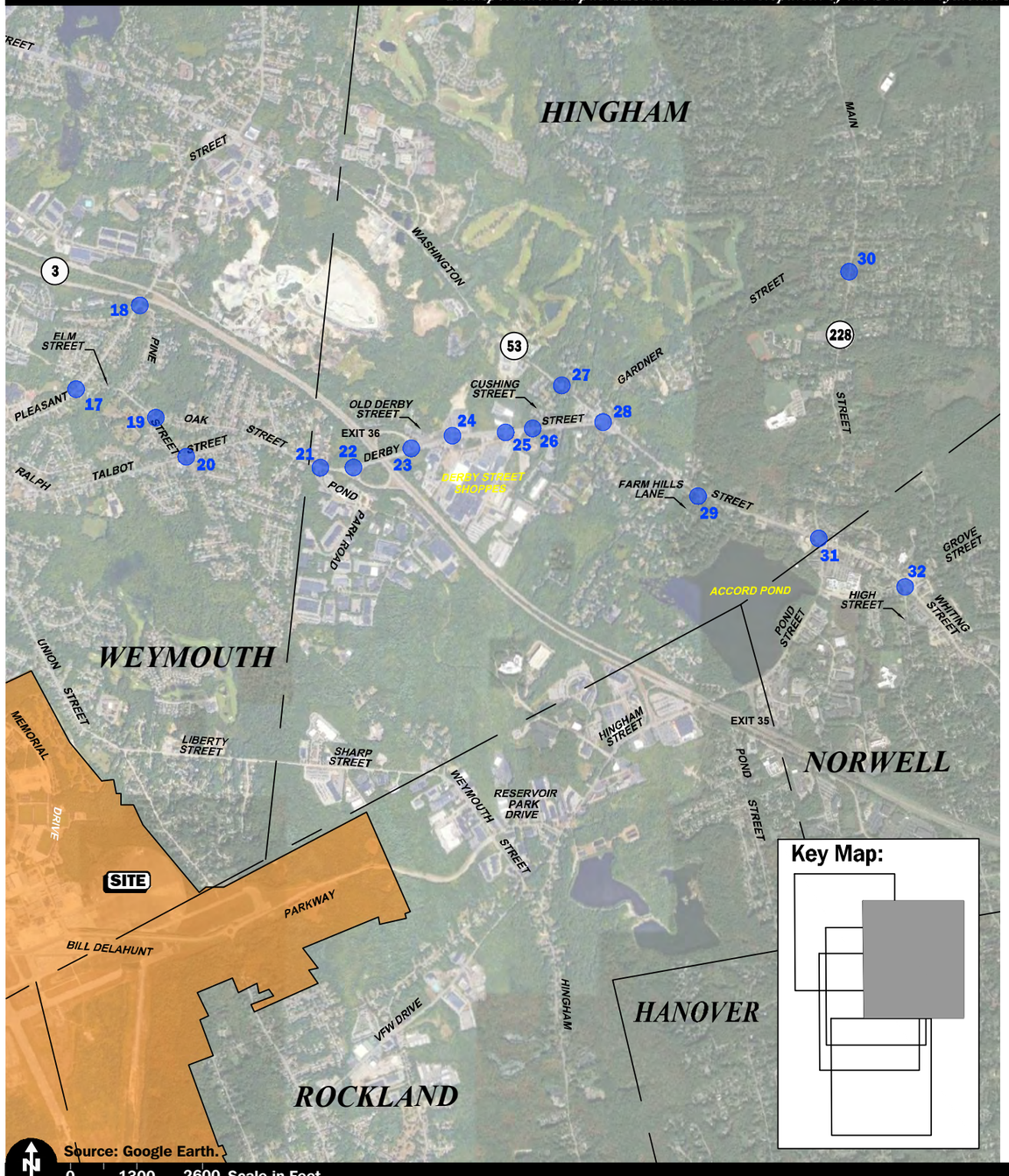


Figure 7-18A

2043 Build
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc



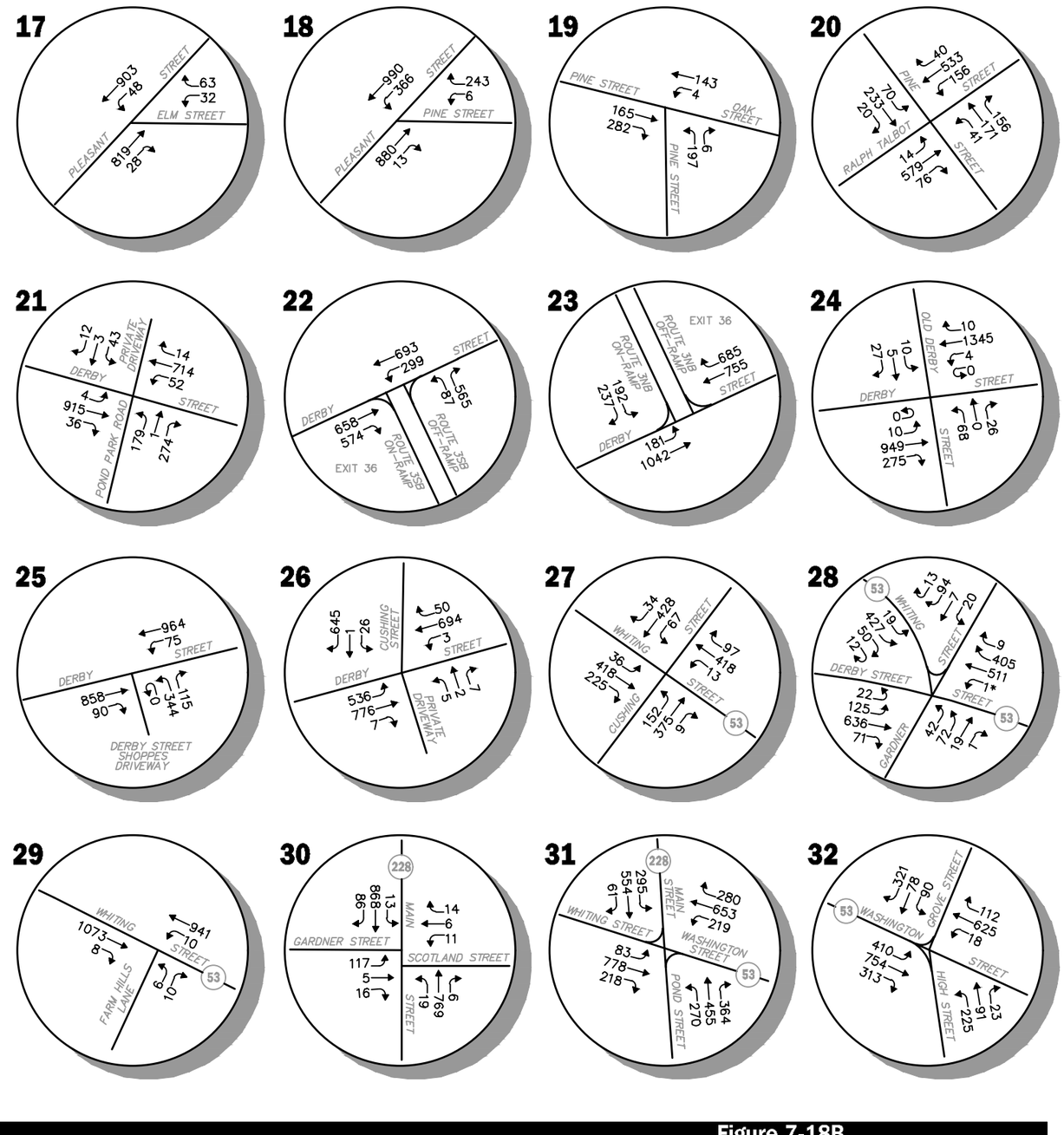
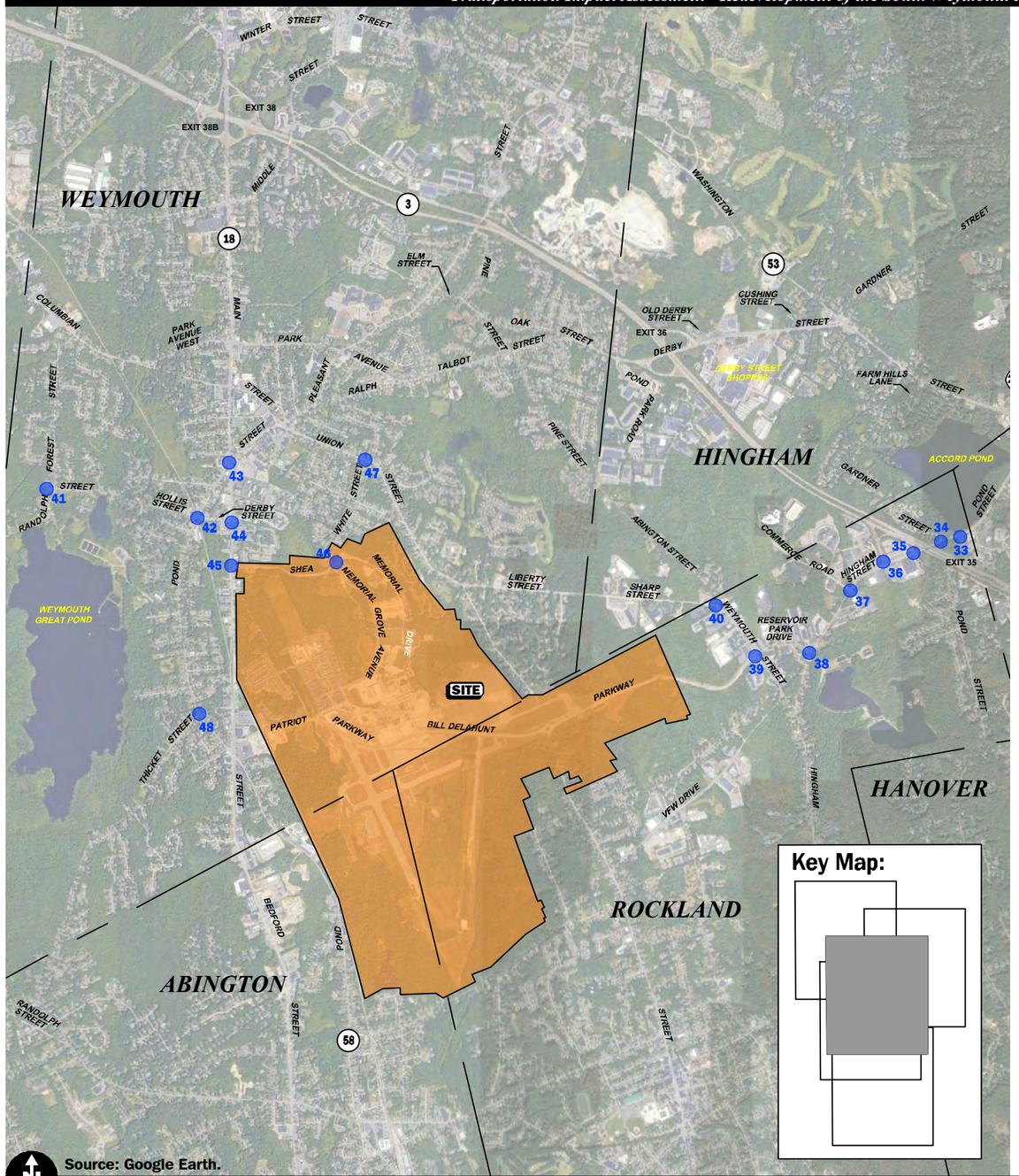
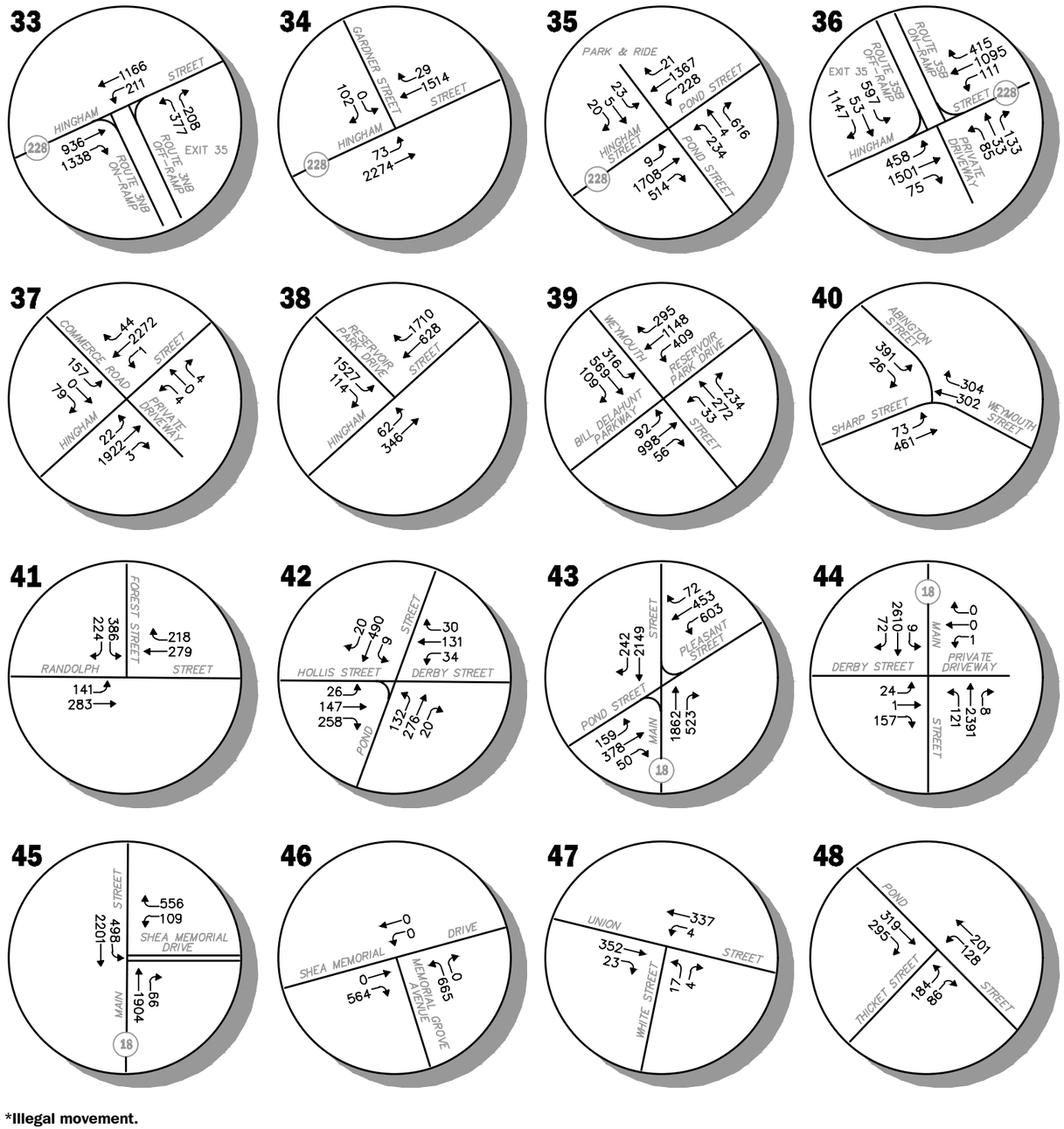


Figure 7-18B

2043 Build
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc



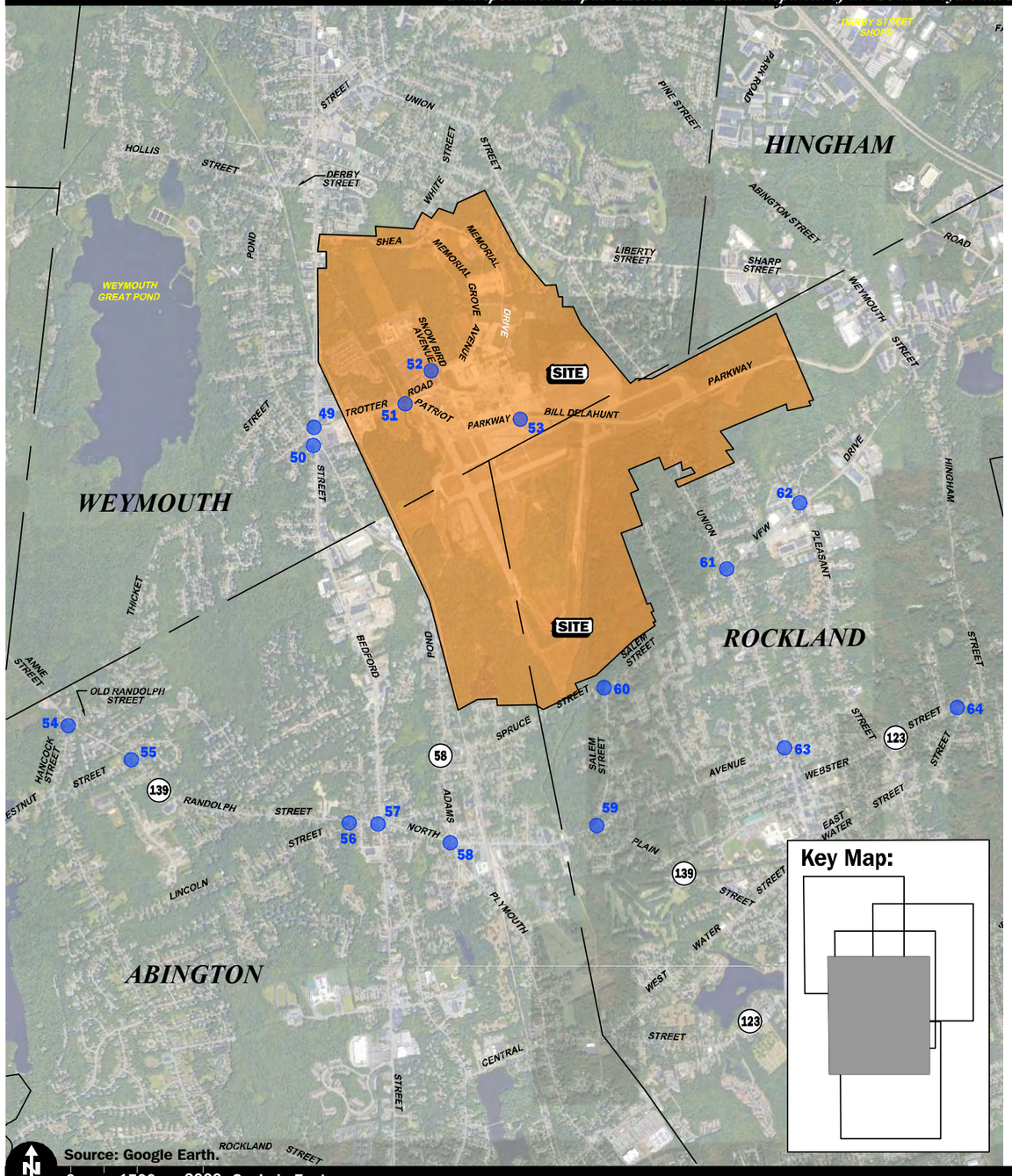


*Illegal movement.

Figure 7-18C

2043 Build
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc



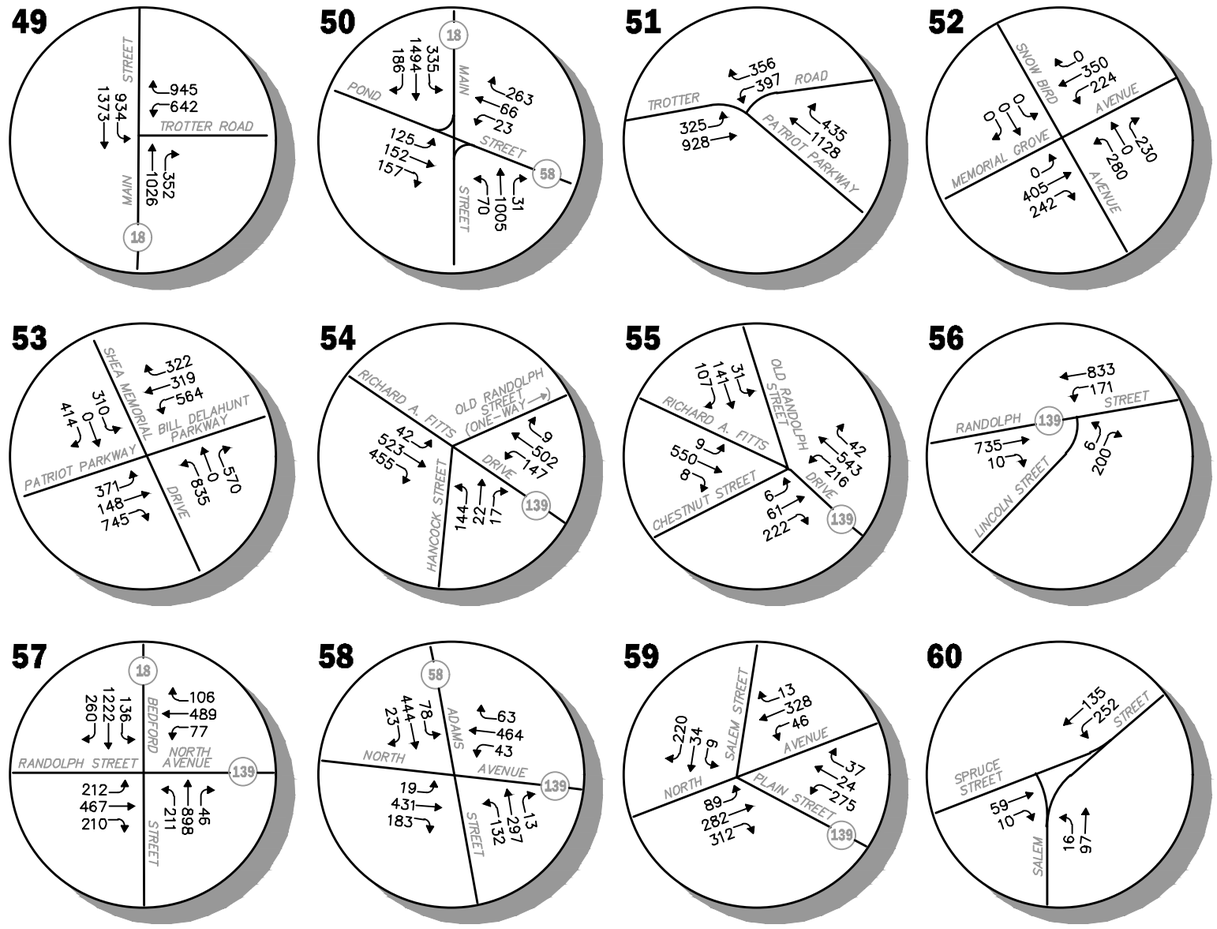
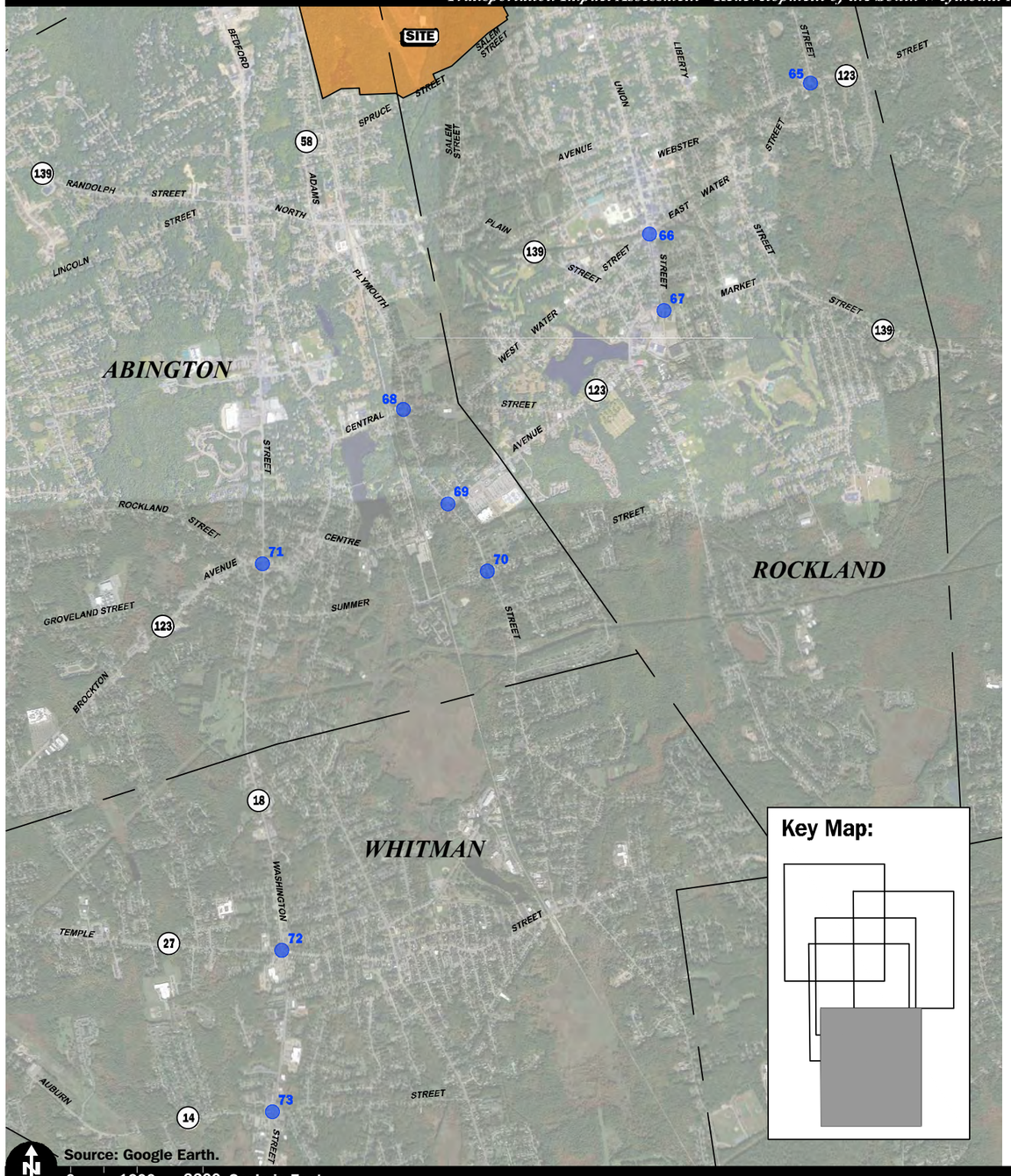
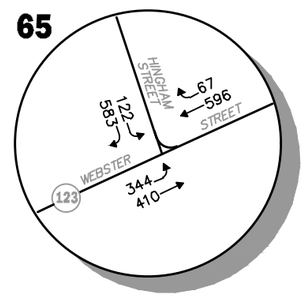


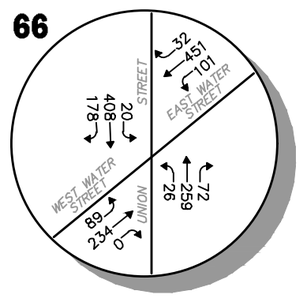
Figure 7-18D

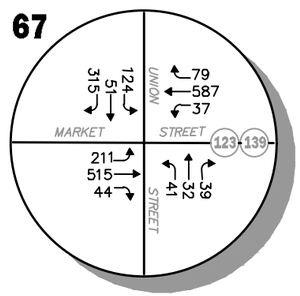
2043 Build
Weekday Evening
Peak-Hour Traffic Volumes

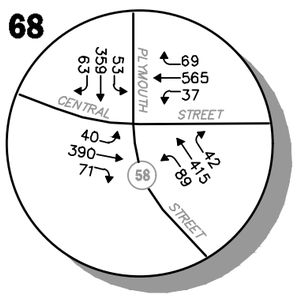
Vanasse & Associates inc

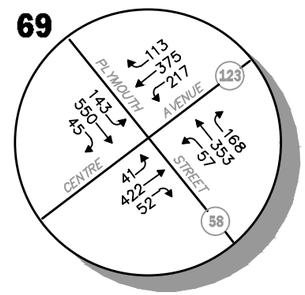


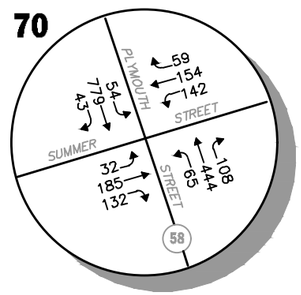


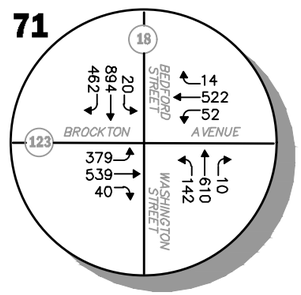


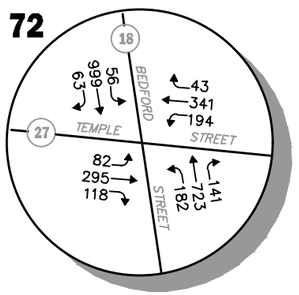


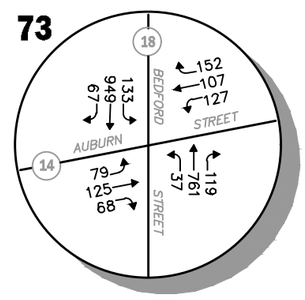








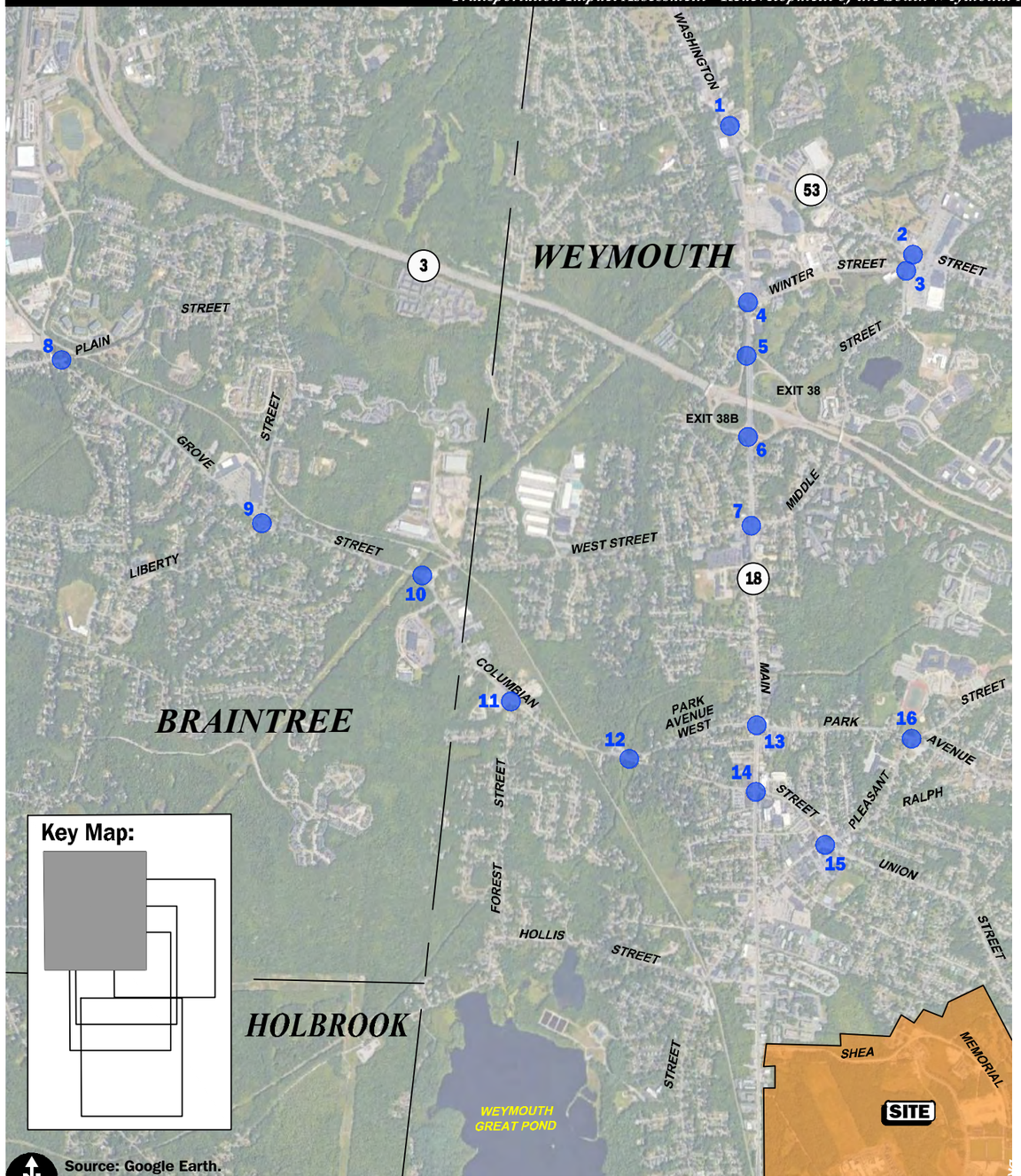




Vanasse & Associates inc

Figure 7-18E

2043 Build
Weekday Evening
Peak-Hour Traffic Volumes



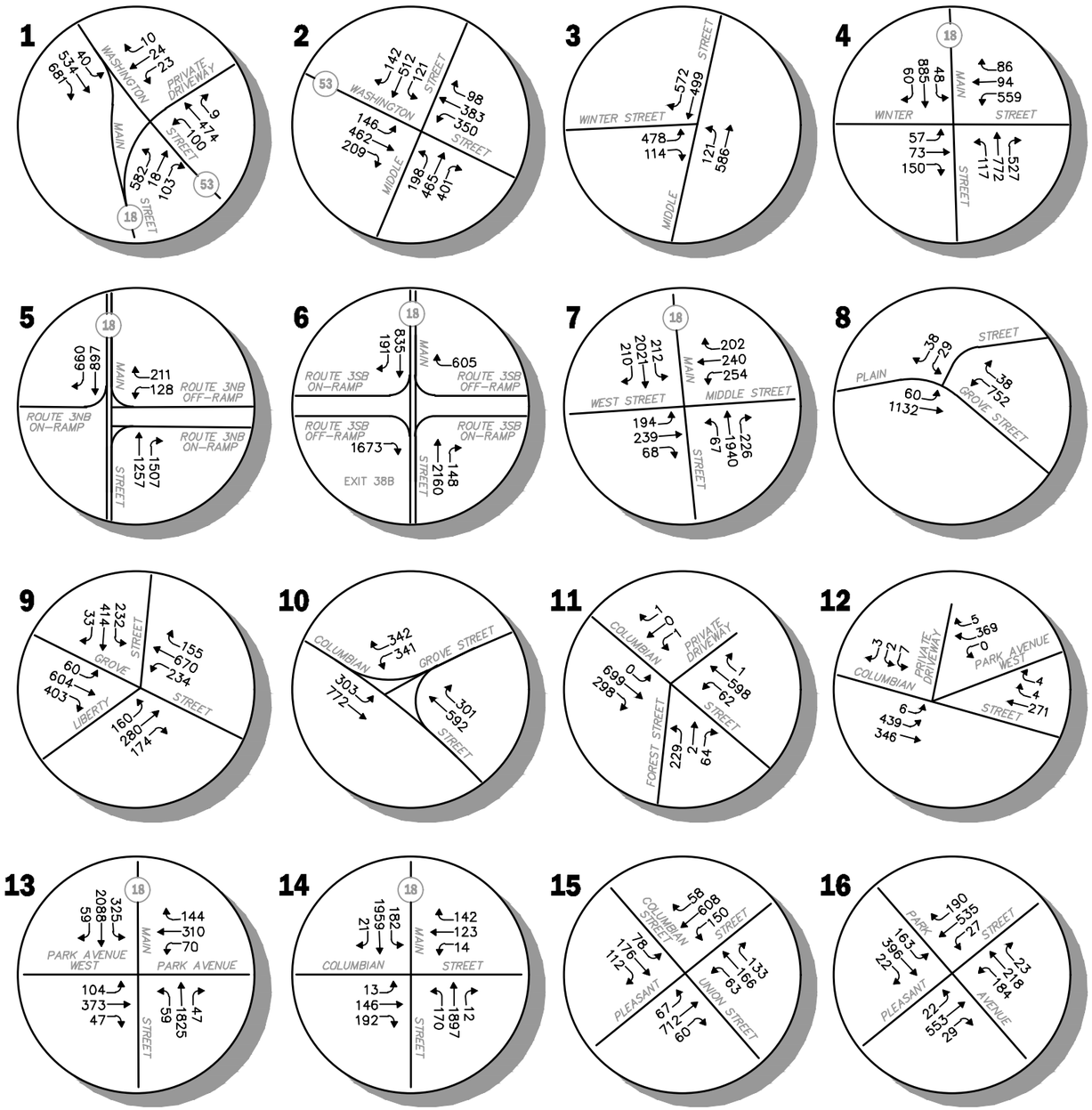
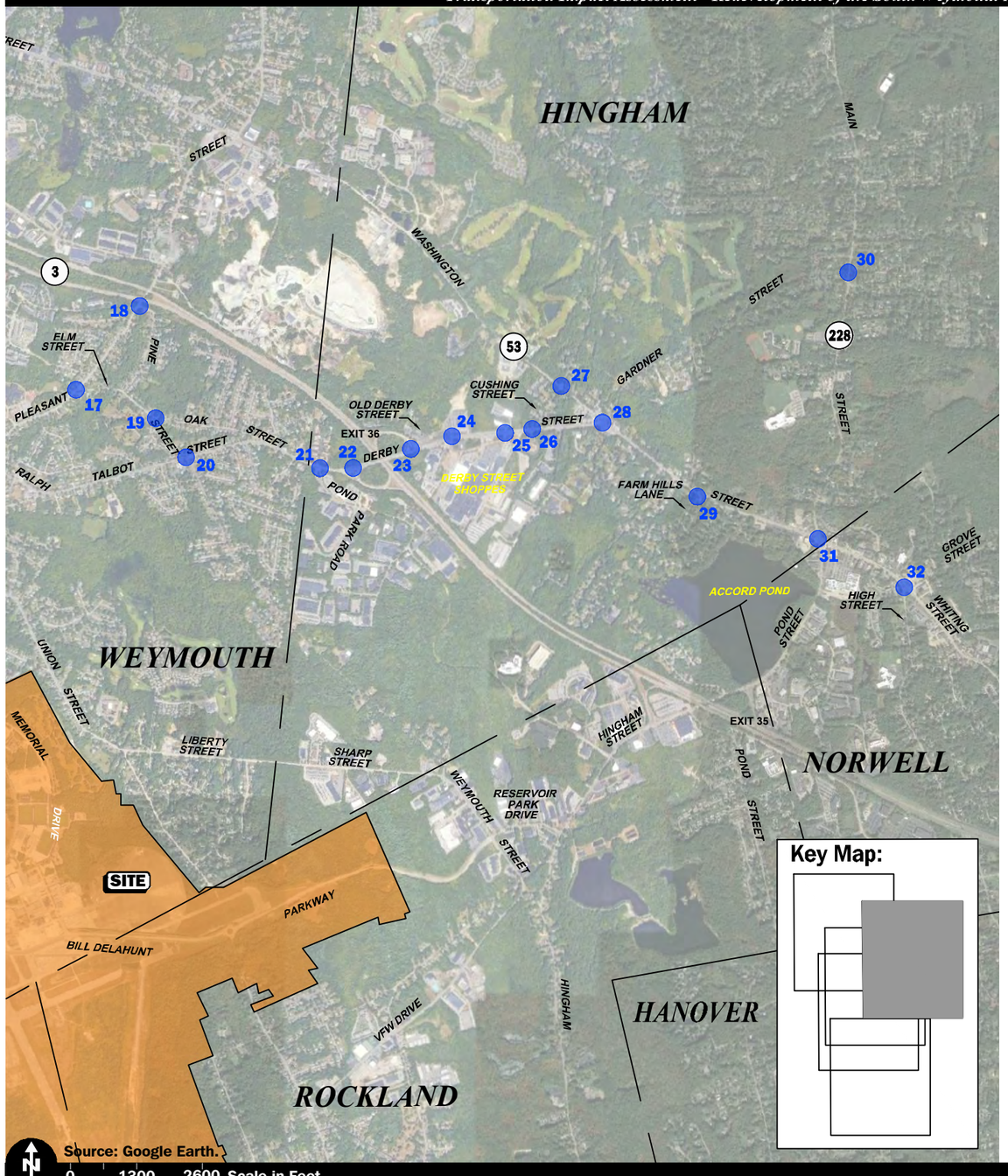
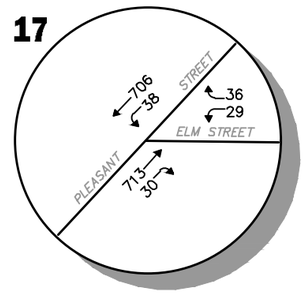


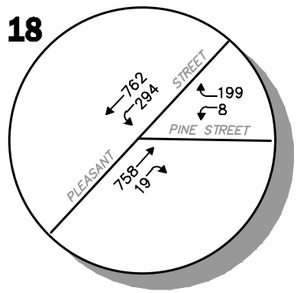
Figure 7-19A

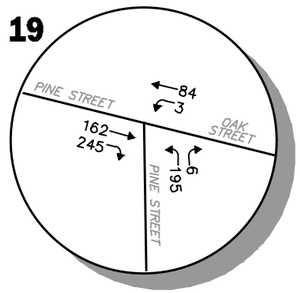
2043 Build
Saturday Midday
Peak-Hour Traffic Volumes

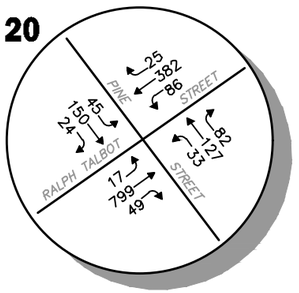
Vanasse & Associates inc

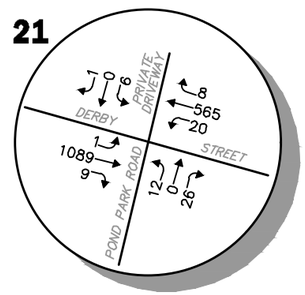


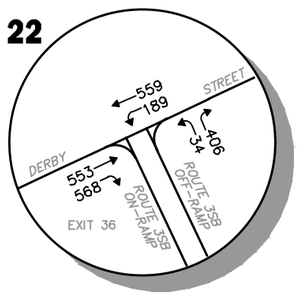


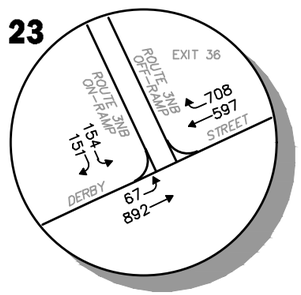


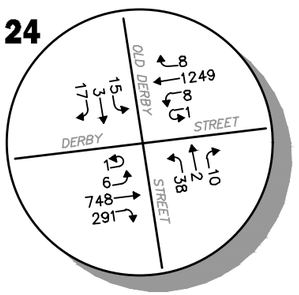


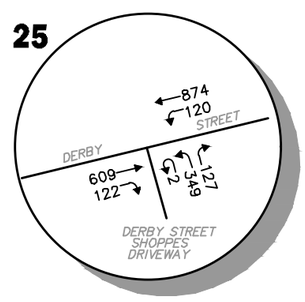


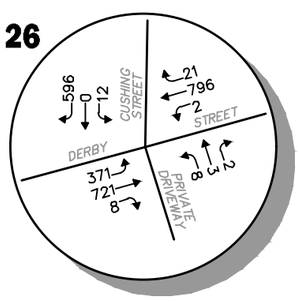


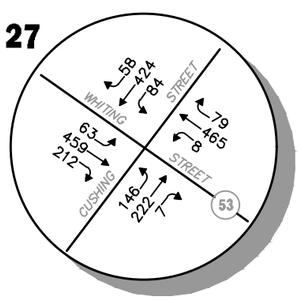


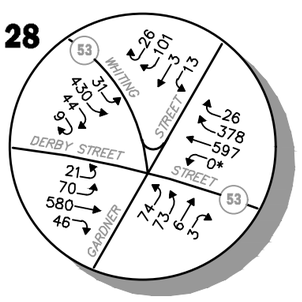


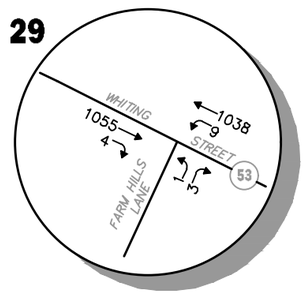


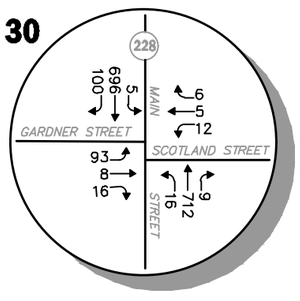


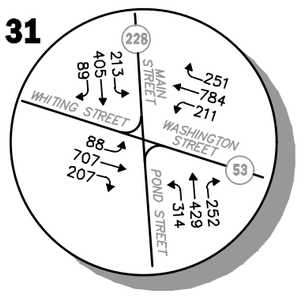












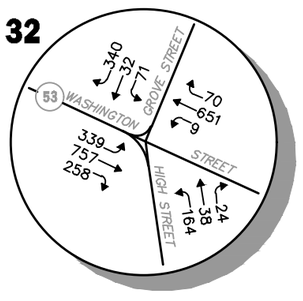
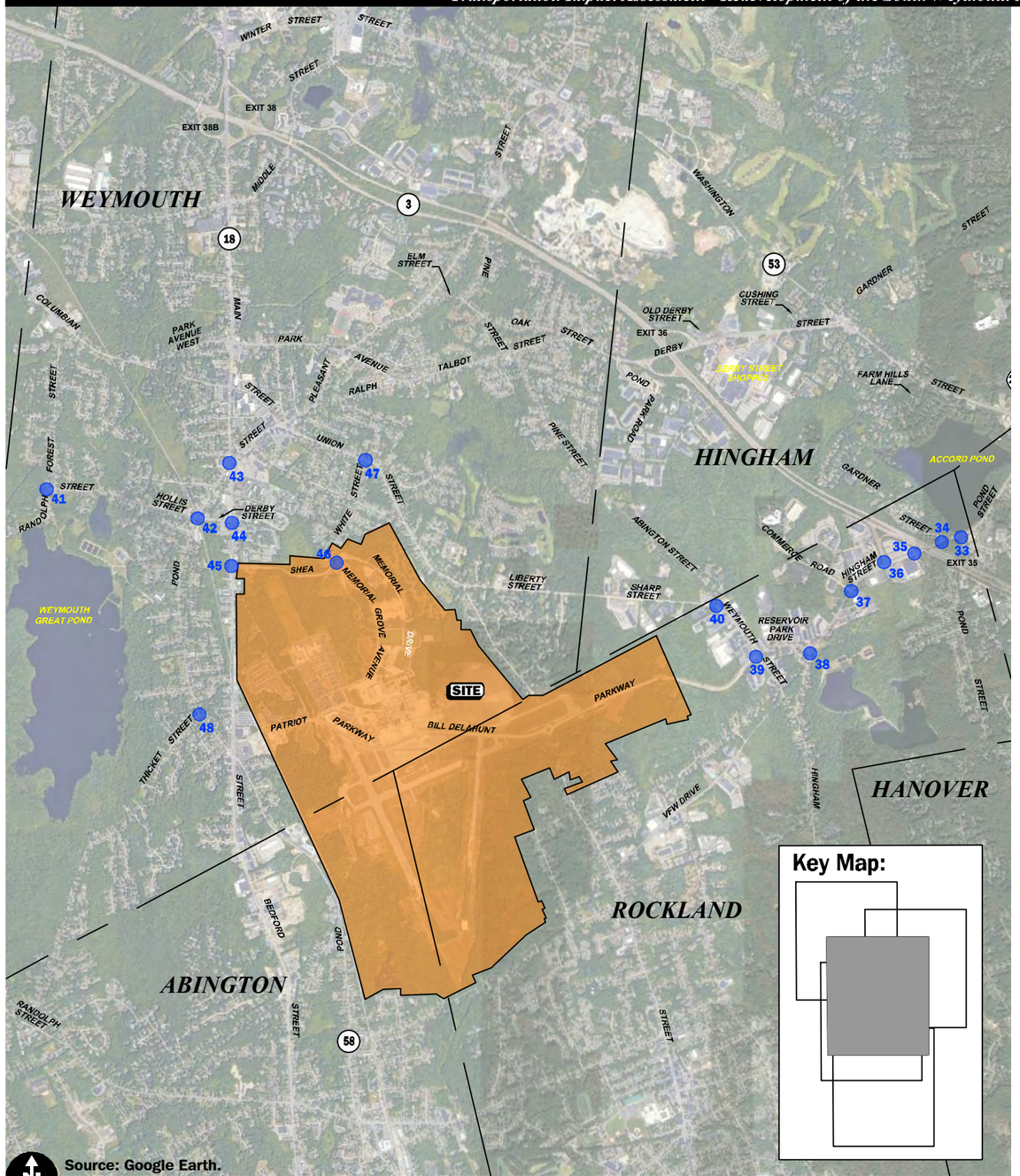
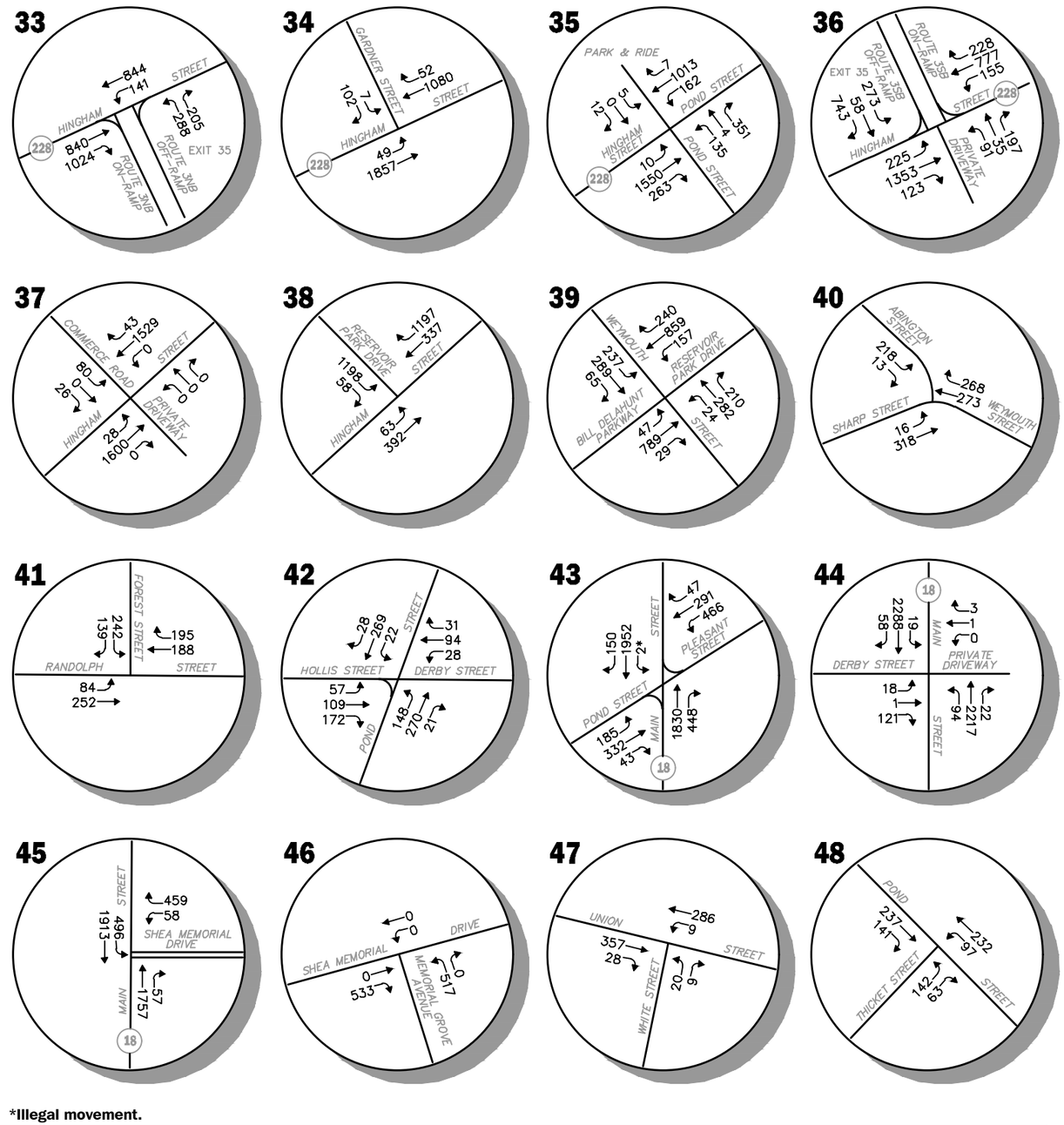


Figure 7-19B

2043 Build
Saturday Midday
Peak-Hour Traffic Volumes

Vanasse & Associates inc



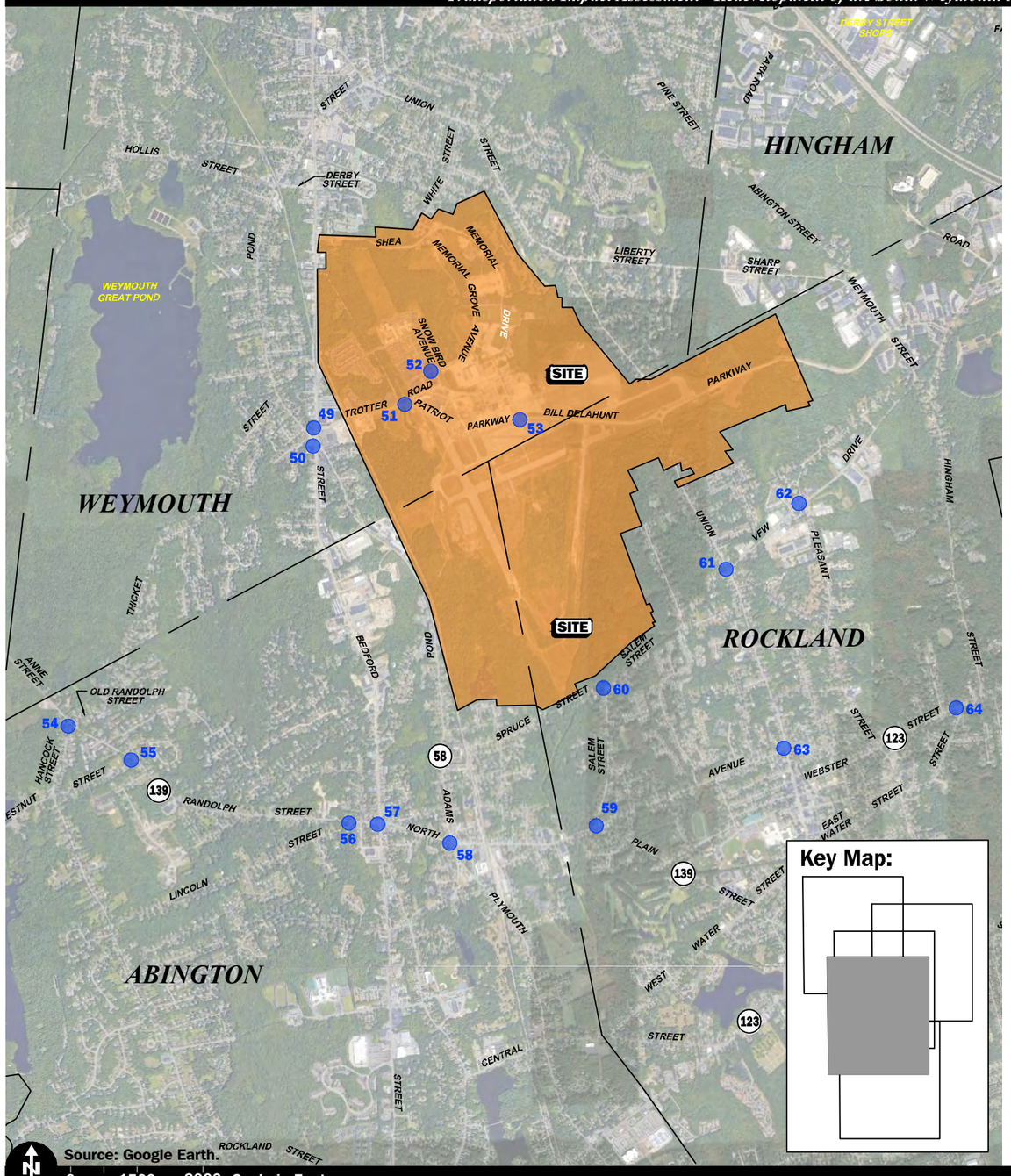


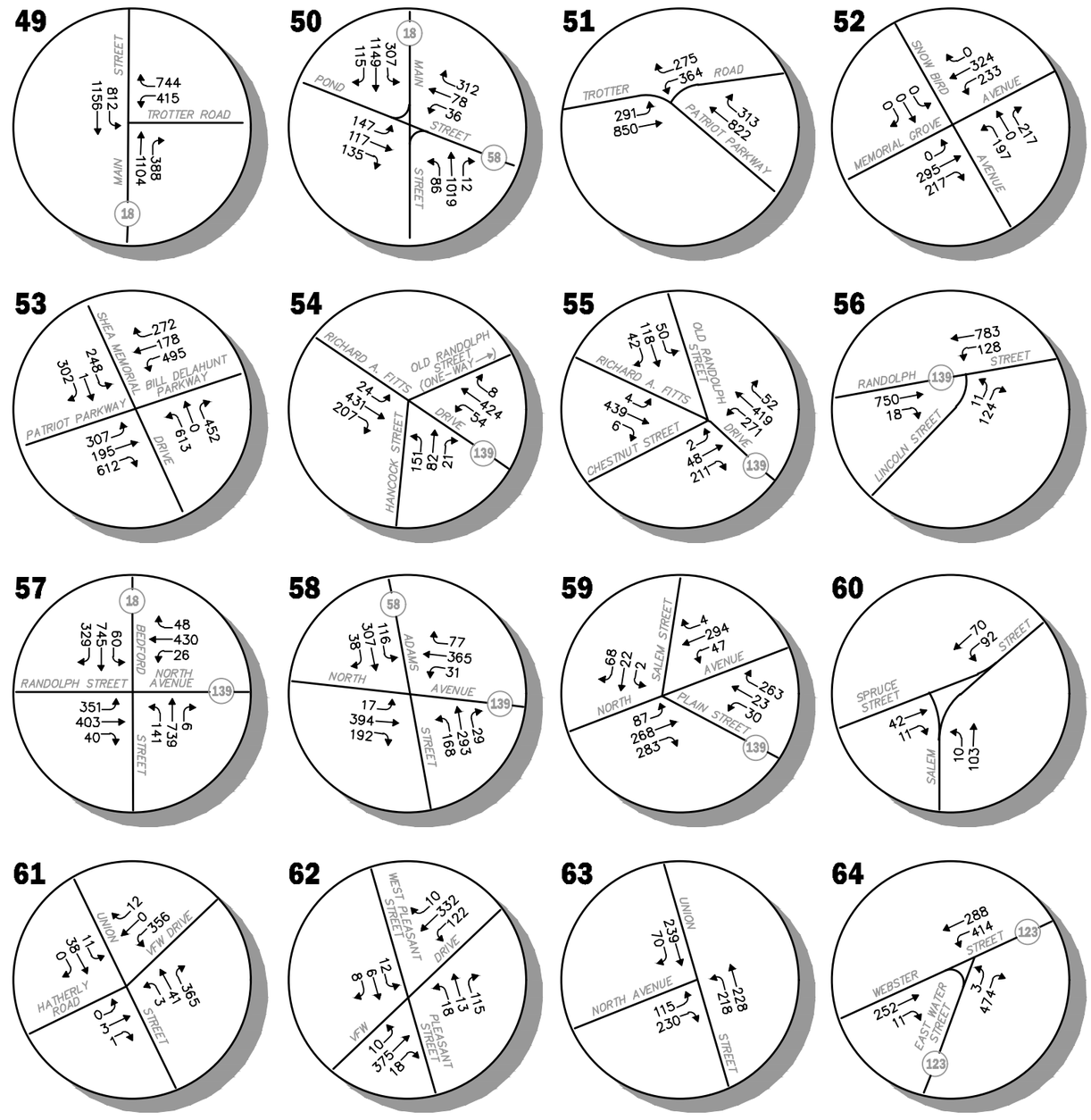
*Illegal movement.

Figure 7-19C

2043 Build
Saturday Midday
Peak-Hour Traffic Volumes

Vanasse & Associates inc



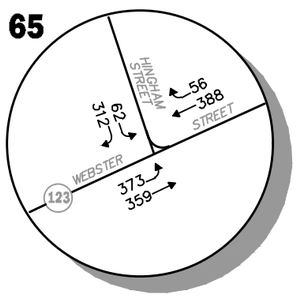


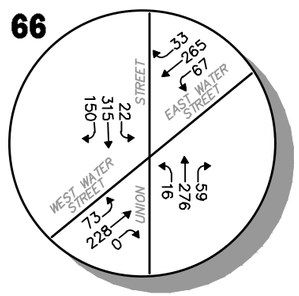
*Illegal movement.

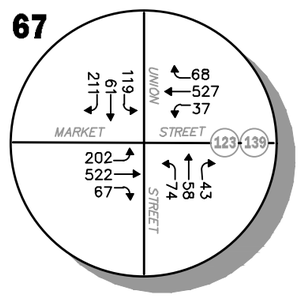
Figure 7-19D

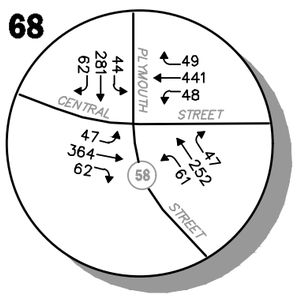
2043 Build
Saturday Midday
Peak-Hour Traffic Volumes

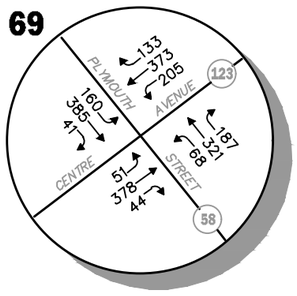
Vanasse & Associates inc

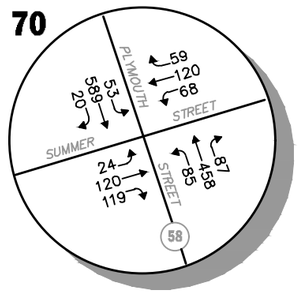


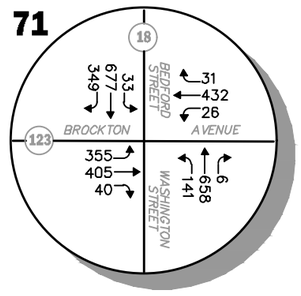


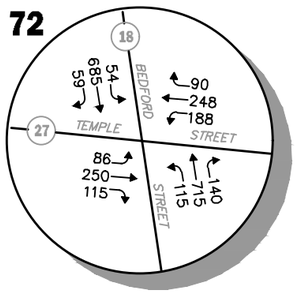


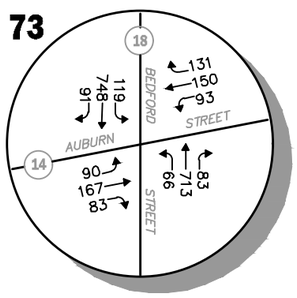












Source: Google Earth.

0 1600 3200 Scale in Feet

Figure 7-19E

2043 Build
Saturday Midday
Peak-Hour Traffic Volumes

Vanasse & Associates inc

TRAFFIC OPERATIONS ANALYSIS

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 Existing, No-Build, and Build traffic-volume 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.

METHODOLOGY

Levels of Service

A primary result of capacity analyses is the assignment of level of service to traffic facilities under various traffic-flow conditions.[38] 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 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 congested or constrained operating conditions.

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.

[38]The capacity analysis methodology is based on the concepts and procedures presented in the *Highway Capacity Manual, 6th Edition;* Transportation Research Board; Washington, DC; 2016.

Signalized Intersections

The six levels of service for signalized intersections may be described as follows:

- *LOS A* describes operations with very low control delay; most vehicles do not stop at all.
- *LOS B* describes operations with relatively low control delay. However, more vehicles stop than LOS A.
- *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.
- *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.
- *LOS E* describes operations with high control delay values. Individual cycle failures are frequent occurrences.
- *LOS F* describes operations with high control delay values that often occur with oversaturation. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Levels of service for signalized intersections are calculated using the operational analysis methodology of the 2000 *Highway Capacity Manual*[39] and implemented as a part of the Synchro® 11 software. This method assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on delay. Level-of-service designations are based on the criterion of control or signal delay per vehicle. Control or signal delay is a measure of 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 7-7 summarizes the relationship between level of service and control delay. The tabulated control delay criterion may be applied in assigning level-of-service designations to individual lane groups, to individual intersection approaches, or to entire intersections.

[39] *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2000.

Table 7-7
LEVEL-OF-SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS[a]

Level of Service	Control (Signal) Delay Per Vehicle (Seconds)
A	≤10.0
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	>80.0

[a]Source: *Highway Capacity Manual*, Transportation Research Board; Washington, DC; 2000; page 16-2.

Unsignalized Intersections

The six levels of service for unsignalized intersections may be described as follows:

- *LOS A* represents a condition with little or no control delay to minor street traffic.
- *LOS B* represents a condition with short control delays to minor street traffic.
- *LOS C* represents a condition with average control delays to minor street traffic.
- *LOS D* represents a condition with long control delays to minor street traffic.
- *LOS E* represents operating conditions at or near capacity level, with very long control delays to minor street traffic.
- *LOS F* represents a condition where minor street demand volume exceeds capacity of an approach lane, with extreme control delays resulting.

The levels of service of unsignalized intersections are determined by application of a procedure described in the *Highway Capacity Manual, 6th Edition.*[40] 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 *Highway Capacity Manual, 6th Edition*. Table 7-8 summarizes the relationship between level of service and average control delay for two-way stop controlled and all-way stop controlled intersections.

[40]*Highway Capacity Manual, 6th Edition;* Transportation Research Board; Washington, DC; 2016.

Table 7-8
LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS[a]

Level-of-Service by Volume-to-Capacity Ratio		Average Control Delay
v/c ≤ 1.0	v/c > 1.0	(Seconds Per Vehicle)
A	F	≤10.0
B	F	10.1 to 15.0
C	F	15.1 to 25.0
D	F	25.1 to 35.0
E	F	35.1 to 50.0
F	F	>50.0

[a]Source: *Highway Capacity Manual, 6th Edition*; Transportation Research Board; Washington, DC; 2016; page 20-6.

Vehicle Queue Analysis

Vehicle queue analyses are a direct measurement of an intersection's ability to process vehicles under various traffic control and volume scenarios and lane use arrangements. The vehicle queue analysis was performed using the Synchro® intersection capacity analysis software. The Synchro® vehicle queue analysis methodology is a simulation based model which reports the number of vehicles that experience a delay of six seconds or more at an intersection. For signalized intersections, Synchro® reports both the average (50th percentile) and the 95th percentile vehicle queue. For unsignalized intersections, Synchro® reports the 95th percentile vehicle queue. Vehicle queue lengths are a function of the capacity of the movement under study and the volume of traffic being processed by the intersection during the analysis period. The 95th percentile vehicle queue is the vehicle queue length that will be exceeded only 5 percent of the time, or approximately three minutes out of sixty minutes during the peak one hour of the day (during the remaining fifty-seven minutes, the vehicle queue length will be less than the 95th percentile queue length).

Merge/Diverge Analysis

The Highway Capacity Software (HCS) merge and diverge analysis is based on the procedures described in the *Highway Capacity Manual 6th edition*.[41] The main features of the merge and diverge method for freeway ramp capacity estimation are: the volume of traffic on the ramps and freeway; the number of lanes; the length of the acceleration/deceleration lane; free flow speeds; ramp type; ramp location (left or right); terrain type; and the presence of upstream and downstream ramps.

The HCS analytical model calculates a roadway density expressed in passenger cars per mile per lane (pc/mi/ln). The roadway density within the merge/diverge area is correlated to a level-of-service based on the concepts described in the HCM. The density ranges that define levels of service for merge and diverge conditions are shown in Table 7-9.

[41]Ibid.

Table 7-9
LEVEL-OF-SERVICE CRITERIA FOR FREEWAY MERGE AND DIVERGE SEGMENTS[a]

Level-of-Service	Density (pc/mi/ln)
A	≤10.0
B	>10-20
C	>20-28
D	>28-35
E	>35
F	Demand Exceeds Capacity

[a]Source: *Highway Capacity Manual; 6th Edition*; Transportation Research Board, Washington, D.C.; 2016.

ANALYSIS RESULTS

Level-of-service and vehicle queue analyses were conducted for 2023 Existing, 2043 No-Build, and 2043 Build conditions for the intersections within the study area. The results of the intersection capacity analyses summarizing overall operating conditions at the study area intersections are presented in Table 7-10, with a detailed summary and analysis results presented in the Appendix. *It should be noted that the Salem Street/Spruce Street intersection (Intersection 60) was analyzed as two separate intersections to reflect the separate functional areas created by the raised island on the Spruce Street approach.*

Table 7-10
OVERALL INTERSECTION LEVEL-OF-SERVICE SUMMARY

	2022 Existing	2043 No-Build	2043 Build
Route 18 at Route 53 (Intersection 1)			
Weekday Morning peak-hour	B	B	C
Weekday Evening peak-hour	B	C	C
Saturday Midday peak-hour	C	C	C
Route 53 at Middle Street (Intersection 2)			
Weekday Morning peak-hour	E	F	F
Weekday Evening peak-hour	F	F	F
Saturday Midday peak-hour	F	F	F
Middle Street at Winter Street (Intersection 3)			
Weekday Morning peak-hour	E	F	F
Weekday Evening peak-hour	F	F	F
Saturday Midday peak-hour	F	F	F

Table 7-10 (Continued)
OVERALL INTERSECTION LEVEL-OF-SERVICE SUMMARY

	2022 Existing	2043 No-Build	2043 Build
Route 18 at Winter Street (Intersection 4)			
Weekday Morning peak-hour	B	B	C
Weekday Evening peak-hour	C	C	D
Saturday Midday peak-hour	C	C	C
Route 18 at the Route 1 Northbound Ramps (Intersection 5)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A
Route 18 at the Route 1 Southbound Ramps (Intersection 6)			
Weekday Morning peak-hour	A	A	B
Weekday Evening peak-hour	A	A	B
Saturday Midday peak-hour	A	B	B
Route 18 at West Street and Middle Street (Intersection 7)			
Weekday Morning peak-hour	D	E	F
Weekday Evening peak-hour	D	E	F
Saturday Midday peak-hour	C	D	F
Grove Street at Plain Street (Intersection 8)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A
Liberty Street at Grove Street (Intersection 9)			
Weekday Morning peak-hour	C	C	D
Weekday Evening peak-hour	D	E	F
Saturday Midday peak-hour	D	D	E
Grove Street at Columbian Street (Intersection 10)			
Weekday Morning peak-hour	A	B	B
Weekday Evening peak-hour	B	C	D
Saturday Midday peak-hour	A	B	B
Columbian Street at Forest Street(Intersection 11)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A

Table 7-10 (Continued)
OVERALL INTERSECTION LEVEL-OF-SERVICE SUMMARY

	2022 Existing	2043 No-Build	2043 Build
Columbian Street at Park Avenue West (Intersection 12)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A
Route 18 at Park Avenue and Park Avenue West (Intersection 13)			
Weekday Morning peak-hour	D	D	F
Weekday Evening peak-hour	C	D	F
Saturday Midday peak-hour	C	D	F
Route 18 at Columbian Street (Intersection 14)			
Weekday Morning peak-hour	C	D	F
Weekday Evening peak-hour	C	D	F
Saturday Midday peak-hour	B	C	F
Pleasant Street at Columbian Street and Union Street (Intersection 15)			
Weekday Morning peak-hour	A	C	D
Weekday Evening peak-hour	A	D	D
Saturday Midday peak-hour	A	C	C
Pleasant Street at Park Avenue (Intersection 16)			
Weekday Morning peak-hour	C	C	D
Weekday Evening peak-hour	D	E	E
Saturday Midday peak-hour	C	D	D
Pleasant Street at Elm Street (Intersection 17)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A
Pleasant Street at Pine Street (Intersection 18)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A
Pine Street at Oak Street (Intersection 19)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A

Table 7-10 (Continued)
OVERALL INTERSECTION LEVEL-OF-SERVICE SUMMARY

	2022 Existing	2043 No-Build	2043 Build
Pine Street at Ralph Talbot Street (Intersection 20)			
Weekday Morning peak-hour	B	B	C
Weekday Evening peak-hour	C	D	E
Saturday Midday peak-hour	B	B	B
Pond Park Road at Derby Street (Intersection 21)			
Weekday Morning peak-hour	A	B	B
Weekday Evening peak-hour	B	B	B
Saturday Midday peak-hour	A	A	A
Derby Street at the Route 3 Southbound Ramps (Intersection 22)			
Weekday Morning peak-hour	A	B	B
Weekday Evening peak-hour	B	B	B
Saturday Midday peak-hour	A	A	A
Derby Street at the Route 3 Northbound Ramps (Intersection 23)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	B	B
Saturday Midday peak-hour	A	A	A
Derby Street at Old Derby Street (Intersection 24)			
Weekday Morning peak-hour	B	B	B
Weekday Evening peak-hour	B	B	B
Saturday Midday peak-hour	B	B	B
Derby Street at the Derby Street Shops Driveway (Intersection 25)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	B	B	B
Saturday Midday peak-hour	B	B	B
Derby Street at Cushing Street (Intersection 26)			
Weekday Morning peak-hour	B	C	C
Weekday Evening peak-hour	C	C	C
Saturday Midday peak-hour	C	C	C
Route 53 at Cushing Street (Intersection 27)			
Weekday Morning peak-hour	B	B	B
Weekday Evening peak-hour	C	C	C
Saturday Midday peak-hour	C	C	C

Table 7-10 (Continued)
OVERALL INTERSECTION LEVEL-OF-SERVICE SUMMARY

	2022 Existing	2043 No-Build	2043 Build
Route 53 at Derby Street and Gardner Street (Intersection 28)			
Weekday Morning peak-hour	D	E	E
Weekday Evening peak-hour	F	E	F
Saturday Midday peak-hour	E	E	E
Route 53 at Farm Hills Lane (Intersection 29)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A
Route 228 at Gardner Street and Scotland Street (Intersection 30)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A
Route 228 at Route 53 (Intersection 31)			
Weekday Morning peak-hour	C	C	D
Weekday Evening peak-hour	C	D	D
Saturday Midday peak-hour	C	C	C
Route 53 at High Street and Grove Street (Intersection 32)			
Weekday Morning peak-hour	C	C	C
Weekday Evening peak-hour	D	C	C
Saturday Midday peak-hour	C	C	C
Route 228 at the Route 3 Northbound Ramps (Intersection 33)			
Weekday Morning peak-hour	A	B	C
Weekday Evening peak-hour	A	B	B
Saturday Midday peak-hour	A	A	A
Route 228 at Garden Street (Intersection 34)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A
Route 228 at Pond Street (Intersection 35)			
Weekday Morning peak-hour	B	B	C
Weekday Evening peak-hour	C	D	E
Saturday Midday peak-hour	B	B	C

Table 7-10 (Continued)
OVERALL INTERSECTION LEVEL-OF-SERVICE SUMMARY

	2022 Existing	2043 No-Build	2043 Build
Route 228 at Hingham Street and the Route 3 Southbound Ramps (Intersection 36)			
Weekday Morning peak-hour	C	C	E
Weekday Evening peak-hour	D	D	E
Saturday Midday peak-hour	C	C	C
Hingham Street at Commerce Road (Intersection 37)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	B	B	D
Saturday Midday peak-hour	A	A	A
Hingham Street at Reservoir Park Drive (Intersection 38)			
Weekday Morning peak-hour	C	B	F
Weekday Evening peak-hour	B	B	F
Saturday Midday peak-hour	B	B	C
Weymouth Street at Bill Delahunt Parkway and Reservoir Park Drive (Intersection 39)			
Weekday Morning peak-hour	C	C	F
Weekday Evening peak-hour	C	C	F
Saturday Midday peak-hour	B	B	E
Weymouth Street at Sharp Street at Abington Street (Intersection 40)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A
Randolph Street at Forest Street (Intersection 41)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A
Pond Street at Hollis Street and Derby Street (Intersection 42)			
Weekday Morning peak-hour	C	C	D
Weekday Evening peak-hour	C	C	D
Saturday Midday peak-hour	C	C	C
Route 18 at Pond Street and Pleasant Street (Intersection 43)			
Weekday Morning peak-hour	C	C	F
Weekday Evening peak-hour	C	D	F
Saturday Midday peak-hour	C	C	F

Table 7-10 (Continued)
OVERALL INTERSECTION LEVEL-OF-SERVICE SUMMARY

	2022 Existing	2043 No-Build	2043 Build
Route 18 at Derby Street (Intersection 44)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A
Route 18 at Shea Memorial Drive (Intersection 45)			
Weekday Morning peak-hour	B	B	F
Weekday Evening peak-hour	B	B	F
Saturday Midday peak-hour	B	B	F
Shea Memorial Drive at Memorial Grove Avenue (Intersection 46)			
Weekday Morning peak-hour	A	A	E
Weekday Evening peak-hour	A	A	F
Saturday Midday peak-hour	A	A	C
White Street at Union Street (Intersection 47)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A
Thicket Street at Pond Street (Intersection 48)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A
Route 18 at Trotter Road (Intersection 49)			
Weekday Morning peak-hour	B	B	F
Weekday Evening peak-hour	B	C	F
Saturday Midday peak-hour	B	B	F
Route 18 at Pond Street (Intersection 50)			
Weekday Morning peak-hour	B	C	C
Weekday Evening peak-hour	B	C	C
Saturday Midday peak-hour	B	C	C
Trotter Road at Patriot Parkway (Intersection 51)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A
Snow Bird Avenue at Memorial Grove Avenue (Intersection 52)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	D
Saturday Midday peak-hour	A	A	B

Table 7-10 (Continued)
OVERALL INTERSECTION LEVEL-OF-SERVICE SUMMARY

	2022 Existing	2043 No-Build	2043 Build
Patriot Parkway at Shea Memorial Drive and Bill Delahunt Parkway (Intersection 53)			
Weekday Morning peak-hour	A	A	F
Weekday Evening peak-hour	A	A	F
Saturday Midday peak-hour	A	A	F
Route 139 at Hancock Street and Old Randolph Street (Intersection 54)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A
Route 139 at Chestnut Street and Old Randolph Street (Intersection 55)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A
Route 139 at Lincoln Street (Intersection 56)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A
Route 18 at Route 139 (Intersection 57)			
Weekday Morning peak-hour	D	D	E
Weekday Evening peak-hour	D	D	F
Saturday Midday peak-hour	C	D	E
Route 58 at Route 139 (Intersection 58)			
Weekday Morning peak-hour	C	C	C
Weekday Evening peak-hour	C	C	C
Saturday Midday peak-hour	C	D	D
Route 139 at North Avenue and Salem Street (Intersection 59)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A
Salem Street at Spruce Street (Intersection 60) (North Leg/South Leg)			
Weekday Morning peak-hour	A/A	A/A	A/A
Weekday Evening peak-hour	A/A	A/A	A/A
Saturday Midday peak-hour	A/A	A/A	A/A

Table 7-10 (Continued)
OVERALL INTERSECTION LEVEL-OF-SERVICE SUMMARY

	2022 Existing	2043 No-Build	2043 Build
Union Street at VFW Drive and Hatherly Road (Intersection 61)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A
VFW Drive at Pleasant Street and West Pleasant Street (Intersection 62)			
Weekday Morning peak-hour	A	A	A
Weekday Evening peak-hour	A	A	A
Saturday Midday peak-hour	A	A	A
Union Street at North Avenue (Intersection 63)			
Weekday Morning peak-hour	B	B	B
Weekday Evening peak-hour	B	B	B
Saturday Midday peak-hour	B	B	B
Route 123 at Webster Street (Intersection 64)			
Weekday Morning peak-hour	B	C	C
Weekday Evening peak-hour	B	B	B
Saturday Midday peak-hour	B	B	B
Route 123 at Hingham Street (Intersection 65)			
Weekday Morning peak-hour	B	C	C
Weekday Evening peak-hour	B	C	C
Saturday Midday peak-hour	A	B	B
Union St. at East Water Street and West Water Street (Intersection 66)			
Weekday Morning peak-hour	B	C	C
Weekday Evening peak-hour	B	C	C
Saturday Midday peak-hour	A	B	B
Route 123 at Union Street (Intersection 67)			
Weekday Morning peak-hour	B	B	B
Weekday Evening peak-hour	B	C	C
Saturday Midday peak-hour	B	C	C
Route 58 at Central Street (Intersection 68)			
Weekday Morning peak-hour	B	B	B
Weekday Evening peak-hour	C	D	D
Saturday Midday peak-hour	B	C	C
Route 123 at Route 58 (Intersection 69)			
Weekday Morning peak-hour	C	C	C
Weekday Evening peak-hour	E	E	E
Saturday Midday peak-hour	D	D	D

Table 7-10 (Continued)
OVERALL INTERSECTION LEVEL-OF-SERVICE SUMMARY

	2022 Existing	2043 No-Build	2043 Build
Route 58 at Summer Street (Intersection 70)			
Weekday Morning peak-hour	B	B	B
Weekday Evening peak-hour	C	E	E
Saturday Midday peak-hour	B	B	B
Route 18 at Route 123 (Intersection 71)			
Weekday Morning peak-hour	D	D	F
Weekday Evening peak-hour	D	D	E
Saturday Midday peak-hour	D	D	D
Route 18 at Route 27 (Intersection 72)			
Weekday Morning peak-hour	C	C	C
Weekday Evening peak-hour	C	D	D
Saturday Midday peak-hour	C	C	C
Route 18 at Route 14 (Intersection 73)			
Weekday Morning peak-hour	B	B	B
Weekday Evening peak-hour	B	B	B
Saturday Midday peak-hour	C	C	C

As can be seen in Table 7-10, 51 of the 73 study area intersections are predicted to continue to operate at an overall LOS D or better during all three peak hours with the addition of Project-related traffic, where an LOS of "D" or better is generally defined as "acceptable" operating conditions, with 16 of the 73 intersections shown to drop to a level of service below LOS D during one or more peak hour as a result of the addition of Project-related traffic. Specific improvements have been identified for these intersections that are intended to reduce motorist delays and vehicle queuing, and off-set the predicted impact of the Project (see *Recommendations* section).

The following section describes operating conditions at those intersections that are currently or are predicted to operate at or over capacity (i.e., LOS "E" or "F", respectively).

Signalized Intersections

Route 53 at Middle Street (Intersection 2)

No-change in overall level of service is predicted to occur over No-Build conditions, with Project-related impacts defined as an increase in vehicle queuing of up to six (6) vehicles. Focusing on individual movements, the addition of Project-related traffic was shown to result in an increase in average motorist delay that caused the following level of service changes:

- *Weekday Morning peak-hour:*
    - Route 53 westbound left-turn movements - LOS D to LOS F
    - Middle Street northbound through movements - LOS D to LOS E
    - Middle Street northbound right-turn movements - LOS E to LOS F

- *Saturday Midday peak-hour:*
    - Route 53 eastbound left-turn movements - LOS D to LOS E
    - Route 53 westbound through/right-turn movements - LOS D to LOS E

Independent of the Project, overall operating conditions at the intersection are at or over capacity during the weekday morning, weekday evening, and Saturday midday peak-hours.

Middle Street at Winter Street (Intersection 3)

No-change in overall level of service is predicted to occur over No-Build conditions, with Project-related impacts defined as an increase in vehicle queuing of up to four (4) vehicles. Focusing on individual movements, the addition of Project-related traffic was shown to result in an increase in average motorist delay that caused the following level of service change:

- *Weekday Evening peak-hour:*
    - Winter Street eastbound left-turn movements - LOS D to LOS E

Independent of the Project, overall operating conditions at the intersection are currently or over capacity during the weekday morning, weekday evening, and Saturday midday peak-hours.

Route 18 at West Street and Middle Street (Intersection 7)

Overall operating conditions were shown to change from LOS E to LOS F during the weekday morning and weekday evening peak-hours and from LOS D to LOS F during the Saturday midday peak-hour with the addition of Project-related traffic, with vehicle queues predicted to increase by more than 15 vehicles. Focusing on individual movements, the addition of Project-related traffic was shown to result in an increase in average motorist delay that caused the following level of service changes:

- *Weekday Morning peak-hour:*
    - Route 18 northbound through movements - LOS E to LOS F
    - Route 18 southbound through movements - LOS C to LOS E
- *Weekday Evening peak-hour:*
    - Route 18 southbound through movements - LOS D to LOS E
- *Saturday Midday peak-hour:*
    - Route 18 northbound through movements - LOS D to LOS F
    - Route 18 southbound through movements - LOS C to LOS F

Independent of the Project, overall operating conditions at the intersection are predicted to be at capacity during the weekday morning and weekday evening peak-hours.

Liberty Street at Grove Street (Intersection 9)

Overall operating conditions were shown to change from LOS C to LOS D during the weekday morning peak-hour, from LOS E to LOS F during the weekday evening peak-hour and from LOS D

to LOS E during the Saturday midday peak-hour with the addition of Project-related traffic, with vehicle queues predicted to increase by up to 13 vehicles. Focusing on individual movements, the addition of Project-related traffic was shown to result in an increase in average motorist delay that caused the following level of service changes:

- *Weekday Morning peak-hour:*
    - Grove Street westbound left-turn movements - LOS B to LOS C
    - Grove Street westbound through movements - LOS C to LOS D
- *Weekday Evening peak-hour:*
    - Grove Street westbound through movements - LOS D to LOS F
- *Saturday Midday peak-hour:*
    - Grove Street eastbound through movements - LOS DE to LOS F
    - Grove Street westbound through movements - LOS D to LOS E

Independent of the Project, overall operating conditions at the intersection are predicted to be at capacity during the weekday evening peak-hour.

Route 18 at Park Avenue and Park Avenue West (Intersection 13)

Overall operating conditions were shown to change from LOS D to LOS F during the weekday morning, weekday evening and Saturday midday peak-hours with the addition of Project-related traffic, with vehicle queues predicted to increase by more than 15 vehicles. Focusing on individual movements, the addition of Project-related traffic was shown to result in an increase in average motorist delay that caused the following level of service changes:

- *Weekday Morning peak-hour:*
    - Route 18 northbound left-turn movements - LOS B to LOS C
    - Route 18 northbound through/right-turn movements – LOS E to LOS F
    - Route 18 southbound through movements - LOS C to LOS E
- *Weekday Evening peak-hour:*
    - Route 18 northbound through/right-turn movements – LOS C to LOS F
    - Route 18 southbound through movements - LOS D to LOS F
- *Saturday Midday peak-hour:*
    - Route 18 northbound through/right-turn movements – LOS D to LOS F
    - Route 18 southbound through movements - LOS C to LOS F

Independent of the Project, left-turn movements from Route 18 southbound currently operate over capacity during the weekday morning and Saturday midday peak-hours.

Route 18 at Columbian Street (Intersection 14)

Overall operating conditions were shown to change from LOS E to LOS F during the weekday morning and weekday evening peak-hours, and from LOS D to LOS F during the Saturday midday peak-hour with the addition of Project-related traffic, with vehicle queues predicted to increase by

more than 15 vehicles. Focusing on individual movements, the addition of Project-related traffic was shown to result in an increase in average motorist delay that caused the following level of service changes:

- *Weekday Morning peak-hour:*
    - Route 18 northbound left-turn movements – LOS A to LOS C
    - Route 18 northbound through/right-turn movements – LOS C to LOS F
    - Route 18 southbound through/right-turn movements - LOS B to LOS D
    - Columbian Street eastbound right-turn movements - LOS C to LOS D
    - Columbian Street westbound right-turn movements – LOS C to LOS D

- *Weekday Evening peak-hour:*
    - Route 18 northbound left-turn movements – LOS C to LOS F
    - Route 18 northbound through/right-turn movements – LOS C to LOS F
    - Route 18 northbound left-turn movements – LOS D to LOS F
    - Route 18 southbound through/right-turn movements - LOS C to LOS F
    - Columbian Street westbound right-turn movements – LOS C to LOS D

- *Saturday Midday peak-hour:*
    - Route 18 northbound left-turn movements – LOS B to LOS D
    - Route 18 northbound through/right-turn movements – LOS C to LOS F
    - Route 18 northbound left-turn movements – LOS D to LOS E
    - Route 18 southbound through/right-turn movements - LOS C to LOS F
    - Columbian Street eastbound left-turn/through movements - LOS D to LOS E
    - Columbian Street westbound left-turn/through movements – LOS D to LOS E

Independent of the Project, one or more movements at the intersection are predicted to operate over capacity during the weekday morning and weekday evening peak-hours.

Pleasant Street at Park Avenue (Intersection 16)

Overall operating conditions were shown to change from LOS C to LOS D during the weekday morning peak-hour with the addition of Project-related traffic, with an increase in vehicle queuing of up to four (4) vehicles. Focusing on individual movements, the addition of Project-related traffic was shown to result in an increase in average motorist delay that caused the following level of service changes:

- *Weekday Morning peak-hour:*
    - Pleasant Street southbound left-turn/through movements – LOS C to LOS E

- *Weekday Evening peak-hour:*
    - Pleasant Street southbound through/right-turn movements - LOS C to LOS D
    - Pleasant Street northeastbound approach – LOS B to LOS C

- *Saturday Midday peak-hour:*
    - Pleasant Street southbound left-turn/through movements – LOS D to LOS F

Independent of the Project, one or more movements at the intersection are currently or are predicted to operate at or over capacity during the weekday evening and Saturday midday peak-hours.

Pine Street at Ralph Talbot Street (Intersection 20)

Overall operating conditions were shown to change from LOS B to LOS C during the weekday morning peak-hour and from LOS D to LOS E during the weekday evening peak-hour with the addition of Project-related traffic, with an increase in vehicle queuing of up to six (6) vehicles. Focusing on individual movements, the addition of Project-related traffic was shown to result in an increase in average motorist delay that caused the following level of service changes:

- *Weekday Evening peak-hour:*
    - Pine Street southeastbound approach – LOS E to LOS F
    - Pine Street northwestbound approach – LOS D to LOS E
    - Ralph Talbot Street westbound approach – LOS D to LOS F

Independent of the Project, movements from Pine Street southeastbound are predicted to operate at capacity during the weekday evening peak-hour.

Route 53 at Derby Street and Gardner Street (Intersection 28)

Overall operating conditions were shown to change from LOS E to LOS F during the weekday evening peak-hour with the addition of Project-related traffic, with an increase in vehicle queuing of up to three (3) vehicles. Focusing on individual movements, the addition of Project-related traffic was shown to result in an increase in average motorist delay that caused the following level of service change:

- *Weekday Morning peak-hour:*
    - Route 53 southbound U-turn/left-turn movements – LOS D to LOS E

Independent of the Project, overall operating conditions at the intersection are currently at or over capacity during the weekday morning, weekday evening, and Saturday midday peak-hours.

Route 228 at Pond Street (Intersection 35)

Overall operating conditions were shown to change from LOS B to LOS C during the weekday morning and Saturday midday peak-hours, and from LOS D to LOS E during the weekday evening peak-hour with the addition of Project-related traffic, with vehicle queues predicted to increase by more than 15 vehicles. Focusing on individual movements, the addition of Project-related traffic was shown to result in an increase in average motorist delay that caused the following level of service changes:

- *Weekday Morning peak-hour:*
    - Route 228 eastbound left-turn/through movements – LOS B to LOS C
    - Route 228 westbound approach – LOS B to LOS C
    - Pond Street northbound left-turn/through movements – LOS C to LOS D
    - Pond Street northbound right-turn movements - LOS C to LOS D
    - Park and Ride driveway southbound left-turn/through movements – LOS C to LOS D

- Park and Ride driveway southbound right-turn movements - LOS C to LOS D

- *Weekday Evening peak-hour:*
  - Route 228 eastbound left-turn/through movements – LOS B to LOS D
  - Route 228 westbound approach – LOS E to LOS F

- *Saturday Midday peak-hour:*
  - Route 228 westbound approach – LOS B to LOS C
  - Pond Street northbound left-turn/through movements – LOS C to LOS D
  - Pond Street northbound right-turn movements - LOS C to LOS D

Independent of the Project, one or more movements at the intersection currently operate at or are predicted to operate at or over capacity during the weekday evening peak-hour.

Route 228 at Hingham Street and the Route 3 Southbound Ramps (Intersection 36)

Overall operating conditions were shown to change from LOS C to LOS E during the weekday morning peak-hour and from LOS D to LOS E during the weekday evening peak-hour with the addition of Project-related traffic, with vehicle queues predicted to increase by more than 15 vehicles. Focusing on individual movements, the addition of Project-related traffic was shown to result in an increase in average motorist delay that caused the following level of service changes:

- *Weekday Morning peak-hour:*
  - Hingham Street eastbound through/right-turn movements - LOS C to LOS F

- *Weekday Evening peak-hour:*
  - Route 228 westbound through/right-turn movements – LOS D to LOS E
  - Hingham Street eastbound left-turn movements – LOS E to LOS F
  - Hingham Street eastbound through/right-turn movements - LOS D to LOS E

- *Saturday Midday peak-hour:*
  - Hingham Street eastbound through/right-turn movements - LOS C to LOS D
  - The Route 3 Southbound Off-Ramp left-turn movements – LOS C to LOS D
  - The Route 3 Southbound Off-Ramp left-turn/through movements – LOS C to LOS D
  - The Private driveway northbound through movements – LOS C to LOS D
  - The Private driveway northbound right-turn movements - LOS C to LOS D

Independent of the Project, one or more movements at the intersection currently operate at or are predicted to operate at capacity during the weekday evening peak-hour.

Hingham Street at Reservoir Park Drive (Intersection 38)

Overall operating conditions were shown to change from LOS B to LOS F during the weekday morning and weekday evening peak-hours, and from LOS B to LOS C during the Saturday midday peak-hour with the addition of Project-related traffic, with vehicle queues predicted to increase by more than 15 vehicles. Focusing on individual movements, the addition of Project-related traffic

was shown to result in an increase in average motorist delay that caused the following level of service changes:

- *Weekday Morning peak-hour:*
    - Hingham Street northbound through movements - LOS C to LOS F
    - Reservoir Park Drive eastbound left-turn/right-turn movements - LOS C to LOS F

- *Weekday Evening peak-hour:*
    - Hingham Street northbound through movements - LOS A to LOS B
    - Reservoir Park Drive eastbound left-turn/right-turn movements - LOS C to LOS F

- *Saturday Midday peak-hour:*
    - Hingham Street northbound left-turn movements – LOS A to LOS B
    - Hingham Street northbound through movements - LOS A to LOS B
    - Hingham Street southbound through movements – LOS A to LOS C
    - Reservoir Park Drive eastbound left-turn/right-turn movements - LOS B to LOS E

Weymouth Street at Bill Delahunt Parkway and Reservoir Park Drive (Intersection 39)

Overall operating conditions were shown to change from LOS B to LOS F during the weekday morning and weekday evening peak-hours, and from LOS B to LOS E during the Saturday midday peak-hour with the addition of Project-related traffic, with vehicle queues predicted to increase by more than 15 vehicles. Focusing on individual movements, the addition of Project-related traffic was shown to result in an increase in average motorist delay that caused the following level of service changes:

- *Weekday Morning peak-hour:*
    - Bill Delahunt Parkway northeastbound left-turn movements - LOS D to LOS F
    - Bill Delahunt Parkway northeastbound through/right-turn movements - LOS C to LOS F
    - Reservoir Park Drive southwestbound left-turn movements – LOS C to LOS D
    - Reservoir Park Drive southwestbound through/right-turn movements – LOS C to LOS D

- *Weekday Evening peak-hour:*
    - Bill Delahunt Parkway northeastbound left-turn movements - LOS D to LOS F
    - Bill Delahunt Parkway northeastbound through/right-turn movements - LOS C to LOS F
    - Reservoir Park Drive southwestbound left-turn movements – LOS D to LOS E
    - Reservoir Park Drive southwestbound through/right-turn movements – LOS B to LOS E

- *Saturday Midday peak-hour:*
    - Hingham Street southeastbound right-turn movements – LOS A to LOS B
    - Hingham Street northwestbound left-turn movements - LOS B to LOS C
    - Hingham Street northwestbound right-turn movements – LOS B to LOS C
    - Bill Delahunt Parkway northeastbound through/right-turn movements - LOS C to LOS F

- Reservoir Park Drive southwestbound left-turn movements – LOS B to LOS C
- Reservoir Park Drive southwestbound through/right-turn movements – LOS B to LOS D

Route 18 at Pond Street and Pleasant Street (Intersection 43)

Overall operating conditions were shown to change from LOS C to LOS F during the weekday morning and Saturday midday peak-hours, and from LOS D to LOS E during the weekday evening peak-hour with the addition of Project-related traffic, with vehicle queues predicted to increase by more than 15 vehicles. Focusing on individual movements, the addition of Project-related traffic was shown to result in an increase in average motorist delay that caused the following level of service changes:

- *Weekday Morning peak-hour:*
  - Route 18 northbound through movements – LOS C to LOS F
  - Route 18 northbound right-turn movements – LOS C to LOS D
  - Route 18 southbound through movements – LOS C to LOS E
  - Pleasant Street southwestbound left-turn movements – LOS D to LOS E

- *Weekday Evening peak-hour:*
  - Route 18 northbound through movements – LOS C to LOS F
  - Route 18 northbound right-turn movements – LOS C to LOS D
  - Route 18 southbound through movements – LOS D to LOS F
  - Pond Street northeastbound left-turn/through movements – LOS D to LOS E

- *Saturday Midday peak-hour:*
  - Route 18 northbound through movements – LOS C to LOS F
  - Route 18 southbound through movements – LOS C to LOS E
  - Pond Street northeastbound left-turn movements – LOS D to LOS E
  - Pond Street northeastbound left-turn/through movements – LOS D to LOS E
  - Pleasant Street southwestbound left-turn movements – LOS D to LOS E
  - Pleasant Street southwestbound left-turn/through movements – LOS D to LOS E

Route 18 at Shea Memorial Drive (Intersection 45)

Overall operating conditions were shown to change from LOS B to LOS F during the weekday morning, weekday evening and Saturday midday peak-hours with the addition of Project-related traffic, with vehicle queues predicted to increase by more than 15 vehicles. Focusing on individual movements, the addition of Project-related traffic was shown to result in an increase in average motorist delay that caused the following level of service changes:

- *Weekday Morning peak-hour:*
  - Route 18 northbound through/right-turn movements – LOS B to LOS F
  - Route 18 southbound left-turn movements - LOS C to LOS F
  - Shea Memorial Drive westbound right-turn movements – LOS C to LOS E

- *Weekday Evening peak-hour:*
  - Route 18 northbound through/right-turn movements – LOS B to LOS F

- Route 18 southbound left-turn movements - LOS C to LOS F
- Route 18 southbound through movements - LOS A to LOS D
- Shea Memorial Drive westbound right-turn movements – LOS B to LOS C

- *Saturday Midday peak-hour:*

  - Route 18 northbound through/right-turn movements – LOS B to LOS E
  - Route 18 southbound left-turn movements - LOS C to LOS F
  - Route 18 southbound through movements - LOS A to LOS B
  - Shea Memorial Drive westbound right-turn movements – LOS B to LOS C

Route 18 at Trotter Road (Intersection 49)

Overall operating conditions were shown to change from LOS B to LOS F during the weekday morning and Saturday midday peak-hours, and from LOS C to LOS F during the weekday evening peak-hour with the addition of Project-related traffic, with vehicle queues predicted to increase by more than 15 vehicles. Focusing on individual movements, the addition of Project-related traffic was shown to result in an increase in average motorist delay that caused the following level of service changes:

- *Weekday Morning peak-hour:*

  - Route 18 northbound through/right-turn movements – LOS B to LOS C
  - Route 18 southbound left-turn movements – LOS B to LOS F
  - Trotter Road westbound left-turn movements – LOS E to LOS F
  - Trotter Road westbound right-turn movements – LOS D to LOS F

- *Weekday Evening peak-hour:*

  - Route 18 northbound through/right-turn movements – LOS B to LOS C
  - Route 18 southbound left-turn movements – LOS C to LOS F
  - Route 18 southbound through movements – LOS B to LOS C
  - Trotter Road westbound left-turn movements – LOS E to LOS F
  - Trotter Road westbound right-turn movements – LOS D to LOS F

- *Saturday Midday peak-hour:*

  - Route 18 northbound through/right-turn movements – LOS A to LOS C
  - Route 18 southbound left-turn movements – LOS B to LOS F
  - Route 18 southbound through movements – LOS A to LOS B
  - Trotter Road westbound left-turn movements – LOS D to LOS F
  - Trotter Road westbound right-turn movements – LOS D to LOS F

Independent of the Project, left-turn movements from Trotter Road are predicted to operate at capacity during the weekday morning and weekday evening peak-hours.

Shea Memorial Drive at Patriot Parkway and Bill Delahunt Parkway (Intersection 53)

Overall operating conditions were shown to change from LOS A to LOS F during the weekday morning, weekday evening and Saturday midday peak-hours with the addition of Project-related traffic, with vehicle queues predicted to increase by more than 15 vehicles. Focusing on individual movements, the addition of Project-related traffic was shown to result in an increase in average motorist delay that caused the following level of service changes:

- *Weekday Morning peak-hour:*
    - Patriot Parkway eastbound left-turn movements - LOS A to LOS B
    - Patriot Parkway eastbound through/right-turn movements – LOS A to LOS C
    - Shea Memorial Drive northbound approach – LOS A to LOS F
    - Shea Memorial Drive southbound left-turn/through movements – LOS A to LOS F
    - Bill Delahunt Parkway westbound left-turn movements – LOS A to LOS F
    - Bill Delahunt Parkway westbound through/right-turn movements – LOS A to LOS C

- *Weekday Evening peak-hour:*
    - Patriot Parkway eastbound left-turn movements - LOS A to LOS F
    - Patriot Parkway eastbound through/right-turn movements – LOS A to LOS B
    - Shea Memorial Drive northbound approach – LOS A to LOS F
    - Shea Memorial Drive southbound left-turn/through movements – LOS B to LOS E
    - Bill Delahunt Parkway westbound left-turn movements – LOS A to LOS F
    - Bill Delahunt Parkway westbound through/right-turn movements – LOS A to LOS C

- *Saturday Midday peak-hour:*
    - Patriot Parkway eastbound left-turn movements - LOS A to LOS B
    - Patriot Parkway eastbound through/right-turn movements – LOS A to LOS C
    - Shea Memorial Drive northbound approach – LOS A to LOS F
    - Shea Memorial Drive southbound left-turn/through movements – LOS A to LOS C
    - Bill Delahunt Parkway westbound left-turn movements – LOS A to LOS F
    - Bill Delahunt Parkway westbound through/right-turn movements – LOS A to LOS C

Route 18 at Route 139 (Intersection 57)

Overall operating conditions were shown to change from LOS D to LOS E during the weekday morning and Saturday midday peak-hours, and from LOS D to LOS F during the weekday evening peak-hour with the addition of Project-related traffic, with vehicle queues predicted to increase by more than 15 vehicles. Focusing on individual movements, the addition of Project-related traffic was shown to result in an increase in average motorist delay that caused the following level of service changes:

- *Weekday Morning peak-hour:*
    - Route 18 southbound through/right-turn movements – LOS D to LOS E
    - Route 139 eastbound left-turn movements – LOS D to LOS F

- *Weekday Evening peak-hour:*
    - Route 18 northbound through/right-turn movements – LOS C to LOS D
    - Route 18 southbound through/right-turn movements – LOS D to LOS F
    - Route 139 eastbound left-turn movements – LOS D to LOS F

- *Saturday Midday peak-hour:*
    - Route 18 southbound through/right-turn movements – LOS D to LOS F

- Route 139 eastbound left-turn movements – LOS D to LOS F

Independent of the Project, one or more movements at the intersection currently operate at or are predicted to operate at or over capacity during the weekday morning, weekday evening and Saturday midday peak-hours.

Route 123 at Route 58 (Intersection 69)

No change in level of service is predicted to occur for any movement over No-Build conditions, with Project-related impacts defined as an increase in vehicle queuing of up to one (1) vehicle. Independent of the Project, overall operating conditions at the intersection are currently at capacity during the weekday evening peak-hour.

Route 58 at Summer Street (Intersection 70)

No-change in overall level of service is predicted to occur over No-Build conditions, with Project-related impacts defined as an increase in vehicle queuing of up to one (1) vehicle. Focusing on individual movements, the addition of Project-related traffic was shown to result in an increase in motorist delay that caused the following level-of-service change:

- *Weekday Evening peak-hour:*
  - Route 58 southbound approach - LOS D to LOS E

Independent of the Project, overall operating conditions at the intersection are predicted to be at capacity during the weekday evening peak-hour.

Route 18 at Route 123 (Intersection 71)

Overall operating conditions were shown to change from LOS D to LOS F during the weekday morning peak-hour and from LOS D to LOS E during the weekday evening peak-hour with the addition of Project-related traffic, with vehicle queues predicted to increase by up to nine (9) vehicles. Focusing on individual movements, the addition of Project-related traffic was shown to result in an increase in average motorist delay that caused the following level of service changes:

- *Weekday Morning peak-hour:*
  - Route 18 northbound approach - LOS E to LOS F
  - Route 123 eastbound approach – LOS E to LOS F

- *Weekday Evening peak-hour:*
  - Route 18 southbound approach - LOS D to LOS E
  - Route 123 eastbound approach – LOS E to LOS F

- *Saturday Midday peak-hour:*
  - Route 123 eastbound approach – LOS D to LOS F

Independent of the Project, one or more movements at the intersection currently operate at or are predicted to operate at capacity during the weekday morning and weekday evening peak-hours.

Unsignalized Intersections

The following unsignalized intersections were found to have critical movements which operate at or are predicted to operate at or over capacity under 2022 Existing and/or 2043 No-Build conditions independent of the Project:

- Grove Street at Plain Street (Intersection 8)
- Columbian Street at Forest Street (Intersection 11)
- Columbian Street at Park Avenue West (Intersection 12)
- Pleasant Street at Columbian Street and Union Street (Intersection 15) – *Signalized under future conditions*
- Pleasant Street at Elm Street (Intersection 17)
- Pleasant Street at Pine Street (Intersection 18)
- Route 228 at Gardner Street and Scotland Street (Intersection 30)
- Route 228 at Gardner Street (Intersection 34)
- Weymouth Street at Sharp Street and Abington Street (Intersection 40)
- Randolph Street at Forest Street (Intersection 41)
- Route 18 at Derby Street (Intersection 44)
- Pond Street at Thicket Street (Intersection 48)
- Route 139 at Hancock Street and Old Randolph Street (Intersection 54)
- Route 139 at Chestnut Street and Old Randolph Street (Intersection 55)
- Route 139 at Lincoln Street (Intersection 56)
- Route 139 at North Avenue and Salem Street (Intersection 59)
- Union Street at VFW Drive and Hatherly Road (Intersection 61)
- VFW Drive at Pleasant Street and West Pleasant Street (Intersection 62)

The addition of Project-related traffic to these intersections resulted in a general increase in average motorist delay and in vehicle queuing over 2043 No-Build conditions.
Critical movements at the following unsignalized intersections were to operate at or over capacity as a result of the addition of Project-related traffic:

- Shea Memorial Drive at Memorial Grove Avenue (Intersection 46)
- Trotter Road at Patriot Parkway (Intersection 51)
- Memorial Grove Avenue at Grove Avenue and Snow Bird Avenue (Intersection 52)

Please refer to the *Recommendations* section of this TIA to review specific improvements that have been identified for the above-described intersections that are intended to reduce motorist delays and vehicle queuing, and off-set the predicted impact of the Project.

SIGHT DISTANCE EVALUATION

Sight distance measurements were performed at the gateway intersections that serve the Project site: Route 18 at Shea Memorial Drive; Route 18 at Trotter Road; and Weymouth Street at Bill Delahunt Parkway and Reservoir Park Drive. The measurements were performed in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)[42] requirements, and included both stopping sight distance (SSD) and intersection sight distance (ISD) measurements. In brief, SSD is the distance required by a vehicle traveling at the design speed of a roadway, on wet pavement, to stop prior to striking an object in its travel path. ISD or corner sight distance (CSD) is the sight distance required by a driver entering or crossing an intersecting roadway to perceive an on-coming vehicle and safely complete a turning or crossing maneuver with on-coming traffic. In accordance with AASHTO standards, if the measured ISD is at least equal to the required SSD value for the appropriate design speed, the intersection can operate in a safe manner. Table 7-11 presents the measured SSD and ISD at the subject intersections.

[42] *A Policy on Geometric Design of Highway and Streets*, 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); Washington D.C.; 2018.

Table 7-11
SIGHT DISTANCE MEASUREMENTS[a]

Intersection/Sight Distance Measurement	Feet		
	Required Minimum (SSD)	Desirable (ISD)[b]	Measured
Route 18 at Shea Memorial Drive			
Stopping Sight Distance:			
Route 18 approaching from the north	425	--	600+
Route 18 approaching from the south	425	--	600+
Intersection Sight Distance:			
Looking to the north from Shea Memorial Drive	425	590	600+
Looking to the south from Shea Memorial Drive	425	480	600+
Route 18 at Trotter Road			
Stopping Sight Distance:			
Route 18 approaching from the north	425	--	600+
Route 18 approaching from the south	425	--	600+
Intersection Sight Distance:			
Looking to the north from Trotter Road	425	590	600+
Looking to the south from Trotter Road	425	480	600+
Weymouth Street at Bill Delahunt Parkway and Reservoir Park Drive			
Stopping Sight Distance:			
Weymouth Street approaching from the north	305	--	500+
Weymouth Street approaching from the south	305	--	500+
Intersection Sight Distance:			
Looking to the north from Bill Delahunt Parkway	305	385	500+
Looking to the south from Bill Delahunt Parkway	305	445	500+

[a]Recommended minimum values obtained from *A Policy on Geometric Design of Highways and Streets*, 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2018; and based on a 50 mph approach speed along Route 18 and a 40 mph approach speed along Weymouth Street.

[b]Values shown are the intersection sight distance for a vehicle turning right or left exiting a roadway under STOP control such that motorists approaching the intersection on the major street should not need to adjust their travel speed to less than 70 percent of their initial approach speed. The gap time for left-turn movements exiting Shea Memorial Drive and Trotter Road was increased by 0.5 seconds to account for the additional northbound travel lane on Route 18.

As can be seen in Table 7-11, the available lines of sight at the gateway intersections were found to exceed the recommended minimum sight distances to function in a safe (SSD) and efficient (ISD) manner based on the appropriate approach speed and with consideration of the additional travel lanes on Route 18.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

VAI has conducted a TIA in support of this NPC filing documenting the changes to the master plan development program for the mixed-use redevelopment known as that is being advanced on the site of the former SWNAS in the Towns of Abington, Rockland and Weymouth, Massachusetts. This assessment is responsive to the outstanding scope of study that was identified in the Certificate that was issued by the Secretary of Energy and Environmental Affairs in response to the 2017 NPC[43] that was filed for the immediately preceding iteration of the Project then known as Union Point, if and to the extent such scope is still applicable to the 2023 modified development program. As detailed throughout the NPC filing and this TIA, the previous 2017 development program proposed a much more rigid development construct, whereas the Project includes a mix of uses that can evolve over time to respond to changing market conditions provided that impacts of the Project remain within those studied as part of the 2023 modified development program that serves as a baseline preferred build condition.

This TIA was prepared in consultation with MassDOT and the Towns of Abington, Rockland and Weymouth, and was performed in accordance with MassDOT's TIA Guidelines and the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such reports. The geographic scope of the study area that has been assessed as a part of this TIA is consistent with that evaluated in the 2007 FEIR[44] and 2017 NPC that were filed for prior iterations of the Project.

This assessment has concluded the following with respect to the Project (as measured by analyzing the 2023 modified development program) and the study area roadways and intersections:

1. Using trip-generation statistics published by the ITE[45] and inclusive of diverted-link trips, the Project is expected to generate approximately 53,438 vehicle trips on an average weekday and 47,476 vehicle trips on a Saturday (both two-way volume over the operational day of the Project), with approximately 4,148 vehicle trips expected during the weekday morning peak-hour, 4,835 vehicle trips expected during the weekday evening peak-hour and 3,963 vehicle trips expected during the Saturday midday peak-hour While midday

[43]Epsilon, et al; op. cit. 7-1 February, 28, 2017.

[44]Epsilon, et al; op. cit. 7-1 June 17, 2007.

[45]Institute of Transportation Engineers; op. cit. 7-1.

peak hour vehicle trips were not studied in the 2017 NPC filing, the 2023 modified development program is expected to generate *fewer* average weekday and Saturday vehicle trips than the 2017 NPC development program;

2. The Project will not result in a significant impact (increase) on motorist delays or vehicle queuing over Existing or anticipated future conditions without the Project (No-Build conditions), with 51 of the 73 study area intersections predicted to continue to operate at an overall LOS D or better during all three the peak hours with the addition of Project-related traffic, where an LOS of "D" or better is generally defined as "acceptable" operating conditions, and 16 of the 73 intersections shown to drop to a level of service below LOS D during one or more peak hour as a result of the addition of Project-related traffic. Specific improvements have been identified for these intersections that are intended to reduce motorist delays and vehicle queuing, and off-set the predicted impact of the Project (discussion follows);

3. Independent of the Project, 25 of the study area intersections were found to have a motor vehicle crash rate that is above the MassDOT average crash rates and/or were identified as high crash locations for the 2017-2019 reporting period and Highway Safety Improvement Program (HSIP) eligible. Road Safety Audits (RSA) were conducted at 21 of the study area intersections between June 2011 and February 2022, with the majority of the improvements recommended therein since completed. Specific recommendations have been provided to advance safety related improvements at six (6) of the 25 study area intersections where safety enhancements have not yet been advanced (discussion follows); and

4. Lines of sight at the Project access gateway intersections of Route 18 at Shea Memorial Drive, Route 18 at Trotter Road and Weymouth Street at Bill Delahunt Parkway and Reservoir Park Drive intersections were found to exceed the recommended minimum distances for safe and efficient operation based on the appropriate approach speeds.

In consideration of the above, we have concluded that the Project can be accommodated within the confines of the existing transportation infrastructure in a safe and efficient manner with implementation of the recommendations that follow.

RECOMMENDATIONS

A detailed transportation improvement program has been developed that is designed to provide safe and efficient access to the Project site and address any deficiencies identified at off-site locations evaluated in conjunction with this study. The recommended improvement measures have been classified into four categories: 1) Project Site Access; 2) Off-Site Improvements; 3) Transportation Demand Management (TDM); and 4) Traffic Monitoring; and, where applicable, will be completed in conjunction with the Project subject to receipt of all necessary licenses, permits, and approvals.

Project Site Access

Vehicular access to the Project site is and will continue to be provided by three primary gateways: Shea Memorial Drive (via Route 18); Bill Delahunt Parkway (via Route 228 to Route 3); and Patriot Parkway (via Trotter Road to Route 18). Access to the individual development areas within the Project site will be provided by way of roadways and driveways located within the Project site. The design and location of the specific driveways and roadways will be advanced with the

development of the final development plans. The following general recommendations will be used to guide the design plans for the development areas within the Project site:

- Roadways and driveways within the Project site will be designed with consideration of Complete Streets design principles and the following design guidelines based on functional class:

  - ***Major Collectors*** *(Gateway Streets conveying trips to Route 18 and Hingham Street):* Four (4) travel lanes (two lanes per direction) separated by a raised median with separate turn lanes provided at major intersections.

  - ***Minor Collectors*** *(Roadways that convey trips from the individual development areas to the Major Collectors):* Two (2) travel lanes separated by a double-yellow centerline or raised median with separate turn lanes provided at major intersections.

  - ***Local Roadways*** *(Roadways that serve development areas):* Two (2) travel lanes separated by a double-yellow centerline.

  - ***Driveways*** *(Driveways serve individual building areas or a collection of building areas):* Driveways should generally be a minimum of 20-feet in width for minor traffic generators and 24-feet in width for major traffic generators, and should be designed with appropriate corner radii to accommodate turning maneuvers for delivery trucks and emergency vehicles.

- Circulating drives within individual development sites will be a minimum of 24-feet in width where perpendicular parking is proposed adjacent to the drive aisle.

- Intersection spacing should follow the guidelines set forth in the MassDOT *Project Development & Design Guide*.[46]

- Intersections should be placed under STOP-sign control where necessary to regulate traffic or to assign the vehicular right-of-way pursuant to the guidance provided in the *Manual on Uniform Traffic Control Devices* (MUTCD).[47] Modern roundabouts should be considered in lieu of the installation of traffic control signals at major intersections where the installation of a traffic control signal is found to be warranted based on the criteria established in the MUTCD.

- All signs and pavement markings to be installed within the Project site shall conform to the applicable standards of the MUTCD.

- Americans with Disabilities Act (ADA) compliant wheelchair ramps should be provided at all pedestrian crossings where sidewalks are present, with driveways designed such that the sidewalk is flush with (i.e., crosses) the driveway.

- Signs and landscaping to be installed within intersection sight triangle areas should be designed and maintained so as not to restrict lines of sight.

[46]Massachusetts Highway Department; op. cit. 7-3.
[47]Federal Highway Administration; op. cit. 7-3.

- Snow accumulation (windrows) within the sight triangle areas should be promptly removed where such accumulations would impede sightlines.

Off Site Improvements

The recommended off-site improvements have been developed to: i) address existing and predicted future capacity constraints; ii) to off-set the predicted impact of the Project; and iii) to enhance safety at intersections identified as high crash locations. The recommended improvements have been structured to build-upon or expand the improvements that were identified for the Project as a part of the 2007 FEIR,[48] with additional improvements identified where necessary to address the impacts of the 2023 modified development program.

Table 7-12 summarizes the elements of the transportation improvement program for the Project, the schedule for implementation and the responsible party, as well as indicating if the improvement measure was defined in the 2007 FEIR.

The schedule for implementation was aggregated into five (5) tiers to coincide with the anticipated build-out of the Project:

- ***Tier 1*** – To be completed prior to the issuance of a Certificate of Occupancy for any new development;
- ***Tier 2*** – To be completed prior to the issuance of a Certificate of Occupancy for any new commercial building that alone or in aggregate exceeds 500,000 sf, or for new residential development that alone or in aggregate exceeds 1,500 dwelling units;
- ***Tier 3*** – To be completed prior to the issuance of a Certificate of Occupancy for any new commercial building that alone or in aggregate exceeds 1,000,000 sf, or for new residential development that alone or in aggregate exceeds 3,000 dwelling units;
- ***Tier 4*** – To be completed prior to the issuance of a Certificate of Occupancy for any new commercial building that alone or in aggregate exceeds 2,000,000 sf, or for new residential development that alone or in aggregate exceeds 6,000 dwelling units; and
- ***Tier 5*** – To be completed if and when warranted based on the results of the annual Traffic Monitoring and Reporting Program (discussion follows).

[48]Epsilon, et al; op. cit. 7-1 June 17, 2007.

Table 7-12
TRANSPORTATION IMPROVEMENT PROGRAM SUMMARY

Intersection Number	Improvement Location	Description	Included in 2007 FEIR	Responsible Party	Status	Implementation Schedule
--	Rte. 18 (Roadway Segment)	Widen Rte. 18 to two travel lanes per direction	**X**	MassDOT	**Complete**	--
15	Pleasant St./Columbian St./Union St.	Widen to provide turn lanes at the intersection, improve mobility and intersection geometry, and upgrade traffic signal system	**X**	Town of Weymouth	Under construction	--
37	Hingham St./Commerce Rd.	Widen to provide left-turn lane on both Hingham Street approaches and upgrade traffic signal system	**X**	Town of Rockland	Under design and will be constructed under a MassWorks grant	--
46	Shea Memorial Dr./Memorial Grove Ave.	Realign the intersection to designate the Shea Memorial Dr. northeastbound and Memorial Grove Ave. northwestbound legs the primary maneuver		BPD Union Point LLC	--	Tier 1
51	Trotter Rd./Patriot Pky.	Install traffic signal system; widen Trotter Rd. and Patriot Pkwy. to provide two approach lanes along each leg		BPD Union Point LLC	--	Tier 1
52	Memorial Grove Ave./Snow Bird Ave.	Install traffic signal system; widen Memorial Grove Ave. westbound to provide a left-turn lane and Snow Bird Ave. northbound to provide a right-turn lane		BPD Union Point LLC	--	Tier 1
1	Rte. 18/Rte. 53	Implement short-term safety improvements		BPD Union Point LLC	--	Tier 2
2	Rte. 53/Middle St.	Optimize traffic signal timing and implement short-term safety improvements		BPD Union Point LLC	--	Tier 2
3	Middle St./Winter St.	Optimize traffic signal timing; perform RSA; implement short-term safety improvements		BPD Union Point LLC	--	Tier 2
4	Rte. 18/Winter St.	Implement short-term safety improvements		BPD Union Point LLC	--	Tier 2
7	Rte. 18/West St./Middle St.	Implement short-term safety improvements	**X**	BPD Union Point LLC	Turn lanes installed and traffic signal upgraded	Tier 2
9	Liberty St./Grove St.	Optimize traffic signal timing		BPD Union Point LLC	--	Tier 2
13	Rte. 18/Park Ave./Park Ave. West	Optimize traffic signal timing and implement short-term safety improvements	**X**	BPD Union Point LLC	Turn lanes installed and traffic signal upgraded	Tier 2
14	Rte. 18/Columbian St.	Optimize traffic signal timing and implement short-term safety improvements	**X**	BPD Union Point LLC	Turn lanes installed and traffic signal upgraded	Tier 2
16	Pleasant St./Park Ave.	Optimize traffic signal timing; Perform RSA; implement short-term safety improvements		BPD Union Point LLC	--	Tier 2
22	Derby St./Rte. 3 Southbound Ramps	Implement short-term safety improvements		BPD Union Point LLC	--	Tier 2

Table 7-12 (Continued)
TRANSPORTATION IMPROVEMENT PROGRAM SUMMARY

Intersection Number	Improvement Location	Description	Included in 2007 FEIR	Responsible Party	Status	Implementation Schedule
23	Derby St./Rte. 3 Northbound Ramps	Implement short-term safety improvements		BPD Union Point LLC	--	Tier 2
28	Rte. 53/Derby St./Gardner St.	Optimize traffic signal timing and implement short-term safety improvements		BPD Union Point LLC	--	Tier 2
31	Rte. 53/Rte. 228	Perform RSA and implement short-term safety improvements		BPD Union Point LLC	--	Tier 2
35	Rte. 228/Pond St.	Optimize traffic signal timing and implement short-term safety improvements	**X**	BPD Union Point LLC	Turn lanes installed and traffic signal upgraded	Tier 2
36	Rte. 228/Hingham St./ Rte. 3 Southbound Ramps	Optimize traffic signal timing	**X**	BPD Union Point LLC	Left-turn lane added to Rte. 3 off-ramp and traffic signal upgraded	Tier 2
38	Hingham St./Reservoir Park Dr.	Optimize traffic signal timing	**X**	Town of Rockland	Under design and will be constructed under a MassWorks grant	Tier 2
43	Rte. 18/Pond St./Pleasant St.	Optimize traffic signal timing and implement short-term safety improvements	**X**	BPD Union Point LLC	Turn lanes installed and traffic signal upgraded	Tier 2
45	Rte. 18/Shea Memorial Dr.	Widen Rte. 18 southbound to provide an additional left-turn lane and Shea Memorial Dr. to provide an additional right-turn lane; Optimize traffic signal timing	**X**	BPD Union Point LLC	Rte. 18 widened to provide 2 general-purpose lanes northbound and 1 left-turn and 2 through lanes southbound	Tier 2
49	Rte. 18/Trotter Rd.	Widen Rte. 18 northbound to provide an additional through lane and (2) right-turn lanes and widen Trotter Road to provide a second left-turn lane and a second Right-turn lane; Optimize traffic signal timing and coordination with Int. 50	**X**	BPD Union Point LLC	Rte. 18 widened to provide 2 general-purpose lanes northbound and 1 left-turn and 2 through lanes southbound	Tier 2
50	Rte. 18/Pond St.	Optimize traffic signal timing and coordination with Int. 49 and implement short-term safety improvements	**X**	BPD Union Point LLC	Turn lanes installed and traffic signal upgraded	Tier 2
53	Shea Memorial Dr./Patriot Pky./ Bill Delahunt Pky.	Widen Shea Memorial Dr. to provide three approach lanes along both legs; Optimize traffic signal timing		BPD Union Point LLC	--	Tier 2
54	Rte. 139/Hancock St./Old Hancock St.	Implement short-term safety improvements		BPD Union Point LLC	--	Tier 2
55	Rte. 139/Chestnut St./Old Randolph St.	Install traffic signal system; widen Rte. 139 northbound to provide a left-turn lane; implement short-term safety improvements		BPD Union Point LLC	--	Tier 2
57	Rte. 18/Rte. 139	Optimize traffic signal timing and implement short-term safety improvements	**X**	BPD Union Point LLC	Turn lanes installed and traffic signal upgraded	Tier 2
62	VFW Drive/Pleasant Street/West Pleasant Street	Perform RSA and implement short-term safety improvements		BPD Union Point LLC	--	Tier 2

Table 7-12 (Continued)
TRANSPORTATION IMPROVEMENT PROGRAM SUMMARY

Intersection Number	Improvement Location	Description	Included in 2007 FEIR	Responsible Party	Status	Implementation Schedule
67	Route 123/Union Street	Implement short-term safety improvements		BPD Union Point LLC	--	Tier 2
68	Route 58/Central Street	Implement short-term safety improvements		BPD Union Point LLC	--	Tier 2
69	Route 123/Route 58	Optimize traffic signal timing and implement short-term safety improvements		BPD Union Point LLC	--	Tier 2
70	Route 58/Summer Street	Optimize traffic signal timing; RSA; implement short-term safety improvements		BPD Union Point LLC	--	Tier 2
72	Route 18/Route 27	Implement short-term safety improvements		BPD Union Point LLC	--	Tier 2
73	Route 18/Route 14	Implement short-term safety improvements		BPD Union Point LLC	--	Tier 2
--	Abington St./Pine St./Oak St. (Roadway Segment; Traffic Calming)	Install traffic calming measures	**X**	BPD Union Point LLC	To be Completed	Tier 3
--	Thicket St. (Roadway Segment; Traffic Calming)	Install traffic calming measures	**X**	BPD Union Point LLC	To be Completed	Tier 3
--	Forest St. (Roadway Segment; Traffic Calming)	Install traffic calming measures	**X**	BPD Union Point LLC	To be Completed	Tier 3
--	Gardner St. (Roadway Segment; Traffic Calming)	Install traffic calming measures	**X**	BPD Union Point LLC	To be Completed	Tier 3
--	Union Point	Multi-Modal Transportation Facility	**X**	BPD Union Point LLC	To be Completed - Tri-Town TMA to be Established	Tier 3
18	Pleasant St./Pine St.	Widen Pine St. to provide a right-turn lane		BPD Union Point LLC	--	Tier 3
39	Weymouth St./Bill Delahunt Pky./ Reservoir Park Dr.	Widen Bill Delahunt Pkwy. and Reservoir Park Dr. to add an additional travel lane; Optimize traffic signal timing	**X**	BPD Union Point LLC	Bill Delahunt Pky. added to intersection and traffic signal modified	Tier 3
--	Hingham St. (Roadway Segment)	Widen Hingham St. to provide a four-lane cross-section between the Rte. 3 southbound ramps and Reservoir Park Dr.		Town of Rockland (MassWorks)/BPD Union Point LLC	--	Tier 4
20	Pine St./Ralph Talbot St.	Optimize traffic signal timing; widen Pine St. northbound to provide a right-turn lane and Ralph Talbot St. westbound to provide a left-turn lane		BPD Union Point LLC	--	Tier 4
42	Pond Street/Hollis Street/Derby Street	Optimize traffic signal timing	**X**	BPD Union Point LLC	To be Completed	Tier 4
48	Pond St./Thicket St.	Widen Thicket St. to provide a left-turn lane		BPD Union Point LLC	--	Tier 4

Table 7-12 (Continued)
TRANSPORTATION IMPROVEMENT PROGRAM SUMMARY

Intersection Number	Improvement Location	Description	Included in 2007 FEIR	Responsible Party	Status	Implementation Schedule
56	Rte. 139/Lincoln St.	Widen Lincoln St. to provide a left-turn lane		BPD Union Point LLC	--	Tier 4
58	Route 58/Route 139	Optimize traffic signal timing	**X**	BPD Union Point LLC	To be Completed	Tier 4
71	Route 18/Route 123	Optimize traffic signal timing; implement short-term safety improvements; widen Rte. 18 northbound to add a left-turn lane, Rte. 18 southbound to add a right-turn lane and Rte. 123 to add a left-turn lane	**X**	BPD Union Point LLC	Turn lanes installed and traffic signal upgraded	Tier 4
--	Bill Delahunt Pky. (Roadway Segment)	Improve the roadway cross-section, if necessary, based on the measured traffic volumes and to facilitate the addition or expansion of pedestrian and bicycle accommodations	**X**	BPD Union Point LLC	Initial phase complete between Shea Memorial Dr. and the extension of Union St.	Tier 5
--	Shea Memorial Dr. (Roadway Segment)	Improve the roadway cross-section, if necessary, based on the measured traffic volumes and to facilitate the addition or expansion of pedestrian and bicycle accommodations	**X**	BPD Union Point LLC	Initial phase complete approaching/departing Rte. 18	Tier 5
--	Reservoir Park Dr. (Roadway Segment)	Improve the roadway cross-section, if necessary, based on the measured traffic volumes and to facilitate the addition or expansion of pedestrian and bicycle accommodations.		Town of Rockland (MassWorks)/ BPD Union Point LLC	--	Tier 5
11	Columbian St./Forest St.	Install traffic signal system; Widen Columbian St. to provide a right-turn lane eastbound and a left-turn lane westbound	X	BPD Union Point LLC	To be Completed	Tier 5
12	Columbian St./Park St. West	Install traffic signal system; Widen Columbian St. to provide a right-turn lane eastbound	**X**	BPD Union Point LLC	To be Completed	Tier 5
40	Weymouth St./Sharp St./Abington St.	Widen to provide turn lanes at the intersection and install traffic signal system	**X**	BPD Union Point LLC	To be Completed	Tier 5
41	Randolph St./Forest St.	Widen to provide turn lanes at the intersection and install traffic control signal system	**X**	BPD Union Point LLC	To be Completed	Tier 5

The following provides additional detail on the improvements that have been recommended as a part of this assessment.

Traffic Operations

- ***Traffic Signal Installation***

  The addition of Project-related traffic to the following intersections was shown to result in a change in operating conditions that may necessitate the implementation of specific traffic control improvements, including the installation of a traffic control signal:

  - *Columbian Street at Forest Street* (Intersection 11)
  - *Columbian Street at Park Avenue West* (Intersection 12)
  - *Weymouth Street at Sharp Street and Abington Street* (Intersection 40)
  - *Randolph Street at Forest Street* (Intersection 41)
  - *Trotter Road at Patriot Parkway* (Intersection 51)
  - *Memorial Grove Avenue at Snow Bird Avenue* (Intersection 52)
  - *Route 139 at Chestnut Street and Old Randolph Street* (Intersection 55)

  At the present time, the subject intersections do not appear to meet the necessary warrants as defined in the MUTCD for the installation of a traffic signal. As such, the Proponent will monitor traffic volumes, operating conditions and motor vehicle crash data at these intersections as a part of the annual Traffic Monitoring and Reporting Program (discussion follows). If and to the extent that the installation of a traffic signal is found to be warranted and the installation is desirable by the community within which the intersection is located, the Proponent will design and construct a traffic control signal at the intersection pursuant to the suggested schedule of implementation defined in Table 7-12 to the extent that the improvements can be completed within the public right-of-way and subject to receipt of all necessary licenses, permits and approvals.

  With the installation of a traffic control signal and associated geometric improvements (where necessary) at the subject intersections, overall intersection operations were shown to be improved to LOS D or better during the peak hours at six (6) of the seven (7) intersections identified above. Even with these improvements, the Trotter Road/Patriot Parkway intersection was shown to operate at an overall LOS F during the weekday morning and evening peak-hours, and at LOS E during the Saturday midday peak-hours. That being said, as the final plans are advanced for the development areas within the Project site, the access points can be located in manner to disperse trips within the Project site and lessen impacts at the Trotter Road/Patriot Parkway intersection.

- ***Geometric Improvements***

  In an effort to improve traffic operations and off-set the predicted impact of the Project, the Proponent will design and construct the following geometric improvements at the identified intersections, according to the suggested schedule of implementation defined in Table 7-12:

Roadway Segments

- *Hingham Street* – Widen Hingham Street to provide a general four-lane cross-section between the Route 3 southbound ramps and Reservoir Park Drive. These improvements are being funded through a MassWorks grant to the Town of Rockland.
- *Bill Delahunt Parkway* – Improve the roadway cross-section, if necessary, based on the measured traffic volumes and to facilitate the addition or expansion of pedestrian and bicycle accommodations.
- *Shea Memorial Drive* – Improve the roadway cross-section, if necessary, based on the measured traffic volumes and to facilitate the addition or expansion of pedestrian and bicycle accommodations.
- *Reservoir Park Drive* – Widen Reservoir Park Drive to provide a four-lane cross-section. Outside of the limits of the Hingham Street/Reservoir Park Drive intersection improvements that are being advanced as a part of the Hingham Street MassWorks grant, improve the roadway cross-section, if necessary, based on the measured traffic volumes and to facilitate the addition or expansion of pedestrian and bicycle accommodations.

Intersections

- *Pleasant Street at Pine Street* (Intersection 18) – Widen the Pine Street westbound approach to provide a left-turn lane and a right-turn lane (depicted on Figure 7-20).
- *Pine Street at Ralph Talbot Street* (Intersection 20) – Widen the Pine Street northbound approach to provide a left-turn/through lane and a right-turn lane, and the Ralph Talbot Street westbound approach to provide a left-turn lane and a through/right-turn lane (depicted on Figure 7-21).
- *Weymouth Street at Bill Delahunt Parkway and Reservoir Park Drive* (Intersection 39) – Widen the Bill Delahunt Parkway northeastbound and Reservoir Park Drive southwestbound approaches to provide a left-turn lane, two through lanes and a channelized right-turn lane (depicted on Figure 7-22).
- *Route 18 at Shea Memorial Drive* (Intersection 45) – Widen the Route 18 southbound approach to provide two left-turn lanes and two through lanes, and the Shea Memorial Drive westbound approach to provide a left-turn lane and two right-turn lanes (depicted on Figure 7-23).
- *Shea Memorial Drive at Memorial Grove Avenue* (Intersection 46) – Realign the Shea Memorial Drive/Memorial Grove Avenue intersection to be located to the south of Shea Field Memorial Grove in order to reflect the primary flow of traffic within the Project site (depicted on Figure 7-24).
- *Pond Street at Thicket Street* (Intersection 48) – Widen the Thicket Street northeastbound approach to provide a left-turn lane and a right-turn lane (depicted on Figure 7-25).

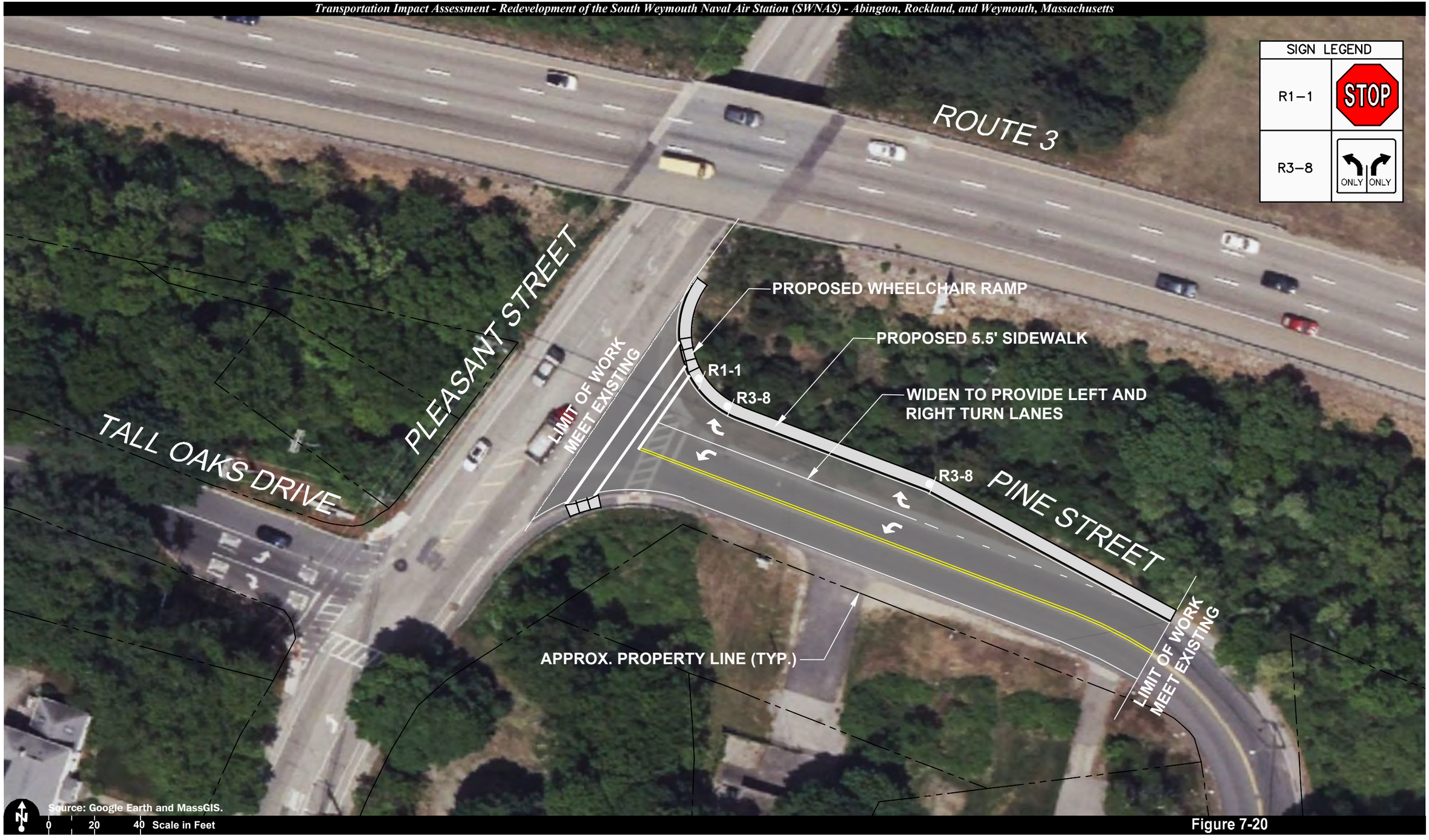


Figure 7-20

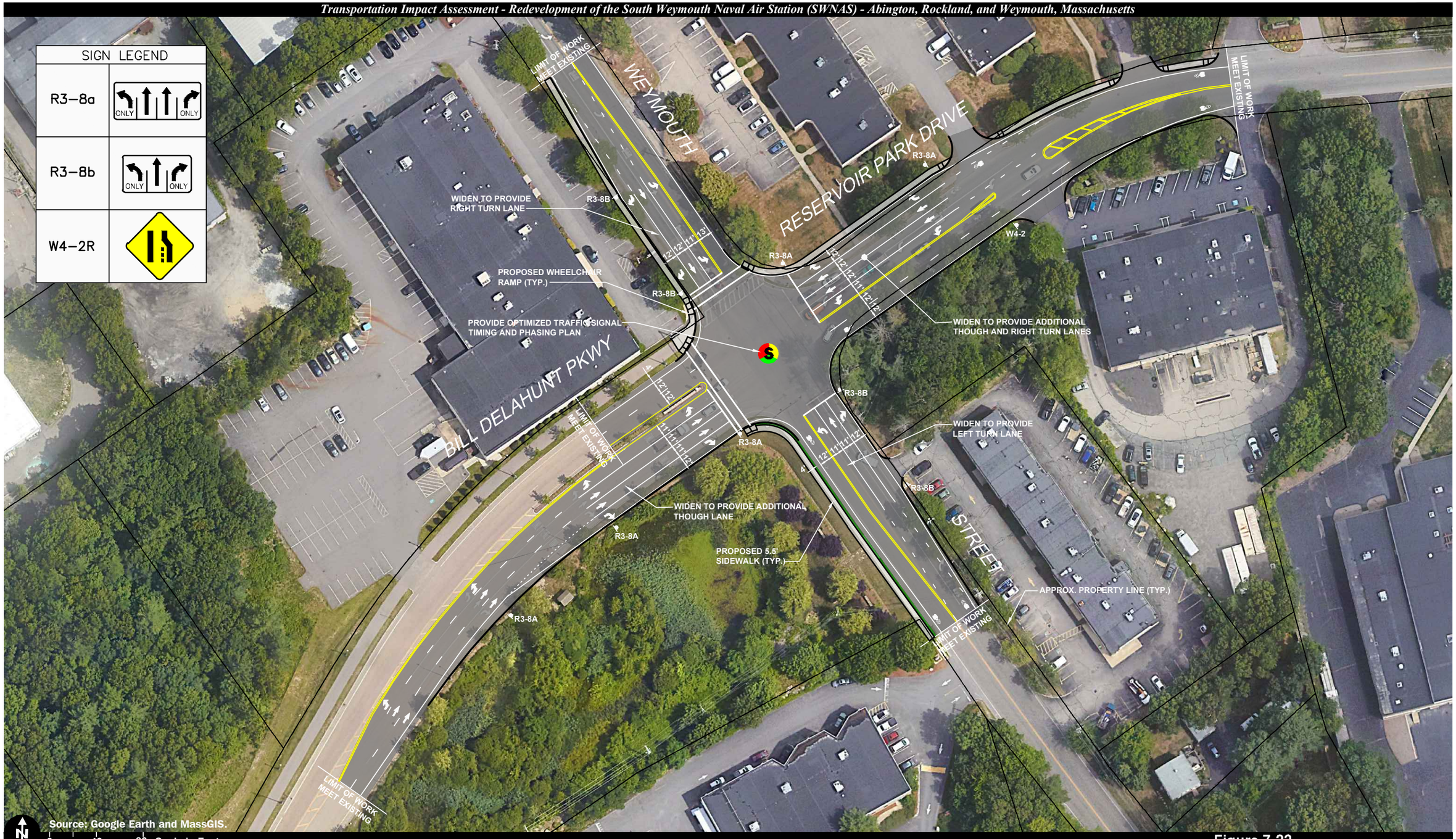
Conceptual Improvement Plan
Pleasant Street at Pine Street

Vanasse & Associates inc

Figure 7-21

Conceptual Improvement Plan
Pine Street at Ralph Talbot Street

Vanasse & Associates inc



Source: Google Earth and MassGIS.

Figure 7-22

Conceptual Improvement Plan
Weymouth Street at
Bill Delahunt Parkway and
Reservoir Park Drive

Vanasse & Associates inc

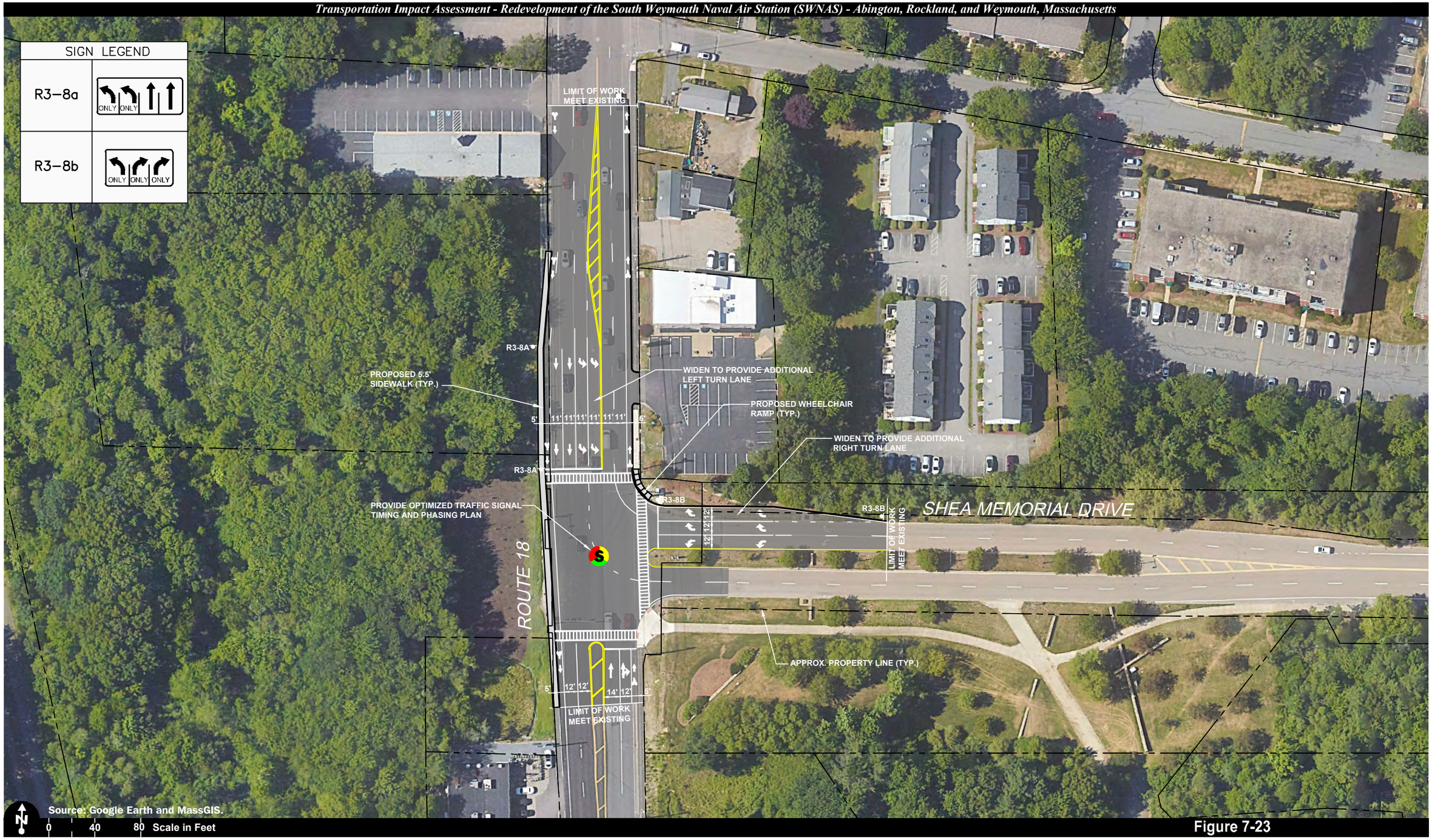


Figure 7-23

Conceptual Improvement Plan
Route 18 at Shea Memorial Drive

Vanasse & Associates inc

Source: Google Earth and MassGIS.

Figure 7-24

Conceptual Improvement Plan
Shea Memorial Drive at
Memorial Grove Avenue

Vanasse & Associates inc

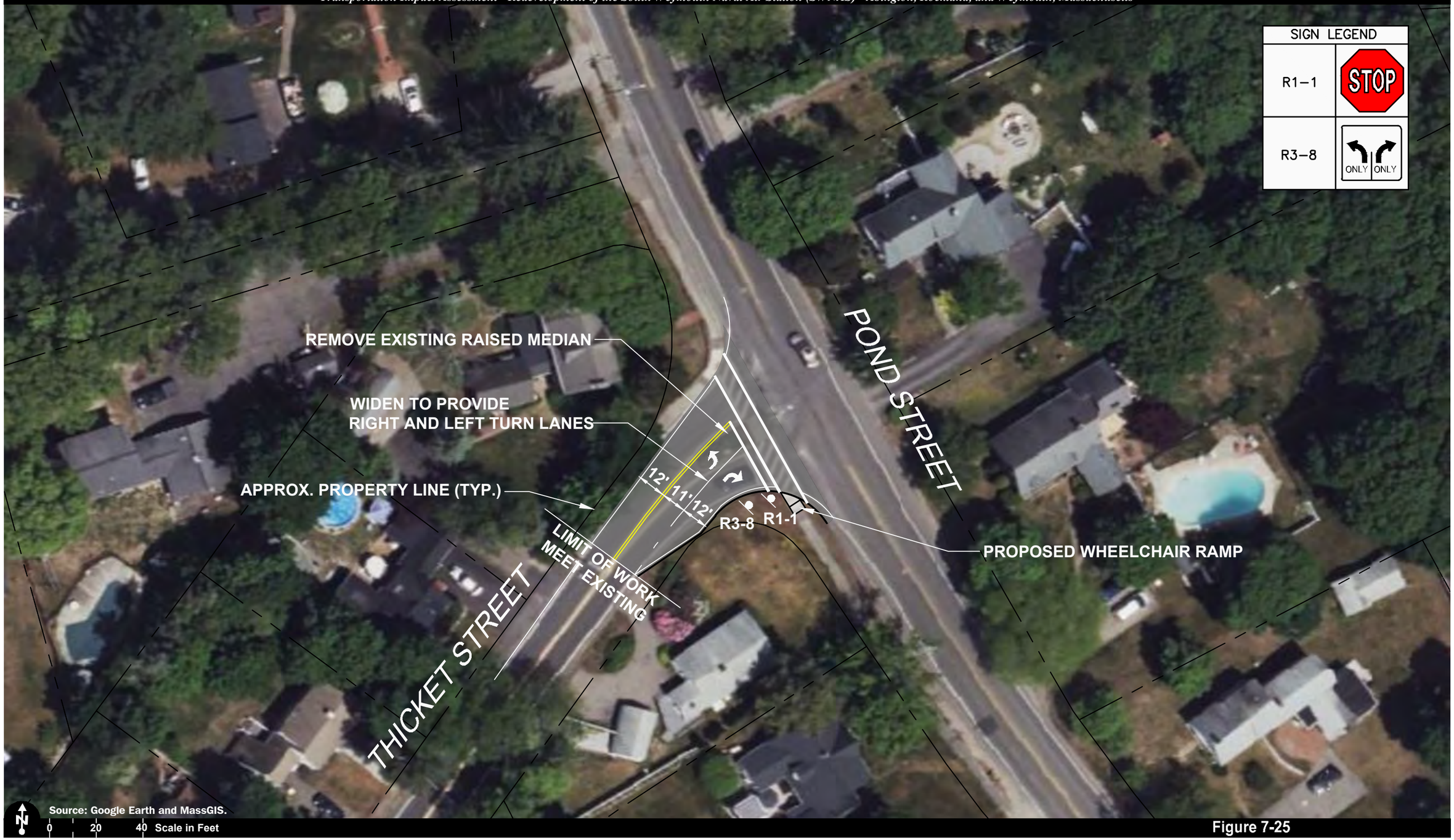


Figure 7-25

Conceptual Improvement Plan
Pond Street at Thicket Street

Vanasse & Associates inc

- *Route 18 at Trotter Road* (Intersection 49) – Widen the Route 18 northbound approach to provide two through lanes and a right-turn lane, and the Trotter Road westbound approach to provide a left-turn lane and two right-turn lanes (depicted on Figure 7-26).
- *Trotter Road at Patriot Parkway* (Intersection 51) – Widen the Trotter Road eastbound approach to provide a left-turn lane and a through lane, the Trotter Road southbound approach to provide a left-turn lane and a right-turn lane, and the Patriot Parkway westbound approach to provide a through lane and a channelized right-turn lane (depicted on Figure 7-27).
- *Memorial Grove Avenue at Snow Bird Avenue* (Intersection 52) – Widen the Memorial Grove Avenue westbound approach to provide a left-turn lane and a through/right-turn lane, and the Snow Bird Avenue northbound approach to provide a left-turn/through lane and a right-turn lane. In addition, the intersection should be placed under all-way STOP-sign control subject to meeting the necessary warrants as specified in the MUTCD (depicted on Figure 7-28).
- *Shea Memorial Drive at Patriot Parkway and Bill Delahunt Parkway* (Intersection 53) – Widen the Shea Memorial Drive northbound approach to provide a left-turn lane, a left-turn/through lane and a right-turn lane, and the Shea Memorial Drive southbound approach to provide a left-turn/through lane and two right-turn lanes (depicted on Figure 7-29).
- *Route 139 at Lincoln Street* (Intersection 56) – Widen the Lincoln Street northeastbound approach to provide a left-turn lane a right-turn lane (depicted on Figure 7-30).
- *Route 18 at Route 123* (Intersection 71) – Widen the Route 18 northbound approach to provide a left-turn lane, a through lane and a through/right-turn lane, the Route 18 southbound approach to provide a through/left-turn lane, a through lane and a right-turn lane, and the Route 123 eastbound approach to provide a left-turn lane, a through lane and a through/right-turn lane (depicted on Figure 7-31).

o *Future Traffic Signal Control*: In conjunction with the installation of traffic control signals at the previously mentioned intersections, if and when warranted, geometric improvements should be advanced at the following three (3) intersections, subject to receipt of all necessary licenses, permits and approvals:

- *Columbian Street at Forest Street* (Intersection 11) – Widen the Columbian Street eastbound approach to provide a left-turn/through lane and a right-turn lane and the westbound approach to provide a left-turn lane and a through/right-turn lane (depicted on Figure 7-32).
- *Columbian Street at Park Avenue West* (Intersection 12) – Widen the Columbian Street eastbound approach to provide a left-turn/through lane and a right-turn lane (depicted on Figure 7-33).

SIGN LEGEND	
R3-7R	RIGHT LANE MUST TURN RIGHT
R3-8a	ONLY ONLY ONLY

ROUTE 18

POND STREET

TROTTER ROAD

APPROX. PROPERTY LINE (TYP.)

PROPOSED WHEELCHAIR RAMP (TYP.)

WIDEN TO PROVIDE ADDITIONAL RIGHT TURN LANE

PROPOSED 5.5' SIDEWALK (TYP.)

R3-8A

R3-8A

5' 11' 11' 11' 12' 12'

LIMIT OF WORK MEET EXISTING

PROVIDE OPTIMIZED TRAFFIC SIGNAL TIMING AND PHASING PLAN

R3-7R

REMOVE EXISTING RAISED MEDIAN

WIDEN TO PROVIDE RIGHT TURN LANE

12' 11' 5' 11'

R3-7R

LIMIT OF WORK MEET EXISTING

Source: Google Earth and MassGIS.

N

0 30 60 Scale in Feet

Figure 7-26

Conceptual Improvement Plan
Route 18 at Trotter Road

Vanasse & Associates inc

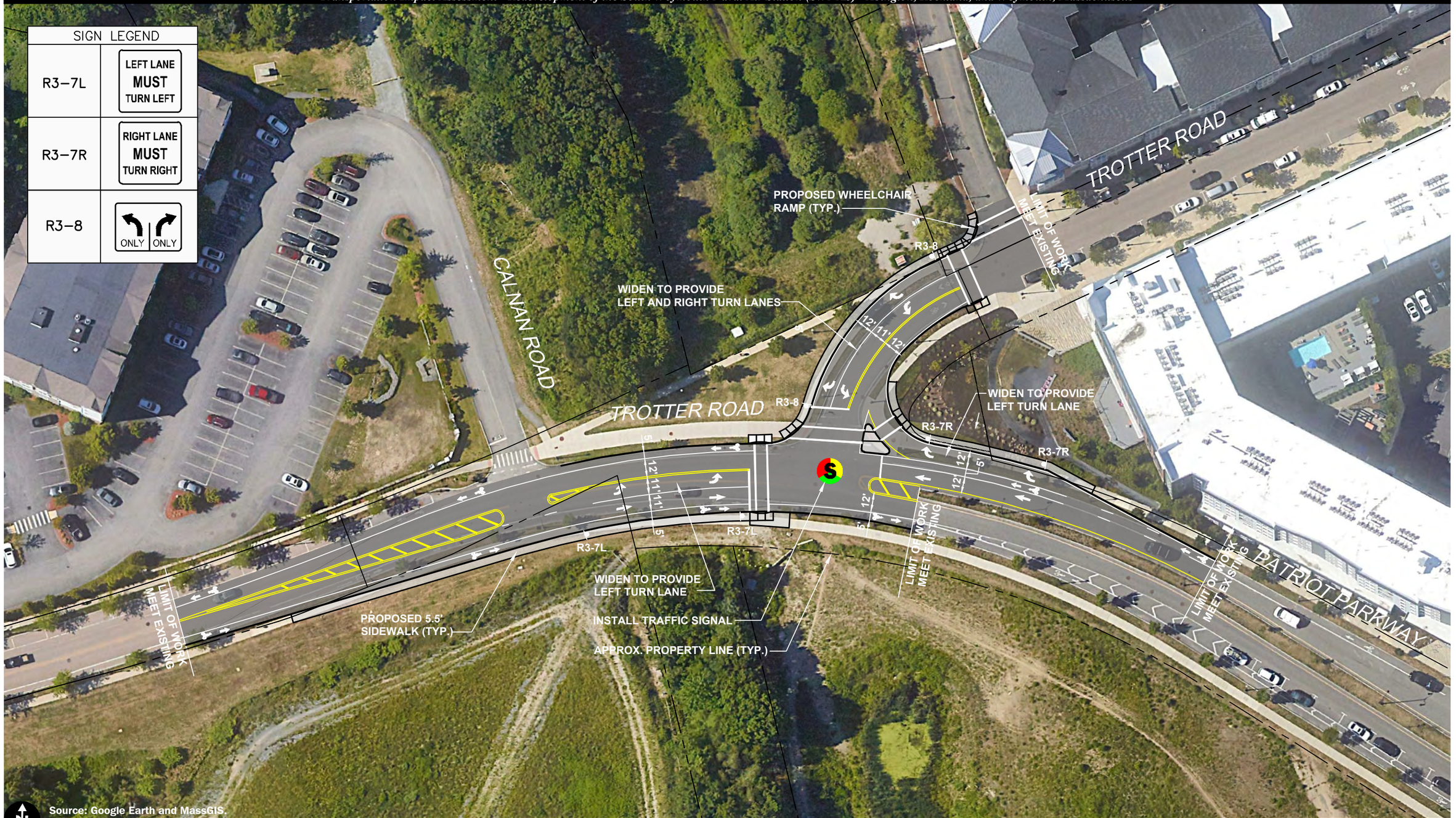


Figure 7-27

Conceptual Improvement Plan
Trotter Road at Patriot Parkway

Vanasse & Associates inc

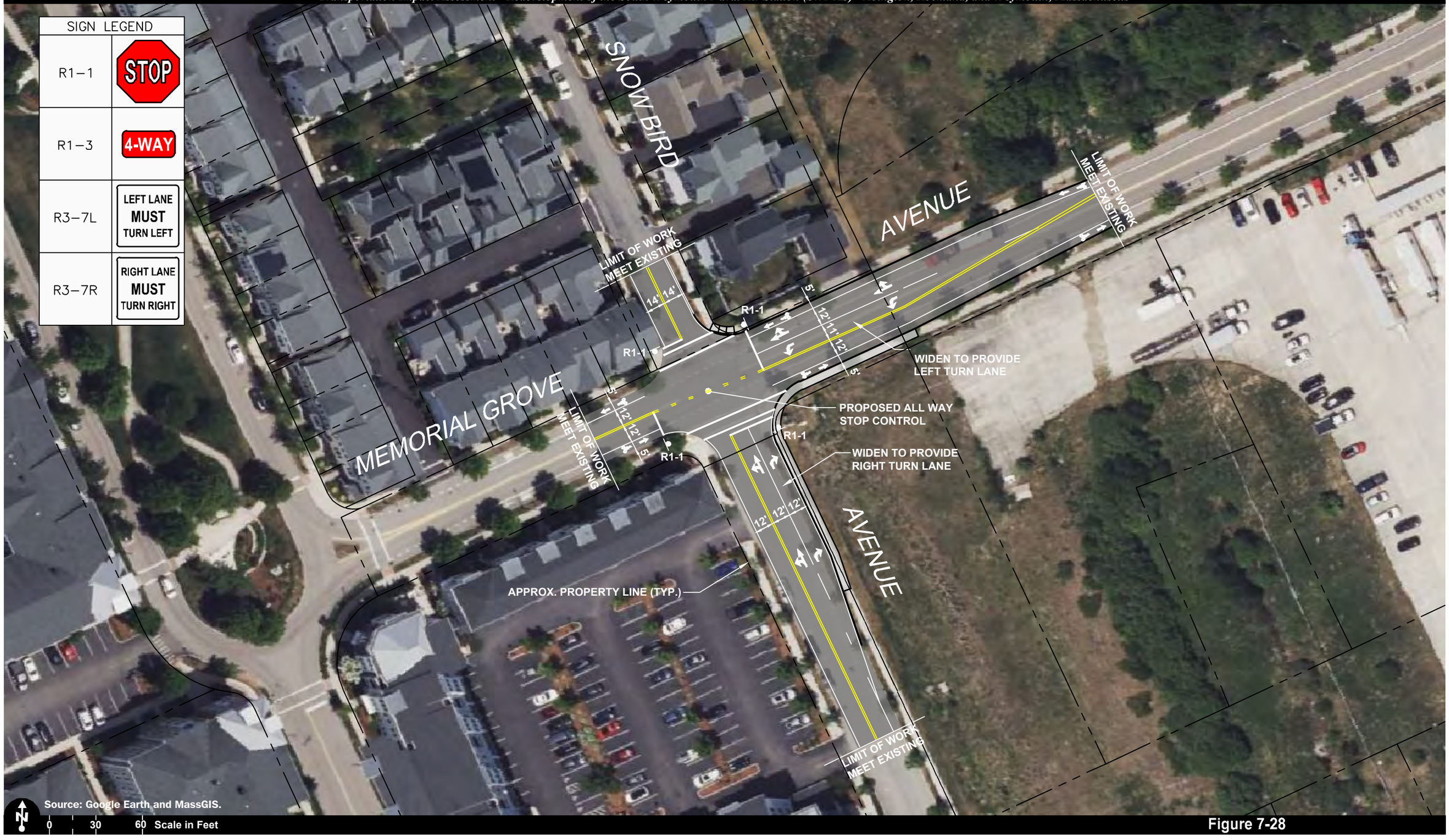


Figure 7-28

Conceptual Improvement Plan
Memorial Grove Avenue at
Snow Bird Avenue

Vanasse & Associates inc

Figure 7-29

Conceptual Improvement Plan
Patriot Parkway at
Bill Delahunt Parkway and
Shea Memorial Drive

Vanasse & Associates inc

Figure 7-30

Conceptual Improvement Plan
Route 139 at Lincoln Street

Vanasse & Associates inc

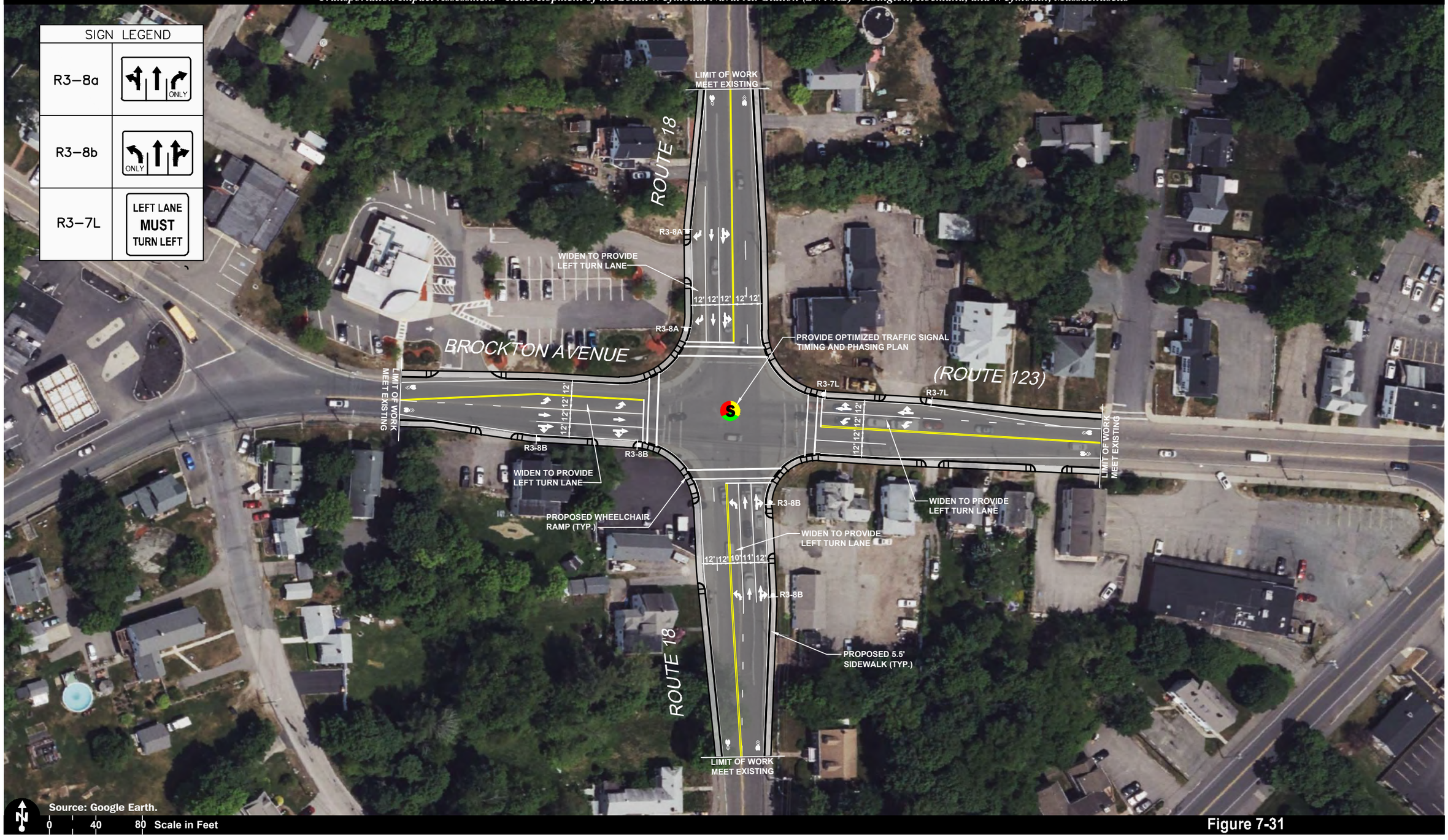


Figure 7-31

Conceptual Improvement Plan
Route 18 at Route 123

Vanasse & Associates inc

Figure 7-32

Conceptual Improvement Plan
Columbian Street at Forest Street

Vanasse & Associates inc

Figure 7-33

Conceptual Improvement Plan
Columbian Street at
Park Avenue West

Vanasse & Associates inc

– *Route 139 at Chestnut Street and Old Randolph Street* (Intersection 55) – Widen the Route 139 northbound approach to provide a left-turn lane and a through/right-turn lane (depicted on Figure 7-34).

With the implementation of the suggested geometric changes, 11 of these 15 intersections were shown to operate at an overall LOS D or better during the peak hours. Of the four (4) intersections that do not achieve this level of service, with the suggested geometric changes: i)the Weymouth Street/Bill Delahunt Parkway/Reservoir Park Drive intersection was shown to improve from an overall LOS F to LOS D during the weekday morning peak-hour; from LOS F to LOS E during the weekday evening peak-hour; and from LOS E to a LOS C during the Saturday midday peak-hour; and ii) the Route 18/Trotter Road, Trotter Road/Patriot Parkway and Patriot Parkway/Shea Memorial Drive/Bill Delahunt Parkway intersections were shown to operate at an overall LOS F during the peak hours; however, vehicle queuing and average motorist delays were shown to be generally reduced. The detailed analysis results are provided in the Appendix.

❖ ***Traffic Signal Timing Improvements***

In an effort to improve traffic operations and off-set the predicted impact of the Project, the Proponent will, subject to receipt of all necessary licenses, permits and approvals, design and implement an optimal traffic signal timing and phasing plan for the following intersections that were identified to be operating at or over capacity pursuant to the suggested schedule of implementation defined in Table 7-12:

– *Route 53 at Middle Street* (Intersection 2)

– *Middle Street at Winter Street* (Intersection 3)

– *Liberty Street at Grove Street* (Intersection 9)

– *Route 18 at West Street and Middle Street* (Intersection 13)

– *Route 18 at Columbian Street* (Intersection 14)

– *Pleasant Street at Park Avenue* (Intersection 16)

– *Pine Street at Ralph Talbot Street* (Intersection 20)

– *Route 53 at Derby Street and Gardner Street* (Intersection 28)

– *Route 228 at Pond Street* (Intersection 35)

– *Route 228 at Hingham Street and the Route 3 Southbound Ramps* (Intersection 36)

– *Hingham Street at Reservoir Park Drive* (Intersection 38)

– *Weymouth Street at Bill Delahunt Parkway and Reservoir Park Drive* (Intersection 39)

– *Pond Street at Hollis Street and Derby Street* (Intersection 42)

– *Route 18 at Pond Street and Pleasant Street* (Intersection 43)

– *Route 18 at Shea Memorial Drive* (Intersection 45)

Figure 7-34

Conceptual Improvement Plan
Route 139 at Chestnut Street and Old Randolph Street

Vanasse & Associates inc

- *Route 18 at Trotter Road* (Intersection 49)
- *Route 18 at Pond Street* (Intersection 50)
- *Shea Memorial Drive at Patriot Parkway and Bill Delahunt Parkway* (Intersection 53)
- *Route 18 at Route 139* (Intersection 57)
- *Route 58 at Route 139* (Intersection 58)
- *Route 123 at Route 58* (Intersection 69)
- *Route 58 at Summer Street* (Intersection 70)
- *Route 18 at Route 123* (Intersection 71)

The subject intersections will be monitored as a part of the annual Traffic Monitoring and Reporting Program (discussion follows). To the extent that the monitoring program indicates that additional traffic signal timing optimizations are necessary, the Proponent will implement the optimizations, again, subject to receipt of all necessary licenses, permits and approvals.

With the implementation of an optimal traffic signal timing plan, operating conditions at eight (8) of the 15 subject intersections were shown to improve to an overall LOS D or better during the peak hours, with four (4) of the intersections improving to an overall LOS D or better for one or more peak hours, and all intersections predicted to have a reduction in overall motorist delay and vehicle queueing. The detailed analysis results are provided in the Appendix.

Safety

Independent of the Project the following intersections were identified to have a motor vehicle crash rate that exceed the MassDOT average crash rates for similar intersections and/or were designated as HSIP eligible by MassDOT, and have not previously been the subject of a Road Safety Audit (RSA):

- *Middle Street at Winter Street* (Intersection 3)
- *Pleasant Street at Park Avenue* (Intersection 16)
- *Route 53 at Route 228* (Intersection 31)
- *VFW Drive at Pleasant Street and West Pleasant Street* (Intersection 62)
- *Route 58 at Summer Street* (Intersection 70)

In an effort to identify and advance safety improvements at these intersections, the Proponent will: i) facilitate the completion of a RSA for the intersections; and ii) design and construct the short-term, low-cost improvements that are suggested as an outcome of the RSA. The RSAs are currently underway and the construction of the short-term, low-cost improvements will be designed and constructed pursuant to the suggested schedule of implementation defined in Table 7-12 to the extent that the improvements can be completed within the public right-of-way and subject to receipt of all necessary licenses, permits and approvals.

The Pleasant Street/Columbian Street/Union Street intersection (Intersection 15) was found to have a motor vehicle crash rate that exceeds the MassDOT average crash rate for an unsignalized

intersection and was designated as a top 200 crash cluster location. This intersection is currently being reconstructed as a part of an intersection improvement project that is being advanced by the Town of Weymouth. No additional improvements are required at this intersection to accommodate the Project.

In addition, the remaining short-term, low-cost improvements identified in the RSAs for the following intersections that have not yet been implemented will be completed:

- *Route 18 at Route 53* (Intersection No. 1)
- *Route 53 at Middle Street* (Intersection No. 2)
- *Route 18 at Winter Street* (Intersection No. 4)
- *Route 18 at West Street and Middle Street* (Intersection No. 7)
- *Route 18 at Park Avenue and Park Avenue West* (Intersection No. 13)
- *Route 18 at Columbian Street* (Intersection No. 14)
- *Derby Street at the Route 3 Southbound Ramps* (Intersection No. 22)
- *Derby Street at the Route 3 Northbound Ramps* (Intersection No. 23)
- *Route 53 at Derby Street and Gardner Street* (Intersection No. 28)
- *Route 228 at Pond Street* (Intersection No. 35)
- *Route 18 at Pond Street and Pleasant Street* (Intersection No. 43)
- *Route 18 at Pond Street* (Intersection No. 50)
- *Route 139 at Hancock Street and Old Hancock Street* (Intersection No. 54)
- *Route 139 at Chestnut Street and Old Randolph Street* (Intersection No. 55)
- *Route 18 at Route 139* (Intersection No. 57)
- *Route 123 at Union Street* (Intersection No. 67)
- *Route 58 at Central Street* (Intersection No. 68)
- *Route 123 at Route 58* (Intersection No. 69)
- *Route 18 at Route 123* (Intersection No. 71)
- *Route 18 at Route 27* (Intersection No. 72)
- *Route 18 at Route 14* (Intersection No. 73)

The short-term, low-cost safety-related improvements that have not yet been implemented will be completed pursuant to the suggested schedule of implementation defined in Table 7-12 to the extent that the improvements can be completed within the public right-of-way and subject to receipt of all necessary licenses, permits and approvals.

With implementation of the aforementioned recommendations, safe and efficient access will be provided to the Project site and the Project can be accommodated within the confines of the existing and improved transportation system.

Transportation Demand Management (TDM)

The Proponent is committed to advancing the Project in a manner that reduces impacts on the transportation infrastructure. This commitment starts with a design that has been purposely configured to facilitate trips between development areas and recreational opportunities within the Project site by non-motorized modes of transportation. In order to reduce single-occupancy (SOV) trips external to the Project site and enhance mobility within the development, the Proponent will develop and implement a comprehensive TDM program, a principal component of which will be providing initial funding to establish a Tri-Town Transportation Management Association (the "Tri-Town TMA").

The following details the framework of the TDM program for the Project.

TDM Program Management

A full-time Transportation Demand Management Coordinator (TDMC) (who may also have other duties and responsibilities) will be employed to serve as the single point of contact for residents, employees and the Tri-Town TMA, and to lead the TDM program and associated marketing and outreach activities. The TDMC will, as part of the overall TDM program, establish and implement quality control procedures and performance measures to ensure a high level of service, appropriate implementation of alternative transportation incentive programs, and effectiveness of those programs. The email address and phone number of the TDMC will be made available to residents and employees. The TDMC will work with the Tri-Town TMA to compile and distribute up-to-date information concerning available commuting options and the incentive programs available to residents and employees that use alternative commuting modes to SOVs. This information will be included in a "welcome packet" that will be made available to all new residents and employees, and will include the following information:

- MBTA maps, schedules and fare information, including the service schedule and fare information for Commuter Rail service from South Weymouth Station
- Tri-Town TMA shuttle service routes, stops and hours of operation, when established
- Location of bicycle parking areas
- Location of bikeshare stations
- Map of local and regional bicycle and pedestrian routes
- Location and contact information for carsharing services
- Details of any Emergency Ride Home (ERH) offered through the Tri-Town TMA

In addition, the TDMC will coordinate with the Tri-Town TMA to host an annual transportation fair that will focus on the transportation alternatives and incentive programs that are available to residents and employees of the businesses that are located within the Project site, and will include programs focused on pedestrian and bicycle safety.

Tri-Town TMA Shuttle Service

A shuttle service will be operated by the Tri-Town TMA that will connect the development areas within the Project site with continued service to the MBTA South Weymouth Commuter Rail Station. Initial funding for this service will be provided by the Proponent and will be offered at no ($0) cost to residents and employees of businesses that are located within the Project site for the first year of operation. The service will be expanded to include other destinations and routes outside of the Project site as membership in the Tri-Town TMA increases and as demand warrants, and will be funded through the dues assessment to members of the TMA as a means of subsidizing the service.

Promotional and Incentive Programs

This Project site is situated adjacent to South Weymouth Station on the Kingston Line of the MBTA Commuter Rail system, which is located at 89 Trotter Road, and is connected to the Project site by way of Trotter Road and Patriot Parkway, and the interconnected network of sidewalks, bicycle accommodations and pathways within the Project site. The Project has also been designed to promote walking and bicycling, with sidewalks provided along one or both sides of the roadways within the development, pedestrian paths to connect development areas and recreational amenities, and bicycle accommodations that include both on- and off-road facilities. This network of pedestrian and bicycle accommodations will be extended as a part of the Project along the gateway roadways (Shea Memorial Drive, Bill Delahunt Parkway and Patriot Parkway/Trotter Road) to connect to Route 18, Weymouth Street and Hingham Street (via Reservoir Park Drive). The TDMC will promote the use of alternative modes of transportation to SOVs through promotional and public awareness programs that will be developed in conjunction with the Tri-Town TMA and will focus on the following factors/programs to incentivize travel mode changes:

- **Cost Savings**

  Ridesharing can reduce transportation costs; employees can typically deduct use of public transit from pre-tax or post-tax income; car insurance companies may offer discounts to employees that use public transportation as their primary commuting mode directly or through an annual mileage discount; and employers may have incentive programs that provide employees with rewards for use of non-SOV modes. Increased fuel prices can be avoided or minimized by increasing the use of non-motorized modes.

- **Public Transportation**

  The following services will be provided to encourage the use of public transportation and will be managed by the TDMC:

  - Information on MBTA schedules and fares, and the schedule for the Tri-Town TMA shuttle, when established, will be made available to residents and employees, included in resident and employee informational packets and marketing information, and provided on the website for the Project.
  - Commercial tenant(s) will be encouraged to allow employees to set aside pre-tax funds as allowable under the Commuter Choice provisions of the Federal Tax Code, including the MBTA "Perq for Work" program (formerly known as the Corporate Pass Program), which provides employees the opportunity to buy MBTA passes as a pre-tax exemption.

- Transit screens or other equivalent displays will be provided in the lobby areas of multifamily residential buildings and commercial buildings (as appropriate) to display real-time traffic and bus location information (similar to https://transitscreen.com/).

❖ **Public Transportation Benefit**

Lease agreements with commercial tenants will require that they become a member of the Tri-Town TMA and that they offer a monthly transportation benefit, capped at the cost of an unlimited bus/subway pass (Monthly LinkPass), to all employees who commute by a non-SOV mode for a minimum of three (3) days per week and register with the TDMC. The cost of this pass is currently $90 per month, and this cap will increase with each fare increase that is initiated by the MBTA to ensure that the benefit will allow employees to purchase an unlimited bus/subway pass each month. Eligible employees will have the freedom to spend the monthly transportation benefit in any way that they prefer – on transit fares, bicycle maintenance, gas for carpools, vanpool fees, walking shoes, etc.

The Proponent will coordinate with the MBTA to endeavor to locate CharlieCard purchase/recharge kiosks or other such system for the purchase or replenishment of public transit fares at appropriate locations within the Project site defined in consultation with the MBTA that are accessible to employees and the public, and that meet the MBTA's customer service standards.

❖ **Ridesharing**

The TDMC will market a ridematching program to facilitate carpooling by residents and employees. Information on ridematching services will be made available to residents and employees, included in the new employee and resident "welcome packets" and provided on corporate and residential community websites. In addition, preferential parking will be reserved or provided by commercial tenants for carpools and vanpools.

❖ **Car Sharing**

The Proponent will work with a car-share provider to stage car-share vehicles at accessible locations within the Project site for use by residents and by employees.

❖ **Pedestrian/Bicycle Program**

In order to encourage walking and the use of bicycles as an alternative to the use of SOVs by residents and employees of the Project, the Proponent will implement the following measures:

- As appropriate, the Proponent will work with a bikeshare provider to establish a bikeshare program for the Project. Access to the bikeshare program will be made available at no ($0) cost to residents and employees of commercial tenants within the Project site that register with the TDMC for the first year of residency or employment. Thereafter, a bikeshare fee structure will be established by the Tri-Town TMA that will be included in the dues assessment to members of the TMA as a means of subsidizing the service.

- Secure bicycle parking will be provided at appropriate locations within individual development sites. Bicycle parking will include both interior (covered) and exterior bicycle parking. It is anticipated that a minimum of one (1) bicycle parking space per 15 vehicle parking spaces will be provided for commercial uses and one (1) bicycle parking space for every five (5) automobile parking spaces will be provided for a multifamily residential or mixed-use development. It is anticipated that a minimum of six (6) bicycle parking spaces will be provided for any individual use or development area.

- Bicycle and pedestrian commuting options will be encouraged and marketed to residents and employees by the TDMC, including making available up-to-date pedestrian and bicycle maps for local and regional facilities, and the location of bicycle parking within the Project.

- Employees that walk or bicycle to work will have access to a shower, changing area and locker located within individual buildings subject to tenant fit-out requirements or in shared amenities buildings.

- To encourage safety, commercial tenants will be encouraged to offer reflective vests at no cost to all employees who walk or bicycle to work.

❖ **Emergency Ride Home**

An Emergency Ride Home (ERH) program will be provided to all employees who commute to work by a non-SOV mode at least three (3) days per week. The ERH program will be coordinated by the TDMC and offered through the Tri-Town TMA, and will allow for a maximum of four (4) ERH per year per participating employee.

❖ **Flexible Work Schedules**

In order to encourage the use of public transportation, the Proponent will encourage commercial tenants to offer employee work schedules that are flexible so as to be consistent with public transportation schedules and, to the extent permitted by corporate policies, allow employees the opportunity to work from home as a way to eliminate vehicle trips to the buildings.

Traffic Monitoring and Reporting Program

The Proponent will conduct post-development traffic and parking monitoring, and an employee survey program in order to evaluate the success and to refine the elements of the TDM program, and to validate the trip projections for the Project. The monitoring program will include the following:

i) Obtaining traffic volume information over a continuous seven day, weeklong period on the gateway roadways that serve the Project site (Shea Memorial Drive, Bill Delahunt Parkway, Reservoir Park Drive and Patriot Parkway/Trotter Road);

ii) Performing turning movement counts and vehicle classification counts the following intersections) during the weekday morning (7:00 to 9:00 AM), weekday evening (4:00 to 6:00 PM) and Saturday midday (11:00 AM to 2:00 PM) peak periods:

- Route 53 at Middle Street (Intersection 2)
- Middle Street at Winter Street (Intersection 3)
- Liberty Street at Grove Street (Intersection 9)
- Route 18 at West Street and Middle Street (Intersection 13)
- Route 18 at Columbian Street (Intersection 14)
- Pleasant Street at Park Avenue (Intersection 16)
- Pine Street at Ralph Talbot Street (Intersection 20)
- Route 53 at Derby Street and Gardner Street (Intersection 28)
- Route 228 at Pond Street (Intersection 35)
- Route 228 at Hingham Street and the Route 3 Southbound Ramps (Intersection 36)
- Hingham Street at Reservoir Park Drive (Intersection 38)
- Weymouth Street at Bill Delahunt Parkway and Reservoir Park Drive (Intersection 39)
- Pond Street at Hollis Street and Derby Street (Intersection 42)
- Route 18 at Pond Street and Pleasant Street (Intersection 43)
- Route 18 at Shea Memorial Drive (Intersection 45)
- Route 18 at Trotter Road (Intersection 49)
- Route 18 at Pond Street (Intersection 50)
- Shea Memorial Drive at Patriot Parkway and Bill Delahunt Parkway (Intersection 53)
- Route 18 at Route 139 (Intersection 57)
- Route 58 at Route 139 (Intersection 58)
- Route 123 at Route 58 (Intersection 69)
- Route 58 at Summer Street (Intersection 70)
- Route 18 at Route 123 (Intersection 71)

iii) Performing a 12-hour (7:00 AM to 7:00 PM) turning movement count and vehicle classification count on an average weekday and Traffic Signal Warrants Analysis (TSWA) at the following intersections:

- Columbian Street at Forest Street (Intersection 11)
- Columbian Street at Park Avenue West (Intersection 12)
- Weymouth Street at Sharp Street and Abington Street (Intersection 40)
- Randolph Street at Forest Street (Intersection 41)

- Trotter Road at Patriot Parkway (Intersection 51)
- Memorial Grove Avenue at Snow Bird Avenue (Intersection 52)
- Route 139 at Chestnut Street and Old Randolph Street (Intersection 55)

iv) Evaluating motor vehicle crash data at the monitored intersections;

v) Performing a survey of resident and employee commuting modes; and

vi) Providing ridership information for the Tri-Town TMA shuttle service.

The traffic volume data that forms the basis of this TIA will be used as the baseline for measuring changes in vehicle dependent data. The monitoring program will commence within six (6) months after the earlier to occur of completion of 1,500 new dwelling units or 500,000 sf of new commercial space at the Project and will continue on an annual basis thereafter for a period not to exceed 10-years. The results of the monitoring program will be summarized in a report to be provided to MassDOT, the Metropolitan Area Planning Council (MAPC), the Old Colony Planning Council, and the towns of Abington, Rockland and Weymouth within 2-months after the completion of the data collection effort. The report will document: i) traffic volumes associated with the constructed portions of Project; ii) traffic operations (i.e., motorist delays, vehicle queuing and LOS), crash severity and calculated crash rates at the monitored intersections; iii) the results of the TSWA for the identified intersections; iv) the elements of the TDM program that have been implemented and use of alternative modes of transportation to single-occupant vehicles by residents and employees of the Project; and v) Tri-Town TMA shuttle service utilization.

If any of the following conditions are documented as a part of the monitoring program: i) the measured traffic volumes exceed the predicted traffic volumes for the constructed land uses as defined using trip-generation data published by the ITE for the appropriate land use(s) by more than 10 percent on a regular and sustained basis during the monitoring period; ii) there is a material increase in the number of motor vehicle crashes occurring at the gateway intersections that are attributable to the Project; or iii) the overall directional distribution of Project-related traffic as measured on the gateway roadways varies by more than 10 percent from the directional distributions that form the basis of this assessment; the Proponent will identify and undertake corrective measures in conjunction with the appropriate parties and subject to receipt of all necessary licenses, permits and approvals. These measures may include without limitation:

- Traffic signal timing modifications
- Sign and pavement marking improvements
- Wayfinding sign program to disperse trips between the gateway roadways
- On-site operation and management strategies that are designed to reduce overall and peak traffic volumes and parking demands
- Providing financial incentives for employees to carpool or use alternative modes of transportation to SOVs
- Offering free or reduced fees for bikeshare membership, carshare use and/or ridership fees for the Tri-Town TMA shuttle
- Expanding the Tri-Town TMA shuttle service to include service to other commuter hubs (Braintree Station, Logan Express, etc.) and employment centers

The identified corrective measures, if any, will be documented in the transportation monitoring program report, and will identify the appropriate parties responsible for implementation (assumed to be the Proponent unless the corrective measure(s) are a part of a committed improvement project or plan that is scheduled to be implemented by others), required approvals, and the timeline for implementation. The status of implementation of the identified improvement measure(s) will be documented in the subsequent monitoring report.

As detailed throughout this TIA, with implementation of the aforementioned recommendations, safe and efficient access will be provided to the Project site and the Project can be accommodated within the confines of the existing and improved transportation system.