Transportation
Land Development
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Services

Vanasse Hangen Brustlin, Inc.

101 Walnut Street
P. O. Box 9151
Watertown, MA 02471-9151
617 924 1770
FAX 617 924 2286
www.vhb.com

Memorandum

To: Mr. Stephen Buchbinder
Schlesinger and Buchbinder
1200 Walnut Street
Newton, MA 02461-1267

Date: April 4, 2013

Project No.: 10865.00

From: Randall C. Hart
Director of Transportation Planning & Engineering, LD

Matt Kealey, P.E. PTOE
Project Manager

Re: Station at Riverside Redevelopment
Response To Questions/Comments
City of Newton/Riverside Office Properties

This memorandum has been prepared to provide response to comments and questions that have been raised by the City of Newton and representatives of Equity Office Properties (Stantec Letter). The following outlines the questions raised in our response:

City of Newton:

Department of Planning and Development (Memorandum March 1, 2013)

The City of Newton Department of Planning and Development issued a memorandum to the Board of Alderman on March 1, 2013. The purpose of the memorandum, as stated in the memorandum, "was to provide the Board of Alderman and the public with technical information and planning analysis, which may be useful in the special permit decision making process of the Board of Alderman." On page 9 of the memorandum, there are a series of bullets under the heading of "Petitioners Responsibilities" that are the focus of this section of the comments and response:

Comment: *A Transportation Demand Management Plan that includes measureable and implementable actions to incentivize use of alternative modes of transportation.*

Response: For reference, a summary of the Transportation Demand Management Plan is included in the Attachments of this document. At the working session on March 5, 2013, there was much discussion about establishing a TDM coordinator and the logistics of how that would be achieved (i.e. would it be a full time position, etc.). For a site like this, the role of TDM coordinator would likely be added to the responsibilities of an existing employee, like the building operations manager for the proposed office building, as an example. Some examples of specific measures include:

- Telecommuting options.
- Promotional events for bikers and walkers.

- Provide incentives for bicycle and HOV commuting.
- Prioritize local hiring.
- Offer direct deposit to employees.
- Provide a guaranteed ride home program to eliminate an often-cited deterrent to carpool and vanpool participation.
- Sponsor vanpools and subsidize expenses.
- Provide preferential carpool and vanpool parking within the parking garages and spaces near office building entrances as a convenience to participants and to promote ridesharing.
- Provide subsidies to employees who purchase monthly or multiple trip transit passes.

In addition, located in the northeast corner of the residential building (at street grade) will be a bike storage room that all residents of the building will have access to. This room will provide formal bike storage and will include amenities such as a "work-station" where bicycle repairs can be performed, tools will be provided, and a compressor for filling tires will be present. This type of amenity to the residential building will be attractive to bicycle enthusiasts.

Comment: *A Parking Management Plan that includes all features presented thus far in a single document, and includes an accounting of the number of parking spaces at various locations on- and off-site.*

Response: A parking management plan summary has been included in the response to comments below and a copy of all parking documents prepared on behalf of the project is included in the Attachments of this document. In addition, Figure 1 (attached) demonstrates the parking count in each location of the site has been included.

Comment: *Statement from MBTA regarding shared use of the ICF*

Response: A letter from the MBTA will be provided in the near future.

Comment: *Consideration of unbundling rental and parking from rental of residences*

Response: Due to the layout of the proposed parking garage under the residential building, there is a number of areas that would utilize tandem parking spaces (16 tandem spaces on the upper level and 10 tandem spaces on the lower level). It is not practical to think that these types of spaces could be used or shared with other uses on site. As such, any opportunities for unbundled parking would likely result in scattered spaces rather than a designated section for shared use.

Comment: *Proposed layout of bike lanes along Grove Street, including transitions at roundabouts and trestles*

Response: VHB has prepared an updated plan of the Grove Street improvements which provides continuous five foot bike lanes on each side of Grove Street within the project limits. The updated plan is included in the Attachments at both 11x 17 and full scale versions (see "Revised Grove Street Plans section of the attachments).

Comment: *Clarification regarding access to Grove Street from homes near the Asheville Road roundabout*

Response: As discussed on many occasions in the public forum, the roundabout at the Southbound Route 128 Ramp and Grove Street has been shifted to the south in a substantial way. By moving the intersection to the south we have effectively ensured that Grove Street is no closer to the residents than it is today. In fact, in all locations in close proximity to the roundabout, it is substantially further away from the residential properties than it is today. As much as 35 feet of additional buffer area is being created and we expect within that buffer area that there will be opportunities to add screening to provide a separation between the residential properties and Grove Street. This buffer does not exist to today.

The proposed changes will not result in any changes in access to the residential homes located in proximity to the proposed Grove Street/Southbound Ramp. In fact, the additional buffer that will be created between Asheville Road and Pierrepont Road will create longer driveways than those which exist today. In addition, with the roundabout in place, residents who live between these two roadways will no longer need to take a left turn from their driveway to gain access to Grove Street eastbound; they can instead take a right turn and reverse direction at the roundabout. For the purpose of demonstrating the before and after conditions for residential access with the proposed improvements in place, a revised plan has been prepared and is provided in the Attachments of this document in both a 11 x17 and full scale format (see "Revised Grove Street Plans section of the attachments).

Comment: *Conceptual design for facades of ICF showing relationship to other structures and appearance from the street.*

Response: The design of the facades of the ICF will be conducted by the MBTA. The design process, which was described by representatives of the MBTA at a prior Land Use Committee hearing, is a public process that solicits input from the City of Newton officials and residents.

Questions from City Planning Department received by email (Receive March 9, 2013)

Comment: ***Site Plans. Need to make sure that the plans are current and represent in intended treatment for internal intersections:***

Response: The site plans have been modified as a result of the access improvements that MassDOT now supports. In addition, at the request of the City, the internal intersection that provides access to the residential and office components of the project has been modified to include a roundabout instead of a 4-way unsignalized intersection. A conceptual layout of this roundabout is shown in the attached plan.

Comment: ***Internal Roundabout; there seems to be some interest in a mini roundabout inside the site.***

Response: As discussed in the response to comment above, the site plans have been modified and now include a roundabout at the internal intersection per the City's request. One thing to note is that a "mini" roundabout at the internal intersection, as requested, is not practical as it needs to accommodate buses, tractor trailers, and emergency vehicles. The minimum design that is available and can accommodate the appropriate sized vehicles has been included in the revised site plan, which is provided in the Attachments.

Comment: *Revised layout for Grove Street to show better deflection at roundabouts, bike lanes on Grove Street, and a cycle track on the bridge. While I know this might normally be considered later on, for the purposes of our current discussion, I think it would be helpful to show how this can work, even if it has to change later for logistical reasons. I think we should start with what is most desired by the community and seek support to make it happen rather than take off the table now.*

Response: As discussed on many occasions, the plans prepared to date are conceptual in nature and demonstrate the intended geometry that we be formalized during the design review process. It is VHB's intention to maximize the deflection to the extent practical during the design review process. There are many factors that must be considered when designing modern roundabouts and therefore it is not possible to evaluate every aspect of this during preliminary concept development. However, given the questions and comments that have been consistently raised on this topic, VHB

has further reviewed the conceptual plans development and have made a series of adjustments on the concept to address this issue including the following:

- NB Ramp Roundabout
  - Northbound approach (NB off ramp) was adjusted to the greatest extent practicable based on the following constraints: If the NB approach was shifted west to provide a greater deflection, the design requirement of a two lane approach to be tangent to the roundabout would rotate the ramp onto private property. To eliminate this impact to private property, shifting the roundabout to the north was reviewed and the results show that this option will increase the westbound departure angle, require bridge modifications and steepen the MassDOT ramp gradient.
  - Southbound approach meets acceptable design criteria.
  - Additional deflection was provided on the eastbound approach shifting the westbound departure lane against till it hit the bridge wing walls.
  - The westbound approach meets acceptable design criteria.

- SB Ramp Roundabout
  - The Northbound approach (SB off-ramp) has been maximized within the existing constraints. Additional deflection would require shifting Quinobequin Road to the west. In order to accommodate a design vehicle with the new decreased angle from Grove Street to Quinobequin Road southbound, the required geometry will create impacts and land takings on private property.
  - The Southbound approach from Asheville Road is restricted by the existing geometry. No improvement can be made without major impacts to private property.
  - The Eastbound approach meets acceptable design criteria.
  - Additional deflection has been provided at the westbound approach.

- Bike lanes and cycle track on bridge
  - A formal bike 5 foot lane has been added to both sides of Grove Street within the limits of the project.
  - The eastbound lane drop tapers required east of the SB ramp roundabout terminate on the bridge utilizing the majority of the southerly shoulder. The alignment has been shifted to balance the eastbound and westbound shoulders so that a minimum of 5 feet of shoulder is available were required to provide a continuous 5 foot bike lane in both directions within the project limits.
  - See below for cycle track discussion.

See the revised plan in the Attachments for demonstration of the modifications that have been made to date (see "Revised Grove Street Plans section of the attachments). Please keep in mind that further enhancement to deflection, evaluation of constraints and other design aspects of these intersections will occur during formal design development with MassDOT and the City of Newton.

Comment: *Parking. Anticipated fee should be identified. A management plan needs to be crafted. The last submittal was more of a justification than a plan. We should be reviewing a document you could give to the different businesses so they know what spaces are available to what customers at various times of the day and how their use works. If you have questions, want a model, or want to sit down to review along the way, let me know.*

Response:

There is no fee anticipated for parking at the office and residential portions of the project, which is intended primarily for tenants of each facility. Fee for parking within the ICF will be regulated by the MBTA and is likely to be similar to current parking fees for Riverside Station. Parking associated

with the Community Center and Retail will be free and is likely to be accommodated through a voucher or similar type system. Details of this arrangement will be determined with MBTA moving forward.

For the purpose of summarizing the proposed parking supply the following summary is provided along with Figure 2 (attached) that locates proposed parking supply by location on site.

Office Building (Building A)
Five levels of parking are proposed under the building with the following configuration:

- Floor 5 – 97 parking spaces (91 standard, 4 compact, 2 handicap)
- Floor 4 – 104 parking spaces (95 standard, 7 compact, 2 handicap)
- Floor 3 – 107 parking spaces (98 standard, 7 compact, 2 handicap)
- Floor 2 – 97 parking spaces (91 standard, 4 compact, 2 handicap)
- Floor 1 – 84 parking spaces (78 standard, 4 compact, 2 handicap)
- Floor 0 – 82 parking spaces (73 standard, 7 compact, 2 handicap)

Total: 571 parking spaces (526 standard, 33 compact, 12 handicap) These parking space would be dedicated to tenants of the Office Building during normal business hours. During evening hours it is possible that parking within the office building could be made available to the Indigo Hotel for valet parking during events on occasion in the evenings or weekends. Similarly, it is possible that overflow parking for Red Sox Game Day at the ICF could be accommodated, when appropriate as well. We anticipate that that parking for overflow from Red Sox Game Day events at the office garage would be limited to early evening and weekends exclusively, outside normal office building activity time frames.

Residential Component (Building B)
Two levels of parking (upper and lower) and surface spaces on east side of building:

- Upper Level 235 parking spaces of which 16 are tandem spaces and 4 handicap
- Lower Level 194 parking spaces of which 10 are tandem spaces and 5 handicap
- Surface spaces on east side of building; 12 spaces one of which is handicap

It is anticipated that all parking within the garage of Building B will be designated exclusively for tenants and guest of tenants who reside in the residential units.

MBTA Parking; Intermodal Commuter Facility
Parking within the ICF will consist of dedicated T parking, parking designated for retail tenants, and parking for community center. A summary of the intended supply is provided below:

- Parking Level 6 - 208 parking spaces
- Parking Level 5 – 208 parking spaces
- Parking Level 4 - 208 parking spaces
- Parking Level 3 - 208 parking spaces
- Parking Level 2 - 159 parking spaces
- Parking Level 1 - 15 parking spaces

Parking within the ICF facility will be comprised of a total of 1006 parking spaces, most of which will be designated for MBTA. However as outlined in previous, the 1006 proposed parking spaces represents an increase of approximately 46 parking spaces over existing conditions. These 46 surplus parking spaces will be dedicated accommodating Community Center parking and will be located on the third floor of the garage. In addition, 80 parking spaces would be designated for retail purposes in the west end of the garage.

For the purpose of providing a single source for a summary of the site parking and parking management plan, please refer to the attachments which provides copies of all documents that have been prepared to date on this matter (see "Parking Document Summary section of the attachments).

Comment: *Bikes. Provide total number of bike spaces*

Response: Per the Newton Zoning Code requirements, a minimum of 30 bicycle parking spaces will be provided within the Office, Residential, and ICF facilities (see attached Figure 2). Bike storage will provided along the south west side of the building (Building A). Inside bicycle storage will be provided at the northeast corner of the residential building. And an internal bicycle storage cage, will be provided on the ground floor of the ICF. Additional bike racks will likely be added to key areas including in proximity to the proposed retail as well. Locations of primary bike accommodation on site is identified in figure format in the attachments.

Comment: *Identify key intersections where impacts may be expected as a result of the project and outline the additional work that might need to be done to remedy those situations. Per Lenny's comments, I don't believe the project should be responsible for reversing existing conditions, but to make sure the project causes no additional problems. It will be difficult to find a nexus between intersections a great distance from the site and the project being the cause of congestion. Having said that, I thought Lenny's idea was a good one and sounds like something that you may well have already agreed upon, which is to simply offer to do additional analysis on the most difficult intersections and make recommendations for the future. There were a number of intersections cited.*

Response: As part of our response to FST's original comment letter from August 2012, VHB reviewed the capacity analysis conducted as part of the February 2012 traffic study and identified all the locations that experienced a measurable impact (a drop in level of service) as a result of the project. As part of the review, mitigation measures were identified and proposed at the following additional intersections:

- Route 16 at Concord Street
- Route 16 at Quinobequin Road/Route 128 Southbound Ramp
- Commonwealth Avenue at Auburn Street (west intersection)
- Washington Street at Commonwealth Avenue
- Washington Street at Perkins Street/I-90 Eastbound

Throughout the discussions at the Land Use Planning Committee hearings, concerns about operations at additional intersections have been raised. While these locations are not expected to be noticeably impacted by the proposed project, the Proponent has offered assistance to the City to provide additional study at certain locations to determine what measures would be needed to address existing deficiencies and what measures are feasible. The locations that have been requested further study include:

- Route 30 at Lexington Street
- Route 30 at Melrose Avenue
- Lexington Street at Wolcott Street
- Grove Street at Central/Auburn
- Lexington Street at Auburn Street
- Grove Street at Woodland Street

Other questions from City Planning Department received by email (Received March 11, 2013)

Comment: *Can we put "cycle tracks" on the bridge*

Response: Cycle tracks, by definition, are separate from travel lanes and pedestrian by a physical barrier, such as on-street parking or curb, or are grade separated. Cycle tracks using a barrier separation can be at-grade, or either above or below the level of the travel lanes and cross-streets. The introduction of a "cycle track" on the bridge over Route 128 is something that can be considered and discussed with MassDOT moving forward provided it is designed in a way that does not add any dead load to the bridge structure or become a hazard for approaching vehicles. Also, it should be designed in way that would allow easy maintenance particularly from the perspective of snow removal. Ultimately MassDOT has jurisdiction over the bridge and they will decide what is most appropriate but for the purpose of being responsive to the comment, VHB has prepared an updated plan that includes formal bike lanes along Grove Street for the section where improvements are proposed (see "Revised Grove Street Plans section of the attachments)

Comment: *Prepare a response to Stantec which the city will adopt and forward.*

Response: Response to the November 30, 2012 Stantec letter is provided later in this document.

Comment: *When the MassDOT study on the weave becomes available, she would like to see it.*

Response: As presented by MassDOT at the March 5, 2013 Working Session on this project, DOT will be implementing changes to Route 128/I-95 between Grove Street and the highway entrance from MassPike (northbound). The outside lane will be closed off allowing for a second access entry lane to Route 128/I-95 from MassPike and Route 30 ramps. This change is going to be implemented during school vacation week in April. MassDOT will monitor the results of this change to see if it improves peak hour queues on the ramps. To the extent that MassDOT prepares a report of the operational benefits or similar type document, and makes it available to VHB, we will pass it on to the city for consideration.

Comment: *Dead end on Asheville; city doesn't favor the same as a matter of general principle. Are there specific reasons here not to do so*?

Response: With the proposed improvements at the Grove Street and Quinobequin Road/Asheville Road (southbound ramp) in place (modern roundabout), overall operations and safety at this intersection will be enhanced over existing conditions. This is particularly true for the Asheville Road approach as under current conditions, motorists entering the intersection from this roadway are under STOP sign control and must wait for a break in traffic. Speeds along this section of Grove Street are relatively high and the introduction of roundabouts at both the northbound ramp and the southbound ramp speeds in this area will be reduced substantially.

Modifying Asheville Road to make it a dead end would limit the ability of residents in the Lower Falls area from having a path to gain access to the improved intersection (roundabout) and therefore it does not seem practical to consider such a modification. However, to fully understand the benefit/detriments of making Asheville Road a dead end, a focused traffic study would need to be undertaken by the city. This effort would involve vehicle tracking data within the neighborhood so that the potential redistribution of neighborhood traffic, assuming a dead end were implemented, could be understood in a specific way.

Comment: *Addendum to Construction Management Plan addressing Red Sox game days. Provide specifics (i.e., where will people be directed to park; how will that message be communicated; will there be some type of onsite monitoring?*

Response: During the construction of the ICF, parking will be limited so as to allow for construction staging and construction management. During this time, the parking supply will be keep as close to

existing levels as possible but there will be a loss of spaces. To accommodate the temporary loss of parking, T users and will be notified of the temporary construction through normal media outlets, radio, internet, and through postings that will be made at the station and at train hubs along the Greenline. We also anticipate the use of variable message signs along Route 128 NB and SB that will direct T traffic to an alternative site for parking and access to the T such as Woodland Station/Arborpoint. Between the existing parking supply that will be maintained at Riverside and additional parking that is available at Woodland Station (and potentially Waban and Eliot), the existing parking supply will still be available. Red Sox game day traffic activity will be accommodated much in the same way, although we anticipate attempting to reach out to the red sox to expand on the communication and messaging to inform game patrons of the Riverside Construction activities and encourage alternative means of access to Fenway during the construction period.

Comment: *Residential parking to be available for other uses. Perhaps rent space to retail businesses or hotel for employees*

Response: Due to the layout of the proposed parking garage under the residential building, there would be a number of areas that would utilize tandem parking spaces (16 tandem spaces on the upper level and 10 tandem spaces on the lower level). It is not practical to think that these types of spaces could be used or shared with other uses on site. As such, any opportunities for unbundled parking would likely result in scattered spaces rather than a designated section for shared use.

Comment: *Will the T charge at all hours, or is the facility free at any point?*

Response: Yes, there will be a parking charge at all hours. However, agreements will be worked out regarding the pricing for parking for the retail space and community space.

Stantec; Letter from John Conely at Equity Office Properties (March 4, 2013)

Comment: *The existing unsignalized Station Driveway/Grove Street intersection will be reconstructed to support the proposed development. A traffic signal will be installed. A northbound left-turn lane and southbound right-turn lane will be constructed on Grove Street. Installation of the signal will by design add delays to through traffic on Grove Street traveling to or from your building. (As an unsignalized intersection, through traffic on Grove Street, the main street, has priority over the STOP-sign controlled side street, the Station Driveway.) VHB presented analyses in its initial traffic study showing that with the proposed geometric improvements and construction of a new site access drive at the Route 128 northbound collector-distributor (CD) road, the Station Driveway/Grove Street intersection would operate with only modest delays and limited queuing on Grove Street during peak hours. We questioned these findings based on the following:*

- *The assumed trip distribution for project generated traffic understated the percentage of traffic that is likely to be oriented to the north;*
- *The assumed assignment of traffic oriented to the south between the existing Station Driveway and the proposed CD Road Driveway understated the volume of traffic likely to use Grove Street and the Station Driveway;*
- *Consideration of an alternative trip distribution/assignment may indicate that the proposed northbound left-turn lane on Grove Street is undersized. (Overflow from an undersized left-turn lane would block the northbound through travel lane and delay traffic destined to your property.)*
- *The actual delays experienced by Grove Street traffic will be highly dependent upon the signal timing settings.*

The latest submittal from VHB and the staff report only address the first of these items. VHB did provide alternative traffic analyses that consider a higher share of project traffic oriented to the north on Grove Street. As reported in Table 3 of their October 15, 2012 memorandum, this change in the assumed trip distribution does not significantly change the overall operations of the Station Driveway/Grove Street intersection. The results show the intersection operating at 82 percent of capacity during the more critical PM peak hour with either distribution. During this hour the expected 95th percentile queue for southbound traffic on Grove Street (impacting traffic leaving Riverside Center) is 449 feet. No new analyses have been provided considering a greater use of the Station Driveway by traffic oriented to the south. In the absence of these analyses we cannot comment on the adequacy of the proposed northbound left-turn lane on Grove Street at the Station Driveway.

We have not seen any new analyses of the Station Driveway/Grove Street intersection using an alternative assignment of site traffic oriented to the south. (We still believe that MBTA patrons that presently use the Grove Street driveway will for the most part continue to use this driveway under the proposed development plan. The applicant's studies assume that much of the MBTA traffic will shift to the existing CD Road and CD Road access drive.) To our knowledge this comment has generally been ignored or overlooked by the applicant and City staff.

The March 1, 2013 Newton planning staff report begins to pay attention to this issue but again ignores the trip assignment issue that we raised. Regarding the adequacy of proposed turn lanes on page 5 the staff report states, "staff requests verification of this and requests adjustments, as needed". This request however, is made with no reference to the possible erroneous trip assignment assumptions.

On page 9 of the March 1, 2013 Newton planning staff report there is a summary of the "Petitioner Responsibilities" This summary omits the above request for verification.

Response: As part of the formal City of Newton peer review process, VHB has assessed an alternative project distribution which considers a heavier project draw from Grove Street to the east. This supplemental analysis was prepared to provide a "sensitivity" analysis as we believe the distribution that is presented in the February traffic study is reasonable and was determined based on sound traffic assessment procedures. The commenter suggests that the project traffic distribution should consider a "greater use of the station driveway by traffic oriented to the south" yet no suggestion regarding what they think is appropriate is provided, or any backup regarding how they have arrived at such a conclusion. As stated in the February 2012 TIAS document and discussed in the public realm on many occasions, the internal site roadways and intersection controls are being designed to provide priority for motorist who choose to enter and exit the site at the new CD Road driveway. This includes the proposed office and residential development along with access to/from the ICF parking facility. In addition, as shown in the TIAS, the way finding signage program is being designed to direct all traffic bound for Riverside Station to use the CD Road driveway. There will be no signage directing motorists to the existing Grove Street Driveway. While we believe the distribution provided in the February 2012 TIAS is appropriate for evaluation of project impacts, a second level of sensitivity analysis has been prepared to respond to this comment. For this assessment we have implemented the distribution recommendations provided by FST for traffic along eastern Grove Street, also we have modified the trip assignment entering and exiting the site at the Grove Street site entrance where appropriate (added 8% to Grove from residential distribution, and changed MBTA traffic distribution, oriented to the south, from 75% CD road/25% Grove to 75% Grove/25% CD Road). As summary of assumptions and results of this assessment are provided in the attachments of this document.

Comment: *We previously raised concerns that the unsignalized north driveway at Riverside Center would operate with long delays during the PM peak hour based on the original traffic impact analysis. The revised analysis provided by VHB, which assigns a higher share of The Station at Riverside traffic past this driveway, shows even greater delays for traffic exiting your site. Per Table 2 of the VHB memorandum the site driveway was originally expected to operate at 76 percent of capacity with average delays of 77 seconds per vehicle. The revised analysis shows operations deteriorating with an average delay of 117 seconds and a volume-to-capacity ratio of 90 percent. Furthermore, analysis results shown in Table 1 for the adjacent signalized center site driveway intersection with Grove Street indicate a 95th percentile queue on Grove Street southbound of 373 feet. This queue would block your north site driveway located only 225 feet away. (Even longer queues, in excess of 500 feet, are predicted for the morning peak hour however, more limited traffic volumes exit your site at this driveway during the AM peak hour.) No detailed discussion of this condition has been provided by the applicant nor have any mitigation measures been proposed.*

We have not seen any detailed discussion of this intersection and possible mitigation measures.

Response: Regarding the potential blockage of the north site driveway, it should be noted that under Existing conditions, the 293 foot queue from the center driveway currently blocks the north driveway, so this condition is not caused by the Project. There is no increase in overall delay or the delay for the southbound movement as a result of the project. Furthermore, this movement operates at LOS A with only 6 seconds of delay, and the 95th percentile vehicle queue will clear the intersection in one signal cycle.

Comment: *Traffic approaching your site from the north or exiting to the north will pass through the Woodland Road/Grove Street intersection. This is a four-way, STOP-sign controlled intersection. (Police details have been used at this location during school arrival/dismissal times at the adjacent Williams School.) Table 2 of the VHB memorandum indicates that the intersection experiences traffic demands in excess of capacity under projected 2022 conditions without the Station at Riverside project built. The original traffic study showed the intersection operating at 114 percent of capacity with the Station project built. With the revised analysis operations deteriorate such that AM peak hour operations will reach 120 percent of capacity and PM peak hour operations will reach 128 percent of capacity. Again, no detailed discussion of this condition has been provided by the applicant nor have any mitigation measures been proposed.*

We have not seen any detailed discussion of this intersection and possible mitigation measures.

Response: As noted, this intersection is already over capacity without the Project. The Project is expected to add less than one vehicle per minute during the AM peak, and an average of 1.5 vehicles per minute during the PM peak. As such, the impacts at this location are limited. However, during project traffic discussions with the City this intersection has come on numerous occasions. It's our understanding, based on these conversations, the intersection was made a four way STOP years ago to control traffic speeds in the vicinity of the Williams School even though the four way STOP condition results in poor peak hour traffic operations.

Parking Document Summary

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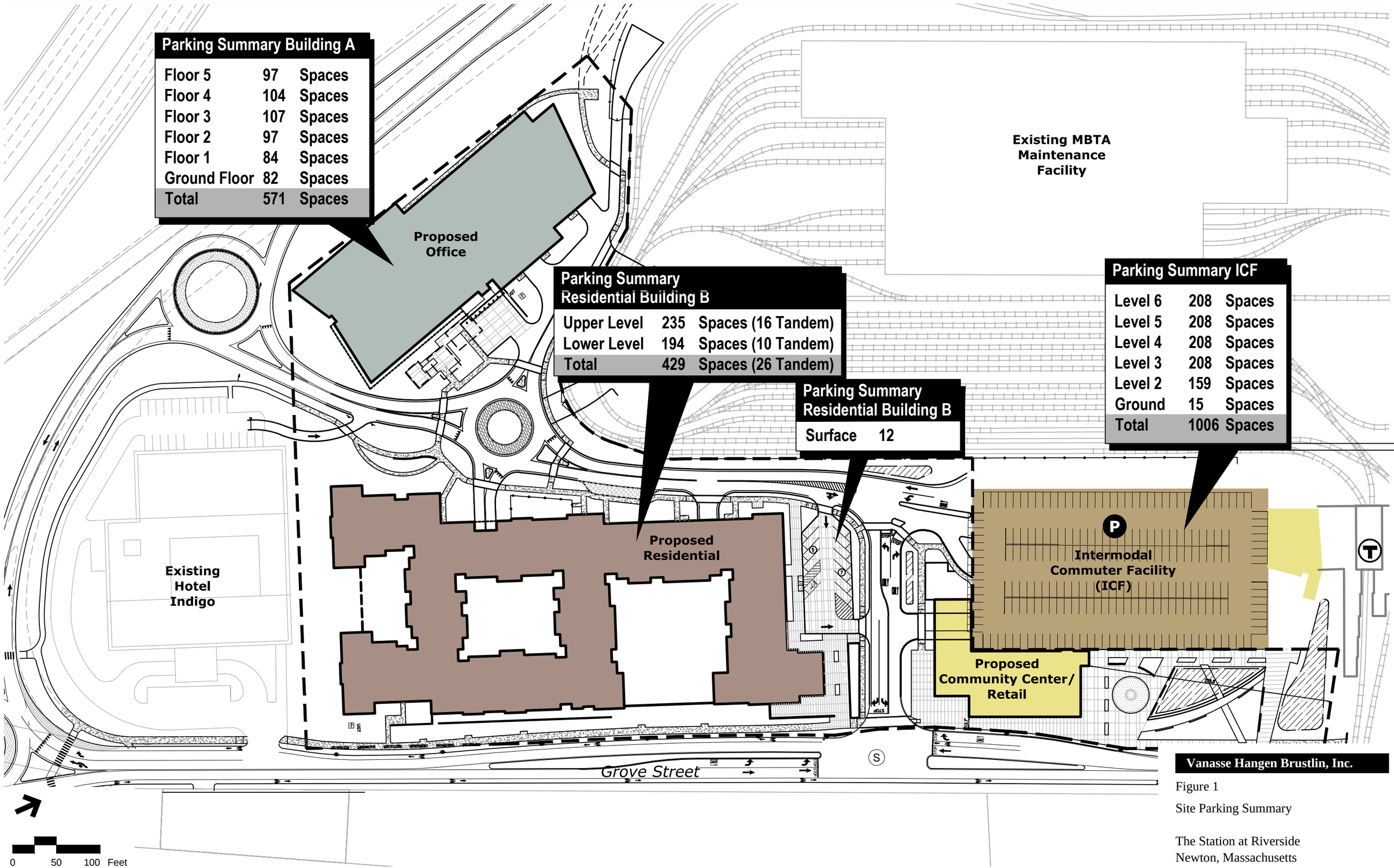

Vanasse Hangen Brustlin, Inc.

Figure 1

Site Parking Summary

The Station at Riverside
Newton, Massachusetts

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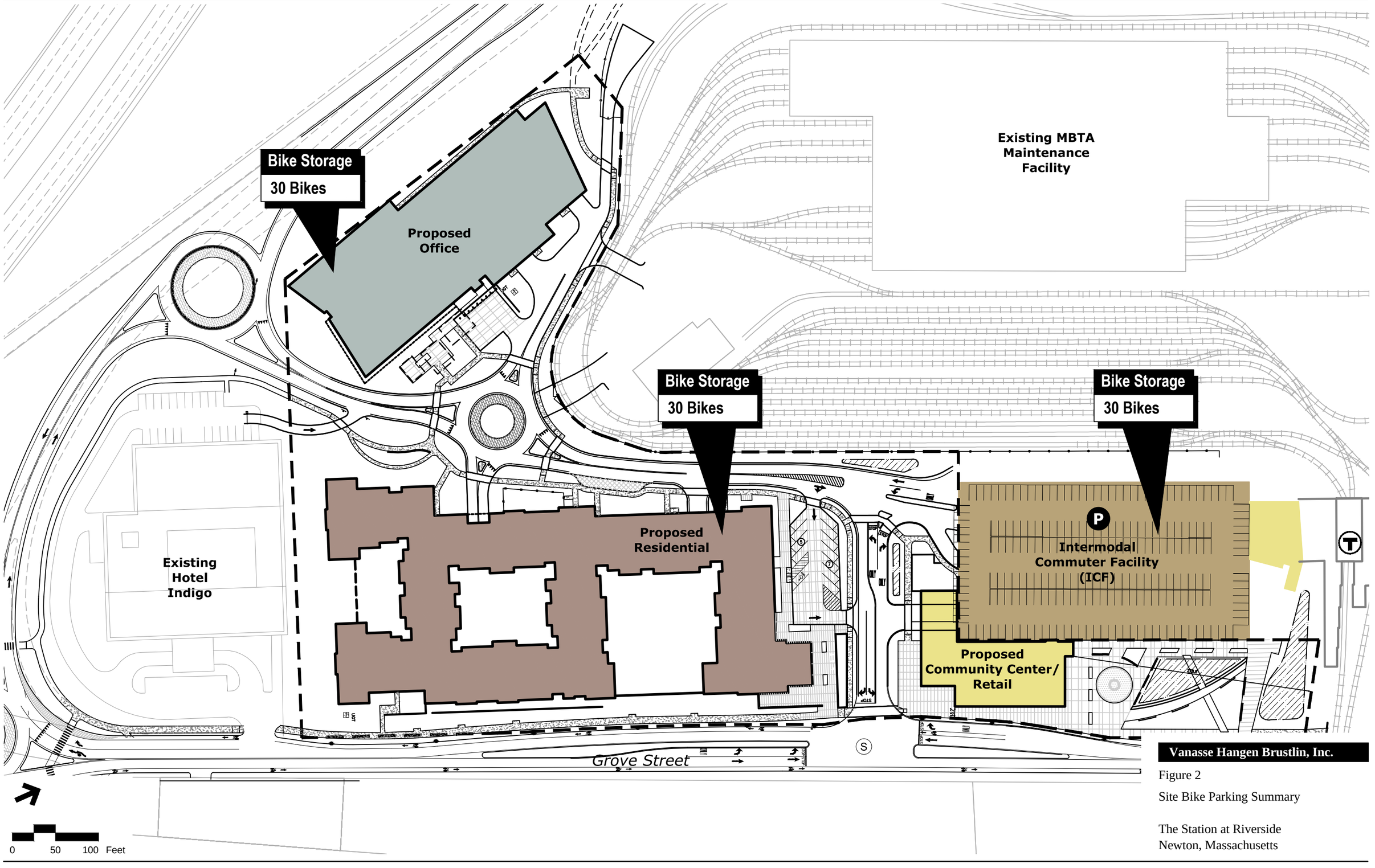

Vanasse Hangen Brustlin, Inc.

Figure 2

Site Bike Parking Summary

The Station at Riverside
Newton, Massachusetts

Transportation
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Vanasse Hangen Brustlin, Inc.

101 Walnut Street
P. O. Box 9151
Watertown, MA 02471-9151
617 924 1770
FAX 617 924 2286

Memorandum

To: Mr. Justin Krebs
The Walsh Company
99 Summer Street
Boston, MA 02110

Date: November 6, 2012

Project No.: 10865.00

From: Randall C. Hart
Director of Transportation Planning & Engineering, Land Development

Matt Kealey, P.E., PTOE
Project Manager

Re: Riverside Station Parking Management Plan

PROJECT SUMMARY

The Station at Riverside project consists of the redevelopment of the existing Riverside MBTA station which is a regional transportation hub, and consists of two primary major development phases. The first phase of work will include the construction of an Intermodal Commuter Facility (ICF) by the MBTA. In essence, the ICF is a consolidation of various transportation related activities including short and long-term commuter parking, local and regional bus services, and MBTA rail platform into a single new multi-level parking structure. The second major phase is the redevelopment of the existing surface commuter parking lot into a mixed-use, transit oriented development (TOD) consisting of residential, office, retail, and community space. Together, the two major phases constitute the Station at Riverside project containing the following overall building program:

- Building A is a 225,000 sf office building that includes a 571-space garage.
- Building B is a 290 unit residential building, with 5,000 sf of ancillary retail space. The building includes a 429-space parking garage and 12 surface spaces located on the east side of the building. The parking garage will be reserved for use by residents only.
- Building C consists of 15,000 sf of retail space and an 8,000 sf community center. Building C is adjacent to, and accessible from, the new MBTA parking garage.
- The 960-space MBTA parking lot will be replaced by a 1,005-space parking garage, an increase of 45 spaces.

As part of the local review process in the City of Newton, numerous questions have been asked about how each component of the site will function, particularly as it relates to the amount of parking available for the retail and the Community Center. To address these concerns, VHB has prepared a Parking Management Plan for the site, which is summarized in this memorandum. It is important to note that there are two very distinct parking conditions experienced at Riverside – average weekday conditions and Red Sox game day conditions. The following text summarizes the anticipated parking conditions and parking management measures that will be in place for an

average weekday and a Red Sox game day under the future Build condition with The Station at Riverside redevelopment in place.

AVERAGE CONDITIONS

To assess average conditions at Riverside, the first step was to conduct an evaluation of existing parking demands on the site. VHB conducted a parking assessment using a monitoring camera, which was positioned to gather parking occupancy data for the period of May 8 through July 31, 2012. Images from 9:15 am, 12:45 pm and 4:45 pm on each of the 85 days were reviewed and the parking occupancy was determined. The results of the parking occupancy counts are summarized in graphical form and in a memorandum attached to this document. The study found that within the existing 960 space MBTA lot, there were typically at least 300 parking spaces available on weekdays. The only exception is for afternoon Red Sox games, during which the MBTA parking was at capacity. Red Sox game day conditions are addressed in the next section of this memorandum.

The next step in assessing the parking demands of the retail and Community Center space is to evaluate the future parking requirements of the proposed uses. Based on local zoning requirements, the proposed 20,000 sf of retail space would require a total of 80 parking spaces and the 8,000 sf of Community Center space would require 54 spaces. It should be noted that the type of retail uses expected throughout the site is retail that is complimentary to the existing uses. These "service style" retail facilities may include a coffee shop, convenience store, dry cleaner, bank, ATM, restaurant, etc. Such types of uses will draw heavily on the traffic (both vehicular and pedestrian) that will already be present on the site for MBTA, office, and residential uses. Therefore both traffic and parking needs associated with the retail is not expected to fit "normal" traffic generation or parking need requirements. The parking demand required by zoning is very likely too high given that much of the retail activity would involve "internal capture" of activity from on-site residents and office employees, and MBTA commuters. Nonetheless, it is useful to understand the worst-case parking scenario should the full demand be realized. For the retail portion of the site, there are 12 surface parking spaces proposed that will be available for general short-term use. In addition, 80 parking spaces dedicated to the retail users will be provided on the second floor of the ICF/MBTA garage. These spaces would be signed as short-term parking with time limits to be determined through an agreement with the MBTA. The time restriction would ensure that these spaces would be available to retail customers and would not be used by commuters taking the train.

Regarding the parking for the Community Center, it should be noted that the proposed ICF/MBTA garage will provide a total of 1,005 spaces, which leaves a surplus of 45 spaces after replicating the existing 960 spaces on site today. These 45 surplus spaces will be dedicated to accommodating Community Center parking and will be located on the third floor of the garage. While the 45 spaces fall just short of the required 54 spaces, it should be reiterated that on average weekdays, at least 300 spaces are available in the parking lot under existing conditions. In addition, future events held at the Community Center requiring full use of their designated parking spaces would typically occur in the evening hours, during which a significant portion of commuters will have already vacated the garage, leaving even more spaces available beyond the 300+ spaces that are normally available on average weekdays.

As summarized above, the parking accumulation study conducted at the existing Riverside parking lot demonstrated that over 300 spaces are typically available on an average weekday. These vacant spaces are more than adequate to accommodate the demands of both the proposed retail space and the Community Center space. However, to ensure efficiency of parking operations for these uses, it is beneficial to designate specific areas within the garage to accommodate the dedicated spaces.

RED SOX GAME DAY CONDITIONS

While the parking accumulation study has documented that the parking supply is more than adequate on average weekdays, the study also showed that on Red Sox game days, the existing parking lot can reach capacity. In cases where the entire 960 MBTA spaces are occupied on game days, it is important to have a well established overflow contingency plan in place to accommodate these demands.

To accommodate potential overflow, it will be necessary to conduct active monitoring of the parking supply and demand within the ICF. Such a plan will require parking attendants to keep a dynamic count of available parking spaces within the garage and redirect vehicles arriving on the site when the garage is full. This can be accomplished through directional signage placed at multiple locations along the internal circulation roads. Typical Red Sox game day traffic begins in the early evening when office workers will be going home for the day, which will leave available spaces in the office building garage and the MBTA garage. If all MBTA spaces located within the ICF are occupied, parking attendants will display signage directing Red Sox traffic to the office garage. A parking attendant will be placed at the office garage to collect parking fees. The signs to be used will be lightweight, foldable "sandwich board" style signs that can easily be deployed and changed to direct traffic to the appropriate parking location. An illustration of the parking overflow plan is shown in Figure 1. It is assumed that parking attendants will be present on site monitoring parking supply several hours in advance of the game start time.

SUMMARY

During the local review process in the City of Newton, questions have been asked about how each component of the site will function, particularly as it relates to the amount of parking available for the retail and the Community Center. To address these concerns, VHB has prepared a Parking Management Plan for the site. The key components of this evaluation are summarized below.

- The proposed retail uses on site will be "service style" retail facilities and may include a coffee shop, convenience store, dry cleaner, bank, ATM, restaurant, etc. Such types of uses will draw heavily on the traffic (both vehicular and pedestrian) that will already be present on the site for MBTA, office, and residential uses. As such, traffic and parking demands associated with this retail have likely been overstated in the studies prepared to date.

- VHB conducted a parking accumulation study to monitor parking demands within the existing MBTA parking lot. The study showed that on an average weekday there are typically over 300 spaces available.

- While the proposed retail and Community Center parking can typically be accommodated with the existing 300± surplus on average weekdays, designated parking areas have been assigned in the ICF for each use, which will ensure parking efficiency as well as availability during Red Sox game days.

- An overflow contingency plan will be put in place to accommodate Red Sox game day parking if the ICF lot fills up. This plan will involve dynamic monitoring of the parking supply and coordinated redirection of traffic to the office parking garage, if necessary.

- Parking attendants at the ICF and Office Building will monitor parking occupancy within the garage.
- If the ICF fills up, the signs will be changed to direct vehicles to the office garage.
- A parking attendant will be preset at the office garage to collect the parking fees.

Collector-Distributor (C-D) Road

Route 128/I-95

INTERSTATE 95

128

Existing MBTA Maintenance Facility

Proposed Office

Parking Attendant

RED SOX (T) PARKING ← OR RED SOX (T) PARKING ↑

RED SOX (T) PARKING ← OR RED SOX (T) PARKING →

RED SOX (T) PARKING FOLLOW SIGNS OR ATTENDANT

Existing Hotel Indigo

Proposed Residential

Parking Attendant

P Intermodal Commuter Facility (ICF)

Riverside Station Platform

Proposed Community Center/ Retail

Grove Street

RED SOX (T) PARKING FOLLOW SIGNS OR ATTENDANT

0 60 120 Feet

Vanasse Hangen Brustlin, Inc.

Figure 1

Red Sox Game Day (Weekday)

Parking Management Plan

Transportation
Land Development
Environmental
Services

VHB *Vanasse Hangen Brustlin, Inc.*

PO Box 9151
101 Walnut Street
Watertown, Massachusetts 02471
Telephone 617 924-1770
FAX 617 924-2286
www.vhb.com

Memorandum

To: Mr. Kevin Daly
The Walsh Company
99 Summer Street
Boston, MA 02110

Date: August 21, 2012

From: William Cranshaw, P.E.
Project Manager, Planning.

Re: Station at Riverside –
Parking Justification

1.0 INTRODUCTION

The recently approved Mixed Use 3/Transit-Oriented District regulations require that the parking provided for the Station at Riverside project "is appropriate to the intensity of development, types of uses, hours of operation, availability of alternative modes of travel and encourages the use of alternatives without over-supplying parking."

To ensure that there is not an over-supply of parking provided by a transit-oriented development the regulations require that there be "a shared-parking analysis that demonstrates that the number of parking spaces to be provided is appropriate to the context, taking into consideration the mix of uses; the demand for parking spaces at different times of day, week and year; availability of alternative modes of transportation; and other site-specific influences on parking supply and demand, such as, but not limited to, Red Sox home games." This memorandum presents a detailed parking evaluation for the Station at Riverside project.

2.0 PROJECT DESCRIPTION

The Station at Riverside project is located at the existing Riverside MBTA station that is a regional transportation hub, and consists of two primary major development phases. The first is the construction of an Intermodal Commuter Facility (ICF) by the MBTA. In essence, the ICF is a consolidation of various transportation related activities including short and long-term commuter parking, local and regional bus services, and MBTA rail platform into a single new multi-level parking structure. The second major phase is the redevelopment of the existing surface commuter parking lot for a mixed-use, transit oriented development (TOD). Together, the two major phases constitute the Station at Riverside project containing the following overall building program:

- Building A is a 225,000 sf office building that includes a 571-space garage.
- Building B is a 290 unit residential building, with 5,000 sf of ancillary retail space. The building includes a 429-space parking garage and 12 surface spaces located on the east side of the building. The parking garage will be reserved for use by residents only.

- Building C consists of 15,000 sf of retail space and an 8,000 sf community center. Building C is adjacent to, and accessible from, the new MBTA parking garage.
- The 960-space MBTA parking lot will be replaced by a 1,005-space parking garage, an increase of 45 spaces.

Additionally, the project site is immediately adjacent to an existing 191-room, full-service hotel. The Indigo Hotel has dedicated parking for its overnight guests; however, potential overflow parking has been considered in the evaluation presented in this memorandum.

3.0 SHARED PARKING METHODOLOGY

The basic premise of shared parking is that a single parking space can serve the parking needs of two or more individual land uses. This occurs routinely in urban areas where, for example, a parking space used during the day by commuters is used during the evening by restaurant patrons. Suburban mixed-use developments can provide a similar synergy of parking utilization.

The Urban Land Institute has studied shared parking among mixed-use development and has developed methodology for evaluating shared parking that is documented in "Shared Parking", Second Edition, which was published in 2005. The ULI procedure involves the following steps:

- Gather and review project data such as dwelling units, restaurant seating, and square footage of retail and office space.
- Select base parking ratios for each land use. These ratios (e.g., x parking space per dwelling unit or y parking spaces per 1,000 sf of office space) tend to represent (1) the parking required for the peak hour of the peak day of the week during the peak month of the year, and (2) locations where there are few travel mode options other than personal vehicle use. The ULI *Shared Parking* report and the ITE *Parking Generation* report provide national standards for the base rates, but the use of locally calibrated rates based on zoning requirements or data collected at comparable facilities is encouraged.
- Adjust the base parking rates for non-auto mode applicable to the site. This should be done separately for employee and customer/visitor parking. The ULI *Shared Parking* report provides data separately for employee and customer/visitor parking demand.
- Determine the season, day and time of peak parking demand by evaluating the monthly, daily and hourly parking demand variations for each type of land use. Time-of-day, day-of-week, and monthly factors are provided in the ULI *Shared Parking* report.
- Make appropriate adjustments for "internal capture" of parking demand to eliminate double counting parking demand in situations where, for example, office employees are also retail customers.

Any shared parking evaluation should also include consideration of how "sharable" are the parking spaces. There may be parking policies that reserve some parking spaces for a single land use (such as reserved parking for residents), or as a practical reality the location of available parking is too distant from many destinations within the project site.

3.1 Base Parking Requirements

The zoning requirements for standalone uses provide a good starting point for the discussion of base parking requirements before adjustments for non-auto mode splits; seasonal, day-of-week, and time-of-

day parking occupancy patterns; and internal capture of parking demand. The City's zoning requirements for the uses proposed are as follows:

- Office: 1 space/250 sf of GFA up to 20,000 sf and 1 space/333 sf of GFA in excess of 20,000 sf
- Residential: 2 Spaces/Dwelling Unit but Board of Alderman may permit fewer by special permit, but no less than 1.25
- Retail: 1 Space/300 sf of GFA, plus 1 Space/3 employees on largest shift
- Public/Community: While no parking requirements have been established for this type of use, we have assumed a parking rate of 1 Space/ 150 sf of GFA. This is likely conservative since a majority of the use of this space will be from the neighborhoods surrounding the site and people may choose to walk to this facility.

4.0 PROPOSED PARKING EVALUATION

4.1 Availability of MBTA parking

Under existing conditions, the MBTA parking supply is more than adequate to accommodate typical daily parking demands. In fact, the parking supply is substantially underutilized. It is only during "game day" Red Sox events when the parking supply becomes fully utilized. With the proposed project in place, there is no reason to believe that the normal parking demands will change and therefore on typical days, there will be more parking that is needed within the IFC.

To substantiate the number of commuter parking spaces reasonably anticipated to be available in the new ICF a monitoring camera was positioned and parking occupancy data were gathered for the period of May 8 through July 31, 2012. Images from 9:15 am, 12:45 pm and 4:45 pm on each of the 85 days were reviewed and the parking occupancy determined. A sample of the images is shown below. The results of the parking occupancy counts are summarized in graphical form attached to this document.

Sample Camera Image – Wednesday May 9, 2012. 12:45pm.

The study found that there were always at least 300 parking spaces available in the MBTA lot on weekdays. The only exception was the1 weekday when there was an afternoon Red Sox game. The MBTA parking was at capacity on that day.

4.2 Project-related Parking

The following presents an evaluation of the parking demands for each of the new buildings, as well as the effects from Red Sox parking and a full-capacity event at the Indigo Hotel and restaurant. Because Building B parking is reserved for residents only, and because the remaining uses are predominately office, the parking evaluation focuses on each building separately rather than a project-wide summary analysis. The per-building discussion provides a clearer understanding of the parking issues and the findings regarding the adequacy and appropriateness of the parking supply provided.

4.2 Project-related Parking

The parking associated with each of the three buildings is described separately in the sections that follow.

4.2.1 Building A

Building A contains 225,000 sf of office space and 571spaces of structured parking. The zoning regulations would otherwise require a minimum of 4 parking spaces per 1,000 sf for the first 20,000 sf, and 3 parking spaces per 1,000 sf thereafter. The total required parking, before transit-oriented design considerations, is therefore 696 spaces.

The building provides 571 parking spaces; or 82% of the base parking requirements of the zoning regulations. A study published in the ITE Compendium of Technical Papers titled *The Effect of Transit Service on Trips Generated by Suburban Development* concluded that “suburban office development located within 500 feet of a rail station can expect commuter trip transit mode shares of between 20 and 25 percent”. Therefore, the assumption of 18% transit use by office commuters is appropriate for this site, and ensures that there is not an over-supply of parking.

As a worst-case scenario, even if the transit share of office commuters was only 10%, the parking demand would be 626 spaces, 55 more than the 571 provided in the office garage. Overflow parking of 55 cars could easily be accommodated in the ICF, which will typically have an estimated 300 available spaces.

4.2.2 Building B

The residential building will have 290 units, with 60% of the units being studio or one bedroom apartments. The project includes 15% affordable housing units. The building also includes 5,000 sf of ancillary retail space. The project provides 441 parking spaces, of which 12 are surface spaces and 429 are in the garage.

Building B: Residential Parking

The garage parking is reserved and assigned solely for residents. The 429 available spaces provides an average of 1.48 parking spaces per unit. The default parking requirement of the zoning regulations is a minimum of 2 spaces per apartment unit, the same as for single-family homes, although the zoning regulation recognizes that a lesser parking requirement may sometimes be appropriate. For those situations the zoning regulations provide a special permit process that allows parking as low as 1.25 spaces per unit.

The 1.48 parking spaces provided per unit is an adequate amount of parking for a location adjacent to a high-frequency transit service and given that some of the parking is "unbundled" from the base rent. Each unit has only 1 parking space included in the base rent and the other parking spaces are available at additional cost. The justification for the 1.48 spaces provided per residential unit is illustrated by the following table that compares the proposed parking at Riverside with parking provided at similar TOD locations.

Development	City	Transit Line	No. of Dwelling Units	No. of Parking Spaces	Spaces per Unit
Station at Riverside	Newton	Green Line	290	429	1.48
Woodland Station	Newton	Green Line	180	230	1.28
Station Landing – Phase I	Medford	Orange Line	292	414	1.42
Station Landing – Phase II	Medford	Orange Line	168	168	1.00

To some extent, it appears that the residential parking may be over-supplied. However, even if that turns out to be true there will not likely be any negative impacts such as encouraging excess automobile traffic activity. One reason is that some of the parking spaces are tandem spaces and if only one of the two paired spaces were assigned to a resident, the empty tandem space could not be used by others. Another reason is that the parking garage will be restricted and will not provide transient parking. Other than residential parking, the only other users that might be accommodated are employees of the Building B retail space, and, in the unlikely event it was necessary and mutually agreeable to all parties, employees from Building A or Building C.

Building B: Retail Parking

The retail component of Building B is 5,000 sf. The type of retail uses expected throughout the site is retail that is complimentary to the existing uses. These "service style" retail facilities may include a coffee shop, convenience store, dry cleaner, bank, ATM, restaurant, etc. Such types of uses will draw heavily on the traffic (both vehicular and pedestrian) that will already be present on the site for MBTA, office, and residential uses. Therefore both traffic and parking needs associated with the retail is not expected to fit "normal" traffic generation or parking need requirements.

The standard zoning requirements for retail call for 20 parking spaces. Such a parking demand is very likely too high given that much of the retail activity would involve "internal capture" of activity from on-site residents and office employees, and MBTA commuters. Nonetheless, it is useful to understand the worst-case parking scenario should the full 20-space demand be realized. There are 12 surface parking spaces provided and the remaining eight parking spaces could be provided by either (1) assigning retail employees to parking in the Building B garage, or more likely, (2) accommodating any overflow parking needs in the adjacent ICF/MBTA garage.

4.2.3 Building C

The building program in Building C consists of 15,000 sf of retail space and 8,000 sf of community space. Parking for this building will be provided entirely in the new ICF/MBTA garage.

Having the parking for Building C uses take place in the ICF/MBTA parking garage is a particularly effective way to ensure there is an adequate supply but not an over-supply of parking provided. The

parking demand for the retail use and community use is likely to peak in the evenings and on weekends, when MBTA-related parking demand is lowest.

Weekday, daytime parking demand represents the worst-case scenario for evaluating the adequacy of the parking supply. There are no generic national standards for parking demand related to "community space" but for the purposes of this analysis a conservative estimate of one car per 150 sf, the weekday, daytime parking demand for the community space would be 54 spaces.

Per the zoning regulations, the required parking for the retail space is 60 spaces (50 for patrons and 10 for employees). As a worst-case scenario, this assumes no internal capture of customer trips from on-site residents or office employees which is a very conservative assumption given the complementary nature of the retail planned.

In all, the weekday, daytime parking demand for the retail space and community space would be 120 spaces. This is 75 spaces more than the additional 45 MBTA spaces being created by the ICF phase of the project, but is well within the estimated 300 parking spaces typically available among the MBTA surface parking today.

4.3 Event Activity

To ensure that the parking provided is appropriate, it is important to understand parking activity associated with events, as well as parking activity of typical daily use. Two situations are described below. The first is game day activity associated with the Boston Red Sox. The second is a full capacity event at the Indigo Hotel and restaurant

4.3.1 Red Sox Games

The 2012 Red Sox home schedule has five (non-holiday) weekday daytime games (start times range from 2:10 pm to 4:10 pm) and 41 weekday evening games (start time typically at 7:10 pm). During most days when there are Red Sox games it can be expected that the MBTA parking is at or near capacity where as under normal non-game day condition it is well below capacity.

The primary effect of the Riverside parking demand on the Red Sox parking is limited to the five weekday day games. Worst-case, the Station at Riverside project would utilize a maximum of 138 of the existing MBTA spaces (55 from Building A, 8 from Building B and a net of 75 from building C), but by the time the MBTA parking typically filled for evening games (about 5:30 pm) much of the office parking demand would have lessened and there would effectively be no overflow of the new Station at Riverside project parking competing with the existing Red Sox parking. For the five day games, however, any overflow from the Station at Riverside project would already be parked in the MBTA spaces before Red Sox parkers arrive. But given the low probability of overflow from the Station at Riverside project occurring in the MBTA parking, and given that daytime Red Sox parkers are already constrained by MBTA daily commuter parkers, the effect of the Station at Riverside project parking on the days of the five daytime home games would be negligible.

4.3.2 Indigo Hotel

The Indigo Hotel has a restaurant that could be fully used on some nights, weekends, and holidays during the year. The parking requirement for the restaurant space is 84 parking spaces. The parking for a full event at the restaurant could be easily accommodated by either the parking at the MBTA or the office building parking garage. Many of the 571 office building garage parking spaces can be expected to be available at times when the Indigo restaurant is hosting a full-capacity event.

5.0 SUMMARY OF FINDINGS

The parking provided for the project is consistent with the objectives of the transit-oriented-design zoning regulations established for the site. It is appropriate given the mix of uses; proximity of high-frequency transit; and differences in parking demand patterns by hour, day of week, and season. It does not provide an over-supply of parking.

- Sufficient parking is provided for the office building assuming only an 18% transit mode share among commuters. If the transit use is only 10% then the maximum overflow of parking in the MBTA garage would be 75 cars, considerably less than the 300 spaces typically available.

- The residential building provides parking at 1.48 spaces per unit. This is higher than similar projects, but even if there is some excess parking it is not expected to have the adverse impacts of encouraging additional traffic. Any excess parking is likely to be among the less-desirable tandem parking spaces. Any excess parking might also be assigned to retail employees.

- The retail and community space may require up to 100 spaces for weekday, daytime parking. This is 55 spaces more than the additional 45 MBTA spaces being created by the garage project, but considerably less than the 300 spaces that are currently typically available in the MBTA parking lot.

- The parking for the project, being predominately for office employees, is complementary to the parking demand for most Red Sox games. The only conflict would be for the five weekday day games. The conflict is similar to that which exists now between MBTA commuter parking and the day game attendees.

Revised Analysis Summary
(Equity Office)

Table 1 Mitigated Intersection Capacity Analysis Comparison
(Based on October 2012 Response to Comments Trip Distribution)

	2022 Build with Mitigation Conditions Full C-D Road Access - Option B-2 (2012 RTC Memo)					2022 Build with Mitigation Conditions Full C-D Road Access - Option B-2 (Updated Trip Distribution)				
				Vehicle Queues					Vehicle Queues	
Location	v/c[a]	Delay[b]	LOS[c]	50th[d]	95th[e]	v/c	Delay	LOS	50th	95th
Grove Street at Riverside MBTA Driveway [f]										
Weekday Morning										
Grove Street EB L	0.16	3	A	7	16	0.35	4	A	15	29
Grove Street EB T	0.72	7	A	131	227	0.72	7	A	119	207
Grove Street WB T	0.48	8	A	85	144	0.52	9	A	82	138
Grove Street WB R	0.07	4	A	0	9	0.07	5	A	0	9
MBTA Driveway SB L	0.48	19	C	20	68	0.53	21	C	19	80
MBTA Driveway SB R	0.03	11	B	0	19	0.06	10	B	0	28
Overall	0.68	8	A	--	--	0.69	8	A	--	--
Weekday Evening										
Grove Street EB L	0.48	11	B	12	30	0.70	17	D	21	112
Grove Street EB T	0.43	5	A	63	104	0.42	4	B	63	104
Grove Street WB T	0.88	22	C	231	449	0.88	23	B	231	449
Grove Street WB R	0.06	4	A	0	9	0.06	4	A	0	9
MBTA Driveway SB L	0.72	32	C	68	152	0.79	39	C	68	152
MBTA Driveway SB R	0.07	13	B	0	24	0.19	14	A	152	48
Overall	0.82	16	B	--	--	0.84	17	B	--	--
Grove Street at the Route 128 NB Ramps [g]										
Weekday Morning										
Grove Street EB LT	0.56	8	A	--	175	0.56	8	A	--	175
Grove Street WB T	0.60	15	B	--	149	0.59	13	B	--	145
Grove Street WB R	0.13	11	B	--	17	0.12	9	A	--	15
Route 128 NB Off-Ramp LT	0.66	23	C	--	179	0.59	22	C	--	138
Route 128 NB Off-Ramp R	0.60	14	B	--	152	0.70	18	B	--	218
C-D Road SB LR	0.16	8	A	--	24	0.09	7	A	--	13
Overall	0.66	13	B	--	--	0.70	13	B	--	--
Weekday Evening										
Grove Street EB LT	0.30	5	A	--	66	0.30	5	A	--	66
Grove Street WB T	0.70	15	B	--	213	0.34	10	A	--	51
Grove Street WB R	0.35	10	B	--	53	0.71	14	B	--	217
Route 128 NB Off-Ramp LT	0.30	9	A	--	46	0.28	10	A	--	41
Route 128 NB Off-Ramp R	0.43	8	A	--	77	0.48	10	A	--	89
C-D Road SB LR	0.54	19	B	--	113	0.42	17	B	--	75
Overall	0.70	11	B	--	--	0.71	11	B	--	--

* Analysis was conducted based on the redistribution recommended by Stantec (March 2013).
a volume to capacity ratio.
b average delay in seconds per vehicle .
c level of service.
d 50th percentile queue length, measured in feet.
e 95th percentile queue length, measured in feet.
f Grove Street at the Riverside MBTA Driveway is proposed to be signalized under 2022 Build with Mitigation conditions.
g Grove Street at the Route 128 Northbound ramps is proposed to be reconstructed as a roundabout under 2022 Build with Mitigation conditions.

Computations

Project: Riverside — Project # 10865.00
Location: Newton, MA — Sheet 1 of 1
Calculated by: MAS — Date: 4/1/13
Checked by: — Date:
Title Trip Distribution - Reassignment
Re: Stantec Comments.

RTC METHODOLOGY

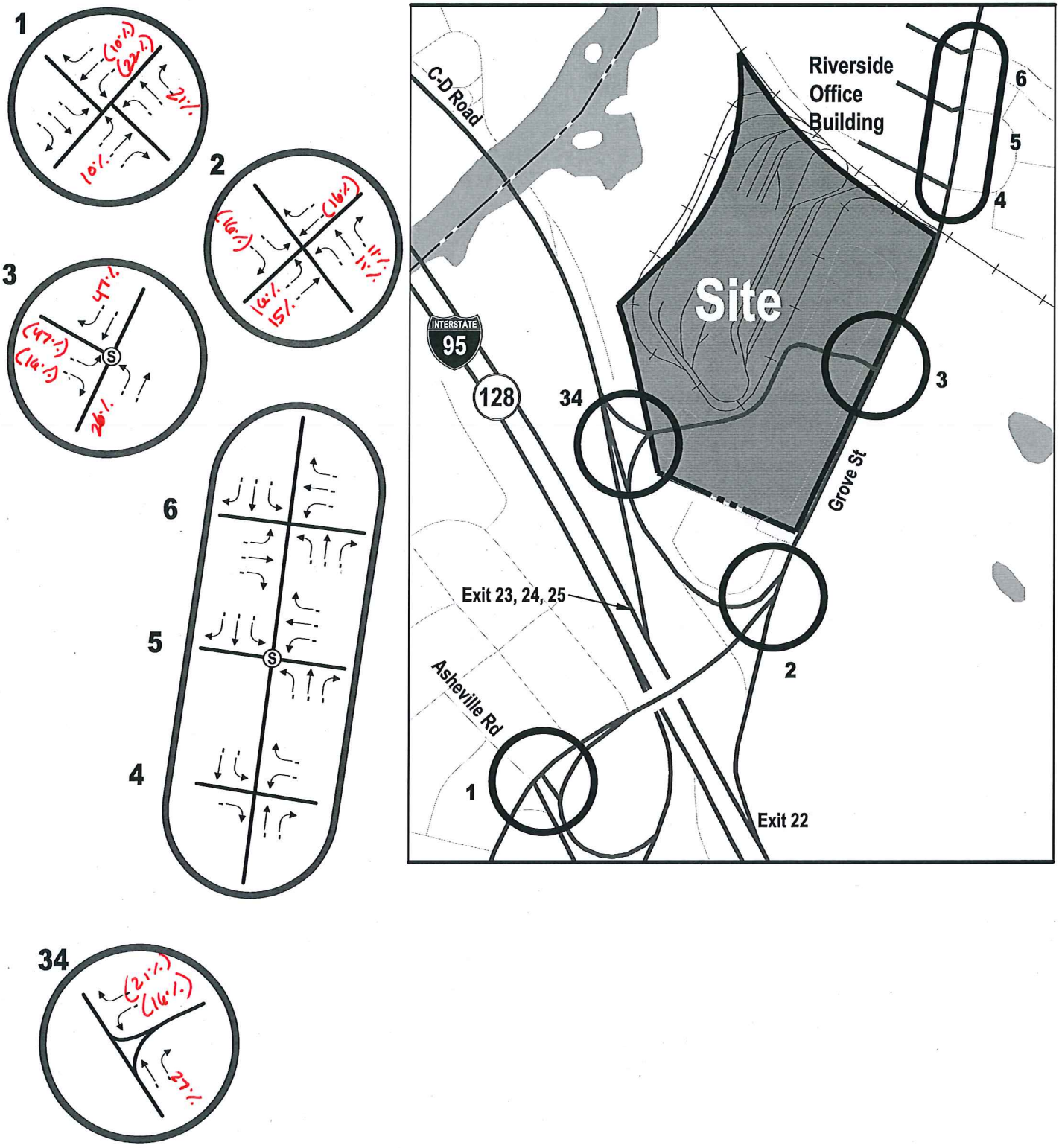
Component	Entering T/D: Via C-Ord.	Via Grove St. NB	Via Grove St. SB	Exiting T/D: From C-Ord. WBL	From Grove St. Drive SBR
Office	76%	0%	24%	44%	0%
Retail	0%	76%	24%	0%	44%
Residential	35%	18%	47%	21%	11%
AM MBTA (Volumes)	139 *	46*	35	59	20
PM MBTA (Volumes)	105 *	35*	30	104	35

* 75% of this traffic uses C-O Road; 25% uses Grove Street

REVISED METHODOLOGY

Component	Via C-Ord.	Via Grove St. NB	Via Grove St. SB	From C-Ord. WBL	From Grove St. Drive SBR
Office	76%	0%	24%	44%	0%
Retail	0%	76%	24%	0%	44%
Residential	27%**	26%**	47%	10%**	16%**
AM MBTA (Volumes)	46**	139*	35	20**	59**
PM MBTA (Volumes)	35**	105*	30	35**	104**

** Trip distribution percentages changed from RTC document.



Vanasse Hangen Brustlin, Inc.

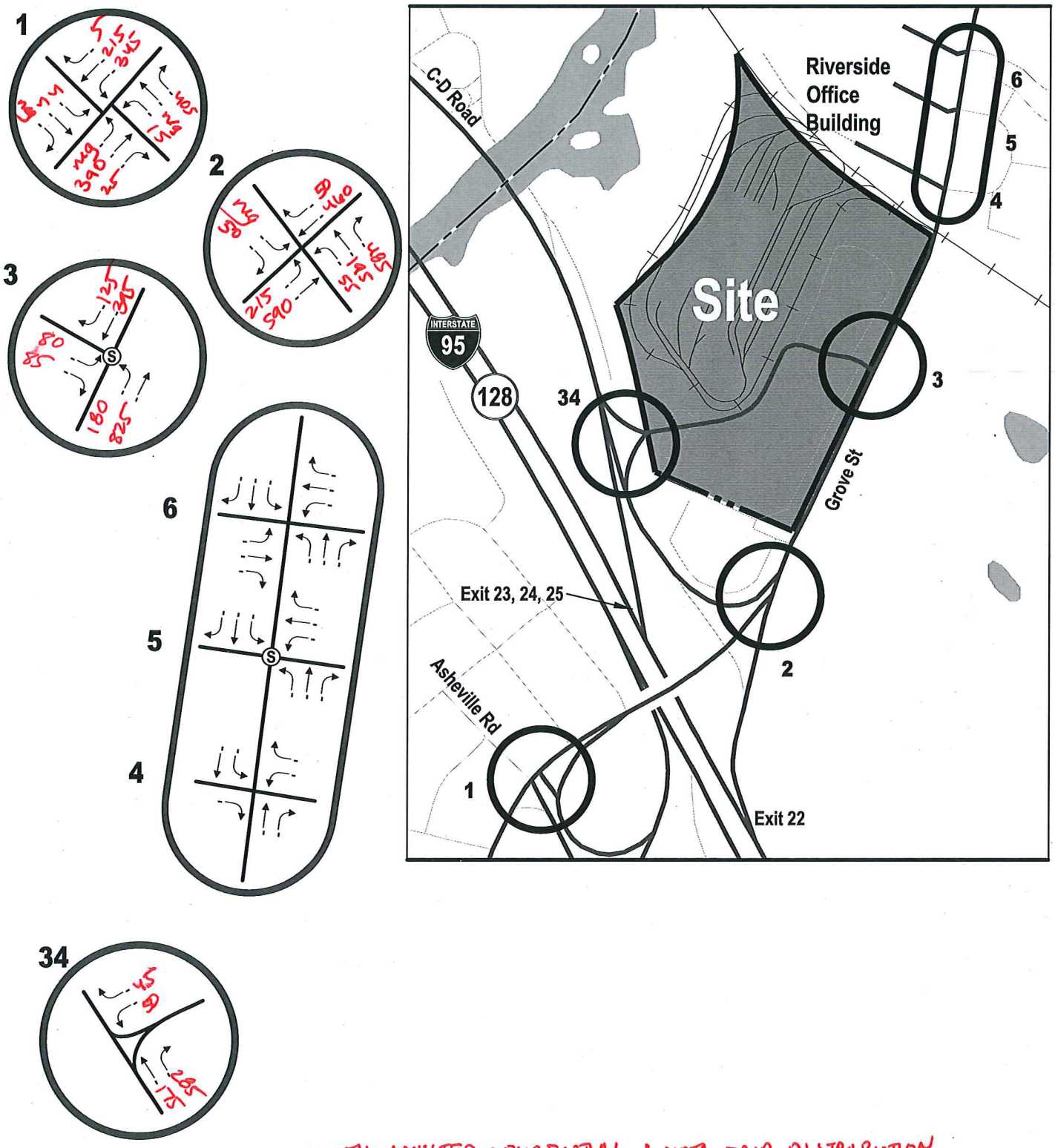
Trip Distribution Map
Residential Component

Figure

0 250 500 Feet

The Station at Riverside
Newton, Massachusetts

Z:\10865.00\graphics\FIGURES\2012 EIR\Networks.dwg



WITH ADJUSTED RESIDENTIAL & MBTA TRIP DISTRIBUTION

Vanasse Hangen Brustlin, Inc.

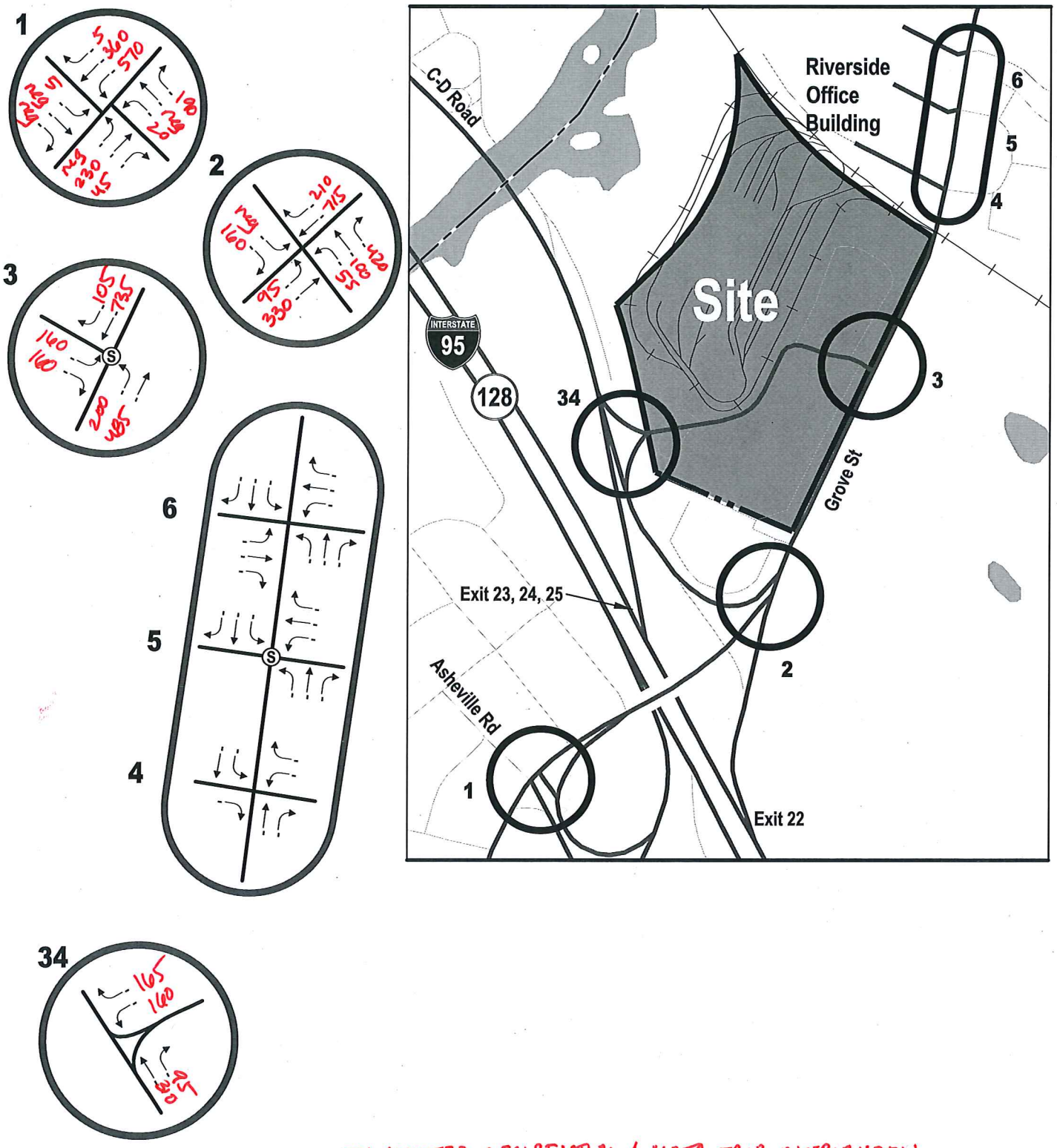
2022 BUILD W/MIT
AM PEAK HOUR TRAFFIC VOLUMES
OPTION B-2
BASED ON MTC VOLUMES

Figure

The Station at Riverside
Newton, Massachusetts

0 250 500 Feet

Z:\10865.00\graphics\FIGURES\2012 EIR\Networks.dwg



WITH ADJUSTED RESIDENTIAL & MBTA TRIP DISTRIBUTION

Vanasse Hangen Brustlin, Inc.

2022 BUILD W/MIT
PM PEAK HOUR TRAFFIC VOLUMES
OPTION B-2
BASED ON RTC VOLUMES

Figure

The Station at Riverside
Newton, Massachusetts

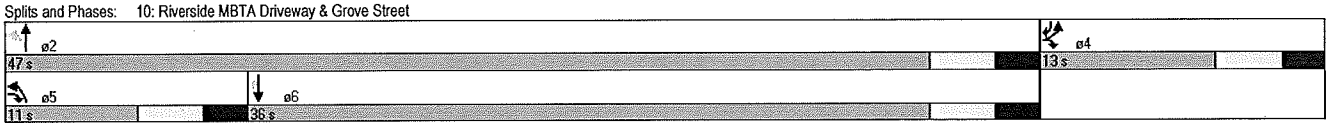
0 250 500 Feet

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	160	160	200	485	735	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	125			200
Storage Lanes	1	1	1			1
Taper Length (ft)	25	25	25			25
Satd. Flow (prot)	1703	1524	1752	1845	1881	1599
Flt Permitted	0.950		0.121			
Satd. Flow (perm)	1703	1524	223	1845	1881	1599
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		136				117
Link Speed (mph)	30			30	30	
Link Distance (ft)	236			1067	276	
Travel Time (s)	5.4			24.3	6.3	
Peak Hour Factor	0.85	0.85	0.91	0.91	0.90	0.90
Heavy Vehicles (%)	6%	6%	3%	3%	1%	1%
Adj. Flow (vph)	188	188	220	533	817	117
Shared Lane Traffic (%)						
Lane Group Flow (vph)	188	188	220	533	817	117
Turn Type		pt+ov	pm+pt			pm+ov
Protected Phases	4	4 5	5	2	6	4
Permitted Phases			2			6
Detector Phase	4	4 5	5	2	6	4
Switch Phase						
Minimum Initial (s)	6.0		6.0	10.0	10.0	6.0
Minimum Split (s)	11.0		11.0	15.0	15.0	11.0
Total Split (s)	13.0	24.0	11.0	47.0	36.0	13.0
Total Split (%)	21.7%	40.0%	18.3%	78.3%	60.0%	21.7%
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		None	None	None	None
Act Effct Green (s)	8.0	19.1	39.1	39.1	28.0	41.1
Actuated g/C Ratio	0.14	0.33	0.68	0.68	0.49	0.72
v/c Ratio	0.79	0.31	0.70	0.42	0.89	0.10
Control Delay	51.5	7.2	21.8	5.1	26.8	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.5	7.2	21.8	5.1	26.8	0.8
LOS	D	A	C	A	C	A
Approach Delay	29.4			10.0	23.5	
Approach LOS	C			A	C	
Queue Length 50th (ft)	68	13	21	63	231	0
Queue Length 95th (ft)	#152	48	#112	104	#449	9
Internal Link Dist (ft)	156			987	196	
Turn Bay Length (ft)			125			200
Base Capacity (vph)	239	600	314	1362	1025	1182
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.31	0.70	0.39	0.80	0.10

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 57.2
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 19.7 — Intersection LOS: B
Intersection Capacity Utilization 71.1% — ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Riverside MBTA Driveway & Grove Street



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	160	160	200	485	735	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1703	1524	1752	1845	1881	1599
Flt Permitted	0.95	1.00	0.12	1.00	1.00	1.00
Satd. Flow (perm)	1703	1524	223	1845	1881	1599
Peak-hour factor, PHF	0.85	0.85	0.91	0.91	0.90	0.90
Adj. Flow (vph)	188	188	220	533	817	117
RTOR Reduction (vph)	0	91	0	0	0	43
Lane Group Flow (vph)	188	97	220	533	817	74
Heavy Vehicles (%)	6%	6%	3%	3%	1%	1%
Turn Type		pt+ov	pm+pt			pm+ov
Protected Phases	4	4 5	5	2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	8.0	19.0	39.1	39.1	28.1	36.1
Effective Green, g (s)	8.0	19.0	39.1	39.1	28.1	36.1
Actuated g/C Ratio	0.14	0.33	0.68	0.68	0.49	0.63
Clearance Time (s)	5.0		5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	239	507	313	1263	926	1151
v/s Ratio Prot	c0.11	0.06	c0.07	0.29	c0.43	0.01
v/s Ratio Perm			0.41			0.04
v/c Ratio	0.79	0.19	0.70	0.42	0.88	0.06
Uniform Delay, d1	23.7	13.6	10.2	4.0	13.0	4.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.6	0.2	7.0	0.2	9.9	0.0
Delay (s)	39.3	13.8	17.2	4.2	22.9	4.0
Level of Service	D	B	B	A	C	A
Approach Delay (s)	26.5			8.0	20.6	
Approach LOS	C			A	C	

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	57.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		

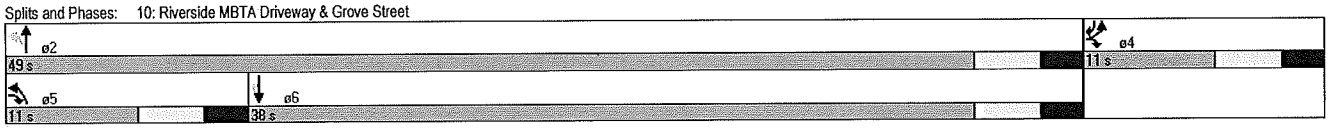
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	80	85	180	825	395	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	0%			0%	1%	
Storage Length (ft)	0	0	125			200
Storage Lanes	1	1	1			1
Taper Length (ft)	25	25	25			25
Satd. Flow (prot)	1641	1468	1787	1881	1853	1575
Flt Permitted	0.950		0.356			
Satd. Flow (perm)	1641	1468	670	1881	1853	1575
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		92				136
Link Speed (mph)	30			30	30	
Link Distance (ft)	236			1342	2037	
Travel Time (s)	5.4			30.5	46.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	1%	1%	2%	2%
Adj. Flow (vph)	87	92	196	897	429	136
Shared Lane Traffic (%)						
Lane Group Flow (vph)	87	92	196	897	429	136
Turn Type		pt+ov	pm+pt			pm+ov
Protected Phases	4	4 5	5	2	6	4
Permitted Phases			2			6
Detector Phase	4	4 5	5	2	6	4
Switch Phase						
Minimum Initial (s)	6.0		6.0	10.0	10.0	6.0
Minimum Split (s)	11.0		11.0	15.0	15.0	11.0
Total Split (s)	11.0	22.0	11.0	49.0	38.0	11.0
Total Split (%)	18.3%	36.7%	18.3%	81.7%	63.3%	18.3%
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		None	None	None	None
Act Effct Green (s)	7.5	15.3	27.0	29.6	21.8	29.6
Actuated g/C Ratio	0.18	0.37	0.66	0.72	0.53	0.72
v/c Ratio	0.29	0.15	0.30	0.66	0.43	0.12
Control Delay	25.3	4.9	4.2	7.6	10.9	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.3	4.9	4.2	7.6	10.9	0.8
LOS	C	A	A	A	B	A
Approach Delay	14.9			7.0	8.5	
Approach LOS	B			A	A	
Queue Length 50th (ft)	19	0	15	119	82	0
Queue Length 95th (ft)	#80	28	29	207	138	9
Internal Link Dist (ft)	156			1262	1957	
Turn Bay Length (ft)			125			200
Base Capacity (vph)	298	604	644	1747	1429	1177
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.15	0.30	0.51	0.30	0.12

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 41
Natural Cycle: 45
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 8.2 — Intersection LOS: A
Intersection Capacity Utilization 56.8% — ICU Level of Service B
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Riverside MBTA Driveway & Grove Street



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	80	85	180	825	395	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	0%			0%	1%	
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1641	1468	1787	1881	1853	1575
Flt Permitted	0.95	1.00	0.36	1.00	1.00	1.00
Satd. Flow (perm)	1641	1468	670	1881	1853	1575
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	92	196	897	429	136
RTOR Reduction (vph)	0	63	0	0	0	61
Lane Group Flow (vph)	87	29	196	897	429	75
Heavy Vehicles (%)	10%	10%	1%	1%	2%	2%
Turn Type		pt+ov	pm+pt			pm+ov
Protected Phases	4	4 5	5	2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	4.3	13.6	28.5	28.5	19.2	23.5
Effective Green, g (s)	4.3	13.6	28.5	28.5	19.2	23.5
Actuated g/C Ratio	0.10	0.32	0.67	0.67	0.45	0.55
Clearance Time (s)	5.0		5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	165	466	558	1253	831	1049
v/s Ratio Prot	c0.05	0.02	0.04	c0.48	0.23	0.01
v/s Ratio Perm			0.20			0.04
v/c Ratio	0.53	0.06	0.35	0.72	0.52	0.07
Uniform Delay, d1	18.3	10.2	3.5	4.6	8.5	4.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.0	0.1	0.4	2.0	0.5	0.0
Delay (s)	21.3	10.2	3.9	6.5	9.0	4.6
Level of Service	C	B	A	A	A	A
Approach Delay (s)	15.6			6.1	7.9	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	42.8	Sum of lost time (s)	10.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

LANE SUMMARY

Site: AM Build - Concept B

Grove Street at NB Ramps
2022 AM Build
Full Access on C-D Road
Roundabout

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Lane Length ft	SL Type	Cap. Adj. %	Prob. Block. %
South: NB Ramps																
Lane 1	60	212	0	272	3.0	458	0.593	100	21.6	LOS C	5.4	137.5	1600	–	0.0	0.0
Lane 2	0	0	527	527	3.0	759	0.695	100	18.3	LOS B	8.5	217.7	1600	–	0.0	0.0
Approach	60	212	527	799	3.0		0.695		19.4	LOS B	8.5	217.7				
East: Grove Street																
Lane 1	0	500	0	500	3.0	841	0.594	100	13.3	LOS B	5.6	144.5	1600	–	0.0	0.0
Lane 2	0	0	54	54	3.0	472	0.115	100	9.2	LOS A	0.6	14.6	1600	–	0.0	0.0
Approach	0	500	54	554	3.0		0.594		12.9	LOS B	5.6	144.5				
North: Access Road																
Lane 1	1	0	54	55	2.0	610	0.091	100	6.9	LOS A	0.5	13.0	1600	–	0.0	0.0
Approach	1	0	54	55	2.0		0.091		6.9	LOS A	0.5	13.0				
West: Grove Street																
Lane 1	234	641	0	875	4.0	1566	0.559	100	8.0	LOS A	6.8	175.0	1600	–	0.0	0.0
Approach	234	641	0	875	4.0		0.559		8.0	LOS A	6.8	175.0				
Intersection				2284	3.4		0.695		13.2	LOS B	8.5	217.7				

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Model used.

LANE SUMMARY

Site: PM Build - Concept B

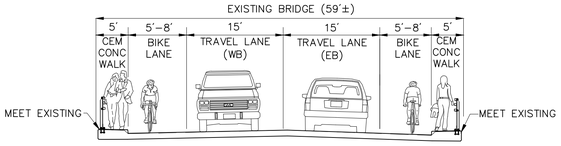
Grove Street at NB Ramps
2022 PM Build
Full Access on C-D Road
Roundabout

Lane Use and Performance

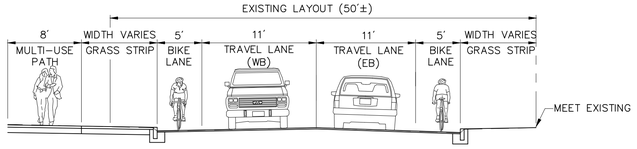
	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Lane Length ft	SL Type	Cap. Adj. %	Prob. Block. %
South: NB Ramps																
Lane 1	60	109	0	168	3.0	601	0.280	100	9.7	LOS A	1.6	40.9	1600	–	0.0	0.0
Lane 2	0	0	457	457	3.0	959	0.476	100	9.5	LOS A	3.5	88.5	1600	–	0.0	0.0
Approach	60	109	457	625	3.0		0.476		9.5	LOS A	3.5	88.5				
East: Grove Street																
Lane 1	0	777	0	777	3.0	1096	0.709	100	14.4	LOS B	8.5	216.6	1600	–	0.0	0.0
Lane 2	0	0	228	228	3.0	668	0.342	100	9.9	LOS A	2.0	51.4	1600	–	0.0	0.0
Approach	0	777	228	1005	3.0		0.709		13.4	LOS B	8.5	216.6				
North: Access Road																
Lane 1	1	0	174	175	2.0	420	0.417	100	16.7	LOS B	3.0	75.2	1600	–	0.0	0.0
Approach	1	0	174	175	2.0		0.417		16.7	LOS B	3.0	75.2				
West: Grove Street																
Lane 1	103	359	0	462	4.0	1563	0.296	100	4.7	LOS A	2.5	65.6	1600	–	0.0	0.0
Approach	103	359	0	462	4.0		0.296		4.7	LOS A	2.5	65.6				
Intersection				2267	3.1		0.709		10.8	LOS B	8.5	216.6				

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Model used.

Revised Grove Street Plans



GROVE STREET
TYPICAL BRIDGE SECTION
SECTION A–A



GROVE STREET
TYPICAL SECTION
SECTION B–B

Vanasse Hangen Brustlin, Inc.

March 27, 2013

Proposed MBTA Riverside
Station Redevelopment

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ASHEVILLE ROAD

PIERREPONT ROAD

DEFOREST ROAD

QUINOBEQUIN ROAD

I-95 SB OFF-RAMP

GROVE STREET

BIT.

CONC. WALK

VGC

SGC

PICKET FENCE

STOCKADE FENCE

CHAIN LINK FENCE

—DENSE TREES— GROUND OBSCURED

ONLY

Vanasse Hangen Brustlin, Inc.

March 27, 2013

Proposed MBTA Riverside Station Redevelopment

25 0 25 50

SCALE IN FEET

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