Transportation

The Roux Campus is well-situated to several major thoroughfares, including I-295, US Route 1, Washington Avenue, and Baxter Boulevard. The site has a single access point, located on Sherwood Street; that access will continue to provide vehicular access in and out of the site in the future. Access to Sherwood Street is provided via Veranda Street which connects to Washington Avenue, I-295, Baxter Boulevard, and US Route 1.

Washington Avenue accommodates all users, with traffic using two lanes in each direction south of Presumpscot Street, one lane in each direction north of that point, and buffered bike lanes north of Presumpscot. Bus routes run along Washington Avenue and pedestrian accommodations are present. In addition, the traffic signal system along Washington Avenue is a traffic responsive system operating with high efficiency. Intersections of Washington Avenue at Veranda Street, at Presumpscot Street, and at Ocean Avenue are each signalized intersections with pedestrians processed concurrently to traffic.

Veranda Street accommodates vehicular traffic with a single lane in each direction. Sharrows (faded) indicate that bicycles share the travel lane. Sidewalks are provided on both sides of Veranda Street and transit stops are present. Sherwood Street is a two-way roadway that is not striped and allows parking. Sherwood Street intersects Veranda Street to form a slightly offset four-way intersection. Both Sherwood Street approaches are stop-controlled at Veranda Street as well as Presumpscot Street.

Bates Street extends from the intersection of Washington Avenue and Veranda Street toward Baxter Boulevard, and consists of a vehicular traffic lane in each direction and a bike lane from Washington Avenue to Baxter Boulevard. A sidewalk runs along the west side of the street, but narrows and is periodically blocked by utility poles. A single lane in each direction at the intersection of Bates Street and Baxter Boulevard provides access north on I-295. Access south on I-295 is via a two-lane connection in each direction at the intersection of Washington Avenue at Veranda Street and Bates Street. This widens at Washington Avenue for turn lanes.

Adjusted Traffic Volumes at Washington Avenue and Veranda Street (2021)

Approach	Movement	AM Peak Hour Volume	PM Peak Hour Volume
Veranda St. Southbound	Left Through Right	130 65 50	70 95 60
Washington Ave. Eastbound	Left Through Right	35 1195 65	50 995 90
Veranda St. Northbound	Left Through Right	65 45 160	65 95 155
I-295 Exit Ramp Westbound	Left Through Right	100 650 80	150 1090 190

The intersection of Washington Avenue and Veranda Street is critical. Traffic from I-295, Baxter Boulevard, and Washington Avenue all travel through it to reach the site.

Several high crash locations (segments or intersections with eight or more traffic crashes and a critical rate factor exceeding 1.00 over the most recent three-year period) are located near the campus:

Intersections (with Crash Totals):
Washington Ave. at Randall St. (8)
US1 at Veranda and I-295 Ramps (14)

Segments (with Crash Totals):
Washington Ave. I-295 NB Exit 8 to Veranda St. (12)
Washington Ave. from Veranda St. to Galvin St. (11)

From 2019 to 2021, one fatal crash occurred within the study area at the HCL location of Veranda Street/ US-1 with the I-295 SB On-Ramps. The crash was determined to be caused from a driver running a stop sign. Safety improvements are being made as a part of the Veranda Street Bridge Replacement project.

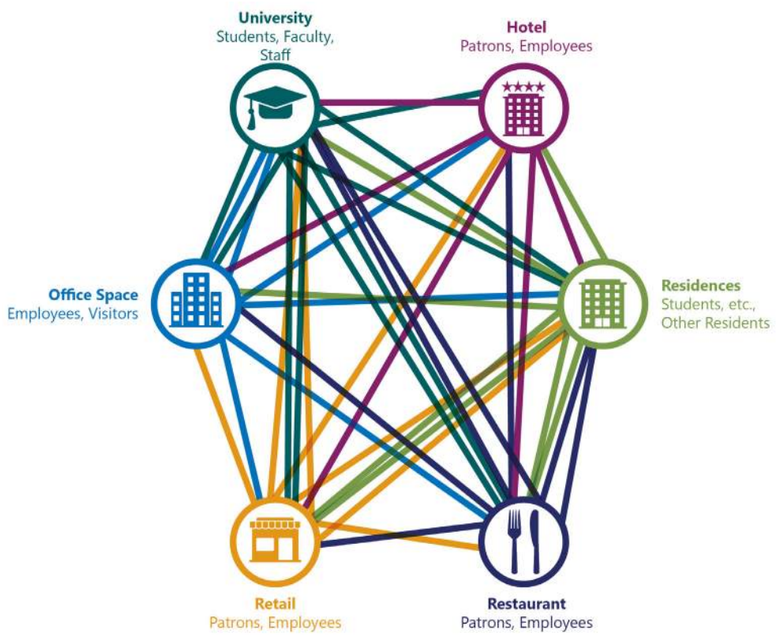
With adequate sight distance, the crashes along Washington Avenue, including at Randall Street, may be attributed to vehicles changing lanes or attempting to turn in or out of side streets where adequate gaps are not available due to congestion. There were no reported pedestrian crashes at the HCL locations. Three bicycle crashes occurred in the study area: one each at the intersections of Washington Avenue/ Bates Street/Veranda Street, Bates Street/Baxter Boulevard, and Washington Avenue/Churchill Street.

Trip Generation

Trip generation was evaluated using standard rates and Maine DOT guidance for the long-term development of the site. Trip generation rates were obtained from the Institute of Transportation Engineers Trip Generation Manual, 11th Edition, where available. Input was received from the City of Portland regarding appropriate land use codes, specifically for the restaurant component. In addition, because the land use code for university/college does not reflect the type of institution proposed here, VHB developed a trip generation methodology based on the anticipated populations at the site.

Relevant uses for the Roux Campus include general office building (LUC 710), multi-family housing mid-rise (LUC 221), high-turnover sit-down restaurant (LUC 932), strip retail plaza (LUC 822), and hotel (LUC 310). As a mixed-use development, many trips will occur between destinations on the campus. Students, faculty, and staff will eat in on-site restaurants and shop at on-site retail stores. Some students and staff will live in the residential units or work in the office space. Partner employees may travel between offices, university buildings, restaurants, and stores.

Inclusion of ancillary uses on the campus, such as housing, hotel, office space and retail, will reduce the number of external trips to the site; internal trips will not generate external traffic or impact the adjacent road network. For traffic generation purposes, internal trips are separated from total trips estimated using engineering standards.



Vehicle Trip Assignment
Vehicle trips were assigned to area roadways by estimating the proportion of trips arriving or leaving on each approach to the area. Estimates were based on data from several sources, including population density maps and US Census Journey to Work data. The process was repeated using catchment areas of various sizes, with minimal change in results. Trip distribution for people within a commuting distance of the site is shown in the adjacent top graphic.

Approximately 50 percent of trips are anticipated to travel from the south to reach the site and 15 percent are anticipated to approach from the north. (The thicknesses of arrows are scaled to indicate the share of trips that will use that route.)

Anticipated distribution of vehicular trips on neighborhood streets is shown in the adjacent bottom graphic. Almost 90 percent of trips are expected to travel through the intersection of Washington Avenue and Veranda Street. However, to access I-295 southbound, some drivers may choose instead to exit by taking a right and traveling up to the southbound on-ramp.

Additionally, approximately 20 percent of the site traffic is oriented to points west /southwest along local roadways or to and from the north on I-295; this will impact the intersection of Bates Street and Baxter Boulevard.

Mode Share
The East Deering Neighborhood is served by multiple bus routes and features a pedestrian and bicycle network. With improvements to these resources, the campus will be well suited for trips by modes other than single-occupant vehicles. We are committed to working with Portland METRO to support increased transit opportunities to and from the campus area. These factors, in addition to a Transportation Demand Management (TDM) plan, will reduce auto mode share.

A transportation engineer developed target mode shares for each envisioned Roux Campus land use, in consultation with City of Portland and Maine Department of Transportation officials. These shares were applied to external trips to determine the likely number of trips by each mode, yielding the estimates in the table at right.

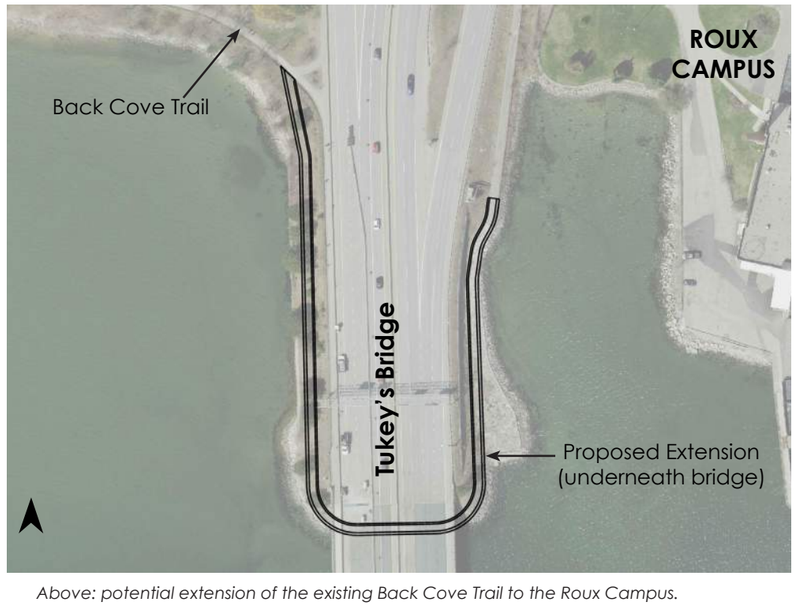
Estimated Mode Split (%)

Land Use	Transit	Ped. & Bike	Vehicle	Carpool Rider
Office	10	10	75	5
Retail	10	50	40	0
Restaurant	10	50	40	0
University	10	20	65	5
Residential	10	20	65	5
Hotel	10	10	75	5

Transportation Improvement Opportunities

Bicycle and Pedestrian Connection Opportunities
Infrastructure improvements can alleviate some neighborhood traffic impacts. These improvements include roadway reconfigurations, pedestrian and cyclist connections, and additional transit provisions. Two opportunities stand out when considering bicycle and pedestrian improvements (illustrated below and in the map at right).

Above: The Back Cove Trail connects with the Eastern Promenade Trail via Tukey's Bridge.



Above: potential extension of the existing Back Cove Trail to the Roux Campus.

The first is an improved connection between the Back Cove Trail and Washington Avenue. At present, users of the Back Cove Trail face a 90-foot mid-block crossing to reach the northwest side of Bates Street. Converting the intersection of Bates Street and sweeping right-turn maneuver would create a shorter, safer crossing. The second improvement is a direct connection from the Roux Campus to the Back Cove Trail, extending the shared-use path below and alongside Tukey's Bridge and through the site.

Parking Demand and Capacity
Parking will be built over time as part of the development program. All vehicular trips are intended to park on site. As demand increases during the phased development, parking will be introduced incrementally to avoid excess supply and inadvertent encouragement of driving to the site.

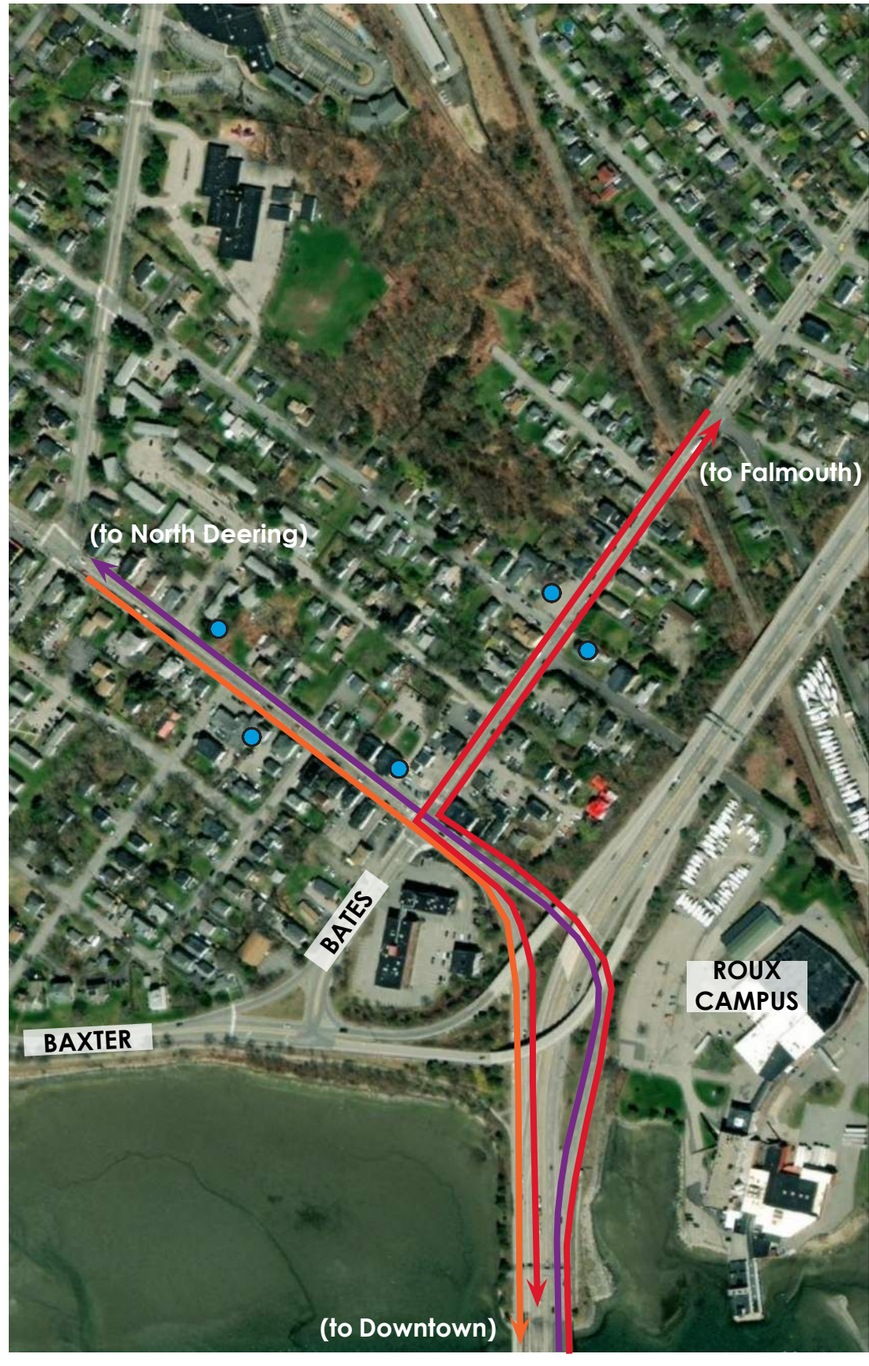
Base parking demand (calculated for each hour of the day using ITE Parking Generation Manual rates, 5th Edition, and the same land use codes as for trip generation) indicate that total parking demand across all uses on the site will peak at 11 AM. At completion of the first phase of development, parking demand is expected to be approximately 700 vehicles. Demand at full build-out could be as high as 1900 vehicles, inclusive of day users and residents. All site parking is intended to be communal; availability in the closest lot to a destination will not be guaranteed. Additionally, uses with opposing peak parking demands will be able to share parking resources.

All parking will be paid parking, and a parking office will be created to handle permitting and enforcement for the campus. Parking costs and regulations may vary between classes of users (students, staff, residents, office tenants, visitors, etc.). The Roux Campus may include on-site car share, enabling travel to and from the site using other modes, with the comfort that vehicles are available if necessary.

Public Transit
Two bus lines currently stop near the site: METRO Route 7 and METRO Routes 9A / 9B. These routes provide direct connections to the peninsula, western Portland, and Falmouth. With a transfer at the Downtown Transportation Center, riders can reach the rest of Portland and several outlying towns.

Buses run continuously throughout the day, readily accommodating the varied schedules of students and other campus users. METRO BREEZ express bus service to Yarmouth, Freeport, and Brunswick and the Husky Line to Westbrook and Gorham establish a regional footprint for transit service. Ten local and express routes connect the campus to most of the Portland area with no more than one transfer.

The Roux Institute at Northeastern University will promote and incentivize transit use. It plans to subsidize transit passes for students and will work with METRO to improve the quality and frequency of transit connections to the Roux Campus.



Other Roadway Improvement Opportunities

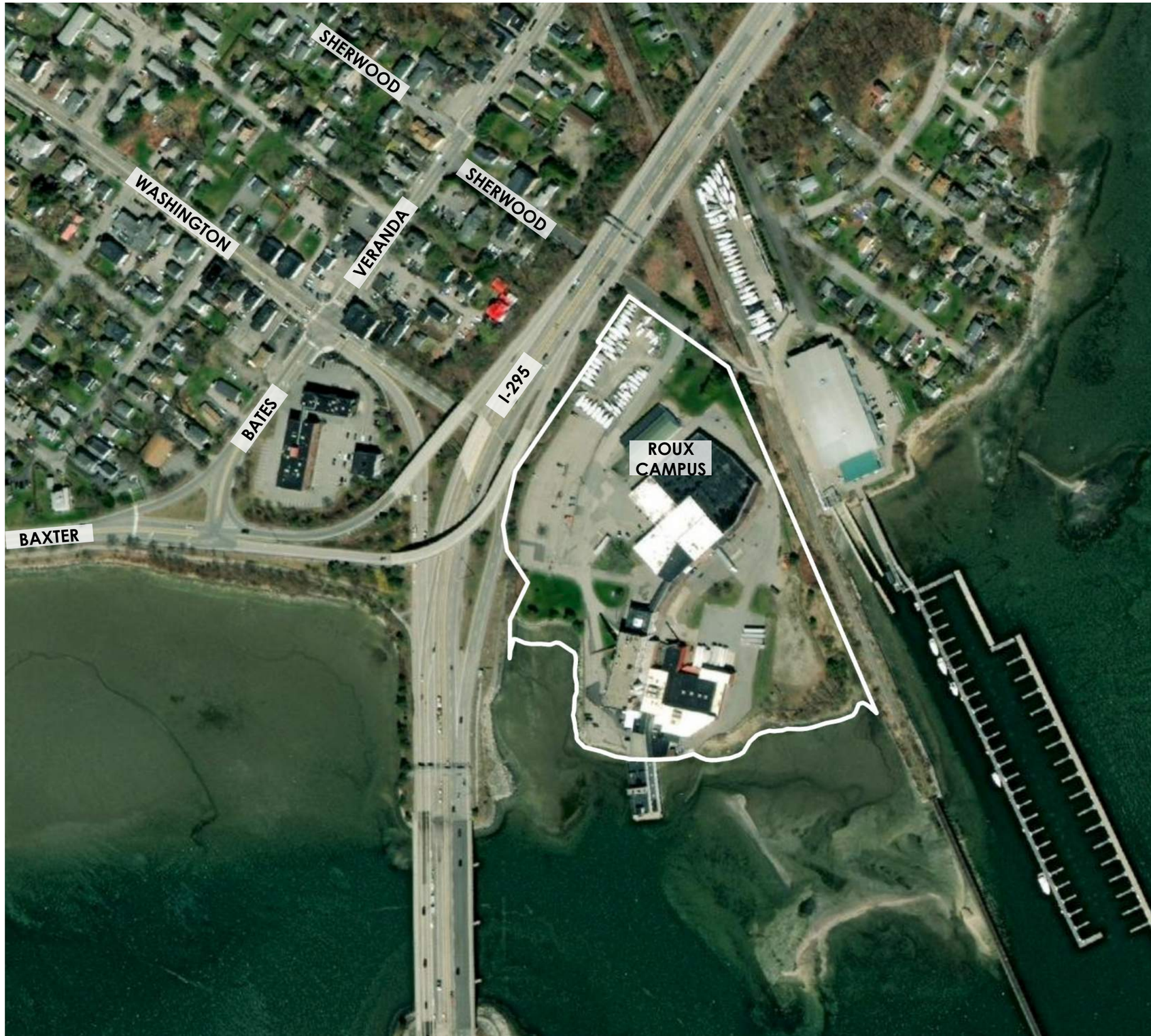
The Roux Campus is constrained on three sides by the Bay, I-295, and a rail line, leaving Sherwood Street as the only viable access road. The campus's vehicle traffic will be highly concentrated on certain streets and intersections immediately surrounding the site. Targeted roadway improvements at these locations can increase capacity and prevent excessive congestion.

These improvements are not tied to specific years or development phases. They are held out as possible mitigation measures to be considered as future traffic warrants. As development continues, the Roux Institute will apply for traffic movement permits (TMP). Potential improvements will be evaluated during the TMP process in collaboration with the Maine Department of Transportation and City of Portland.

Traffic from the campus to southbound I-295 will make two lefts, once onto Veranda Street and again at Washington Avenue. The left turn lane from southbound Veranda Street to Washington Avenue currently has a storage length of only 130 feet. At higher traffic volumes, the line of vehicles waiting to turn left may extend beyond this length, delaying through and right turning vehicles from reaching the intersection. If this type of congestion becomes frequent, it may be mitigated by extending the left turn lane further back. This will require widening Veranda Street between Washington Avenue and Sherwood Street within the existing right-of-way. Widening on Veranda Street would also allow bicycle lanes to be added. This impact will also be reduced through use of signs indicating that I-295 South can also be readily reached by turning right and using the Veranda Street on-ramp.

With 100% of campus traffic traveling through the intersection of Sherwood Street and Veranda Street, improvements may become necessary. The intersection is currently controlled with a stop sign on Sherwood Street. To improve traffic flow, Sherwood Street could be widened at the intersection within available city right-of-way to separate outbound traffic into left and right turn lanes. A bicycle lane could also be added within this space. This would substantially increase capacity on the Sherwood Street approach. If traffic volumes eventually exceed this new capacity, a traffic signal could be installed at the intersection.

Traffic approaching the campus from I-295 southbound will exit at Baxter Boulevard and make a right onto Bates Street. There is significant unused right of way on Bates Street between Baxter Boulevard and Veranda Street that could be repurposed to increase capacity. Another northbound turn lane could be added (isolating left, through, and right movements) at the intersection as well as adding a bike lane. A bike lane would also have the benefit of completing the trail connection from the Back Cove Trail. The intersection of Washington Avenue, Veranda Street, and Bates Street may eventually need other mitigating measures to increase capacity, such as reconfiguring lanes on the I-295 exit ramp approach.



Managing Transportation Demand

Active Transportation
In addition to the transit options in the study area, the Roux Campus development will benefit from existing pedestrian and bicycle infrastructure. Sidewalks are in good condition and pedestrians are accommodated at signalized intersections with crosswalks and concurrent pedestrian signal phasing. Future visitors will benefit from upgraded pedestrian accommodation along Sherwood Street. Once on the site, pedestrian connections will link site uses and points along the waterfront.

The Roux Campus can promote human-powered trips to the site through improved connections to this infrastructure. The area is densely populated, bicycle lanes are provided along Washington Avenue and other roadways, and the Back Cove Trail is nearby. In the future, cyclists will be accommodated on Veranda Street and into the site on Sherwood Street via dedicated bicycle lanes.

Transportation Demand Management (TDM)
TDM programs seek reductions in traffic impacts by subsidizing and marketing alternative commute options. Northeastern University plans aggressive targets of non-single occupant auto trips and intends to limit on-site parking - the goal is a 37 percent reduction in automobile trips from ITE Trip Generation predictions, and a minimum of 20 percent reduction in parking demand compared to anticipated ITE Parking Generation. As mixed uses are created during development, internal trip-making will increase, and these targets may be revised.

Transportation Coordinator: Northeastern University plans to follow industry best practice by appointing a campus-wide transportation coordinator. This person will collect data on the TDM program to ensure it evolves as the site develops. Once aspects of the site are operational, they will conduct a transportation survey to establish a baseline for future trip reduction goals. They will also collect and disseminate information (including non-automobile travel options) among the employers and facility managers on site to encourage TDM participation.

Public Transit Support: Northeastern University intends to partner with Portland METRO to subsidize shorter headway service to the Roux Campus. Student subsidies will enable frequent and reliable service to and from the site. To further support trips via public transit, the Roux Institute at Northeastern University intends to subsidize bus trips for students and employees (for employees, their purchase can also be included as a pre-tax benefit). Lease agreements will encourage transit pass subsidies by other on-site employers.

Carpools: Northeastern University will prioritize parking for carpools near building entrances. The transportation coordinator can facilitate carpools by maintaining a database of interested parties; commuters may be matched with others who live near them or can access a park-and-ride location along their route. The coordinator can also participate in the Maine DOT commuter resource program, which facilitates carpools across nearby sites and provides participants with rewards for carpooling.

Parking Fees: Parking is intended to be shared across uses on the Roux Campus, not guaranteed in individual lots.

Bicycle Travel: Northeastern University will support active transportation by investing in complete streets and trail connections, bike storage, and shower facilities and lockers.

Water Travel: Northeastern University plans to build a modern pier over the footprint of the current pier, in order to accommodate water shuttles and taxies.