Institutional Development Plan
Roux Institute Campus
November 2022

IDEALS
Initiative for Digital Engineering and Life Sciences

The Roux Institute
Northeastern University

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Introduction

Artist Interpretation

Northeastern University's Roux Institute represents a bold new model for learning, research, and entrepreneurship, developed from day one in partnership with industry, government, and other colleges and universities. Through the strong partnership and jointly held vision of Northeastern University leaders, Barbara and David Roux, and the Harold Alfond Foundation, the Roux Institute is delivering on the university's mission to erase the boundaries between the real world and academia.

Northeastern University founded The Roux Institute to stimulate the regional economy through the cultivation of talent and cutting-edge technology capabilities within Maine and northern New England. It achieves this goal by customizing learning programs and research initiatives to meet the needs of employers, by integrating classroom learning with professional experience, and by supporting the launch of innovative startup companies. The Roux Institute's collaborations with its employer-partners keep the institute in step with the economy's—and society's—changing needs and opportunities. They also enable the Roux Institute to identify and begin to address the state's most consequential challenges.

The Initiative for Digital Engineering and Life Sciences (IDEALS) is a Maine non-profit organization tasked with and solely committed to locating and developing a campus for the Roux Institute. Northeastern University in Portland, Maine: a space for cutting-edge educational, research, and collaborative programs in areas including artificial intelligence, computer and data sciences, digital engineering, advanced life sciences, and medicine. IDEALS was formed in 2018 with support from David Roux, a technology entrepreneur and Lewiston native, and his wife Barbara. They sought to create a graduate institute providing opportunities for Maine people to fill talent gaps for growing digital and life sciences companies while ensuring the 21st century success of greater Portland and Maine's economies. IDEALS recruited Northeastern University to establish and run the program, and the Roux Institute at Northeastern University launched in 2020. The Roux Institute now offers post-graduate degrees and certifications, conducts research, assists start-up entities, and partners with private, public, and non-profit entities to develop 21st century workforce talent and spur innovation.

The Roux Institute is temporarily located in leased space in Portland. A permanent campus for the Roux Institute is essential to fulfill its educational and economic potential. The vision for that home - the Roux Institute Campus - is one that allows for continued growth of the education, research, entrepreneurial, and collaborative programs of the Roux Institute while providing space to support those programs and serve the community. After completing an exhaustive four-year search both on and off the Portland peninsula and its surrounding area, IDEALS acquired land formerly occupied by the B&M Baked Beans facility along the Portland waterfront.

Recognizing the prominent role that major educational and healthcare institutions play in the health and well-being of the community, the City of Portland's Land Use Code allows for the creation of Institutional Overlay Zones (IOZ) to "provide a regulatory mechanism where an improved regulatory structure is needed to facilitate a consistent, predictable, and clear growth management process." Consistent with that purpose, we seek designation of an IOZ for the Roux Institute Campus. We will simultaneously seek to change the underlying zone to B-5 Mixed-Use Business. The IOZ designation process requires two components: an Institutional Development Plan (IDP, this document) and a regulatory framework. The purpose of this IDP is to establish baseline institutional data for existing land uses and services while also communicating planned growth; it is the basis of the proposed regulatory framework, submitted under separate cover. The regulatory framework translates the IDP into a set of clear and specific zoning requirements, which will constitute the text and map amendment to the City's Land Use Code. Unlike other institutions for which the IDP process was established, the Roux Institute is in its early years and has not established a stand-alone campus. The IDP allows Northeastern University and IDEALS to memorialize the long-term strategic plan for the Roux Institute Campus in consultation with the Portland community at the very outset of development.

Creation of a new campus provides the opportunity to establish a people-oriented space right from the start. It will prioritize people over cars by creating a pedestrian-friendly landscape supported by multi-modal programs that provide incentives for alternative transportation options. The campus will improve site resilience and sustainability by replacing much of the existing pavement and rooftops with green space and incorporating sustainable building practices.

We intend to create a dynamic, mixed-use campus that contributes to the East Deering neighborhood without encroaching on it or burdening City resources. By providing ancillary uses on site (office and lab space for institutional partners, housing for students, faculty, and employees, a hotel for visitors to the Institute and its partners, retail, and personal services), the Roux Institute Campus will meet demand created by the Roux Institute at Northeastern University and its collaborating partners.

1. Establishing the Context

Our Roots

IDEALS
Initiative for Digital Engineering and Life Sciences
Roux Campus

The Roux Institute Campus will be the first of its kind in the Northeast. It will integrate graduate education in technology and science with groundbreaking research and a wide range of collaborations to spark innovation and economic development. The campus is being designed at a scale that will facilitate learning, collaboration, and research breakthroughs and innovations, encourage start-up businesses, and strengthen existing Maine businesses and institutions. Every component of the campus is directly linked to the mission of the Roux Institute, from the housing – keep students and faculty on campus to foster collaboration and reduce traffic, to the hotel – provide a convening space and accommodation for Institute guests from around the globe so that, together, they can spark new ideas. The iconic waterfront location, minutes from downtown Portland (by bike, bus, boat, car, or on foot) with striking architecture and a vibrant community, will attract talent from around the globe and spread economic advancement throughout Portland and beyond.

At the direction of Northeastern University, IDEALS will oversee the design and construction of a primary academic building housing the Roux Institute and will also seek partnerships from the private sector to construct and operate ancillary uses, such as housing, parking, a hotel, and commercial office and laboratory buildings that support the primary academic uses—all of which would be on a ground lease basis.

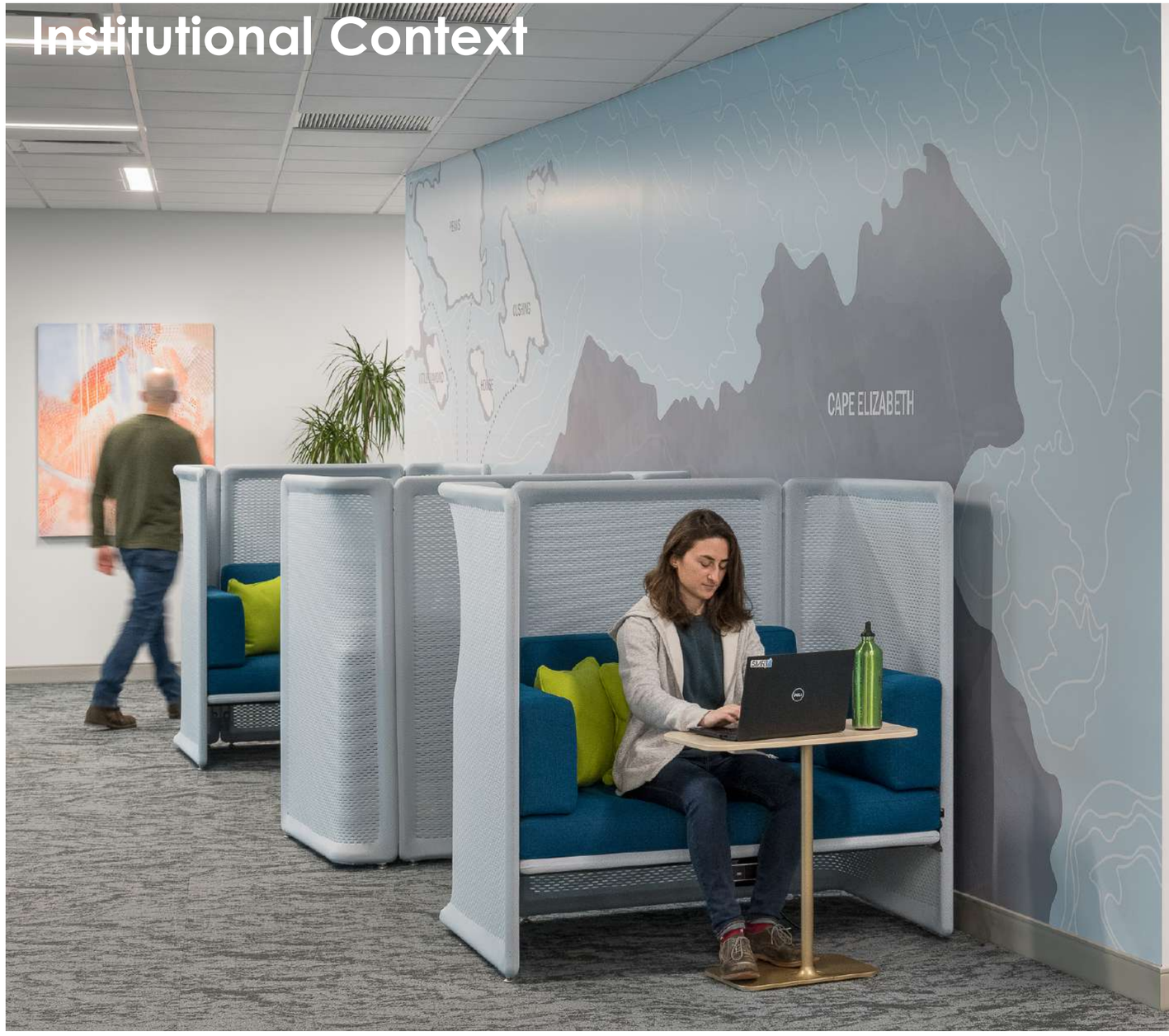
The Roux Institute
Northeastern University

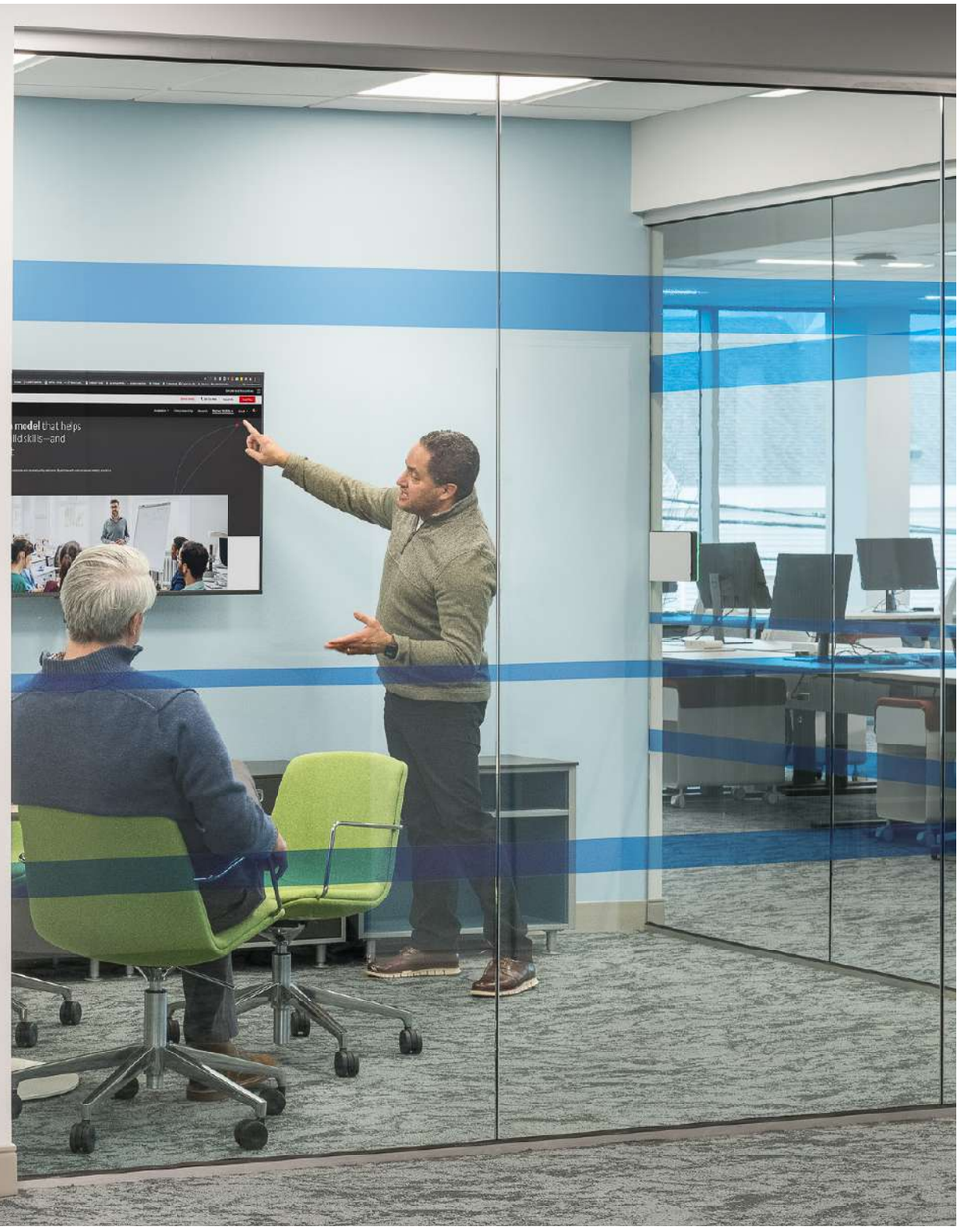
The Roux Institute at Northeastern University was established to develop talent, conduct research, and encourage innovation to support and attract businesses that will thrive in the 21st century economy.

Vision: The State of Maine will be home to a thriving, high-tech economy fueled by people and businesses leading in experiential artificial intelligence, machine learning, big data, life sciences and medicine, engineering, and data visualization. This new economy will attract people and businesses from around the world to the region and provide unprecedented opportunities for all Mainers in a manner that honors and enriches the Maine lifestyle and culture.

Mission: With a vision to enable the creation of a synergistic technology and life science-driven economy and workforce, the Roux Institute designs, curates, and integrates learning, research, and entrepreneurial solutions in collaboration with industry, academic institutions, and community organizations to catalyze talent development and economic impact throughout Maine.

Institutional Context





The Roux Institute at Northeastern University currently has 125 full-time, Maine-based employees, 55 of whom are faculty and post-doctoral staff. The Institute currently has 500 graduate students enrolled. Of Maine's 16 counties, 15 are represented in the student body. The Institute offers 17 graduate programs in computer and data science, analytics, cloud software, cybersecurity, life sciences, and project management.

These educational programs are bolstered by collaboration. The Institute's partnership ranks have grown tenfold as more than 110 Maine organizations now work with and benefit from the institute. Approximately 900 of these partners' employees have taken courses designed by the Roux Institute in concert with their employers. Additionally, 36 startup companies have worked in residence at the Roux Institute, creating 52 new Maine jobs and raising $21M in investment capital to grow their businesses.

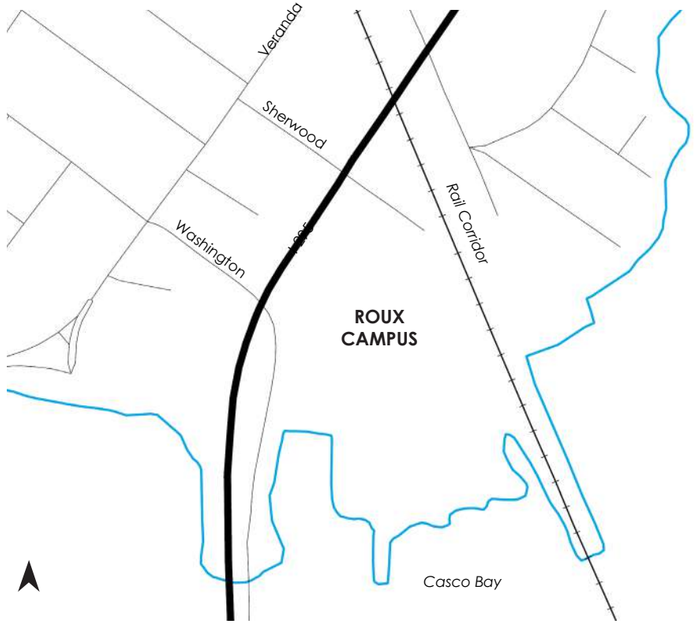
The Roux Institute at Northeastern University currently occupies 44,000 square feet of space leased at 100 Fore Street. This space enabled the Roux Institute to begin providing graduate education services in Portland, but significantly more physical space is needed to meet its Mission & Vision. In the near term (0-5 years), the Roux Institute anticipates enrollment expanding to 1,750 learners; in the medium term (10-20 years), enrollment is anticipated to grow to 2,500; and in the long term (20+ years), enrollment is projected to grow to 5,100, including on-campus, virtual, and hybrid learning settings. The Roux Institute intends to transfer all operations from 100 Fore Street to the new Roux Institute Campus.

Neighborhood Context

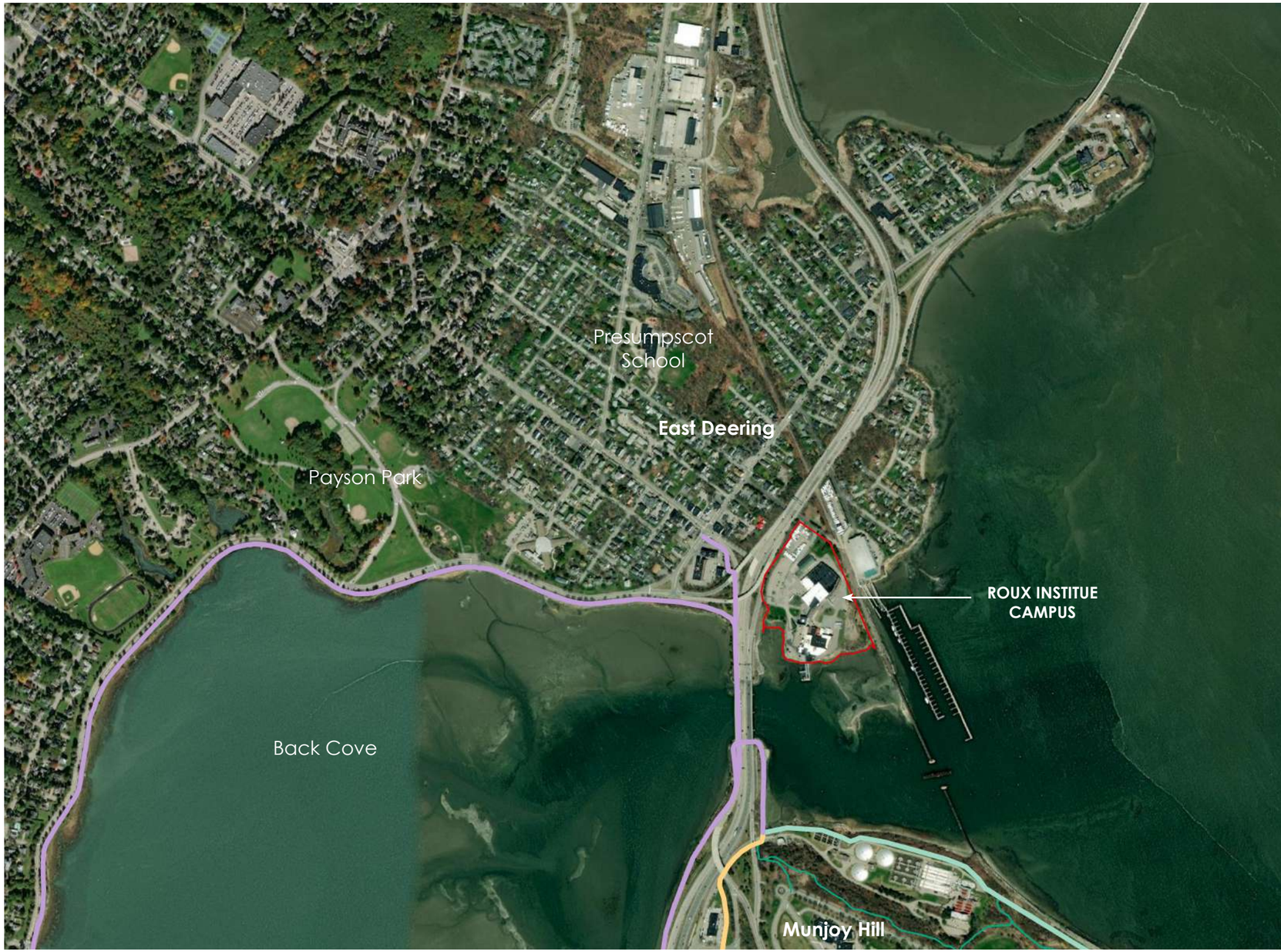
The proposed Roux Institute Campus is located within Portland's East Deering neighborhood, near a residential area of single and multi-family homes (three-story apartment buildings) and a commercial node featuring restaurants, bars, mechanics, and offices. While proximate to these areas, the site is remarkably buffered. I-295 to the west, state-owned vacant parcels to the north, a disused rail corridor and marine business to the east, and Casco Bay to the south collectively surround the property. Access to the site is via Sherwood Street at the intersection with Veranda Street, through a 40-foot-wide highway underpass.

This setting makes for a campus full of potential. Due to its relatively large 13+ acre size and existing buffers, the site lends itself to dense development. Taller buildings with smaller footprints will allow for additional public open space, a mix of landscaped and natural green space, and public waterfront access while helping to reduce impact on Portland's challenged housing stock. The Roux Institute Campus will connect to and enhance the surrounding East Deering neighborhood while simultaneously fostering its own identity.

Future development will acknowledge these advantages and constraints. The site must be planned responsibly to maximize community access while minimizing off-property impacts. The creation of compelling pedestrian, bicycle, water taxi, and public transit connections to the Roux Institute Campus and the waterfront will be particularly crucial. Additional information regarding mode splits, pedestrian, transit and bicycle infrastructure is included in Section 3 of this IDP.

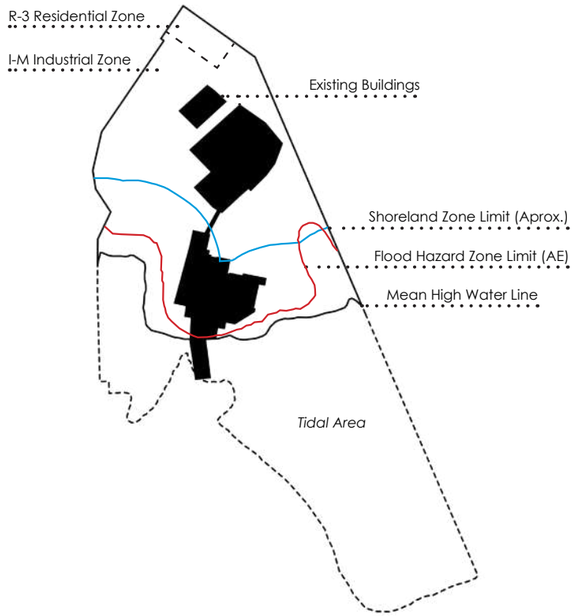


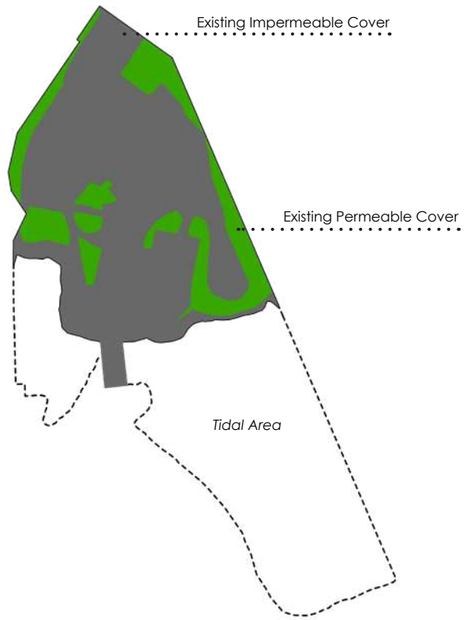
The site's current industrial use does not allow for public open space or amenities or access to considerable shoreline frontage.



The site is near several of Portland's most popular bike and pedestrian trails, including Back Cove Trail, Bayside Trail, and Eastern Prom Trail. Its redevelopment can facilitate better community access to Portland's waterfront, as public open space enhancement is a key design parameter for the Roux Institute at Northeastern University.

Site Context





Under current conditions, the site is inaccessible to the public.

Zoning
The majority of the site is currently zoned I-M Moderate-Impact Industrial, with the area immediately adjacent to and across Sherwood Street zoned R-3 Residential. Parcels adjacent to the site include I-L Low-Impact Industrial at the Maine Yacht Center to the east and R-3 Residential across the railroad tracks to the north. Parcels west of I-295 are generally zoned R-5 Residential and B-2 Mixed-Use Business.

Existing Buildings & Parking
City property assessment records indicate existing buildings were previously used for manufacturing and warehousing. The site has 272 striped parking spaces and additional unstriped trailer parking areas. The reported general building use and total floor area is provided in the table below.

Existing Building Use	Total Floor Area (SF)
Main Production (Bean) Building	63,255
Warehouse, Annex and Fuel Storage Building	49,897
Maintenance (Fish House) Building	16,728
Storage, Labeling and Packing Building	80,180
Finished Product Warehouse Storage Building	9,572

Relationship to Water
The parcel includes approximately 13+ acres above mean high water line (the site) as well as an adjacent 11 acres of submerged lands. The site has 1,000 linear feet of waterfront, within associated Flood Hazard and Shoreland Zones.

The City of Portland designates a shoreland zone within 250 feet of tidal water bodies. Within the shoreland zone, a minimum setback of 25 feet from the normal high-water level is required for structures, roads, and driveways.

Portions of the site are delineated as Special Flood Hazard Areas according to FEMA's Flood Insurance Rate Map (FIRM). The current and effective FIRMs for Cumberland County, based upon FEMA's 1986 publication, indicate portions of the site are within the AE Zone, representing 1% annual chance of flooding. Base flood elevations range from 9 to 11 feet.

Impervious Areas
The majority of the site is developed land, with limited areas of natural vegetation. Approximately 10 acres of land above the mean high-water line are impervious (paved areas, building roofs, etc.). The remaining 2.5 acres of permeable area include lawn and approximately half an acre of vegetated, early successional non-lawn area adjacent to the rail corridor abutting the site to the east.

Not only is the site largely covered in pavement and building structures, it is also inaccessible to the public. Fencing prevents access to the waterfront and the interior of the site. This security was necessary for industrial use. However, new development can "soften" site edges and provide improved access to the waterfront.

Geotechnical & Environmental Investigations
IDEALS conducted preliminary soil investigations of the site. The results of these investigations inform the design of structures. Beneath a surficial layer of pavement or topsoil, the test borings encountered a soil profile generally consisting of fill and uncontrolled fill, overlying glaciomarine clays or bay mud, overlying marine sands, overlying glacial till, and overlying refusal surfaces (probable bedrock).

IDEALS also conducted environmental site assessments, including review of available documentation (such as current permits, record drawings, historic photos, and maps) and site investigations involving soil and groundwater sampling, as well as survey for and sampling of building materials. The environmental site assessments indicated no evidence of oil or hazardous material releases that would require remediation. Environmental conditions including fill soil that may be encountered during earthwork or generated as excess material will be properly managed within the context of the construction project. IDEALS identified hazardous building materials including PCB-contaminated caulking and asbestos containing materials (ACM) consistent with what would reasonably be anticipated given building ages, which will be remediated during the demolition and development process.

Utilities

B&M's facilities required intensive utility and infrastructure development sized appropriately for industrial use. Fortunately, this historic use translates well to re-use in a denser development, as proposed.

Water
Domestic and fire protection services are provided by Portland Water District's (PWD) infrastructure at Sherwood Street. The public water mains nearest to the site are 8-inch and 12-inch, consisting of ductile iron and cast iron. The site is, and will continue to be, serviced by a combined domestic / fire protection loop.

Wastewater
Wastewater will continue to discharge to a gravity public sewer along the I-295 corridor. Downstream of the service connection, public sewer transitions from 15-inch to 48-inch reinforced concrete gravity line conveying combined storm and sanitary sewer from the East Deering neighborhood west of I-295. The 48-inch combined sewer transitions to a 3-barrel (two 18-inch and one 30-inch) siphon along Tukey's bridge and discharges through a pumping station prior to treatment at the Portland Water District's (PWD) East End Wastewater Treatment Facility.

Wastewater is conveyed across a portion of the site near Sherwood Street and I-295 from properties to the northeast (Lennox, Berwick, and Kensington Streets) via an easement benefiting PWD. This easement will remain in place unless otherwise approved by PWD.

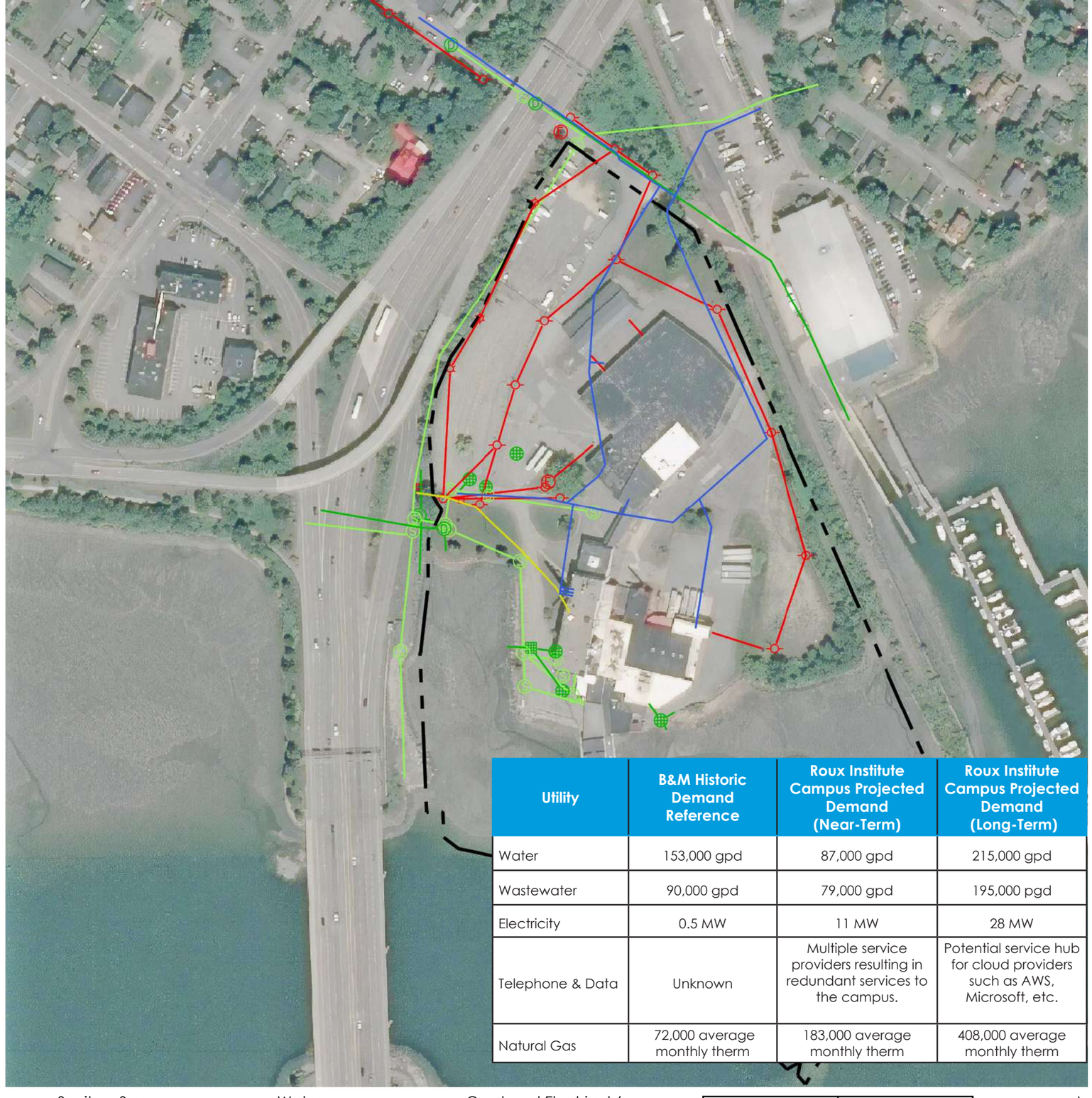
Stormwater
Stormwater runoff from the site is managed through a combination of catch basins, buried infrastructure, and overland flow, discharging untreated runoff via outfalls to the bay. The Roux Institute Campus redevelopment allows for reduction of site impervious area and incorporation of low-impact development techniques; these will improve the water quality and reduce the quantity of runoff prior to its discharge into Casco Bay.

In addition to private stormwater outfalls, a public stormwater outfall is located at the site's southwest corner. This outfall will continue to convey drainage from the neighborhood west of I-295 through an easement located near the southwest corner of the site.

Electricity
Central Maine Power provides electric power via an overhead 12.47kV 3-phase distribution system. The facility has two main secondary metered services. New utility corridors will include electrical infrastructure improvements. Energy-saving technologies and renewable energy sources will be incorporated into building and campus design to reduce electricity consumption and advance sustainability goals. Additional information regarding Energy Conservation Measures is included in Section 3 of this IDP.

Telephone & Data
Fiber-optic internet is located along Veranda Street and Sherwood Street.

Natural Gas
Unitil provides natural gas service to the site via a 6-inch diameter service. Natural gas infrastructure in the East Deering neighborhood is provided at intermediate pressure.



Utility	B&M Historic Demand Reference	Roux Institute Campus Projected Demand (Near-Term)	Roux Institute Campus Projected Demand (Long-Term)
Water	153,000 gpd	87,000 gpd	215,000 gpd
Wastewater	90,000 gpd	79,000 gpd	195,000 pgd
Electricity	0.5 MW	11 MW	28 MW
Telephone & Data	Unknown	Multiple service providers resulting in redundant services to the campus.	Potential service hub for cloud providers such as AWS, Microsoft, etc.
Natural Gas	72,000 average monthly therm	183,000 average monthly therm	408,000 average monthly therm

Coastal & Natural Resources

Immediately adjacent to this highly developed site are natural resource areas including: an estuarine inter-tidal emergent marsh located east of the site near the rail corridor; coastal wetlands for all areas below highest annual tide; tidal waterfowl and wading bird habitat, and blue mussel habitat. Portions of the site are delineated as Special Flood Hazard Areas according to FEMA's Flood Insurance Rate Map (FIRM).

The majority of the on-site work will occur adjacent to, but outside of, coastal wetlands and estuarine inter-tidal emergent marsh areas. Erosion and sediment control measures will be required during construction to protect adjacent natural resources. On-site work in coastal wetlands will be required for pier removal and replacement, bank stabilization and stormwater outfall installation. The footprint of the proposed pier will not extend beyond the existing pier. Likewise, bank stabilization is not intended to extend beyond the toe of the existing riprap slope. Off-site improvements for the bike/pedestrian trail connection will likely require fill in coastal wetlands and will be coordinated through Maine DOT and permitted through Maine DEP and ACOE. Work in coastal wetlands will be minimized to the maximum extent and completed in accordance with Maine DEP wetland permitting requirements (NRPA).

Topography of the site slopes downward from the north to the south, toward the water. The highest elevations are near Sherwood Street, at elevation 28 +/-. The lowest grades are near the loading dock at the B&M Bean Building, at elevation 8.5 +/-. These low areas are only 1-foot above Highest Astronomical Tide.

In recognition of existing vulnerabilities and future sea level rise, resiliency will be key to the Roux Institute Campus. The redevelopment will raise site grades and incorporate infrastructure improvements to create a flood resilient landscape. It will also rehabilitate this brownfield site, enhance natural resource areas, and reduce the impacts of current impervious, industrial conditions by creating habitats that foster ecological diversity and productivity at the water's edge.

The coastal wetland includes rockweed anchored to rocks in tidal mudflat.

Stormwater outfalls drain into the wetland where a scour channel cuts across the mudflat.

The tidal flat is home to tidal waterfowl and wading bird habitat.

Blue mussels are abundant under the pier, where soft-shell clams also grow.

The tidal mudflat portion of the site stretches far into the inlet, resulting in dramatic daily change.

Outfall pipes drain to wetlands in the ravine.

The ravine's slope is vegetated with native sumac and invasive Japanese knotweed.

The estuarine system extends up a ravine along the site's eastern boundary.

Historic Resources

The campus was occupied by residences and a lobster cannery prior to 1913, when Burnham & Morrill (B&M) relocated its operations to the site from Franklin Street. The address of the B&M facility at that time was Water Street, which granted access from the west prior to construction of I-295. By 1913, the five-story B&M Bean Building stood on site, as well as the cod-fish building located on the pier. In the 1920s, B&M began experimenting with brick-oven baked beans in an attempt to offset declines in other product lines (canned fish, meat, and vegetables), and in the 1920s and 1930s began selling brick-oven baked beans in cans. In 1965, B&M's address was designated as 1 Bean Pot Circle. With an appreciation for the B&M history at the site, IDEALS, as the landowner, nominated the B&M Bean Building for designation as a City Historic Landmark. Following a positive recommendation from the City's Historic Preservation Board, the Council approved the landmark designation of the Bean Building (Cannery) and area surrounding the building including the pier. A more extensive description of site history and the preservation of the Bean Building may be found in the Landmark Designation Report for the Burnham & Morrill Company Cannery by Heritage Consulting and Essex Preservation Consulting, dated June 2022.

Bean Building

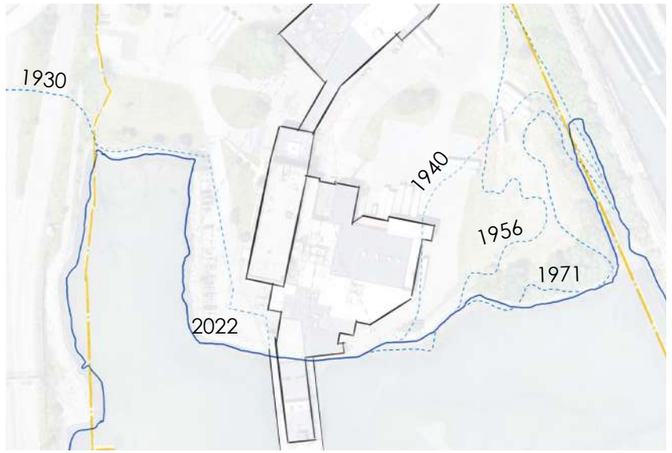
The Bean Building (Cannery) was the cornerstone and flagship of the B&M food manufacturing facility. Constructed circa 1912 by Aberthaw Construction Co., Boston, MA, the building housed the baked bean manufacturing processes and the plant management offices. It is a robust five-story, reinforced-concrete building with a high live-load floor capacity. The concrete frame is exposed on the exterior of the building with brick and masonry infill walls and glass windows. The building is structurally sound with only minor structural modifications required. The main entry is on the 2nd floor level, which is at elevation 21.5', well above today's 100-year flood zone elevation. This, along with the rugged structure and historic community value, make the building an ideal candidate for reuse. A permanent exhibit of artifacts and photographs is planned for the site.

A Changing Shoreline

Buildings are not the only changes that occurred onsite over the last 100-plus years. As indicated in the diagram at right, the shoreline has significantly shifted in reach and shape across decades. Some of the shifts were caused by intentional human manipulation; others appear to have been natural changes where mud flats (with limited salt marshes) extended onto the site.

A New Perspective

The historic relationship of the East Deering neighborhood and B&M site was one of stark contrast between residential and industrial uses. Sudden transitions between residential and manufacturing zones, and from manufacturing to the sea, heightened the disparity. Construction of the Grand Trunk railroad line in the 1860s, and then of Interstate 295 in the 1960s, further isolated the campus' industrial identity. The Roux Institute Campus presents an opportunity for new connections, public access, and thoughtful transitions from the surrounding neighborhoods into a dynamic environment built around the B&M Bean Building.



The Bean Building as it stands today

Views of the B&M campus and related infrastructure earlier in Portland's development (all images from Maine Memory Network)

Municipal Plan Context

The former B&M site is ripe for renewed use and redevelopment. The proposed campus includes adaptive re-use of the B&M Bean Building, facilitates public interaction with the waterfront, creates a new walkable core of diverse uses, and bolsters economic opportunity in East Deering, the City of Portland, and beyond.

Portland's Plan 2030 focuses primarily on eight aspects of Portland's identity and performance: environment, waterfront, transportation, housing, recreation and open spaces, facilities, historic resources, and economy. While the facilities section generally focuses on municipal operations and the waterfront section is focused on the working western, central, and eastern waterfront areas of the peninsula, the other six sections are directly relevant to the proposed plan. Excerpts from the plan relevant to the Roux Institute Campus are provided here.

Portland's Plan 2030, adopted in 2017, is the City's comprehensive plan.

Environment
"Adopt sustainable land use and transportation policies that support connectivity, walkable neighborhoods, and multi-modal transportation."

"Plan for the mitigation and redevelopment of brownfields to support productive uses and a healthier environment for residents."

Transportation
"Promote multi-modal accessibility, enabling residents and visitors of all ages and abilities to participate fully in the social and economic life of the community."

Housing
"Encourage additional contextually appropriate housing density in and proximate to neighborhood centers."

"Identify priority growth areas."

"Allow for a range of housing models in City codes, whether small units, co-housing, or others that may suit changing needs and demographics."

Recreation & Open Space
"Encourage physical and visual access to Portland's waterfront – Casco Bay, Back Cove, and the Stroudwater, Presumpscot, and Fore Rivers – as a "blueway" network and an extension of public space for local and regional recreation and transportation needs."

Historic Resources
"Stabilize and enhance historic areas of the city by ensuring quality investment in existing structures and compatible infill development."

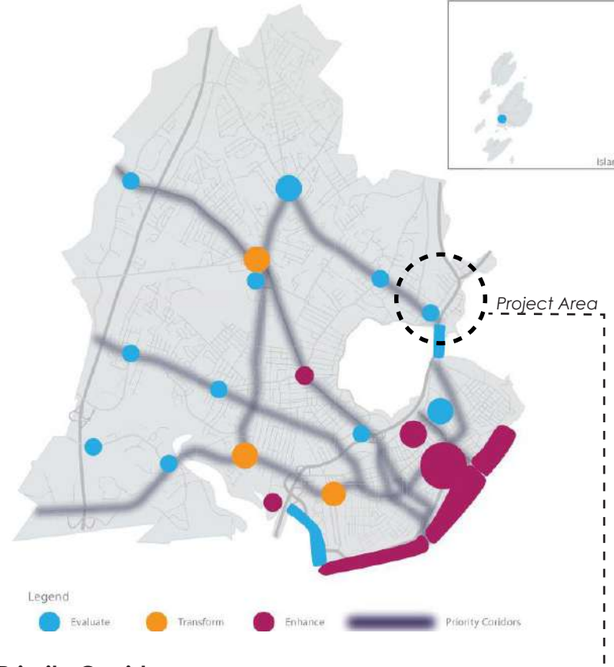
"Ensure an appropriate balance of continuity and change as Portland grows and evolves."

Economy
"Support job creation and business growth through public initiatives and private, institutional, and regional partnerships."

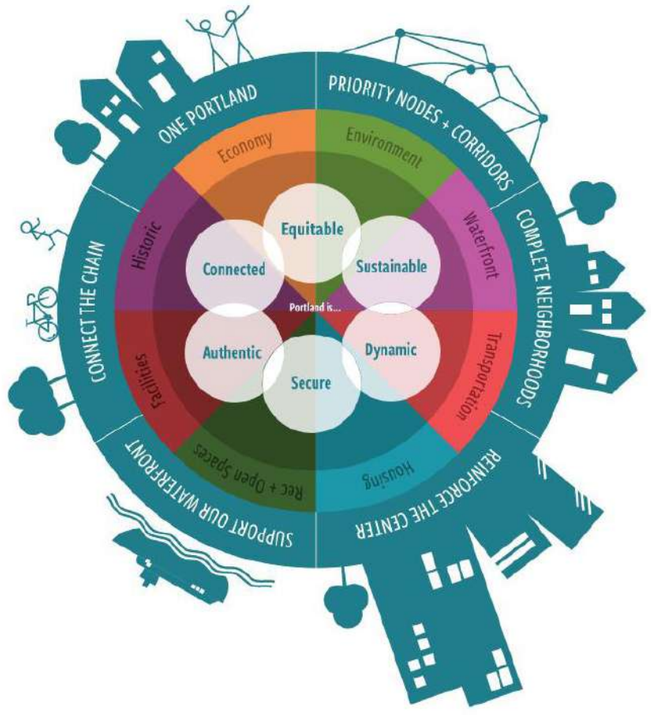
"Develop programs that support industries with high-growth / high-value potential such as life sciences, food production, information technology, and marine-related industries."

"Modify ordinances and make strategic investments to better promote business development and job creation in priority areas."

"Ensure that the growth of Portland's educational, medical, and cultural institutions is integrated into Portland's urban fabric through the use of high-quality design, management of impacts, community partnerships, and innovative planning."



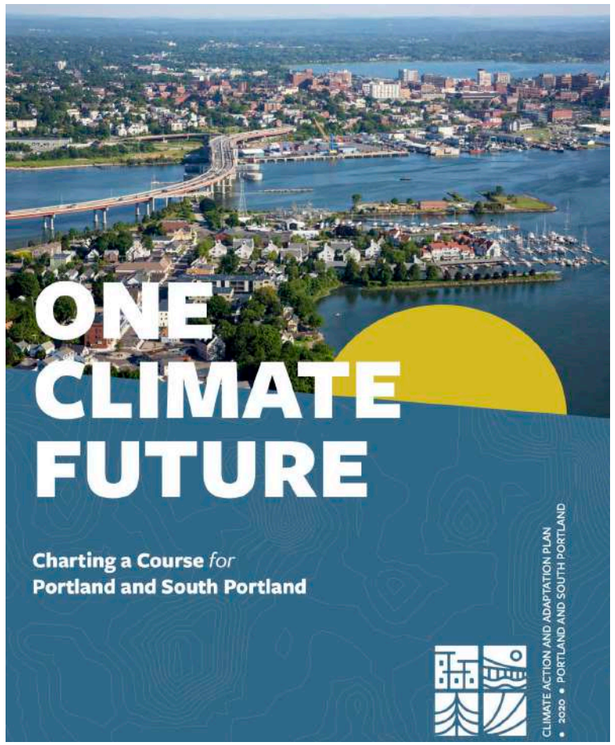
Nodes & Priority Corridors
Portland's Plan 2030 emphasizes potential evolutions in land use. Washington Avenue is identified as a priority corridor, which can provide "additional mixed-use, higher density growth to take advantage of the transit benefits and services that well-designed, diverse corridors can offer." The Washington Avenue / Veranda Street / Tukey's Bridge area is called out for evaluation: such areas "should be assessed for their ability to address neighborhood needs and serve as centers for complete neighborhoods."



Municipal Plan Context (continued)

One Climate Future
The Roux Institute Campus is an opportunity to showcase sustainable buildings, fostering a resilient community across East Deering and the region of Portland. Its waterfront location demands proactive planning for extreme weather and storm surge events although it is not located within the FEMA Velocity Zone. Its location on a developed, industrial piece of land with a single point of access/egress, means that campus development must take advantage of existing infrastructure within the East Deering neighborhood, facilitating trips by active alternative, multi-modal, and mass-transit options.

In 2020, the Cities of Portland and South Portland both adopted a collaborative sustainability and resilience plan: One Climate Future. The plan addresses many challenges, priorities, and strategies for responsible climate stewardship and mitigation of climate-related public health threats. It includes great specificity and is summarized by six general action items. The following are One Climate Future's "six big moves" and discussion of their relevance to the Roux Institute Campus.



Portland and South Portland both adopted the One Climate Future plan in 2020.

1. Build better buildings.
A new campus of higher education, research, and development deserves thoughtful design; it represents an opportunity to implement best practices for energy efficiency, healthy communities, human comfort, and interaction with the surrounding environment. Aside from the iconic B&M Bean Building, existing on-site buildings are not suitable for adaptive reuse. Much of the site will be redeveloped with new construction. In order to attract and respect climate-conscious students and corporate partners, these new buildings will be created with sustainability and resilience top-of-mind. As described in the design guidelines within this plan, Northeastern University is committed to high-performance buildings while setting a standard for design through signature architecture.

2. Connect people to places, to opportunity.
Graduate education, research, and collaboration exist in order to provide opportunity. At their best, they do this in a collaborative and social setting. The Roux Institute at Northeastern University will achieve both. The campus presents this opportunity to the nearby community, where on-site resources become local community resources, as shown on the 15-minute walkshed map included on page 27. Finally, by establishing itself within and supporting existing public transportation networks, the Roux Institute Campus will be accessible to all Portlanders as well as those in the broader greater Portland region, and beyond.

3. Power everything* with clean renewable electricity.
Electrification allows for appliances, buildings, and systems to support the shift to renewable energy in our power grid, without cementing a need for fossil fuels moving forward. This entails moving away from carbon intensive heating and energy sources, as more energy is produced by clean energy renewable sources like solar and wind. IDEALS and Northeastern University will evaluate power purchase agreements for renewable energy sourcing, incorporate passive solar and photovoltaics, consider the use of geothermal and sea water exchange heating and cooling for buildings, and encourage EV usage through on-site charging capacity.

4. Grow a circular economy.
Fostering technology knowledge and life-science research in Portland will diversify its economy and help prepare for the future. Yet workers in these fields will still rely on other, existing aspects of the regional economy. Food producers and preparers, makers and artists, essential workers, and support staff, all make the City of Portland a compelling and delightful place to live. On a small scale, the Roux Institute Campus will facilitate a circular economy through mixed-use, neighborhood-scaled urbanism that creates a place to live, learn, work, and play. On a broader scale, it will strengthen the region through education, research, and collaboration with corporate and community partners; fueling progress through innovation.

5. Nourish ecosystems, which nourish us.
The Roux Institute Campus' tidal waterfront location will allow it to meaningfully contribute to ecological health by designing with nature in mind. While B&M has been a steward of their property, the campus development will result in a significant reduction in impervious surfaces and yield a healthier site that protects and enhances the local ecosystem, which has been diminished through the historically industrial development of the property.

6. Build collaborative capacity to create this future.
The Roux Institute at Northeastern University will develop technology and life science talent and position Mainers, new Mainers, and international students for financially stable and personally rewarding careers. The campus will connect budding talent with existing corporate and community partners, and thus create opportunity for fresh thinking and an innovative future. The Roux Institute Campus will catalyze tech talent and innovation in Portland.

Other Studies
A number of other studies have been conducted that are centered on or relevant to the project area, as outlined below:

I-295 Corridor Update – Scarborough to Brunswick. The I-295 Corridor Update included a study of 17 interchanges that provided access between I-295 and major highways/arterials extending from Scarborough to Brunswick. Improvements for this project were recommended into near-term, medium-term, and long-term. Despite acknowledgement of the heavy volumes and weave section in the vicinity of the Roux Institute project site, no specific improvements were included at the Exit 8 interchange. The long-term recommendations include future study of travel demands, capacity, and opportunities in the urban core of Portland.

Veranda Plan. The Veranda Plan started with an investigation of the rehabilitation and replacement alternatives for I-295 over Veranda Street and US Route 1 bridge. Ultimately, the bridge was replaced and the project construction continues. The project will realign Veranda Street to improve safety and operations by allowing all movements between Veranda Street and points south on I-295 via signalized intersections. The project will also improve bicycle and pedestrian travel along Veranda Street by upgrading it to a complete street.

Martin's Point Shared Use Path Study. The Martin's Point Shared Use Path study recommended several projects to improve the connection from the Back Cove Trail to Martin's Point including crossing the Roux Institute Campus site. Unfortunately, the current design of the I-295/Veranda Street interchange did not include right of way for a shared use path connection as was envisioned in the Martin's Point Shared Use Path Study. However, the project will be providing a shared use path connection along the waterfront of the site and is interested in future connections that may be developed to reach Martin's Point and beyond.

2. Imagining the Future

Artist Interpretation

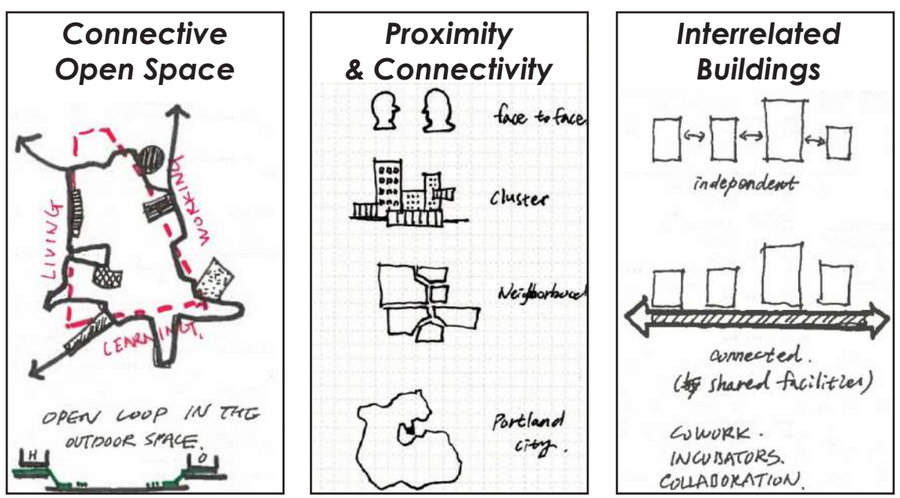
Campus Programming

The Roux Institute Campus will encompass mixed uses regularly associated with graduate education and research: classrooms and laboratories, faculty offices, an incubator, dining areas, convening spaces, fitness centers, neighborhood retail facilities, and housing. As an essential part of the Roux Institute's graduate education programming, the campus will support collaboration with private industry, other institutions, and community organizations. This collaboration is essential to the Roux Institute at Northeastern University's approach to learning through integrated research, student-work opportunities, and entrepreneurial endeavors. Light manufacturing, research and design facilities, and other industry-oriented spaces will allow start-up businesses and established companies to contribute employment opportunities, foot traffic, and dynamism to the area. Hotel rooms will cater to prospective students, start-ups, visiting lecturers, specialists, business partner guests, and parents of students. Most importantly, the hotel will provide the opportunity for unplanned and informal interactions that are so essential to new ideas and innovation.

A range of rental housing options will foster community and provide on-site opportunities for students, faculty, staff, and their families. These units will ease some of the housing and traffic pressure that might otherwise result from new residents attracted to Portland by the Institute. Housing units not occupied by residents affiliated with the Roux Institute may be made available to the public to further assist in easing the housing pressure.

Public open space, including waterfront access and recreational uses, will foster a sense of community. Restaurant, neighborhood grocery, and/or other limited retail options will provide another means for welcoming the neighborhood while reducing dependence on automobiles. The Roux Institute will incentivize transportation options including buses, bikes, pedestrian access, car pooling, and water shuttle or taxi connections.

The long-term vision for the site is to maximize green space and public shoreline access. That vision includes a potential bike and pedestrian path under Tukey's Bridge and bicycle and pedestrian connections at Sherwood Street, Veranda Street, and beyond. These would link to the Back Cove, Eastern Promenade, Bayside, Martin's Point Bridge, and future trail systems.



Concept sketches by Tsoi Kobus Design display the intent to build dynamic, community-rooted space.

Phasing

Before shifts in transportation and distribution networks, the site offered a competitive location for food processing and manufacturing in the 20th century. Now, the site's many compelling attributes enable the pursuit of science, education, and entrepreneurship for the 21st century and beyond. The Roux Institute Campus is envisioned as a hub for collaboration, innovation, and inspiration that contributes to the education of Roux Institute students, stimulates Maine's economy, and enriches the lives of Portlanders through the resources it offers.

While the proposed vision represents an ambitious undertaking, the entire endeavor is based on simple tenets of placemaking: provide a mix of uses, allow for creativity and entrepreneurship, and encourage recreation. This vision takes time to grow and develop. Understanding that institutional uses have phased planning horizons, this IDP considers near, medium, and long-term growth plans. The resulting phasing of the development is represented in the figure to the right.

Fortunately, the nature of the Roux Institute at Northeastern University lends itself well to phasing strategies. Corporate partnerships are a core part of the institute's educational strategy, meaning that office and laboratory partners will sit comfortably within the primary academic building during its first years, before extending outward in the longer term. As the site develops, more and more students, faculty, and employees will be drawn to live and work on site. Like any new campus, as the population of students, residents, and employees grow, so will demand for limited retail and restaurants. In addition, the expanding program needs of the campus may be supported by such uses as on site daycare, bike commuter facilities, maintenance facilities, and security offices.

The proposed vision offers a realistic framework for flexible growth. As the Roux Institute Campus evolves, and the world changes, new opportunities and needs may present themselves. Neighborhood feedback will also inform future growth. A core presence of educational, research, incubator, and partner space will provide the Roux Institute Campus with a strong start, around which additional community needs and services can thrive over time.

Anticipated Phasing (Cumulative Totals)

Building Program	Near-Term (0-5 Years)	Medium-Term (10 Years)	Long-Term (20 Years +)
Academic & Research	1,750 Students 222,000 sf.	2,500 Students 372,000 sf.	5,100 Students 372,000 sf.
Office/Lab Partners	Included in the Roux Institute	Included in the Roux Institute	200,000 sf.
Business Incubation	40,000 - 50,000 sf.	40,000 - 50,000 sf.	40,000 - 50,000 sf.
Residential	175 - 250 Units 150,000 - 200,000 sf.	350 - 425 Units 300,000 - 350,000 sf.	525 - 650 Units 450,000 - 550,000 sf.
Hotel	90,000 sf.	90,000 sf.	90,000 sf.
Retail (Restaurant, Cafe, Market, Kayak, etc.)	10,000 sf.	15,000 sf.	25,000 sf.

Potential Phasing

At the completion of each phase, the Roux Institute Campus will be a model of comprehensive design. At least three acres of permanent, significant public space will be established early in the development of the campus to ensure public benefit. Interim features such as surface parking lots or construction staging areas will be designed to not detract from the pedestrian experience through planting, lighting, wayfinding, graphics, artwork, or fencing. Other interim areas of the site will be appropriately landscaped or accommodate gathering on lawns and hardscape spaces. Interim features such as parking lots may also be programmed with markets, festivals, or cultural events. Lighting and layout of these spaces will be considered to facilitate flexibility so that they can accommodate a variety of campus events.

Development Plan

Near-Term

Mid-Term

Long-Term

Pedestrian
Bike / Pedestrian
Water Taxi
Vehicular
Primary Entrance

Development Plans are conceptual and intended to illustrate how design guidelines and principals could potentially be implemented at this site.

Design Principles

The Roux Institute Campus will be a paradigm for 21st-century education with urban, sustainable, and resilient design. All elements of the campus will be conceived holistically to support the educational program of the Roux Institute. Near and long-term planning supports a vibrant campus environment with views and connections to the waterfront, a variety of public spaces, and site access via bike paths, walkways, and the public pier. Key principles of the design approach include:

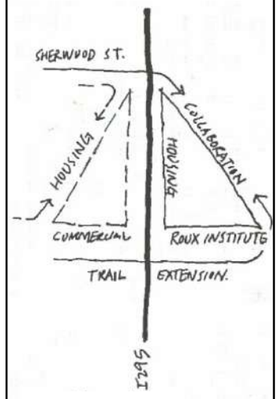
Connected to the Waterfront, Portland, & the World
- Engage the waterfront
- Promote visual and physical connectivity
- Encourage connections to the waterfront through diverse spaces
- Create a holistically built environment
- Restore, repurpose, and revitalize the Bean Building
- Create an iconic architectural expression

Places to Gather
- Welcome the surrounding neighborhood
- Foster community with shared spaces and interaction
- Build a strong association with the City of Portland
- Develop purpose-driven spaces that yield regular connections
- Provide public open space
- Provide spaces where neighbors can work and read while enjoying the campus's environment

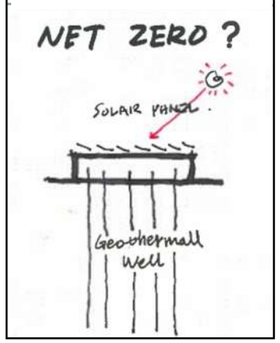
A Sustainable & Resilient Campus
- Employ sustainability benchmarking for environmental stewardship
- Incorporate state-of-the-art features, systems, and techniques
- Minimize energy consumption campus-wide
- Build for resilience; prepare for extreme weather and climate change
- Maximize green space through appropriate building height

Integrated Landscape
- Enhance access through TDM and multi-modal support
- Contribute to Portland's open space network

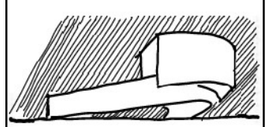
Welcoming the Neighborhood



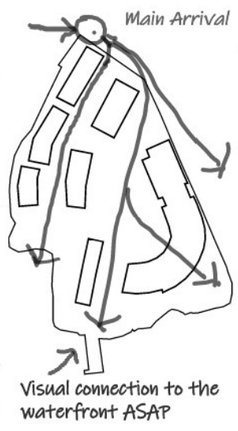
Sustainable & Resilient



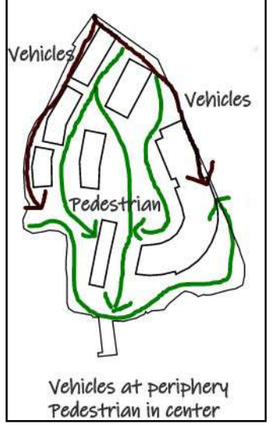
Iconic Architectural Expression



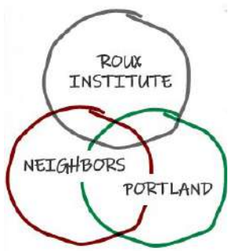
Waterfront Connections



Pedestrian Campus



Foster Community



Artist Interpretation

Above: Concept sketches by Cambridge Seven and Tsoi Kobus Design

Design Guidelines

Waterfront
- The waterfront will be publicly accessible to provide a variety of open spaces throughout all phases of development that foster social interaction.
- New principal buildings on the waterfront shall include a publicly accessible entrance to interior public space (if provided) from the waterfront side and upland side of the building along an anticipated desire line. Said interior public space, if provided, may be closed to the public during special events, outside normal operation hours, and when necessary for security or public safety purposes.

Cohesive campus
- The overall composition and experience of the campus will be considered for cohesive identity from approaches along I-295 and views from the East Deering neighborhood.

Historic preservation
- Buildings, site development, circulation, and open space will respect the B&M Cannery Building, a designated historic Landmark.

Connectivity
- Prioritize the bicycle and pedestrian circulation network on campus while providing connectivity for auto, public transit, service, and emergency vehicles at each development phase.
- Surface parking lots shall be located to the maximum extent practicable toward the rear or side of a building not occupied by a principal entry to a building facing a street, public right-of-way, major pedestrian access routes, or open spaces and/or the waterfront.

Open space
- Open space will be publicly accessible to provide multiple functions for recreation, social gathering and buffers that integrate within the overall composition and experience of the campus at each development phase.

Sustainable practice
- Buildings and site development will incorporate sustainable technologies in building design, orientation, energy production and sensitivity to natural resources at each development phase.

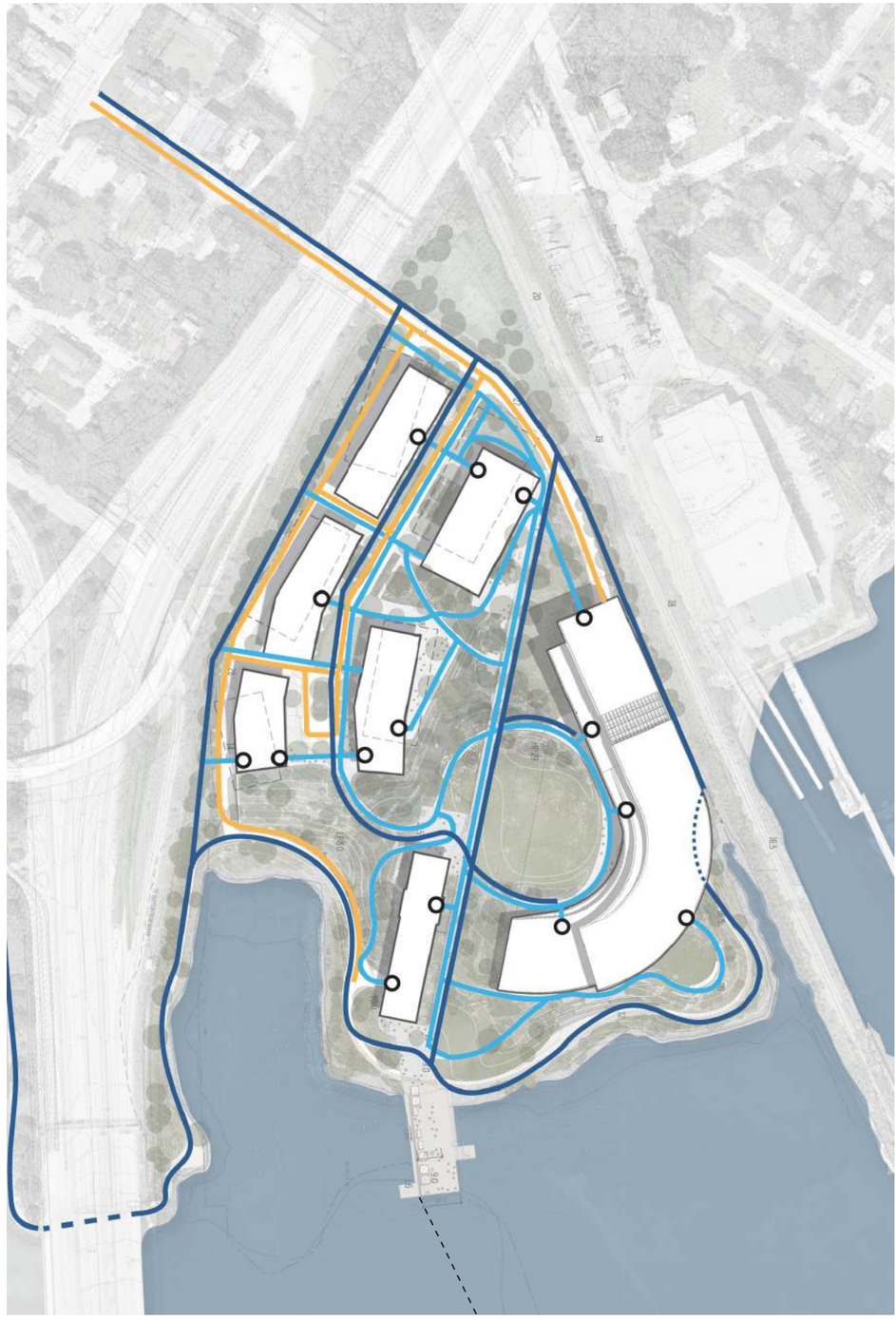
Resilience
- Buildings and site development will incorporate resilience strategies to account for flooding, severe weather events and integration of publicly accessible spaces at each development phase.

Building design
- Building facade materials will be of high quality, durable to the marine climate and contribute to an attractive public realm. The first thirty-five feet of building height shall complement the pedestrian character in materiality, transparency, and detailing.
- Rooftop appurtenances will be incorporated, screened, and set back from roof edges to reduce visual impact from the surrounding neighborhood.

Building entrances
- Building entrances will include prominent facades and be oriented toward, located adjacent to, or accessible from rights-of-way, major pedestrian access routes, or open spaces.

Mitigation of impacts
- Buildings and site development will endeavor to minimize potential negative impacts related to shadows, wind, noise, heat, glare, lighting, contaminants, and the environment.

Visualizing the Guidelines: Potential Long-Term Layout & Circulation



Connected to the Waterfront, Portland, & the World

Artist Interpretation

Development of a new landmark campus, with focus toward the community and the waterfront, will enhance the East Deering neighborhood. New, forward-looking campus buildings adjacent to the restored and repurposed Bean Building will update and respect its legacy. The waterfront will integrate with the entire campus through ecologically focused design. Water views from the ground and buildings will emphasize the site's uniqueness and become an integral part of the campus identity. Pedestrian / bicycle trail connections and water shuttle or taxi service will let the waterfront serve as an entrance to the campus.

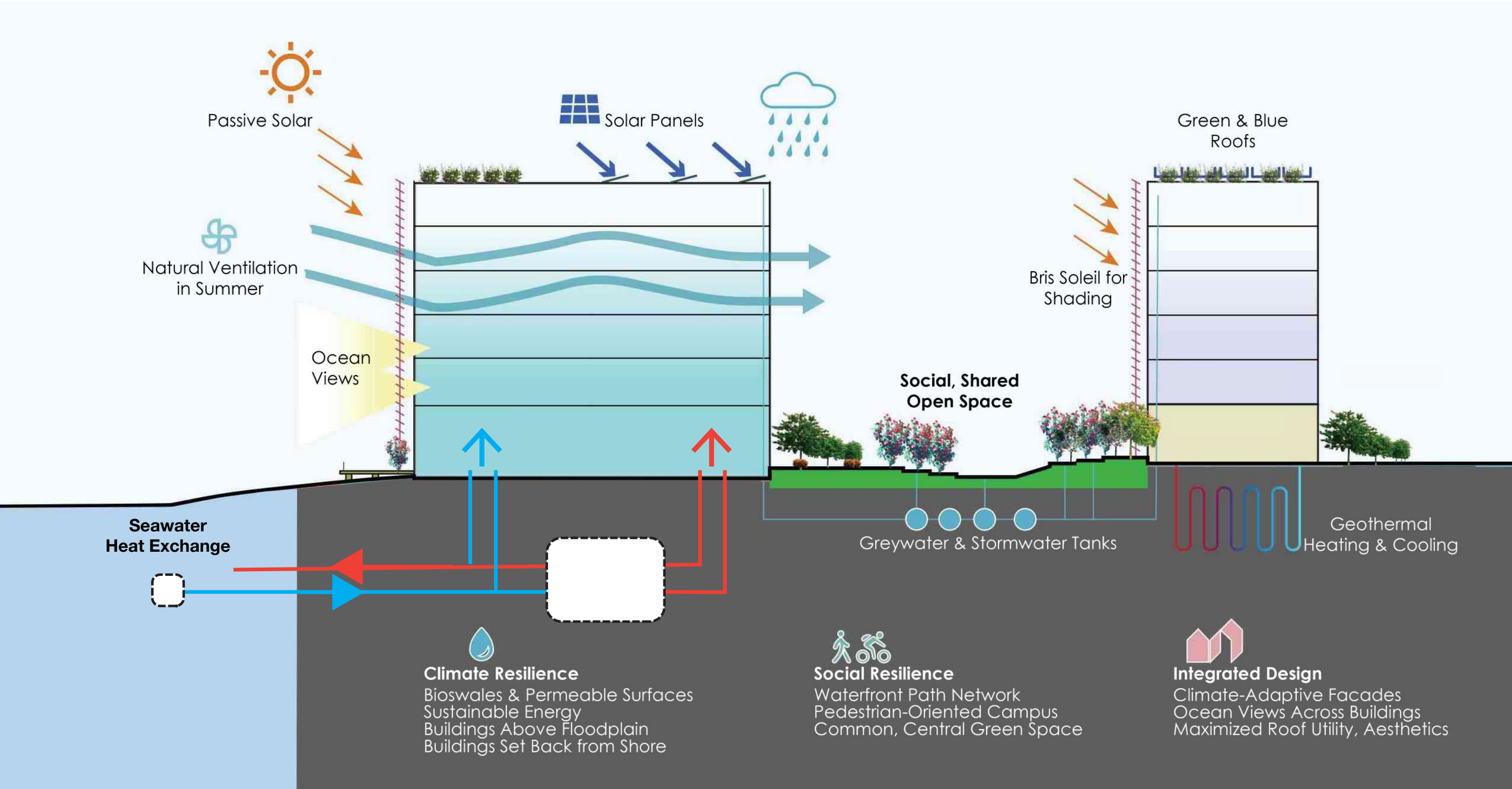
Places to Gather

Artist Interpretation

All new buildings will connect through linking landscaped terraces with a central, pedestrian-oriented green space. The campus will maximize publicly accessible open space through building height and density. This plan will foster a mixed-use environment encouraging interaction and innovation. Internal connections are echoed by external circulation and access points (pedestrian, bicycle, public transit, potential water taxi, automobile) that further strengthen the connection with neighboring communities and the City of Portland.

A Sustainable & Resilient Campus

The Roux Institute Campus intends to incorporate state-of-the-art sustainable technologies. Examples of possible technologies (illustrated below) that will be thoroughly studied include geothermal heating and cooling, photovoltaic solar panels, high-performance building envelopes with triple glazing, green roofs, blue roofs, stormwater / greywater management, passive solar gain, sea water cooling, and natural summer ventilation. If necessary, purchase of renewable power produced off-site will supplement on-site sources. Resilience strategies like constructing buildings well above the 100-year flood zone will also be deployed to account for rising sea levels and severe weather events.



Enhance Access

The striking campus is visible from Interstate 295, as well as from its on- and off-ramps which are located nearby. US Route 1 and downtown Portland are both accessible within minutes. Via Sherwood Street, the Roux Institute Campus will connect to the East Deering and Back Cove neighborhoods. Bus routes within easy walking distance, and waterfront pedestrian and bicycle trails (including a potential new connection under Tukey's Bridge and improvements to Sherwood and Veranda Streets) will link the Roux Institute Campus to the neighborhood as well as to the Back Cove Trail, Bayside Trail, Eastern Promenade, and future trail networks. Within the site, ADA pathways and inclusive design principles will ensure the site benefits all users.

Adjacent to the Roux Institute Campus (but not on its property) is the former Grand Trunk Railway line, which could one day provide a new transportation pathway. Connections to Casco Bay ensure water access to the peninsula, islands, and the entire Maine coast.

Contribute to Portland's Open Space Network

The Roux Institute Campus will add significantly to Portland's open space network via a modern waterfront with public amenities such as lawns, a pier, plazas, and extended green space. Enhanced sidewalks and bike lanes, a potential direct connection to the Back Cove, Eastern Promenade, and Bayside trails, along with a pier for a water shuttle and / or taxi, will help the public get to the Campus. Gardens, native meadows, trees, and natural areas will offer new, calming spaces and create a variety of healthy habitats.

The primary academic building of the Roux Institute at Northeastern University will anchor a cohesive campus of learning, research, and collaboration along with residential and retail facilities that support them; natural systems will integrate with everyday life. A network of inland pathways across various landscapes will thread uses together.

The Roux Institute Campus will transform an industrial site into an ecologically diverse, urban waterfront setting. Many existing impervious surfaces will give way to open spaces and green roofs inspired by natural landscapes from the Greater Portland area. Stormwater management strategies will further contribute to the environmental function of the site.

3. Creating the Path Forward

Artist Interpretation

Assessment of Growth

The City's Land Use Code establishes content requirements for Institutional Development Plans, including considerations of transportation, environment, infrastructure, design, and neighborhood engagement. The following pages apply these lenses to the Roux Institute Campus, how they interact, and the opportunities they create.

Transportation
With one vehicle entry point, the development must be properly planned to minimize impacts on the surrounding street network. Reductions in trip generation through complementary on site uses, alternative modes of transportation, and transportation demand management are crucial.

Infrastructure
Any development is limited by the capacity of nearby utilities infrastructure. Fortunately, the site's previous industrial demands dovetail nicely with the needs of a mixed-use development. High-performance buildings can help reduce further infrastructure demands.

Environment
One compelling aspect of the Roux Institute Campus is the waterfront location; yet decades of production and transportation-oriented industrial use diminished its ecological function. Thoughtful redevelopment will restore some of this function over time.

Design
While the Roux Institute at Northeastern University seeks to inspire aesthetically, the Roux Institute Campus will be designed with neighborhood context and nature in mind. It can serve as a proving ground for best practices in ecological and urban design.

Neighborhood Engagement
The Roux Institute at Northeastern University cannot thrive without the support and goodwill of its neighbors. By establishing and maintaining community engagement, the organization will incorporate fresh ideas and build trust.

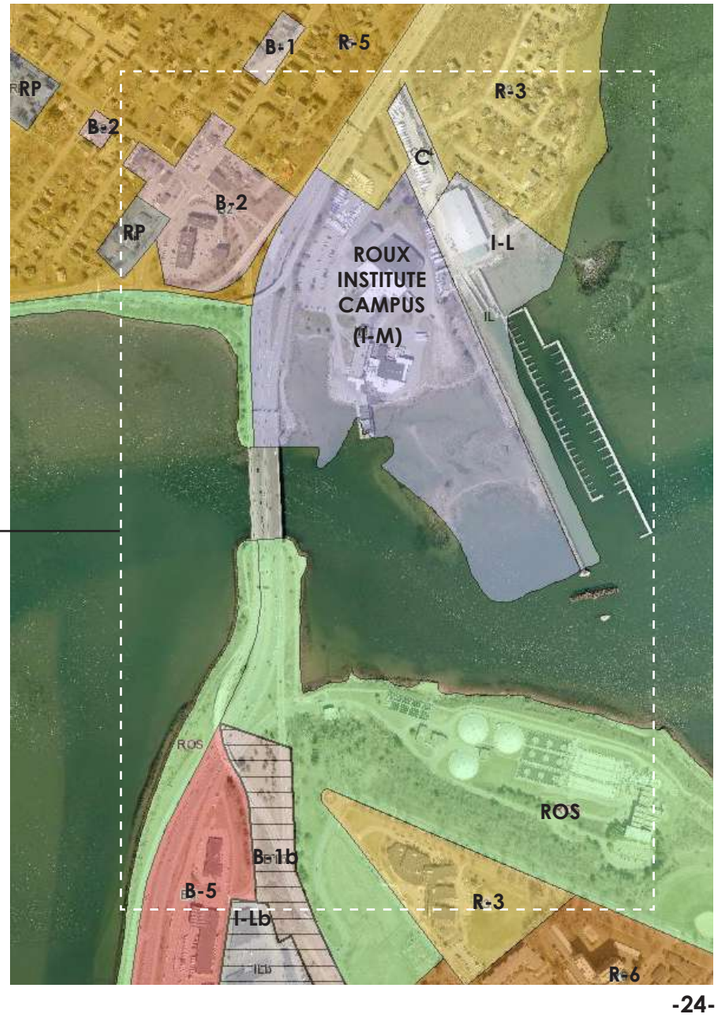
The environment of the site influences its design. That design leads to higher or lesser demands on transportation networks and utility infrastructure, which in turn impact the environment. Underlying the entire process is neighborhood engagement, without which the Roux Institute at Northeastern University cannot succeed.

Boundary of Proposed B-5 & IOZ

The proposed Roux Institute Campus aligns well with the B-5 Mixed-Use Business zone's purpose statement in the City of Portland's Land Use Code:

"To provide areas of the peninsula* near the downtown where a mixture of uses, including marine, industrial, commercial, and residential, is encouraged. The B-5 and B-5b zones are characterized by larger underdeveloped lots with great potential for denser, clustered, urban mixed-use development and more efficient reuse of existing land and buildings. It is anticipated that the dense, mixed-uses of the B-5 and B-5b zones will rely on a shared infrastructure system, including service alleys, parking lots, public transportation facilities, stormwater management, and driveways."

**Per the City of Portland's Land-Use Code, "on-peninsula" is defined as all land south of I-295. The proposed Roux Institute Campus is south of I-295.*



Transportation

The Roux Institute 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.

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.

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
1-295 Exit Ramp Westbound	Left Through Right	100 650 80	150 1090 190

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)
US-1 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.

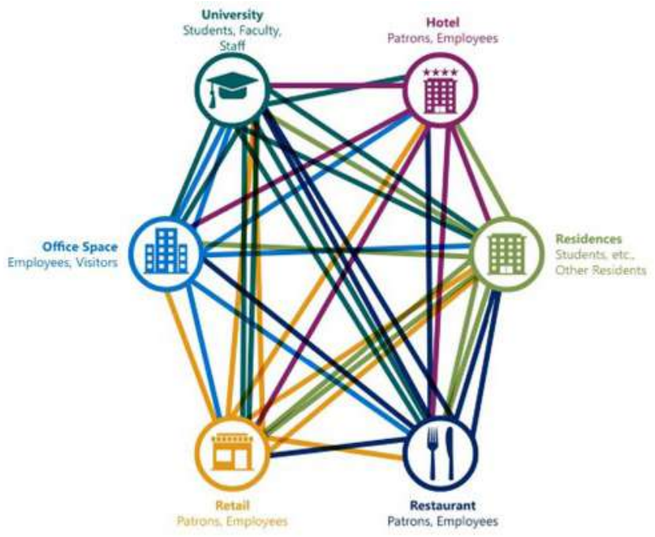
With adequate sight distance, the crashes along Washington Avenue, including at Randall Street, may be attributed to vehicles changing lanes or attempting to turn in or out of side streets where adequate gaps are not available due to congestion. There were no reported pedestrian crashes at the HCL locations. 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

The site is currently closed and therefore does not generate any existing vehicular, bicycle, pedestrian, or transit trips to and from the site. Future 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 Institute 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. The overall internal trip capture across the land uses for this development were estimated to be approximately 28% in the AM peak hour and 22% in the PM peak hour for the IDP full build program. Detailed trip tables are provided in the Transportation Appendix C.



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% of trips are anticipated to travel from the south to reach the site and 15% 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% 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% 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
As indicated above, the existing site in not operational, so there are no regular trips visiting the site from any mode. The East Deering Neighborhood is served by multiple bus routes and, at many locations, features a pedestrian network 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 at the site.

The existing Roux Institute Campus population was surveyed in August 2022 to estimate existing campus mode shares. The survey revealed that 23% of the Roux population is currently using alternate modes of travel with 13% walking, 4% using transit and 6% bicycling. With a more aggressive TDM program, as envisioned at the site, as well as investment in pedestrian, bicycle and transit opportunities, much higher percentages of non-auto trips may be reached.

A transportation engineer developed target mode shares for each envisioned Roux Institute 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

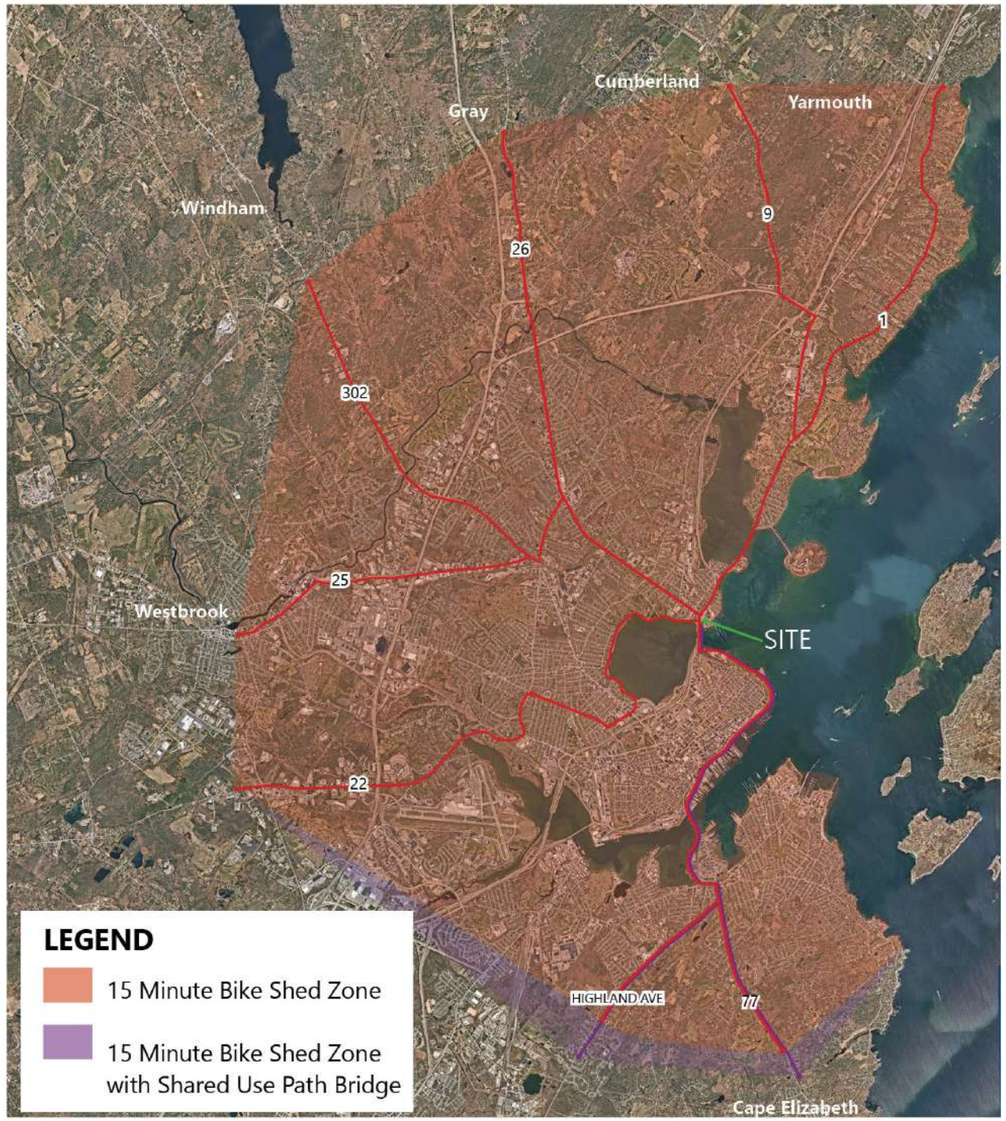
Transportation Improvement Opportunities

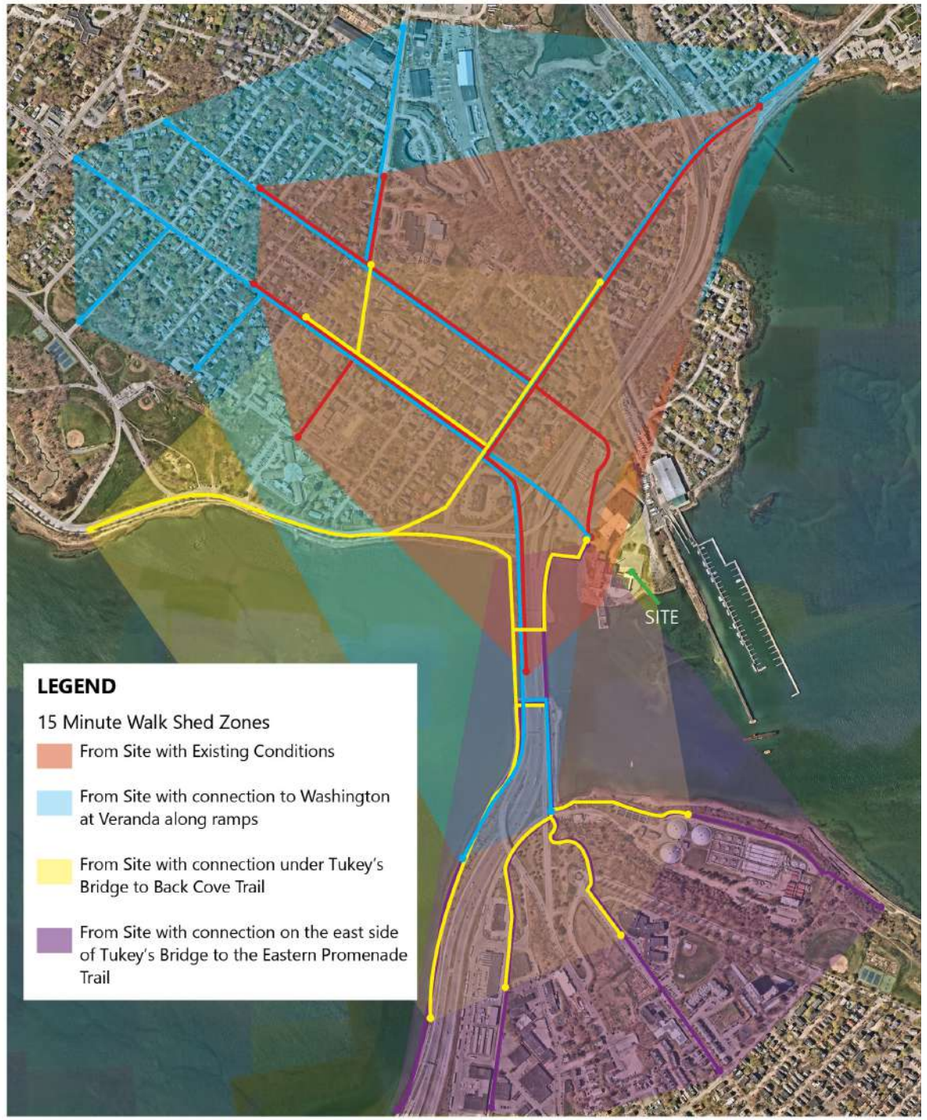
Bicycle and Pedestrian Connection Opportunities
The existing bicycle and pedestrian network includes known constraints along the existing bicycle and pedestrian route across Tukey's Bridge. The sidewalk connecting from the intersection of Washington/Veranda is narrow and adjacent to vehicular traffic on the ramp to I-295. Then this walkway meets the Back Cove Trail which adds bicycle and pedestrian demand to a narrow shared use path over Tukey's Bridge. Current pedestrian and bicycle demand in the study area is low. During the PM peak hour for example, only 6 pedestrians and 6 bicyclists traveled along Veranda Street crossing either leg of Sherwood Street. Similarly, only a total of 20 pedestrian crossings were reported across all legs of the intersection of Washington Avenue and Veranda Street during the PM peak hour.

Improvements to bicycle and pedestrian connections will increase those mode shares for the site and Infrastructure improvements can alleviate some neighborhood traffic impacts. Two opportunities stand out when considering bicycle and pedestrian improvements.

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 Institute Campus to the existing trail network, either by extending the shared-use path below and alongside the north end of Tukey's Bridge or by a shared use path on a new bridge parallel to Tukey's, or both. The site walkshed and bikeshed distances, or typical distances that people are comfortable choosing alternate modes, increase to points south with these connections, increasing the opportunities for bicycle and pedestrian trips and improving the overall bicycle and pedestrian network.

The Roux is committed to working with the City and MaineDOT to provide additional bicycle and pedestrian capacity to accommodate future demand. A Traffic Movement Permit will be required for each phase of the project. At that time, actual mitigation will be tied to the impacts that are anticipated at that time.





Transportation Improvement Opportunities (continued)

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 near-term 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 with goal mode shares. All on-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 on-site 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 categories of users (students, staff, residents, office tenants, visitors, etc.). The Roux Institute 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.

The parking numbers are estimates based on target mode shares and the currently contemplated building program. As the site is developed, Site Plan Review and Traffic Movements Permits will be required that will involve monitoring and reporting on traffic and parking. Based on monitoring results and TDM measures included in these submittals, the parking demand and ultimately supply will be determined so that the site is properly parked for the context at that time. As stated in the Land Use Code, the Planning Board will establish the off-street parking requirement based on a parking study.

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, North Deering and Falmouth. With a transfer at any of the Downtown Transfer Centers, riders can reach the rest of Portland and Greater Portland Region.

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 monthly ridership on the Metro Route 7 is one of the lowest in the Metro system. In 2021, on the average weekday, there were 2521 boardings on Route 7. Each bus has the capacity of approximately 30 people and the bus runs 13 times per weekday inbound and outbound or a monthly capacity of approximately 7800 boardings, which leaves plenty of capacity on Route 7 to accommodate site related traffic.

The Roux Institute Campus is working with METRO to improve the quality and frequency of transit connections to the Roux Institute Campus. Reduction of headways on Route 7, creation of a new route that ends at the Roux and travels through the Peninsula, and construction of a transit stop and turnaround for either service to travel into the site, furthering the convenience of transit as a mode of travel are all being considered.

In addition, the Roux Institute at Northeastern University will promote and incentivize transit use. It plans to subsidize transit passes for students, staff and faculty.

Transportation Improvement Opportunities (continued)

The Roux Institute Campus is constrained on three sides by the Bay, I-295, and a rail line, with Sherwood Street as the 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 potential 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.

Vehicles exiting the campus via Sherwood Street may turn right or left on Veranda Street to access I-295 South. 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.

Vehicles approaching the campus from I-295 southbound will exit at Baxter Boulevard and make a right onto Bates Street. There is a 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.

A potential timeline has been developed and is provided in the Transportation Appendix for when the improvements described above may be implemented if development proceeds as currently anticipated and goal mode shares are met. As the site is developed, Site Plan Review and Traffic Movements Permits will be required that will involve monitoring and reporting on traffic and parking. Based on monitoring results and Transportation Demand Management (TDM) measures included in these submittals, the parking demand and ultimately supply for each phase will be determined so that the site is properly parked for the context at that time. As stated in the Land Use Code, the Planning Board will establish the off-street parking requirement based on a parking study.

Managing Transportation Demand

Active Transportation
In addition to the transit options in the study area, the Roux Institute 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 Institute 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 Institute 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: Paid parking is intended to be shared across uses on the Roux Institute 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, and those accessing the site and commuting by boat.

Monitoring: Northeastern University will monitor transportation to the campus in order to ensure that mode share goals are being met and shall make adjustments as necessary to achieve such goals established in the applicable TDM or TMP.

Transitions

With I-295 to the west, state-owned vacant parcels to the north, the rail corridor and marine business to the east, and Casco Bay to the south, the Roux Institute Campus is surrounded by existing areas of transition from the campus to the surrounding neighborhoods. In addition to the existing buffers, development will further ease the transition to and from the campus through the following design methods.

Between Site Entrance & Campus
Public open space will ease transition from the smaller scale of Sherwood Street. Views to the water and the Bean Building, and clear wayfinding and circulation of pedestrian and bicycle pathways, will welcome site visitors further into the campus. A smooth transition will also be accomplished through thoughtful facade design at the pedestrian level. Potential nuisance features like dumpsters, air handlers, and parking will be appropriately screened. Buildings will avoid blank walls to respect the adjacent neighborhood and facilitate a sense of permeability and welcome.

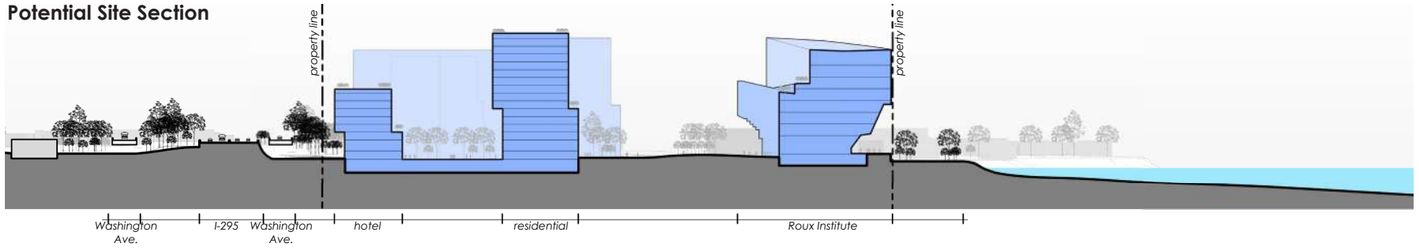
Between Buildings & Campus
Building entrances will face major public spaces or circulation paths. Lower stories will be programmed for activation where they meet the pedestrian realm or feature visually interesting details and activities related to the building. Building articulation, massing, and materials will contribute to the sense of a well-textured, connected campus.

Between Campus & Water
The shoreline area between the buildings and the water will serve as meaningful public open space. This open space will contain a combination of pedestrian and bike trails, passive and active gathering spaces, restored and ecologically improved landscape and shoreline to anchor the site's relationship with the water. Building facades facing the water will be considered public-facing, with views designed for interest from the water and Eastern Promenade Trail.

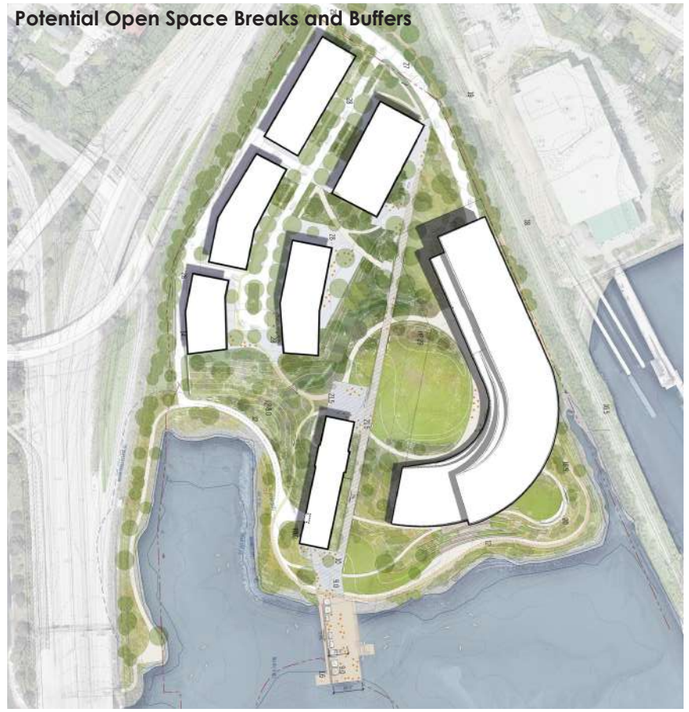
Crime Prevention Through Environmental Design (CPTED)
Key to these successful transitions is a sense of welcome, comfort, and safety. To ensure this, the campus will incorporate the following CPTED design strategies demonstrated to deter crime:

- Mixed use, multi-tenant 24-hour campus that generates "threshold capacity" for a diversity of places, people, and programs
- Ecologically restored, biophilic and publicly accessible campus connected to the wider community
- Highly durable, vandal-resistant materials in the public realm to communicate a well-maintained, clean campus
- Systematic, clear, and appropriately scaled wayfinding to guide and inform all transportation modes and user groups
- Matrix of pedestrian and bike paths connecting well-lit transit stops, bike storage areas, and parking areas to maintain clear sight lines
- Street-level building elevations designed for visibility, minimizing hidden corners and spaces
- Transparency and openness of buildings at ground levels and entrances to connect with the public realm and create pathways
- Controlled campus access points for special events or emergencies

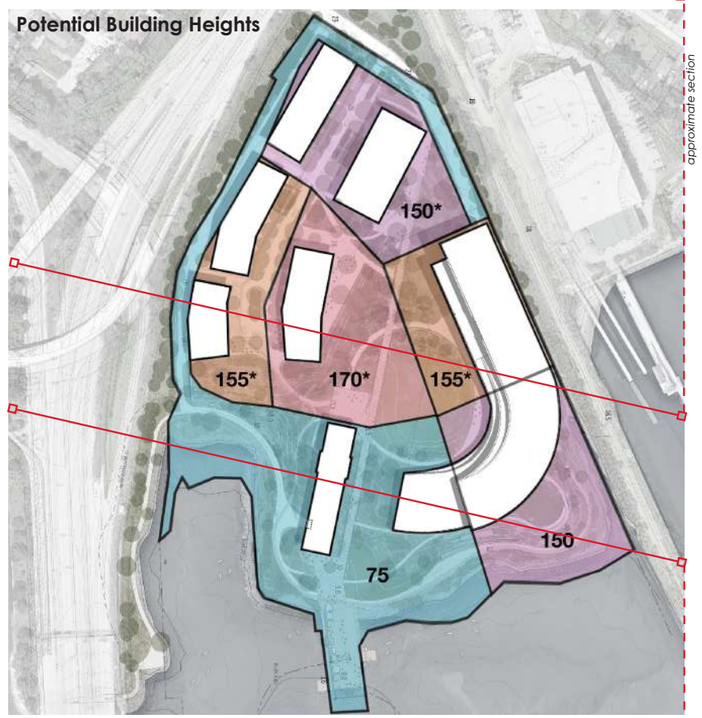
Potential Site Section



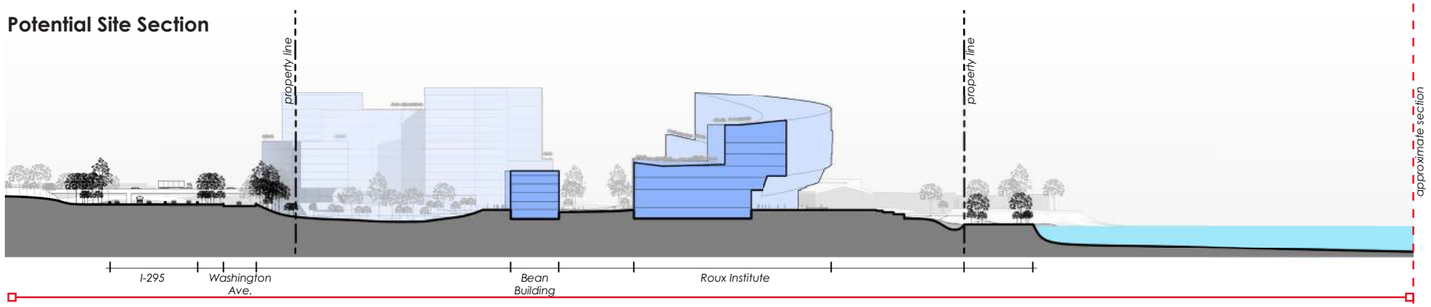
Potential Open Space Breaks and Buffers



Potential Building Heights



Potential Site Section



As campus growth occurs, measures appropriate to each phase will be implemented and scaled to the Institute population and site usage. These measures may include such things as increased lighting, emergency phones, maintenance of clear sight lines, additional wayfinding and attention to spaces between buildings to ensure the governing CPTED principles are maintained.

Safety & Environment

Strengthening Resilience & Ecology
The site is roughly 75% impervious with approximately 10 acres of building roofs, parking areas, and loading dock space. Minimal shoreline buffer is present at the site, with pavement extending right up to the armored embankment along much of the shoreline. Existing site grades adjacent to the Bean Building are only 1-foot above highest astronomical tide. In recognition of these existing vulnerabilities and with a desire to improve ecological function for the site, the redevelopment will raise interior site grades and soften landscapes to reduce impervious area and increase flood resilience.

Energy Consumption
The development presents an opportunity to mitigate energy consumption through high performance building envelopes, particularly with the likely southern exposure of the Academic/ Research building. Similarly, we intend to explore and hopefully incorporate renewable energy sources such as active and passive solar, sea water cooling, and / or geothermal. A sustainability charter will be developed for the campus prior to the first phase of development to establish sustainability benchmarks and guidelines.

Energy Conservation Measures
The project design will include strategies to reduce the energy consumption of the building and associated utility demand and greenhouse gas emissions. The design will incorporate both passive and active energy conservation measures that will allow the project to realize significant reductions in energy demand. The project will incorporate high performance envelope features including triple glazed windows with low U-value, solar control systems and optimized solar heat gain coefficients to reduce heating gains in the summer but take advantage of them during the winter. High efficiency energy recovery systems will be installed to capture and reuse as much heat as possible to significantly reduce the energy required for conditioning outside air. Energy efficiency mechanical distribution systems are being targeted such as radiant heating and other Dedicated Outdoor Air Systems. The project is aiming to electrify as much of the campus energy use as possible and utilizing heat pump systems to maximize efficiency and minimize demand on the grid. Finally, solar generation is being explored as a way to reduce the energy consumption, energy cost and the building's CO_2 footprint.

Noise Generation
The proposed mixed-use academic campus is compatible in uses with the surrounding East Deering neighborhood. The Roux Institute Campus is buffered by I-295, the abandoned Grand Trunk Railway, and adjacent marine uses. Development will adhere to City of Portland technical standards regarding noise, vibration, and other potential nuisances. Pre-development noise measurements will serve as the baseline of analysis, in order to assess noise impacts accurately and to allow improvements to baseline conditions where possible. Development will employ noise abatement techniques (screening, acoustical attenuation, landscape buffering, etc.) for the benefit of residents, students, and all users of the site.


Artist Interpretation

Hazardous Materials
Use of hazardous materials, if any, will be in academic and laboratory contexts, and managed in conformance with all local, state, and federal requirements.

Heat, Glare, and Radiation
Development studies will include analysis of heat, glare, and radiation impacts in order to understand and eliminate safety hazards and lessen impacts of new development. Development will comply with all City standards regarding heat, glare, and radiation.

Wind
Occupant comfort analysis will be performed during each phase of development when applicable site plans are reviewed, with design modifications as necessary to maintain acceptable conditions. The analysis will include comfort at and around buildings as well as major public spaces. Existing buffers of plantings at property lines will be maintained or replaced where appropriate.

Lighting
Exterior lighting will be full cut-off and dark-sky friendly. Fixture output will comply with all City lighting regulations to avoid light spill into neighboring areas from the site. Photometric analysis at each phase of development will be used to inform lighting design in accordance with Illuminating Engineering Society of North America (IESNA) Standards.

Height and Massing
The allowable building heights on the Roux Institute Campus are informed by the historic location and prominence of the Bean Building, the desire to create meaningful public open space while meeting all programmatic goals for the Roux Institute, resilient building design, and potential shadow and other impacts to neighboring properties. Building heights will stagger, with the greatest height at the center of campus and lower heights near the site's boundaries. Building heights around the Bean Building and within 35' of the western and northern edges of the campus will be no greater than 75'. Conceptual massing studies based on proposed building heights are attached as Appendix A.

Shadows
Height and massing will minimize shadow impacts to neighbors and avoid negative impacts to nearby existing public open spaces. The campus height map places the greatest heights to the middle of the site and progressively lower zones to the perimeter. Mechanical enclosures will be set back from roof edges to minimize impact. Conceptual shadow studies based on proposed building heights are attached as Appendix B.

Public Safety
Access to the campus is via Sherwood Street, through a 40-foot wide, 14'10' high highway underpass. The underpass height exceeds the NFPA requirement of 13.5 feet of clearance. The East Deering Fire Station is located one mile away from the campus. In addition, fireboat access will be available at the campus pier.

Public safety needs for the campus will be similar to those on other higher education campuses. Northeastern will have a 24-hour security presence on the Roux Institute Campus. Security personnel will be trained in basic emergency medical services, such as CPR. Other security measures planned for the campus will consider most current proven technologies, including remote-monitored security cameras and emergency blue light telephone boxes.

Bird Safe
The development will incorporate proven technologies and materials with acknowledgment that bird-friendly buildings reduce threats to birds without sacrificing attractiveness, functionality, or natural lighting.

Open Space
The campus will include a minimum of three acres of public open space designed to enhance waterfront access and provide bicycle/ pedestrian network connectivity. The public open space shall be meaningful space, functioning as recreational, natural habitat, and/or public gathering space.

Neighborhood Engagement

The Roux Institute Campus is intended to become an extension of the East Deering neighborhood, which is separated from the site by Interstate 295, the rail corridor, and Maine Yacht Services. The site will be a walkable addition to the neighborhood, with open spaces, waterfront, campus-oriented retail, and restaurant amenities, but it also represents a change. To ensure the campus is designed in a manner benefiting the neighborhood will require robust communication with interested stakeholders.

The City of Portland requires two Neighborhood Meetings related to the Institutional Overlay Zone and Institutional Development Plan processes. We have used those requirements as a starting point for ongoing dialogue. The first Neighborhood Meeting was held virtually on November 18, 2021, with 26 registered attendants and 11 attendees. The feedback was positive, and attendees expressed interest in construction job opportunities, sought additional information regarding traffic and associated transportation improvements, indicated a desire for bike/pedestrian connectivity, requested that lighting plans be considerate of adjacent neighborhoods, and asked about climate resilience and disturbance during construction. A second Neighborhood Meeting was held in person at the Ocean Avenue Elementary School on April 6, 2022. Although the City only requires that abutters within 500 feet of the campus be notified of the meeting, IDEALS and Northeastern expanded the list of invitees to include a much broader radius and mailed over 1700 meeting notices. Forty-eight people attended the meeting at the school. Many attendees expressed concerns about the scale of the proposed development, building height, and traffic. As a result, IDEALS and Northeastern reduced the planned square footage of construction by 27% and the tallest proposed building heights by 19%.

In addition to Neighborhood Meetings required by the regulatory process, IDEALS and Northeastern have hosted periodic virtual forums called Roux Institute Campus Roundtables as a way to engage with the East Deering neighborhood and beyond on an on-going basis. The first such event occurred December 14, 2021. Additional meetings occurred on February 1, March 23, and June 2, 2022 An Open House was held at the site on September 6, 2022, with over 130 public participants.

To keep all potential stakeholders apprised of the development plans, IDEALS and Northeastern maintain a website, www.rouxcampusportland.org, to showcase up-to-date plans, present information about the Roux Institute at Northeastern University, and provide notice of upcoming events with links to meeting documents and recordings of prior forums. The site is an interactive platform with an email link for questions and a feedback section that probes for input on a wide variety of issues. This platform will also be a valuable communication tool during construction, providing a means to share information related to construction schedule, work hours, management plans, public safety, and site access.

Additionally, Northeastern University and IDEALS have a designated community contact for members of the public. This contact works closely with neighborhood and city stakeholders to solicit ideas and feedback and ensure that any concerns are dealt with promptly, whether reported in person or through the website.

Finally, members of the team are conducting regular outreach to interested stakeholders and potential partners to gain broad input into development plans. This will continue to facilitate assessment and calibration regarding how the Roux Institute Campus can fit into the Portland landscape and ways it can best live up to its potential as a model for education, economic development, recreation, and aesthetics.

Regular Neighborhood Forums
Northeastern University and IDEALS will continue to host neighborhood forums on a quarterly basis to discuss items such as phasing plans, project impacts, construction plans and schedule, and any neighbor concerns.

Northeastern University and IDEALS will provide an estimated construction schedule at the beginning of a project and provide regular updates throughout construction.

Community Advisory Group
Northeastern University and IDEALS will create a Community Advisory Group to maintain a dialog for the purpose of sharing information on project development, planning, and seeking input. To the extent practicable, the group shall be comprised of a representative from the following categories:

- East Deering Neighborhood
- Recreation, parks, and trails
- Bicycle/pedestrian
- Rail
- Public Transit
- Portland Harbor
- Portland Public School System
- Higher Education
- Sustainability
- Business Community

The Community Advisory Group will meet quarterly and may meet more frequently as necessary. Input gathered and meeting documentation from Neighborhood Forums will be provided to the Community Advisory Group.

Construction Management Principles

A detailed Construction Management Plan will be submitted as part of the site plan review, based on the following principles:

- Open and transparent communication
- One-on-one conversations whenever possible
- Multiple channels to give and receive information
- Timely sharing of plans and considerations
- Receptivity and response to input
- Respect for affected parties

Northeastern University and IDEALS are committed to communicating early and often with neighbors and interested parties. Existing communication platforms – in-person meetings and calls; website; info@rouxcampusportland.org; and Neighborhood Forums will be supplemented with a dedicated construction webpage on the website, along with social media, texting, and a hotline to ensure the public has easy access to timely and accurate information.

Project Schedule
A Master Project Schedule will be prepared at the onset of each stage of construction, with distinct project schedules for buildings developed over the course of construction. Scheduling updates will be shared at the outset of each undertaking.

Public Safety Considerations
During construction of the initial phase, the site will be off-limits to the public. Thereafter, secured fencing and signage will be used to protect public spaces from construction areas and direct traffic flow. Pedestrian, bike, and vehicular access will be clearly marked throughout the campus. Appropriate lighting will ensure safe pedestrian routes. Where possible, buffers will be established between construction sites and vehicular and pedestrian ways. Following completion of initial phase, interim connections to bike and pedestrian ways will be provided when temporary construction impacts are necessary. All procedures will be OSHA compliant.

Construction Staging
Construction staging will occur inside the project's limit of work, as designated on the site plan submission or as approved by the Planning Board during the site plan review process.

Truck Routes
Truck routes and timing will be addressed in the projects' Construction Management Plan during site plan review and monitored throughout construction. In coordination with the city, wayfinding signage may be installed where specific locations are identified as no-travel zones for reasons of safety or traffic impacts. Every effort will be made to schedule construction traffic to avoid undue impacts when roadways are busy and/or queuing to gain access to the site. There will be no truck or construction-related parking within the city right-of-way.

Noise Impacts
Notwithstanding the existing buffers to the site, there will be noise impacts as a result of construction activities. For those noise events that are above the regular background level, advance notifications will be provided using the communications mechanisms described above. The City of Portland Noise Ordinance will be followed.

Air Quality Impacts
Construction Managers have a range of tools available to mitigate and manage dust and other agents effecting air quality. While the waterfront location and general westerly winds will partially alleviate these impacts, additional measures to be implemented as needed include covering loaded truck beds and soil stockpiles, use of wetting agents, and periodic cleaning of construction staging areas, roadways, and truck wheels.

Community Benefits

The Roux Institute at Northeastern University, through its programming and its publicly accessible waterfront campus, will provide numerous benefits to the residents of the City of Portland and beyond. At the core of the Roux Institute's mission is service to Portland and Maine's people by offering graduate programs in high-growth fields with generous scholarship support, launching startups and driving talent development, and supporting existing Maine businesses and institutions--all with the goal of bringing cutting edge technology capabilities to Maine through education, research, and entrepreneurship. The nearly billion-dollar investment in the Portland Campus will generate local jobs at all levels, both temporary and permanent. The very nature of an innovation hub like the Roux Institute is to create new opportunities.

Community Spaces
The Roux Institute's publicly accessible, waterfront campus will benefit the adjacent neighborhoods and greater Portland community. Some of those benefits include:

- At least three acres of open space will be built in the first phase of construction and maintained thereafter, available for use by all members of the public
- Safe public bicycle / pedestrian trails linking to the Back Cove and Eastern Promenade trails available for use by all members of the public
- Open space and a waterfront pedestrian walkway available for use by all members of the public
- Indoor spaces for use by members of the public, as available
- Convening space available for use by members of the public
- Snow ban parking for adjacent neighbors
- A pier available for public use with facilities for kayaking and paddleboarding

Workforce Development During Construction
Construction of the Roux Institute campus provides an opportunity to educate and develop our workforce for the future. The following are some examples of community benefit opportunities during the construction phase of the project:

Outreach to Local Schools - Portland Public Schools, Trade Schools and Community Colleges
- Host a Roux Institute Campus Construction Lab, where interested parties including future and current tradespeople will be invited to come learn from the project team about construction techniques, project management strategies, and trade work on this complex and technical project. This will gain exposure for a younger population to learn about the trades and construction industry and will contribute to the advancement of Maine's existing trade workforce
- Attend and participate in training programs within each of the established educational facilities interested in participating
- Involve field supervisory staff and craft workers in establishment of a curriculum for the core skillsets anticipated for the project
- Involve staff members as part time "adjunct professors" in the interested educational facilities and work to incorporate elements of the planning of the project in curricula via:
  - » ACE Mentoring and similar programs to engage with high school students
  - » Community College and Portland area Higher Education Institutions with the goal of incorporating project specific construction scheduling, estimating, and virtual design concepts into the curriculum

Apprentice Program Development
- Encourage and educate potential subcontractors on the incorporation of apprenticeship programs in their current business / recruiting and employee retention planning
- Incorporate the evaluation of trade contractors' apprenticeship programs in the selection of the subcontractors for the project
- Evaluate the current and past performance of the apprenticeship programs when evaluating potential subcontractors
- Establish goals for apprentice participation in construction workers on site and at off-site fabrication facilities

Local Worker Preference
- Hold local job fairs prior to the start of construction and throughout the construction phase of the project to ensure that the maximum number of local workforce participation is achieved
- Set goals and measure performance of each contractor for local resident worker participation including other measures of business level participation in the project, such as:
  - » Maine Based Business participation
  - » Women Owned Business
  - » Disadvantaged Business
  - » New Mainers

Community Benefits (continued)

Northeastern University's Roux Institute is delivering on its mission to erase the boundaries between the real world and academia. It achieves this goal by customizing learning programs and research initiatives to meet the needs of employers, by integrating classroom learning with professional experience, and by supporting the launch of innovative startup companies. The Roux Institute's collaborations with its employer-partners keep the institute in step with the economy's—and society's—changing needs and opportunities. They also enable the Roux Institute to identify and begin to address the state's urgent and most consequential challenges.

Together, the Roux Institute and its partners are:

- Co-designing educational programs that prepare workforce talent for today's innovation economy, focusing on STEM fields such as artificial intelligence and the computer, data, and advanced life sciences, and by integrating classroom learning with professional experiences afforded by employer-partners
- Conducting interdisciplinary research focused on solving challenges that affect Portland, the state of Maine, and communities globally. The explicit goal is to translate findings into knowledge and activities that make a significant, measurable impact on the world. Priorities include widening access to equitable and effective healthcare; providing broader and more reliable access to technology; and devising data- and technology-driven methods to mitigate dependence on unreliable supply chains
- Attracting, supporting, and launching new businesses throughout Maine, opening new doors to opportunity and prosperity for people across the state and region

Now in its third academic year, the Roux Institute is steadily laying the groundwork for transforming Maine's economy and is securely rooted in Maine and leading important, transformational impact throughout the state. From its launch through the start of the current academic term in September 2022:

- The institute's partnership ranks have grown tenfold as more than 110 Maine organizations now work with and benefit from the institute
- Five hundred graduate students are enrolled, and more than 900 employees of partner organizations have completed custom training programs
- Thirty-six startup companies have worked in residence at the Roux Institute, creating 52 new Maine jobs and raising $21M in investment capital to grow their new businesses
- Five, robust research programs are established, led by globally recognized leaders who are pursuing substantial governmental and private funding to spur growth
- And more than 125 Mainers are employed by the institute, 25% of whom relocated to Maine to join the effort and support the institute's mission

Commitment to Diversity, Equity, and Inclusion
The COVID-19 pandemic, a heightened awareness of the devastating impact of racial and ethnic discrimination, and other global disruptions have starkly illustrated the need for a new higher education model that empowers people to navigate and solve complex problems across a multiplicity of contexts, whether geographic, political, intellectual, socioeconomic, or cultural.

To this end, Northeastern University recently unveiled *Academic Plan: Experience Unleashed*, a strategic vision that aligns learning, research, and entrepreneurship to solve urgent challenges in collaboration with partners around the world. Central to the plan is a commitment to human diversity. Throughout the university's global system, Northeastern teams are working with local partners and communities to build a diverse, equitable, and inclusive community of learners, faculty, entrepreneurs, staff, and partners. This work is based on the truth that humankind's toughest challenges are dynamic, interconnected, and affect people and communities in ways that depend upon context. To maximize our impact within diverse and rapidly evolving contexts, we must immerse learning, discovery, and innovation in real-world experience.

Enabling Access for all Mainers
Through the transformational Roux Institute's *Alfond Scholars Initiative*, the university will distribute $67 million in scholarships to Maine residents who are studying at the institute, providing unprecedented support for Mainers to pursue academic and career advancement. More than $11M in need-based scholarships have been awarded inception-to-date. The Roux Institute's *Alfond Scholars Initiative* also supports the recruitment and retention of diverse learners through its co-op and post-doctoral research programs.

Benefits to Employers and the Business Community
The Roux Institute was founded on collaboration with employer partners and higher education partners, which keep the Institute in step with the economy's—and society's—changing needs and opportunities. Twenty-three of the institute's industry partners are headquartered in Portland. Collectively, these organizations employ more than 40,000 people. Eleven Portland-based community and academic partners, who collectively employ 12,000 people, also work with the Roux Institute. These partnerships enable The Roux Institute to support Portland-based companies and the people they employ, while also identifying and beginning to address the city's most urgent and consequential challenges.

Benefits to Higher Education and Community Partners
Northeastern University, through its work at The Roux Institute, is committed to working with higher education and community partners throughout Maine to decrease the barriers of entry to high tech careers, and to bring our talent and expertise to benefit these vital organizations.

Community Benefits (continued)

The institute's work with Maine higher education partners focuses on building an ecosystem that creates clear pathways for learners to and through college and onto graduate learning, as well as building the critical R&D capacity across the city and the region. Through its fourteen higher education partnerships, the Roux Institute and its partners feature joint expertise to ensure that Maine-based learners get a robust education and can contribute effectively to workforce and research needs. For example, the institute has developed accelerated matriculation and completion pathways with five higher education partners, helping college graduates to maximize returns on both time and tuition investments, while remaining in Maine to complete master's degrees at The Roux Institute on an accelerated timeline.

The institute's various community partnerships focus on leveraging people, space, and networks to advance the work of Maine's mission-drive, community organizations. For example, Roux Institute faculty volunteer to lead computer science training for teachers in Portland schools; Casco Bay High School students complete internships at The Roux Institute; and the institute hosts Girls Who Code camps for middle and high school students from throughout Maine.

Similar, near-term events are planned as well – some of which are directly linked to the university's diversity, equity, and inclusion commitments. For example, The Third Place and The Roux Institute are partnering to host networking events to support BIPOC professionals as they connect, live, and work in Portland. The institute is committed to expanding and scaling these offerings. In the future, the institute's community engagement programs will support educators, students, and community groups that share our commitment to a diverse, equitable, and inclusive high-tech ecosystem that is a possibility for all – and benefits all.

Supporting the Growth of Local Entrepreneurs

A final community benefit is the robust entrepreneurship programming supporting people to learn about business creation and supporting entrepreneurs to launch their ventures. Already, the Institute has hosted two "Maine Start Summits," which are three-day business creation hackathons and many other events for entrepreneurs, which create open and accessible on-ramps for anyone to bring an idea to life and begin to not only provide Portland with great products, but also generate more jobs and revenue at the same time.

Commitment to the City of Portland and our Region

Ultimately, the university's success will be inextricably linked to that of its faculty, graduates, and partners. Through the work of the Roux Institute and other organizations, Maine will be home to a thriving, tech-forward economy fueled by people and businesses leading innovations in realms from AI-driven healthcare to life sciences technology. This economy will attract new people and companies to the region. It will also provide unprecedented opportunities for all Mainers in a manner that honors and enriches their treasured lifestyle and culture.

Appendix A
Conceptual Massing Studies

Campus Concept | near-term

Campus Concept | near-term

Campus Concept | long-term

Campus Concept | long-term

Appendix B
Conceptual Shadow Studies

Shadow Study | December/June: 9am, 10:30am Noon, 1:30pm & 3pm, near-term & long-term

Appendix C
Supplemental Transportation Information

VHB's Technical Transportation Appendix

Trip Generation

The person trip generation estimates for the currently contemplated full development were determined including both internal trips between uses on the site and external trips that have either origins or destinations off site that use all modes to travel to and from the site. The total trips generating and their associated ITE Land Use Codes are provided in Table 1. Information on Roux projected population and programming and the resulting trip profile are provided in Table 2 below. For more specific information for the trip generation of the Academic Building, the detailed trips by academic population are illustrated in Table 2 below.

Table 1: Person Trips for IDP Full Build Development Program (including internal and external)

Site Land Uses and Descriptions				*AM PEAK HOUR*			*PM PEAK HOUR*		
LUC	**Land Use**	**Size**	**Unit**	**Total**	**Entering**	**Exiting**	**Total**	**Entering**	**Exiting**
N/A	Academic Building	400	1,000	314	288	26	562	138	425
221	Multifamily Housing (Mid-Rise)	650	Units	274	63	211	254	155	99
710	General Office Building	200	1,000 SF	304	268	36	288	49	239
760	Research and Development Center	50	1,000 SF	52	42	9	49	8	41
310	Hotel	125	Rooms	58	32	25	74	38	36
822	Strip Retail Plaza (<40k)	10	1,000 SF	24	14	9	66	33	33
932	High-Turnover Sit-Down Rest.	15	1,000 SF	144	79	65	136	83	53
	Total Trips			**1169**	**786**	**382**	**1428**	**503**	**926**

Table 2: Academic Building Trip Generation Components on a Typical Day

		AM peak hour	*PM peak hour*
1,680 Enrolled Graduate Learners (hybrid)	in	32	48
	out	0	64
	total	32	112
3,500+ Corporate Learners (online and hybrid)	in	70	0
	out	0	140
	total	70	140
150 People at Special Events	in	15	50
	out	0	15
	total	15	65
50+ Embedded Startups (ITE LUC Office 100 emp)	in	43	13
	out	6	61
	total	49	74
165 Faculty & Staff (ITE LUC Office 165 emp)	in	71	18
	out	10	88
	total	81	106
10% more Visiting Faculty & Staff (ITE LUC Office 16 emp)	in	7	2
	out	1	9
	total	8	11
105 Researchers (ITE LUC R&D 105 emp)	in	50	7
	out	9	48
	total	59	55
Total Academic Building Population	**in**	**288**	**138**
	out	**26**	**425**
	total	**314**	**562**

Target mode shares for each proposed Roux Campus land use were developed and discussed with City of Portland and Maine Department of Transportation officials at several meetings. These shares, as outlined in Table 3 below, were applied to external trips to determine the likely number of trips by each mode.

Table 3: Mode Share By Land Use

Land Use	*% Transit*	*% Ped/Bike*	*% Vehicle*	*% Carpool*
University	10%	20%	65%	5%
Residential	10%	20%	65%	5%
Office	10%	10%	75%	5%
Hotel	10%	10%	75%	5%
Retail	10%	50%	40%	0%
Restaurant	10%	50%	40%	0%
Overall Site Mode Shares	**10%**	**18/19%**	**67/66%**	**5%**

Applying each of these mode shares to the trip generation for the appropriate land use results in the trip generation by mode as shown in Table 4 below.

Table 4: External Trips by Land Use and Mode for Long-Term Build Out

Peak Hour	Vehicle			Transit			Walk/Bike/Other			Total Trips		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
AM	424	141	565	62	22	84	107	46	153	593	208	801
PM	217	520	737	34	77	111	77	133	211	329	730	1058

Parking Demand

Parking demand will be determined by phase as the existing parking demand and anticipate mode shares are determined. In each phase, the existing and future parking will be evaluated. Base parking demand was estimated for each hour of the day using ITE Parking Generation Manual, 5th Edition rates and the same land use codes as for trip generation with the exception of the Roux Institute which used the evaluation of population travel profiles as outlined above. The estimates indicate that total parking demand across all uses on the site will peak at 4 PM as driven by Roux Institute parking needs.

Table 5: Estimated Peak Parking Demand based on Current Buildout Development Program[1]

LUC	Land Use Group	Size	Unit	Peak Parking Demand (4:00 PM)
710	General Office Building	200	1000 Sq. Ft.	329
820	Convenience Retail	10	1000 Sq. Ft.	6
932	High-Turnover (Sit Down) Restaurant	15	1000 Sq. Ft.	24
222	Multifamily Housing (High Rise)	650	Units	153
310	Hotel	125	# Rooms	55
550	Roux Institute	400	1000 Sq. Ft.	1002
760	Research and Development	50	1000 Sq. Ft.	62
			Total:	1631

[1] Parking demand as calculated based on goal mode shares provided above

As indicated, the parking numbers are estimates based on target mode shares and the currently contemplated building program. As the site is developed, Site Plan Review and Traffic Movements Permits will be required that will involve monitoring and reporting on traffic and parking. Based on monitoring results and TDM measures included in these submittals, the parking demand and ultimately supply will be determined so that the site is properly parked for the context at that time. As stated in the Land Use Code, the Planning Board will establish the off-street parking requirement based on a parking study.

Transportation Improvements

Based on the evaluation of the IDP full build program and the anticipated impact on the transportation network, a series of potential projects have been identified that could mitigate these impacts, if they are found to occur in the future. Each project is listed with the anticipated phase of the program development at which the mitigation may be necessary based on operations.

- Sherwood Street (short term)
  - Improve Sherwood Street to accommodate bicycles and pedestrians in separate facilities (i.e. bike lanes and sidewalk) where possible with potential shared accommodations through the limited cross section under the I-295 bridge. A separate left and right turn lane on Sherwood is not anticipated to be required until the mid term and a traffic signal that is required in the long term.
- Shared Use Path Connection (mid term)
  - A shared use path connection from the site to provide better connectivity to the Back Cove Trail, neighborhood, and/or Eastern Promenade Trail

- Washington Avenue at Veranda Street (mid to long term)
    - Addition of an eastbound right turn lane (Bates approach) and northbound right-turn lane (I-295 Ramp). With these lanes, and timing changes, the overall LOS will improve to a C during the AM peak hour and LOS D during the PM peak hour (was LOS F without improvement). Alternatively, the ramp from the Washington Avenue off-ramp to Sherwood Street could be considered.
- Veranda Street (mid term)
    - Improve Veranda Street to accommodate bicycles in separate space.
- Veranda Street at Sherwood Street (full IDP build program as currently contemplated)
    - Provide signalized control including a separate northbound left-turn lane. These changes would result in an overall LOS C/D during the AM/PM peak hours.
- Bates Street at Baxter Boulevard (full IDP build program)
    - Provide an all-way stop controlled intersection. Under all-way stop control, the intersection would experience a slight increase in delay resulting in less than 19 seconds of delay for the westbound and eastbound approaches. However, it would improve the southbound left turn from LOS B during the AM and PM peak hours to a LOS A.
- Washington Avenue at Presumpscot Street (full IDP build program as currently contemplated)
    - Per discussion with the City's Consultant, VHB also looked at the intersection of Washington Avenue at Presumpscot Street based on its likely effect on the operations of Washington Avenue at Veranda Street. For the full IDP build program, a northbound left turn prohibition would need to be considered, a second southbound thru lane added and the southbound left advance phase removed to address the poor operations during the AM peak hour. In addition, the pedestrian crossing the south leg of the intersection would need to be removed in order to improve overall operations.