



*Learning with Purpose*

# UMASS LOWELL

## Strategic Development Plan 2022-2027





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<sup>1</sup> <https://www.uml.edu/facilities/planning-design-construction/planning/strategic-development-plan-2022-2027.aspx>

APPENDIX C 2009 STORMWATER MANAGEMENT PROGRAM  
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## EXECUTIVE SUMMARY

Consistent with the Special Review Procedure established between the Secretary of Energy and Environmental Affairs of the Commonwealth and the University of Massachusetts Lowell (UMass Lowell) in 2012, this 2022-2027 Strategic Development Plan Update documents planned development activities at the University for the period between 2022 and 2027 by providing a comparison of actual conditions in 2022 to projections made in 2016, a schedule of planned projects between 2022 and 2027, estimates of the individual and cumulative environmental effects of those projects, and updated measures to avoid, minimize, and mitigate those effects.

While not inconsistent with projections modeled in the 2016-2021 Strategic Development Plan, actual conditions in 2022 have been altered by the impacts of the COVID-19 pandemic. The pandemic ended a lengthy period of sustained enrollment growth, and total campus enrollment for the 2022-23 academic year is closer to 2016 levels than to the projections for 2021. Employee headcounts are also well below 2021 projected levels, as staffing for instruction and operation of the campus tracks closely to enrollment. In addition, the pandemic introduced levels of online instruction and remote work that further reduce the population physically on campus. Collectively, these factors resulted in most environmental effects falling below projected levels, particularly those associated with transportation.

Since 2010, UMass Lowell's transformative growth and development have been guided by thoughtful multi-year strategic planning, including regular revision to address evolving circumstances. The university is currently involved in a campus-wide effort to draft a new strategic plan in support of newly appointed Chancellor Julie Chen's goals for UMass Lowell to be a vibrant, inclusive, public, Research 1 university in a Gateway City. The projects and activities described in this document are designed to reinforce that strategic vision.

UMass Lowell's ongoing climate action and energy planning supports its strategic plan objectives. Most recently, the Alternative Energy Master Plan outlined a pragmatic process for achieving carbon neutrality by 2050, drawing heavily on incremental improvements in conjunction with capital investments to reduce overall energy use, electrify energy systems, and expand sustainable and renewable generation. Slowing campus growth also enables these goals to be more readily achieved.

Looking forward, the University anticipates a series of capital projects focusing on facilities renewal and upgrading in support of projected on-campus enrollment levels that are unlikely to reach those previously envisioned for 2021. This is in stark contrast to the focus of the prior decade on new construction projects and rapid expansion. When combined with more hybrid operations and ongoing efforts to reduce climate impacts and increase efficiency, the resulting environmental effects are expected to be below the levels projected for 2021. This will enable UMass Lowell to solidify its recognized position as a leader among public universities in the Commonwealth in reducing its adverse environmental impacts and effectively mitigating those that are unavoidable, while continuing to serve as one of the leading economic engines of the Merrimack Valley and the Commonwealth.

# 1. CHAPTER ONE – BACKGROUND

## 1.1 HISTORY AND CONTEXT

The University of Massachusetts Lowell (UMass Lowell) and its three campuses have evolved as the legacy of the Lowell Normal School (later Lowell State College, now South Campus) and Lowell Textile School (later Lowell Technological Institute, now North Campus). From their founding at the turn of the 20<sup>th</sup> Century, each school grew and expanded until the two merged in 1975 to become the University of Lowell. The University of Lowell became part of the University of Massachusetts System in 1991.

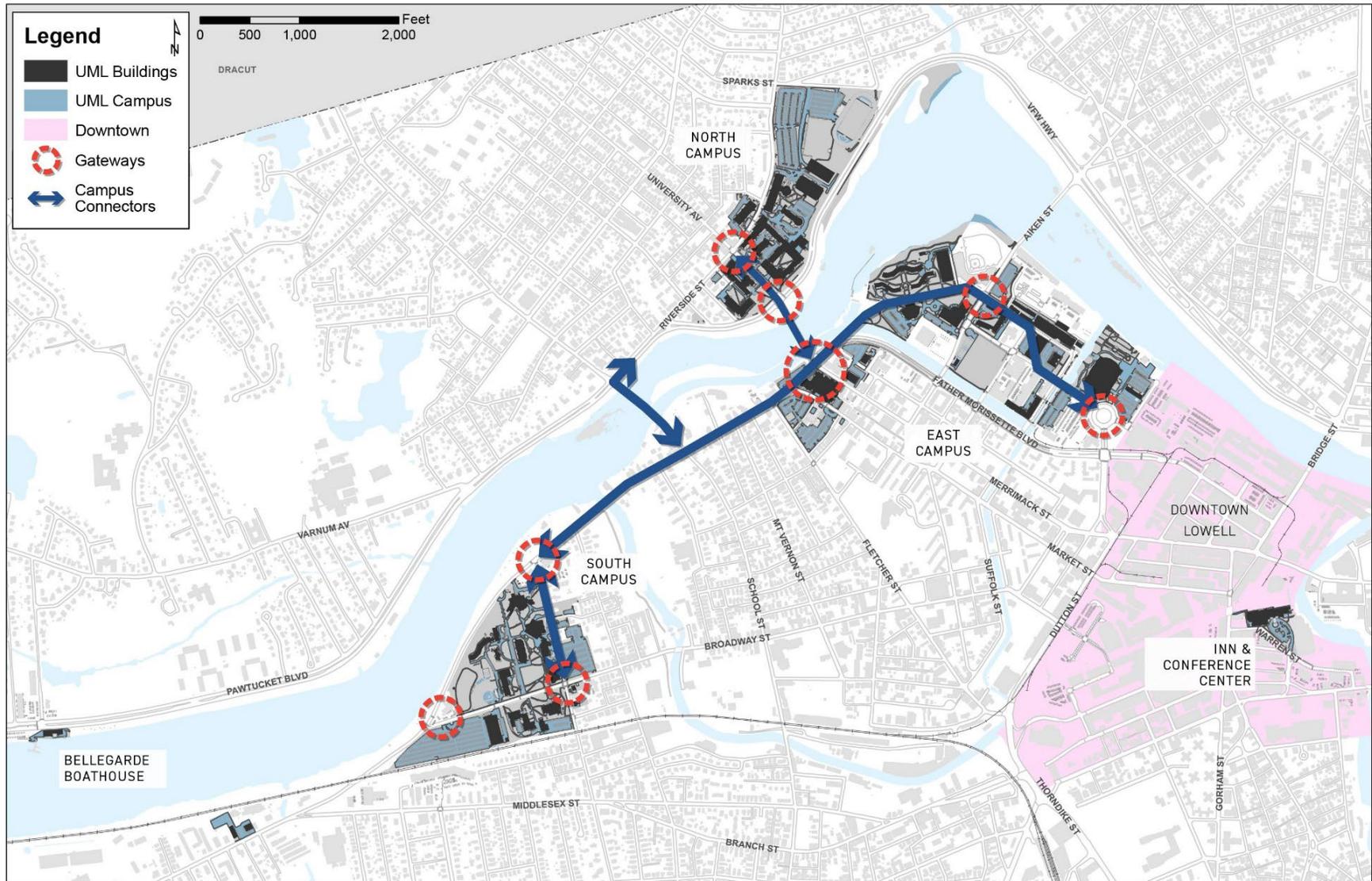
Both schools experienced a period of rapid expansion between the 1950s and 1970s, with substantial real estate acquisition and new building construction. Lowell Tech's expansion into the Northern Canal Urban Renewal District for student housing created the current East Campus. The physical growth of the campus slowed in the 1990s and early 2000s.

Between 2007 and 2019, UMass Lowell grew at an unprecedented pace, increasing enrollment by more than 55% and adding over 2,000,000 square feet of campus building space through new construction, real estate acquisition, and renovations.

Today, UMass Lowell offers its over 17,000 resident and commuter students over 120 bachelor's, master's, and doctoral degrees and professional certificates in the Fine Arts, Humanities, Social Sciences, Sciences, Education, Engineering, Health Sciences, and Business.

The dramatic growth of the campus over the past two decades has been guided by a robust planning effort designed to effectively anticipate and manage the University's growth, including the Strategic Development Plans in 2011 and 2016, a *Climate Action Plan, Alternative Energy Master Plan (AEMP)*, campus sector plans, and transportation planning efforts. All of UMass Lowell's physical planning efforts are grounded in the university's strategic plans. The campus is currently undertaking an inclusive and comprehensive strategic planning initiative to guide the implementation of newly appointed Chancellor Julie Chen's vision for the campus as a vibrant, public Research I university in a Gateway City.

Figure 1. UMass Lowell's Urban Context



**Figure 2. Aerial View of the City of Lowell and UMass Lowell Campuses**



## 1.2 PROJECT REVIEW

The Massachusetts Environmental Policy Act (MEPA) review of capital plan projects at UMass Lowell is governed by a Special Review Procedure that provides for a capital planning update (in the form of a Notice of Project Change) every five years and for the filing of an Environmental Notification Form (ENF) for any individual project that separately meets a MEPA review threshold. The original *2011-2016 Strategic Development Plan* (hereafter *2011-2016 SDP*) was filed with and reviewed by MEPA in 2012. In 2016, UMass Lowell filed the *2016-2021 Strategic Development Plan* (hereafter *2016-2021 SDP Update*). This *2022-2027 Strategic Development Plan Update* (hereafter *2022-2027 SDP Update*) is the second required five-year update to the *2011-2016 SDP*. Since 2012, construction has proceeded on a number of projects, none of which individually met MEPA review thresholds. Section 1.3 summarizes the status of the individual projects described in the *2011-2016 SDP*. The previous SDP documents and MEPA certificates can be found in Appendix B.

### 1.2.1 Special Review Procedure

In August 2011, UMass Lowell filed an ENF with the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) Massachusetts Environmental Policy Act (MEPA) office for a 650-space parking garage on the University's North Campus. In the Certificate of the Secretary of Energy and Environmental Affairs for the North Campus Parking Garage, an Environmental Impact Report (EIR) was not required, but UMass Lowell was required to propose a Special Review Procedure (SRP) covering new projects anticipated in the next five years, prior to the submission of future ENFs. The Special Review Procedure was established by the Secretary of EEA and UMass Lowell in a Certificate dated March 23, 2012, and signed by both parties. Under the SRP, the university files Strategic Development Plans as Notices of Project Change (NPC) every five years. The *2016-2021 SDP* was filed in December 2016 and noticed in the Environmental Monitor on January 11, 2017. The Secretary issued a Certificate accepting the SDP, requiring no further MEPA review on February 10, 2017. That Certificate and the comments attached to it are found in Appendix A of this *2022-2027 SDP Update*.

In 2020, the COVID pandemic and associated impacts on the university's financial position resulted in a temporary freeze of the campus's construction activity and a delay in developing its capital plan. Consequently, UMass Lowell requested a one-year extension of the deadline to file an NPC under this special review procedure. The MEPA office agreed with this requested delay in an email issued by Assistant Director Page Czepiga dated July 13, 2021. The *2022-2027 SDP Update* follows a framework similar to the *2016-2021 SDP Update*. The *2022-2027 SDP Update* responds to February 10, 2017, Certificate requirements and, as directed by the Secretary, provides a full response to the comments (see Chapter 6). In addition, this *2022-2027 SDP Update* provides a comparison of conditions expected in 2021 to actual conditions, a schedule of likely projects between 2022 and 2027, estimates of the individual and cumulative environmental effects of those projects, and updated measures to avoid, minimize, and mitigate those effects.

## 1.3 PROJECT STATUS

For consistency, the University has designated July 1, 2022, as the milestone date for all "current" data and "existing" conditions described in this document, except where specifically noted otherwise. This date is the start of the University's 2022 fiscal year. Throughout the document

where "FY" or fiscal year is used, it refers to the University's July 1 – June 30 fiscal year. Unless noted as a fiscal year, dates in this document refer to calendar years. The latest available data from Fall 2022 is utilized for the enrollment projections because Fall 2022 was the first relatively stable year of university operations post-COVID.

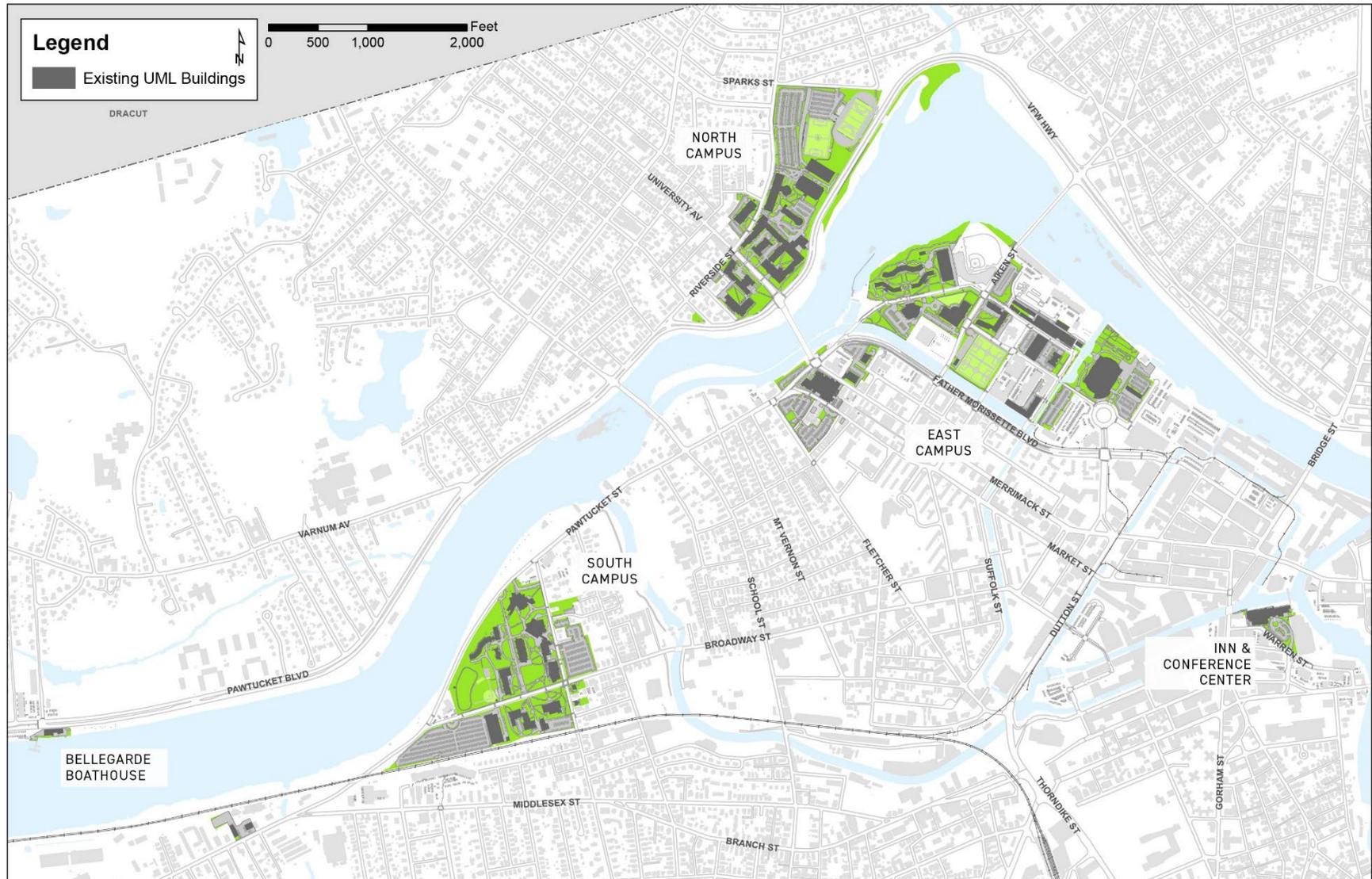
UMass Lowell completed most of the capital projects discussed in the 2016-2021 SDP Update with two exceptions. The Olsen/Life Sciences has been implemented in phases. The current phase is expected to be completed by early 2024. As a result of changing enrollments and housing demand, the University has indefinitely deferred plans for a new South Campus residence hall. The University has successfully addressed the projects' environmental effects, consistent with the expectations established in the *2016-2021 SDP Update*.

The University also maintained ongoing communications and collaboration with the local community, city officials and agencies, private landowners and businesses, as well as state and federal governments to improve the traffic circulation, urban environment, and economic condition around UMass Lowell's campuses.

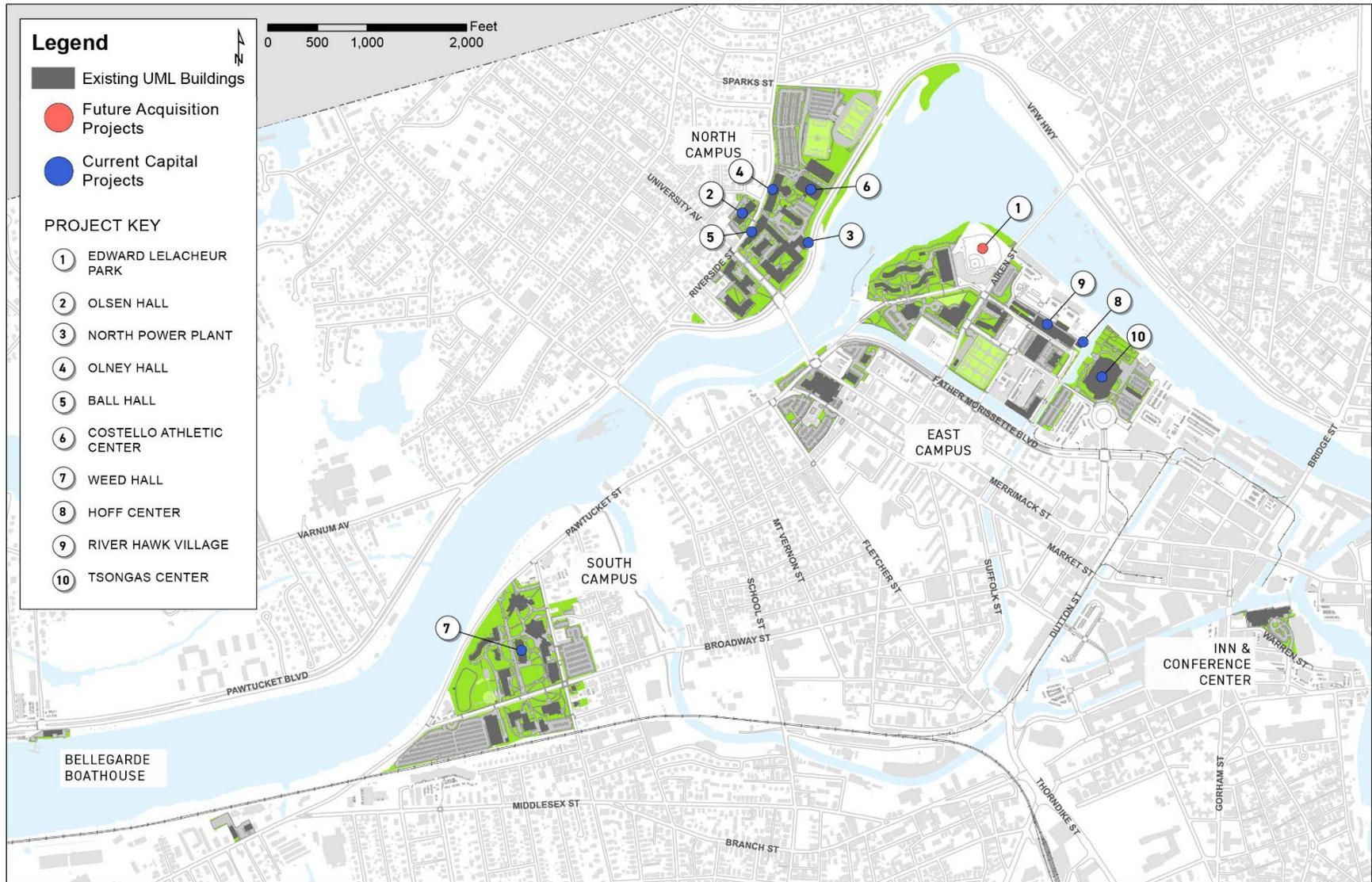
The University successfully reached its 2020 greenhouse gas emissions targets five years ahead of schedule, achieved LEED certification for seven buildings (in addition to the Coburn Hall renovation currently pending), and dramatically reduced its per capita energy consumption. The University's transportation demand management strategies and an increase in remote work and online course delivery have reduced trip generation and parking demand for every population on campus from commuter students to faculty and staff.

UMass Lowell expects to continue and build upon these successful trends over the next five years, as it implements the projects discussed in this document. Figure 3 and Figure 4 illustrate the 2022 existing and projected 2027 physical conditions of the University. Chapter 3 addresses the goals, objectives, planning assumptions, planning process, and planning considerations for the next five years. Updates and details of specific current and future capital projects are discussed in Chapter 4.

**Figure 3. Existing Conditions of UMass Lowell, 2022**



**Figure 4. Projected Future Conditions of UMass Lowell, 2027**



## **2. CHAPTER TWO – EXISTING CONDITIONS, 2022**

This chapter provides an overview of UMass Lowell's campus in 2022, considering the present size, use, and location of sites and buildings, followed by an overview of the transportation network, utilities, and infrastructure.

UMass Lowell's North, South, and East Campuses occupy almost 139 acres of land, contain sixty-two buildings, and house 4.9 million gross square feet of built space. In addition, the University also leases a number of existing properties in four municipalities to meet space needs, to support economic and community development, and to foster strategic collaborations with municipal, corporate, and not-for-profit partners.

### **2.1 CAMPUS EXTERIOR SPACES**

UMass Lowell has made considerable improvements to the campus landscape over the past five years. The University completed the conversion of the Southwick Courtyard in North Campus from surface parking to landscaped open space, reducing the impervious surface and enhancing the character of the North Quad. The project also added an elevator core to make the buildings around the quad more accessible. The completion of the Pulichino Tong Business Center (PTB) created a new plaza connecting PTB, Lydon Library, and Alumni Hall. The plaza - a mix of hardscape and softscape enhances the character of open spaces along University Avenue.

The University also redeveloped several parking lots, incorporating additional landscaping, on-site stormwater retention, and other best practices to satisfy the City of Lowell stormwater requirements and reduce or eliminate runoff into adjacent stormwater or combined sewer systems. The University converted two-thirds of the Cumnock parking lot in North Campus into the Perry Plaza landscaped open space, which provided outdoor activity space for students and staff and created new or improved accessible entrances to the surrounding buildings. The Pinanski parking lot in North Campus was also redeveloped to improve pedestrian circulation and safety, introduce landscaping, clarify parking, and reduce impervious surfaces in front of the building.

On the East Campus, the University completed the Campus Recreation complex, replacing 4.8 acres of impervious building and parking lot areas with recreation fields that include extensive on-site stormwater retention and recharge systems, and the Northern Canal Overlook Park. On South Campus, the University reduced impervious surfaces by eliminating redundant pathways between Weed and Durgin Hall. The outdoor landscape around Coburn Hall and Dugan Hall was enhanced, and it also included accessible paths to the buildings from the street. All of these completed and ongoing capital projects have consistently incorporated sustainable landscaping and minimized paved surfaces in their site design plans.

The University also celebrates its campus tree canopy. UMass Lowell was the first college in New England to be named an official Tree Campus USA, designated by the Nebraska-based Arbor Day Foundation in 2011. The University continues to receive this recognition annually, reflecting its detailed inventory, maintenance, and management of the trees on campus. Every year, the University plants between twelve to twenty additional trees to enhance the campus and contribute to reducing GHG emissions. The University is also pursuing a voluntary Level I Arboretum Accreditation from ArbNet, which advances the planting, study, and conservation of trees.

Table 1 and Table 2 show the projected and actual proportions of pervious and impervious surfaces on the University campuses in 2022. The deviation between the projected and actual Green Space is almost entirely due to more accurate mapping of the boundaries of pervious and impervious spaces on campus. The increase in the impervious area on East Campus is primarily due to the acquisition of the previously developed Perkins Properties (River Hawk Village) and the largely impervious Hall Street Garage and associated surface parking lots. All of this impervious area predated the university's ownership. The increase in impervious surfaces was balanced by the addition of Campus Recreation Complex fields on East Campus, North Campus Quad, and the landscaped open space around Cumnock Hall. Figure 5 through Figure 8 illustrate the locations and extent of pervious and impervious areas across the three campuses as of 2016.

**Table 1. Mass Lowell Pervious and Impervious Surfaces, 2021, as Projected in the 2016-2021 SDP Update, in acres**

	North Campus <sup>(1)</sup>	South Campus <sup>(2)</sup>	East Campus <sup>(3)</sup>	University Total
Roof Areas	8.6	6.71	13.09	28.41
Other PavAreas	15.38	16.69	19.93	52.00
<b>Total Impevious <sup>(4)</sup></b>	<b>23.98</b>	<b>23.4</b>	<b>33.02</b>	<b>80.41</b>
<b>Total Gree Space <sup>(5)</sup></b>	<b>18.89</b>	<b>19.07</b>	<b>21.02</b>	<b>58.98</b>
<b>Total Area</b>	<b>42.87</b>	<b>42.47</b>	<b>54.04</b>	<b>139.39</b>
Pervious %	44.1%	44.9%	38.9%	42.3%

Does not include developed properties and spaces.

(1) North Cam includes 11.0 acres of undeveloped Merrimack River frontage.

(2) South Campus includes the Bellegarde Boathouse.

(3) East Campus includes University Crossing and the I Conference Center.

(4) Sum may equal the total due to rounding errors.

(5) Pervious areas were classified as Green Space in the 2021 SDP.

**Table 2. Mass Lowell Pervious and Impervious Surfaces, FY2022 Actual, in acres**

	North Campus <sup>(1)</sup>	South Campus <sup>(2)</sup>	East Campus <sup>(3)</sup>	University Total
Roof Areas	8.41	6.45	12.99	27.86
Other PavAreas	15.46	17.34	21.41	54.21
<b>Total Impevious <sup>(4)</sup></b>	<b>23.88</b>	<b>23.79</b>	<b>34.40</b>	<b>82.07</b>
<b>Total Gree Space <sup>(5)</sup></b>	<b>18.59</b>	<b>18.11</b>	<b>21.33</b>	<b>58.03</b>
<b>Total Area</b>	<b>42.47</b>	<b>41.90</b>	<b>55.73</b>	<b>140.09</b>
Pervious %	43.8%	43.2%	38.3%	41.4%

Does not include developed properties and spaces.

(1) North Cam includes 11.0 acres of undeveloped Merrimack River frontage.

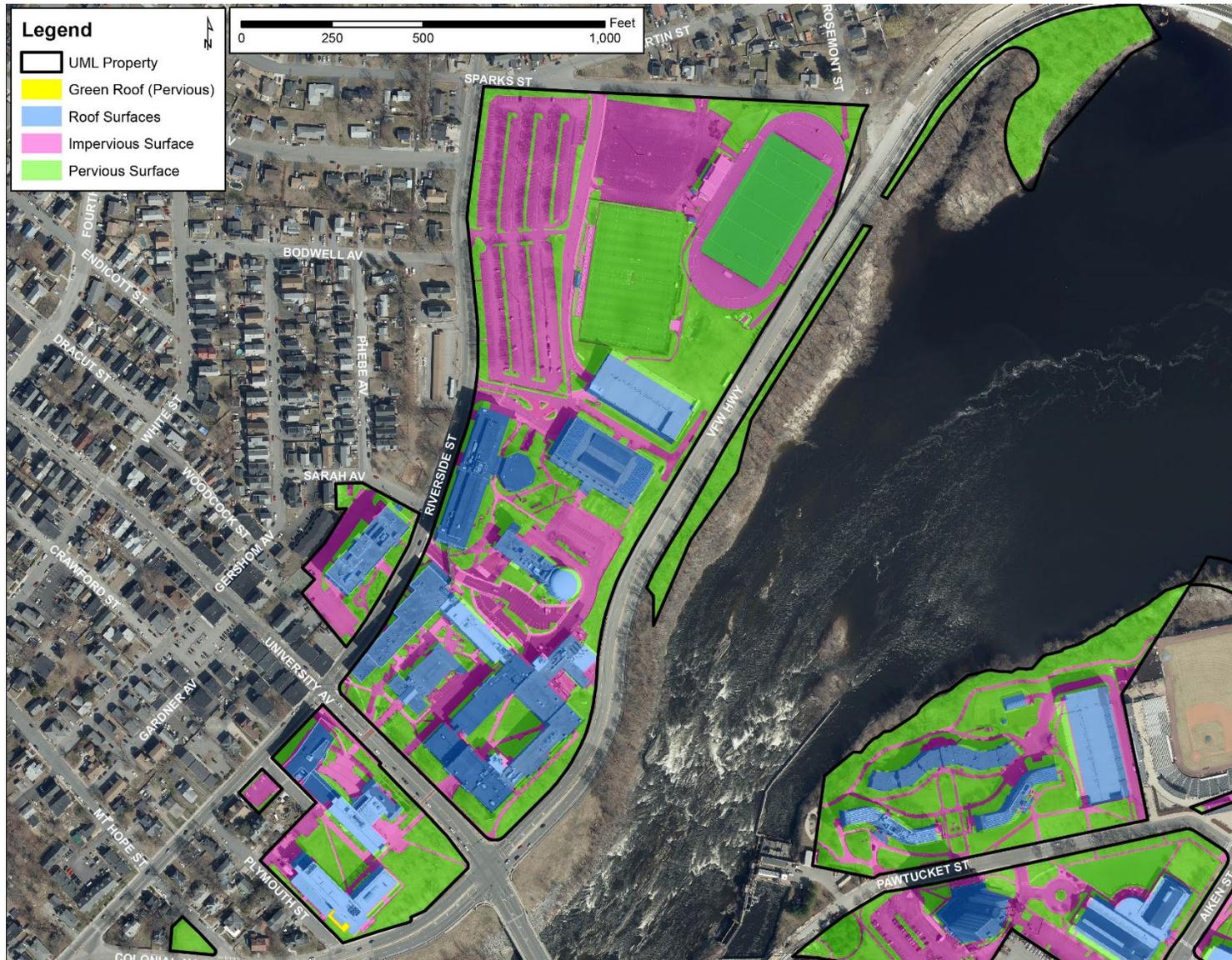
(2) South Campus includes the Bellegarde Boathouse.

(3) East Campus includes University Crossing and the I Conference Center.

(4) Sum may equal the total due to rounding errors.

(5) Pervious areas were classified as Green Space in the 2021 SDP.

**Figure 5. North Campus Pervious and Impervious Surfaces, 2022**



**Figure 6. South Campus Pervious and Impervious Surfaces, 2022**

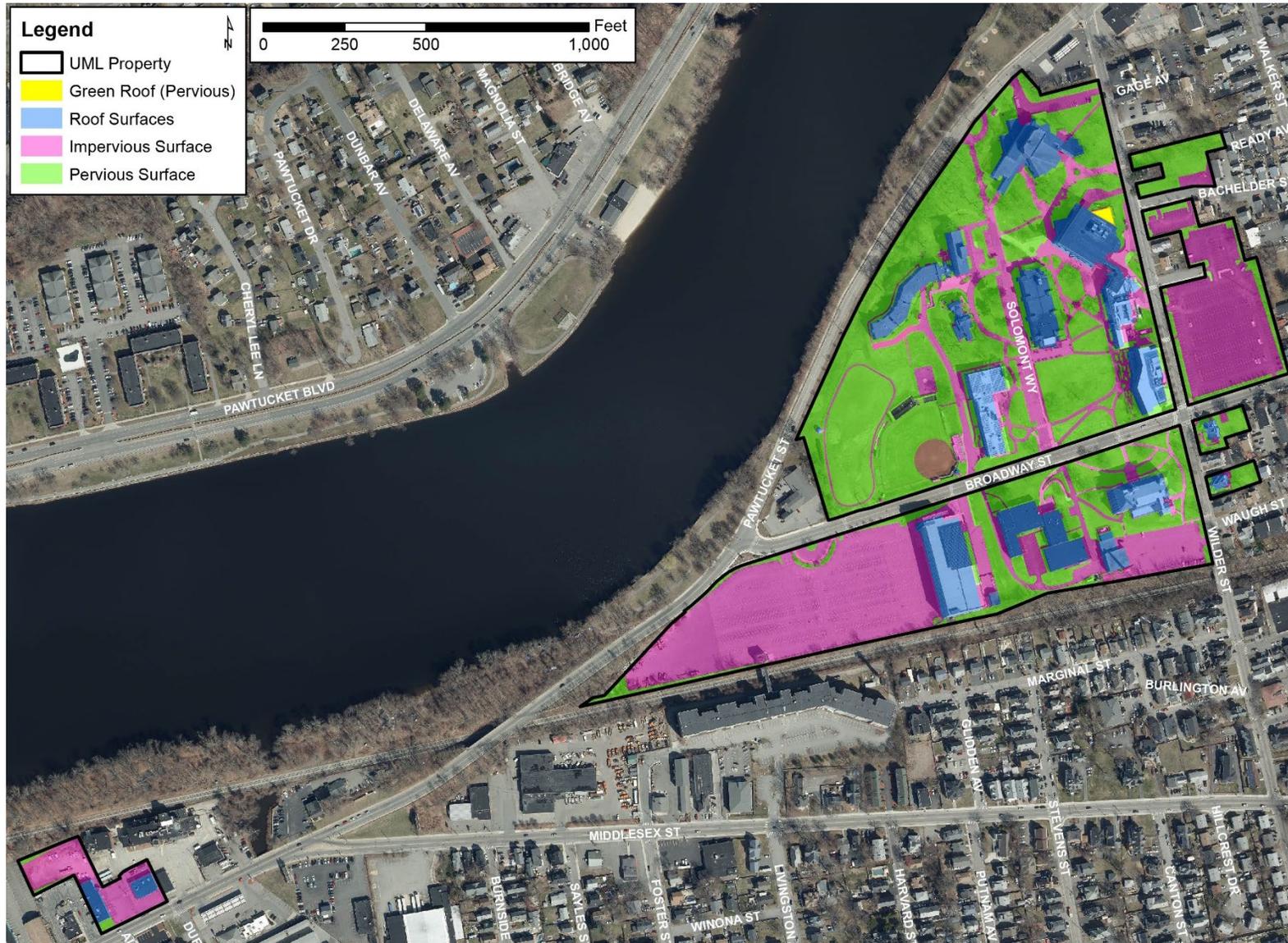
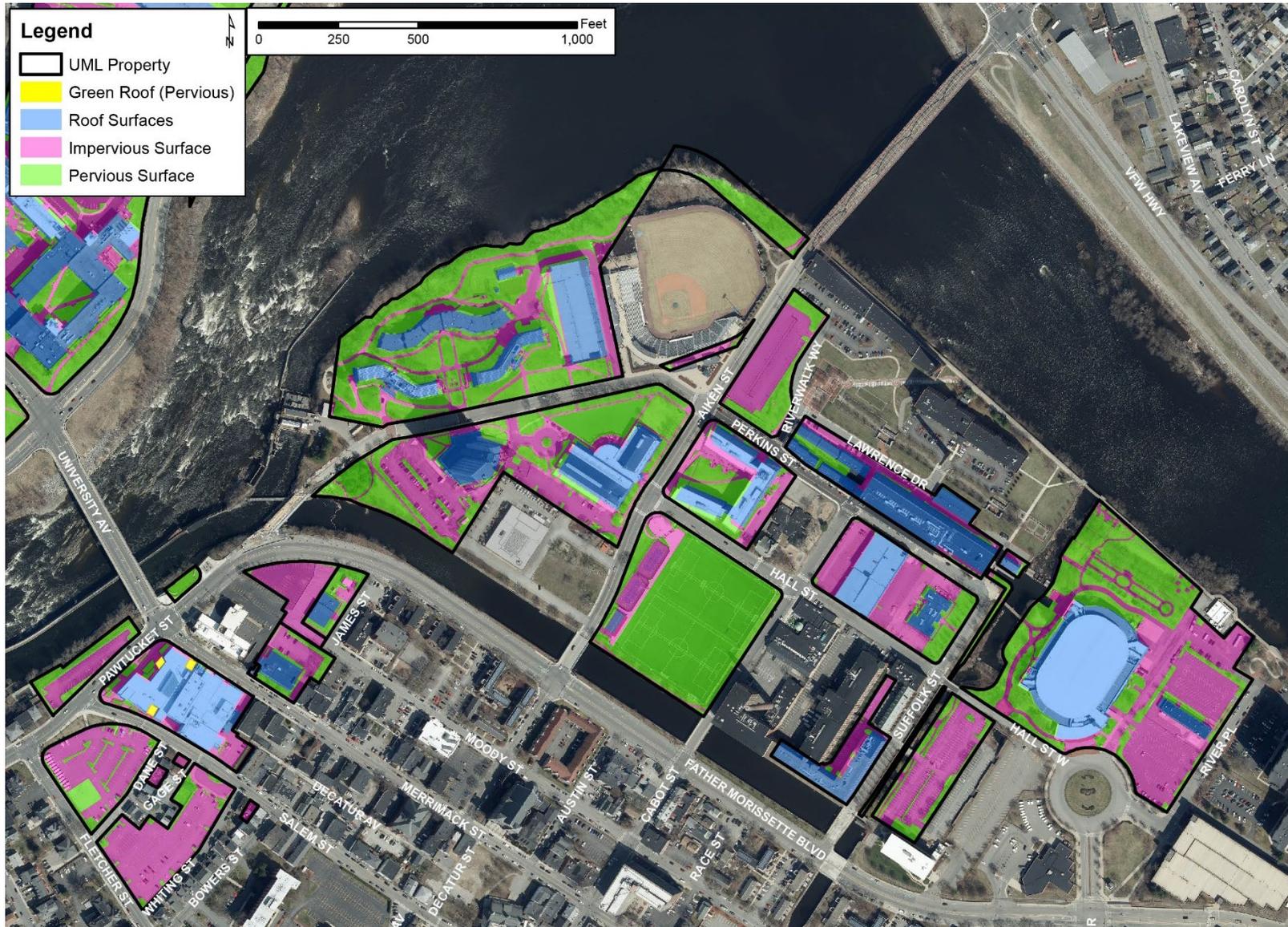


Figure 7. East Campus Pervious and Impervious Surfaces, 2022





## 2.2 CAMPUS INTERIOR SPACES

UMass Lowell expanded its campus building space by about 525,000 gross square feet over the past five years. Approximately 33% of the campus square footage is devoted to academic and research space. Student support spaces (residential and athletic/recreational), administrative, campus, facilities support, and parking spaces make up the rest.

As part of its space planning effort, the University actively tracks all space usage and demand across the campuses via a Facilities Information System (FIS). The FIS maintains an active inventory of every individual room on campus by a unique space ID, space use, and assignment. This information feeds into the operations and services work order systems to keep track of work items, the project management database to keep track of ongoing projects, and the space planning and programming model for space usage analysis and demand projection.

Table 3 summarizes the existing building use of all spaces across the University, complemented by graphic illustration in Figure 9. Figure 10 through Figure 13 present a more detailed view of each campus of UMass Lowell with the location and primary use of each building and ongoing project.

**Table 3. Existing Building Use at UMass Lowell, FY2022**

Building Use	North	South	East	UMass Lowell Total
	Campus	Campus <sup>(2)</sup>	Campus <sup>(3)</sup>	
Academic	238,412	169,821	19,465	698
Research	220,039	9,602	35,422	265,063
Residential	-	65,228	569,925	153
Student Life	30,459	32,421	93,827	156,707
Athletic/Recreational	47,908	18,594	116,194	696
Administrative	159,770	115,583	188,138	463,491
Support	17,818	19,591	63,201	610
Parking	169,793	207,722	267,030	644,545
Other <sup>(1)</sup>	12,703	7,510	20,833	046
<b>Total Net Assignable Squart (NASF)</b>	<b>896,902</b>	<b>646,072</b>	<b>1,374,035</b>	<b>2,917,009</b>
<b>Gross Square Feet (SF)</b>	<b>1,397,512</b>	<b>985,405</b>	<b>2,058,997</b>	<b>4,441,914</b>

Does not include the followi:

- Leased buildings

(1) "Other" consists of currenty unassigned spaces in 817 Merimack , and current ration projects

(2) South Campus includes Uass Lowell Bellegarde Boathoue

(3) East Campus includes Uversity Crossing and the UMassell Inn & Conferene Center

**Figure 9. Existing Building Use at UMass Lowell, FY2022**

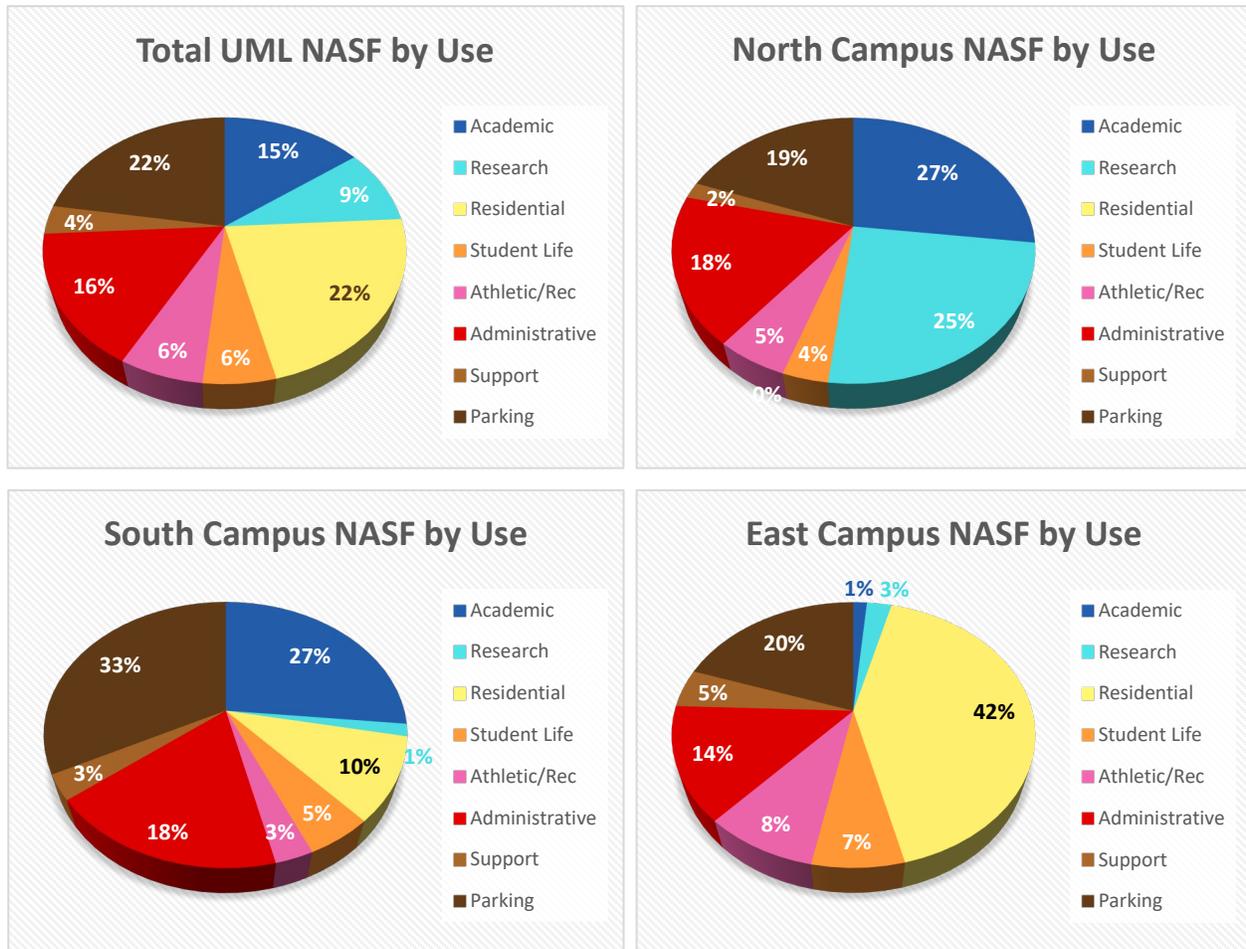


Figure 10. North Campus Building Use, 2022



**NORTH CAMPUS** (18 buildings)

#	Building Name	Year Built
1	Alumni Hall	1950
2	Ball Hall	1958
3	Costello Athletic Center	1967
4	Cumnock Hall	1954
5	Falmouth Hall	1907
6	Grounds Maintenance Garage	1966
7	Shah Hall (previously Kitson Hall)	1902
8	Lydon Library	1969
9	North Campus Garage	2012
10	North Power Plant	1910
11	Olney Hall	1974
12	Olsen Hall	1974
13	Dandeneau Hall (previously Pasteur Hall)	1938
14	Perry Hall	1950
15	Pinanski Center	1968
16	Saab Emerging Technologies & Innovation Center (ETIC)	2012
17	Southwick Hall	1902
18	Pulichino Tong Business Center (PTB)	2017

**Exterior Spaces**

- A** Cumnock Lawn
- B** Cushing Field Complex
- C** Pinanski Quad
- D** Riverside Parking Lot
- E** Saab ETIC Quad
- F** Saab ETIC Riverview Terrace
- G** North Quad / Southwick Courtyard
- H** Perry Plaza



**SOUTH CAMPUS** (18 buildings)

#	Building Name	Year Built
1	150 Wilder St.	1905
2	820 Broadway St.	1890
3	Allen House	1854
4	Coburn Hall	1894
5	Concordia Hall	1966
6	Dugan Hall	1962
7	Durgin Hall	1976
8	Donna M. Manning Health & Social Sciences Building (HSSB)	2013
9	Mahoney Hall	1960
10	McGauvran Student Union	1974
11	O'Leary Library	1974
12	Sheehy Hall	1989
13	South Campus Garage	2013
14	South Power Plant	1966
15	Weed Hall	1972
16	South Maintenance Facility (previously 1485 Middlesex St.)	1969
17	Office Services & Central Receiving (previously 1499 Middlesex St.)	1977
18	Richard L. Schueller Observatory	2019

**Exterior Spaces**

- A Broadway Riverview Lot
- B Riverview Field
- C South Campus Quad / Mall
- D Wilder Staff Lot

Figure 12. East Campus Building Use, 2022



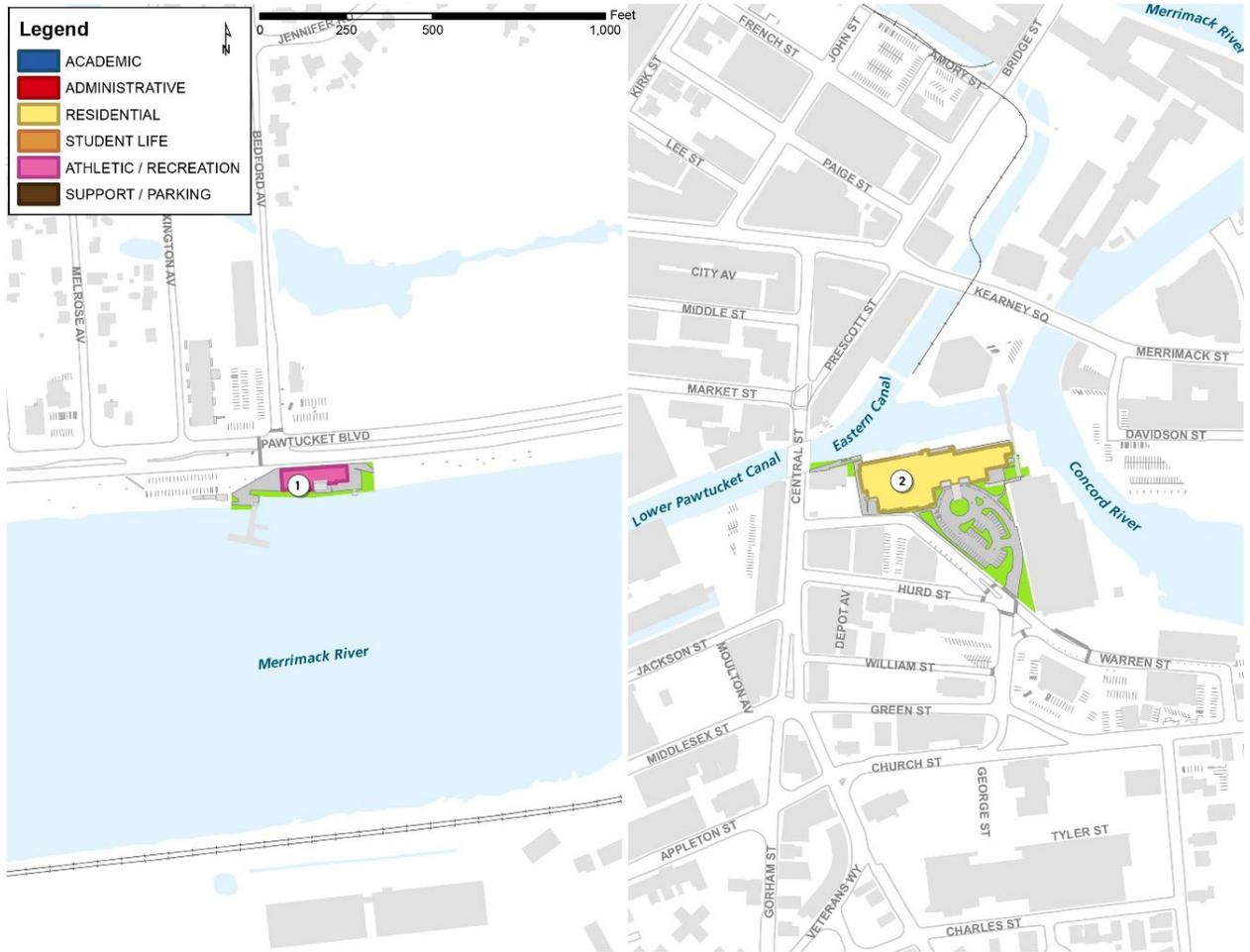
**EAST CAMPUS** (20 buildings)

#	Building Name	Year Built
1	Ames Textile	1968
2	Bourgeois Hall	1967
3	Campus Recreation Center (CRC)	2001
4	Donahue Hall	1989
5	East Campus Garage	2007
6	Fox Hall	1973
7	Leitch Hall	1967
8	Tsongas Center	1997
9	Tsongas Garage	1968
10	University Crossing	1959
11	East Maintenance Facility (8 James St. / UC Building 6)	1985
12	University Suites	2013
13	Wannalancit Mills	1862
14	River Hawk Village	1909
15	River Hawk Village Townhouses	1880
16	45 Lawrence Drive	1880
17	Charles Hoff Alumni Scholarship Center	1900
18	Rist Urban Agriculture Farm	2017
19	Recreation Complex	2017
20	Hall Street Parking Garage	2009

**Exterior Spaces**

- A Fletcher Lot
- B Perkins Street Lot
- C Rec Center Quad
- D Riverwalk (City of Lowell)
- E Salem Lot
- F Tsongas North Lawn
- G Tsongas West Lawn
- H Northern Canal Overlook
- J Campus Recreation Complex

**Figure 13. ICC and Boathouse Building Use, 2022**



**BELLEGARDE BOATHOUSE & INN AND CONFERENCE CENTER (2 buildings)**

#	Building Name	Year Built
1	UMass Lowell Bellegarde Boathouse	1984
2	UMass Lowell Inn & Conference Center (ICC)	1984

## 2.3 TRANSPORTATION CONTEXT

The *2011-2016 SDP* emphasized UMass Lowell's goal to create "one campus/one community" and the challenges to achieving that goal at the outset of the five-year period. The 2016-2021 SDP Update continued this focus. Over the past five years, the University has continued to improve the connections among the three campuses, addressed student, faculty, and staff transportation needs, and promoted more sustainable modes of transportation. More significantly, the COVID pandemic immediately accelerated dramatic increases in remote work by campus employees and online course delivery that have significantly reduced the daily vehicle trips to and from campus as well as intercampus travel. In addition, COVID and demographic factors reversed the enrollment growth trend and have substantially reduced projections for additional enrollment growth, further reducing the traffic generation and parking demand.

### 2.3.1 Public Transit

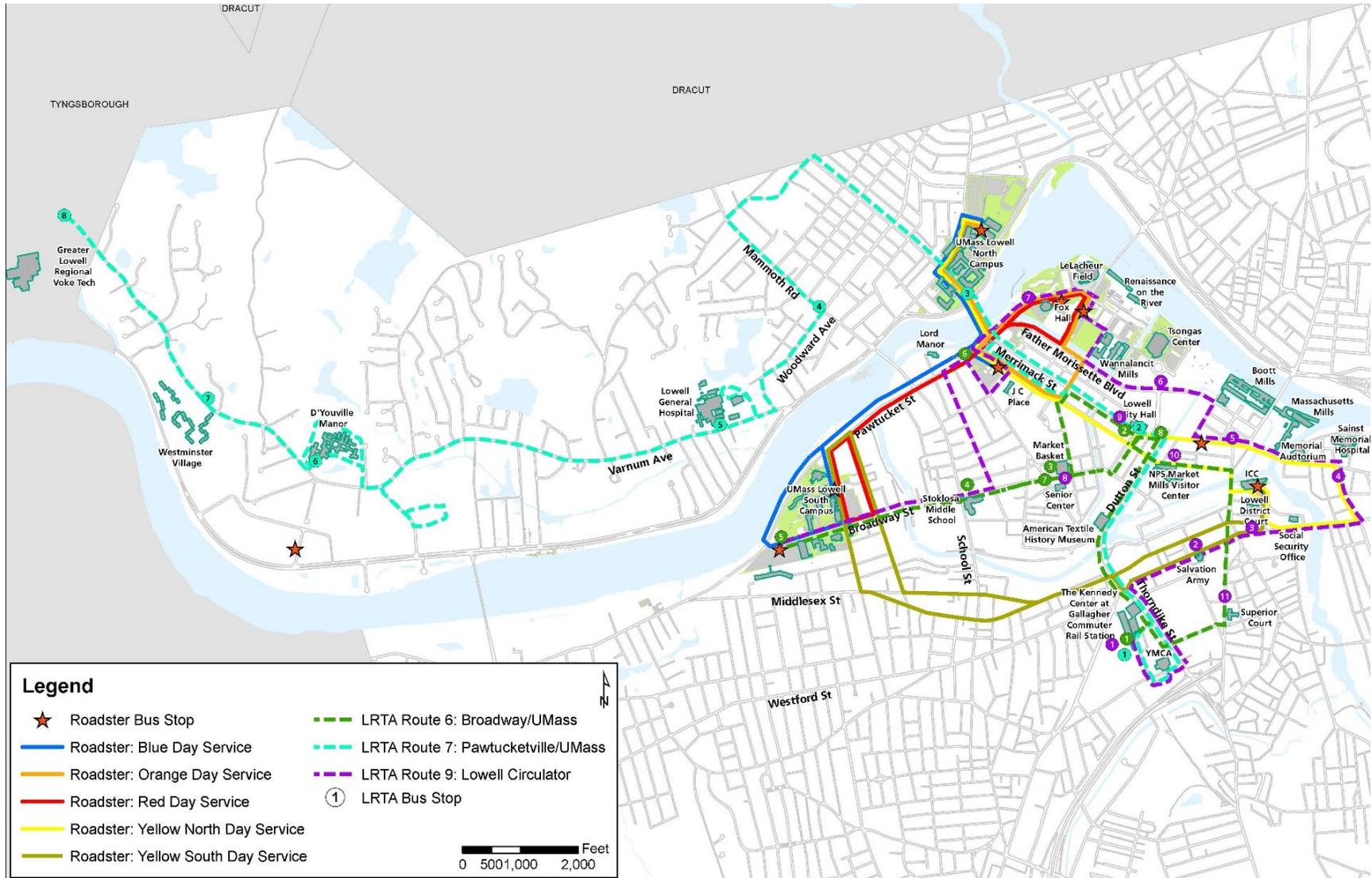
UMass Lowell operates a day, evening, and weekend shuttle system (UMass Lowell Riverhawk Roadster), which services campus and community destinations and works with the Lowell Regional Transit Authority (LRTA) to extend public transit access to its regional bus service and the MBTA commuter rail network at the Charles A. Gallagher Transit Terminal. The University and the LRTA are actively engaged in ongoing dialogue to enhance and strengthen opportunities for collaboration.

The University has also been actively improving the system efficiency, conducting usage tracking and customer surveys, and adjusting bus frequency and routes accordingly. In the last five years, the University consolidated its service from seven routes to five routes. The University eliminated Green North, Green South, and Purple routes and introduced a new Orange route between the East Campus and North Campus. The University collaborated with LRTA in this consolidation by providing free transit to the University affiliates on all the LRTA routes.

Prior to COVID-19, ridership for the Roadster was averaging 5,000 on typical school days and reaching as high as 6,400 on peak class days. Since the University resumed in-person classes post-COVID, the ridership has averaged 4,400 on a typical school day, largely proportional to reductions in in-person on-campus course enrollment. UMass Lowell will continue to monitor ridership over the next five years and adjust schedules as may be required.

With the completion of the Broadway Street Bridge and the Pawtucket Street Bridges over the Pawtucket Canal and Northern Canal, transit access has greatly improved between the South Campus and the North and East Campus. A partnership between the University and the City of Lowell helped secure a Federal TIGER grant and other funding to repair and replace these deteriorating bridges. More details can be found in Section 4.4, under Lowell Canal Bridges. Figure 14 shows the 2022 Roadster bus routes and for LRTA Route # 6, 7, and 9 – routes that service UMass Lowell.

**Figure 14. LRTA Bus Routes and UMass Lowell Roadster Shuttle Routes, 2022**



### 2.3.2 Parking

UMass Lowell's parking pressures have eased considerably since 2016. Reduced student enrollment and on-campus housing demand increased remote work, and online course delivery have reduced parking demand, but some parking lots around UMass Lowell are still full during peak periods. The combination of the Hall Street garage acquisition, termination of parking leases, transportation demand management programs, sustainable transportation facility improvements, and parking decal price increases have also helped balance parking supply and demand.

#### **Parking Supply**

Over the past five years, the University has balanced its parking supply on different campuses. The overall parking inventory is consistent with the 2021 projections provided in the 2016-2021 SDP Update.

Between 2016 - 2021, the University completed the following improvements to its parking inventory.

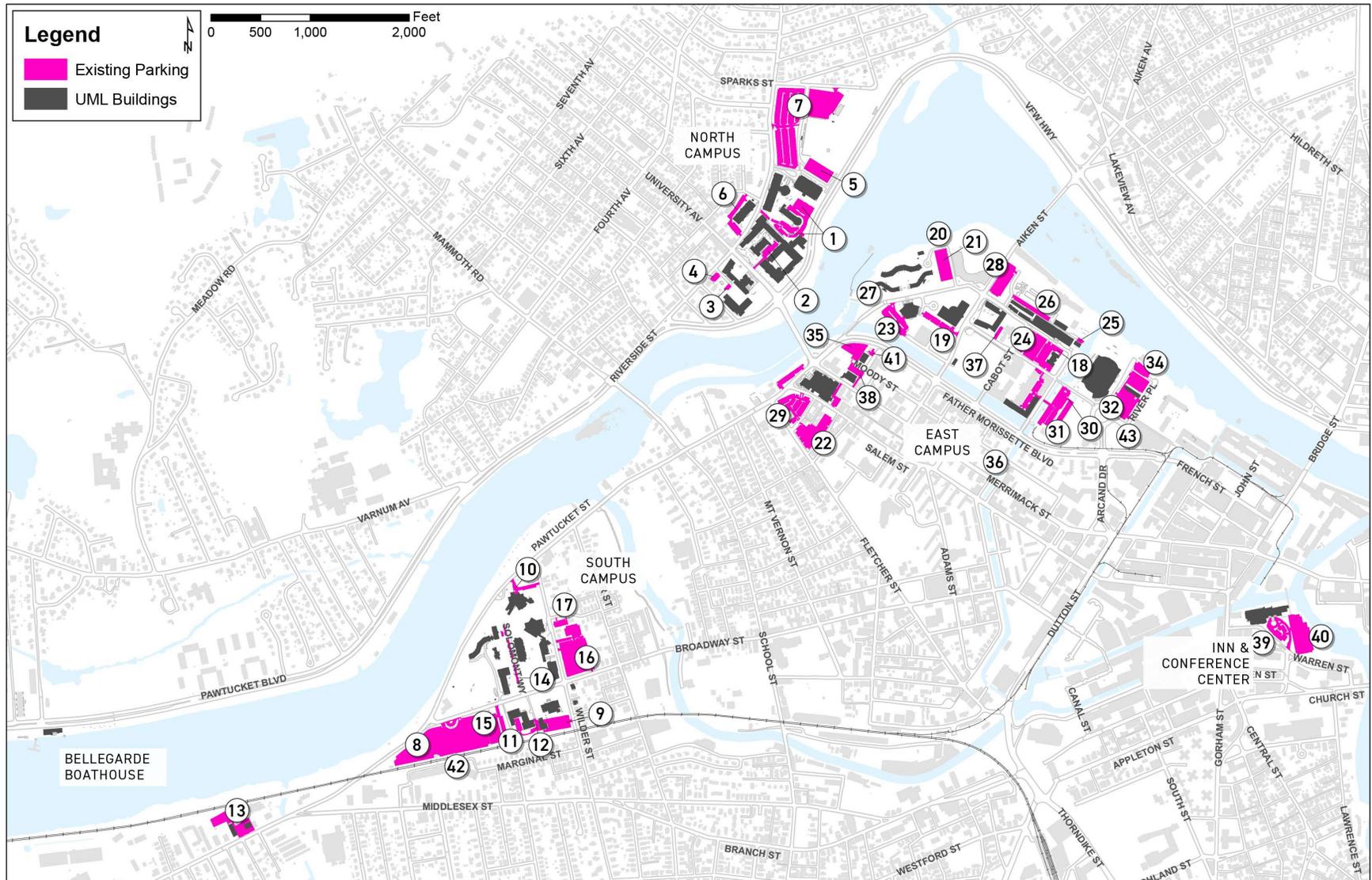
1. **Hall Street Garage and Lawrence Drive in East Campus:** UMass Lowell added approximately 411 spaces with the Hall Street Garage and Lawrence Drive parking spaces as part of the acquisition of Perkins Properties.
2. **Costello / Pinanski Lot in North Campus:** Completed physical improvements to the Costello/Pinanski lot, which yielded 17 additional spaces.
3. **Cumnock Lot in North Campus:** Partial conversion to the landscaped open space resulted in the loss of 48 spaces
4. **Middlesex – Central Services in South Campus:** UMass Lowell added 16 spaces with the acquisition of the properties on the 1485 and 1499 Middlesex Street

Modifications to parking lots at Durgin, Coburn, and Wilder in South Campus, Merrimack, Tsongas, and Fox in East Campus, and Riverside Lot A & B in North Campus result in minor adjustments to the parking inventory.

In addition to the above improvements, the University terminated its parking leases at East Meadow Lane in North Campus (55 Spaces) and Ayotte Garage in East Campus (590 Spaces) to balance its inventory. UMass Lowell has a total of 6,716 parking spaces as of 2022. The University also continues to lease 280 parking spaces from private parties and the City of Lowell.

Figure 15 and Table 4 detail the location and number of parking spaces in every University-owned parking lot or garage in FY2022, with a comparison to the projection in the *2016-2021 SDP* and the future projection for FY2027. Total parking is about 526 spaces fewer than projected for 2022.

Figure 15. UMass Lowell Parking Lots and Garages, 2022



Two activities are responsible for nearly all of the projected change in parking inventory between 2022 and 2027. First, in July 2022, the university acquired property located at 817 Merrimack Street and 680 Father Morrisette Boulevard, which contained 115 existing parking spaces, 55 of which the university leased from the prior owners. Because this acquisition occurred only two weeks after the effective date of “current” activities for this filing, it is included in the projection and the 2022 actual count. Second, the university is currently negotiating with a private developer to contract for a public private partnership that will redevelop several existing parking lots on the East Campus. Because details related to which lots will be developed in what sequence, how parking will be replicated and new demand accounted for, and the fact that the project itself will separately submit permitting application materials, the potentially impacted lots are noted in the table below but are not adjusted in the 2027 projections.

**Table 4. UMass Lowell Parking Supply, 2022**

<b>2022-2027 University-Owned Parking</b>					
#	Lot Name	2021 Projected	2022 Actual	2027 Projected	Notes
<b>North Campus</b>		<b>1,740</b>	<b>1,731</b>	<b>1,731</b>	
1	Costello / Pinanski	157	143	143	Redesign completed
2	Cumnock	12	28	28	Partial conversion into courtyard completed
3	Saab ETIC	4	4	4	Handicapped spaces
4	Standish Visitor	20	17	17	Conversion from undeveloped property completed
5	North Parking Garage	642	642	642	
6	Olsen	67	67	67	
7	Riverside Lots A & B	838	830	830	Redesigned completed
	Southwick	0	0	0	Being converted into a courtyard
<b>South Campus</b>		<b>2,385</b>	<b>2,352</b>	<b>2,352</b>	
8	Broadway	949	949	949	
9	Coburn	69	77	77	Redesign completed
10	Durgin	25	25	25	
11	Mahoney Lower	12	12	12	
12	Mahoney Upper	32	32	32	
13	Middlesex – Central Services	57	16	16	Excludes the Gravel Yard
14	Solomont	31	31	31	
15	South Parking Garage	765	765	765	
16	Wilder Faculty/Staff	411	411	411	
17	Wilder Visitor	34	34	34	
<b>East Campus</b>		<b>2,155</b>	<b>2,262</b>	<b>2,262</b>	
18	Ames	51	42	42	Anticipated redevelopment as a public-private partnership
19	Campus Recreation	58	58	58	
20	East Courtyard	49	49	49	
21	East Parking Garage	630	630	630	
22	Fletcher Lot	184	184	184	
23	Fox	90	93	93	
24	Hall Street Garage	369	369	369	
25	Hoff Alumni Center	6	6	6	
26	Lawrence Drive	42	42	42	

27	Pawtucket Visitor	52	52	52	
28	Perkins St	141	141	141	Anticipated redevelopment as a public-private partnership
29	Salem Lot	132	132	132	
30	Tremont Preferred	71	71	71	
31	Tremont Visitor	17	17	17	
32	Tsongas Lot B	130	130	130	Anticipated redevelopment as a public-private partnership
33	Tsongas Lot C	85	85	85	Anticipated redevelopment as a public-private partnership
34	Tsongas Lot D	24	22	22	Anticipated redevelopment as a public-private partnership
35	680 Father Morissette Blvd (GPS Lot)	0	79	79	This existing parking lot was acquired by the University in 2022.
36	Decatur Lot	19	19	19	The existing lot was inadvertently left out in the 2016-2021 SDP
37	University Suites	5	5	5	The existing lot was inadvertently left out in the 2016-2021 SDP
38	817 Merrimack	0	36	36	Recently acquired building
<b>THE ICC</b>		<b>371</b>	<b>371</b>	<b>371</b>	
39	ICC Surface	51	51	51	
40	ICC Garage	320	320	320	
<b>University Total</b>		<b>6,651</b>	<b>6,716</b>	<b>6,716</b>	

#### 2022-2027 Leased Parking

#	Lot Name	2021 Projected	2022 Actual	2027 Projected	Notes
	East Meadow Lane	55	0	0	
41	839 Merrimack (GPS Lot)	0	54	54	
42	Riverview Suites	156	156	156	Leased
43	Ayotte Garage	600	10	10	
43	Father Morissette Blvd	60	60	60	Leased existing on-street parking from City
<b>Total LEASED</b>		<b>871</b>	<b>280</b>	<b>280</b>	

### Parking Demand

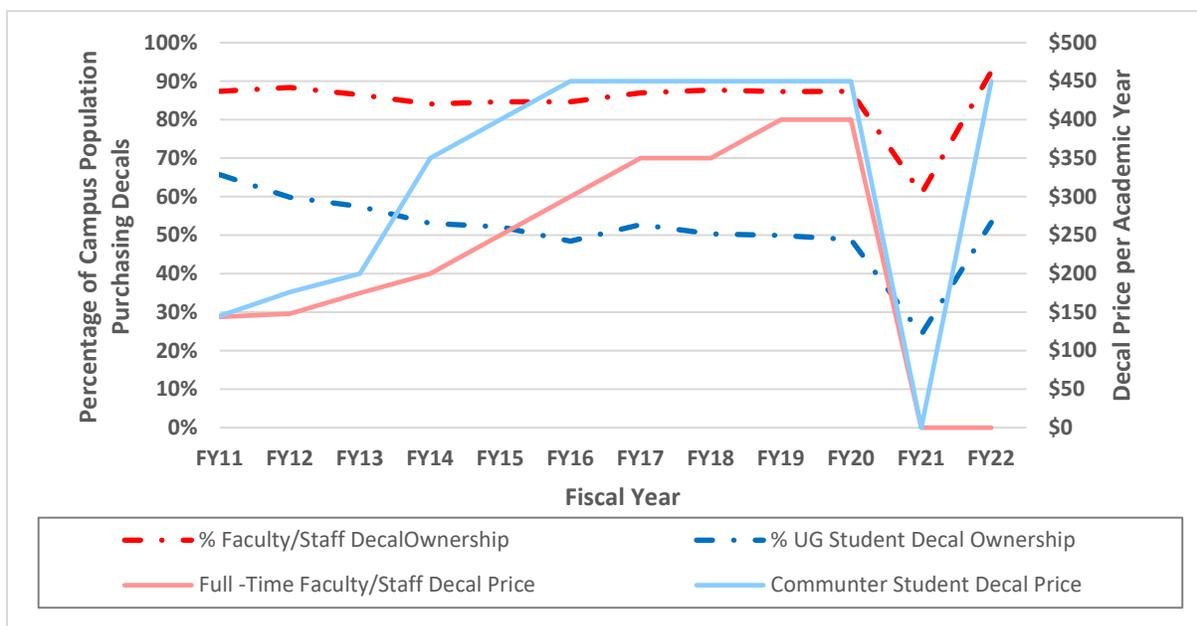
While balancing the need for parking, the University has been putting as much effort into reducing parking demand through a combination of transportation demand management (TDM) programs, sustainable transportation facilities improvements, and parking decal price increases. Section 5.6 has more details on the ongoing TDM programs. Section 2.3.3 has more information on sustainable transportation facilities improvements, and the following paragraphs discuss the impact of COVID, parking decal ownership trends, price increases, and the overall effect of these demand-reducing policies and programs. Table 5 and Figure 16 illustrate the trends.

**Table 5. Mass Lowell Parking Decal Ownership and Prices**

	FY2016		FY2022		% Change 2016-2022 Decal Holders
	Decal Holders	Yearly Decal Pricing	Decal Holders	Yearly Decal Pricing <sup>(4)</sup>	
Full-time Faculty/Staff	1,564		1,639		5%
Part-time Faculty/Staff	578	\$80/150 <sup>(3)</sup>	438	\$130/175 <sup>(5)</sup>	-24%
<b>All Faculty/Staff</b>	<b>2,142</b>		<b>2,077</b>		<b>-3%</b>
Resident Students <sup>(1)</sup>	1,262		1,656		31%
Commuting Students <sup>(2)</sup>	3,800	\$450	4,047	\$450	7%
<b>All Student Holders</b>	<b>5,062</b>		<b>5,703</b>		<b>13%</b>
Vendor/Visit	354		299	-\$396	-16%

- (1) Resident student population is based on beds available on campus
- (2) Commuter student population includes only undergraduate students, as graduate students and continuing education students generally take classes during off-peak times when parking decals are not required. Graduate students with teaching and research assistantships are also eligible to purchase the less expensive staff decals (thus includes part of the faculty/staff decal ownership category)
- (3) FY2016 Yrly decal pricing was \$130 for adjunct faculty and \$175 for part-time staff
- (4) FY2020 decal pricing is used as a proxy for the FY2022 decal prices. In FY2021 and FY2022, the University stopped charging for parking to remove an undue burden on its staff, faculty, and students due to COVID-19. These parking charges are being restored to the pre-pandemic level as the University resumes its in-person instruction. The University anticipates that by FY2023, the parking charges will be restored to their pre-pandemic level.
- (5) FY2020 Yrly decal pricing was \$130 for adjunct faculty and \$175 for part-time staff

**Figure 16. UMass Lowell Parking Decal Ownership and Prices FY2011-FY2022**



Faculty & Staff parking charges were waived during the pandemic but have been restored to pre-pandemic pricing in FY23

Overall, parking decal ownership increased by approximately 7% between FY2016-FY2022. The faculty and staff decal holders have reduced by 3% between FY2016 and FY2022. The resident and the commuting student decal holders increased by 31% and 7%, respectively. The increase in the overall parking decal ownership and the resident student decal holders can be attributed to the addition of 790 student-bed University Suites in October 2015 and the University's acquisition of River Hawk Village and Hall Street Garage with approximately 691 student beds and 369 parking spaces respectively in 2016.

The COVID-19 pandemic forced the UMass Lowell staff and faculty to work remotely. Remote and hybrid work has continued even after the on-campus instruction has resumed. The University is also actively promoting online instruction, particularly for its graduate and post-professional programs in response to student demand. The hybrid work schedule and instruction have reduced the overall demand for parking on the campus, as seen from the almost 7% reduction in the faculty/staff decal holders and a 3% reduction in the number of total parking decal holders between FY2019 - FY2022. These remote activities have also reduced actual parking utilization by individual decal holders.

Although the percentage of decal ownership among staff and faculty is higher than it was in 2016, this is mainly due to a 40% reduction in the number of part-time faculty and staff. The decal prices have remained constant over the last five years for resident and commuter students to minimize the cost burden on students and their families.

The University expects to maintain and enhance its sustainable transportation policies and programs, which have positively impacted parking demand and traffic generation over the past decade. Section 5.6 discusses these efforts in the context of the next five years.

### **2.3.3 Sustainable Transportation**

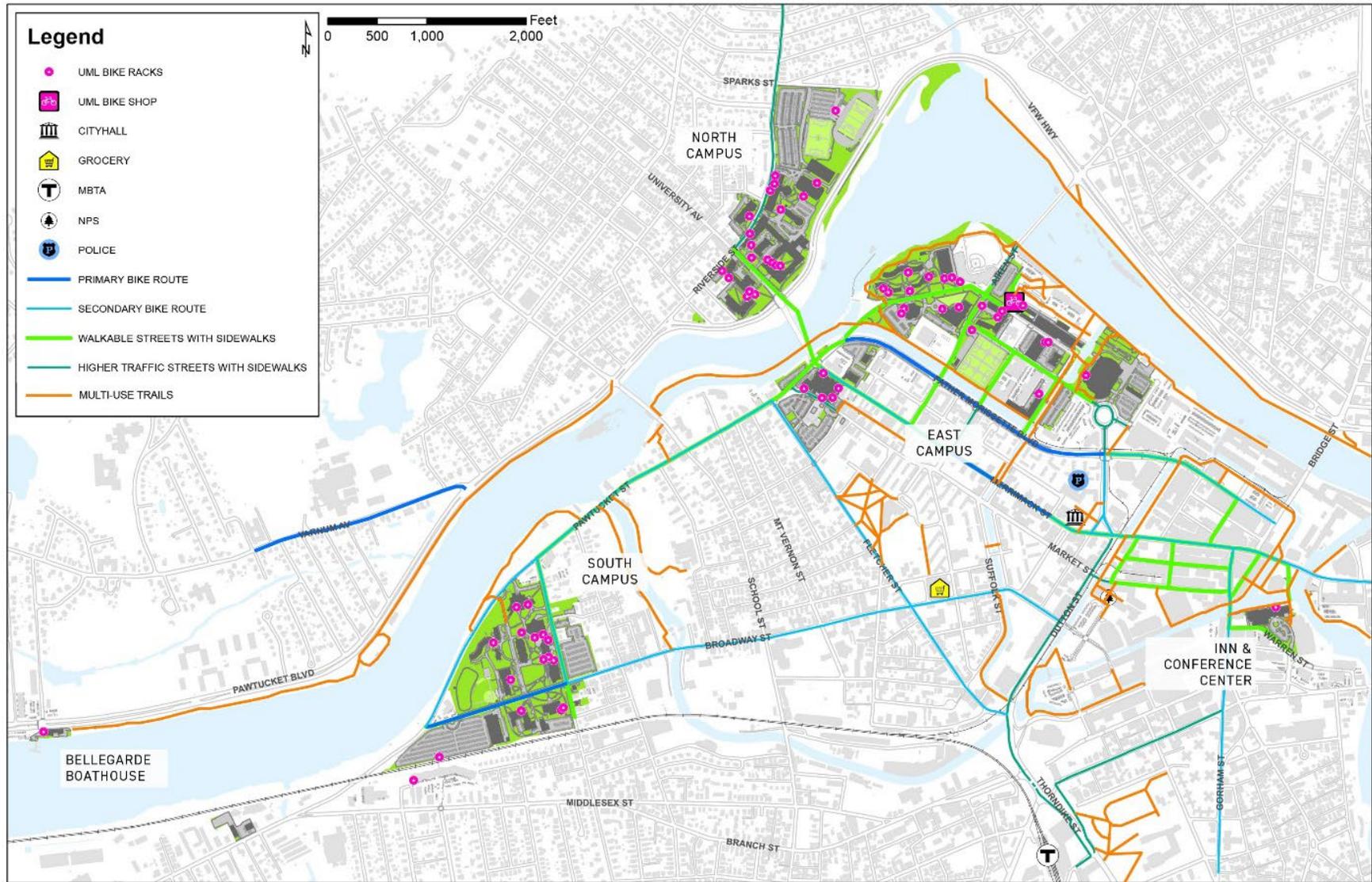
Lowell, with its industrial heritage, offers very walkable, as well as attractive, streetscapes. Besides improving public transit service and relieving parking conditions on campus, the University promotes bicycling and walking as a sustainable and healthy way to travel between the campuses and other local destinations. Working with the City of Lowell and other partners, the University continues to improve bike and pedestrian access to and among the three campuses. Furthermore, the University offers both bike-share and car-share (via Zipcar) services to students, faculty, and staff to reduce automobile use and parking demand.

#### **Bike and Pedestrian Routes**

UMass Lowell continues to work with the City of Lowell to improve bicycling and pedestrian connections between the three campuses to promote sustainable and healthy modes of transportation. Figure 17 shows the current bike and pedestrian routes in the vicinity of the University.

A system of on-street bike lanes, shared bike routes, and off-street multi-use trails link the three campuses, as well as Downtown Lowell, the ICC, and the Kennedy Bus Transfer Center and MBTA Lowell Commuter Rail Station at the Gallagher Transit Terminal. During the past five years, the City of Lowell has improved bicycling facilities, installing newly dedicated and shared bike lanes on the streets across the City and around the campuses. For pedestrians, most of the streets in the City are equipped with sidewalks on both sides, and intersection traffic controls are continuously improving.

Figure 17. Bike and Pedestrian Routes in the Vicinity of UMass Lowell, 202



The recently completed City of Lowell Complete Streets Plan identifies the Pawtucket Street Corridor, which connects East and North Campus to South Campus, as a priority project. In addition, Merrimack Street Corridor from Pawtucket Street to Dutton Street is identified as a priority project with bicycle, pedestrian, and landscape improvements to connect UMass Lowell to the Downtown. Recent work on the Lord Overpass will add multi-use paths along Thorndike Street, which will improve bicycle connectivity from the North and East Campus to Gallagher Transit Terminal.

While it is still a work in progress, the bike and pedestrian links from East Campus to Downtown Lowell offers multiple routes between destinations. Father Morissette Boulevard and a section of Merrimack Street are equipped with dedicated bike lanes.

The link between the South Campus and the other campuses has improved with the recent completion of the Pawtucket Street Bridges over the Northern and Pawtucket Canals and the Broadway Street Bridge over the Pawtucket Canal. All three bridges contain dedicated pedestrian and bicycle infrastructure, most notably the twelve-foot-wide shared use path on the bridge over the Northern Canal.

In addition, the University is working with the City and MassDOT to reconstruct Pawtucket Street from the East Campus to the South Campus as a complete street with a continuous shared-use path providing enhanced pedestrian and cycling accommodations for students, other campus constituents, and neighborhood residents to travel between campuses without driving. The project will fill in a missing link in the Canalway network between the Northern Canalway's end at School Street and the Pawtucket Canalway in Frances Gate Park. It will also provide improved multi-modal access to the K-8 Bartlett School. The project is listed on the TIP for funding in 2027, has a MassDOT project manager assigned, and is in pre-25% engineering. To the west of the South Campus, the Bellegarde Boathouse is accessible by bicycling and walking via a riverfront multi-use path that begins at the Intersection of Mammoth Road/School Street and Varnum Avenue/Riverside Street.

### **Other Sustainable Transportation Facilities and Programs**

In addition to working with the City of Lowell and other partners to improve bicycling and walking routes on surrounding City streets, the University also invests in sustainable transportation facilities on the campus, including a well-distributed system of bike racks, electric vehicle charging stations, and dedicated parking spaces for carpool vehicles.

#### **Bicycling:**

Between 2016 and 2019, bike usage on the campus increased by 72% based on the bike counts conducted by the University. Due to COVID-19, the University was unable to gather data on the bike counts on the campus during 2020 and 2021. In 2022, bike usage on the campus is resuming with the return to more normal campus operations.

Between 2016 and 2021, the University installed 242 additional bike racks, bringing the total number of bike racks across campuses to 1,026, many of which are now covered. In addition to this 30% increase in total rack spaces, the University also improved 86% of the existing rack spaces to bring them up to campus standards. The University has also integrated all the bicycle rack locations on a University-wide GIS-based online portal to make it easier for the campus community to locate these racks.

The University also operates a campus bike share program called FreeWheelers, which is available to all UMass Lowell students, faculty, and staff members. The University has gathered data for the number of checkouts of FreeWheelers bikes from Spring 2016 onwards. FreeWheelers bike usage has been consistently high from 2016 to 2019, with a decline during the COVID-19 pandemic in 2020 and 2021. The FreeWheelers usage is again ramping up with the resumption of in-person instruction at the University. In the future, the University plans to add additional bicycles and checkout locations for the FreeWheelers at the UMass Lowell Inn and Conference Center.

In 2018, the University also opened an Outdoor Adventure Program and Bike Shop to promote bicycling within the UMass Lowell community. The Bike Shop not only sells and services bicycles to the University community but is also open to Lowell residents. In addition to the Bike Shop, the University has also added five outdoor bicycle repair stands (Fix My Ride) to make it easy for bicycle users to repair and service their bicycles.

The UMass Lowell Bike Shop, in conjunction with the Outdoor Adventure Program, hosts a variety of bike rides as well as instructional programs to promote bicycling and bicycle safety among students, staff, and faculty. Some of these initiatives are listed below:

- Opening Week Bike Rally and Campus Bike Tour
- Open Group Bike Rides! - Slow Roll – Weekly Group Rides
- Bike Maintenance Basics Workshops – Twice a month bike maintenance workshop
- Bike Commute Basics - Twice a month bike commuting/road safety seminar
- Learn to Ride a Bike – Twice a month instructional session to teach biking to first-time bicyclists
- Light Giveaway – Road safety gear giveaway – once or twice a semester

For its efforts, the University was awarded the Bicycle Friendly University Bronze Certification by the League of American Bicyclists in 2015. This certification was upgraded to Silver in 2019 for the University's continued efforts in promoting bicycling. More information about UMass Lowell's efforts to promote bicycling can be found online at <https://www.uml.edu/bike/>

### **Public Transit:**

To promote transit use, the University developed partnerships with the Lowell Regional Transit Authority (LRTA) and Merrimack Valley Regional Transit Authority (MVRTA), offering faculty, staff, and students the ability to ride all LRTA buses and MVRTA Route 1/41 at no cost to the user by simply showing their UMass Lowell UCARD.

UMass Lowell meets with the LRTA team on a regular basis to discuss coordinated improvements to transit options to serve the UMass Lowell and City of Lowell communities. In 2021, meetings with the LRTA covered topics including enhanced marketing and social media outreach, continued opportunities to streamline service on shared routes, and enhanced reporting and data analysis.

### **Carpool, Electric Vehicles, and Electric Charging:**

The University is also incentivizing and promoting the use of electric vehicles and carpooling among the University community. To make carpooling even more appealing, UMass Lowell provides a 50 percent discount to carpoolers for premium parking permits and has 120 carpool-

permit-only parking spaces available on a first-come, first-serve basis. Additionally, registered carpoolers can obtain up to 16 one-day commuter parking permits per semester to accommodate an occasional need to drive alone. This is available for participants without a carpool hangtag. In the last five years, the University added 26 additional electric charging stations and two additional spaces for carpool vehicles.

In addition to providing the trip-reduction incentives required by the Massachusetts Department of Environmental Protection (MassDEP) Rideshare Regulation for a facility with over 1,000 applicable commuters, the following incentives are voluntarily provided by UMass Lowell:

***Telecommuting/Online Learning:***

Following the pandemic when nearly all courses were delivered virtually, the University has significantly increased its online learning offerings, including both credit and non-credit courses. Most professional graduate degree programs now are wholly or mostly offered online. Many large-format undergraduate lecture courses are now offered with asynchronous online options. The University also initiated a work from home program. With the return of in-person instruction, the University has continued to support hybrid work arrangements for those employees whose duties can be successfully completed remotely. The campus expects to make its current temporary hybrid and remote work policy permanent effective January 1, 2023.

***Middlesex 3 Transportation Management Association (TMA):***

UMass Lowell is a member of the Middlesex 3 TMA. The TMA area includes Bedford, Billerica, Burlington, Chelmsford, Lowell, Tewksbury, Tyngsborough, and Westford. Students, faculty, and staff at UMass Lowell can register to utilize commuter services offered through the TMA, such as eCommuter.org, which offers features including ride-matching and emergency ride-home programs that encourage members of the University to pursue more sustainable transportation methods to and from work and school.

***Emergency Ride Home Program:***

To alleviate the fear of being stranded in an emergency, UMass Lowell, through the Middlesex3 TMA, offers its employees who use alternative modes an emergency ride home. The Emergency Ride Home (ERH) program provides transportation by Lyft, taxi, or rental car to those who use an alternative to driving alone in the event of an emergency—usually within 30 minutes of notification. All registered carpoolers, van poolers, transit users, bicyclists, and walkers are eligible for the program. Employees can register online through eCommuter.org and are provided with a program identification card, forms, and instructions for use upon registration.

***Distance Learning:***

UMass Lowell offers over 50 degree and certificate programs online. Blackboard Learn is the web-based course management system used throughout all UMass campuses. It allows instructors to enhance the online learning experience by offering discussions, readings, multimedia materials, course information (such as a syllabus and required textbooks), assignments, and assessments. Online learning enhances UMass Lowell's trip-reduction efforts by enabling the University to substantially reduce trips to and from the campus.

**ZipCar:**

UMass Lowell commuters can sign up for Zipcar at a rate considerably lower than the rate offered to the general public and also receive additional savings on the hourly rates when using Zipcar Monday through Friday. Students, faculty, and staff can join for only \$25 for the first year and pay no application fee, no monthly minimum, and no membership deposit. Free Zipcar memberships are available for resident assistants, orientation leaders, tour guides, and student government to assist in promoting the program. Zipcar's Refer-A-Friend program allows current members to generate free credit, which increases as they refer more new Zipcar members. The university partners with Zipcar to coordinate and promote its presence on campus, encouraging resident students to utilize on-campus Zipcars instead of bringing a personal vehicle. There are currently four Zipcars on campus. Figure 18 through Figure 21 show the locations of these sustainable transportation facilities and programs across UMass Lowell.



Figure 19. South Campus Sustainable Transportation Facilities, 2022

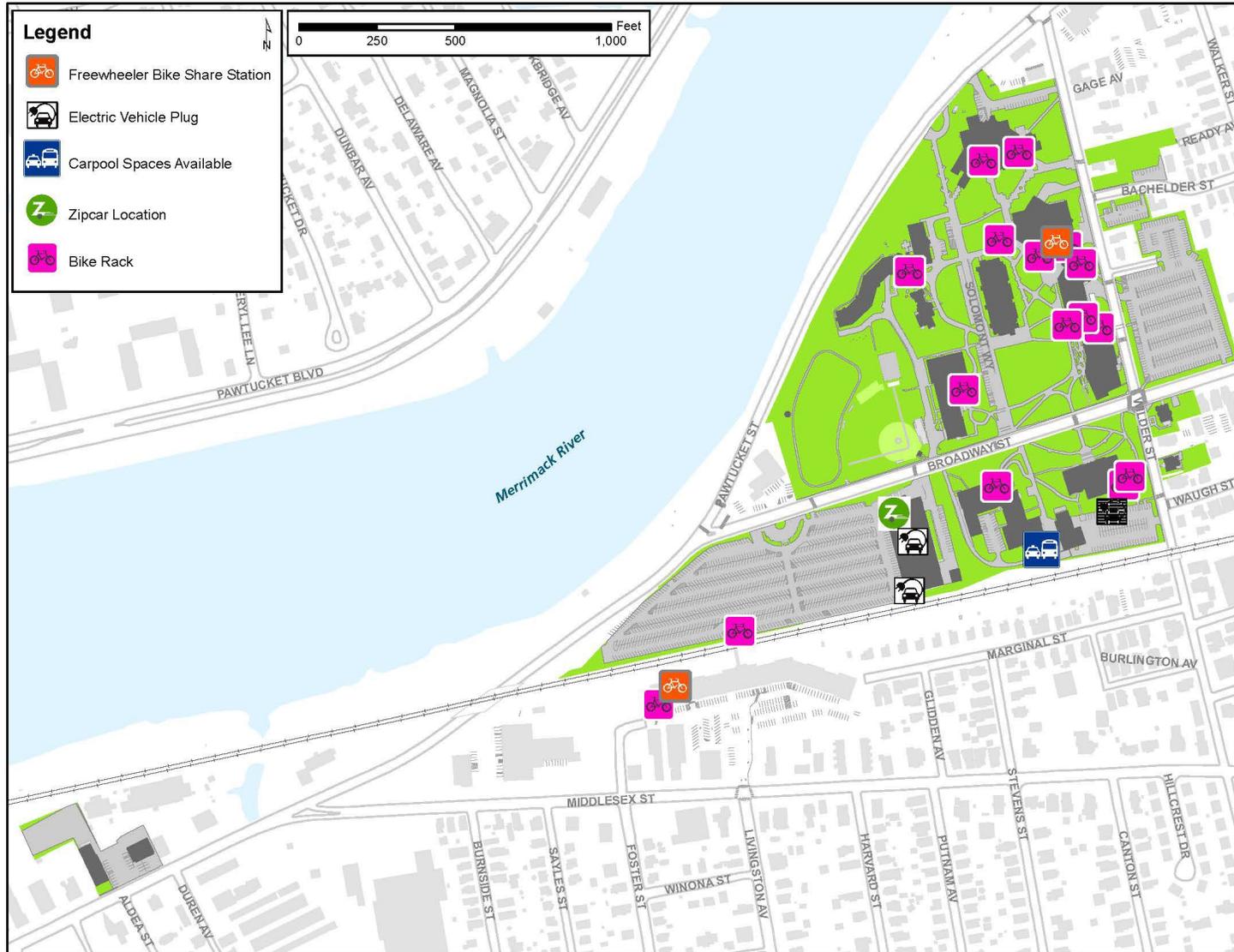
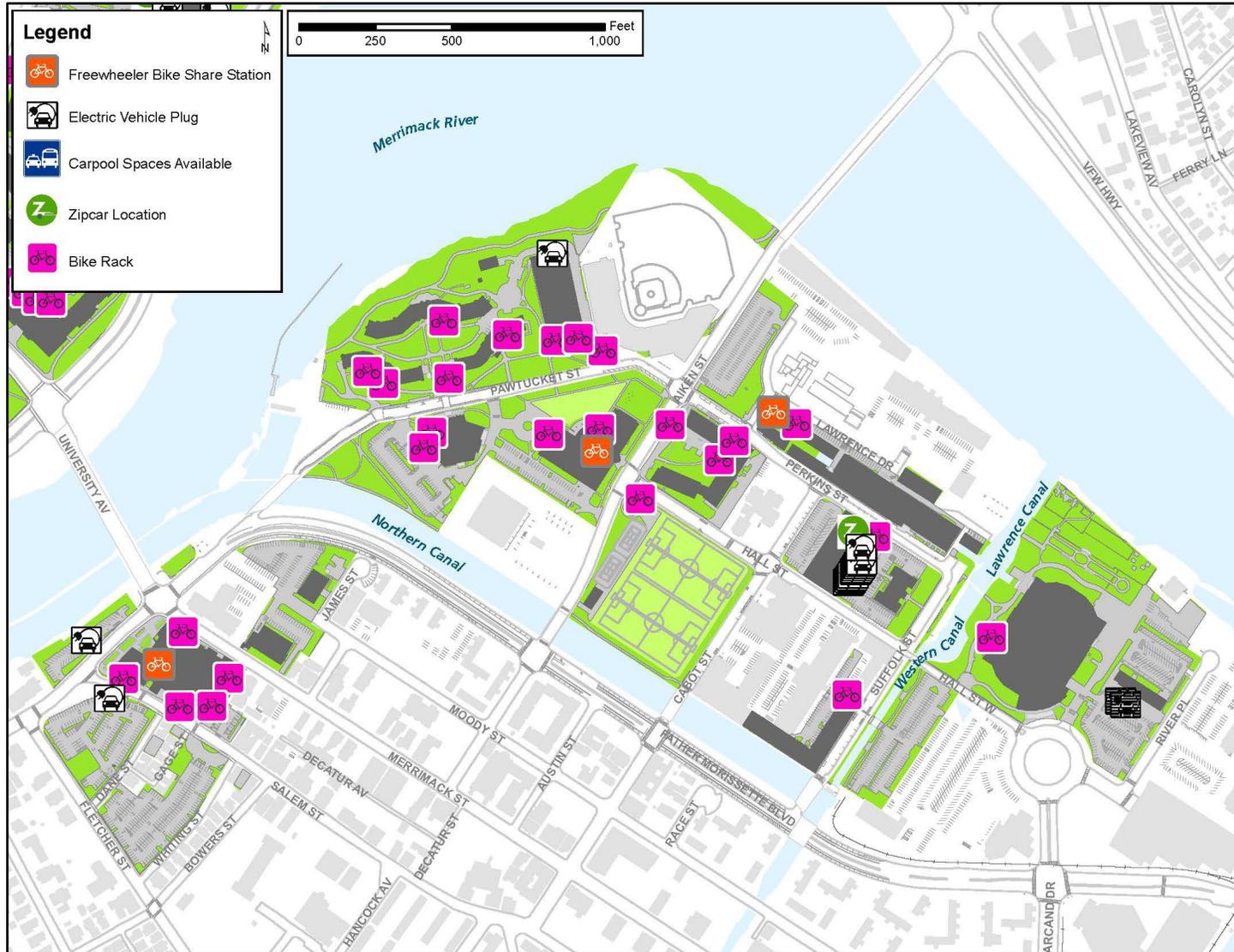
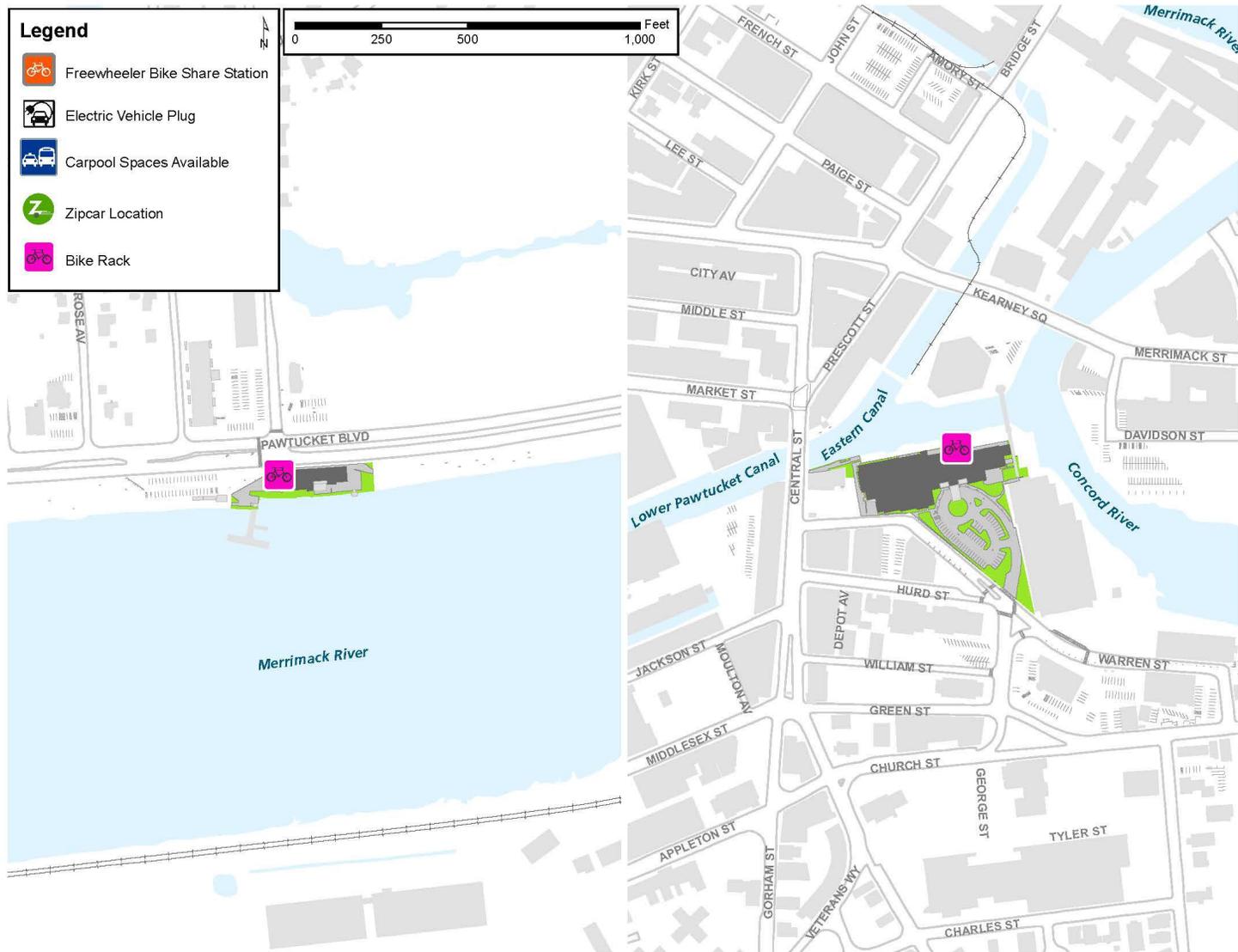


Figure 20. East Campus Sustainable Transportation Facilities, 2022



**Figure 21. ICC and Boathouse Sustainable Transportation Facilities, 2022**



### 2.3.4 Vehicle Trip Generation

Between 2016 and 2021, the University experienced an almost 11 percent reduction in its full-time and part-time faculty and staff. During the same period, the undergraduate student population decreased by 0.5 percent. The reduction in faculty and staff population has proportionally reduced the parking decal ownership, whereas the decal ownership has increased for undergraduate students primarily due to the increased student bed capacity on campus and the associated parking.

As per the 2021 Northern Middlesex Regional Traffic Volume Report, the City of Lowell has the lowest average growth rate in the region of 0.11 percent per year from 2011 to 2021. Despite significant enrollment growth and campus expansion between 2011 and the onset of COVID, ADT counts at locations around the campuses of the university collected and reported by the Northern Middlesex Council of Governments (NMCOG) during this period do not reflect any significant increase in traffic volumes relative to Citywide background conditions. These ADT counts are presented in Table 6. In many locations more recent point-in-time ADT counts are actually lower than previous counts.

**Table 6. Traffic Volumes for Locations near the UMass Lowell Campus, 2011 – 2021**

City of Lowell Traffic Locations	Average Daily Traffic Volumes <sup>1</sup>											Growth Rate
	ADT 2011	ADT 2012	ADT 2013	ADT 2014	ADT 2015	ADT 2016	ADT 2017	ADT 2018	ADT 2019	ADT 2020	ADT 2021	
Aiken St S of Hall St			10,747			11,865						
Father Morissette Blvd E of Aiken St	9,000											
Pawtucket St W of Wilder St				7,800								
VFW Hwy E of University Ave (Textile Ave)	18,327	19,266				13,281	13,427	13,615	12,728	10,488		-5.35
VFW Hwy W of University Ave	14,764	15,499		15,772		16,152	15,282	15,496	15,588	12,417		1.99
Walker Street S of Broadway				3,500								
Wilder St S of Pawtucket St	7,600			6,100			7,500				6,364	-1.81

Based on the ITE LUC 550 methodology employed in the *2011-2016 SDP and 2016-2021 SDP*, the actual ADT volume in 2021 was 15,217 trips, which represents a decrease of 1,548 trips since 2016 largely due to the post-pandemic reductions in total employment at UMass Lowell. The findings of this analysis are presented in Table 7.

**Table 7. ITE LUC 550 ADT Calculation for UMass Lowell, FY 2021**

	<b>Headcount</b>	<b>Average Daily Traffic<sup>(1)</sup></b>
<b>2016-2021 SDP Update</b>		
2016 all employees (actual)	2,559	16,765
2021 all employees (projected)	2,796	17,901
<b>2021 all employees (actual)</b>	<b>2,245</b>	<b>15,217</b>

(1) Equation:  $e^{(0.74 * \ln(X) + 3.92)}$  where X = the number of employees

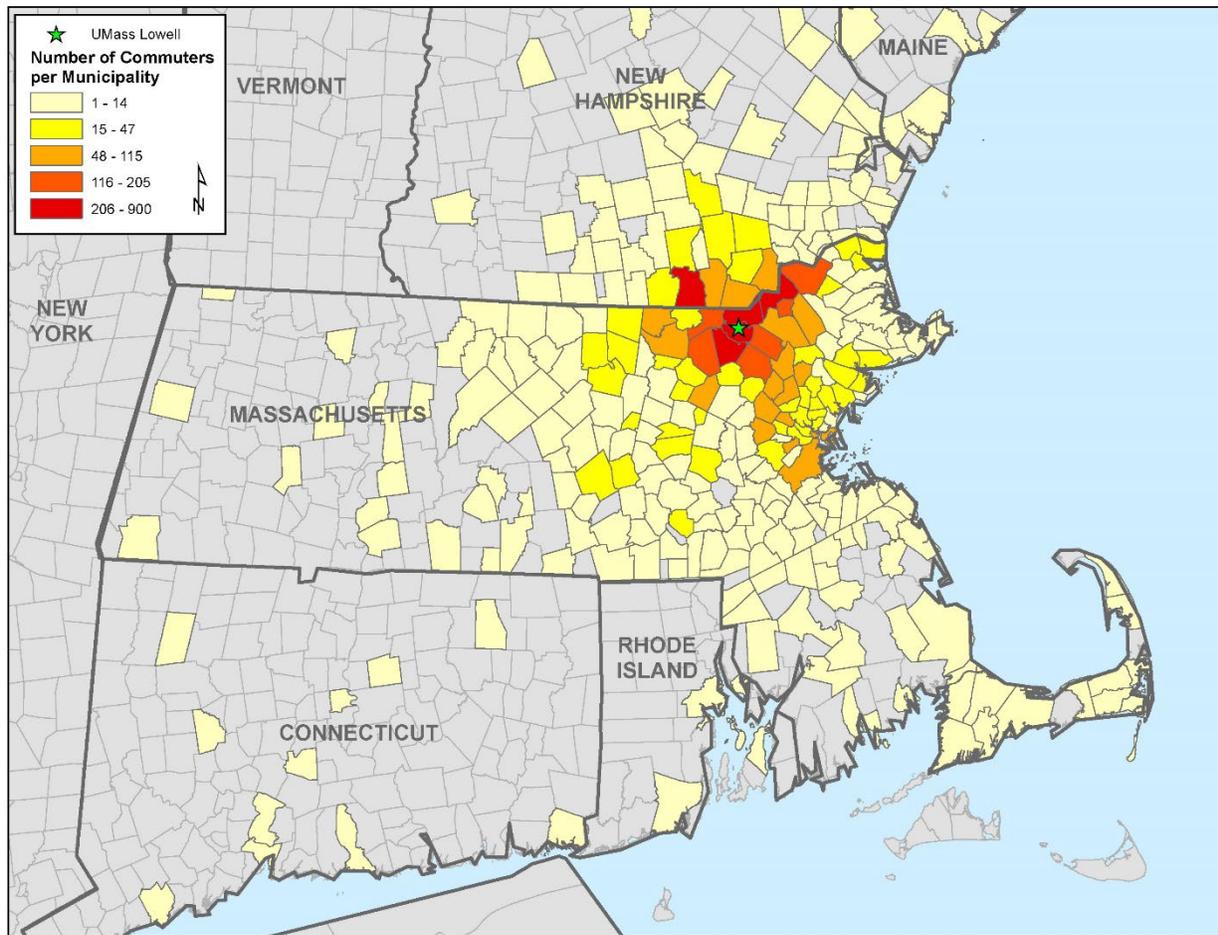
The overall traffic reduction around the campus is likely a result of the decline in enrollment and employment, hybrid learning, and work-from-home trends, despite a minor increase in the number of commuter students.

Section 5.6.3 discusses trip generation analysis and projection for 2027 and ADT projection in further detail, but it is highly unlikely that even by 2027 trip generation will reach the levels projected for 2021 in the prior SDP filing

### **Origins of Vehicle Trips to Campus**

Based on geographic data provided to the University when parking decals are purchased, Figure 22 shows that faculty, students, and staff commuted to UMass Lowell from a range of locations in Merrimack Valley, Southern New Hampshire, and beyond. The recent pattern is largely identical to that depicted in the *2011-2016 SDP and 2016-2021 SDP Update*. Outside of Lowell, the highest density of commuters came from the nearby towns of Chelmsford, Billerica, Dracut, Methuen, and Nashua, NH, as well as a cluster of communities along major highway routes, such as Interstate 495 and US Route 3. Table 8 provides a more precise description of commuter driving distances in FY2016.

**Figure 22. Commuter Origins, FY 2021**



**Table 8. Driving Distances for Parking Decal Holders, FY2022**

Distance to Campus (mi)	Student Decal Holders	Faculty/Staff Decal Holders	All Decal Holders
0 to 1	14%	16%	15%
1 to 3	5%	7%	5%
3 to 5	5%	6%	5%
5 to 10	23%	19%	22%
10 to 20	32%	31%	31%
20 to 50	20%	19%	20%
50+	1%	2%	2%
<b>Mean (mi)</b>	<b>36.4</b>	<b>40.4</b>	<b>44.9</b>
<b>Median (mi)</b>	<b>28.6</b>	<b>28.1</b>	<b>33.2</b>

Table 8 shows that while a majority of students, faculty, and staff who purchased a parking decal lived beyond 10 miles from the University, close to a quarter of the decal owners lived within 10 miles of school or work. Consequently, UMass Lowell’s transportation demand management

strategies will focus on promoting alternative sustainable transportation options for these groups of near-by decal owners. In addition, the University continues to offer a housing subsidy to encourage more faculty and staff to purchase or rent housing within the City of Lowell, increasing the likelihood that they will be able to take advantage of TDM options and further reduce driving trip generation. Section 5.6 presents the details of these policies and strategies.

## **2.4 UTILITIES AND INFRASTRUCTURE**

UMass Lowell relies upon typical urban infrastructure for utility service connections to the campus. The University maintains water, sewer, electric, gas, and steam infrastructure on campus. Regional utilities operated by the City of Lowell provide water and wastewater. National Grid distributes and meters electricity and gas serving campus facilities. New UMass Lowell projects are designed to minimize impacts on these systems. Significant resources have been invested in reducing the University's generation of wastewater and consumption of water and fossil fuels.

### **2.4.1 Water and Wastewater**

UMass Lowell relies on the municipal Lowell Regional Water Utility (LRWU) for water supply. The LRWU sources and treats water from the Merrimack River. Based on LRWU water meter readings, the University used 44,200 CCF (CCF, or Centum Cubic Feet) of water in FY2021, averaging around 90,500 gallons per day. This usage is substantially lower because of the COVID-19-related campus closure. In FY2019, the full reporting period prior to COVID-19, the University used 137,900 CCF of water with an average of 283,000 gallons per day, which represents an increase from the water usage reported in FY 2016, largely due to more accurate meter records than were available in 20216. With in-person instruction resuming on campus, the University anticipates that these trends will stabilize.

The University's sanitary wastewater flows to Lowell City Wastewater Utility's (LRWWU) Duck Islands Wastewater Treatment Plant downriver from the University. LRWWU does not track the University's wastewater flow, but it can be assumed the University's outflow would be its water usage minus irrigation and cooling tower consumption plus any stormwater entering combined sewers after falling on University property. Based on standard wastewater flow assumptions (90% of water use), the University generated 124,000 CCF of sanitary wastewater in FY2019, averaging 254,000 gallons per day.

### **2.4.2 Stormwater Management**

Using the New York State Simple Method with the same set of assumptions as in the *2011-2016 SDP* and *2016-2021 SDP Update*, it is estimated that UMass Lowell generated 103,493 CCF of stormwater in FY2021.

After developing the 2009 Stormwater Management Program, UMass Lowell received an NPDES General Permit for discharges of stormwater from small MS4s in Massachusetts (the MA MS4 Permit) on April 4, 2016, effective from July 1, 2018. Based on the litigation, EPA issued modifications to the MA MS4 permit, which were finalized on December 7, 2020.

UMass Lowell submitted a Notice of Intent (NOI) for coverage under Small Municipal Separate Storm Sewer Systems in Massachusetts (MS4 General Permit) on September 26, 2018. The EPA issued National Pollutant Discharge Elimination System (NPDES) Permit ID# MAR042054

to the University on June 26, 2019. To comply with the permit, UMass Lowell is required to develop and implement a suite of best management practices (BMPs) that are designed to reduce the discharge of pollutants from the MS4 to the maximum extent possible. The University is also required to develop Stormwater Management (SWMP) Program to implement permit requirements and develop storm sewer system maps. The University is also required to submit annual reports documenting progress on the SWMP program for the first permit term and in years two and four in the future permit terms unless additional reporting is required.

The University Stormwater Management Program has been updated from the 2009 version to address the new permit requirements, including each of the six Minimum Control Measures (MCMs).

- MCM 1: Public Education and Outreach
- MCM 2: Public Involvement and Participation
- MCM3: Illicit Discharge Detection and Elimination (IDDE)
- MCM4: Construction Site Stormwater Runoff Control
- MCM5: Post-Construction Stormwater Management in New Development and Redevelopment
- MCM6: Municipal Good Housekeeping and Pollution Prevention.

Since 2019, the University has also submitted annual reports on or before September 30 each year. Since adopting its *2009 Stormwater Management Program* (attached in Appendix C), UMass Lowell has made substantial investments to implement the plan across the three campuses, including stormwater drainage and catch basin upgrades, storm-sewer separation projects, underground tank removals, impervious surface reduction, public awareness and education programs on stormwater runoff and water pollution, and an ongoing outfall screenings and catchment investigations. These investments have continued after receiving the National Pollutant Discharge Elimination System Permit ID #: MAR042054 (attached in Appendix C),

### **Stormwater Management Program Activities:**

Following is the list of different activities performed by the University to address the new permit requirements under different Minimum Control Measures (MCMs)

#### **Public Education and Outreach**

- The University has worked with the UML Outdoor Recreation program, Mass Sierra Club, and the Merrimack River Watershed Council for the past three years to host a river clean-up day each June. Anywhere from 15-30 volunteers take to the water with kayaks and equipment provided by UML, including gloves, rakes, grabbers, and trash bags to help keep the river clean.
- The University plans to develop stormwater education and outreach activities, promote stormwater management controls, and properly inspect and maintain stormwater infrastructure and BMPs on campus to the extent allowed.
- The University's Stormwater Program web page currently includes educational information relevant to students, faculty, the general public, businesses, industries, and contractors. The webpage includes various educational topics on stormwater pollution and contact information for the University's Facilities Service Desk and Environmental Health and Safety Department to report any drainage or potential pollution issues.

- The University maintains a website to share educational materials with each of the four target audiences. The stormwater web page can be found at: <https://www.uml.edu/eem/ehs/storm-water-management/>

### **Public Involvement and Participation**

- The University has created an internal stormwater committee to include key contacts and leads for certain implementation tasks in the SWMP. Meetings were held on July 30, 2019, and September 19, 2019, to establish roles and responsibilities.
- UML has established a Catch Basin Stenciling/Marking Program where University staff and student volunteers can stencil a message next to catch basins or install storm drain markers reminding people not to dump anything down the storm drains. Catch basin stenciling/marketing sends a clear message to all University employees, faculty, and students to keep trash, debris, leaf litter, and pollutants out of the storm drainage system. Currently, most of the University's catch basins have a "no dumping" message stenciled on or near their grate.

### **Post-Construction Stormwater Management in New Development and Redevelopment**

- The University completed two projects in Permit Year 3 (2020-2021) to reduce the amount of impervious area in the North Campus. Projects at the Pinanski Parking Lot and the Perry Hall Plaza eliminated approximately 5,500 square feet and 8,500 square feet of impervious area, respectively, by replacing pavement with landscaped areas.
- The University also reduced the amount of impervious area on the rooftop of their O'Leary Learning Commons on South Campus. The project reduced the impervious area on the rooftop by approximately 2,300 square feet by retrofitting the roof with a rooftop garden for flowers, herbs, and vegetables.
- The University has integrated a rainwater capture system at the University's Urban Agriculture Farm to irrigate plants. Rainwater collected through the gutter system is funneled to an 1,800-gallon storage tank inside the greenhouse which is used to irrigate the plants. There are also raised berms planted with Rhubarb to capture excess runoff. It is a mission of the University to promote sustainable stormwater management. The University's Greenhouse and Urban Agriculture Farm uses all organic growing methods without the use of synthetic fertilizers or pesticides.
- The University had an independent contractor complete 116 catch basin cleanings during Year 1 for all three Campuses. The University has secured a new contract for catch basin cleanings to occur in future years.
- In addition to the existing sedum tray green roofs at the University Crossing and Emerging Technologies and Innovation Center, the University has developed a green roof garden at University Crossing that is used to grow food for the campus in partnership with Mill City Grows. The approximately 500 square feet space is located in one of the most visible spaces on campus and employs highly effective rainwater management techniques utilizing drainage tiles and permeable surfaces to minimize runoff. In addition, irrigation methods on the green roof garden are highly efficient, using drip emitters in an on-demand system tied to local weather station data. As a result, stormwater runoff from the roof is kept to a minimum.

**Municipal Good Housekeeping and Pollution Prevention.**

- For the University's grounds maintenance - fertilizer is applied four times annually using products that contain 0% phosphorus, 50% organic materials, and total nitrogen of about 3.5lbs/1,000 square feet for the growing season.
- All leaf waste collected on campus is shredded, and either used on the University's Urban Agriculture Farm or sent to Mill City grows' "Big Farm" Urban Farm location at 1001 Pawtucket Boulevard in Lowell.
- UML has installed three pollinator habitats on campus in the past two years. These areas, with a native wildflower mix, have significantly reduced the University's irrigation and maintenance needs while promoting the campus's unique approach to grounds management in an urban setting. In addition, the University's Director of Sustainability, Ruairi O'Mahony, is a member of the State of Massachusetts Pollinator Habitat Working Group.
- UMass Lowell's Facilities Department replaced three gas-powered lawn mowers with electric, solar-assisted mowers. The new mowers have 90% efficiency, save approximately 1,170 gallons of gasoline per year, and reduce annual greenhouse gas emissions by approximately 22,900 pounds.
- The University modified its shuttle bus washing protocol to mitigate impacts on stormwater quality. The University relocated its washing activity away from storm drains and on a previous surface to allow wash water to drain into the ground.
- The University is in the process of drafting a policy regarding pets on campus. The new policy will outline the potential negative impacts pet waste can have on stormwater quality and will make pet owners and handlers responsible for managing their own pet's waste.
- In the future, the University plans to draft procedures for catch basin cleaning, sweeping streets and University-owned parking lots, winter road maintenance, stormwater treatment structure inspection and maintenance, parks and open spaces, vehicles and equipment, and buildings and facilities. The University is also working on updating its illicit Discharge Detection & Elimination (IDDE) plan.

**Storm Drainage and Outfall Investigation and Map Update**

The University retained AMEC Earth & Environmental, an engineering consulting firm, to update stormwater drainpipe and outfall maps. The map update covered the findings of the previous investigations, including several previously undocumented storm-drain pipes across the campuses.

Building upon these previous map updates, the University began updating campus maps for Spill Pollution Control and Countermeasure (SPCC) planning. The University's SPCC plan was updated and now identifies oil storage locations on campus, the types of containment systems in place at each location, and best practices for protecting stormwater.

Figure 23 through Figure 26 show the stormwater drainpipe and outfall locations for each of the campuses. Section 5.2.2 discusses the ongoing and new policies and programs in regard to stormwater management, as well as projected stormwater generation in FY2021.

**Figure 23. North Campus Stormwater Drain and Outfall Map**



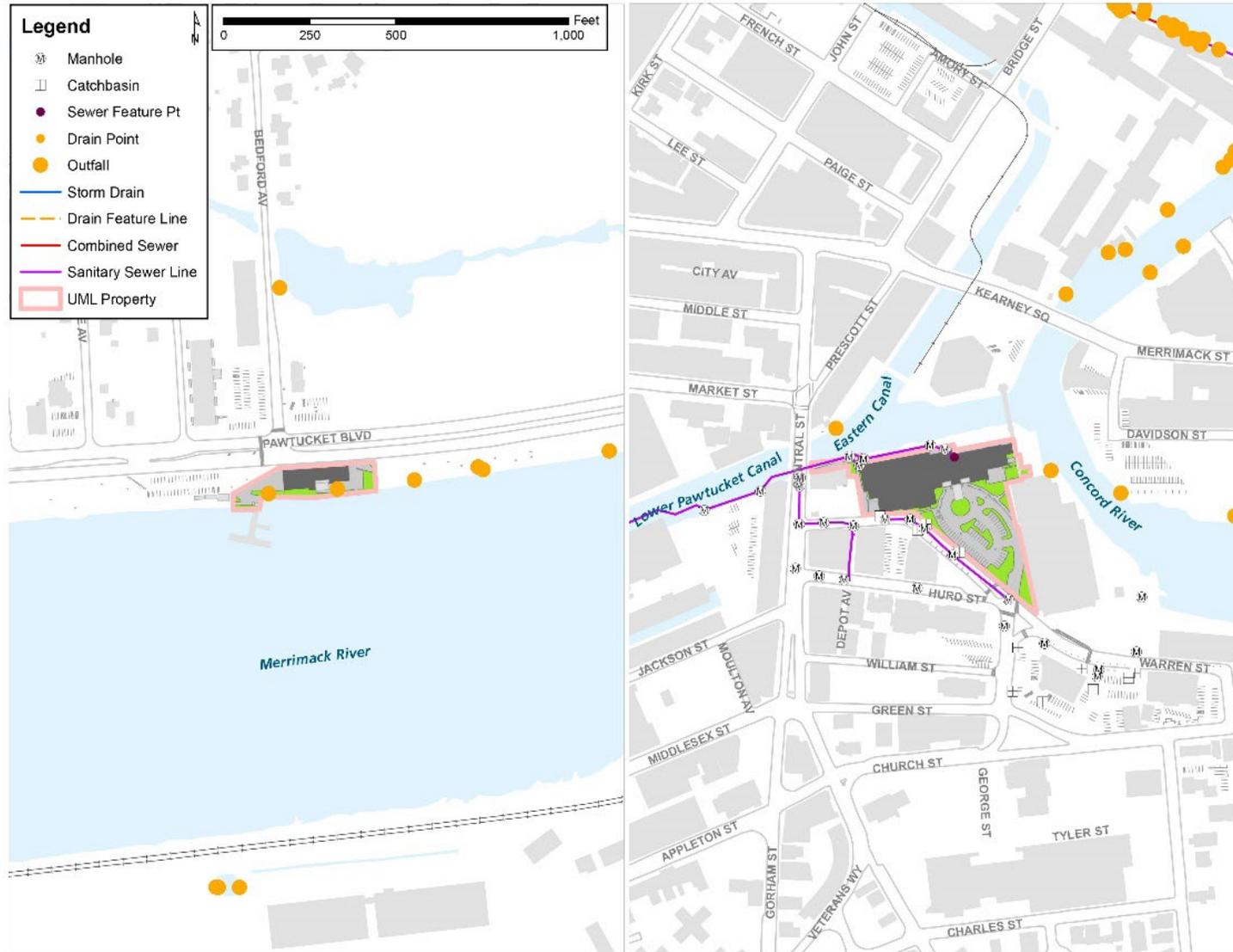
Figure 24. South Campus Stormwater Drain and Outfall Map



Figure 25. East Campus Stormwater Drain and Outfall Map



**Figure 26. Boathouse & ICC Stormwater Drain and Outfall Map**



### **2.4.3 Steam and Power**

UMass Lowell purchases electricity and gas from National Grid but relies on two heating plants for steam generation and maintains steam lines throughout the campuses for heating. The North Power Plant (NPP) and South Power Plant (SPP) each have three boilers that can burn both natural gas and fuel oil. Since FY2012, the heating plants only burn natural gas as primary fuel and burn #2 and #6 diesel oils as backup fuel. NPP phased out the more polluting #6 oil in favor of #2 oil (equivalent to Ultra-Low-Sulfur Diesel) in two of its boilers through its boiler replacement/upgrade in 2012. Also, NPP is replacing its aging third 800 HP boiler with a combination of 300 HP and 500 HP boilers to allow for flexibility during peak and non-peak days. This boiler upgrade will also phase out #6 oil in favor of #2 oil. SPP completed its boiler replacement project to increase the efficiency of the gas boilers and phase out #6 fuel oil in 2016.

The campus has completed several phases of repairs to aging underground steam infrastructure on its South and North Campuses over the past five years. These projects have included steam trap replacement, condensate line replacement, and insulation repair and replacement, collectively eliminating leaks and improving efficiency.

The University used 40.7 million kWh of electricity and 216,000 Dth (Dekatherm) of natural gas in FY2021. These usage numbers for steam and power are skewed on the lower side due to the COVID-related campus closures in FY 2021 and 2020. For comparison purposes, the University used 51.4 million kWh of electricity and 264 Dth of natural gas in FY2019, which was the last full year of operation before the COVID-related shutdown at the end of FY2020.

Between 2016-2021, the University completed its fifth photovoltaic solar array on top of the South Campus Parking Garage as part of the Accelerated Energy Project (AEP). This array almost doubled the generation capacity of installed solar panels to 484 kWh. The University is also reviewing opportunities to procure energy from renewable sources.

Figure 30 in Section 3.5.2 shows the location of these five renewable energy facilities and the University's LEED-certified buildings. Additional solar panels are being considered as part of future construction and renovation projects.

The boiler replacement projects at the heating plants are further discussed in Section 5.7. Past, current, and projected electricity use and gas use are discussed in Section 5.8. Other energy efficiency projects and the overarching *UMass Lowell Climate Action Plan* are discussed in Section 3.5.

### 3. CHAPTER THREE – PLANNING FOR THE FUTURE

Previous discussions have highlighted some issues surrounding UMass Lowell's physical environment. This chapter discusses the University's approach to addressing these challenges through a strategic planning process. The following sections identify planning goals, assumptions, and processes. The resulting University development needs are highlighted here as a context for the capital development program.

#### 3.1 GOALS AND OBJECTIVES

Building on a tradition of successful strategic planning, in the Fall of 2022, UMass Lowell began an inclusive campus-wide process to develop the action steps to realize the vision articulated by its new Chancellor, Julie Chen, and address the challenges posed by demographic headwinds, recovery from the pandemic, and climate change. The plan will also establish a series of metrics to measure progress toward success. UMass Lowell strives to be an inclusive, vibrant public Research 1 university in a gateway city. A set of interconnected priorities established in the process include:

1. Continue to strengthen UMass Lowell's branding, admissions processes, and academic programs and supports to recruit, admit, and retain students through successful graduation and beyond.
2. Expand the availability of paid research, co-op, internship, and other experiential learning opportunities as central to the undergraduate experience, in partnership with corporations, community-based organizations, and government entities.
3. Prioritize continued efforts to strengthen the research profile relative to peers, leveraging UMass Lowell's current trajectory to join the top category of U.S. research universities (Carnegie Research 1).
4. Embrace diversity, equity, and inclusion as a core principle touching all academic and operational aspects of the campus.
5. Leverage the community as a strength by partnering with City government, neighborhood organizations, regional businesses, and non-profits to collectively work to communicate the positive impacts of learning, living, and working in Lowell.
6. Reinvigorate the on-campus community and in-person connections among faculty, staff, and students, while strategically evaluating workplace flexibility experienced during the pandemic.
7. Embrace environmental sustainability and carbon mitigation as a core principle touching all academic and operational aspects of the campus.
8. Emphasize "hands-on" learning and social interaction as the fundamental benefits of an in-person, on-campus educational experience, while continuing to provide the flexibility of on-line and hybrid course delivery models to reach a broader universe of students.
9. Align student mental health services and programs with a campus culture that elevates wellbeing as a campus value, reduces barriers of access to mental health treatments, and destigmatizes the need to seek mental health support.

The new strategic plan will be published in the Spring of 2023 and will guide all future academic, research, and physical activities on campus for the ensuing five to ten years.

Many of the themes of the new strategic plan from planning for designation by the Carnegie Corporation as a Research 1 university to developing a framework for promoting diversity, equity, inclusion, and belonging on campus to reinforcing UMass Lowell's status as one of the most sustainable universities in the nation. As a result, the capital plan and development activities described herein are naturally in alignment with the emergent vision and are unlikely to be significantly altered as the plan is finalized.

Of the themes noted above, 1, 3, 5, and 7 above most directly inform capital and development planning. In addition, the following strategic goals and priorities from prior campus planning initiatives continue to significantly influence campus development activity:

- Create sound and sustainable rolling master and facilities renewal plans that drive organizational development and activities to foster a single academic community on a unified campus
- Foster ease of movement around campus and within the City. Expand the way-finding system, including signage, technology, and gateways, while enhancing campus accessibility and compliance with the spirit of the Americans with Disabilities Act.
- Leverage the attributes of our legacy and place by building on Lowell's collaborative tradition and practice in developing the urban fabric of one campus/one city, informed by strong collaboration with municipal and regional planning partners.
- Improve the quality of the campus environment, including green spaces, interior and exterior places, and fuller integration of the iconic Merrimack River.
- Incorporate programs of exhibited art and shared archives that complement our legacy in key locations.
- Using entrepreneurial strategies, renew, modernize, and right-size campus facilities while addressing evolving needs.
- Renew and reconfigure spaces that support academic success and career readiness, student collaboration, entrepreneurship, and research, including learning commons and academic conferencing.
- Improve student life for both residential and commuter students through enhancements and expansion of auxiliary and student services, particularly dining, athletic, and recreational resources.
- Progressively reduce the deferred maintenance backlog by broadening investments in preventative and corrective measures while concurrently supporting the development of facilities needed for new programmatic requirements and growth.
- Confirm a sense of a safe, modern, and welcoming campus community through enhanced security and technology across the campus, including investment in security technologies, building access and emergency communications systems, and enhanced community-based policing.
- Expand collaboration with the Lowell Police Department and other law enforcement agencies.
- Continuously improve the University's business-continuity posture, disaster-recovery capabilities, and emergency preparedness, including public health response and training.
- Support the full range of campus activities and programs with information technology systems that are current, secure, and have sufficient capacity to meet projected demand.

- Responsibly renew and enhance energy systems and infrastructure for sustainability, reduced consumption, and cost avoidance, incorporating the recommendations of the Alternative Energy Master Plan in major capital projects as applicable.
- Design for LEED certification of new building and large renovation projects as well as compliance with the provisions of Executive Order 594 – Leading by Example.
- Implement sustainable practices, including transportation, waste reduction, local agricultural sourcing, native landscaping, water conservation, and renewable energy solutions where appropriate.

The University transparently monitors its progress by publishing an annual report card of key quantitative measures of various goals and objectives. The latest report card was published along with the *UMass Lowell 2020 Update* in May 2021 (attached in Appendix G).

### 3.2 PLANNING ASSUMPTIONS

While most “current” data in this filing are as of July 1, 2022, enrollment data as of Fall 2022 are used as the basis for projections in this 2022-2027 SDP Update, to ensure that the impacts of the full return to in-person operation following the pandemic are captured.

In 2016, UMass Lowell projected an enrollment of 20,000 by 2021 - a 3.0% yearly growth in its enrollment. The 2016-21 SDP Update was predicated on this aggressive growth assumption. In reality, demographic headwinds limited UMass Lowell’s growth to only 0.72% annually between 2016 and January 2020. With COVID-19 compounding demographic conditions, the University’s enrollment declined annually by 4% between 2020 to 2022, culminating in a Fall 2022 total enrollment of 17,333. UMass Lowell expects the factors contributing to these enrollment challenges to continue, and in some cases increase for the duration of this Strategic Development Plan period.

#### Demographic Shifts

UMass Lowell continues to face significant demographic headwinds. Recent research suggests that the traditional college-age population will continue to decline due to the reduction in birth rates that started during the Great Recession and has continued with the COVID pandemic. A substantial drop in the number of high school graduates, often referred to as the “demographic cliff” is anticipated beginning in Spring 2025. Additionally, those graduating students will be increasingly lower-income, racially and ethnically diverse, and often from households headed by parents without college degrees. All of these factors historically have been indicators of lower college enrollment. The national trends are projected to be particularly acute in the Northeast and the Upper Midwest, further weakening the outlook for public higher education institutions in Massachusetts.

#### Shifting Student Demand:

In addition to broad demographic changes, student preferences for fields of study have shifted significantly in recent years. There is a distinct movement toward career-oriented majors that are perceived to provide skills directly associated with employment opportunities in areas of workforce growth. According to data compiled by the National Center for Education Statistics, this includes strong growth in Computer Sciences, Engineering, Business, Health, and Life Sciences majors, while demand for the Liberal Arts, Humanities, and Visual Arts is declining. Social Sciences and Physical Sciences appear comparatively flat. This same movement toward degree programs

offering applied professional skills has resulted in national growth in Masters degree programs even as undergraduate enrollments have declined in recent years. UMass Lowell is seeing this trend emerge from Fall 2019 onwards, where declining demand for traditional undergraduate programs has been offset by increased interest in graduate degrees and certificates.

### Competition from Online Programs

After COVID-19, most undergraduate students were eager to return to campus for in-person learning. By contrast, many graduate students realized the benefits of the online programs that helped them balance their personal and professional responsibilities while continuing their education. In addition, as online learning became mainstream during COVID-19, more schools entered this arena. This has also prompted rapid technological and pedagogy advances to support this delivery format, and as a result, the competition from and among online programs has increased significantly.

UMass Lowell was among the pioneers in offering a robust program of online classes starting two decades ago. That experience and the technology that supported these courses greatly aided the University in rapidly transitioning to fully remote instructional delivery in Spring 2020 as the COVID-19 pandemic forced the temporary cessation of on-campus classes. But the recent competition from online programs may impact in-person graduate enrollment as UMass Lowell continues to strengthen its online offerings and work to reinforce the value of the in-person, on-campus higher education experience.

UMass Lowell anticipates it will continue to capture an increasing share of the college-age population by providing greater value to students than some of its competitors. Based on some of the above factors, The University has built the model of its development impacts discussed in this SDP around the assumption that it will grow annually at 0.7% through 2027, achieving a total enrollment of 17,960 students by the end of the five years, as shown in Table 9.

**Table 9. UMass Lowell Student Enrollment, 2015 to 2027**

Headcount	Fall 2015 Actual <sup>(1)</sup>	Fall 2020 Projected <sup>(1)</sup>	Fall 2022 Actual	Fall 2027 Projected
Undergraduate	10,457	12,400	10,408	10,780
Graduate & Non-Degree Day	4,184	4,700	4,941	120
<b>Total Day Headcount</b>	<b>14,641</b>	<b>17,100</b>	<b>15,349</b>	<b>15,900</b>
Online & Continuing Ed	2,809	2,900	1,984	2,060
<b>Total Headcount</b>	<b>17,450</b>	<b>20,000</b>	<b>17,333</b>	<b>17,960</b>

(1) As projected in the 2016-2021 SDP Update

(2) Data from UMass Lowell 2020: 2021 Report Card

The number of faculty on campus is largely associated with enrollment. Consequently, faculty headcount (shown in Table 10) also grew considerably slower than projected since the 2016-

2021 SDP 9. The total number of full and part-time faculty serving the campus in Fall of 2020 was only a handful greater than the total in Fall of 2015, well below the level projected in the 2016-2021 SDP. The projection for Fall of 2027 also remains below the level previously forecast for Fall of 2020.

Campus staffing is expected to experience minimal expansion of the non-student-facing administrative, research, and support employees. Academic and student services staffing may grow approximately proportionate to the growth in undergraduate enrollment. The total staff growth is projected to be less than 75 FTEs throughfall 2027.

**Table 10. UMass Lowell Faculty Members, Fall 2015 to Fall 2**

Number of Faculty	Fall 2015 Actual <sup>(1)</sup>	Fall 2020 Projected <sup>(1)</sup>	Fall 2020 Actual <sup>(2)</sup>	Fall 2027 Projected
Full-Time Faculty	565	661	627	675
Part-Time FTE	182	200	124	128
<b>Total Faculty FTE</b>	<b>747</b>	<b>861</b>	<b>751</b>	<b>803</b>
Percent Instruction Capacity by Adjuncts	24%	23%	17%	24%
FTE Student: FTE Faculty Ratio	17:1	18:1	19:1	18:1

(1) Data from *UMass Lowell 2020: 2016 Report Card*

(2) Data from *UMass Lowell 2020: 2021 Report Card*

### 3.2.1 Student Residences

#### **Progress since 2016:**

Since 2016, UMass Lowell has continued its transformation from primarily a commuter school to a residential campus, with a net increase of 700 new beds in its inventory for a total of 4570 available for fall 2022. With this transformation over the past fifteen years, the proportion of undergraduates living on campus grew from approximately 25% to 42%. This growth was implemented using a broad range of tools from the ground-up new construction to public-private partnerships to adaptive reuse of real estate acquisitions.

In the last five years, the number of undergraduate students living on campus has ranged from 40%- 42%. However, COVID-19 abruptly ended more than a decade of steady and significant growth in demand for on-campus housing at UMass Lowell, causing the campus to reduce its net available bed count for the first time in decades. The COVID decline has been reversed since Fall 2021, but the university is not expecting to see any significant net increase in its total on-campus resident student housing capacity for the duration of this SDP planning period.

**Projections through 2027:**

With the pandemic subsiding, the University anticipates the restoration of normal levels of housing demand in the coming years. Based on pre-COVID data, approximately 80% of new full-time first-year students, 20% of new undergraduate transfer students, and 30% of returning undergraduates choose to live in on-campus housing, along with a modest number of graduate and part-time students and others. These trends appear to be returning, enabling the university to essentially align demand with its existing housing inventory by Fall 2026. Hence, the University is not anticipating a significant net change in the number of beds available over the next five years.

**Other Priorities for the Future:**

The Residence Hall portfolio includes a range of housing options, including traditional dormitories, suites, apartments, and townhouses, in a dozen buildings or complexes located on the East and South Campuses. Over the next five years, any housing projects will focus on two areas: efforts to modernize and address deferred maintenance needs in existing residence halls and potentially using the East Campus Initiative for larger-scale recalibration of the inventory to respond to programmatic and enrollment management goals and to potentially eliminate deferred maintenance by replacing aging buildings. Programmatic changes may include redesigning the Living Learning Communities model to better align with the academic colleges, increasing the faculty-in-residence program, and making the on-campus living experience more accessible and inclusive.

**3.2.2 Research**

As shown in Table 11, increasing research expenditures signal a continual need for more specialized research space and supporting space for graduate students and research teams. This need is most evident in science and engineering disciplines but also affects health and environment programs, as well as art and music, to lesser degrees.

While research space demand is unique to each discipline and is difficult to predict, the University actively tracks, models, and projects research space usage and demand on each campus. The University has continued to renovate, right-size, and convert older building spaces into research spaces. Capital projects in Weed, Ball, and Olney Hall, as well as the remaining work underway in Olsen Hall, will not only yield an improved academic space but will also incorporate infrastructure improvements that will enable existing spaces to better support contemporary research.

In addition, the University plans to continue to invest in its research endeavors with the following activities:

- Prepare for dedicated investments and activities to support impending Research 1(R1) status, including strategic alignment of facilities, hard infrastructure, and research needs.
- Continue to support the need for additional specialized research spaces of the larger research teams and interdisciplinary centers, such as Fabric Discovery Center (FDC), Harnessing Emerging Research Opportunities to Empower Soldiers (HEROES), New England Robotics Validation and Experimentation (NERVE), the Rist Institute for Sustainability and Energy, and the Massachusetts Medical Device Development Center (M2D2), that bring in large federal grants.

- Continue to expand research activities beyond the campus boundaries to promote economic development in the surrounding communities like the Innovation Hub at 110 Canal Street, UMass Lowell Research Institute in Lincoln, and Andover Research Laboratory locations.
- Expand Core Research Facilities to promote interdisciplinary collaboration, shared use of high-value research equipment, and attract external researchers on campus.
- Invest in hiring outstanding faculty at the junior and senior levels and additional staff to provide dedicated research development services to increase research productivity.
- Increase industry research partnerships bringing new and existing industry partners close to campus and promoting the growth of UMass Lowell's Applied Research Cooperation and associated partnerships.

**Table 11. UMass Lowell Research Dollar Volume, Fall 2020 to Fall 2030**

	FY2020 Actual	FY2027 Projected	FY2030 Projected
Total research expenditures (millions) <sup>1</sup>	\$92.20	\$111.10	\$120.30
Expenditures per tenure track faculty member <sup>2</sup>	\$198,220	\$211,619	\$212,920
Total externally funded research (millions) <sup>3</sup>	\$64.40	\$80.80	\$88.30

(1) Estimated growth rate of 2.7% per year

(2) Estimated avg. growth of 5 new T/TT positions per year

(3) Estimated growth rate of 3% per year

### 3.2.3 On-Line Education

Online education – including both online and blended in-class/online courses - has been a significant factor in UMass Lowell's academic growth, and expansion in course enrollments expected to continue, as shown in Table 12. During the COVID-19 shutdown, the University leveraged its investments in online education and pivoted to online-only learning. The University has incorporated online and continuing education into its space usage and demand model.

**Table 12. UMass Lowell Online Course Registration, Fall 2010 to Fall 2020**

Enrollment	Fall 2015 Actual <sup>(1)</sup>	Fall 2020 Actual <sup>(1)</sup>	Fall 2026 Projected
Online & Continuing Education Enrollment Headcount	2,809	1,854	1,920
Online Course Enrollments <sup>(2)</sup>	25,021	35,615	39,180

(1) Data from UMass Lowell 2021 Report Card

(2) The sum of the number of the enrollments in all online courses including day stus who are not included in the Online & Continuing Education headcount.

### 3.3 THE PLANNING PROCESS

In contrast to many institutions' fixed master planning approach, UMass Lowell has embraced a coordinated rolling master planning model. Anchored in the university's strategic plans, which outline the academic vision for the University, this approach identifies the physical support and infrastructure necessary to achieve the University's strategic goals. Components of this coordinated planning framework include a series of campus-level rolling master plans, system plans, topical and thematic plans, resource inventory and documentation, and capital financing and project plans. This approach ensures that planning activities and outcomes are responsive to changing conditions and aligned with reasonable time horizons to guide the University in making appropriate strategic investment decisions in furtherance of its core mission and functions. In addition, these efforts incorporate robust stakeholder engagement efforts, including outreach beyond the campus where actions under consideration may have or be perceived as impacting the University's neighbors or the City of Lowell.

The campus-level plans affirm the academic objectives of each college and derive space, infrastructure, and facilities improvements necessary to accommodate the successful implementation of those objectives. These plans typically employ a five-year and ten-year horizon, and the University strives to update them regularly to ensure their alignment with evolving circumstances. Since the *2011-2016 SPD* was approved, UMass Lowell has completed and updated academic campus sector plans for both the North and South Campuses, which are instrumental in defining the development program described in this SDP Update.

Topical and thematic plans delve more deeply into particular areas necessary to support the continued transformation of the campus. Examples include an assessment of the needs of campus recreation programs; a study of improving pedestrian and bicycle accommodations along the Pawtucket Street corridor conducted in partnership with the City of Lowell and other neighborhood stakeholders; a campus-wide accessibility improvements plan; a *South Campus Landscape Master Plan* that incorporates thoughtful consideration of stormwater management; student housing demand modeling; and a study of the evolution of the campus libraries.

Resource inventory and documentation inform all planning work and enable data-driven decision-making. Among these exercises are documentation of deferred maintenance needs in all campus buildings, surveys of campus utility infrastructure, transportation, and parking, and instructional space utilization studies. These surveying and documentation efforts correspond with the University Facilities Informational System (FIS), as mentioned in Section 2.2.

### 3.4 NEW SPACE REQUIREMENTS

The University does not anticipate a significant need for net new space on campus but does anticipate continuing need to modernize and improve campus facilities to support an expanding research program, changes in pedagogy, and evolving student needs, while also addressing deferred maintenance and aging building infrastructure. There are several traditional drivers of space demand in higher education.

- **Enrollment Growth** – Typically the primary driver of new space demand, as discussed elsewhere in this report, UMass Lowell does not anticipate a level of enrollment growth through 2027 which would necessitate significant physical expansion of the campus.

- **Research Growth** – This is an essential component of a major university and a primary driver of many of UMass Lowell's sustaining contributions to the economic development of the Merrimack Valley and the Commonwealth. Modern research requires larger and more complex facilities, particularly in the Sciences and Engineering, which must be consistently renewed to support rapid advances in these fields. UMass Lowell's research program is expected to continue to expand and cultivate additional partnerships with private entities, sharing resources and forums for collaborative discovery and innovation.
- **Right-sizing & Addressing Obsolescence** – As the University strategically modernizes and responds to evolving standards and practices for instruction and research, many program areas require additional square footage to adequately accommodate new technology and other needs.
- **New Academic Programs** – UMass Lowell's ongoing success and growing reputation, as well as changes in public expectations for higher education, have stimulated demand for new academic programs. While the University strives to integrate these into existing facilities and interdisciplinary academic communities, invariably new programs place additional pressures on space.
- **Residential Campus** – As UMass Lowell has transitioned from a predominantly commuter school to a residential campus in recent years, student success has risen, and many of its proportional impacts on traffic and parking demand have declined significantly. With the slowing enrollment growth, the university does not anticipate significant net new student housing development. However, evolving student expectations and cost considerations, as well as the need to address deferred maintenance in residence hall buildings may prompt projects to adjust the portfolio of student housing available at UMass Lowell.

Recognizing the inherent costs and challenges in addressing all of the University's space demands through new construction, UMass Lowell has employed several fundamental strategies to minimize the need for new construction and its associated impacts. These include:

- **Centralization of Services** – A lingering legacy of the two separate colleges that merged to form the University was the duplication of functions on two campuses less than a mile apart. With the strategic focus on forging a "one campus" identity, UMass Lowell has worked to consolidate administrative offices, general education, public safety, central services, student services, food and retail functions, information technology, maintenance, and housekeeping into right-sized space, reducing their overall impact on-campus facilities.
- **Relocation of Non-academic Functions** – To facilitate instructional and research growth within existing core academic buildings, UMass Lowell is strategically decanting administrative, service, and other non-academic uses to central facilities (if student-facing) and remote facilities (when not student-facing). Remote work modalities may

accelerate this trend, perhaps reducing the overall demand for administrative space on campus.

- **Repurposing Existing Facilities and Previously Developed Properties** – To minimize the environmental and financial costs associated with new construction, UMass Lowell employs a wide range of approaches to meeting space demands, including acquisition and adaptive reuse of existing buildings, redevelopment of vacated urban sites adjacent to the campus, and leases of private facilities.

### **3.4.1 North Campus**

In 2014 and 2015, design firm Payette helped UMass Lowell and the Commonwealth's Division of Capital Asset Management and Maintenance (DCAMM) to complete a thorough review of the existing and future space needs of the three North Campus colleges (the Kennedy College of Sciences, the Francis College of Engineering, and the Manning School of Business), as well as the services needed to support their visions and requirements for teaching and research activity. This study projected enrollment growth, modeled space programs, assessed the capacity of existing facilities to accommodate them, developed alternative scenarios to address space needs, and recommended solutions to accommodate research facilities, instructional labs, classrooms, faculty offices, and required support spaces.

Notable features of the recommended strategy, which is designed to maximize the utility of existing space and minimize the need for new construction, include:

- **Pulichino Tong Business Center** – Complete construction and relocate the Manning School of Business into the new building, allowing back-fill of offices and classrooms by other academic departments. This project has been completed.
- **North Quad Pod Addition** – Complete construction of the infrastructure, accessibility, and code compliance Pods at the North Quad to enable efficient and cost-effective renovation and use of the four-building complex., This project has been completed.
- **Perry Hall Renovation** – Comprehensive renovation of the building for interdisciplinary Engineering laboratory uses, including restoration and completion of the fire-damaged fourth floor. This project has been completed.
- **Olsen Hall Renovation** – Build infrastructure for new core research facilities and renovate academic space within Olsen Hall to support Life Sciences. This phased renovation is ongoing, with current phases expected to be completed by early 2024.
- **Centralized Services and Operations** – Relocate remaining non-academic functions that do not need to be close to teaching and research facilities from the North Campus to the new Central Services and Facilities Operations Buildings on Middlesex Street, allowing academic expansion within existing buildings. This project has been completed.
- **Specialized Space** – Strategically align uses with existing buildings' ability to support a specific use. Reserve buildings with adequate infrastructure, ceiling heights, structural grid and systems, and core research facilities for laboratory and other technically intensive uses. Assign office and classroom uses to buildings with less technical capacity. This effort is ongoing in multiple buildings.

- **Interdisciplinary Collaboration** – Support interdisciplinary cross-pollination of ideas by developing shared research facilities and the adjacent placement of collaborative academic departments. This effort is ongoing.
- **Renovation Project Coordination** – Plan space re-assignments and capital project sequences to maximize opportunities for the renovation of existing buildings in phases of at least a full floor at a time to achieve right-sized space allocations and efficient floor plans while minimizing costs. This effort is ongoing in multiple buildings.
- **Enabling Projects** – Capitalize on code-enabling projects like the North Quad Pod additions to maximize utility and capacity of existing buildings. This effort is ongoing.
- **Current Trends for Learning Space** – Consistent with trends in higher education planning, incorporate common spaces, informal study areas, academic support, and service functions in renovated interior and exterior landscape spaces as applicable and appropriate. This effort is ongoing.
- **Sustainable Buildings** – Address deferred maintenance and improve energy efficiency across building systems in conjunction with renovation projects to improve the comfort of occupants, reduce life-cycle costs, and enhance environmental sustainability. This effort is ongoing.

### 3.4.2 South Campus

In 2012, consulting planners and architects from Perkins+Will completed the South Campus Sector Plan on behalf of DCAMM and UMass Lowell. In 2015, Sasaki was engaged to review and update this plan as part of the University's commitment to a rolling master planning process that is responsive to the ever-evolving circumstances of a rapidly growing research university. These two plans form the basis for a comprehensive strategy to document the academic visions, evaluate existing conditions, identify facility needs, and recommend solutions to accommodate the requirements of teaching and research for the College of Health Sciences, College of Fine Arts, Humanities, and Social Sciences, and Graduate School of Education.

Notable features of the recommended strategy, which is similarly focused on maximizing the utility of existing space and minimizing the need for new construction, include:

- **Coburn Hall Renovation and Addition** – Enable significant additional utilization of Coburn Hall and accommodate academic objectives by addressing accessibility and code deficiencies and increasing program space through a renovation and addition project. This project has been completed, and the building is occupied.
- **Health Science Core** – Support the College of Health Sciences' goal to concentrate teaching and research functions on the South Campus in support of interdisciplinary work and operational efficiency. This effort is ongoing.
- **South Campus Mall** – Build on the newly-created South Campus Mall as an anchor for a traditional campus setting to support Humanities and Fine Arts programs, with continued investment in landscape enhancements to improve accessibility, stormwater management, and the overall character of the campus. The Mall has been established, with landscape improvements ongoing.
- **Student Life** – Continue to expand the resources available to support an increased South Campus residential population resulting from the opening of the Riverview Suites

dormitory. This effort was largely completed with the opening of the McGauvran Dining facility and Riverview Suites Fitness Center.

- **One Campus/One Community** – Reinforce the "one campus/one academic community" strategic priority by improving the connectivity between South Campus and the other UMass Lowell campuses. Design work for the Pawtucket Greenway, the centerpiece of this effort, is ongoing.
- **Shared Resources** – Encourage the development and use of shared resources such as conference space, study and learning commons, and adjunct offices. This effort is ongoing.
- **Code Compliance** – Resolve code deficiencies where it is appropriate and cost-effective to do so to enable the maximum efficiency of existing buildings. This effort is ongoing.
- **Centralized Services and Operations** – Relocate remaining non-academic functions that do not need to be close to teaching and research facilities from the South Campus to the new Central Services and Facilities Operations Buildings on Middlesex Street, allowing academic expansion within existing buildings. This project has been completed.
- **New Building Sites**– Reserve sites and plan for potential future addition of new buildings, including one at the intersection of Solomont Way and Broadway Street and another at the corner of Bachelder Street and Wilder Street.
- **Sustainable Buildings** – Address deferred maintenance and improve energy efficiency across building systems in conjunction with renovation projects to improve the comfort of occupants, reduce life-cycle costs, and enhance environmental sustainability. This effort is ongoing.

### 3.4.3 East Campus

From its inception in the wake of the City of Lowell's urban renewal activities of the 1960s, East Campus has served as a center for student housing and student life activities. UMass Lowell intends to continue to invest in East Campus as the primary location to support its emergence as a residential university. East Campus also serves as the strongest geographic link between the University and Lowell's Downtown and the conduit for enabling resident students to have a positive impact on the cultural and economic vitality of the city.

As this report is being prepared, the university is in negotiations with a private development team to establish a public-private partnership that will transform as much as ten acres of underutilized university property on the East Campus into a vibrant mixed-use district. The project, which will be developed over multiple phases over several years, is expected to include university research facilities, co-location space for industry partners, retail, restaurants, and residential uses, as well as structured parking and enhanced infrastructure. This project will be privately led and permitted, so its impacts are not included in this filing.

Primary strategic priorities for East Campus include:

- **Student Life** – Reinforce the concentration of student housing and student activities so that resources for supporting academic success can be most effectively provided and a robust student life experience can be achieved. This effort is ongoing.
- **Recreation** – Construction of new outdoor recreation resources at the 225 Aiken Street site. This project has been completed.

- **Fox Hall Elevator Addition** – Add new elevators to Fox Hall to improve vertical circulation and meet code requirements in an 800-bed high-rise dormitory. This project has been completed.
- **Student Housing** – Rebalance the portfolio of student housing types available on East Campus to align with student demand and price sensitivity. This effort is ongoing.
- **University Crossing** – Support the growth of University Crossing as a gateway for the entire University and a hub of student life and service functions. This effort is ongoing.
- **Wannalancit Business Center** – Continue to support academic growth on North and South Campuses by decanting non-academic administrative functions to the Wannalancit Business Center. This effort is ongoing.
- **Campus Parking** – Meet and minimize campus parking demands and impacts using property already devoted to parking use. Accommodate parking displaced by the East Campus Redevelopment, along with new demand through the construction or leasing of additional structured parking. This effort is ongoing.
- **Sustainable Transportation** – Reduce vehicle trips by investments in improved pedestrian, bicycle, and transit connections between the residential East Campus and the academic campuses. The Pawtucket Greenway project that is currently in design is a primary element to achieve this goal.
- **Sustainable Buildings** – Address deferred maintenance and improve energy efficiency across building systems in conjunction with renovation projects to improve the comfort of occupants, reduce life-cycle costs, and enhance environmental sustainability. This effort is ongoing.

#### **3.4.4 Renovated Interior Space**

The University's approach to meet its space needs prioritizes renewal and reuse of existing facilities wherever possible. As enrollment growth slows along with increases in hybrid administrative work and virtual delivery of some instruction, the university expects that this focus will be reinforced with nearly all capital projects over the next five years involving work on existing buildings as opposed to new construction. Changes in departmental organization, program offerings, research initiatives, and pedagogy require constant renovation and renewal of existing buildings. These projects also strive to address deferred maintenance and improve energy performance whenever possible.

### **3.5 CLIMATE ACTION PLAN**

UMass Lowell's approach to climate action and sustainability is deeply rooted within the overall strategic planning framework at the university. Beginning with the university's first *Climate Action Plan* (CAP), which was adopted in 2012, UMass Lowell has pursued a climate and sustainability strategy that is reflective of, and responsive to, our unique urban setting in the City of Lowell. The UMass Lowell campus serves as a living lab for climate action and sustainability where cutting-edge research and teaching informs campus operations and community engagement that uphold and enhance the campus, and the Commonwealth's, climate goals.

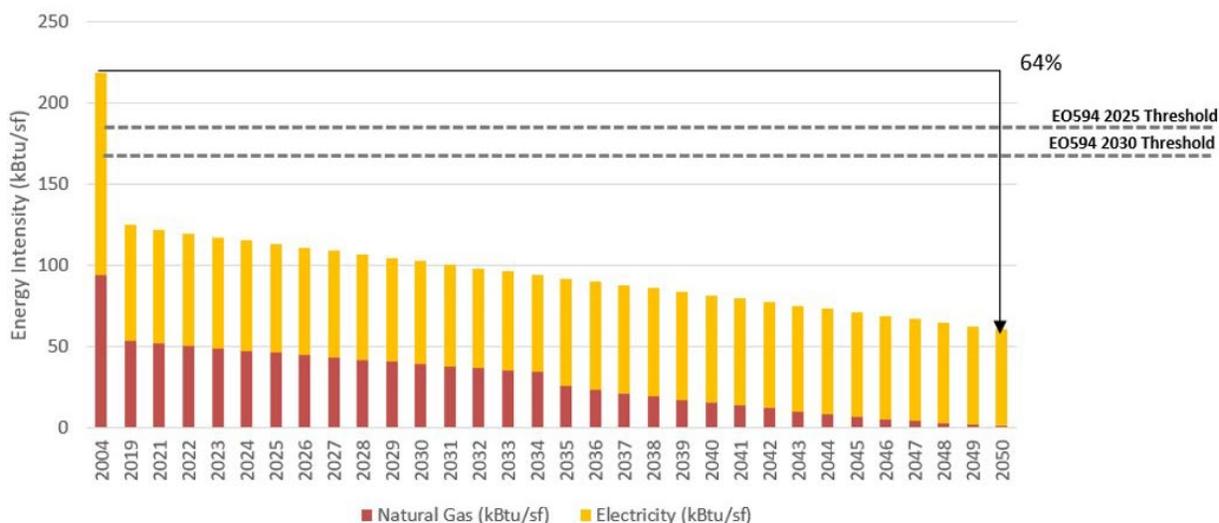
Through a coordinated and planning centric approach, the University has implemented the majority of the recommendations highlighted in the original CAP. UMass Lowell achieved its 2020 Phase 1 milestone and emission reduction goals in 2015 despite significant growth in student

enrollment and the physical campus. UMass Lowell has also met its 2030 Phase 2 CAP milestone and emission reduction goals ahead of schedule through.

Buoyed by the success of CAP implementation efforts, while also recognizing the need for a more detailed and thorough planning analysis that would guide the next ten years of climate, energy, and sustainability planning at the university, UMass Lowell completed a Carbon Reduction and Alternative Energy Master Plan in 2021. Funded by the Department of Energy Resources (DOER), and developed with BR+A Consulting Engineers, the plan provides a road map for how the campus can practically attain carbon neutrality while also serving as a model for other agencies in the Commonwealth to follow. Specifically, the plan outlines goals and progress that support the goals of *MA Executive Order 594: Leading by Example - Decarbonizing and Minimizing Environmental Impacts of State Government*

The Carbon Reduction and Alternative Energy Master Plan was developed in close partnership with DOER and the Energy and Sustainability team at the Department of Capital Asset Management and Maintenance (DCAMM). It outlines a multi-phased series of recommendations for inclusion in capital projects, along with ongoing energy conservation and efficiency work that aims to reduce and ultimately eliminate on-campus, fossil fuel generation which will be complemented by the ongoing, and legislatively mandated, greening and decarbonization of the electrical grid.

**Figure 27. Energy Use Intensity Forecast: Carbon Reduction and Alternative Energy Master Plan 2021**  
EUI Forecast



UMass Lowell was awarded a Leading by Example Award from the DOER for our carbon reduction planning efforts outlined in this plan. In addition to the AEMP, the university’s climate action activities over the past five years have included:

- Established the Rist Institute for Sustainability and Energy in 2019. The Rist Institute serves as UML’s hub for hands-on research, engagement and operations focused on sustainability, climate change and renewable energy. Traditionally, these activities fell

under multiple centers and offices including the Climate Change Initiative, the Center for Renewable Energy, and the Office of Sustainability. The Rist Institute has brought these entities under one umbrella to foster integrated knowledge and action and serve as the catalyst to increase prominence and expand the impact of our total efforts in sustainability.

- Annual Greenhouse Gas reporting to the Department of Energy Resources and to the University of Massachusetts Board of Trustees;
- Annual reporting and compliance with the MassDEP Rideshare Regulation Program;
- Adhering to the University's commitment to achieve at least LEED Silver Certification on all new buildings, most recently including the renovations of Perry Hall and Coburn Hall;
- Implemented and expanded transportation demand management strategies and programs to reduce commute trips and driving between the three campuses;
- Implemented more than 100 energy-saving measures in 30 buildings across campus from 2016 onwards as part of the state's largest completed Accelerated Energy Program.
- Launched the Sustainability Engagement and Enrichment Development (S.E.E.D.) Fund and partnered with Mill City Grows on the Greenhouse and Urban Farm on East Campus, the FarmShare CSA program, and the new Green Roof farms/gardens at University Crossing and O'Leary Library;
- Worked with the City of Lowell to improve conditions for cyclists and pedestrians and partnered with the Lowell Regional Transit Authority and the Merrimack Valley Regional Transit Authority to provide free bus service for students, faculty, and staff;
- Entered into Strategic Energy Management Partnership (SEMP) with National Grid in February 2020 to reduce its annual utility bill while improving operations and reducing maintenance costs. The agreement incentivizes the University to implement projects that annually save 400,000-kilowatt hours (kWh) of electricity and 25,000 therms of natural gas over the next three years. The University can earn \$160,000 in incentives for meeting those goals. Over the course of the three-year program, incentives could surpass \$500,000;
- Improved the efficiency of 800 steam traps that begin to release steam from the University's steam heating system after calcification;
- Improved the pipe insulation to decrease energy loss in 23 mechanical rooms across campus;
- Doubled the number of EV charging stations from ten to twenty. These twenty dual-head stations in ten parking lots and garages across campus provide charging ports for up to 40 vehicles at a time;
- Deployed UPrint, a green initiative to reduce paper waste by eliminating unwanted and excess printing through a centralized printing software system, which had reduced 40% in printing annually, or 17 million pages per year;

- The University's Department of Facilities Management, Operations, and Services worked closely with the University's Sustainability Office regarding best practices and annual reporting for fertilization application and refrigerant release avoidance.

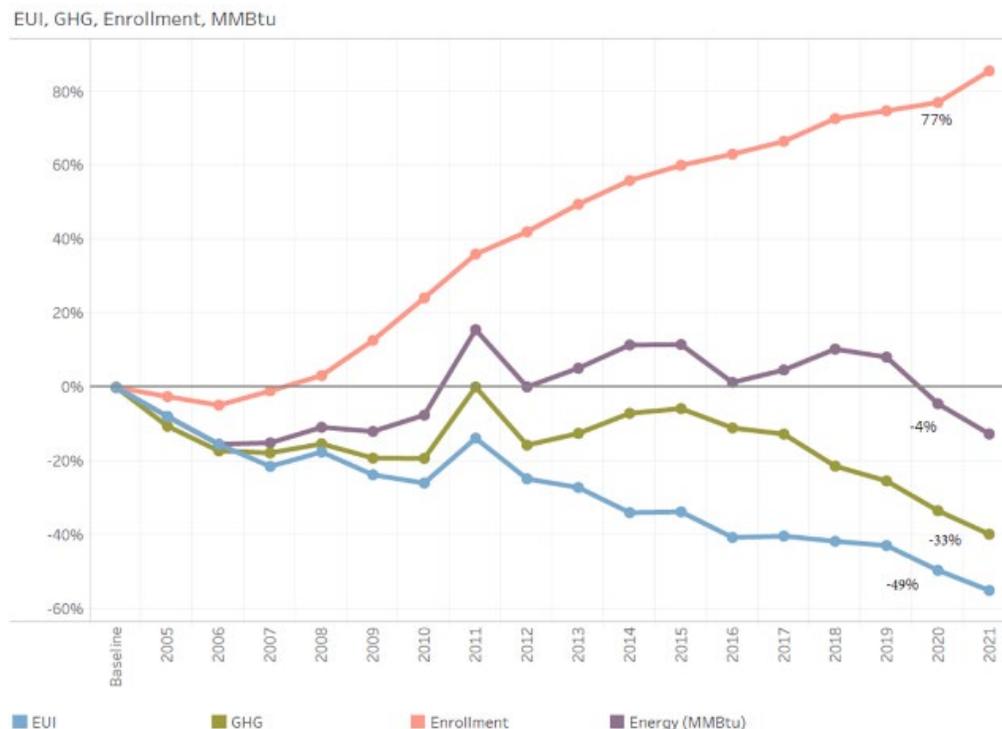
### 3.5.1 Greenhouse Gas Management

UMass Lowell is in full compliance with the Department of Energy Resources Greenhouse Gas and Emissions reporting requirements in support of EO 594. Each year, UMass Lowell completes an annual emissions inventory to the DOER's Leading by Example program along with a separate report to University of Massachusetts Board of Trustees. In both instances the data is compiled by an independent consultant, Competitive Energy Services and the Emissions Inventory and Disclosures for UMass Lowell is available through DOER, and the UMass President's Office.

UMass Lowell is required under MassDEP air quality regulations to track and report significant air emissions annually. Scope 1 GHG emissions (stationary and mobile) are reported through the web-based Climate Registry Information System (CRIS) according to the Climate Registry's guidance. All other emissions are reported through MassDEP's web-based Source Registration reporting system in accordance with MassDEP regulations. This reporting is carried out by an independent consultant, Woodard & Curran, Inc.

UMass Lowell also voluntarily reports its Greenhouse Gas Emissions to the Association for the Advancement for Sustainability in Higher Education (AASHE). In its February 2022 submission to AASHE's Sustainability Tracking and Assessment Rating System (STARS) report, UMass Lowell received a Gold score of 83.37, which is the best performing in Massachusetts and the third-highest in New England.

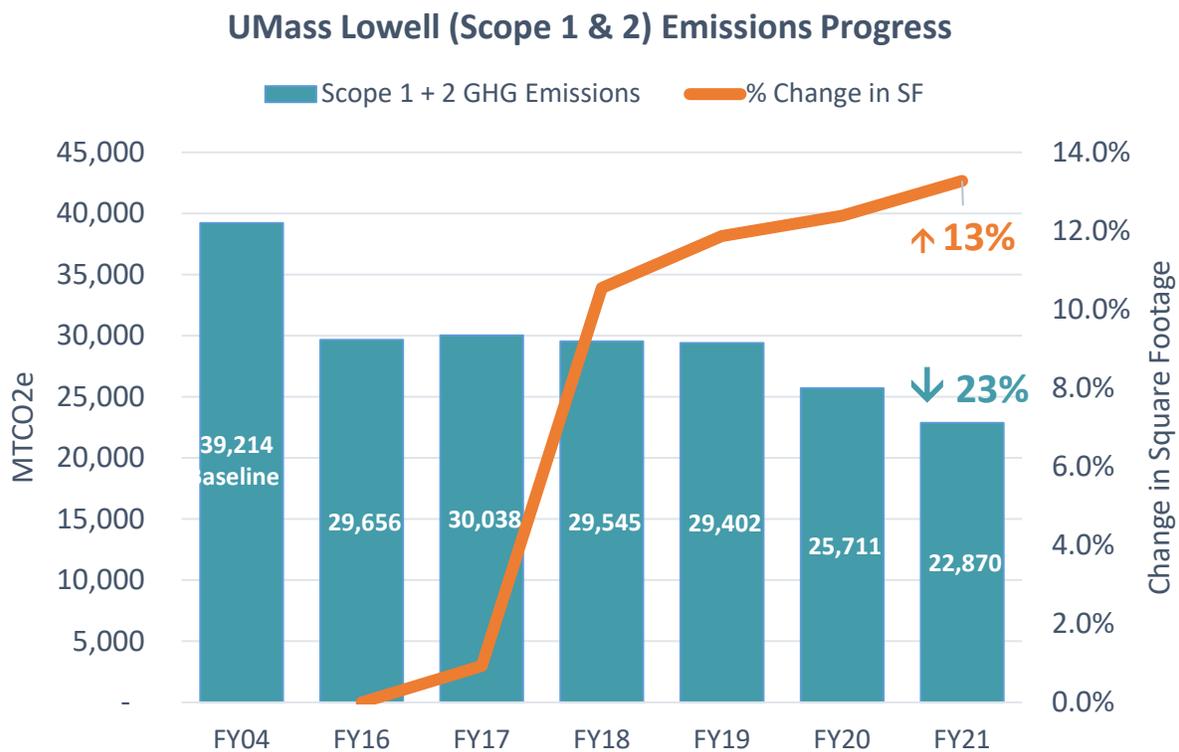
**Figure 28. UMass Lowell EUI, GHG, Enrollment, MMBtu since 2004 DOER Baseline**



UMass Lowell’s largest source of stationary (Scope 1) GHG emissions comes from its on-campus power plants located on North and South campus. Stationary generation resulted in *11,464 Metric Tons of CO2 Equivalent in FY21*. Fortunately, as documented in the campus Carbon Reduction and Alternative Energy Master Plan, UMass Lowell does not operate combined heat and power systems. This presents increased opportunity for the campus to reduce emissions to coincide with the greening of the electrical grid and an overall shift to more efficient and environmentally friendly heating and cooling options throughout the life of the plan.

The majority of Scope 2 emissions at UMass Lowell, *4,634 Metric Tons of CO2 Equivalent in FY21*, come from purchased electricity. UMass Lowell will continue to monitor and balance opportunities for the campus to support and contribute to the opportunities that will come from an increasingly greener and cleaner electrical grid for the region.

**Figure 29. UMass Lowell Scope 1 and 2 Emissions Progress (2016- 2021)**



Scope 3 emissions, particularly due to the impact of the pandemic, are down significantly at UMass Lowell. Over the last three fiscal years, commuting to and from campus was greatly reduced, study abroad and business travel was at an absolute minimum, and associated business activities and their related emissions were reduced to near zero. Moving forward, starting with FY23, UMass Lowell will revert to full Scope 3 reporting that will be reflected in the annual reporting and compliance approaches documented above.

### **3.5.2 Green Building Design Standards**

UMass Lowell, alongside the University of Massachusetts Building Authority (UMBA) and the Commonwealth's Division of Capital Asset Management and Maintenance (DCAMM) – other Commonwealth agencies that the University often partners in funding and managing construction projects, are subject to the Governor's Executive Order 594, titled "Leading By Example: Decarbonizing and Minimizing Environmental Impacts of State Government."

Executive Order 594 sets goals and requirements that will accelerate the decarbonization of energy used to heat and cool state facilities, help to demonstrate new technologies and strategies necessary to meet the Commonwealth's energy goals, and quicken the shift to electric heating in state buildings. This Executive Order sets a target to reduce state buildings' energy use intensity (energy consumption per square foot) by 20% in the fiscal year 2025 and 30% in 2030 (based on the fiscal year 2004 baseline). As part of efforts to reduce energy use, emissions and costs, Executive Order 594 also sets targets to reduce fuel oil consumption by 90% by 2025 and 95% by 2030 from a 2004 baseline. The Commonwealth publicly tracks progress toward Executive Order 594 targets and a broad range of sustainability metrics.

This executive order requires all Commonwealth agency new construction and substantial renovation projects larger than 20,000 square feet to adhere to the updated "Massachusetts LEED Plus" standard. The revised standards also apply to substantial renovations that are similar to new construction.

The Massachusetts LEED Plus standard requires the following:

- LEED Silver or higher certification by the U.S. Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) program for all new construction and major renovation projects over 20,000 square feet;
- Energy Performance 20% better than current Massachusetts energy code requirements (to be replaced by Specialized Stretch Energy Code when promulgated);
- Prioritize envelope performance, air filtration, ventilation heat recovery, and reduced solar heat gains
- Use efficient electric or renewable thermal technologies for space heating/cooling and hot water heating systems
- Design to an Energy Use Intensity(EUI) target that meets or exceeds best-in-class by building type and climate zone
- Maximize installation of onsite renewable energy or design solar-ready
- Incorporate long-term climate resiliency into design and siting decisions
- Install EV charging stations and "EV-ready" parking spaces

Projects smaller than 20,000 square feet must meet all requirements of the updated LEED Plus standard except LEED Certification.

The USGBC's LEED program has four levels of certification based on a point-based rating system: LEED Certified, LEED Silver, LEED Gold, and LEED Platinum. In adhering to Executive Order 594, UMass Lowell has set LEED Silver as the minimum target for all new construction and major renovation projects greater than 20,000 SF. Projects smaller than 20,000 SF and other phased or partial renovation projects that cannot attain certification will be designed to meet the Massachusetts LEED Plus standard but not undergo the USGBC's LEED certification process.

## LEED Building Construction Projects

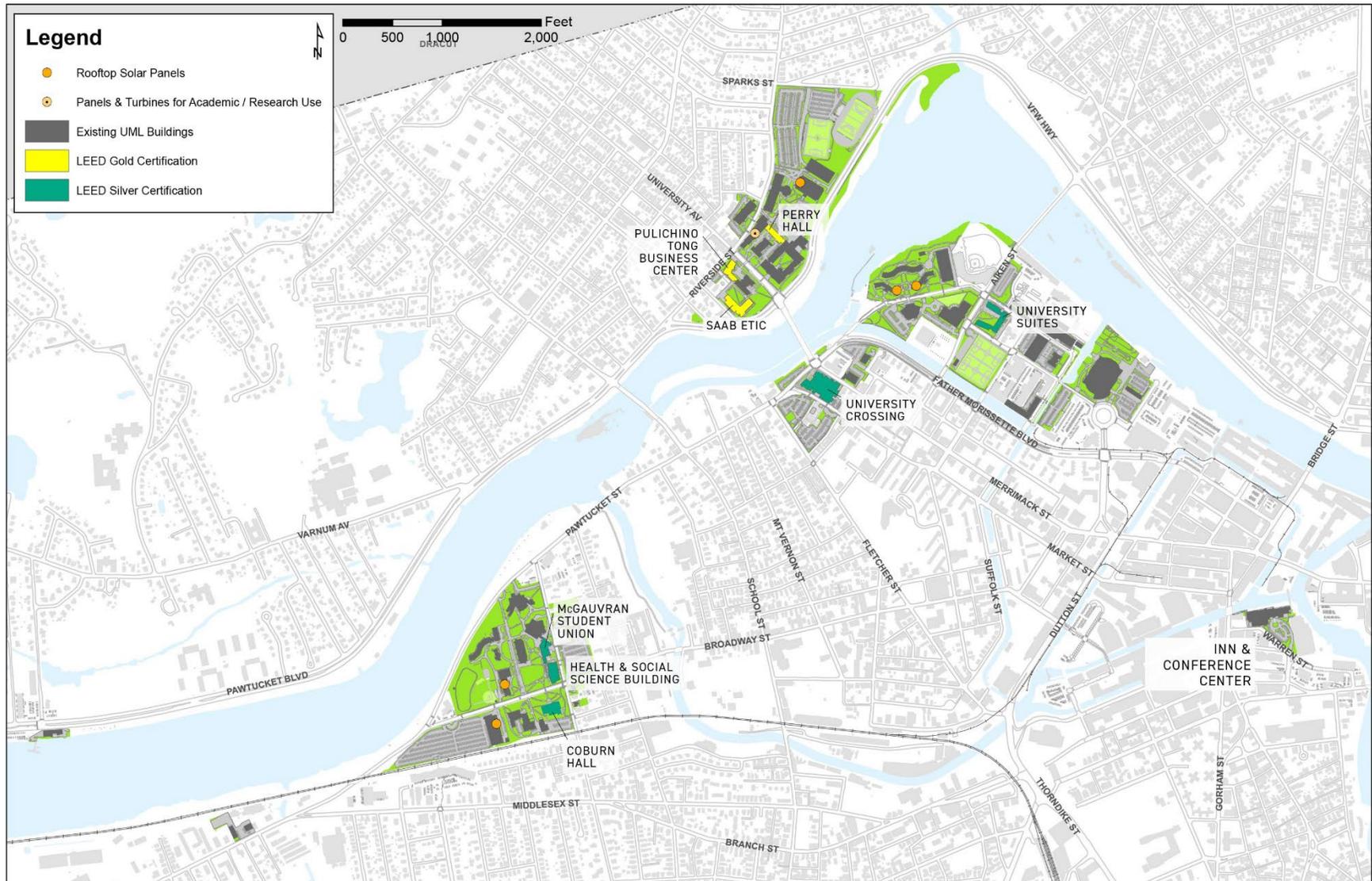
Since the adoption of the Massachusetts LEED Plus building standard based on previous Executive Order 484 and the 2021 Executive Order 594, the University has a growing list of LEED-certified buildings:

- The **Mark and Elisa Emerging Technologies and Innovations Center (ETIC)** was certified LEED Gold.
- The **Health and Social Sciences Building (HSSB)** was certified LEED Silver.
- The **University Suites** residence hall was certified LEED Silver.
- The **University Crossing student center** was certified LEED Silver. In addition, the **Crossroads Café** at University Crossing was recognized as a "3-Star Certified Green Restaurant" by the Green Restaurant Association in November 2016 for the sustainable features of the dining facilities and University Dining's commitment to sustainability.
- The **McGauvran Student Union** Repurposing Renovation (Dining Hall for South Campus) was completed in November 2015 and fully occupied in January 2016. The project includes installation of a natural gas high-efficiency heating and domestic hot water system, which replaced the steam-based heating system powered by the South Power (Steam Heating) Plant. The project received LEED Silver certification in September 2016. In addition, the South Campus Dining Commons at the McGauvran Student Union was also recognized as a "3-Star Certified Green Restaurant" by the Green Restaurant Association in July 2016.
- The **Pulichino Tong Business Center (PTB)** was completed and occupied in January 2017, featuring high-efficiency HVAC and LED lighting systems, a passive solar wall, and other sustainable building features. The building received the LEED Gold certification.
- The renovation of **Coburn Hall** was completed in 2020. It included energy efficient mechanical, electrical, and plumbing systems, native landscaping, the introduction of insulation in the roof structure of the building, improved indoor air quality, and sustainable materials, in the reuse of an historic structure. The project was designed according to the Massachusetts LEED Plus standard and received LEED Silver certification from the USGBC in late 2022.
- **Perry Hall Renovations**, a 56,000 square foot renovation of the existing lab building, was completed in 2019 and occupied the same year. The project incorporates a variety of energy-saving and efficient building systems strategies, major envelope upgrades, water use reduction, and low environmental impact materials. The project achieved the LEED Gold Certificate.

Besides these new construction projects, renovations at Bourgeois Hall, Leitch Hall, and Fox Dining Hall were designed to achieve LEED Silver certification. The University is also undertaking

major capital improvement projects in Ball Hall, Olsen Hall, Olney Hall, and Weed Hall. These renovation projects will be designed to meet or exceed Massachusetts LEED Plus standards. Figure 30 shows the location of each LEED-certified building on campus, along with the location and capacity rating of rooftop solar panels on university buildings.

**Figure 30. UMass Lowell LEED Certified Building and Renewable Energy Facilities, 2022**



## 4. CHAPTER FOUR – CURRENT CAPITAL PROJECTS PLAN

Previous chapters have identified UMass Lowell's framework for physical evolution and responsive planning, as well as the scale of need for additional space. This chapter describes the major capital projects underway or proposed to address identified needs. These projects, together with the optimization of existing facilities, will make significant progress toward meeting the University's academic, research, and student life needs.

### 4.1 RECENT CAPITAL PROJECTS

#### 4.1.1 2016-2021 UMass Lowell Capital Projects

The *2016-2021 Strategic Development Plan* identified ten major capital projects in progress or planning stages. Since that document was published and approved, the following projects have been completed as proposed:

- **North Quad Pod Addition** opened in Fall 2016.
- **Southwick Courtyard** opened in Fall 2016 with the North Quad Pod Addition.
- **Perry Hall Engineering Building** opened in 2019 after being closed for 18 months for renovations.
- **South Campus Mall**, with the new landscaping, opened for students in Fall 2016.
- **Central Services and Facilities Operations** Buildings opened in Spring 2017.
- **Perkins Properties**, renamed River Hawk Village, opened as student housing in Fall 2017.
- **Fox Hall Elevator Addition** was completed in Fall 2017.
- **Aiken Street Recreation Fields** renamed the **Campus Recreation Complex** opened for students in Fall 2018.
- **Pawtucket Street Riverfront Park**, renamed as the **Northern Canal Overlook**, was completed in 2020.
- **Accelerated Energy Program** (AEP) was completed in 2017.

The status of the two-to-five-year projects identified is as below:

- **Olsen/Life Sciences** project is being implemented in phases subject to availability of funding. The current phases are expected to be completed by early 2024.
- **Coburn Hall** restoration was completed in 2020.
- Plans for the **New Residence Hall** on the South Campus have been indefinitely deferred due to changes in student housing demand.

Also during this period, care and control of the Bellegarde Boathouse was formally transferred from the Department of Conservation and Recreation to UMass Lowell. UMass Lowell had operated the facility for several years prior to this transfer so the change had little impact on day-to-day activities at the facility.

#### **4.1.2 UMass Lowell Energy Efficiency Projects**

Many campus-funded energy efficiency projects have been completed, including:

- Parking lot lighting in the Riverside lots on North Campus and the Fox Hall lot on East Campus was replaced with new LED fixtures. Battery solar lighting fixtures were installed along the walking route between East and North Campuses
- Lighting has been upgraded with efficient LED fixtures in Alumni Hall, Allen House, Shah Hall, Olsen Hall, Dandeneau Hall, Wannalancit Business Center, Olney Hall, Coburn Hall, Concordia Hall, O'Leary Library, and various parking structures,
- Steam Distribution – steam piping and condensate lines were repaired, replaced, and reinsulated in various locations on both the South and North Campuses, eliminating leaks and improving efficiency.
- Steam Trap Replacement and Maintenance – Improved the efficiency of 800 steam traps that begin to release steam from the University's steam heating system after calcification.
- Improved the pipe insulation to decrease energy loss in 23 mechanical rooms across campus;
- HVAC Efficiency projects were completed in Alumni Hall, Falmouth Hall, Olsen Hall, Shah Hall, Campus Recreation Center, River Hawk Village, including window sensors, Submillimeter Lab, and Costello Athletic Center.
- Building Management System Upgrades – additional control points have been added to mechanical equipment in conjunction with renovation projects impacting most campus buildings. These controls enable centralized operation and reduced energy consumption.

#### **4.1.3 2016-2021 Capital Projects by Others**

In addition, several projects permitted and completed by others have directly benefited UMass Lowell, including:

- Replacement bridge that carries Pawtucket Street over the Northern Canal and Pawtucket Canal opened to traffic in 2021, reducing travel distance and associated fuel consumption for campus shuttles and improving pedestrian connections among the campuses.
- A private owner renovated the building located at 839 Merrimack Street that the university now leases as its Graduate and Professional Studies Center. This renovation included significant improvements to the envelope insulation and efficiency of the mechanical system serving the building. Private developers completed tenant improvement renovations to support university research facilities in leased property in Andover and Lincoln, as well as Lowell.

## **4.2 CURRENT CAPITAL PROJECTS**

### **4.2.1 North Campus**

#### **Olsen Infrastructure**

By 2024, UMass Lowell will complete the current phases of a multi-phase renewal of the mechanical, electrical, plumbing, and fire protection infrastructure serving Olsen Hall. This work

will enable the campus's primary Life Sciences building to support contemporary research and instructional needs. It will also provide greater reliability and improvements to operational efficiency for these systems.

### **NPP Boiler #3 Replacement**

Over the past decade, the two primary boilers at the North Power Plant have been upgraded and replaced. The third boiler was installed in 1966 and is now due for replacement. UMass Lowell is advancing a project to replace this 800HP boiler with two smaller ones, one 300HP, and one 500HP, to allow for more efficient partial load plant operations. The 300HP boiler will be capable of burning natural gas or ultra-low sulfur diesel as fuel sources.

#### **4.2.2 Two to Five Year North Campus Projects**

##### **Olney Renewal**

The campus is preparing for a multi-phased investment in Olney Hall that will combine modernization of the instructional program for Physics, Chemistry, and Environmental, Earth and Atmospheric Sciences (EEAS) with deferred maintenance. Up to \$45 million of this will ultimately be funded from campus borrowing. The balance is expected to be state support through the higher education major capital funding program.

The first phase will demolish the lecture hall appendage on the east side of the building and replace it with a new addition that includes several new instructional spaces, a new primary north entrance to the building, redesigned and relocated loading, a new code-compliant chemical handling facility, and key enabling facilities for future critical repairs – a shell mechanical room and a new vertical shaft to the roof level of the main building.

The project will also include the modernization of instructional spaces in the main building, enabling relocations of academic offices, and coordinated investments in mechanical and electrical systems and building envelope, consistent with the recommendations of the AEMP.

##### **Ball Renewal**

The campus is launching the first phase of a multi-phase effort to address this long-neglected building. Donor interest is expected to be directly associated with improving program space for Engineering students and faculty, especially in Plastics, but also in Mechanical and Electrical/Computer. The bulk of the funding will necessarily need to be spent on electrical, mechanical, and envelope improvements, without which instructional and research laboratory spaces cannot be modernized.

##### **Costello Phase II**

Phase II of a multi-stage renewal of the primary Athletics building on North Campus will involve replacing an indoor swimming pool with a new strength and conditioning facility and related modifications. Eliminating the antiquated indoor pool will significantly reduce energy consumption and ongoing building deterioration associated with the presence of water and pool chemicals in the facility.

### **4.2.3 Current South Campus Projects**

#### **South Campus Steam and Electrical Infrastructure**

The campus is implementing parallel efforts to upgrade the underground electrical distribution network and the steam distribution and condensate return lines on its South Campus. This project will improve the redundancy and reliability of electrical service and eliminate leaks and the associated energy waste in the steam and condensate network.

### **4.2.4 Two to Five Year Current South Campus Projects**

#### **Weed Hall Renewal**

As the first phase of a multi-phase renewal, UMass Lowell intends to convert two fixed-seating tiered lecture halls to flat-floor active learning instructional labs, creating new mechanical space below; construct a new entrance on the east side, along with student study space and a second means of egress from the basement level; and introduce new electrical service, mechanical systems, toilet rooms, and other code compliance measures. Subject to receipt of federal grant funding, the project's initial phase may also include improvements to third-floor research laboratory spaces.

### **4.2.5 Current East Campus Projects**

#### **Acquisition of LeLacheur Park**

The City of Lowell is in the process of transferring ownership the LeLacheur Park baseball stadium to the university. The university expects to invest in capital projects to address significant deferred maintenance, code compliance, and facility condition issues following the completion of the real estate transaction.

#### **Hoff Center Pedestrian Bridge**

Due to deteriorating structural conditions discovered during a recent repair of the adjacent canal wall by the canal owners, the superstructure of this pedestrian bridge across the Lawrence Feeder Canal will be repaired and reconstructed. The bridge is connected to a building listed on the National Register of Historic Places and crosses one of Lowell's historic power canals. The engineering, design, and permitting process will be completed in close consultation with local historic authorities.

#### **River Hawk Village Central HW Heating System**

The University acquired the buildings now known as River Hawk Village in 2016. Before university ownership, the building had been renovated as residential apartments with distributed hot water tanks in each unit. The campus intends to construct a central water heating plant and eliminate the distributed hot water tanks, significantly improving efficiency, reducing energy consumption, and eliminating a major maintenance challenge.

#### **Tsongas Center Rooftop HVAC Unit Replacements**

This project will replace rooftop air handling, heating, and cooling equipment that dates to the building's original construction in the late 1990s. In addition to significantly improving reliability, the new units will be more energy efficient to operate, reducing fuel consumption and associated emissions.

### 4.3 PROJECTS BY OTHERS

#### East Campus Development Initiative

UMass Lowell is working to establish a partnership with a private developer to facilitate the redevelopment of up to ten acres of land on its East Campus. The five parcels are currently largely undeveloped, or surface parking lots but are expected to house a mix of uses including research & development, education, athletics, and residential, with University and private tenancies. As the project advances, the private developer partner will have responsibility for applicable land use and environmental permitting, including any required filings with the MEPA office.

### 4.4 TRANSPORTATION INFRASTRUCTURE IMPROVEMENTS

Building upon the 2011 UMass Lowell *Campus Transportation Plan (CTP)*, UMass Lowell completed the *Transportation Master Plan Update (TMP Update)* in December 2018 with the assistance of the Transportation consulting firm Stantec and Nelson Nygaard. The transportation plan update evaluated the progress from the 2011 CTP. The update's key findings focused on driving, parking, transportation demand management (TDM), walking, biking, and transit. The transportation plan update identified a number of physical deficiencies in the transportation infrastructure around UMass Lowell, particularly impacting the bicycling and walking experience. The update also highlighted the low awareness of the TDM programs among the campus users, the lack of regional bus service to the campus, and low parking utilization on the campus of the remote lots. Since then, the University has worked with municipal, state, and federal partners in ongoing collaborative efforts to make infrastructure improvements recommended in this *TMP Update*. These initiatives are listed in Section 2.3.3. Sustainable Transportation and infrastructure improvement related initiatives are detailed below.

#### 4.4.1 Pawtucket Greenway

UMass Lowell is leading an effort in partnership with the City of Lowell and the Massachusetts Department of Transportation to redesign Pawtucket Street, which connects South Campus to East Campus, as a complete street with enhanced pedestrian and cycling infrastructure. The project will expand on recently completed replacements of the bridges that carry Pawtucket Street over the Northern and Pawtucket Canals as well as the Northern Canal Overlook in providing safer and more comfortable facilities for walking and biking between the University's campuses, including shared use paths, separated bike lanes, more generous sidewalks, lighting, and streetscape improvements. The intent of the project is to reduce the dependence on automobile use to travel between campuses, eliminating the associated greenhouse gas emissions, traffic congestion, and related impacts. Improving these connections will also allow for more efficient use and scheduling of existing campus facilities to better respond to differential enrollment growth among programs while minimizing the need for new construction. The project has been approved by the MassDOT Project Review Committee and is listed on the Northern Middlesex Council of Governments Transportation Improvement Program.

#### 4.4.2 Lowell Canal Bridges

Lowell, Massachusetts is known as the "Birthplace of the American Industrial Revolution" and was designated in the late 1970s as the first urban National Park to celebrate the country's industrial heritage. Chief among Lowell's significant historic resources is an unparalleled intact 5.6-mile network of power canals. One of the unusual legacies of this otherwise celebrated heritage is that

eight canal bridges on and near the UMass Lowell campuses remained in private ownership until 2015. Seven of the bridges were in various states of disrepair or deterioration, necessitating weight restrictions that adversely impacted public safety, commerce, economic development, traffic congestion, and transportation efficiency in the City to a significant degree. Buses, fire trucks, and commercial vehicles were prohibited from crossing some or all of these spans and therefore had to use cumbersome and circuitous alternate routes.

UMass Lowell assisted the City of Lowell in obtaining a \$13.4 million TIGER grant from the U.S. DOT to replace or repair all of these bridges. Projects to replace or repair bridges that carry Pawtucket Street over the Northern and Pawtucket Canals, Merrimack Street over the Eastern, Merrimack, and Western Canals, and Broadway Street over the Pawtucket Canal have been completed. Substantial structural repairs to the bridge that carries Central Street over the Pawtucket Canal are under construction as of this writing. Repairs to the bridge that carries Suffolk Street over the Western Canal have been deferred due to funding limitations. The bridge improvements have already greatly improved intercampus travel and significantly reduced the associated environmental impacts.

- Eliminating weight restrictions on the bridges between the South and East Campus has increased the efficiency and convenience of campus transit, increasing ridership and reducing emissions as well as travel time.
- Removing sidewalk closures and other barriers has significantly enhanced safety, convenience, and comfort for pedestrians traveling between campuses and increased the proportion and volume of intercampus trips conducted on foot instead of in single-occupancy vehicles.
- Introducing new bicycle accommodations on the bridges has improved bicycling infrastructure and safety, facilitating expansion of the share of intercampus travel conducted on bicycles.

For more detailed information on this project, visit <https://www.lowellma.gov/165/Bridges>

#### **4.4.3 Multi-Modal Transportation Infrastructure Improvements**

Figure 31 and Table 13 on the following pages illustrate the locations, types of projects involved, and funding sources of the bridges, alongside other major infrastructure improvements to enhance bicycling, walking, driving, and public transit access in the vicinity of UMass Lowell.

**Table 13. Priority Infrastructure Roadway Improvements in the Vicinity of UMass Lowell**

#	Project Name	Project Type	Funding Source	Status
<b><u>Priority Bridge Projects in the Vicinity of UMass Lowell, FY2022</u></b>				
12	Lowell - Rourke Bridge Replacement (MassDOT Project ID 607887)	Bridge Replacement	MassDOT	TIP Year 2024
<b><u>Priority Roadway Improvements in the Vicinity of UMass Lowell, FY2022</u></b>				
J	Reconstruction & Related Work on VFW Highway (MassDOT Project ID 605966)	Roadway/Corridor Improvements	MassDOT	TIP Year 2025

<b>K</b>	Lowell-Pawtucket Street Corridor Improvements (MassDOT Project ID 612549)	Roadway/Corridor Improvements	MassDOT	Not Scheduled
<b>L</b>	Lowell – Connector Reconstruction from Thorndike Street to Gorham Street (MassDOT Project ID 604694)	Roadway/Corridor Improvements	MassDOT	Not Scheduled
<b>M</b>	Lowell-Pedestrian Walkway & Bicycle Connection at Pawtucket Falls Overlook from Vandenberg Esplanade to School Street (MassDOT Project ID 607885)	Bicycle and Pedestrian Improvements	MassDOT	Not Scheduled

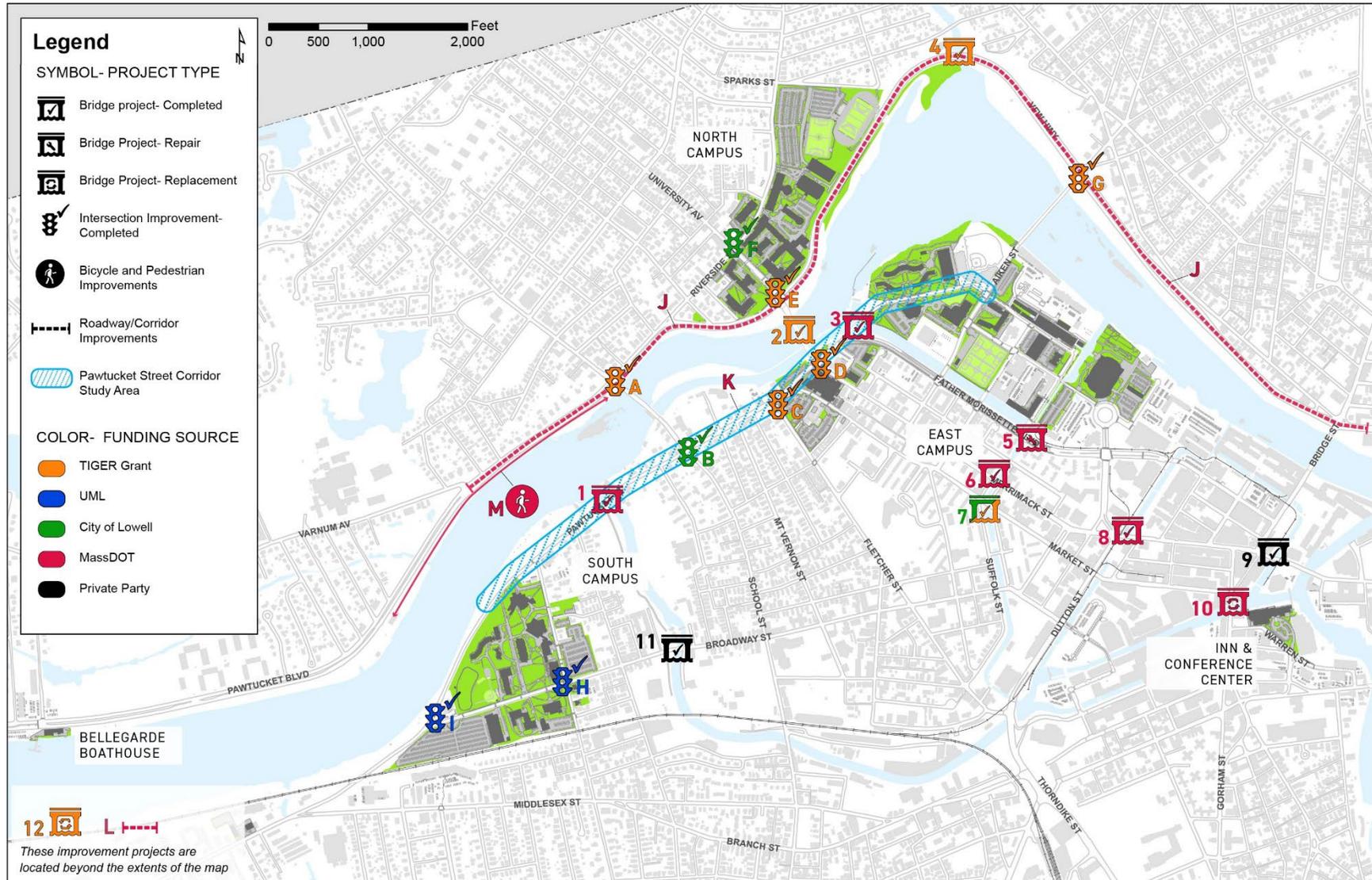
#### **Status of Bridge Projects presented in 2016-2021 SDP Update**

<b>1</b>	Pawtucket St. over Pawtucket Canal	Bridge Replacement	TIGER Grant	Complete
<b>2</b>	University Ave. over Merrimack River	New Bridge	MassDOT	Complete
<b>3</b>	Pawtucket St. over Northern Canal	Bridge Replacement	TIGER Grant	Complete
<b>4</b>	VFW Hwy. over Beaver Brook	Bridge Replacement	MassDOT	Complete
<b>5</b>	Suffolk St. over Northern Canal	Bridge Repair	TIGER Grant	Not Funded
<b>6</b>	Merrimack St. over Western Canal	Bridge Repair	TIGER Grant	Complete
<b>7</b>	Market St. over Western Canal	Bridge Replacement	City of Lowell / MassDOT	Complete
<b>8</b>	Merrimack St. over Merrimack Canal	Bridge Repair	TIGER Grant	Complete
<b>9</b>	Kearney Sq. over Eastern Canal	Bridge Replacement	Private bridge owner	Complete
<b>10</b>	Central St. over Lower Pawtucket Canal	Bridge Repair	TIGER Grant	Ongoing
<b>11</b>	Broadway St. over Pawtucket Canal	Bridge Replacement	Private bridge owner	Complete

#### **Status of Intersection Improvement Projects presented in 2016-2021 SDP Update**

<b>A</b>	Varnum Ave. / Riverside St. at Mammoth Rd.		MassDOT	Complete
<b>B</b>	Pawtucket St. at Mammoth Rd.		City of Lowell	Complete
<b>C</b>	Pawtucket St. at Fletcher St.		MassDOT	Complete
<b>D</b>	Pawtucket St. at Merrimack St.		MassDOT	Complete
<b>E</b>	VFW Hwy. at University Ave.		MassDOT	Complete
<b>F</b>	University Ave. at Riverside St.		City of Lowell	Complete
<b>G</b>	VFW Hwy. at Aiken St.		MassDOT	Complete
<b>H</b>	Broadway St. at Wilder St.		UMass Lowell	Complete
<b>I</b>	Pawtucket St. at Broadway St.		UMass Lowell	Complete

**Figure 31. Priority Infrastructure Roadway Improvements in the Vicinity of UMass Lowell, FY2022**



## **4.5 UMASS LOWELL IN 2027**

UMass Lowell in 2027 will be an inclusive, vibrant Public Research 1 University in a Gateway City. Undergraduate and graduate students with UMass Lowell degrees will help solve the world's complex challenges because of the quality of their education. The University will offer unique cross-disciplinary and paid learning experiences to enhance student return on investment and strengthen the economic development connections among the campus, its host city and region, students, and alumni. The learning experiences will be enriched with intensive involvement in research, co-op, and other applied learning activities. The University will also provide its students with tools and resources to improve their mental health as they focus on learning.

In 2027, UMass Lowell will be an R1 University, where graduate and research programs will be strengthened in quality and quantity, and new programs will be developed, including distinctive doctoral programs that are interdisciplinary. UMass Lowell will have continued the current upward arc of research and scholarship, including creative work. The University will continue to attract external funding from all sources and will have strengthened collaboration with other UMass campuses and industries. The University will also enhance the quality and experience of graduate and undergraduate students through their participation in research projects.

UMass Lowell will have strengthened its engagement with the City of Lowell and will leverage this connection to offer its students diverse cultural opportunities. The University will continue to be an anchor institution for the City of Lowell. It will partner with public, private, municipal, and regional institutions to attract more investment within the community and region.

UMass Lowell will host an inclusive environment where individuals and groups feel welcomed, valued, respected and supported to thrive on campus. UMass Lowell will be recognized as a higher education leader in sustainability and climate action through both innovative teaching and research and operational best practices.

This vision will be supported by a campus that continues to develop, guided by the principles and plans outlined in Chapter 3. The following sections more fully describe the physical conditions of the campuses anticipated in 2027.

### **4.5.1 North Campus**

Ball Hall, Olney Hall, and Olsen Hall renovations will provide improved laboratories, offices, and teaching spaces to the Francis College of Engineering and Kennedy College of Sciences. The Olney Hall addition will also create a new gateway for the students from Riverside Street parking lots. Collectively, North Campus renewal projects will strengthen the identity of the North Campus as a STEM-focused Innovation District. Overall, landscape enhancements with the renewal projects will enhance the campus's identity, safety, and cohesion.

### **4.5.2 South Campus**

The Weed Hall renewal will anchor the eastern side of the South Campus Quad with renovated classrooms, student meeting rooms, and a new pedestrian entrance. The South Campus Quad, with the renovated Coburn Hall at one end and the O'Leary Library and Learning Commons at the other, serves as an iconic campus green and central quadrangle for the South Campus, strengthening its identity as home to the College of Humanities, Fine Arts, and Social Sciences

and the College of Health Sciences. Continued enhancement of the South Campus landscape will complement these building renovation projects.

#### **4.5.3 East Campus**

East Campus will expand its role as the center for student life on campus. With River Hawk Village, East Campus is home to nearly 3,000 students in residence halls, the largest dining facility on campus, an enhanced Campus Recreation Center, and the University's most significant athletics and events venues. In addition, the new Campus Recreation Complex serves as a gateway and central green for the East Campus.

The public-private partnership to redevelop portions of East Campus will create a vibrant mixed-use main street connecting the university's two main athletic and event venues, the Tsongas Center and LeLacheur Park. This project will also strengthen the integration of the University into the economic vitality of Lowell and its downtown by attracting private industry and residential development to the area, drawn by the access to University research & development, as well as its student and alumni workforce.

At Pawtucket Street and University Avenue intersection, University Crossing will continue to function as a central gateway and activity hub for students across the three campuses, symbolically and literally supporting the University's "One Campus" vision. In addition to housing student clubs and organizations, student-centered administrative functions, and the senior leadership of the campus, University Crossing serves as a multi-modal transportation center for the University.

The Wannalancit Business Center will continue to be renovated to support expanded use and occupancy by the University's administrative functions, freeing space on the North and South campuses to support the growth of academic departments.

#### **4.5.4 Off Campus**

UMass Lowell maintains several off-campus facilities in leased and partnership spaces to support its entrepreneurial, economic, and community development mission. These include industry partnerships, business incubation centers, community research centers, and other satellite facilities in leased space in Andover, Lincoln, and Haverhill, as well as Lowell.

The University selectively responds to opportunities to expand its campus through strategic real estate acquisitions, particularly of blighted or underutilized properties close to its existing campuses.

#### **4.5.5 Land Use in 2027**

The projects planned for the next five years are not expected to result in any significant changes to campus land use. The acquisition of LeLacheur Park will increase the building square footage allocated to athletics and recreation on campus, but it will be a continuation of the current use of the facility under new ownership. Spaces currently vacated for renovations will be reoccupied with uses similar to the prior ones following completion of the projects.

#### 4.5.6 Impervious Area in 2027

The following tables provide a comparison of the pervious and impervious surfaces between 2021 and 2027.

**Table 1 UMass Lowell Pervious and Impervious Surfaces, FY2022 Actual, in acres**

	North Campus <sup>(1)</sup>	South Campus <sup>(2)</sup>	East Campus <sup>(3)</sup>	University Total
Roof Areas	8.41	6.45	12.99	27.86
Other Paved Areas	15.46	17.34	21.41	54.20
<b>Total Impervious<sup>(4)</sup></b>	<b>23.88</b>	<b>23.79</b>	<b>34.40</b>	<b>82.06</b>
<b>Total Pervious</b>	<b>18.59</b>	<b>18.11</b>	<b>21.33</b>	<b>58.03</b>
<b>Total Area</b>	<b>42.47</b>	<b>41.90</b>	<b>55.73</b>	<b>140.09</b>
Pervious %	43.8%	43.2%	38.3%	41.4%

Does not include leased properties and spaces.

(1) North Campus includes 11.0 acres of undeveloped Merrimack River frontage.

(2) South Campus includes the Bellegarde Boathouse.

(3) East Campus includes University Crossing and the Inn & Conference Center.

(4) Sum may not equal the total due to rounding.

**Table 1 UMass Lowell Pervious and Impervious Surfaces, FY2027 Projected, in acres**

	North Campus <sup>(1)</sup>	South Campus <sup>(2)</sup>	East Campus <sup>(3)</sup>	University Total
Roof Areas	8.41	6.45	14.27	29.14
Other Paved Areas	15.46	17.34	21.76	54.56
<b>Total Impervious<sup>(4)</sup></b>	<b>23.88</b>	<b>23.79</b>	<b>36.03</b>	<b>83.69</b>
<b>Total Pervious</b>	<b>18.71</b>	<b>18.27</b>	<b>24.16</b>	<b>61.13</b>
<b>Total Area</b>	<b>42.58</b>	<b>42.06</b>	<b>60.19</b>	<b>144.83</b>
Pervious %	43.9%	43.4%	40.1%	42.2%

Does not include leased properties and spaces.

(1) North Campus includes 11.0 acres of undeveloped Merrimack River frontage.

(2) South Campus includes the Bellegarde Boathouse.

(3) East Campus includes University Crossing and the Inn & Conference Center, and LeLac Park

(4) Sum may not equal the total due to rounding.

## 5. CHAPTER FIVE – ENVIRONMENTAL EFFECTS

The continued modernization of UMass Lowell campus is expected to have positive environmental effects over the next five years. The University is moving toward greater sustainability and energy efficiency through a combination of ongoing upgrades, renovation of older buildings, demolition of obsolete buildings, and a focus on deferred maintenance, accessibility, and landscaping. In addition, with continued improvement in operational practices in transportation, site and building management, recycling, and construction management, UMass Lowell is working to limit and reduce environmental effects.

### 5.1 AASHE STARS

UMass Lowell participates in the Sustainability Tracking, Assessment & Rating System (STARS) administered by the Association for the Advancement of Sustainability in Higher Education (AASHE) to evaluate the University's sustainability progress.

Described by AASHE as "a transparent, self-reporting framework for colleges and universities to measure their sustainability performance," STARS rates higher education institutions based on sustainability credits grouped into five categories and 18 impact areas. The five categories are Academics, Engagement, Operations, Planning & Administration, and Innovation & Leadership. Self-reporting institutions are recognized as STARS Reporters, and those that achieve certain scores are eligible to earn a STARS Bronze, Silver, Gold, or Platinum rating.

UMass Lowell submitted its first STARS report in May 2015 and achieved a Silver rating. The framework and the first report helped the University identify areas of concern and sustainability improvement opportunities. The University submitted its subsequent three-year update STARS report in 2016, 2019, and 2022, all of which received a Gold rating – a recognition of UMass Lowell's continued efforts to promote long-term sustainability.

With the participation in the STARS, the University has implemented a series of sustainable programs and guidelines, such as a more comprehensive sustainable procurement policy, a green cleaning policy for campus facilities, and more robust engagement programs with students, faculty, staff, and the public. In addition, the University has continuously increased its offering of sustainability-related courses and emphasis in sustainability across the academic curriculum. UMass Lowell also promotes sustainability innovations and, as part of the University of Massachusetts system, divested its endowment from direct holdings in fossil fuels.

The University submitted its most recent STARS report in February 2022 with a Gold rating. As with the CAP and the GHG reduction effort tracked through Second Nature, the University is committed to continually advancing its sustainability efforts in line with its strategic plans.

The STARS reports are available on AASHE's website<sup>2</sup>.

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<sup>2</sup> <https://reports.aashe.org/institutions/university-of-massachusetts-lowell-ma/report/>

## 5.2 WATER MANAGEMENT

### 5.2.1 Water and Wastewater

Despite subsequent declines during the COVID pandemic, actual water use in FY2019 (as billed by the Lowell Regional Wastewater Utility) exceeded the water use projection in the *2016-2021 SDP*, as shown in Table 16 below. Actual water use intensity, incorporating the actual total floor area on campus, was also higher than projected. Several factors likely contributed to this unanticipated outcome. Overall campus growth, including the addition of the River Hawk Village residence halls contributes to the water use increase. Expansion of the research program in particular increases water use in existing buildings. In addition, the University has also experienced some inconsistency in tracking water use in the past years due to missing, incomplete, or delayed water meter readings dating back to before 2011.

Improvements in metering and billing practices at LRWU have enabled the University to model water use more accurately than previously. The University is projecting a minor decrease in the Water Use Intensity with a minor increase in enrollment and an increase in research activity. With better data, higher water efficiency through fixture upgrades and replacements in renovated spaces, and water-efficient design standards for new and existing buildings and outdoor landscapes, the University will be able to offset the increased water use from continued increases in research activity. In addition, the University does not anticipate any net new residence hall construction or acquisition, which would typically increase water use.

**Table 16. Summary of UMass Lowell Water Use, FY2021 vs. FY2027**

	<b>FY2021 Projected</b>	<b>FY2019 Actual <sup>(2)</sup></b>	<b>FY2027 Projected <sup>(6)</sup></b>
Gallons/day (GPD) of Water Use –	220,000	283,000	264,000
Average/Peak <sup>(1)</sup>	440,000	566,000	528,000
Total Water Use (CCF)	108,000	137,900	128,130
Building Floor Area (s.f.) <sup>(3)(4)</sup>	4,820,931	4,773,194	4,928,043
<b>Water Use Intensity <sup>(5)</sup></b>	<b>2.24</b>	<b>2.89</b>	<b>2.60</b>

(1) Average is based on water meter readings. The peak is estimated as twice the average.

(2) FY2019 data is used as a comparison because the pandemic shutdown in 2020 do not provide comparable water use metrics. This data is based on meter readings on water bills issued Lowell Regional Water Utility.

(3) Building Floor Area used for utilities use reporting, which may include leased building, include buildings under construction, and exclude existing building spaces that are vacant, is calculated differently from how the campus building floor area is calculated in this SDP Update. The calculation of this different floor area is reported in the *Leading by Example Program Energy Tracking and Reporting Form* submitted annually UMass Lowell.

(4) The Building Floor Area for FY2027 is projected based on the FY2022 Building Gross Area of 4,904,788 square feet. The FY2022 area includes leased and owned buildings and the recent acquisition of 17 Merrimack. The gross square feet for FY 2027 includes LeLacheur Park, which will be acquired by 2027.

(5) Water Use Intensity (ft<sup>3</sup>\*100/sq.ft.) = Total Water Use (CCF) ÷ Building Floor Area (sq.ft.) x 100

(6) FY2027 Projections assume that University will be able to reduce its Water Use Intensity by 10% from FY 2019

The University recently acquired an existing building at 817 Merrimack Street. Although the building is currently mothballed, when it is repopulated with university functions, they will not likely exceed the water usage associated with the former medical uses of this building. The University is also in the process of acquiring LeLacheur Park – a Baseball field from the City of Lowell. This

facility's use is not expected to change with the ownership transfer. However, the university does anticipate replacing the natural grass playing surface with artificial turf when funding becomes available. The elimination of the need to irrigate the playing field will likely significantly reduce water consumption.

The University has had water-efficient fixtures in its Design Standards since the first Plumbing Standard and Sustainability Guidelines were written in early 2011. The University implements these standards as the buildings are renovated. The University also updates these standards based on recent advancements in water-efficient technologies. The Accelerated Energy Project (AEP) also included the replacement of hot water heaters, boilers, and plumbing fixtures with more water-efficient models in several existing buildings.

UMass Lowell is in the process of procuring and integrating a cloud-based remote water management system with the University's irrigation system. The water management system can track water use and leaks in real-time, automatically adjust irrigation based on need, and shut off irrigation remotely. The water management system can also be integrated with an onsite weather station to utilize real-time weather conditions to control performance. This system is partially implemented and currently allows the irrigation system to be operated remotely, but due to the COVID pandemic, the full implementation has been postponed. Anticipated to be fully in place by the end of 2027, the water management system can save up to 35% of the water used for irrigation. This effort will complement ongoing programs to install native, drought-resistant plantings on the campus to reduce irrigation demands.

Wastewater generation mirrors water usage. Shared billing programs between the Lowell Regional Water Utility and Lowell Regional Wastewater Utility result in a similar variance between the wastewater projections included in the *2016-2021 SDP* and the amounts reflected in actual 2019 billings.

Similarly, the University's ongoing efforts to reduce water usage and improve water efficiency will commensurately lower wastewater generation. With the 0.7% increase in student enrollment, low growth in faculty and staff size, land acreage, and building floor area, the University is only projecting FY2027 wastewater generation to be approximately 237,000 GPD, a 7% decrease over the five years from its 254,352 GPD reported in 2019. Water conservation efforts described above are primarily responsible for the projected decline in per capita wastewater generation.

To prevent wastewater contamination, the University maintains a "no pour down the drain" policy in all laboratories. In addition, it requires prior approval and completion of a "Non-Hazardous Waste Determination Form" for any exception to the policy. These procedures are designed to help ensure that chemical wastes are collected through the University's controlled waste accumulation program.

In addition, the University's main laboratory buildings are equipped with acid waste neutralization sumps where approved acidic wastewater is neutralized before merging with sanitary wastewater. UMass Lowell Environmental Health and Safety (EHS) office inspects and maintains the limestone chip tanks in all sumps annually.

UMass Lowell's EHS Office provides training to all lab users. They also provide services such as a Chemical Hygiene plan, emergency response, development of SOPs, hazardous and non-hazardous waste satellite accumulation program, non-hazardous waste determination forms, lab

inspections, lab commissioning and decommissioning, and review and approval of all hazardous materials used on campus. Hazardous materials are received on campus at the EHS Hazardous Materials Chemical Receiving Stockroom. Materials are inventoried, barcoded, and delivered to labs on campus.

The University's newly updated Industrial Sewer User Permit is effective from May 17, 2021, to January 30, 2026, covering two specific wastewater outfalls: the wastewater storage system for the Nuclear Reactor at Pinanski Hall and wastewater generated at the Saab ETIC involving its Air Scrubbing System and wafer research laboratory. The permit requires self-monitoring of flow, pH, Chemical Oxygen Demand (COD), Copper, Lead, Zinc, Arsenic, Mercury, and Total Toxic Organics (TTO). There were no violations during the 2016-2021 review period.

The University is actively coordinating and assisting the City of Lowell with projects to separate combined sanitary and storm drainage infrastructure on and near its three campuses.

### **5.2.2 Stormwater**

Using the New York State Simple model and adjusting for projected changes in total campus acreage and impervious area, it is estimated that UMass Lowell will generate 127,000 CCF of stormwater runoff in FY2027. This modeling approach does not account for the fact that nearly all new and renovated buildings and parking areas since 2011, including those currently planned, retain more stormwater onsite than pre-development conditions. In addition, in many cases, the groundwater recharge systems retain 100% of stormwater onsite. As a result, this estimate is extremely conservative.

#### **Stormwater Management Program Update**

UMass Lowell remains in compliance under its National Pollutant Discharge Elimination System Permit ID# MAR042054, including continuing to implement the minimum control measures - Public Education and Outreach, Public Involvement and Participation, Illicit Discharge Detection and Elimination, Construction Site Stormwater Runoff Control, Post-Construction Stormwater Management in New Development and Redevelopment, and Good Housekeeping and Pollution Prevention. The University works with the Stormwater Management consulting firm Woodard & Curran (WC) to ensure facility GIS mapping is updated annually. The University is working with consultants to update the required MS4 Maps. The University recently developed best practices-based SOPs for catch basin cleaning, street sweeping, winter road maintenance, and stormwater treatment structure inspection and maintenance. The University is also working on updating Illicit Discharge Detection & Elimination (IDDE) plan.

For the upcoming Permit Year, the University plans to accomplish the following tasks:

- Update its MS4 Map,
- Outfall Screening for illicit discharges (approximately 20 outfalls)
- Catchment investigations for illicit discharges
- Phosphorus Source Identification Report.

The University's Notice of Intent (NOI), permit, and the yearly Annual Reports are available under Non-Traditional MS4s and University of Massachusetts Lowell on the EPA website <https://www.epa.gov/npdes-permits/regulated-ms4-massachusetts-communities>

### **Reducing Impervious Surface**

On the North Campus, the North Quad Pod Addition Project completed the conversion of the Southwick Courtyard from impervious surface parking to landscaped open space. The Cumnock parking lot was also converted from impervious surface parking to landscaped outdoor space connecting buildings. In addition, the University redesigned the Pinanski parking lot to reduce impervious surfaces and increase accessibility. The planned replacement of the eastern appendage to the Olney Science Center will result in increased on-site capture and retention of stormwater as well as increased exterior pervious landscaping.

On the South Campus, the University removed redundant concrete pathways around Weed Hall, introduced new pervious landscaping at the South Campus bus hub on Wilder Street, and redesigned walking paths around Coburn Hall to reduce impervious surfaces. The University plans to further reduce impervious surfaces around Durgin Hall and Weed Hall in the future.

On the East Campus, the University created the Campus Recreation Complex on 4.8-acre, 225 Aiken Street property that replaced a large, paved parking lot and warehouse structure with no on-site stormwater retention with athletic fields and a subsurface groundwater recharge system that retains nearly all of the stormwater that falls on the property. The Northern Canal Overlook replaced two large tenement buildings with pervious landscaping.

The University is committed to minimizing stormwater runoff from the sites of its major construction projects. During parking lot renewal projects, the University incorporates onsite stormwater retention and other best practices to reduce impervious surfaces and minimize or eliminate runoff into adjacent drainage or combined sewer systems. The runoff is diverted to separated drainage systems or appropriately permitted outfalls where available. Drainage designs will allow for easy future connections to separated stormwater infrastructure when the Lowell Regional Wastewater Utility makes it available.

Although the East Campus Redevelopment project will be permitted separately, it is expected to convert several existing paved surface parking lots with little stormwater retention and recharge infrastructure to new development with modern stormwater management systems that will reduce net runoff into the City's wastewater system.

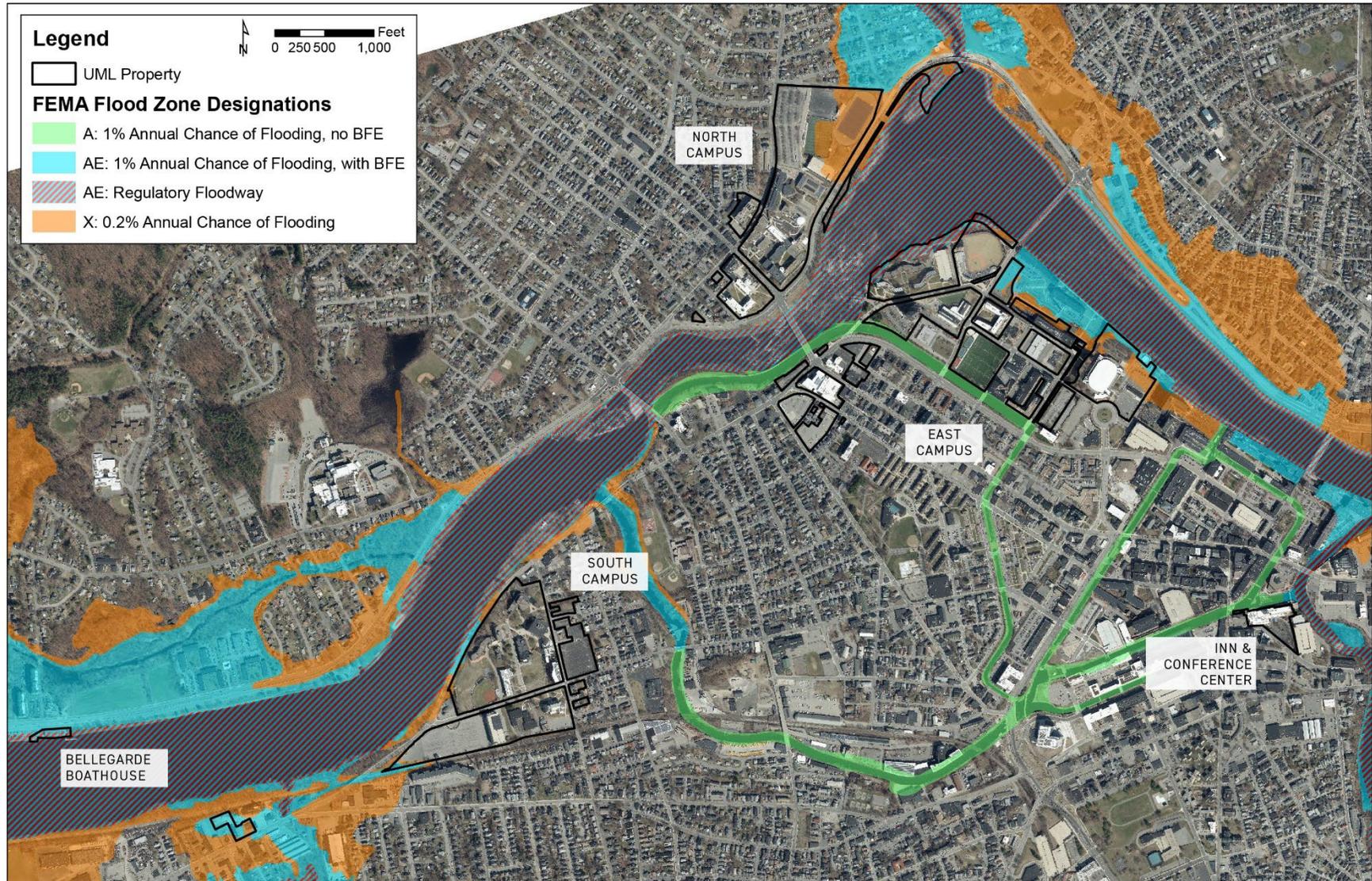
#### **5.2.3 Wetlands**

There are no jurisdictional wetland resources or tidelands on occupied portions of the primary UMass Lowell campuses. Several UMass Lowell properties are adjacent to Lowell's historic canals. Portions of the East Campus and the parcels located at 1485 and 1499 Middlesex Street are in FEMA-designated flood hazard areas. Before development and construction activity, the University reviews projects on sites adjacent to the canals or in flood hazard areas with the Lowell Conservation Commission. Subject to the guidance and direction received from the Conservation Commission, any such projects will be designed and implemented to avoid, minimize, and mitigate any unavoidable impacts to resource areas.

The University also owns a linear riverfront parcel of land between the Merrimack River and the VFW Highway on its North Campus and the Bellegarde Boathouse adjacent to the Vandenberg Esplanade. The riverfront parcel on North Campus, which includes a riverbank, bordering vegetated wetlands, and a riverfront area defined in the Massachusetts Wetlands Protection Act and associated regulations, is currently undeveloped. The Bellegarde Boathouse on the northern

bank of the Merrimack River is a water-dependent use. The University has no plans to alter the use or activities conducted on these parcels.

Figure 32. UMass Lowell and FEMA Flood Zone Areas



## 5.3 SOLID AND HAZARDOUS WASTE

### 5.3.1 Solid Waste Management and Recycling

UMass Lowell has a well-developed recycling and waste diversion program and continues to see reductions in solid waste disposal and increases in recycling. The University's primary goal is to reduce the overall output of waste. Most recycling occurs through a single-stream recycling program coordinated through the University's waste contractor, Casella Resource Solutions.

For its overall efforts, the University was named "Innovator of the Year" in 2021 by Casella Waste Systems, its regional solid waste contractor. The University's sustainability efforts were also recognized recently by the Association for the Advancement of Sustainability in Higher Education. In its 2019 Sustainable Campus Index, UML ranked fifth in waste reduction among more than 650 higher education institutions worldwide.

In the last five years, the University's compost program expanded to cover all food service operations campus-wide. In addition, the Office of Sustainability has continued to refine Fall and Spring move-out waste diversion and donation drives. Instead of ending up in landfills, goods are donated to local charitable organizations, including the Wish Project, Catie's Closet, Gradbag, Savers, and the UMass Lowell Navigators Club.

UMass Lowell is also the first college campus in the region and second in the country to install a "Grind2Energy" food waste recycling systems that convert food scraps into renewable energy. The systems installed at Cumnock Marketplace and the Tsongas Center convert food scraps into a slurry stored in a 3,600-gallon holding tank. The liquid waste is pumped into a truck and hauled to an anaerobic digestion facility, where captured methane is converted into renewable energy. In addition, the remaining nutrient-rich organic material can be used as fertilizer.

In Spring 2019, student residents' move-out donations weighed in at 14,019 pounds, four times more than what was collected in 2014, the first year the University formalized its move-out donation process.

UMass Lowell expects to reinforce the success of these programs and continue reducing its overall waste generation over the next five years. New and expanded initiatives include:

- Front-of-house composting at all campus dining locations;
- Campus-wide trash/recycling signage updates;
- Upgrading of communal recycling/trash locations in all residence halls;
- Expansion of the move-out donations/diversion program;
- Improved e-waste recycling and reporting processes;
- Implementation of a new paper purchasing and printing policy; and
- Adoption and implementation of a new electronics purchasing policy.

### **5.3.2 Hazardous Materials Management**

UMass Lowell strictly adheres to the Massachusetts construction and demolition materials waste bans. UMass Lowell's commitment to sustainable design and LEED-certifiable construction also reinforces its strict contractual requirements for construction waste reduction and recycling.

Testing for hazardous construction materials is done for all projects during the design phase. If hazardous materials are discovered, they are abated before construction begins and disposed of according to the applicable laws and regulations. Disposal of hazardous materials discovered during construction is coordinated among the University, UMBA, or DCAMM, the design team, and the contractors in compliance with applicable state regulations and the project's permit(s) to remove hazardous materials.

Through its Department of Environmental Health and Safety (EHS), UMass Lowell also has robust hazardous material purchasing and management programs to monitor hazardous materials entering and in storage on campus. EHS-administered programs include hazardous waste management, laboratory safety, training and inspection programs, stormwater, wastewater, air emission management, permitting, and reporting for regulatory compliance.

University faculty and staff planning to work with hazardous materials for teaching, research, or operational purposes must utilize the University's online purchasing program called Buyways to procure their materials, which ensures they will be properly tracked and documented even before they arrive on campus. Faculty and staff are prohibited from using University issued credit cards for purchasing hazardous materials. Requisitions for hazardous materials purchasing are reviewed by multiple Departments, including EHS, to ensure that materials requiring pre-registration are approved and that there is proper oversight of the hazardous materials being used on campus.

Upon review and approval, all hazardous materials are delivered to the EHS hazardous materials chemical receiving stockroom. EHS staff reviews the shipping paperwork and enters the chemical, biological, or radiological specific information into a web-based hazardous materials inventory program. Bar codes are printed and assigned to containers, and the materials then are delivered by EHS staff members to the labs for storage and use.

During the process of reviewing hazardous materials requisitions made by faculty and staff, EHS staff also cross references the online inventory program to promote the re-use of unwanted or excess chemicals on campus. EHS also acquires chemicals during lab clean-outs. These materials are offered for re-use during the review of chemical requisitions when someone is trying to purchase material on hand. These programs allow the University to reduce the total volume of hazardous materials on campus.

EHS staff and environmental hazardous waste management contract employees conduct weekly inspections of all satellite waste accumulation areas on campus. This ensures that all hazardous and non-hazardous wastes generated on campus are properly labeled, stored, and shipped in compliance with all MassDEP, US EPA, and DOT regulations.

In May 2019, the EHS office implemented a hazardous materials chargeback or fee of 23% on all departmental hazardous material purchases. This program generates about \$40,000 per fiscal year. The money is used to dispose of legacy chemicals and ordinary wastes generated in labs on campus. The front-end fee also discourages bulk buying or accumulating hazardous materials

that may not otherwise be needed, further reducing the amount of hazardous materials on campus.

## **5.4 COMMUNITY OUTREACH AND CONSTRUCTION PERIOD CONSIDERATIONS**

UMass Lowell is committed to minimizing and mitigating the adverse effects of construction on both academic and urban neighbors. The University is also committed to regular and consistent communication with its internal campus community and external neighbors to ensure proactive dissemination of information and prompt response to questions and concerns.

### **5.4.1 Community Outreach**

Engagement with the broader Lowell community has been and is a significant priority of the University throughout the planning and execution phases of campus renewal. Over the last few years, as construction activity has commenced, University officials at all levels have been engaged in meetings with their counterparts in the City of Lowell, neighborhood groups, business groups, community organizations, and officials from the Lowell National Historical Park. Meetings are designed to provide up-to-date information on capital project development, the current status of work at the University, acquisitions, future plans, and anticipated construction period activity.

- The following is a non-exhaustive list of examples of the meetings, briefings, and other activities the University uses and expects to continue to support community outreach. Presentations on the UMass Lowell capital program and master plan are made to the Lowell City Council and its Committee on Education Partnerships at least annually.
  - UMass Lowell senior leadership meets regularly with the Lowell City Manager and senior City leadership.
  - Regular briefings are presented to the Lowell Plan, an organization of political, business, and community leaders, including updates on the capital plan.
  - Several meetings are held with neighborhood groups describing the general capital plan and providing project-specific updates, with particular attention paid to groups representing the neighborhoods immediately adjacent to the University – Pawtucketville, the Highlands, and the Acre.
- Correspondence or in-person communications are shared with neighborhood stakeholders, property owners, and abutters as needed regarding construction updates, particularly in the Acre and Pawtucketville neighborhoods.
- The Chancellor hosts student forums and employee forums at least annually to discuss the ongoing capital program and physical transformation of the University.
- Timely updates and communications regarding the capital program and ongoing progress are provided regularly through UMass Lowell publications, including the website, social media, alumni magazine, and other outlets.
- In 2020, UMass Lowell and the City of Lowell announced the Green Community Partnership, an alliance to provide leadership, resources, and expertise for sustainability initiatives throughout Greater Lowell. The University, in collaboration with private donors, also established a \$50,000 annual grant program to fund joint university/community projects that align with UMass Lowell's sustainability goals and City of Lowell's Sustainable Lowell 2025 Master Plan.

- In 2022, UMass Lowell with Middlesex Community College (MCC), the City of Lowell, the Greater Lowell Chamber of Commerce, and the Lowell Public Schools co-sponsored the "September in the City" festival, launched this year to highlight the multicultural tapestry of events, artistry, and food that help define the City of Lowell.
- The University also engaged the local and regional stakeholders, including officials from the City of Lowell, Lowell Regional Transportation Authority (LRTA), Merrimack Valley Regional Transportation Authority (MVRTA), and Northern Middlesex Council of Governments (NMCOG) in preparing the 2018 Transportation Master Plan Update. As part of the planning process, the University held a public workshop attended by 150 attendees, and some regional and local stakeholders were part of the steering committee.
- A virtual forum was held in 2020 to solicit community input in the design of the Pawtucket Greenway.
- UMass Lowell is a signatory partner in the Upper Merrimack Street Transformative Development Initiative, led by MassDevelopment, the City of Lowell, and the Coalition for a Better Acre, aimed at fostering responsible and equitable economic and community development in the Upper Merrimack Street corridor adjacent to East Campus.
- UMass Lowell has deepened its engagement with the Lowell Public Schools, Middlesex Community College, the Merrimack Repertory Theatre, Lowell Community Health Center, Mill City Grows, the Coalition for a Better Acre, and various other local community partners to promote educational, economic, and cultural opportunities for students, community members, and others.

#### **5.4.2 Construction Period Considerations**

UMass Lowell's Project Construction and Management team works to ensure the success of projects, from scoping and programming through design, construction, and move-in. Throughout the process, the team is committed to minimizing and mitigating environmental impacts through best practices and thoughtful programming. Green building standards, building material recycling, traffic access and safety, noise and dust control, snow and stormwater management, excavation and vibration monitoring, responsive communication with the community, and contaminated material treatment and disposal are several of the team's key areas of consideration.

For all current and planned capital construction projects, including those described in this report and other smaller on-campus renovations, construction waste management, and disposal plans are developed. All waste is identified by generation point, quantity/weight, estimated waste percentage, and target for salvage or recycling. The construction management firm uses all reasonable means to divert construction and demolition waste from landfills and incinerators. All hazardous materials are fully monitored and tracked throughout the abatement process.

For projects which affect public rights-of-way or have significant delivery activity, traffic management plans are prepared and submitted to the City of Lowell for review by the City Engineer and other municipal departments. The construction management firm or general contractor provides the traffic management plans, as well as site logistics plans, to all subcontractors to ensure they understand the requirements of the project and address traffic and pedestrian safety throughout the duration of the project. The site logistics plans also describe the location of construction access gates and erosion control measures. These plans are revised to

deal with each subsequent phase of a project. Ground vibration is monitored during pile driving and blasting when necessary.

The construction management firm or general contractor works with each subcontractor to address noise, dust, and vibration issues associated with construction to ensure that any adverse effect on the surrounding buildings is minimized. Construction site fencing with solid scrim is used on each project site in appropriate locations to control dust and debris. Additional dust prevention measures include watering down all debris on site. When a project involves demolition or hazardous materials removal, dust monitoring and dust prevention measures are employed as required by applicable laws, regulations, and policies.

Storm Water Pollution Prevention Plans are established by the construction management firm or general contractor, and Environmental Protection Agency (EPA) Notices of Intent are filed as needed. Stormwater Management Plans are submitted to the City Engineer and Lowell Regional Wastewater Utility for review. Stormwater Management Plans are also submitted to the Lowell Conservation Commission for their review when project sites are located in proximity to resources under their jurisdiction.

## 5.5 HISTORICAL AND ARCHEOLOGICAL RESOURCES

In 2012, UMass Lowell engaged a qualified historic preservation consultant, Wendy Frontiero, to complete a Historic Resources Survey of campus buildings. This study included the preparation of standard Massachusetts Historical Commission (MHC) Historic Survey Forms (Form Bs) for 18 campus buildings that were then at least 50 years old. In addition to documenting their historic and architectural status and significance (if any), this exercise established the eligibility of campus buildings for listing on the National Register of Historic Places.

The following campus buildings are currently listed on the National Register:

1. Allen House
2. Wannalancit Mill (formerly Tremont & Suffolk Mills)
3. River Hawk Village, 1-65 Perkins Street (various buildings of the Lawrence Manufacturing Company)

The following campus buildings are eligible for listing on the National Register (buildings marked with an asterisk "\*" are eligible only as contributing structures to a potential North Campus historic district, not individually eligible):

4. Alumni Memorial Library
5. Ball Hall \*
6. Coburn Hall
7. Cumnock Hall \*
8. Falmouth Hall \*
9. Shah Hall (formerly Kitson Hall) \*
10. North Power Plant \*
11. Dandeneau Hall (formerly Pasteur Hall) \*
12. Perry Hall (formerly Engineering Building) \*
13. Southwick Hall

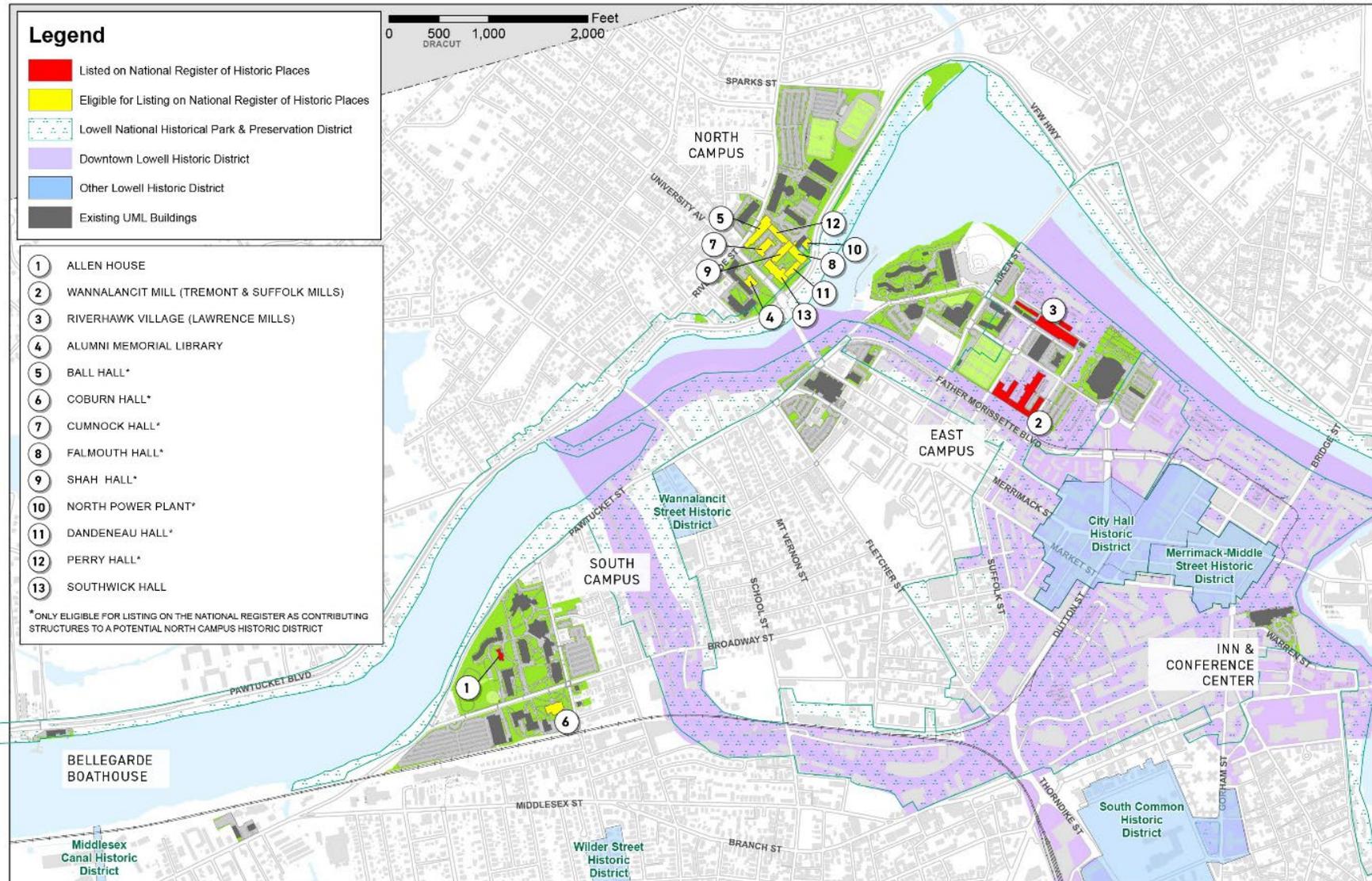
Because many campus buildings were constructed in the 1960s and early 1970s, a new portfolio of facilities have reached their fifty-year anniversaries since 2012 or soon will. As a result, the university has engaged Wendy Frontiero to complete additional survey forms for the following buildings to identify those which are now also eligible for listing on the National Register of Historic Places. These forms will be submitted to the MHC in the first half of 2023.

- Ames Textile
- Bourgeois Hall
- Concordia Hall
- Costello Athletic Center
- Dugan Hall
- Falmouth Annex (former North Campus maintenance garage)
- Fox Hall
- Leitch Hall
- Lydon Library
- McGauvran Hall
- O’Leary Library
- Olney Hall
- Olsen Hall
- Pinanski Hall
- South Maintenance Facility
- South Power Plant
- Tsongas Center Garage
- Weed Hall

In addition, portions of the East Campus and North Campus of the University, as well as the Inn and Conference Center, fall within the boundaries of various historic districts listed on the National Register of Historic Places, as shown in Figure 33. Buildings-related to listing on the National Register are numbered according to the list above.

Consistent with the MHC’s guidelines and regulations, the University and its partner agencies involved in capital construction and renovation projects file Project Notification Forms with the MHC for projects involving the above-listed buildings or campus areas located within listed historic districts.

**Figure 33. UMass Lowell Historic Buildings, Buildings Eligible for Listing, and Local Historic Districts, 2022**



## 5.6 TRANSPORTATION

Transportation enhancements have been a key component of the sustainable growth model at UMass Lowell. The University has embraced GreenDOT – MassDOT's Comprehensive Sustainability Initiative – by encouraging transportation that is less carbon-intensive, such as transit, as well as active transportation that produces zero emissions, such as biking and walking. In addition, through its Office of Sustainability, UMass Lowell maintains its commitment to reducing the environmental effects of transportation by providing convenient alternatives to driving alone that are environmentally friendly, promote health and wellbeing, and reduce transportation costs, both at the individual and institutional levels.

Moreover, UMass Lowell is committed to maintaining a low traffic impact on the local community by limiting the use of single-occupancy vehicles by the campus population. This commitment goes hand-in-hand with the GHG emissions reduction commitment. The GreenDOT initiative, together with the aggressive TDM program and support for public transit and active transportation, reduce both GHG emissions and ADT (Average Daily Traffic) generated by the University.

The University reported 1.6 MTCO<sub>2e</sub> (Metric tons of carbon dioxide equivalent) Scope 3 GHG emissions per FTE between FY2015 and FY2016. Scope 3 emissions were relatively consistent until the COVID campus closure during which they dropped to negligible levels. FY2023 will be the first one with largely restored in-person campus operations. As a result it will be the first year since FY2019 where Scope 3 emissions models can be adequately employed for tracking purposes. It is anticipated that hybrid work models will likely result in modest reductions in Scope 3 emissions per FTE.

A review of historical traffic volume data from the City of Lowell, the Northern Middlesex Council of Governments (NMCOG), and MassDOT indicates that traffic volumes immediately surrounding the UMass Lowell campuses have increased by approximately 0.34% per year since 2010 and 0.11% per year for the City. Although both represent only marginal levels of traffic increase, the deviation between the roadways near the campuses and the background conditions City-wide is likely due to a combination of University growth over the last decade and increases in volumes of regional commuter traffic accessing the limited number of Merrimack River crossings, most of which are located on or adjacent to UMass Lowell's campuses.

The success of UMass Lowell's TDM program is one of the main reasons for the GHG emissions reduction and limited ADT increase over the past years. Increased focus on on-campus housing, biking, walking, carpooling, and public transit has also reduced the impact of traffic. With enrollment expected to remain below previously projected 2021 levels and adoption of a campus-wide remote and hybrid work policy, the University anticipates that its traffic generation will remain below the levels accepted in the 2017 MEPA Certificate through at least 2027. The following sections highlight the ongoing initiatives, programs, and services of UMass Lowell's TDM program and the University's continued commitment to reducing the environmental effects of transportation and provide an ADT projection for the next five years.

### **5.6.1 Ongoing TDM Programs**

#### **Hybrid & Remote Work**

Like many other educational institutions during the pandemic, UMass Lowell instituted a robust work-from-home program. Employees whose job function did not require them to be on campus were required or permitted to work remotely full-time or a few days a week. While many employees have returned to campus in conjunction with the restoration of in-person education, the University has continued to support hybrid and fully-remote work modalities for non-student facing employees. Following the pandemic, the percentage of telecommuters increased to 8 percent from the 1 percent reported in 2018. In addition, drive-alone trips decreased to 58 percent from 71 percent in 2018.

#### **Transit Agency Collaboration**

UMass Lowell meets with the Lowell Regional Transit Authority (LRTA) team regularly to discuss coordinated improvements to transit options to serve the UMass Lowell and City of Lowell communities. In 2021, meetings with the LRTA covered topics including enhanced marketing and social media outreach, continued opportunities to streamline service on shared routes, and enhanced reporting and data analysis.

#### **Virtual Learning**

UMass Lowell offers over 50 degrees and certificate programs online. Since the pandemic, the campus has also offered numerous individual courses online or in various hybrid formats, including for day students. *Blackboard Learn* is the web-based course management system used throughout all UMass campuses. It allows instructors to enhance the online learning experience by offering discussions, readings, multimedia materials, course information (such as a syllabus and required textbooks), assignments, and assessments. Online learning enhances UMass Lowell's trip-reduction efforts by enabling the University to eliminate trips to/from the campus substantially. The University is committed to developing more programs and courses to take advantage of technology and respond to increasing community demands for this popular option.

#### **UMass Lowell Shuttle Services**

The UMass Lowell campus shuttle service, the Roadster, offers transportation between its campuses. This service also provides travel off-campus and to downtown Lowell. The Roadster shuttle operates five routes Monday through Friday from 7:00 am until 6:00 pm. In addition, three fixed routes and an on-demand shuttle service are available between 6 pm and Midnight. Under normal conditions, the service operates seven, 40+passenger buses and seven, 14 to 20-seat vans/minibuses.

The campuses and their parking facilities are separated geographically, generating significant demand for staff and students to travel between them. The shuttles currently transport approximately 5,300 passengers each day when school is in session, significantly reducing transportation-related greenhouse gas emissions versus the alternative of driving alone. Strict parking policies (such as "park once") and enforcement ensure students are using the shuttle, biking, or walking between campuses, reducing transportation emissions' impact.

#### **Lowell Canal Bridges TIGER Grant**

The Lowell Canal Bridges project, with the repair and replacement of the five designated bridges listed in Table 13, is helping the University significantly reduce its transportation-related Greenhouse Gas (GHG) emissions as documented in its Climate Action Plan. By providing more direct links between south and east campuses, the project will create environmental and sustainability benefits by reducing air pollution associated with transit travel emissions due to a reduction in vehicle miles traveled (VMT). The initial study estimated that the entire project would yield an annual VMT reduction of 51,608 among UMass Lowell buses, LRTA buses, and Lowell Public School buses.

### **Bicycling Incentives**

UMass Lowell has a Bike Shop on campus, and five bike repair stands (Fix My Ride), including a bike stand, tire repair tools, Allen wrenches, and a bike pump. For people who do not have bikes, there is the *Freewheelers Bike Share* program that offers faculty, staff, and students the use of a bicycle for up to one day. These programs significantly promote sustainable travel around campus and the City of Lowell. UMass Lowell provides free bike helmets, locks, and lights each semester to promote safe biking. The University recently awarded a Sustainability Encouragement & Enrichment Development (S.E.E.D.) Grant to incentivize people who currently buy a semester or annual commuter parking pass to try commuting by bicycle. The grant will partially reimburse parking pass costs, provide discounts at the bike shop, and fund educational materials related to bicycling as a commuting mode. The University also is rated a Bike Friendly University by the League of American Bicyclists.

### **Carpooling & Vanpooling**

Carpool and vanpool matching is coordinated through a partnership with Middlesex 3 Transportation Management Association (TMA). The TMA area includes Bedford, Billerica, Burlington, Chelmsford, Lowell, Tewksbury, Tyngsborough, and Westford. Students, faculty, and staff at UMass Lowell can register to utilize commuter services offered through the TMA, such as eCommuter.org, which offers features including ride matching and emergency ride home programs that encourage members of the University to pursue more sustainable transportation methods to and from work and school. UMass Lowell will continue to work toward increasing its carpooling/vanpooling population and promoting existing benefits to all commuters.

### **Discount on Parking Permits for Carpoolers**

UMass Lowell offers a preferential parking program for commuters who carpool to the campus. The University also provides a 50% discount to carpoolers for premium parking permits, along with 120 carpool-permit-only parking spaces on a first-come-first-served basis. Additionally, registered carpoolers can obtain up to 16 one-day commuter parking permits per semester to accommodate an occasional need to drive alone. This is available for participants without a carpool hangtag. The carpool spaces are conveniently located on all three campuses: North Campus, Riverside Lot B (faculty, staff, and commuter students); South Campus, Wilder Lot (faculty and staff); South Campus, Broadway/Riverview (commuter students); and University Crossing (faculty and staff).

### **Emergency Ride Home Program**

To alleviate the fear of being stranded in an emergency, UMass Lowell, through the Middlesex 3 TMA, offers its employees who use alternative modes an emergency ride home. The Emergency Ride Home (ERH) program provides transportation by Lyft, taxi, or rental car to those who use an alternative to driving alone in the event of an emergency—usually within 30 minutes of notification.

All registered carpoolers, van poolers, transit users, bicyclists, and walkers are eligible for the program. Employees can register online through eCommuter.org, and are provided with a program identification card, forms, and instructions for use upon registration.

### **Transit Passes**

The Lowell Regional Transit Authority (LRTA) provides public transit to the UMass Lowell campus with three routes: Route 6, Route 7, and Route 9. The bus routes connect the university campus with downtown Lowell and the Gallagher Intermodal Transportation Center with connections to the MBTA Commuter Rail and Merrimack Valley RTA service. To support the use of transit by commuters, the University developed partnerships with the LRTA and MVRTA, offering faculty, staff, and students the ability to ride all LRTA buses and MVRTA Route 1/41 at no cost to the user by simply showing their UMass Lowell UCARD.

### **Preferential Parking for Fuel-Efficient Vehicles**

UMass Lowell offers 13 preferential parking spaces for fuel-efficient vehicles (FEVs) in the Fletcher Lot at University Crossing. The spaces are 100% utilized each weekday and contribute to the University's goal of transportation related GHG reductions.

### **Zipcar**

UMass Lowell commuters can sign up for Zipcar at a rate considerably lower than the general public. Students, faculty, and staff can join for only \$15 for the first year and pay no application fee, monthly minimum, or membership deposit. The University works with Zipcar to coordinate and promote its presence on campus, encouraging resident students to utilize on-campus Zipcars instead of bringing a personal vehicle to campus. There are currently only four vehicles on campus because of the pandemic and vehicle shortages. Plans are underway to correct this shortfall. UMass Lowell's Zipcar program will continue to grow as more resident students come to campus.

### **Electric Vehicle Charging**

Partnering with MassDEP, UMass Lowell introduced a network of EV charging stations on campus in mid-2015. In the last five years, the University more than doubled the number of dual-head EV charging stations from seven to twenty. These twenty charging stations can charge forty vehicles at a time. UMass Lowell is monitoring EV charging station usage and is committed to expanding its EV charging infrastructure and providing increased opportunities for further mitigating transportation related GHG emissions.

### **Live in Lowell Program**

Launched in 2015, UMass Lowell provides direct financial incentives for its faculty and staff to purchase or rent housing in the City of Lowell, thereby shortening their commutes, expanding their transportation options, and reducing the environmental impacts of their commuting activity. In addition, several private rental housing owners and not-for-profit partners have added complementary incentives and benefits to this program.

#### **5.6.2 Parking in 2027**

A detailed accounting of the existing and projected future parking supply at UMass Lowell can be found in Chapter 2. To minimize parking demand, the University will continue promoting sustainable transportation alternatives to single-occupancy vehicle driving through the combination of policy, programs, infrastructure, and parking decal pricing, as previously

discussed. With minimal projected enrollment growth, the University does not anticipate adding any net new parking to its inventory. Instead, the University will accommodate any additional parking needs by optimizing the use of the existing lots.

### **5.6.3 Vehicle Trip Generation in 2027**

The 2016-2021 SDP projected an enrollment increase of 15% during that planning period. Due to COVID and other demographic trends, actual enrollment declined by 3% instead. Current models project that enrollment will not reach the levels previously anticipated for 2021 before 2027. Since enrollment is the primary factor in vehicle trip generation at a university, it appears unlikely that the campus will attain the ADT that was accepted when the 2017 MEPA certificate was issued prior to the end of this SDP update period.

In addition, the University plans to issue a permanent remote and hybrid work policy for its staff before the end of the calendar year. This will further reduce the number of employees driving to campus at peak hours, relative to levels anticipated in 2016. As online instruction continues to expand, a commensurate reduction in student vehicle trips is also anticipated. Online courses will likely attract greater proportions of commuter students than resident students, increasing the impact on this instructional modality in reducing traffic generation. With continued and increased TDM programs, these working and learning modalities would ensure that vehicle usage rates in 2027 among campus populations would remain below the Average Daily Traffic (ADT) the 2016-2021 SDP projected for the year 2021.

## **5.7 STEAM AND POWER**

After replacing two of its boilers through its boiler replacement/upgrade program in 2012, The University is replacing North Power Plant's (NPP) aging third 800 HP boiler with a combination of 300 HP and 500 HP boilers to allow for flexibility during peak and non-peak days.

The University completed a boiler replacement project in the South Power Plant (SPP) to increase the efficiency of the gas boilers and phase out #6 fuel oil in 2016. The University significantly decreased potential emissions and realized energy savings similar to those experienced at the NPP following its 2012 upgrade.

In addition to these boiler upgrades, the University conducts periodic steam trap maintenance, steam line upgrades, insulation upgrades, condensate line insulation upgrades in North and South Power Plants, and piping infrastructure. The University anticipates that these upgrades would eliminate steam leakage equivalent to approximately 6,700 dekatherms of energy loss per year. Overall, HVAC equipment and controls, Energy Management Systems (EMS), building enclosure, Heat Recovery systems, steam trap repair, and replacement and pipe insulation upgrades across the three campuses have resulted in the 23,400 dekatherms of Net Annual Therm savings.

## **5.8 ENERGY USE**

The University completed a \$23M Accelerated Energy Project (AEP) in 2018. AEP projects and other projects completed after AEP will see a 1,300,000 kWh reduction in electricity use annually. In 2021, UMass Lowell completed the Alternative Energy Master Plan (AEMP). AEMP has an ambitious goal to achieve carbon neutrality by 2050, and to monitor progress toward that goal, UML collaborated with BR+A Consulting Engineers and Anser Advisory to develop this master

plan. The AEMP aligns multiple stakeholder groups across the campus a common set of interim carbon reduction goals with the ultimate goal of carbon neutrality by 2050. In addition, the plan supports campus sustainability objectives, legislative mandates like Executive Order 594, and University commitments.

1. The plan evaluates existing energy and metering-related data management systems to analyze onsite electricity and steam production, building-level performance, and campus-level energy performance on an ongoing basis;
2. The plan forecasts the campus' annual energy demands and identifies energy sources and energy saving opportunities that can meet these demands in a resilient, cost-effective, and sustainable manner.
3. The plan also identifies the energy saving opportunities in a building-by-building analysis. Finally, it provides a toolkit of Energy Efficiency Measures (ECMs) and Alternative Energy Measures (AEMs) that can be implemented to achieve "Good" or "Best" energy efficiency scenarios.  
ECMs toolkit spans architectural, HVAC, electrical, plumbing, and equipment-related improvements providing a comprehensive range of choices for implementation
4. The plan also provides an investment plan and the implementation timeline to provide UML with actionable, cost-effective energy efficiency and alternative energy projects to achieve University's goals and the emission and EUI requirements as outlined in Executive Order 594.

The following are among the more significant projects identified in the AEMP that are expected to be partially or fully implemented by 2027:

- North campus infrastructure piping upgrades including low-temperature hot water and chilled water distribution
- Upgrades for the following buildings:
  - a. Ball Hall (North Campus)
  - b. Costello Athletic Center (North Campus)
  - c. Olney Hall (North Campus)
  - d. Olsen Hall (North Campus)

The University plans to implement the AEMP-suggested recommendations for these buildings as a part of the projects identified in Section 4.2. The UMass Lowell Alternative Energy Master Plan is included in Appendix E.

## 5.9 GREENHOUSE GAS EMISSIONS

UMass Lowell received a Leading by Example award administered by the Department of Energy Resources (DOER) in 2019 and 2021 for its efforts to decarbonize the campus and reduce associated greenhouse gas emissions. The University is also consistently a top performer in AASHE's Sustainable Campus Index.

### Climate Action Plan

The University has already reached its target for GHG Emissions reductions for 2030 listed in the *2016-2022 SDP Update*. However, with a significant focus of future capital projects to improve existing instruction space, UMass Lowell will:

- Maintain its Scope 1 + 2 GHG emissions at or below current levels
- Reduce building energy use intensity and continue to benefit from the decarbonization of the electric grid serving the campus
- Modestly reduce Scope 3 GHG emissions through hybrid and remote work protocols.

The university's projected enrollment stability, planned renovation projects incorporating energy efficiency measures suggested in the AEMP, and operational initiatives to reduce energy consumption will enable the campus to achieve these goals.

The acquisition of the River Hawk Village increased available on-campus housing, thus reducing GHG emissions from future students who would otherwise commute to the university. In addition, continued commitment to TDM policies and programs, close monitoring of parking demand, and completing bridge replacement projects will contribute toward reducing Scope 3 GHG emissions beyond the benefits derived from remote work and online instruction.

## **5.10 RESILIENCY PLANNING**

As the effects of global climate change manifest concretely, it has become increasingly clear that, in addition to reducing greenhouse gas emissions, climate action needs to involve resiliency planning to respond to the emergent impacts that no longer appear avoidable. UMass Lowell is fortunate to be geographically situated where it can avoid many of the most severe challenges like those associated with sea level rise. Despite that advantage, several areas of concern have already begun to manifest, and the campus is working to address them. These include:

### **5.10.1 More Frequent and Sustained Summer Heat Events**

As global temperatures rise, Massachusetts is starting to see higher summer temperatures and longer-duration heat waves. These are exacerbated by the heat island effect of UMass Lowell's urban location. These periods of sustained heat place excessive demands on cooling equipment required to preserve research activity and sustain occupant comfort in buildings. In most cases, this equipment was not designed to support the level of operation associated with these incidents, increasing the risk of failure.

As immediate response measures, the campus has begun to employ demand response measures and encouraged remote work practices to enable reductions in loads placed on the equipment. In the intermediate term, the campus has altered its design standards and is now selecting and sizing replacement equipment to operate effectively under these new conditions while preserving requirements for energy conservation and efficiency.

As preventative and mitigation measures, the campus has also adopted several design standards and practices to lessen the heat island effect associated with its location. These include specifications for light-colored roof materials on buildings, the installation of green roofs on several buildings, and the cultivation of an arboretum on campus. The University also partners with various non-profit organizations and the City of Lowell to increase tree planting in the neighborhoods near the campuses as well as on the campus itself.

### **5.10.2 Rising Electrical Demand**

A corollary impact of combatting these heat wave events is rising electrical demand in the region and on campus. The electrification of transportation and heating sectors is expected to further tax the regional electrical capacity and infrastructure. The university has been focused on conservation measures, efficiency, and controls to help lessen its contributions to this demand. These include a robust building management system that allows dramatic reductions in consumption during peak demand periods with the touch of a button, retro commissioning of buildings to reduce their energy demand, and design standards in new projects to require increased efficiency and lower energy consumption.

### **5.10.3 Utility Disruptions**

Aging infrastructure combined with this increased demand means that the risk of service disruptions from failures both on- and off-campus also has risen. To reduce these risks on campus, the university has incorporated redundant loops into its central steam and electrical distribution networks on both the North and South Campuses. These systems are also almost exclusively underground on campus, protecting them from high winds and falling tree limbs or other storm-related issues. Since more disruptions now arise from incidents with off-campus infrastructure, a particular challenge in an older Gateway City with an antiquated grid, UMass Lowell has also begun to implement measures to increase the use of local uninterruptible power supply(UPS) equipment which protects sensitive research, telecommunications, and building service equipment. These systems either allow for safe powering down or smooth the transition to generator back-up power during black outs and brown outs.

### **5.10.4 Increased Flood Risk from Storm Events**

In addition to heat waves, climate change is increasing the frequency of intense rain events. These storms result in flood issues with rapid rises in river levels near the campus as well as poor drainage on streets near the campus. Fortunately, as discussed elsewhere in this report, very few areas of the campus are in high-risk areas for river flooding. Those areas at risk are generally undeveloped and undevelopable properties, with two significant exceptions. Two, one-story university service buildings on Middlesex Street are located in or near flood risk zones. The operations in these facilities have adopted flood risk mitigation plans to effectively respond to incidents and protect people, equipment, and operations if they occur. The multi-story River Hawk Village residence hall has been able to go further, lifting most building equipment and critical elements above the flood elevation in the building.

## 6. CHAPTER SIX – RESPONSE TO COMMENTS

As recommended by the MEPA Office, the table below provides a direct response to each suggestion raised or comment made by the Secretary and others in their review of the *2016-2021 SDP Update*. The full text of the Certificate and comments showing the coding of the individual comments abstracted for response is found in Appendix A.

Code	Comments	UMass Lowell Response
<b>Responses to Certificate of the Secretary of EEA on the NPC – February 10, 2017</b>		
<b><i>Environmental Impacts and Mitigation</i></b>		
<b>C-1</b>	"UMass Lowell will design projects to be consistent with UMass Lowell's Green Building Guidelines, the Campus Sustainability Initiative, the Climate Action Plan, meet or exceed Leadership in Energy and Environmental Design (LEED) Silver for all new construction, and comply with Executive Order No. 484 —Leading By Example."	During the last five years, UMass Lowell has designed its projects based on Green Building Guidelines, the campus' sustainability initiatives, and in compliance with Executive Order No. 484. Perry Hall Renovation and Pulichino Tong Business Center received the LEED Gold Certification. Coburn Hall Renovation, completed in 2020, is undergoing certification. In addition, McGauvran Center Renovation, Health and Human Sciences Building, and University Crossing, received the LEED Silver Certification in 2016.
<b><i>Review of NPC - East Campus</i></b>		
<b>C-2</b>	"UMass Lowell has stated, and the MEPA process will continue to require with subsequent filings, a goal to avoid, minimize and mitigate Damage to the Environment to the extent practicable as design advances with regard to Strategic Development Plan implementation."	UMass Lowell continues to incorporate avoidance, minimization, and mitigation of environmental impacts in its capital project practices and in university operations.
<b>C-3</b>	"I strongly encourage UMass Lowell to meet with City of Lowell early and often in the design and construction process for each Strategic Development Plan element to ensure that projects are reviewed and constructed in accordance with applicable laws and regulations."	UMass Lowell maintains consistent and regular formal and informal communication with City of Lowell officials around a broad range of subjects from capital development to real estate to community-oriented programming and engaging students in the life of the City. While the Community Relations office takes the lead in this area, the Chancellor's leadership team, Facilities Management, Student Affairs, Research and Innovation, and many other departments help to maintain these relationships.  UMass Lowell ensures that projects which require review and compliance with applicable laws and regulations administered and enforced by the City of Lowell follow the requisite processes.

<b>Traffic and Transportation</b>		
<b>C-4</b>	The University will implement a Transportation Demand Management (TDM) program as part of its Campus Transportation Plan, which will include a range of measures to reduce vehicle trips.	The University has implemented and continues to strengthen its TDM programs. These programs include: telecommuting/online learning, operation of a robust campus shuttle service, a free campus bike share program, incentives for commuting using bicycles and carpools, Zipcar, and subsidizing free transit for campus affiliates on LRTA and certain MVRTA routes. In addition, the University offers a Live in Lowell program that provides financial incentives for employees to purchase or rent housing close to campus. These programs are described in more detail in Section 5.6.1 of the SDP.
<b>C-5</b>	Ridership will continue to be monitored over the next five years	UMass Lowell's Office of Transportation Services monitors the ridership of the Roadster shuttle service on an ongoing basis, with the exception of a hiatus during COVID pandemic when shuttle service was temporarily curtailed.
<b>C-6</b>	Transit access will be greatly improved to and from South Campus when the new bridge reopens in 2017.	The re-opening of the bridges that carry Broadway Street and Pawtucket Street over Pawtucket Canal and Pawtucket Street over the Northern Canal have enabled more efficient routing of inter-campus shuttles, reducing GHG emissions, travel times, and operating expenses.
<b>Parking</b>		
<b>C-7</b>	I encourage the University to continue to explore ways to encourage and incentivize alternative modes of transit use by faculty, students, and staff as the 2016-2021 Strategic Development Plan is implemented.	As described in Comment No.C-4 previously, the University has continued to implement various programs to promote alternative modes of transit and reduce parking demand. Remote and hybrid work protocols for staff have notably reduced on-campus parking and single-occupancy vehicle trips associated with commuting.
<b>C-8</b>	The Proponent should consult with MassDEP to provide stormwater management plans and detailed information on the BMP designs so that MassDEP may assess whether the stormwater management system would be consistent with the total maximum daily loads established for the Merrimack River. Consideration also should be given to utilizing BMPs that control other impairments identified in the Integrated List of Waters for which TMDLs have not been prepared, including mercury and phosphorus.	UMass Lowell's Stormwater management program has been updated from the 2009 version to address the new NPDES MS4 General Permit requirements, including addressing the compliance with the required six Minimum Control Measures to the extent practical. The University has submitted permit-mandated Annual Reports which document the progress of the stormwater management program. In addition, the University has implemented green infrastructure and Low Impact Development techniques to minimize the addition of impervious surfaces and land disturbance to the extent possible in its recent projects.

<b>C-9</b>	Encourage UMass Lowell to continue to look at stormwater management infrastructure from a comprehensive perspective when determining the layout of future buildings, impervious pathways and roadways, and parking. UMass Lowell should continue to explore Low Impact Development (LID) options, green roofs, use of existing natural drainage patterns, recharge of clean roof runoff to groundwater, and pervious pavement during the design of building sites and roadway improvements.	UMass Lowell's master planning has generally avoided introducing new impervious areas. It has also included converting several previously impervious parking lots to pervious landscaped open spaces, particularly on North Campus. Minor projects to rehabilitate parking areas and outdoor landscapes have also worked to reduce net impervious area. Green roof features have been developed on two campus buildings and groundwater recharge systems have been incorporated into several recent campus development projects.
<b>Greenhouse Gas Emissions</b>		
<b>C-10</b>	I encourage UMass Lowell to continue to explore and incorporate to the extent feasible additional energy efficiency measures to establish and showcase a new standard in State facility high performance building design.	The University completed the Accelerated Energy Program (AEP) as described in the previous NPC. In June 2021, the University also completed an award-winning Alternative Energy Master Plan (AEMP) with funding, engagement, and support from DOER. The University is in the process of incorporating AEMP recommendations as it undertakes projects to renovate campus infrastructure and buildings.
<b>Construction Period Impacts</b>		
<b>C-11</b>	According to the Massachusetts Historical Commission (MHC) demolition of 193 Pawtucket Street and 199 Pawtucket Street would constitute an "adverse effect" (950 CMR 71.05(a)) through the destruction or alteration of all or part of a State Register property. The MHC recommends that UMass Lowell explore alternatives that would eliminate, minimize or mitigate the adverse effect of the proposed demolition. UMass Lowell will address historic impacts and mitigation with MHC through its historic review process.	After an extensive consultation and review process guided by the Massachusetts Historical Commission, the university and its local, state, and federal partners entered into a memorandum of agreement that addressed appropriate mitigation measures in conjunction with the unavoidable adverse effect of the demolition of these two buildings. The mitigation has included extensive pre-demolition photo-documentation of the impacted resources, funding and installation of permanent public signage interpreting the history of the Little Canada neighborhood, investing in design work to advance a key connection in the Canalway system between the Northern Canalway and the Frances Gate Park, funding to support archival work in the Center for Lowell History, and design review of the Northern Canal Overlook.

<b>C-12</b>	UMass Lowell should prepare and implement a Construction Waste Management (CWM) Plan for each component of construction. Materials to be salvaged, recycled, and disposed should be identified, along with methods to facilitate and promote salvage and recycling over disposal. It should identify potential reuse applications for asphalt, brick or concrete (ABC) to limit disposal at approved facilities. I encourage the Proponent to set salvage and recycling goals to gauge overall success of waste diversion.	The University has drafted Sustainable Design Guidelines for its capital projects. These guidelines encourage reuse of the existing space and to salvage and refurbish materials when possible. To manage construction waste, the guidelines direct contractors to recycle construction waste to divert disposal to landfill including materials such as clean wood, drywall, carpet, and insulation which can be recycled. In addition, the University also includes a Construction Waste Management Section in the specifications of all major renovation and new construction projects.
<b>C-13</b>	The project will require the preparation of a Stormwater Pollution Prevention Plan (SWPPP) in accordance with the NPDES CGP. Erosion and sedimentation controls should be implemented throughout the project site to reduce potential impact to wetland resource areas. UMass Lowell should support compliance with anti-idling regulations during the construction period through the installation of on-site signage and contractor education. All construction activities should be undertaken in compliance with the conditions of all State and local permits (as applicable).	UMass Lowell’s Stormwater management program has been updated from the 2009 version to address the new NPDES MS4 General permit requirements, including preparing the Stormwater Pollution Prevention Plan (SWPPP) and addressing the compliance with the required six Minimum Control Measures to extent practical. The University has submitted permit mandated Annual Reports for the years 1 through 4, which documents the progress of the stormwater management program. The University has also integrated anti-idling requirements in its standard specifications and all construction activity is undertaken in compliance with the state and local permits.
<b>Responses to MassDEP Comments</b>		
<b>Wastewater</b>		
<b>DEP-1</b>	In accordance with the requirements of 314 CMR 12.04(2)(d), the LRWWU, as a permittee with combined sewer overflows (CSO), is responsible to ensure that four gallons of infiltration and inflow (I/I) will be removed for each gallon of new design flow. The project proponent will need to work with LRWWU to ensure that this requirement is met.	The University is coordinating with LRWWU to ensure that the University projects adhere to LRWWU's obligations as a CSO permittee. LRWWU is developing a program to address I/I mitigation requirements which may include off-site mitigation fees.
<b>DEP-2</b>	The proponent will need to meet with LRWWU staff to confirm that the sewer and drain infrastructure in the locations of the proposed facilities is sufficient to convey the associated flows, and that that any system modifications are consistent with the CSO abatement plans.	The University coordinates with LRWWU on a project-by-project basis for significant infrastructure projects. In addition, the University meets with the LRWWU staff to create annual or biannual opportunities to update LRWWU with future projects and system modifications to ensure that they are consistent with CSO abatement plans.
<b>Recycling/Waste Reduction</b>		

<b>DEP-3</b>	By incorporating recycling and source reduction into the design, the proponent has the opportunity to join a national movement toward sustainable design. Sustainable design was endorsed in 1993 by the American Institute of Architects with the signing of its Declaration of Interdependence for a Sustainable Future. The project proponent should be aware there are several organizations that provide additional information and technical assistance, including WasteCap, the Chelsea Center for Recycling and Economic Development, and MassRecycle	UMass Lowell has a well-developed recycling & waste diversion program and continues to see reductions in solid waste and increases in recycling. Most recycling occurs through a single-stream recycling program coordinated through the University's waste contractor, Casella Resource Solutions. The University's compost program covers all food service locations, and the Office of Sustainability holds Fall and Spring move-out waste diversion and donation drives working with local charitable and non-profit organizations. UMass Lowell also recently installed the "Grind2Energy" food waste recycling system that converts food scraps into renewable energy. In addition, the University has initiatives to recycle e-waste and waste diversion programs.
	Massachusetts Contingency Plan/M.G.L. §.21E	
<b>DEP-4</b>	If contamination at the site is known or suspected, the appropriate tests should be conducted well in advance of the start of construction and professional environmental consulting services should be readily available to provide technical guidance to facilitate any necessary permits. If dewatering activities are to occur at a site with contaminated groundwater, or in proximity to contaminated groundwater where dewatering can draw in the contamination, a plan must be in place to properly manage the groundwater and ensure site conditions are not exacerbated by these activities. Dust and/or vapor monitoring and controls are often necessary for large-scale projects in contaminated areas. The need to conduct real-time air monitoring for contaminated dust and to implement dust suppression must be determined prior to excavation of soils, especially those contaminated with compounds such as metals and PCBs. An evaluation of contaminant concentrations in soil should be completed to determine the concentration of contaminated dust that could pose a risk to health of on-site workers and nearby human receptors. If this dust concentration, or action level, is reached during excavation, dust suppression should be implemented as needed, or earthwork should be halted.	UMass Lowell complies fully with all applicable provisions of the Massachusetts Contingency Plan whenever a project or activity requires these measures, including those noted in the comment.

<b>Responses to Massachusetts Historical Commission (MHC) Comments</b>		
<b>MHC-1</b>	Demolition of 193 Pawtucket Street and 199 Pawtucket Street would constitute an “adverse effect” (950 CMR 71.05(a)) through the destruction or alteration of all or part of a State Register property. The MHC recommends that UMASS Lowell explore alternatives that would eliminate, minimize or mitigate the adverse effect of the proposed demolition. MHC looks forward to receiving a Project Notification Form with a full description of the proposed project at this location as the information becomes available.	Please see response to comment number C-11.
<b>MHC-2</b>	The Strategic Development Plan states that a number of buildings owned by UMASS Lowell will be renovated between 2016 and 2021. The MHC looks forward to receiving, reviewing, and commenting on the projects individually as project details become available.	The University consistently files project notification forms with both the Lowell Historic Board and MHC for any project impacting a designated or eligible historic resource. It is currently updating its survey of campus buildings to identify eligible resources that have passed the 50-year threshold since the 2012 survey. Notably, the comprehensive renovation of Coburn Hall was recognized with several awards for sensitively addressing accessibility in a historic preservation project.
<b>Responses to Northern Middlesex Council of Governments (NMCOG) Comments</b>		
<b>NMCOG-1</b>	The City of Lowell Department of Planning and Development has raised concerns regarding the lack of specific information relative to the wetland impacts of those projects proposed within jurisdictional areas. They are particularly concerned about the impacts of demolishing two existing multifamily residential buildings on Pawtucket Street in order to create a riverfront park, and the construction of recreation fields on Aiken Street adjacent to the Northern Canal. The City has also raised concerns about potential pollutant releases due to contamination issues, particularly on the Aiken Street Recreation Field site, which has an industrial history.	The university filed requests for determination of applicability with the Lowell Conservation Commission for both of the projects noted in the comment and received negative determinations. In both cases, the university employed construction site practices to avoid runoff impacts into adjacent waterways.

<p><b>NMCOG-2</b></p>	<p>The Lowell Conservation Commission is concerned with the recreation field project given that the on-site stormwater management infrastructure ties into the municipal system, and no information has been provided as to how the stormwater will be treated. The Conservation Commission also commented that a portion of the North Campus includes bordering vegetated wetlands, and that other projects are subject to the state Wetlands Protection Act and Lowell Wetlands Ordinance, as they are located on bordering land subject to flooding and isolated land subject to flooding (i.e. 1499 Middlesex Street and 1485 Middlesex Street). The Conservation Commission requested that the University indicate which properties are within a FEMA Special Flood Hazard area and identify any of properties are within an Estimated or Priority Habitats for Rare and Endangered Species. Additionally, the Commission has requested that the University outline the impacts of all proposed construction activities on natural vegetation within the riverfront areas (including canals).</p>	<p>The recreation field project successfully removed a large volume of stormwater from the municipal system through onsite storage and infiltration replacing a large building and paved surface parking lot that previously had no significant on-site stormwater management.</p> <p>The University routinely files requests for determination or notices of intent with the Lowell Conservation Commission for projects that impact jurisdictional or potentially jurisdictional resource areas.</p> <p>A map is included in this Strategic Development Plan overlaying flood hazard areas on the campus for reference.</p> <p>Even for projects that are found to be outside the jurisdiction of the Wetlands Protection Act, the campus routinely incorporates construction site practices designed to minimize or avoid impacts to natural vegetation and water resource areas.</p>
<p><b>NMCOG-3</b></p>	<p>The City questions the methodology used to calculate new vehicle trip generation and finds that the ADTs vary significantly from those outlined in the ITE Trip Generation Manual. They have also raised concerns about the calculation of auto ownership based on student parking decals. The City is concerned about the streets that were included within the trip generation and level of service analysis, in that many of the roadways and intersections impacted by traffic traveling to the University were not included in the analysis. It is the City's opinion that the continued growth of the University will generate more than 3,000 trips, requiring an ENF under the MEPA process.</p>	<p>Many factors have reduced the trip generation associated with campus activity and growth below the rate of growth of enrollment. These include transportation demand management, hybrid/remote work, online course offerings, and an increase in the proportion of students who live on campus as opposed to commute.</p> <p>It is also worth recognizing that the University's enrollment (and associated changes in employee population) did not increase as much as was contemplated in the 2016-2021 SDP, further reducing trip generation below the levels projected in that document.</p> <p>NMCOG's most recent traffic volume report also indicates that at locations close to the UMass Lowell campuses where traffic counts have been consistently measured, including VFW Highway/University Avenue and Wilder/Pawtucket Streets, traffic counts have declined by 1.81% to 5.95% between 2012 and 2021, despite university expansion.</p>

<b>NMCOG-4</b>	Comments were also received from the Lowell National Historical Park (LNHP) regarding the proposed demolition of 193 and 199 Pawtucket Street, which are located within a National Register District. The boundaries of the National Park and Preservation District extend on the south side of the Merrimack River and Northern Canal to include these structures. The Park Service has noted that the previous owner of these structures invested over \$800,000 to rehab the properties, and the National Park Service feels strongly that the buildings are nationally significant historic properties and should not be demolished.	Please see response to comment number C-11.
<b>Responses to Lowell National Historical Park Comments</b>		
<b>LNHP-1</b>	Missing from Section 5.4 HISTORIC AND ARCHEOLOGICAL RESOURCES on pages 91-92 is reference to the historic properties at 193 and 199 Pawtucket Street, which are part of a National Register District and should be listed as such. They are listed on page 17 as "Vacant and to be demolished." A proposal for a park at this location appears on page 66. The boundaries of the National Park and Preservation District extend on the south side of the Merrimack River and Northern Canal to specifically encompass these buildings, which UML purchased in 2015 to remove for a park and wider sidewalks. In 2010-2011, the prior owner invested \$723,681 in 193 Pawtucket Street (1905) and in 2013, \$92,000 was invested in 199 Pawtucket Street (1890) making them suitable for rehabilitation. Lowell Park management met with UML management in January 2016 to express objections, but the buildings have remained vacant and continue to be part of UML's demolition plans. The City Traffic Engineer has cited the extra lane width in the roadway available to widen sidewalks, which would avoid demolition. The Plan (p.66) says there is no "feasible option that preserves the buildings for any purpose while also achieving the project goals (a park)." The National Park has argued that nationally significant historic properties should not be demolished for parks or sidewalks.	Please see response to comment number C-11.

<b>Responses to City of Lowell Comments</b>		
<b>L-1</b>	Page 86, Section 5.1.3 Wetlands — None of the projects proposed have been evaluated under this section. There is a blanket statement that refers to UMass Lowell's commitment to reviewing projects located in jurisdictional areas with the Lowell Conservation Commission, but there is no analysis of proposed projects and their impacts in this section. Impacts related to the demolition of the existing residential buildings on Pawtucket Street for the construction of a new riverfront park overlooking the Merrimack River and the construction of the Aiken Street Recreation Fields adjacent to the Northern Canal should be evaluated.	The projects subject to jurisdiction under the Wetlands Protection Act were submitted to and reviewed by the Lowell Conservation Commission and implemented with the benefit of the Conservation Commission's guidance to avoid, minimize, and mitigate any unavoidable impacts to resource areas.
<b>L-2</b>	Page 86, Section 5.2 Solid and Hazardous Waste - There is no mention in this section of how UMass Lowell plans to address potential release conditions at properties proposed for additions or redevelopment. Work on contaminated sites falls under the jurisdiction of M.G.L. Chapter 21E. At least one project site, the Aiken Street Recreational Fields (a former industrial site), will require the proper handling of soils during construction. Environmental impacts related to contamination for all proposed construction projects should be evaluated.	UMass Lowell has worked under the direction of licensed site professionals to ensure compliance with the provisions of M.G.L. Chapter 21E on all projects where applicable. The Aiken Street Recreational Fields project was supervised by Weston & Sampson and reviewed by DEP to ensure proper handling of soils as well as the safety of workers during construction and occupants or users of the fields upon completion.
	Section 4.2.3 East Campus:	
<b>L-3</b>	However, the University should state how the stormwater will be treated prior to connecting to the municipal system. This project is discussed in further detail in Section 5.1.3 Reducing Impervious Service. All stormwater that is collected in a University drainage system should be treated prior to discharge to a municipal system	The stormwater management design for the Aiken Street Recreation Fields significantly reduced the amount of stormwater that was discharged into the municipal system by collecting and infiltrating the majority of stormwater on site under the fields themselves. Prior to the project, the vast majority of the site was impervious surfaces that drained directly to the street channeling all stormwater into municipal catch basins without treatment.
<b>L-4</b>	Demolition of the dwelling structures and construction of the Pawtucket Street Riverfront Park requires permits from the Lowell Conservation Commission. The projects are jurisdictional under The Act and the Lowell Wetlands Ordinance (Chap. 280, §1.-13). The University does not indicate what the impacts, if any, will be to both the River and the Canal adjacent to the site.	The Lowell Conservation Commission issued a negative determination on the university's request for determination of applicability for the referenced project.

	Section 5.1.3 Wetlands:	
<b>L-5</b>	This Section states that there are no wetland resource areas located on the UMass Lowell campuses. The portion of North Campus discussed in this Section does include bordering vegetated wetlands. Numerous University projects are jurisdictional under the Wetlands Protection Act and Lowell Wetlands Ordinance due to bordering land subject to flooding and isolated land subject to flooding (i.e. 1499 Middlesex, 1485 Middlesex Street). Figure 34 indicates that those two (2) properties are located on South Campus. This Section is not clear and a little confusing.	UMass Lowell appreciates that clarification is needed in this area and is refining the language of this section with this notice of project change.
<b>L-6</b>	The following are wetland resources and the University should provide more detail on their development impacts on these resources. The University should indicate properties that are within a FEMA Special Flood Hazard Areas. The University should indicate if any of their properties are within Estimated Habitats of Rare Wildlife or Priority Habitat of Rare Species. Riverfront projects may affect important wildlife habitats including species that use the river corridor to migrate. The University should outline the impacts of all proposed construction that could have on natural vegetation within riverfront areas (including Canals). This Section does not explain if there are any vernal pools on University property {found within depressions in riverfront areas). The University should explain the extent of (or their limit) of activity in riverfront areas.	<p>As noted above, the university is including documentation of flood hazard area impacts on its campus property in this notice of project change.</p> <p>No vernal pools have been identified on campus property to date.</p> <p>The only land owned by the university that directly abuts the Merrimack River is found in two locations. A strip of land along the VFW Highway on north campus has been fenced and closed to all general access as part of closure requirements for a hazardous soils release discovered during MassDOT's replacement of the bridge that carries VFW Highway over the Beaver Brook. A portion of East Campus land is located between the City of Lowell's Riverwalk and the river. No development is feasible or contemplated in this area.</p>
<b>L-7</b>	All projects within 100' of Canals and Rivers require a permit from the Lowell Conservation Commission.	The university will continue to comply with applicable provisions of the Wetlands Protection Act for all campus development projects.
	Vehicle Trip Generation (5.5.2, pg. 95 and Table 4 of Appendix D)	

<b>L-8</b>	Auto ownership is derived from parking decal sales, however, the plan makes an assumption that all commuting students have a decal. Figure 17 on page 26 shows a correlation between increasing decal prices and decreasing purchases. This seems to be a basic price elasticity graph, and does not necessarily mean a drop in commuting traffic. Based on anecdotal evidence from resident complaints, there appears to be a problem with UML commuter's parking further into the neighborhoods to avoid purchasing a \$450 decal. It is suggested that the % car ownership (i.e. access to a car) for commuting students be increased to 95% since it is likely that commuters will have access to a vehicle even if its not their own. Likewise part time faculty/staff % car ownership (i.e. access to vehicle) should likewise be upwards of 95%.	The university strongly supports neighborhood requests that the City of Lowell establish resident-only parking zones on public streets in neighborhoods perceived to be adversely impacted by student and staff attempting to evade parking decal costs associated with on-campus parking.
<b>L-9</b>	Mode share in the study is applied on top of decal ownership, which is redundant. For example, the study presents the car ownership rate for part time staff/faculty at 65% based on decal purchase — but then subtracts another 10% for mode share to the 65% figure. This means that 6% of staff/faculty buy a \$150 parking decal but don't use it. If the study uses decal purchasing as the metric to determine auto usage, it is already discounting mode share. It is suggested that mode share either be eliminated from the decal-ownership based analysis or alternatively that mode share of 10% be applied to the more realistic car ownership rates as discussed in (a) above.	University affiliated parking and trip generation have not reached the levels projected by the university's 2016 analysis. Enrollment is not expected to reach the level projected for 2021 prior to 2027. As a result, it appears that impacts will not reach the levels forecast by TEC's model during the upcoming period, regardless of whether some of the modeling assumptions were less conservative than are now being requested.
<b>L-10</b>	The weekly weekday trips multiplier is not explained within the document or the appendix. The trip multiplier assumes that commuters to the school (full time staff/faculty and off-campus students) will only have 2 trips per day (one trip into and one trip out of the City). It is far more likely that commuter students/staff would spend their time between classes running errands, returning home for lunch, visiting friends, participating in activities, etc. Page 32 of the document shows that 95% of parking decal holders live beyond a 1 mile radius from campus, and that the median distance is 13 miles.	UMass Lowell has a strict "park once" policy that only allows commuter students access to a single parking location depending on their class year. It is highly inconvenient for students to return to their vehicles and leave campus for any of the reasons noted in the comment and then return to campus later the same day. Knowing this, commuter students tend to arrange their class schedules to consolidate their classes in blocks without breaks in between. All vehicles entering the campus lots need to swipe their unique ID cards to open the access control gate. Data from these swipes reinforces the assumption that commuter students rarely make multiple same day trips in and out of campus lots.

<b>L-11</b>	The study also does not take into account all the trips by campus service vehicles from the facilities division. UML vehicles are a constant sight on Pawtucket Street as they drive back and forth between campuses	The university owns a total of 42 facilities vehicles that service the campus. These vehicles are operated during scheduled work hours which by definition do not coincide with peak commuting hours. As a result, the net impact of the trips associated with these vehicles is not likely to have a significant impact on peak-hour trip generation.
<b>L-12</b>	The ITE Trip Generation rate for LU 550 (university/College) is 1.71 per student (9 <sup>th</sup> Edition). If this rate was to be applied to the 2,459 prospective new students (not counting continuing education or online students) the trip generation would be 4,205 trips per day. The study cites using faculty members as the independent variable to calculate ITE trip generation on section 2.3.4 of the document, but as previously commented on by MassDOT (page 119) using students as the independent variable is more accurate. The 4,205 trips generated per ITE deviates significantly from the UML traffic study's conclusion that only 2,200 new trips would be generated	As previously noted, the university's development since 2016 did not result in even the level of trip generation forecast by the model used by its consultants.
	Trip Distribution and LOS Analysis (5.5.2, pg. 97 and Appendix D pp. 9-10)	
<b>L-13</b>	Table 7 (pg. 12 Appendix D) lists eight streets which are supposedly 'Near or Within Campus', however it does not list any of the major roadways or intersections affected by UML traffic, namely: Pawtucket Street from Merrimack Street to Broadway; Merrimack Street/University Avenue from Aiken Street to Riverside Street; Riverside Street from Dracut T/L to Varnum Avenue; Broadway from Pawtucket Street to School Street; intersection of School Street and Pawtucket Street; Intersection of Merrimack Street and Pawtucket Street; Intersection of University Avenue and Riverside Street; Intersection of VFW at School Street and University Avenue; Intersection of Broadway and Wilder Street	Tables 7 & 8 used locations near or on campus where historical traffic count data was available through the Northern Middlesex Council of Governments. Similar data to reflect trends was not available for the other locations noted in the comment.

<b>L-14</b>	Table 7 calculates the average campus traffic growth rate as 0.50% - but this calculation is an average of the average growth rates of each street. Since street ADT vary from 6,026 to 26,231 the average of the averages is not accurate representation in the growth of traffic. These rates should be recalculated based on traffic growth on the roadways and intersections listed in (e) above.	This observation is correct. The weighted average annual growth rate should have been 1.6% in Table 7.
<b>L-15</b>	Level of Service analysis should be conducted at the subject intersections.	The review process did not establish that there would be sufficient total impact to warrant LOS analysis.
	Parking Analysis (2.3.2, pg. 22)	
<b>L-16</b>	Parking continues to be an issue with UML students frequently parking in residential neighborhoods. It is apparent that the continued UML growth will continue to impact the City's tight parking availability at the detriment of residents.	Please see response to comment number L-8.
	Conclusion	
<b>L-17</b>	The City disagrees with the conclusion as stated on page 31 that the proposed development plan "falls well below the MEPA threshold of 3,000 ADT." The ITE trip generation analysis clearly shows that at the trip generation would likely be above the threshold and require an ENF.	Actual growth and associated trip generation were well below the threshold of 3,000 ADT.
<b>L-18</b>	The City believes that UML's growth has contributed to the significant increase in congestion in the areas of the School Street and University Avenue Bridges and would like to see proposed traffic mitigation projects as part of an ENF filing.	Although the university disagrees with this perception, it has funded and led efforts to conduct road safety audits at the intersections adjacent to these two bridges and continues to fund design work to improve the Pawtucket Street corridor in a manner which is expected to reduce total vehicle use through the substantial improvement of available infrastructure to support cycling, pedestrian activity, and micro-mobility, while improving vehicle accommodations.

<b>LHB-1</b>	<p>Note that Figure 39 on page 92 associated with Section 5.4 (Historical and Archeological Resources) does not identify two properties that are “UML Buildings Listed on the National Register of Historic Places.” The two properties located at 193 and 199 Pawtucket Street are accurately shown as being within the Lowell National Historical Park &amp; Preservation District as well as the Downtown Lowell Historic District. However, the map needs to be revised so that these two properties are color-coded red since they are also “UML Buildings Listed on the National Register of Historic Places” due to their inclusion in the Lowell National Historical Park &amp; Preservation District. This would be consistent with other similar properties, the Allen House, Wannalancit Mill, and the Perkins Properties noted on page 91 and shown in red on Figure 39 on page 92.</p>	<p>The maps in this notice of project change reflect all campus-owned buildings that are individually listed on the National Register of Historic Places and all areas of campus that are included within the boundaries of districts listed on the National Register of Historic Places.</p>
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## APPENDICES

Appendices may be found at the  
UMass Lowell Strategic Development Plan 2022-2027 [website](#)<sup>3</sup>

### Appendix A

- Certificate of the Secretary of EEA, February 10, 2017 (2016-2021 SDP Compliance) and Comments

### Appendix B

- UMass Lowell Strategic Development Plan 2011-2016
- UMass Lowell Strategic Development Plan 2016-2021 Update
- Certificate of the Secretary of EEA, March 23, 2012 (SRP Establishment)
- Certificate of the Secretary of EEA, October 12, 2012 (2011-2016 SDP Compliance)
- Comments UMass Lowell Strategic Development Plan 2011-2016

### Appendix C

- 2009 Stormwater Management Program
- 2016 Massachusetts Small Municipal Separate Storm Sewer System General Permit (MS4 General Permit) Permit ID #: MAR042054
- 2016 Massachusetts Small Municipal Separate Storm Sewer System General Permit - Administratively Continued Permit Coverage Letter
- UMass Lowell MS4 Permit Year 1 to 4 Annual Reports
- UMass Lowell Standard Operating Procedures

### Appendix D

- UMass Lowell Alternative Energy Master Plan - June 2021

### Appendix E

- UMass Lowell Climate Action Plan Update - June 2017

### Appendix F

- UMass Lowell Report Cards (From 2016- 2021)

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<sup>3</sup> <https://www.uml.edu/facilities/planning-design-construction/planning/strategic-development-plan-2022-2027.aspx>



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