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# Campus-Wide Parking Vision Plan

Dennis Swinford

*Massachusetts Institute of Technology*, [swinford@MIT.EDU](mailto:swinford@MIT.EDU)

Niels P. la Cour

*University of Massachusetts - Amherst*, [nplacour@cp.umass.edu](mailto:nplacour@cp.umass.edu)

VHB

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# Campus Wide Parking Vision Plan

## University of Massachusetts, Amherst



SUBMITTED TO

University of Massachusetts  
Amherst, Massachusetts

SUBMITTED BY



*Vanasse Hangen Brustlin, Inc.*  
WATEROWN, MASSACHUSETTS

FEBRUARY 2013



*Vanasse Hangen Brustlin, Inc.*

[www.vhb.com](http://www.vhb.com)

*University of Massachusetts  
Amherst*

*Campus Wide Parking Vision  
Plan*

Prepared for **University of Massachusetts  
Amherst, Massachusetts**

Prepared by **Vanasse Hangen Brustlin, Inc.  
Watertown, Massachusetts**

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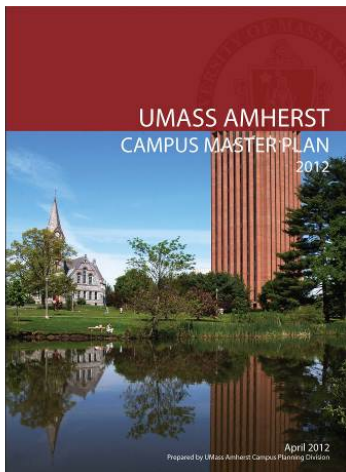
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# 1

## Introduction



***UMass Amherst Master Plan, April 2012***

Spearheaded by the Campus Planning Division, the University of Massachusetts Amherst has recently completed a campus-wide Master Plan. With the campus in the midst of a \$1 billion capital improvement program, the new Master Plan looks 40 years into the future, matching academic vision with upgraded facilities to strengthen the sense of community and enhance the campus's beauty. This Parking Vision Plan was a key component of the overall Master Plan. It establishes a parking system vision and set of guiding principles that support the vision of the Master Plan and institutes a blueprint for parking-related decisions and policies on the UMass Amherst campus.

This report consists of five chapters. Chapter 1 discusses the study purpose and methodology. The parking principles and the plans for new parking facilities are presented in Chapter 2. Chapters 3 and 4 provide an assessment of existing and future parking conditions. Near and long-term parking recommendations are summarized in Chapter 5.

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### 1.1 Purpose

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***The presence of surface parking lots within the campus core conflicts with the Master Plan vision of eliminating conflict points by moving parking from within the campus core to the periphery***

The purpose of this Campus Wide Parking Vision Plan is to define an efficient, implementable, and sustainable strategy for the campus that complements the overarching goals and objectives of the Master Plan for the UMass Amherst Campus. One of the core goals of this study was to define “parking principles” for the campus that establish a vision and policy blueprint for parking which could be implemented immediately and sustained over the long-term.

The surface parking lots on the core campus (the area bounded by Massachusetts Avenue, Commonwealth Avenue, Governors Drive and North Pleasant Street) are constantly targeted as future developable sites without replacement parking. Moreover, present parking policies tend to favor the provision of convenient parking that is located very close to buildings. The presence of surface parking lots within the





campus core conflicts with the Master Plan vision. The Master Plan seeks to alleviate the many conflict points between vehicles, pedestrians, and bicycles within the core campus by moving parking from within the campus core to the periphery. The parking principles and recommendations presented in this plan address these key issues.

A key stakeholder in the development of this Parking Vision Plan was the UMass Parking and Transportation Advisory Board (PTAB). The PTAB played a major role in vetting the Master Plan and the Parking Vision Plan development. PTAB meets quarterly to review matters related to campus parking and transportation. Given the importance of parking and transportation at UMass, PTAB's role is critical in that it generates broad-based input from students, faculty, and staff. There were two meetings with PTAB regarding the Master Plan in general, including transportation and parking, and one dealing specifically with the parking vision that is articulated in this report, including providing information to support PTAB consideration of a possible ban on freshmen parking on campus.

This Parking Vision Plan recognizes and respects the collective bargaining agreement between the University and the employee unions which has been in place since 1999. This collective bargaining agreement is the official mechanism used to establish the parking fee structure for university employees. Any changes to parking policies and permit fees would need to be vetted through the PTAB and reviewed for consistency with the collective bargaining agreement.

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***This plan recognizes the collective bargaining agreement between the University and the employee unions. Changes to parking policies and permit fees would need to be vetted through the PTAB and reviewed for consistency with the collective bargaining agreement***

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## 1.2 Study Methodology

This study addresses existing parking supply and utilization, and assesses future parking supply and needs based on increased demand from institutional growth and planned changes in the parking supply, including displacement of spaces by new construction and the addition of new spaces. The plan evaluated potential locations for future parking facilities, assessed the appropriate scale of these facilities, and examined transit and pedestrian connections between parking and the core campus. Order-of-magnitude cost estimates for potential future parking, transit, bicycle and pedestrian facilities and programs were developed to inform the selection of the best strategies for the future.

To assess the existing parking supply and demand relationship, an inventory was completed along with parking accumulation data collection to determine the existing utilization of each parking facility. The inventory and counts were conducted in the fall of 2010 after classes had been in session for several weeks. Parking accumulation in each facility was recorded on Wednesday, September 29th and Thursday, September 30th between 7:00 AM and 5:00 PM.



Future parking conditions were analyzed based on projections of existing demand and proposed changes in the parking supply. Future parking demand was projected based on the expected future staff and enrollment levels. Parking demand ratios were developed using the authorized users and existing utilization in each parking facility and the existing numbers of students and staff. These ratios were applied to future student enrollment and staff size to project future parking demand.

The projections of future parking demand were compared to the expected parking supply to determine future utilization and identify potential areas of need by user group. The expected future parking supply includes the loss of parking for planned development and the construction of four new parking garages as envisioned in the campus Master Plan. The planned garages were sized and sited using the parking principles presented in this report, with particular focus on ensuring the garages were effective at intercepting traffic at the campus periphery.

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# 2

## Parking Vision, Principles and Recommendations

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### 2.1 Parking Vision and Principles

Several principles for the UMass Amherst parking system were developed based on the long-term vision for the system from the Master Planning process:



*The core campus bounded by North Pleasant Street, Massachusetts Avenue, Commonwealth Avenue, and Governors Drive will be free of large surface parking lots and the roadways that connect them to the surrounding road system. A new parking garage will be located centrally on the core campus next to the existing Campus Center Garage, recognizing the need for additional visitor parking and Campus Center Hotel parking supporting special events.*

***Major parking facilities will be strategically located at the periphery of the campus core campus to intercept traffic***

*Most major parking facilities will be located at key locations along the periphery of the core campus where they will intercept traffic before it enters the core campus. Small-scale surface parking will continue to be provided to accommodate handicap parking and to meet the special requirements of particular facilities and academic departments.*

*The facilities on the core campus periphery will include existing surface lots and new parking garages designed to replace parking spaces lost to future campus development. All major facilities will include convenient pedestrian access to the campus core, bicycle accommodations and connections to the shuttle bus system.*

An overarching element of the campus mission and vision as set forth in the Master Plan is that ***“This Plan will serve as a guide for sustainable future development that reinforces the vision...”*** Throughout the master planning process, a common theme was to embrace and promote New England sustainability. Transportation items specifically cited included shuttle buses and expanded bike paths.



Based on the Master Plan vision and the principles of sustainability, the following twelve parking principles have been developed to guide future development of the campus parking system:

1. Maximize the number of spaces that are located near campus gateways and that are served by the campus shuttle;
2. Minimize the amount of parking provided within the core campus;
3. Provide sufficient parking to meet future demand, accounting for spaces lost to development and increased parking demands from an increased number of students and staff; the cost of replacement parking should be incorporated into each development project;
4. Provide direct links to parking facilities from the perimeter road system to minimize vehicular traffic through the campus core;
5. Provide safer and more convenient pedestrian connections between parking facilities and academic and administrative buildings in the campus core;
6. Respect the location of existing and planned bicycle and pedestrian corridors when developing new parking facilities;
7. Provide garage entrances with adequate queuing space to minimize impacts on adjacent roadways;
8. Incorporate provisions for convenient bicycle, motor scooter, and motorcycle parking with safer and more convenient access;
9. Support development of a network of intermodal connections for pedestrians, bicycles and shuttle buses that support non-auto connections to desired campus destinations.
10. Provide an adequate amount of visitor parking in each facility to meet the needs of core campus buildings served by each facility;
11. Maximize the opportunities to share parking resources among various user groups including employees, commuter students, resident students, visitors, and event attendees; and
12. Provide shared use parking to meet the demands created by special events at various venues on campus.

---

***These 12 parking principles will help achieve the Master Plan vision of eliminating conflict points between vehicles, pedestrians, and bicycles within the core campus by moving parking from the core to the periphery***

Over time, adherence to these parking principles will help achieve the Master Plan vision of eliminating the many conflict points between vehicles, pedestrians, and bicycles within the core campus by moving parking from the core to the periphery. The following sections describe the recommendations for each of the four 10-year phases of the Master Plan.

---

## 2.2 Near-Term – The First 10 Years

Within the near-term (first 10 years), the Campus Master Plan calls for the construction of an approximately 700-space garage adjacent to the existing Campus Center Garage and the provision of direct shuttle service to Lots 11 and 12. The shuttle service could be introduced early in the 10-year period, before construction of the Phase 1 garage, to relieve pressure on the Campus Center Garage as development eliminates surface spaces on the campus core. As existing facilities are closed to accommodate Master Plan development, new employees should be assigned to outlying parking lots, leaving any available close-in spaces for the reassignment of existing employees from lots that are closed.



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### Assignment of New Employees

In anticipation of the closure of core employee lots from Master Plan development, parking that becomes available within the campus core should initially be offered to current employees who have been displaced as a result of the development. New employees would be allowed to be placed on a core lot waiting list of their choice, however they would be initially assigned a periphery parking space. The existing tiered parking cost model based on salary and lot location is effective and equitable and should continue to be applied so that employees are aware of the amount they are saving by choosing parking on the periphery compared to the more expensive lots in the core. Over time, as the core lots are all eliminated in favor of structured parking on the periphery, this assignment process will not be necessary.

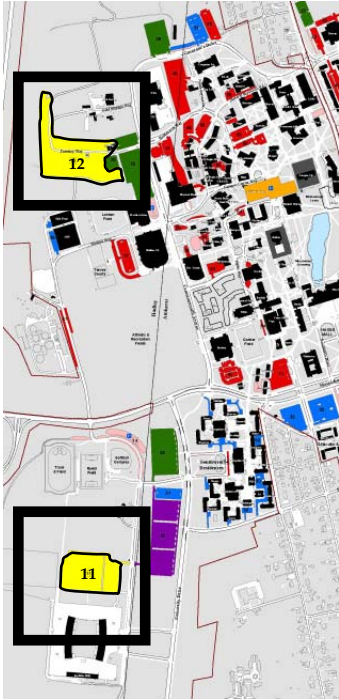


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### “Power Plant” Parking Garage

The Master Plan includes construction of a new 700-space garage on the site of the old power plant adjacent to the existing Campus Center Garage. It would provide additional parking for the central part of the campus, including the Du Bois Library, Student Union, Lincoln Campus Center, and the Campus Center hotel. In addition, it would replace spaces lost to new development on the core campus. The proposed garage would be accessed from Campus Center Way. In addition to providing expanded parking, it also could serve as a major intermodal transportation center for shuttle, local and intercity buses. This intermodal transportation center would replace the existing bus stop at Haigis Mall, which is proposed for elimination in the second phase (10-20 years) of Master Plan development. The garage would effectively create a bridge over the existing ravine which would enhance pedestrian and bicycle connectivity.

Phase in Direct Shuttle Service to Lots 11 and 12



*The most remote sections of Lots 11 and 12 are not used*

Currently, the most remote sections of parking Lots 11 and 12 are not used. As development increases and parking spaces are lost in the campus core, parking demand can be expected to migrate farther out from the core. To support increased use of the remote parking areas in Lots 11 and 12, the Master Plan recommends direct shuttle bus connections between the main campus and the two parking areas starting with Lot 12 and then transitioning to Lot 11 as needed (Lot 11 is currently primarily used by students living in Southwest who only drive their cars occasionally so there is very low turnover).

The existing shuttle routes that circulate around the campus do so in a “figure eight” pattern. Future parkers using Lot 11 and 12 would have to walk to their destination or ride the campus shuttle along much of the bus loop before arriving at their destination. Direct shuttle service between the lots and the campus core would increase accessibility and encourage more students who drive to park in these underutilized and less expensive lots on the campus fringe. This direct shuttle service would be implemented only once the demands for these two parking areas increase and warrant more direct service than what is currently provided.

The Lot 12 shuttle would connect the sections of the lot farthest from the main campus with the Campus Center via Campus Center Way. The bus stop would be located on the circle next to the parking garage or in a location provided in the proposed expansion of the garage. The shuttle would operate continuously between the two locations providing frequent service and a trip length of only a few minutes. Similarly, the shuttle to Lot 11 could use the existing stop at Haigis mall or a stop at the Robsham Visitors Center after the Haigis mall loop is closed as part of Phase 2 of the Master Plan. An extension farther into the campus via North Pleasant Street or Thatcher Way could be considered if a suitable bus turnaround can be provided.

2.3 Long-term – Beyond 10 Years

*Over the long-term, strategically located parking garages are recommended to replace the scattered surface parking in the campus core which will become infill development sites*

Over the long-term (10 – 40 years), the Campus Master Plan calls for the reduction of surface parking in the central campus to reduce pedestrian and bicycle conflicts, and to provide sites for future buildings. Replacement parking for these lost spaces will be provided in new garages situated at key locations around the perimeter of the core campus:

- **Southeast corner of Massachusetts Avenue and Lincoln Avenue (10-20 years):** An 860-space facility at this location would serve the Whitmore Administration building, the Robsham Visitors Center, the Fine Arts Center and several other buildings on the core campus. The garage would be developed in Phase 2 of the



Master Plan. It would intercept traffic approaching the campus from the west and southwest, and with the proposed reduction in the Massachusetts Avenue cross section to one travel lane in each direction, parkers can easily walk to destinations on the core campus. A bus stop and bicycle storage would be provided.

- ▶ **North end of campus near (20-30 years):** A 655-space facility roughly on the site of Parking Lots 31 and 68 would serve Computer Science, Engineering and the Lederle Graduate Research Center. It would intercept traffic approaching the campus from the north, northeast, and the northwest when the direct connection to Route 116 is provided. Both the garage and a direct Route 116 connection are planned for Phase 3. With the relocation of Governors Drive to the north, pedestrians from the garage would not need to cross any roadway to reach destinations on the core campus. As with the Phase 2 garage, a bus stop and bicycle storage would make it a multimodal facility.
- ▶ **North Pleasant Street at Massachusetts Avenue (30-40 years):** A 670-space facility on the east side of the intersection of North Pleasant Street and Massachusetts Avenue would intercept traffic from the south. The provision of retail space on the ground floor and university space along the front side of the building would help define a major gateway to the campus while also connecting the campus to the Gateway project proposed by the Town of Amherst. The garage would serve the Studio Arts Building, the Newman Center, the Fine Arts Center and Morrill Science I - IV.

These new garages, in addition to the planned garage adjacent to the Campus Center Garage, will add approximately 2,900 spaces to the campus parking supply to offset many of the more than 3,900 spaces displaced by campus development over the course of the Master Plan. All of the planned garages meet the parking principles and serve to forward the parking vision presented above. The Future Conditions Review chapter of this report provides a detailed discussion of the change in the campus parking supply and parking demand for the four phases of the Master Plan.

During the long-term, consideration should be given to providing direct and more frequent shuttle service between the core campus and Parking Lots 13 and 24. These are the most remote lots and will likely be the last to fill as demand increases and the number of spaces in the core campus declines. The only reasonable access between these lots and the campus is shuttle service. As with Lots 11 and 12, the existing loops provide indirect service, requiring riding the campus shuttles along much of the bus loop before arriving at a stop near their destination. More frequent, direct shuttle service between the lots and the campus core would increase accessibility and encourage more students to park in the underutilized areas.



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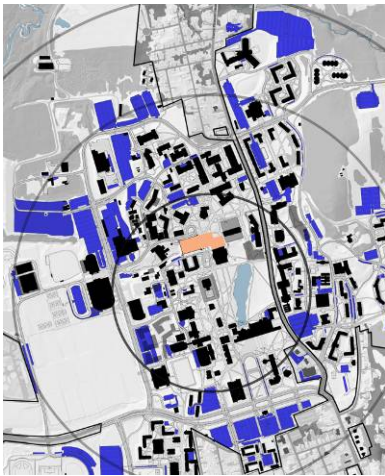
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## Existing Parking Conditions

This chapter describes the existing campus parking supply, parking operations, utilization by user group, and calculated parking demand ratios. Because many of the facilities serve multiple users, demand by user group has been estimated.

### 3.1 Campus Parking Supply

The campus has approximately 13,650 parking spaces distributed among 56 surface parking lots and one parking garage. About 12,700 spaces are in surface lots that cover about 96 acres of land. The parking garage, which is located adjacent to the Campus Center, contains 950 spaces, with 223 spaces in the lower garage (permit parking) and 740 spaces in the upper garage (visitor pay parking). Figure 1 shows the campus parking supply by permit and user type and Figure 2 illustrates the campus parking supply by times parking permits are required in each facility.

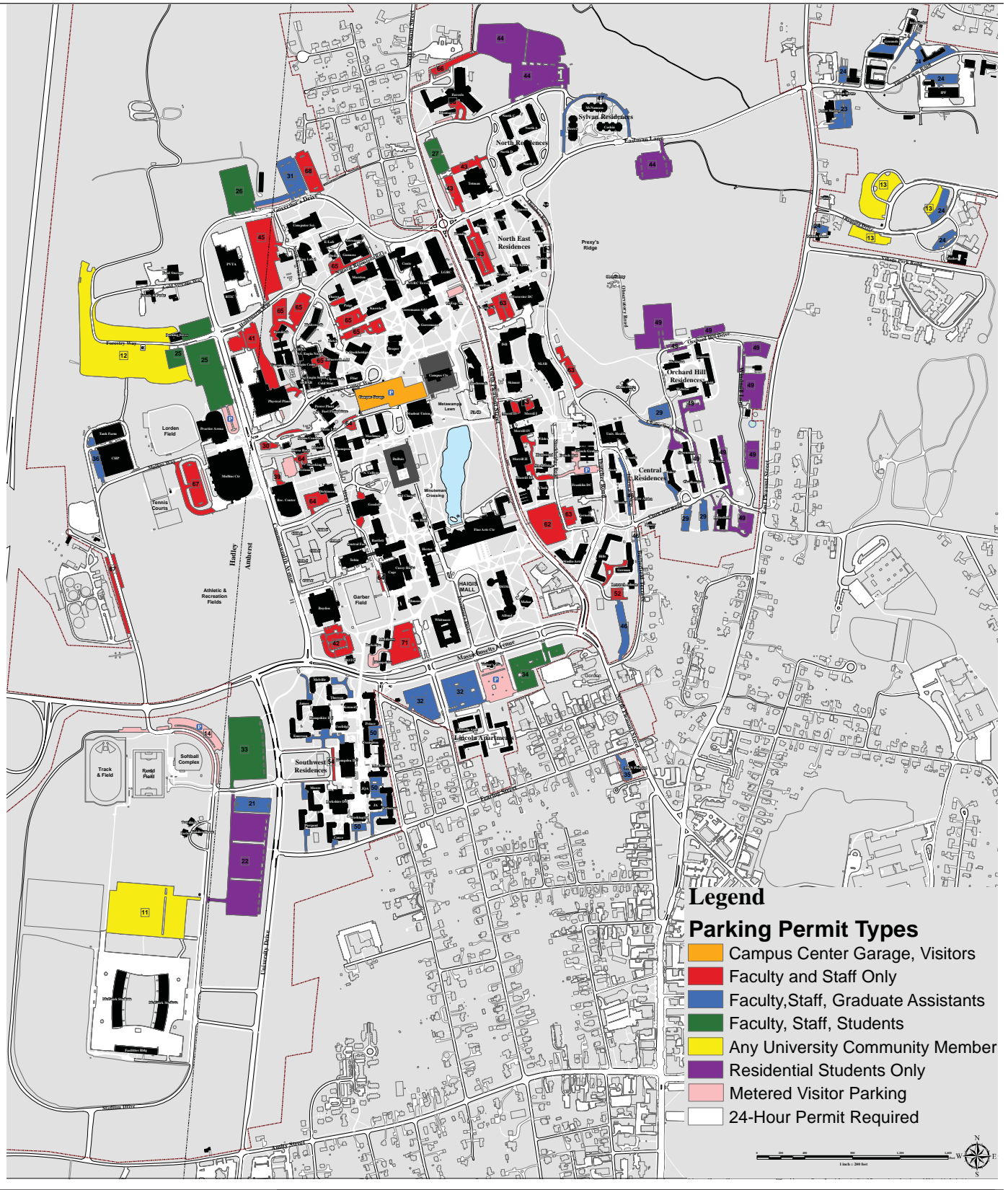


Approximately 25 percent of the campus parking supply (3,350 spaces) is located in the campus core (bounded by North Pleasant Street, Massachusetts Avenue, Commonwealth Avenue, and Governors Drive). Approximately 2,400 of those spaces are in surface lots scattered across the core campus. The access roadways to the core campus parking facilities often cross pedestrian pathways, creating many pedestrian/vehicular conflict points. The remaining 10,300 spaces are outside the core, requiring most parkers to walk across busy roadways to reach their destinations on campus. Some of these crossings can be difficult for pedestrians, especially along Massachusetts Avenue and Commonwealth Avenue. Both are heavily traveled, four-lane roadways.

**Existing parking:**

- 13,650 spaces
- 1 garage
- 56 surface lots
- 96 acres

Almost 93 percent of the parking spaces on the UMass campus are in surface parking lots, which have a significant land footprint - almost 96 acres. The 96 acres devoted to surface parking is nearly the size of the academic core. These surface parking areas mostly have impervious surfaces, which require drainage infrastructure and storm water management systems. The 10,300 spaces located outside the core campus represent almost 75 percent of all surface parking spaces.



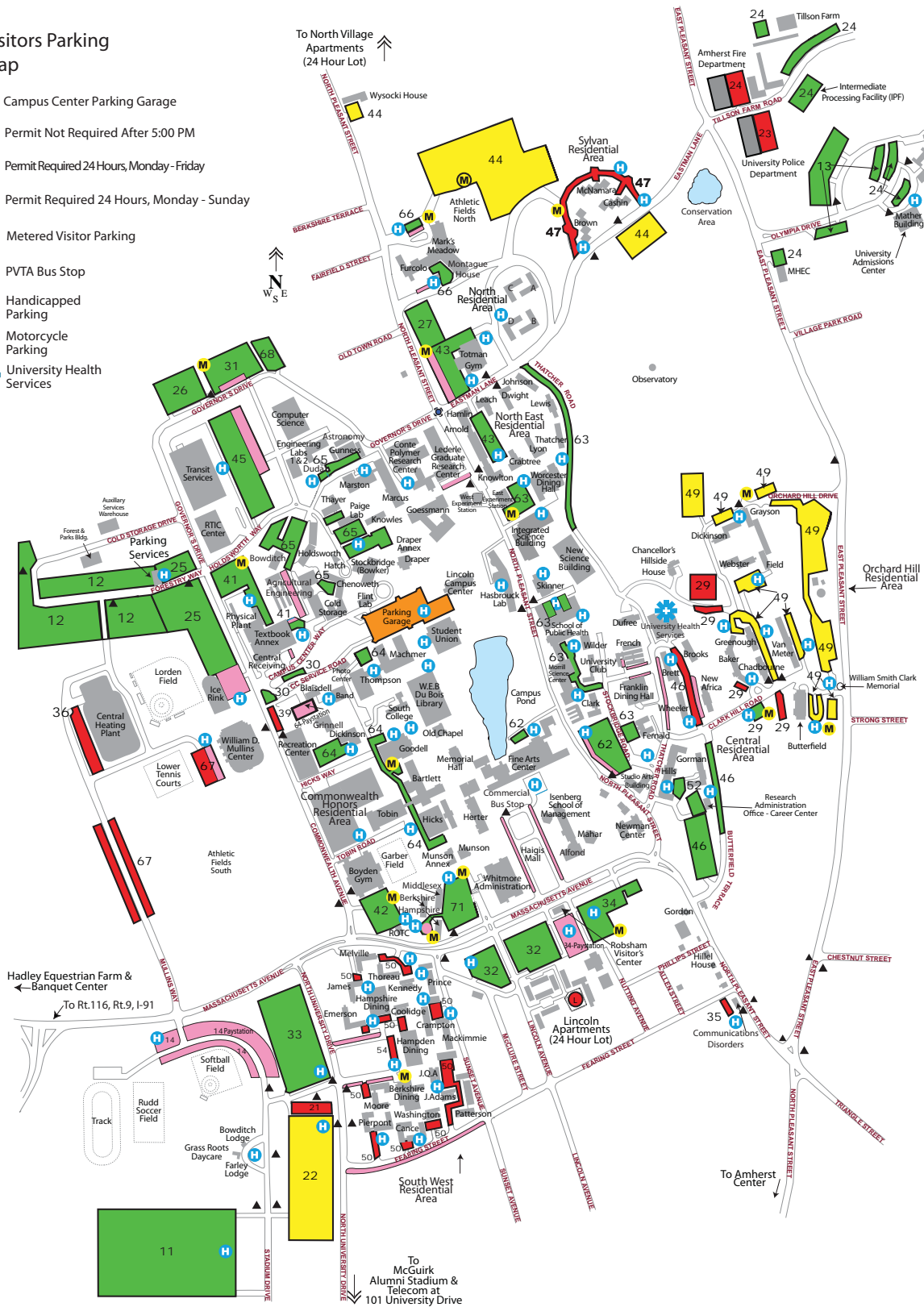
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Parking by Permit Type

Figure 1

### Visitors Parking Map

- Campus Center Parking Garage
- Permit Not Required After 5:00 PM
- Permit Required 24 Hours, Monday - Friday
- Permit Required 24 Hours, Monday - Sunday
- Metered Visitor Parking
- PVTA Bus Stop
- H Handicapped Parking
- M Motorcycle Parking
- University Health Services



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Parking Supply Permit Restrictions

Figure 2

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## 3.2 Parking Operations

The campus parking supply is divided into several categories, including metered parking, visitor parking in the campus center garage, and permit parking. Metered and campus center garage parking are available to all users for a fee. The five types of permits are as follows:

- ▶ Red lots are available to employees and post-doctoral students.
- ▶ Blue lots are available to employees, Graduate Employee Organization (GEO) members, and Graduate Research Assistants and Teaching Assistants.
- ▶ Green lots are available to employees and off-campus commuter students.
- ▶ Purple lots are available to students living on-campus.
- ▶ Yellow lots are open to any University community member.

The cost of parking differs by the lot areas, and prices for parking fees are divided into four main groups plus employees:

- ▶ Group 1: Freshman, Sophomore, Junior, Senior, Graduate, Continuing Education and Stockbridge;
- ▶ Group 2: GEO, GEO Eligible, Post Doctoral;
- ▶ Group 3: Retired Employee; and
- ▶ Group 4: vendors, contractors and all others who do not qualify for employee payroll deduction pay a flat fee.

The 2011-2012 Parking fees for each lot type are presented in Table 1. For employees, the cost of parking permits is determined by their salary.





Table 1 Parking Fees for 2011-2012

Lot Type	Group 1	Group 2	Group 3	Group 4
Red	-	\$116	\$51	\$344
Blue	-	\$81	\$40	\$288
Green	\$315	\$61	\$30	\$174
Purple	\$280	\$56	-	\$159
Yellow	\$225	\$40	\$20	\$58
Lower Garage	\$894	\$253	-	\$894
Upper Garage	\$515	\$146	\$71	\$515
Night	\$99	\$45	-	\$99
Motorcycles	\$99	\$45	-	\$99
Lincoln	-	\$99	-	\$99
North Village	-	\$99	-	\$99
Resident Staff	-	-	-	\$71
Mobile	-	-	-	\$800
Vendor	-	-	-	\$800

Group 1: Freshman, Sophomore, Junior, Senior, Graduate, Continuing Education and Stockbridge

Group 2: GEO, GEO Eligible, Post Doctoral

Group 3: Retired Employees

Group 4: Vendors, contractors and all others who do not qualify for employee payroll deduction pay a flat fee

### 3.3 Parking Demand/Utilization

On Wednesday, September 29, 2010 and Thursday, September 30, 2010, parking occupancy counts were taken. The number of parked cars in each facility was recorded every hour between 7:00AM and 5:00 PM.

Separate parking counts were taken for regular (not restricted or reserved), metered, handicapped, reserved, carpool, 15-minute loading zone, motorcycle, state vehicle, resident staff and vendor parking spaces. The number of vehicles parked in each facility for each category was counted in each hour. Vehicles not parked in a marked space were also counted and identified as illegal parking. The peak number of parked cars in any one hour was compared to the facility capacity to determine utilization. The peak hour of utilization did not always occur at the same time for each facility.

The overall utilization of the total parking supply is shown in Table 2. It includes total occupancy for all spaces and regular spaces by hour for each day. The average of the two days counts is also included. The counts for the two days were quite similar. Parking utilization for all spaces peaked between 1:00 PM and 2:00 PM on both days with an average occupancy of 9,135 spaces. Peak utilization for all spaces was 67 percent of capacity. The utilization of the regular spaces also peaked between 1:00 and 2:00 PM with an average count of 8,157 vehicles or almost 69 percent of capacity.

**Table 2 Parking Occupancy by Time of Day**

Hour	All Spaces			Regular Spaces		
	Wednesday <sup>1</sup>	Thursday <sup>2</sup>	Average	Wednesday	Thursday	Average
7-8 AM	5,412	5,406	5,407	4,889	4,914	4,902
8-9 AM	6,502	6,506	6,504	5,864	5,776	5,820
9-10 AM	8,056	8,295	8,176	7,269	7,368	7,319
10-11 AM	8,816	8,944	8,880	7,920	7,964	7,942
11AM-12PM	8,993	9,110	9,052	8,076	8,129	8,103
12-1PM	9,004	9,171	9,088	8,124	8,177	8,151
1-2PM	9,016	9,254	9,135	8,104	8,210	8,157
2-3 PM	8,748	9,168	8,958	7,836	8,163	8,013
3-4 PM	8,247	8,561	8,404	7,329	7,574	7,452
4-5 PM	7,786	7,667	7,727	6,814	6,752	6,783
<b>Capacity</b>	<b>13,644</b>	<b>13,644</b>	<b>13,644</b>	<b>11,863</b>	<b>11,863</b>	<b>11,863</b>
<b>Sum of Maximum Counts <sup>3</sup></b>	<b>9,605</b>	<b>9,682</b>	<b>9,644</b>	<b>8,478</b>	<b>8,528</b>	<b>8,503</b>
<b>Excess Spaces <sup>4</sup></b>	<b>4,039</b>	<b>3,962</b>	<b>4,000</b>	<b>3,385</b>	<b>3,335</b>	<b>3,360</b>
<b>Parking Space Need <sup>5</sup></b>	<b>10,147</b>	<b>10,147</b>	<b>10,147</b>	<b>8,478</b>	<b>8,528</b>	<b>8,503</b>

Shaded boxes show highest hourly counts.

1. September 29, 2010
2. September 30, 2010
3. Sum of maximum vehicle count (occupancy) in each facility over the course of the day. The total number of cars parked in each hour is less because not all facilities reach peak occupancy at the same time of the day.
4. Capacity minus sum of maximum occupancies
5. Parking space need is the maximum occupancy of regular spaces plus all reserved and restricted spaces which are not available to general users.

Table 2 also presents the sum of the maximum hourly occupancies for each facility for each day. The average sum of the maximum occupancies was 9,644 (71 percent) for all spaces and 8,503 (72 percent) for the regular spaces. This resulted in excess capacity of 4,000 spaces for the total supply and 3,360 regular spaces. Existing parking space need for all parking is 10,147 spaces or 74 percent of capacity. Existing need is calculated as the sum of the peak occupancy for regular spaces and the number of reserved and restricted spaces, which are not open to general users.

In any parking system is it desirable to reserve a percentage of spaces open at peak times to accommodate turnover and prevent excessive circulation of vehicles as drivers search for a parking space. Based on not exceeding 90 percent of capacity, the practical supply of regular spaces is approximately 10,675 and of all spaces is approximately 12,280. Based on the practical supply only, about 2,175 regular spaces and 2,650 of all spaces are available. The available practical supply was used to evaluate the impact of the projected increases in parking demand for each phase of Master Plan development on the projected parking supply.



## Surface Parking

In addition to considering overall parking utilization, utilization for particular parking permit groups was analyzed to determine if there is any need for additional parking for specific user groups. Table 3 shows the utilization of spaces by parking permit type for regular spaces only. Because various users groups can purchase different sticker types, it is not possible to strictly classify utilization by user groups with the exception of resident students who are the only ones who can obtain a purple permit.

**Table 3 Utilization of Parking by Permit Type**

Lots	9/29/10 Wednesday	9/30/10 Thursday	Average	Capacity	Utilization	Excess Spaces
Purple <sup>1</sup>	2,465	2,434	2,450	2,786	88%	336
Red <sup>2</sup>	1,585	1,644	1,615	2,366	68%	751
Green <sup>3</sup>	1,278	1,264	1,271	1,579	80%	308
Blue <sup>4</sup>	985	1,021	1,003	1,409	71%	406
<b>Subtotal</b>	<b>6,313</b>	<b>6,363</b>	<b>6,339</b>	<b>8,140</b>	<b>78%</b>	<b>1,801</b>
Yellow <sup>5</sup>	1,013	996	1,005	2,487	40%	1,482
<b>Total</b>	<b>7,326</b>	<b>7,359</b>	<b>7,344</b>	<b>10,627</b>	<b>69%</b>	<b>3,283</b>

Note: Utilization data represents "regular spaces" only which does not include metered, handicapped, reserved, carpool, loading, motorcycle, and vendor parking spaces

1. Purple Lots are for resident students
2. Red Lots are for faculty and staff
3. Green lots are for faculty, staff, and students
4. Blue lots are for faculty, staff, and graduate assistants
5. Yellow lots are the most remote and least expensive parking open to any University community member

The overall utilization of the 10,627 regular spaces in the permit lots is 69 percent, with 3,283 open spaces. Because of their greater distance from most campus locations, the yellow lots are the least utilized with only 40 percent peak utilization. The yellow lots are available to all permit holders. If the yellow lots are excluded, utilization for all other permit lots ranges from 68 to 88 percent, with an overall utilization of 78 percent and 1,801 open spaces. The purple lots are the most heavily used at 88 percent and the green lots, which serve faculty, staff and students, were the second most heavily utilized at 80 percent.



### 3.4 Parking Demand Ratios

Parking demand ratios can be determined from parking utilization counts. Separate demand ratios were calculated for students and employees (faculty/staff). To calculate parking demand ratios, the number of cars parked for each group was divided by the respective population of each group. As shown in Table 4, there are 24,340 students and





7,969 faculty/staff at UMass. During the September 2010 parking counts, 3,345 student vehicles were parked and 6,092 faculty/staff vehicles were parked. The parking demand ratio for students is 0.137 spaces per student and for faculty and staff is 0.764 spaces per employee. Separate ratios for resident students and commuter students were not used because the individual ratios are similar.

**Table 4 Parking Demand Ratios**

	Students	Faculty/Staff
Population <sup>1</sup>	24,340	7,969
Number of Parked Vehicles <sup>2</sup>	3,345	6,092
<b>Parking Demand Ratio per Person</b>	<b>0.137</b>	<b>0.764</b>

1. Population estimates for faculty/staff include executive, administrative, managerial, professional, faculty, classified employees and graduate appointments.
2. Estimated based on permit sales and lot designations.

### 3.5 Transit Operations

Several outlying parking lots are served by on-campus shuttle buses operated by UMass Transit. Shuttle bus service is provided along two figure eight bus routes made up of two loops each. One loop serves the western part of the campus and includes North Pleasant Street, Massachusetts Avenue, Commonwealth Avenue, and Governors Drive. This loop includes the regional and intercity bus stop at Haigis Mall. The other loop serves the eastern part of the campus and includes North Pleasant Street, Eastman Lane, and East Pleasant Street.

The two on-campus bus routes are Routes 34 and 35. Route 34 travels north along North Pleasant Street, clockwise around the eastern loop and counterclockwise around the western loop. Route 35 operates in the opposite direction, traveling south on North Pleasant Street, clockwise on the western loop and counterclockwise on the eastern loop. Both buses serve the same general stops but in opposite directions. Each route has three stops on North Pleasant Street, serving the center of the campus, as well as several other stops on the periphery of the campus, including:

- Graduate Research Center/Knowlton (North Pleasant Street);
- Hasbrouck/Skinner (North Pleasant Street);
- Fine Arts/Studio Arts (North Pleasant Street);
- Haigis Mall;
- Robsham Visitors Center;
- Southwest Residential Area;
- Parking Lot 11/UMass Stadium;
- Boyden Gym;
- Mullins Center;
- Parking Lots 12/25;
- Governors Drive;



- North and Northeast Residential Areas;
- Sylvan Residential Areas; and
- Orchard Hill.

A number of local and regional Pioneer Valley Transit Authority (PVTA) bus routes also serve the UMass campus but none of them serves UMass parking areas. All the transit routes serving the UMass campus are shown in Figure 3.

There is all day service on both routes with the first bus on Route 34 departing Lot 11/UMass Stadium at 7:05 AM and the last bus departing at 11:05 PM. The first Route 35 bus departs Lots 12 and 25 at 7:18 AM. and the last bus departs at 11:53 PM. Both shuttle routes generally operate on 15-minute headways, providing 7 ½ minute service to all stops. However, each bus route provides a different level of service to specific locations on campus from remote parking areas. For example, a rider boarding at Lot 11 would reach the Fine Arts and Studio Arts buildings much sooner on Route 34 than on Route 35. Similarly, a rider boarding at Lots 12/25 would reach the Graduate Research Center and Knowlton much more quickly on the Route 35 bus than on the Route 34 bus. As a result, the effective level of service at the more remote parking areas depends on the riders final location.

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## 3.6 Bicycle and Pedestrian Pathways

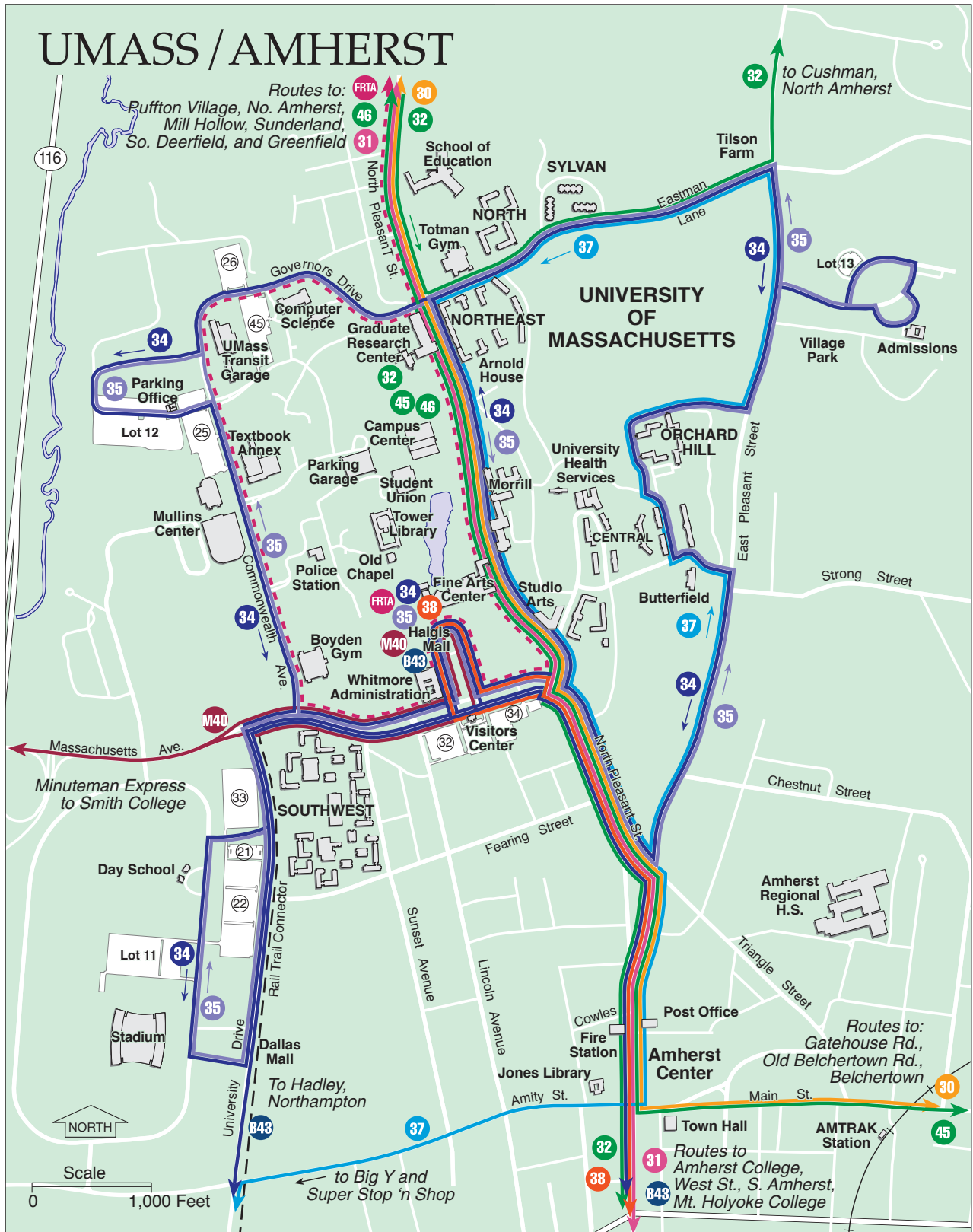
This section focuses on the relationship of bicycle and pedestrian accommodations with the UMass parking system. There is an extensive set of pedestrian paths and sidewalks serving virtually all the parking facilities on campus. There are also many bicycle racks throughout the campus.

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### Pedestrian Network

The campus supports a high volume of pedestrian traffic with an extensive network of pedestrian paths, many of which serve various campus parking facilities. The only exceptions are Lots 13 and 24 on Olympia Drive. There is no sidewalk on East Pleasant Street between Olympia Drive and Eastman Lane or Village Park Road (this is Town-owned property). The primary mode of travel is walking within the core campus, which is defined generally as the area bounded by Massachusetts Avenue, Commonwealth Avenue, Governors Drive, Eastland Lane, Thatcher Way and North Pleasant Street. As discussed in Section 3.5 Transit Operations, access around the campus is also provided by shuttle bus service.

The current pedestrian network in the campus core is quite complex and has numerous points of conflict between pedestrians, and passenger cars and service vehicles.



Vanasse Hangen Brustlin, Inc.

Transit Service

Figure 3

Generally, north-south movement across the campus is relatively direct. The pedestrian spine, which serves the campus well, could be extended north toward Sciences and Engineering. East-west movements are more difficult, because of the Campus Pond and topography. The system would benefit from simplification and better differentiation or separation between pedestrians, bicycles, service areas, roadways, and parking areas.

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## Bicycle Network



***Bike racks on campus are well utilized and there are areas where more storage is needed***

There are two off-campus bicycle facilities serving the UMass campus. The Five College Bikeway is a significant regional resource with the UMass/Amherst Bikeway serving as a connector to the Norwottuck Rail Trail, which links the campus to Amherst, Northampton, Hadley, and beyond. North Pleasant Street and East Pleasant Street between the campus and downtown Amherst provide a five-foot bike lane on each side of the roadway. There are no bike paths or lanes connecting the campus to North Amherst.

There are limited dedicated bicycle accommodations on the UMass campus – bicycles and pedestrians generally share the same space. Bike racks on campus are well utilized and there are areas where additional bike storage is necessary, such as on Thatcher Way.

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## 3.7 Peer Assessment/Comparison

Table 5 compares parking characteristics and policies at five large public and private universities with those at UMass Amherst. Characteristics listed include enrollment, number of employees, parking supply, parking fees, underclass restrictions, shuttle service, satellite parking, ridesharing, and other transportation demand management (TDM) measures.

For the six institutions, student populations range from 10,000 to 42,000 with UMass in the middle of this range at 24,400. Faculty/staff sizes range from 7,900 to 20,000 with UMass on the low end with 8,000 (including executive, administrative, managerial, professional, faculty, classified employees and graduate appointments). The number of parking spaces ranges from 10,000 to 22,200 with UMass in the middle with 13,650. UMass' various parking characteristics are generally in line with the other institutions. The TDM programs in place at the peer institutions appear to be more aggressive than UMass's TDM program. Given that UMass has ample parking and is located in a less congested area than the other universities in this comparison, this is not a surprising finding.

**Table 5 Peer Assessment /Comparison**

University	Students	Faculty/ Staff	Parking Supply	Parking Fees	Underclassmen Restrictions	Shuttle Service	Satellite Parking	Rideshare	Other TDM
UMass Amherst	24,400	8,000 <sup>1</sup>	13,650	Students: \$99-\$315 Faculty/Staff: Sliding scale based on salary	Freshmen allowed cars; no restrictions	Yes, extensive No fare	Five designated park and ride lots	Ride matching, including reduced fees, preferred parking and free one-day permits Van pool information/coordination Rideshare program	Discounted clean vehicle permits Occasional parking permits Guaranteed Ride Home Car Sharing Bicycle Commuter Program
University of Rochester, Rochester, NY	10,000	19,000 (includes medical campus)		Commuter Students: \$178-\$237 Resident Students: \$386 Faculty/Staff: \$237-\$1,201		Yes, extensive Free rides on local and regional buses			Aggressive parking fees Occasional parking permits Social media Bike borrowing program
North Carolina State, Raleigh, NC	31,100	7,900	18,000	\$0-\$948		Yes, extensive		Ride matching	TDM Coordinator: Alternative modes program: 12 free daily parking passes
Cornell University, Ithaca, NY	18,000	14,400	10,500	\$0-\$690	No freshmen		Free park and ride with bus service	Carpool and vanpool incentives, including free parking, reserved parking, cash rebate, 30-day money back guarantee	Full time TDM coordinator; Occasional parker program
Stanford University, Palo Alto, CA	15,000	17,100	22,200	\$282-\$726	No freshmen	Yes, extensive		Ride matching service; Reserved parking for carpools/vanpools; Van pool subsidies	Six TDM staff; Commuter Club up to \$216 cash benefit; Free travel on many bus and rail lines; Pre-tax payment for transit passes; Guaranteed ride home Occasional parking permits; Flexible work hours
University of Wisconsin, Madison	42,000	20,000	13,000 (capped)	\$195-\$1,055; Discounted daily parking \$6.00/day	All discouraged; Lottery for students	Yes; limited Free passes for Madison Metro	\$195/month for park and ride	Ride matching service	Full time TDM coordinator; Car sharing; Guaranteed ride home;; Occasional parking permits

1. Population estimates for faculty/staff include executive, administrative, managerial, professional, faculty, classified employees and graduate appointments.

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## 3.8 Parking Principles

Several principles for the UMass Amherst parking system were developed based on the long-term vision for the system from the Master Planning process:

*The core campus bounded by North Pleasant Street, Massachusetts Avenue, Commonwealth Avenue, and Governors Drive will be free of large surface parking lots and the roadways that connect them to the surrounding road system. A new parking garage will be located centrally on the core campus next to the existing Campus Center Garage, recognizing the need for additional visitor parking and Campus Center Hotel parking supporting special events.*

*Most major parking facilities will be located at key locations along the periphery of the core campus where they will intercept traffic before it enters the core campus. Small-scale surface parking will continue to be provided to accommodate handicap parking and to meet the special requirements of particular facilities and academic departments.*

*The facilities on the core campus periphery will include existing surface lots and new parking garages designed to replace parking spaces lost to future campus development. All major facilities will include convenient pedestrian access to the campus core, bicycle accommodations and connections to the shuttle bus system.*

An overarching part of the campus mission and vision as set forth in the Master Plan is that “This Plan will serve as a guide for sustainable future development that reinforces the vision...” Throughout the master planning process, a common theme was to embrace and promote New England sustainability. Transportation items specifically cited included shuttle buses and expanded bike paths.

Based on the Master Plan vision, including demonstrating sustainability, the following twelve parking principles have been developed to guide future development of the campus parking system:

1. Maximize the number of spaces that are located near campus gateways and that are served by the campus shuttle;
2. Minimize the amount of parking provided within the core campus;
3. Provide sufficient parking to meet future demand, accounting for spaces lost to development and increased parking demands from an increased number of students and staff; the cost of replacement parking should be incorporated into each development project;
4. Provide direct links to parking facilities from the perimeter road system to minimize vehicular traffic through the campus core;
5. Provide safer and more convenient pedestrian connections between parking facilities and academic and administrative buildings in the campus core;



6. Respect the location of existing and planned bicycle and pedestrian corridors when developing new parking facilities;
7. Provide garage entrances with adequate queuing space to minimize impacts on adjacent roadways;
8. Incorporate provisions for convenient bicycle, motor scooter, and motorcycle parking with safer and more convenient access;
9. Support development of a network of intermodal connections for pedestrians, bicycles and shuttle buses that support non-auto connections to desired campus destinations.
10. Provide an adequate amount of visitor parking in each facility to meet the needs of core campus buildings served by each facility; and
11. Maximize the opportunities to share parking resources among various user groups including employees, commuter students, resident students, visitors, and event attendees; and
12. Provide shared use parking to meet the demands created by special events at various venues on campus.

Over time, adherence to these parking principles will help achieve the Master Plan vision of eliminating the many conflict points between vehicles, pedestrians, and bicycles within the core campus by moving parking from the core to the periphery. The following sections describe the recommendations for parking according for each of the four 10-year phases of the Master Plan.

# 4

## Future Conditions

### 4.1 Parking Demand

The population at UMass Amherst is generally comprised of students, faculty and staff. Currently, there are approximately 24,500 students and 8,000 faculty/staff (including executive, administrative, managerial, professional, faculty, classified employees and graduate appointments) enrolled at or employed by the University. It is expected that the student population will increase by approximately 3,400 for Phase 1 of the Master Plan, and 3,000 per phase for Phases 2, 3 and 4. The faculty and staff population is expected to increase by approximately 850 for Phase 1, and 950 per phase for Phases 2, 3 and 4.

### Projected Student Enrollment

The student body at UMass Amherst is comprised of undergraduate classmen, students from Stockbridge College and Graduate Students. The student population for 2010 Existing Condition and Phases 1 through 4 are presented in Table 6. The increase in population between 2010 Existing Condition and Phase 1 are approximately 3,375 students. The increase associated with Phases 2, 3, and 4 are constant at 3,000 students per phase.

**Table 6 Student Population by Phase**

Master Plan Phase	Undergraduate and Stockbridge	Graduate	Total	Increase in Student Population
Existing	20,126	4,214	24,340	-
1	22,500	5,214	27,714	3,374
2	24,500	6,214	30,714	3,000
3	26,500	7,214	33,714	3,000
4	28,500	8,214	36,714	3,000





## Projected Faculty/Staff Size

The non-student body is comprised of executive, administrative, managerial, professional, faculty, classified employees and graduate appointments. The faculty/staff population for 2010 Existing Condition and Phases 1 through 4 are presented in Table 7. The increase in population between 2010 Existing Condition and Phase 1 are approximately 850 faculty. Phases 2, 3, and 4 assume an increase of approximately 950 faculty and staff for each phase.

Table 7 Faculty/Staff Population by Phase

Master Plan Phase	Staff	Faculty	Classified	Graduate Appointments	Total	Total Population Increase
Existing	1,777	1,554	2,088	2,550	7,969	-
1	2,031	1,776	2,386	2,630	8,823	854
2	2,251	1,968	2,645	2,915	9,779	956
3	2,471	2,160	2,903	3,199	10,733	954
4	2,690	2,353	3,161	3,484	11,688	955
<b>Total</b>						<b>3,719</b>



## Parking Demand by Phase

Future parking demand for students and employees was projected for each phase of Master Plan development. The projections were made by applying the demand ratios for each group estimated from the existing parking counts to the projected future populations of students (resident and commuter) and employees (faculty and staff).

### Students

Based on the projected number of students presented in Table 8 and the student parking demand ratio estimated from existing counts, future student parking demand was projected and is shown in Table 10. The increase in student parking demand between 2010 Existing Conditions and Phase 1 is approximately 465 spaces. The projected increase for the remaining three phases is 412-413 spaces per phase. By the end of Phase 4, student parking demand is projected to increase by 1,701 spaces.



**Table 8 Projected Student Parking Demand by Phase**

Master Plan Phase	Projected Student Population	Existing Parking Demand Ratio	Projected Parking Demand	Increase in Parking Demand
Existing	24,340	0.137	3,345	-
1	27,714	0.137	3,809	464
2	30,714	0.137	4,221	412
3	33,714	0.137	4,633	412
4	36,714	0.137	5,046	<u>413</u>
<b>Total</b>				<b>1,701</b>

**Faculty/Staff**

Based on the projected number of employees for each phase shown in Table 9 and the employee parking demand ratio estimated from existing counts, future employee parking demand was projected and is shown in the table. The projected increase in employee parking demand between 2010 Existing Conditions and Phase 1 is 653 spaces. The projected increase for the remaining three phases is constant at about 730 spaces per phase. By the end of Phase 4, employee parking demand is projected to increase by 2,843 spaces.

**Table 9 Faculty/Staff Parking Demand by Phase**

Phase	Projected Faculty/Staff Population	Existing Parking Demand Ratio	Projected Parking Demand	Increase in Parking Demand
Existing <sup>1</sup>	7,969	0.764	6,092	-
1	8,823	0.764	6,745	653
2	9,779	0.764	7,476	731
3	10,733	0.764	8,205	729
4	11,688	0.764	8,935	<u>730</u>
<b>Total</b>				<b>2,843</b>

1. Existing faculty/staff population includes executive, administrative, managerial, professional, faculty, classified employees and graduate appointments.

**Total Demand**

The total projected parking demand by phase is presented in Table 10. The projected demands include other demand, such as visitor parking, as well as the faculty/staff and student demand projected above. There is an assumed increase in other demand of 70 spaces in each phase. Total increased demand is 1,187 spaces in Phase 1 and



approximately 1,213 spaces in each of the remaining phases. The total additional demand at the end of all four phases of the Master Plan is 4,824 spaces.

**Table 10 Increased and Total Parking Demand by Phase**

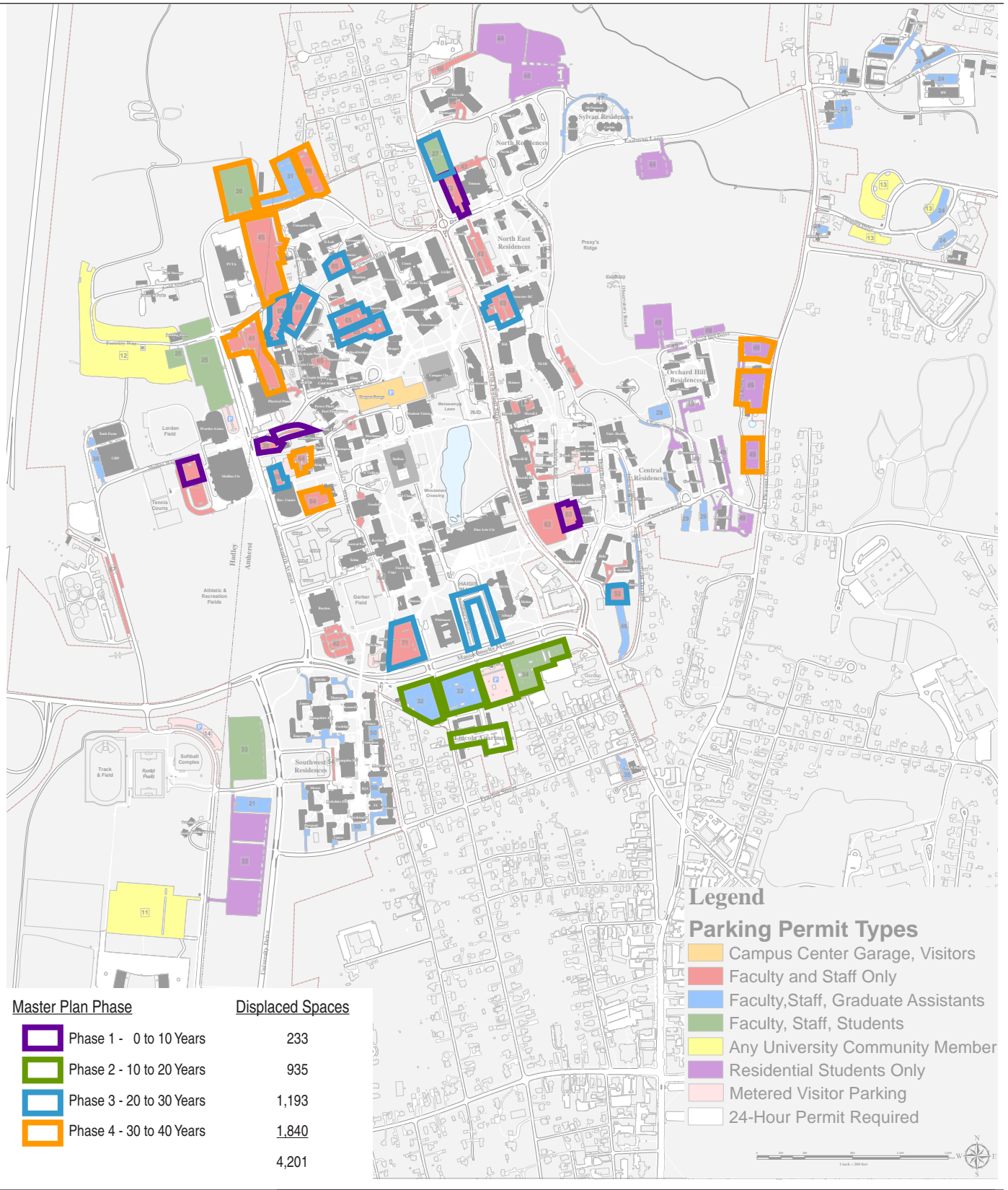
Phase	Faculty/ Staff	Students	Other	Total	Cumulative Total
Existing					9,657
1	653	464	70	1,187	10,844
2	731	412	70	1,213	12,057
3	729	412	70	1,211	13,268
4	730	413	70	1,213	14,481
<b>Total</b>	<b>2,843</b>	<b>1,701</b>	<b>280</b>	<b>4,824</b>	

## 4.2 Parking Supply

The following sections described projected changes in the parking supply as presented in the Master Plan. They include the displacement of existing parking to accommodate the construction of new buildings and the addition of four new garages over the life of the Master Plan.

### Displaced Parking

During each phase of the Master Plan, parking will be eliminated to accommodate campus development. The lots and number of spaces displaced by phase are presented in Table 11 and shown in Figure 4. Approximately 4,200 spaces will be displaced over the four phases of the Master Plan. During Phase 1, 233 spaces will be displaced, with the majority located on the west side of the core campus. The 935 spaces that will be displaced in Phase 2 are predominately south of Massachusetts Avenue. The 1,193 spaces displaced during Phase 3 are scattered throughout the core campus. The largest number of displaced spaces is 1,840 during Phase 4. The majority of these spaces are near the Computer Science Center south of relocated Governors Drive and in the Orchard Hill Residential Area.



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Displaced Parking by Master Plan Phase

Figure 4



**Table 11 Displaced Parking by Phase**

Phase	Lots	Displaced Spaces
1	Lot 30	36
	Lot 43 (West of Totman)	70
	Lot 63 (East of Lot 62)	47
	<u>Lot 67 (West of Mullins Center)</u>	<u>80</u>
	<b>Total: Phase 1</b>	<b>233</b>
2	Lincoln	92
	Lot 32	412
	Lot 34	189
	Lot 42	55
	<u>Visitor Center</u>	<u>187</u>
	<b>Total: Phase 2</b>	<b>935</b>
3	Lot 27	125
	Lot 39	14
	Lot 52	30
	Lot 62	266
	Lot 63 (Worcester Dining Hall)	91
	Lot 65	408
	Lot 71	186
	<u>President's Drive</u>	<u>73</u>
	<b>Total: Phase 3</b>	<b>1,193</b>
4	Lot 26	291
	Lot 31	190
	Lot 41	215
	Lot 45	397
	Lot 49 (along East Pleasant Street)	450
	Lot 64	154
	<u>Lot 68</u>	<u>143</u>
		<b>Total: Phase 4</b>
	<b>TOTAL: Phases 1-4</b>	<b>4,201</b>

Table 12 presents the change in total surface parking by phase resulting from the parking displacements listed in Table 11 above. The existing supply of almost 12,700 surface parking spaces would be reduced to about 8,500 spaces by the end of Phase 4 of the Master Plan.

**Table 12 Expected Change in Surface Parking Supply by Phase**

Phase	Displaced Spaces	Remaining Surface Parking Spaces
Existing	-	12,681
1	233	12,448
2	935	11,513
3	1,193	10,320
4	1,840	8,480
<b>Phases 1-4</b>	<b>4,201</b>	<b>8,480</b>



### Planned Garages

The planned displacement of about 4,200 parking spaces requires the addition of new parking spaces to maintain a reasonable balance between supply and demand. The Master Plan proposes four new garages to replace about 2,900 of the displaced spaces at locations around the periphery of the core campus. This section describes the methodology used to evaluate and select proposed locations for parking structures. Estimates of the cost of constructing the proposed garages are also included.

To replace parking displaced by campus development and reduce the footprint of parking on the campus, the Master Plan includes four garages. The following six sites were evaluated for inclusion in the Master Plan as possible garage locations:

1. The site of the former power plant west of, and adjacent to, the existing garage
2. North side of Massachusetts Avenue in the vicinity of Lincoln Avenue
3. South side of Massachusetts Avenue in the vicinity of Lincoln Avenue
4. The site of existing lots 31 and 68 south of relocated Governors Drive
5. The “gate way” site on the west side of North Pleasant Street at Massachusetts Avenue
6. The Worcester Dining Hall site on the west side of Thatcher Way

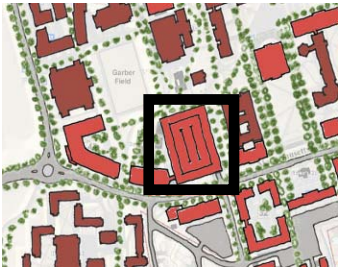


**Site 1 -Adjacent to Existing Garage**

As noted above, only four sites were selected for garages based on the parking principles and evaluation criteria. Table 13 summarizes the evaluation matrix for the six sites based on six criteria, including the ability to:

- meet near-term parking demands;
- meet long-term parking demands;
- intercept traffic before it enters the campus core;
- provide good pedestrian access to various destinations on the core campus;

- serve multiple user groups at various times; and
- serve as a mobility hub.



**Site 2 –North side of Mass Ave**

The site next to the existing Campus Center Garage (Site 1) scores high on almost every criterion. The two sites on the north side and south sides of Massachusetts Avenue near Lincoln Avenue (Sites 2 and 3) also scored high and rated equally overall. Only one of these sites was to be selected since they both ranked high. The south side (Site 3) was selected because it would better serve the Robsham Visitors Center and a new roadway south of the site connecting to North Pleasant Street would divert traffic from the neighborhood and Massachusetts Avenue. The north campus site (Site 4) and the southeast Gateway site (Site 5) scored 3 and 4, respectively. The Thatcher Way site (Site 6) was dropped from further consideration because it did not meet the evaluation criteria as well as the other garages evaluated.



**Site 3 –South side of Mass Ave**

Table 14 lists the four sites selected and the number of spaces proposed for each site. Four parking garages (one in each phase) are planned to provide almost 2,900 parking spaces to replace displaced parking. For Phase 1, a 700-space underground parking structure is proposed west of the Campus Center Garage on the site of the existing defunct power plant. In Phase 2, a 860-space above-grade garage is proposed south of Massachusetts Avenue, replacing parking lots 32 and 34 and the Robsham Visitors Center parking lot. A 655-space parking structure is proposed at the north end of the campus near the Computer Science Building in Phase 3, located south of the proposed relocation of Governors Drive. In Phase 4, a 670-space parking garage is proposed at the southeast gateway to the campus, east of the intersection of North Pleasant Street and Massachusetts Avenue. Figure 5 shows the locations of the planned garages.



**Site 4 –Relocated Governors Drive**



**Site 5 –Gateway at North Pleasant Street/Mass Ave**



**Site 6 –Thatcher Way**



**Table 13 Parking Garage Location Matrix**

Ranking: ✓✓✓✓✓ = most effective ✓ = least effective								
Location	Near-Term Needs	Long-Term Needs	Intercept Traffic	Pedestrian Access	User Flexibility	Mobility Hub	Rank	Recommendation
Site 1 – Adjacent to Existing Garage	✓✓✓	✓✓✓✓✓	✓✓✓	✓✓✓✓✓	✓✓✓✓✓	✓✓✓✓✓	#1	Recommended for Phase 1
Site 2 – North of Massachusetts Avenue	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	#2	Discarded; location 3 better serves the Visitors Center
Site 3 – South of Massachusetts Avenue	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓	✓✓✓✓	✓✓✓✓✓	#2	Recommended for Phase 2
Site 4 – South of Relocated Governors Drive	✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓	✓✓	#3	Recommended for Phase 3
Site 5 – Gateway Site (North Pleasant Street at Massachusetts Avenue)	✓✓✓	✓✓	✓✓✓✓	✓✓	✓✓✓	✓✓✓	#4	Recommended for Phase 4
Site 6 – Thatcher Way (Worcester Dining Hall site)	✓✓✓✓✓	✓	✓✓✓	✓✓✓	✓	✓	#5	Discarded; does not meet criteria as well as other sites

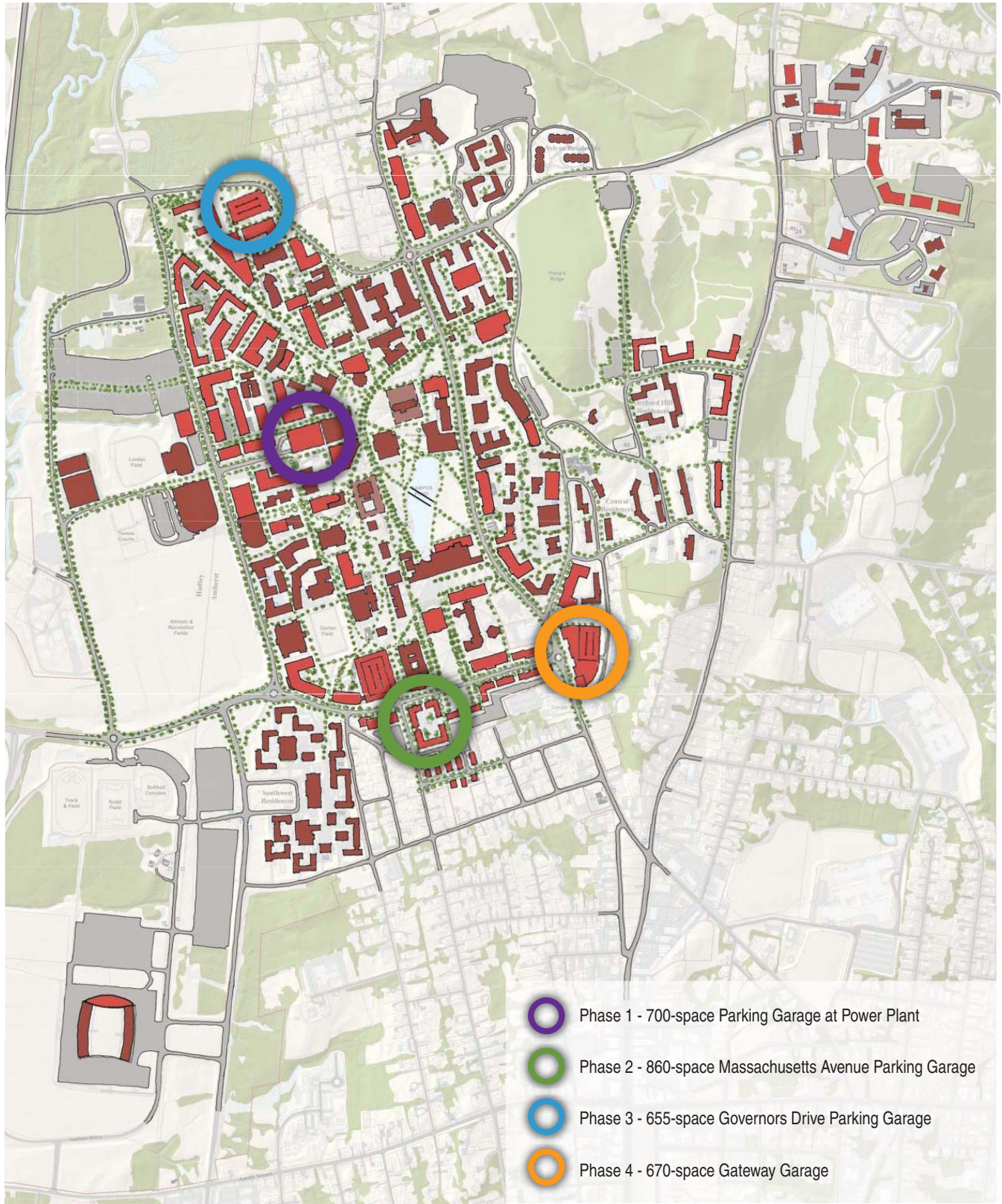
Note: Shaded rows represent sites that have been eliminated from further consideration.

**Table 14 Structured Parking Capacity by Phase**

Phases	Description	Location	Capacity Increase	Total Garage Capacity
Existing	Underground Structure	Campus Center		950
1	Underground Structure <sup>1</sup>	#1 West of the Campus Center Garage	700	1,650
2	Above-grade Structure	#3 Southeast Corner of the Massachusetts and Lincoln Avenues	860	2,510
3	Above-grade Structure	#4 North End of Campus near Computer Science Center and South of Relocated Governors Drive	655	3,165
4	Above-grade Structure	#5 Gateway Site (North Pleasant Street at Massachusetts Avenue)	670	3,835
<b>Total</b>			<b>2,885</b>	<b>3,835</b>

<sup>1</sup> Garage would be constructed in a ravine so that most of it would be below the grade at the top of the Ravine





**Vanasse Hangen Brustlin, Inc.**

Planned Parking Garages

Figure 5

## Estimated Construction Costs for Parking Garages

Table 15 lists each garage location, size and estimated construction cost. Garage construction costs are based on a preliminary cost estimate for the Phase 1 garage and a cost of \$25,000 per space for Phase 2, 3, and 4 garages. The Phase 1 garage is more expensive because of the topography of the site, which is located in a ravine, leading to atypical site work with complex utility connections and a green roof. The cost per space of building the garage into the ravine will be much higher than the cost per space for the other three garages, which are all located on generally level sites. The estimated costs do not include removal of the old power plant at the Phase 1 site, relocation of Governors Drive at the Phase 3 site, and the construction of the roundabout adjacent to the Phase 4 site.

**Table 15 Estimated Garage Construction Costs**

Phase	Garage Location	Number of Spaces	Estimated Cost <sup>1</sup>
1	Adjacent to Campus Center Garage at Old Power Plant Site	700	\$60,000,000
2	Southeast Corner of Massachusetts Avenue and Lincoln Avenue	860	\$21,500,000
3	North of Computer Science Center and South of Relocated Governors Drive	655	\$16,375,000
4	East Side of Pleasant Street at Massachusetts Avenue (Southeast Gateway)	670	\$16,750,000
<b>Total</b>		<b>2,885</b>	<b>\$114,625,000</b>

<sup>1</sup> Total costs are in current dollars based on a preliminary cost estimate for the Phase 1 garage and a cost of \$25,000 per space for Phase 2, 3, and 4 garages. Costs are in 2012 dollars.



## Total Parking Supply Changes

Table 16 shows the next effect on the number of campus parking spaces from the projected displacements and additional garages. In Phase 1, there is a net addition of spaces in the center of the campus. The Phase 1 garage will supplement the existing garage to meet existing demands during events at the Campus Center and on campus in general. It will also serve the additional demands generated by campus growth (see Demand by Phase below). During the second phase of the plan, there will be a small decline in the parking supply. Larger declines will take place during Phases 3 and 4, with a net total loss of 1,316 spaces.



Table 16 Parking Supply Changes by Phase

Phase	New Garage Capacity	Displaced Surface Parking	Net Change in Parking Supply <sup>1</sup>	Cumulative Change in Parking Supply
1	700	233	+467	+467
2	860	935	-75	+392
3	655	1,193	-538	-146
4	670	1,840	-1,170	-1,316
<b>Total</b>	<b>2,885</b>	<b>4,201</b>	<b>-1,316</b>	

<sup>1</sup> Additional garage parking minus displaced surface parking

### 4.3 Parking Supply/Demand Analysis

Figure 6 provides a comparison of the projected parking supply and projected parking demand. As reported above, the existing system has considerable excess capacity with almost 4,000 open spaces during the October 2010 counts. By Phase 3, the parking supply is expected to be almost equal to demand and by the end of Phase 4 demand will exceed supply by more than 2,100 spaces. Since this deficit is based on a 40-year projection of both the parking supply and demand, no mitigation measures are recommended in this study. As with any plan, the projections of parking demand and plans for changes in the parking supply will need to be regularly revisited and planned improvements modified as needed.

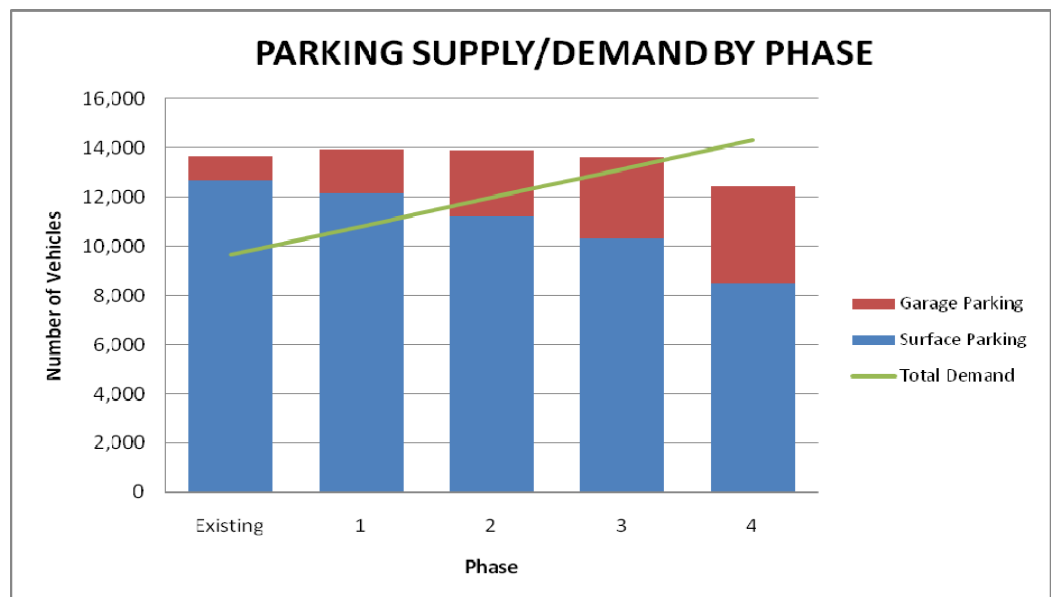


Figure 6 Parking Supply and Demand by Phase



Table 17 shows the projected change in the number of spaces available with increased staff, student and other parking demand and changes in the parking supply. The existing available supply to accommodate additional parking demand is 4,000 spaces. This number declines to 3,277 spaces at the end of Phase 1 and turns into a 2,141-space deficit at the end of Phase 4. As mentioned above, the projections of parking demand and plans for parking supply changes should be regularly revisited and planned improvements modified to accommodate changing needs.

**Table 17 Available Spaces by Phase**

Phase	Change in Parking Supply		Change in Parking Demand		Cumulative Available Spaces <sup>1</sup>
	Net Change	Cumulative Change	Net Change	Cumulative Change	
Existing					4,000
1	467	467	1,190	1,190	3,277
2	-75	392	1,210	2,400	1,992
3	-538	-146	1,210	3,610	244
4	-1,170	-1,316	1,215	4,825	-1,895
<b>Total</b>	<b>-1,316</b>	<b>-1,316</b>	<b>4,825</b>	<b>4,825</b>	<b>-2,141</b>

1. Cumulative available spaces equals available spaces from previous phase minus cumulative change in parking demand plus cumulative change in the parking supply

## 4.4 Roadway, Transit, Pedestrian and Bicycle Improvements



***Extension of Mullins Way to access Lots 12 and 25 to relieve Commonwealth Avenue***

The roadway, bicycle, pedestrian and transit improvements included in the Master Plan are presented in Table 18. These improvements are all programmed for the first three phases of the Master Plan. The proposed gateway garage east of North Pleasant Street at Massachusetts Avenue is the only Master Plan improvement included in Phase 4. The garages included in the Master Plan are not included in the table because they were described in detail earlier.

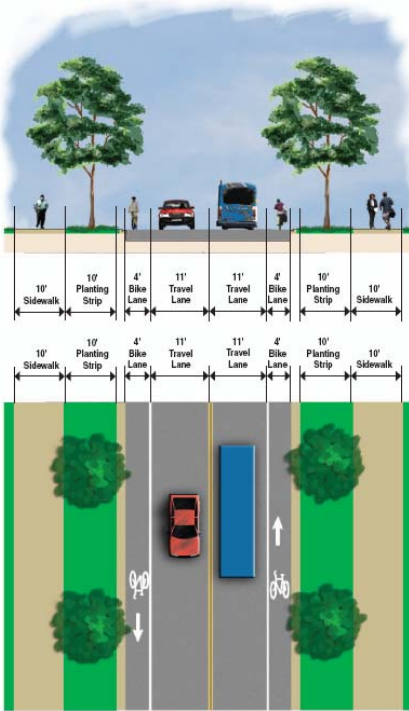
Roadway and transit improvements that could significantly affect access to UMass parking facilities include:

- Extension of Mullins Way to provide an alternative route to Parking Lots 12 and 25 (Phase 1)
- Provision of two new direct shuttle routes to parking (Phase 1):
  - Between Parking Lot 11 and Haigis Mall
  - Between Parking Lot 12 and Campus Center
- Provision of an east-west roadway south of, and parallel to, Massachusetts Avenue to provide additional access to the proposed garage on the southeast corner of Massachusetts Avenue and Lincoln Avenue (Phase 2)

- The provision of a new roadway connection between Governors Drive and Route 116 (Phase 3)
- Relocation of Governors Drive to the north of existing Parking Lots 26, 31, and 68 (Phase 3)
- Restricting access on North Pleasant Street to buses, bicycles and service vehicles only (Phase 3)

**Table 18 Master Plan Transportation Recommendations by Phase**

Transportation Improvement	Related Areas
<i>Phase 1 (within 10 years)</i>	
Mullins Way Access Improvements	Extension to Parking Lot 12
Installation of Roundabout	Massachusetts Avenue/North Pleasant Street
Complete Streets Enhancement	Commonwealth Avenue North Pleasant Street Governors Drive Eastman Lane Massachusetts Avenue
Phase in Direct Shuttle Routes	Between Parking Lot 11 and Haigis Mall Between Parking Lot 12 and Campus Center
Bike Path	Between North Amherst and Commonwealth Avenue
<i>Phase 2 (10 to 20 years)</i>	
New East/West Roadway Link	Gateway Street Grid
Pedestrian Improvements	Ellis Way/ Hicks Way Phillips Street Pedestrian Way
<i>Phase 3 (20 to 30 years)</i>	
Roadway Improvements	Thatcher Way
Roadway Restriction	Buses, bicycles and service vehicles only on North Pleasant Street
Roadway Relocation	Governors Drive to north of existing Parking Lots 26, 31, and 68
New Roadway	Route 116 Connection to Governors Drive



**“Complete Streets: Enhancements:**

- North Pleasant Street
- Commonwealth Avenue
- Massachusetts Avenue
- Eastman Lane
- Governors Drive

The restriction of access to North Pleasant Street is the only improvement that could potentially have a negative impact on parking. However, based on Master Plan development proposed for Phases 1 through 3, there would be no impact because there would be no parking facilities along the restricted section of North Pleasant Street.

The complete streets enhancements proposed on all the streets surrounding the core campus are designed to improve conditions for bicycles and pedestrians without negatively affecting vehicular travel or transit services. Therefore, they are not expected to affect access to parking. The proposed roundabout at North Pleasant Street and Massachusetts Avenue is expected to improve vehicular flow through the intersection. The proposed bike path to North Amherst and the proposed pedestrian improvements are not expected to have any direct effect on parking access.

# 5

## Parking Plan

The Parking Plan is divided into near-term and long-term actions. The near-term actions are intended to be implemented within ten years and are designed to support the development identified in the first phase of the Campus Master Plan. Long-term actions are intended beyond the ten-year horizon, supporting the later phases of the Master Plan. The timing and exact nature of these actions will be dependent on the timing and location of future development. These actions are likely to change as elements of the Campus Master Plan evolve over time.

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### 5.1 Near-Term – Within 10 Years

Within the near-term (first 10 years), the Campus Master Plan calls for the construction of an approximately 700-space garage adjacent to the existing Campus Center Garage and the provision of direct shuttle service to Lots 11 and 12. The shuttle service could be introduced early in the 10-year period, before construction of the 700-space garage, to relieve pressure on the Campus Center Garage as development eliminates surface spaces in the campus core. As existing parking facilities are closed to accommodate Master Plan development, new employees should be assigned to outlying parking lots, leaving any available close-in spaces for the reassignment of existing employees from lots that are closed.

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#### Assignment of New Employees

In anticipation of the closure of core employee lots from Master Plan development, parking that becomes available within the campus core should initially be offered to current employees who have been displaced as a result of the development. New employees would be allowed to be placed on a core lot waiting list of their choice, however they would be assigned a periphery parking space initially. The existing tiered parking cost model based on salary and lot location should continue to be applied so that employees are aware of the amount they are saving by choosing parking on the periphery compared to the more expensive lots in the core. Over time,



as the core lots are all eliminated in favor of structured parking on the periphery, this assignment process will not be necessary.



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## Parking Garage

The Master Plan includes construction of a new 700-space garage on the site of the old power plant adjacent to the existing Campus Center Garage. It would provide additional parking for the central part of the campus, including the library, Student Union, Campus Center and the Campus Center Hotel. In addition, it would replace spaces lost to new development on the core campus. The proposed garage would be accessed from Campus Center Way. In addition to providing expanded parking, it also could serve as a major intermodal transportation center for shuttle, local and intercity buses. This would replace the existing bus stop at Haigis Mall, which is proposed for elimination in the second phase (10-20 years) of Master Plan development.



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## Direct Shuttle Service to Lots 11 and 12

Currently, the most remote sections of parking Lots 11 and 12 are not used. As development increases and parking spaces are lost in the campus core, parking demand can be expected to migrate farther out from the core. To facilitate increased use of the remote parking areas in Lots 11 and 12, the Master Plan recommends direct shuttle bus connections between the main campus and the two parking areas starting with Lot 12 and then transitioning to Lot 11 as needed (Lot 11 is currently primarily used by students living in Southwest who only drive their cars occasionally so there is very low turnover). The existing shuttle routes circulate in around the campus. Because of the existing figure eight shuttle loops, future Lot 11 and 12 parkers would have to walk to their destination or ride the campus shuttle along much of the bus loop before arriving at a stop near their destination. Direct shuttle service between the lots and the campus core would increase accessibility and encourage more students to park in the underutilized areas.

The Lot 12 shuttle would connect the sections of the lot farthest from the main campus with the Campus Center via Campus Center Way. The bus stop would be located on the circle next to the parking garage or in a location provided in the proposed expansion of the garage. The shuttle would operate continuously between the two locations providing frequent service and a trip length of only a few minutes. Similarly, the shuttle to Lot 11 could use the existing stop at Haigis mall or a stop at the visitor's center after the Haigis mall loop is closed as part of Phase 2 of the Master Plan. An extension farther into the campus via North Pleasant Street or Thatcher Way could be considered if a suitable bus turnaround can be provided.

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## 5.2 Long-term – Beyond 10 Years

Over the long-term (10 – 40 years), the Campus Master Plan calls for the reduction of surface parking in the central campus to reduce pedestrian and bicycle conflicts, and to provide sites for future buildings. Replacement parking for these lost spaces will be provided in new garages situated at key locations around the perimeter of the core campus:

- ▶ **Southeast corner of Massachusetts Avenue and Lincoln Avenue (10-20 years):** An 860-space facility at this location would serve the Whitmore Administration building, the Robsham Visitors Center, the Fine Arts Center and several other buildings on the core campus. The garage would be developed in Phase 2 of the Master Plan. It would intercept traffic approaching the campus from the west and southwest, and with the proposed reduction in the Massachusetts Avenue cross section to one travel lane in each direction, parkers can easily walk to destinations on the core campus. A bus stop and bicycle storage would be provided.
- ▶ **North end of campus near relocated Governors Drive (20-30 years):** A 655-space facility roughly on the site of Parking Lots 31 and 68 would serve Computer Science, Engineering and the Lederle Graduate Research Center. It would intercept traffic approaching the campus from the north, northeast, and the northwest when the direct connection to Route 116 is provided. Both the garage and the Route 116 connection are planned for Phase 3. With the relocation of Governors Drive to the north, pedestrians from the garage would not need to cross any roadway to reach destinations on the core campus. As with the Phase 2 garage, a bus stop and bicycle storage would make it a multimodal facility.
- ▶ **North Pleasant Street at Massachusetts Avenue (30-40 years):** A 670-space facility on the east side of the intersection of North Pleasant Street and Massachusetts Avenue would intercept traffic from the south. The provision of retail space on the ground floor and university space along the front side of the building would help define a major gateway to the campus while also connecting the campus to the Gateway project proposed by the Town of Amherst. The garage would serve the Studio Arts Building, the Newman Center, the Fine Arts Center and Morrill Science I – IV.

These new garages, in addition to the planned garage adjacent to the Campus Center Garage, will add almost 2,900 spaces to the campus parking supply to offset many of the more than 3,900 spaces displaced by campus development over the course of the Master Plan. All the planned garages meet the parking principles and serve to forward the parking vision presented above. The Future Conditions Review chapter of this report provides a detailed discussion of the change in the campus parking supply and parking demand for the four phases of the Master Plan.

During the long-term, consideration should be given to providing direct and more frequent shuttle service between the core campus and Parking Lots 13 and 24. These are the most remote lots and will likely be the last to fill as demand increases and the number of spaces in the core campus declines. The only reasonable access between





these lots and the campus is shuttle service. As with Lots 11 and 12, the existing loops provide indirect service, requiring riding the campus shuttles along much of the bus loop before arriving at a stop near their destination. More frequent, direct shuttle service between the lots and the campus core would increase accessibility and encourage more students to park in the underutilized areas.

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### 5.3 Accommodating Growth Without Structured Parking – “Plan B”

In the event that the parking garages recommended in this parking vision plan and the Campus Master Plan are not able to be funded, an alternative solution to meeting the parking needs of the Master Plan would involve expanding surface parking outside the campus core. Once the available parking in the remote parking lots spaces are used, additional remote surface parking lots would have to be constructed on University-owned land that is not slated for a Master Plan building or constrained by environmental resource areas or topography. Areas along relocated Governors Drive, Mullins Way, Eastman Lane, Stadium Drive, and N. University Drive provide the most potential for additional remote surface lots that could effectively intercept traffic before it reaches the campus core. Similar to the proposed future shuttle service to Lots 11 and 12, these remote parking areas would need to be served regularly by a campus shuttle given the distance from the campus core.



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