



CENTRAL MICHIGAN UNIVERSITY

Transportation Master Plan

March 2008



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URS

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1. Executive Summary

1.1. Purpose

The purpose of master planning is to provide a framework for making short-term and long-term decisions which impact or bring about change. The Transportation Master Plan is intended to provide this framework to help guide decisions related to roadway infrastructure changes, pedestrian and non-motorized paths, parking facilities, and transit operations. In some cases, these decisions may be linked with facility improvements, and in other cases they are stand-alone considerations.



The previous Central Michigan University (CMU) Transportation Master Plan was commissioned in 2001. Many of the recommendations of the previous Transportation Master Plan were first suggested as part of the 2001 CMU Master Plan.

Since 2001, many of the previous transportation recommendations have been implemented, and others have not been deployed. New transportation issues have surfaced or have been exacerbated by other changes in or nearby the campus, and CMU's priorities have changed. As a result, CMU commissioned an update to the Transportation Master Plan to address critical transportation issues on the campus.

Through the development of the Transportation Master Plan, CMU's desire to be proactive with addressing current and future transportation issues will be valuable with respect to campus safety, mobility, and maximizing its resources.

1.2. Vision and Goals

CMU 2010 is CMU's Strategic Plan. The vision embodied in this plan is for CMU to achieve national prominence in the areas of integrity, academics excellence, research and creative activity, and public service. This Transportation Master Plan ties in with Priority V: Culture of Integrity. Strategy 3 under Priority V is to provide infrastructure and resources sufficient to advance the institutional mission and priorities.



Existing University Center raised crosswalk.

The following goals of the study were developed as part of the study process:

1. Continue developing a safe and friendly pedestrian environment
2. Maintain safe and intuitive motorist wayfinding and circulation
3. Provide parking facilities in a sustainable and cost-effective manner

The goals were applied to non-motorized, vehicle, parking, and transit functions. During the study, the CMU Steering Committee emphasized on several occasions that Goal 1, a safe and friendly pedestrian environment, was the most important transportation goal. A primary focus of the Transportation Master Plan was to consider the opportunities to reduce or eliminate the vehicle/pedestrian conflicts on Preston Street.

The Transportation Master Plan also complements CMU's commitment to sustainability, which is manifested through the attributes of environmental stewardship and preservation of land for future facility site opportunities.

1.3. Recommendations Summary

The following recommendations were provided for future deployment.

Immediate (2008)

- Coordinate with the City of Mount Pleasant with regard to the Washington Street reconstruction planned for the summer of 2008, including the reconfiguration of the Washington/Hopkins intersection, adding a raised crosswalk on the south leg of the Hopkins intersection, and adding two bus stops along northbound Washington Street.
- Coordinate with the Michigan Department of Transportation (MDOT) with regard to the pedestrian crossing improvement at the South Mission Road/Appian Way intersection.
- Coordinate with the Isabella County Transportation Commission (ICTC) with regard to implementing a new bus route along Washington Street and West Campus Drive.



Washington Street at Hopkins Court intersection.

Short-Term (0-2 Years)

- Close Ottawa Court at the main pedestrian and bicycle path that crosses Ottawa Court on the east side of the Education and Human Services (EHS) building. A vehicle turn-around is needed for the closure east of the path.
- Coordinate with the City with regard to converting portions of Bellows Street from a 4-lane to a 3-lane cross section (no new pavement necessary).
- Develop justification for, design, and construct the traffic signal at the Preston Street/East Campus Drive intersection, including City (traffic signal justification) and MDOT (interconnect with South Mission Road) coordination.
- Design and construct the new Lot 33 driveway to Preston Street, in conjunction with the traffic signal improvement at the Preston Street/East Campus Drive intersection.
- Design and construct transit center improvements, parking aisle islands, and parking lot reconfiguration in Lot 33.
- Remove the circle drive in front of the University Center and replace with a circle drive that eliminates the existing vehicular conflicts at the front door of the University Center.
- Design and install the raised crosswalks on Washington Street, south of Preston Street.
- Coordinate with MDOT and the City with regard to the proposed eastbound right-turn lane at the Preston Street/South Mission Road intersection.

Medium-Term (3-4 Years)

- Design and construct the new Lot 22 driveway on West Campus Drive, and possibly close the existing driveway on Preston Street. Coordination with the Ann Arbor Railroad will be required, after the suggested follow-up study.
- Construct the West Campus Drive/East Campus Drive roundabout, which may also be utilized for future MDOT intersection improvements for the South Mission Road/West Campus Drive/Bluegrass

Road intersections. This improvement will likely require CMU property.

- Re-evaluate the Preston Street closure options, and provide the City with technical justification and identify mitigation measures for the option mutually acceptable between the City and CMU. The mitigation measures will likely require CMU property.
- Design and construct a traffic signal or roundabout at the Preston Street and West Campus Drive intersection.
- Coordinate with MDOT with regard to the design and construction of the proposed eastbound right-turn lane at the Bellows Street/South Mission Road intersection, which will likely require CMU property.
- Coordinate with MDOT with regard to the design and construction of the anticipated improvements to the South Mission Road/Broomfield Road intersection.

Long-Term (5-7 years)

- Design and construct roadway and intersection control improvements associated with the Preston Street closure.
- Design and construct improvements to Preston Street (within the closure area) that maintain emergency vehicle access and provide a stronger pedestrian link to the University Center.
- If Preston Street is not closed, design and construct the Washington Street/Preston Street intersection as a raised intersection.

Future (when necessary)

- Implement separate or shared non-motorized paths, after the suggested follow-up study.
- Design and construct relocated Franklin Street in conjunction with a future facility site in the northeast sector, if desired.
- Design and construct raised crosswalks on Franklin Street (between Warriner Hall and Finch Field

House) and Preston Street (between Lots 27 and 28) when the pedestrian volumes are sufficient.

- Design and construct the reconfiguration of Lot 22, after the suggested follow-up study.
- Design and construct the expansion and reconfiguration of Lot 8 and access changes to Lot 11, after the suggested follow-up parking study.
- Replace the Washington Court Apartments west of EHS with a surface parking lot. Per the Master Plan, the parking lot will ultimately be used as a future facility site.
- Adopt parking strategies that optimize the utility of the existing parking system and/or restrict usage, after the suggested follow-up study.
- Implement remote parking and shuttle from lots south of Broomfield Road.
- Design and construct a parking deck, after the suggested follow-up study.

1.4. Outcome Summary

The deployment of the Transportation Master Plan recommendations will enhance the campus through the fulfillment of the goals and objectives. The statements below illustrate the campus character changes as a result of deploying the recommendations:

- Pedestrians will benefit from physical improvements that improve driver recognition of the pedestrian environment and the elimination of vehicle/pedestrian conflicts. These improvements come in the form of pedestrian crossing improvements, street modifications, and parking lot modifications and removals.
- The closure of Preston Street between Washington Street and Franklin Street would significantly improve the pedestrian-oriented character of the campus. The roadway improvements associated with the Preston Street closure are intended to elevate the function of Bellows Street and West Campus Drive to serve as the “ring road” around the north side of the campus.

- Motorists will benefit from improvements to key intersections near the campus, and direct access to large commuter parking lots from the campus ring roads. These measures will reduce the vehicle usage on roadways within the campus core, such as Preston Street and Washington Street.
- Parking facility modifications will optimize the existing parking lot capacities, expand the commuter parking, and improve parking lot access. The campus parking strategies will improve the efficiency of parking system operation, reducing parking space demand.
- Bicycle and transit opportunities will be strengthened, which will increase the potential for reducing dependency on vehicle travel to the campus and associated parking needs. Such measures allow for CMU to reduce the land requirements for parking and allow for greater opportunity for future academic facility sites.
- Future considerations, such as the relocation of Franklin Street, remote parking with shuttle, and a parking deck, will allow CMU to keep these options available if and when future facility decisions precipitate their usefulness.

2. Introduction

2.1. 2001 CMU Master Plan

The current Master Plan and its recommendations have been largely implemented, although not all of the transportation-related recommendations have been deployed. The Master Plan suggested changes to improve pedestrian connectivity, safety, and mobility, which impacted roadway and parking lot facilities. As a result, these changes have been evaluated to determine their feasibility for future implementation. In large part, these changes were found to be feasible, and mitigation measures were identified to reconcile any adverse impacts.

Recent improvements that have been a significant benefit to the CMU campus include the University Center raised crosswalk, the crossover improvements to Broomfield Road, and the closure of parking lots on the interior of the campus. These specific measures have improved pedestrian mobility and safety, improved vehicular mobility and safety, and/or reduced vehicle/pedestrian conflicts.

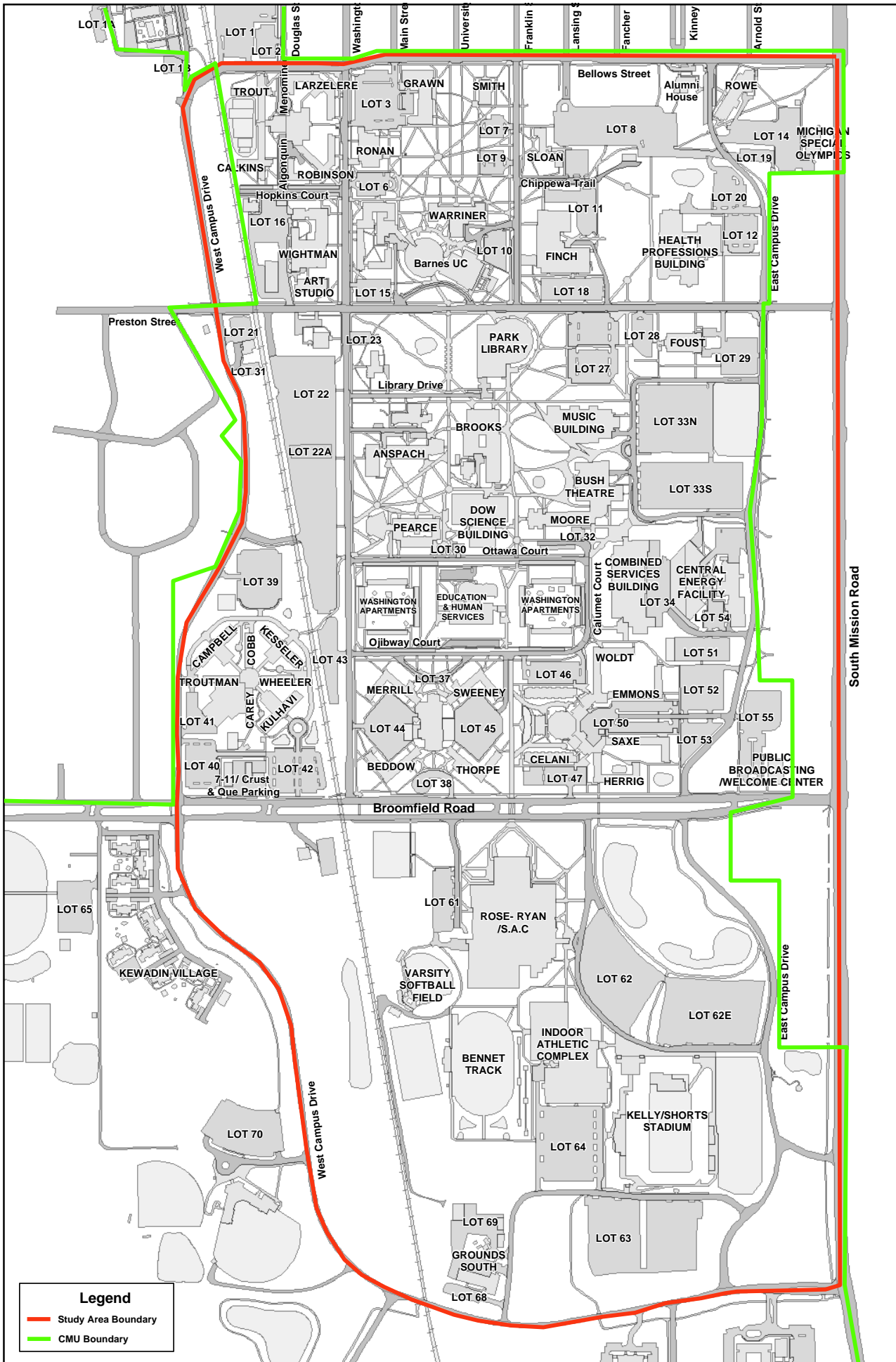
2.2. Study Area

The study area (**Figure 1**) included the CMU campus and surrounding roadways, and was bounded by Bellows Street, West Campus Drive, and South Mission Road. The study area included roadways under the jurisdiction of Central Michigan University, the City of Mount Pleasant, the Isabella County Road Commission (ICRC), and the Michigan Department of Transportation (MDOT).

CMU is located within the Mount Pleasant city limits, and the traffic that passes through the campus is a mix of CMU-generated and regional traffic. As a result, the balance between the needs of the campus and the needs of the community must always be considered with every transportation decision.

2.3. Study Approach

The Transportation Master Plan addresses the issues related to pedestrians, vehicles, parking, and transit. Field data was collected in all of these areas to support the alternatives and evaluation process. Alternatives were identified and evaluated in each area. For the traffic analysis, a horizon year of 2013 was selected and used for the future traffic conditions assessment.



Legend

- Study Area Boundary
- CMU Boundary



0 350 700 Feet

Central Michigan University
Transportation Master Plan
Study Area



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Figure
1

The 6-member CMU Steering Committee provided input and direction for the study. A total of eight meetings were conducted to support the development of the plan:

- Kick-off meeting; November 28, 2007
- Public agency coordination meeting #1; December 12, 2007
- Existing and future conditions discussion; January 11, 2008
- CMU leadership update; January 29, 2008
- Transportation alternatives discussion; February 6, 2008
- Public agency coordination meeting #2; February 11, 2008
- CMU comments discussion; February 14, 2008
- Final report discussion; March 4, 2008

The current plans for CMU and other agencies were obtained and reviewed for relevant information, including the following:

- Central Michigan University Master Plan, 2001
- Central Michigan University Traffic Master Plan, 2001
- CMU Bike System Feasibility Report, 2003
- City of Mount Pleasant Master Plan, 2006
- US-127 Business Route Operation Improvement Study (MDOT), 2007
- Isabella County Master Land Use Plan, 2007
- Charter Township of Union Future Land Use, 2002

2.4. Goals and Objectives

The transportation-specific project goals and objectives were defined early in the study, and were reviewed by the CMU Steering Committee periodically to verify that they reflect and are aligned with CMU's goals and objectives.

Goal 1: Continue developing a safe and friendly pedestrian environment.

Objectives:

- Minimize or remove street crossings from pedestrian paths.
- Provide effective and consistent pedestrian crossing treatments.
- Separate bicycles and pedestrians in high pedestrian volume areas.
- Configure new facility sites and parking lots in a pedestrian-oriented manner.



Pedestrians crossing Preston Street at the Washington Street intersection.

Goal 2: Maintain safe and intuitive motorist wayfinding and circulation.

Objectives:

- Improve key intersections, based on mobility and safety considerations.
- Strengthen ring road concept on the perimeter of the campus.
- Optimize parking lot efficiency, size, and access within space constraints.
- Minimize vehicular mobility obstacles and dead-ends.

Goal 3: Provide parking facilities in a sustainable and cost-effective manner.

Objectives:

- Maintain an appropriate but limited supply of parking adjacent to all campus facilities.
- Provide access to commuter parking lots on the perimeter of campus.
- Reduce the parking demand in the core campus area by utilizing a shuttle service for nearby residential facilities and remote parking lots south of Broomfield Road.
- For long-range planning purposes, identify and preserve potential future parking deck sites.

2.5. Study Participation by Other Transportation Agencies

The transportation agencies that have jurisdiction within the study area are as follows:

- City of Mount Pleasant
- Isabella County Road Commission (ICRC)
- Michigan Department of Transportation (MDOT)
- Isabella County Transportation Commission (ICTC)



Lot 27 adjacent to the Library.

Two meetings were held specifically to coordinate with these agencies. The first meeting was held at the very beginning of the study, and the second meeting was held after the preliminary transportation alternatives were developed. These meetings were particularly useful to understand the specific concerns and historical perspective to adequately perform the evaluation process.

2.6. Projects by Other Transportation Agencies

The other transportation agencies have a number of projects in various stages of the planning or implementation process:

- MDOT and the City are currently in the planning stages for an eastbound right-turn lane at the Preston Street/South Mission Road intersection.
- MDOT and the ICRC are in the planning stages for improving the South Mission Road/Broomfield Road intersection. If funding becomes available, MDOT may target 2011 for this improvement.
- MDOT conducted a long-range study that identified improvements for the South Mission Road/Bluegrass Road/West Campus Drive intersection, based on projected 2030 traffic volumes. No short-term or interim intersection improvements were provided. No intersection improvements are currently listed in MDOT's 5-Year Plan.
- MDOT will be optimizing the traffic signal timings along South Mission Road during 2008.
- MDOT will be implementing improvements to the existing pedestrian crossing on South Mission Road at Appian Way. MDOT has targeted the summer of 2008 for this improvement, and will likely include a median refuge island for pedestrians.
- ICRC will begin the construction of Isabella Road in the spring of 2008. Once the construction is complete, some traffic destined for the growing retail establishments in the area will likely choose to take Isabella Road rather than South Mission Road. A traffic signal is planned for the intersection of Isabella Road and Bluegrass Road.
- ICRC will begin reconstructing the intersection of Broomfield Road and Crawford Road in June 2008. This intersection currently has geometric issues for traffic flow on Broomfield Road.
- The City will be reconstructing Washington Street between Preston Street and High Street during the summer of 2008.

3. Existing Conditions (2007-2008)

3.1. Non-Motorized

3.1.1. Non-Motorized Facilities



Shared bicycle and pedestrian path south of Broomfield Road.

A north-south shared bicycle and pedestrian path is located through the center of campus, connecting West Campus Drive and Preston Street approximately on the Franklin Street alignment. A portion of the path has pavement markings to separate bicyclists and pedestrians, and a portion does not delineate between the user types. In general, the shared path is used as a large sidewalk.

There are 17 marked roadway pedestrian crossings on the CMU campus, as shown in **Figure 2**. These pedestrian crossings are treated in several different ways:

- The Broomfield Road crossing adjacent to Rose Center has a pedestrian-activated traffic signal, and serves only pedestrians crossing Broomfield Road.
- The University Center raised crosswalk is a raised pedestrian crossing, with a stop sign for Preston Street.
- The Washington Street/Hopkins Court and Washington Street/Ottawa pedestrian crossings include stop signs.
- The remaining pedestrian crossings are signed with a variety of signs, and require traffic to yield to pedestrians.



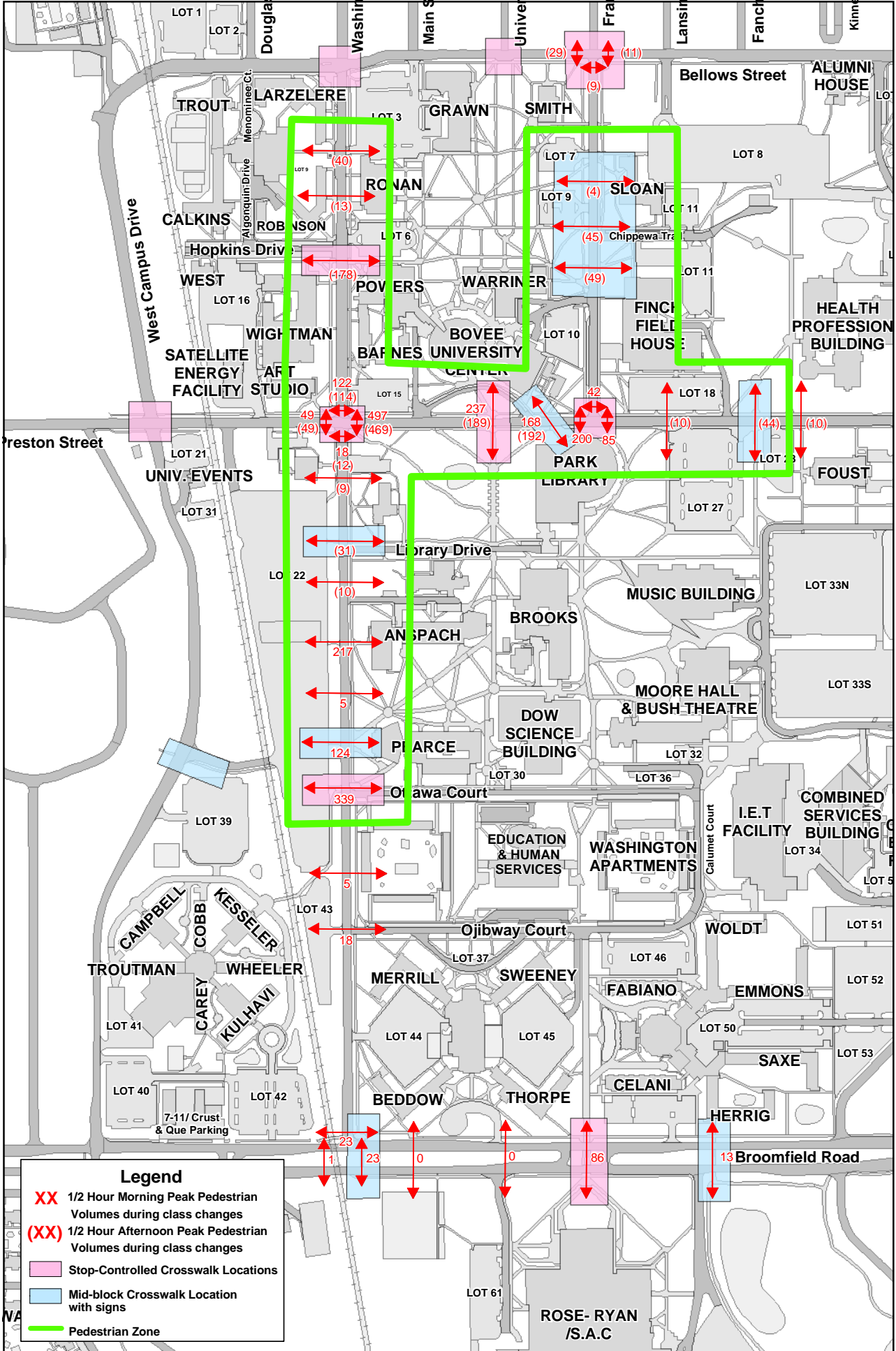
Broomfield Road at the pedestrian-activated traffic signal crossing.

In addition, there is a marked pedestrian crossing South Mission Road at Appian Way, which is used primarily by CMU-bound pedestrians.

3.1.2. Non-Motorized Volumes

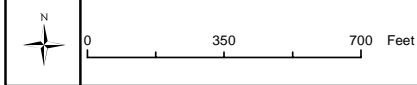
Pedestrian volumes were collected during a ½ hour period in the morning and afternoon along Washington Street, Preston Street, Franklin Street, and Broomfield Road. The ½ hour period represented the class change times, which creates a high volume of pedestrians. The pedestrian volumes were useful for identifying the most pedestrian-sensitive areas.

No bicycle volumes were collected, since the study was conducted during cold weather. Bicycle volumes should be



Legend

- XX** 1/2 Hour Morning Peak Pedestrian Volumes during class changes
- (XX)** 1/2 Hour Afternoon Peak Pedestrian Volumes during class changes
- Stop-Controlled Crosswalk Locations
- Mid-block Crosswalk Location with signs
- Pedestrian Zone



collected in warm weather when non-motorized path improvements are considered.

Upon review of the pedestrian volumes, a “pedestrian zone” was informally established within the Washington Street, Preston Street, and Franklin Street corridors, and it is illustrated in **Figure 2**. The limits of these zones are as follows:

- Washington Street: Ottawa Court to Hopkins Court
- Preston Street: Washington Street to the crosswalk between Lots 27 and 28
- Franklin Street: Chippewa Trail to Preston Street

Based on the limited pedestrian data collection, the ½ hour pedestrian flow across Washington Street within the pedestrian zone is approximately 1,100 pedestrians. The ½ hour pedestrian flow across Preston Street within the pedestrian zone is approximately 1,300 pedestrians. These flows are expected to occur during each class shift during the morning and afternoon, with a greater number occurring around the noon hour.

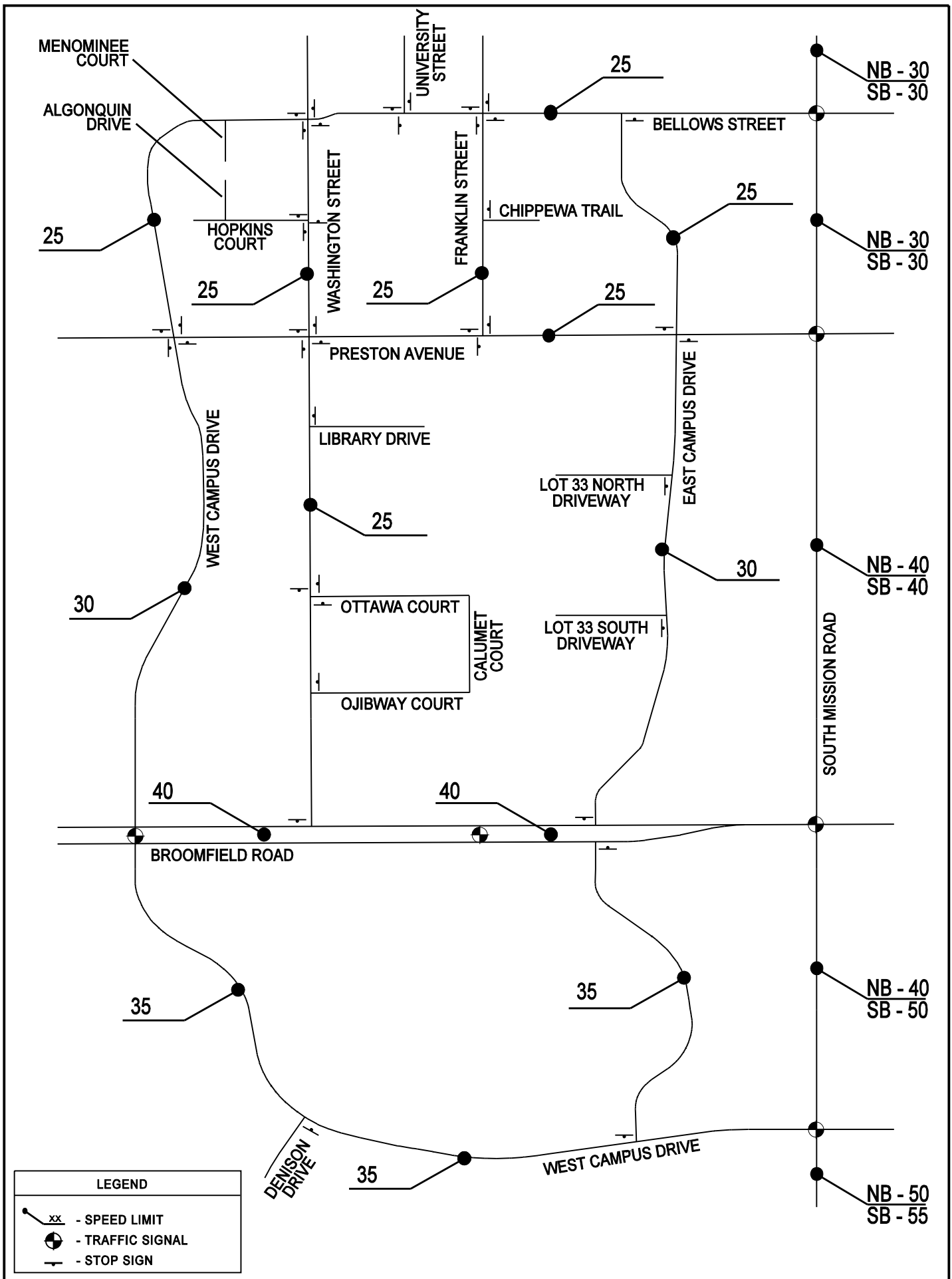
The Washington Street/Preston Street intersection experienced the highest concentration of pedestrian volumes. Approximately 650 pedestrians cross the approaches of this intersection during the ½ hour class change period, including nearly 500 pedestrians on the west approach. This high concentration of pedestrians nearly incapacitates the intersection with respect to vehicular traffic for an extended period of time each hour.

3.2. Vehicles

3.2.1. Study Area Roadways

The roadways and traffic control are described below, and are illustrated in **Figure 3**.

- South Mission Road (US-127 Business Route) is a north/south five-lane roadway. It is the business route for US-127 through Mount Pleasant. South Mission Road is under the jurisdiction of MDOT and functions as principal arterial. The posted speed limit varies between 30 and 55 mph in the study area.
- East Campus Drive is a north/south two-lane roadway. The posted speed limit is 25 mph north of Preston Street, 30 mph between Preston Street



LEGEND	
	- SPEED LIMIT
	- TRAFFIC SIGNAL
	- STOP SIGN

and Broomfield Road, and 35 mph south of Broomfield Road. It is owned by CMU.

- West Campus Drive is a north/south and east/west two-lane roadway. The posted speed limit is 25 mph north of Preston Street, 30 mph between Preston Street and Broomfield Road, and 35 mph south of Broomfield Road. It is owned by CMU south of Preston Road, and under the jurisdiction of the City north of Preston Road.
- Franklin Street is a north/south two-lane roadway. It is under the jurisdiction of the City, and has an unposted speed limit of 25 mph.
- Washington Street is a north/south two-lane roadway. It is one-way southbound between downtown Mount Pleasant and Bellows Street. It is under the jurisdiction of the City and functions as a collector. The posted speed is 25 mph.
- Bellows Street is an east/west roadway that varies between two lanes and four lanes. It is under the jurisdiction of the City, and has a posted speed limit of 25 mph.
- Preston Street is an east/west two-lane roadway. It is under the jurisdiction of the City and functions as a collector. The posted speed limit is 25 mph.
- Broomfield Road is an east/west, four-lane boulevard. It is under the jurisdiction of the ICRC and functions as a minor arterial. The posted speed limit is 40 mph.
- Menominee Court, Algonquin Drive, Hopkins Court, Library Drive, Ottawa Court, Ojibway Court, Calumet Court, and Chippewa Trail are owned by CMU.



Preston Street between East Campus Dr and Franklin Street.

The Ann Arbor Railroad tracks cross West Campus Drive, Broomfield Road, Preston Street, and Bellows Street. West Campus Drive has lights and gates at the crossing. The other railroad crossings have lights only. There is also a railroad crossing at the Lot 22 driveway to West Campus Drive, which has a yield sign and crossbucks for eastbound traffic, and not signage for westbound traffic. The railroad track currently has a speed limit of 25 mph, and two trains use these crossings each day.

3.2.2. Vehicle Volumes

Average daily traffic (ADT) volumes, representing 24 hours of traffic on a typical weekday, were collected and are shown on **Figure 4**.

Turning movement volumes were collected during the morning, noon, and/or afternoon peak traffic periods at the following intersections:

- South Mission Road at Bellows, Preston, and Broomfield
- Bellows Street at Franklin and Washington
- Preston Street at East Campus Drive, Franklin, Washington, and West Campus Drive
- Broomfield Road at East Campus Drive, Washington, West Campus Drive, and the crossovers that service the left-turn movements
- Lot 33 driveways on East Campus Drive

Turning movement volumes were available from MDOT for the following intersections, which were conducted during the fall of 2007:

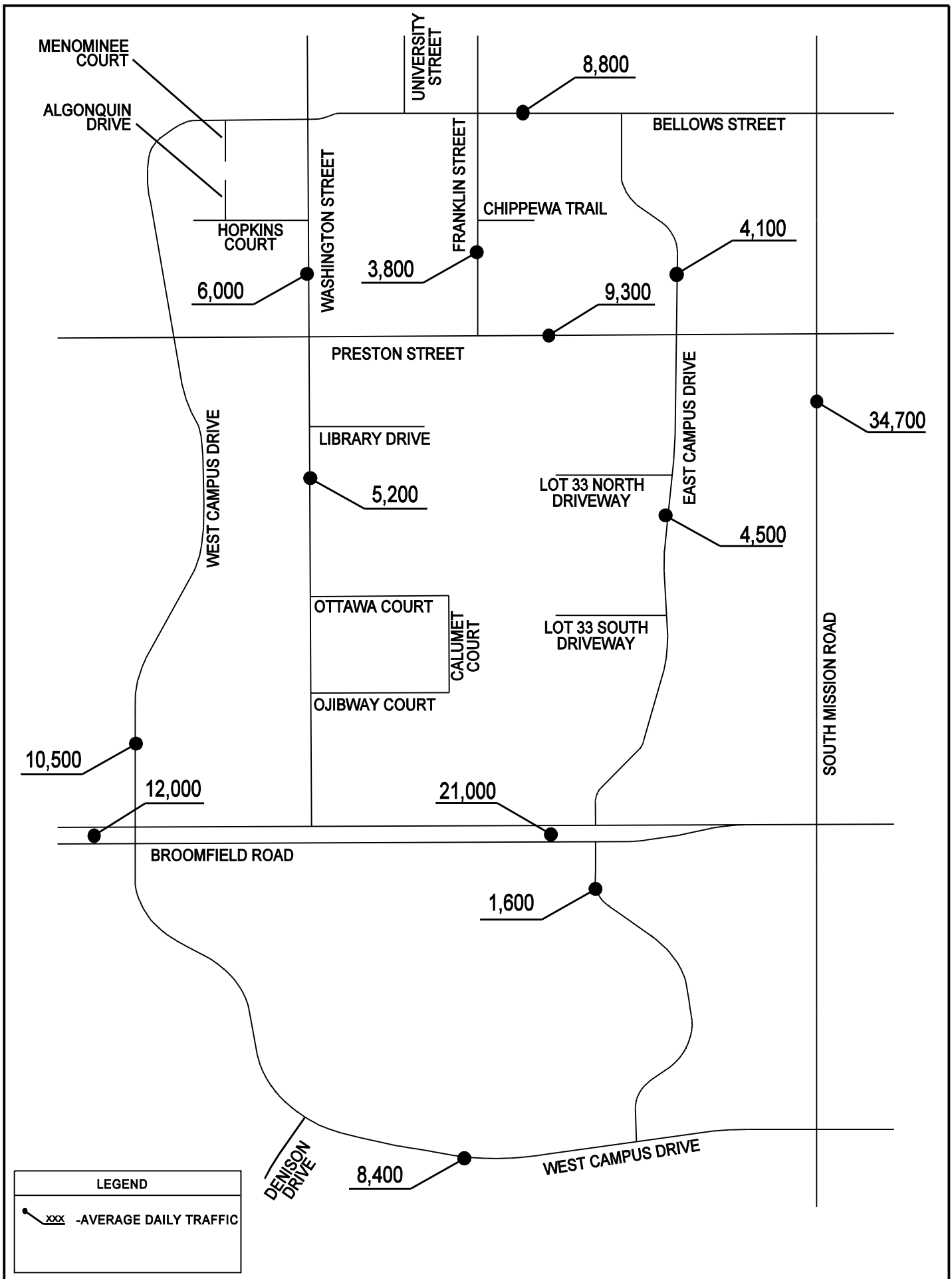
- South Mission Road at Bellows, Preston, Broomfield, and West Campus Drive/Bluegrass Road

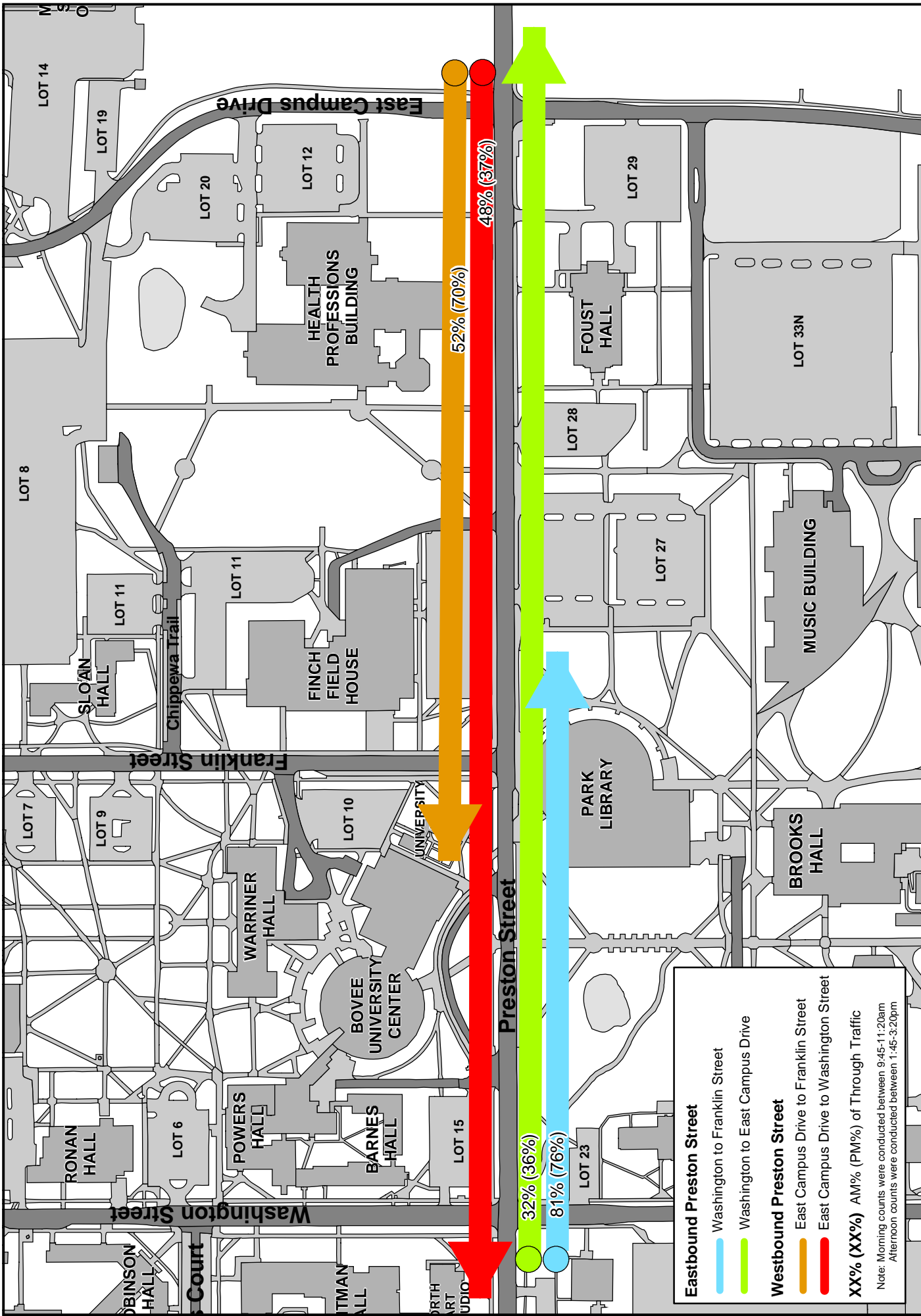
The intersection turning movement figures are provided in **Appendix A**.

A limited origin-destination study was performed on Preston Street to determine what percentage of traffic on Preston Street is CMU-generated traffic. A sampling of traffic occurred during the morning and in the afternoon, and vehicles were tracked between Washington Street and East Campus Drive (see **Figure 5**). The results indicated that between one-half and two-thirds of the traffic on Preston Street is generated by CMU.

3.2.3. Intersection Level of Service

The intersection level of service was determined for each intersection for which intersection turning movement data was collected, as shown in **Appendix A**. The analysis does not explicitly take into account the effect of pedestrians, which are significant only at the Preston Street intersections with Washington Street and Franklin Street.





Eastbound Preston Street

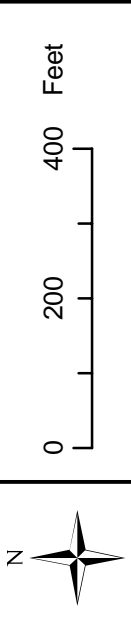
- Washington to Franklin Street
- Washington to East Campus Drive

Westbound Preston Street

- East Campus Drive to Franklin Street
- East Campus Drive to Washington Street

XX% (XX%) AM% (PM%) of Through Traffic

Note: Morning counts were conducted between 9:45-11:20am
 Afternoon counts were conducted between 1:45-3:20pm



3.2.4. Roadway Issues

The crash data associated with the campus and the nearby streets was reviewed. A total of two crashes were recorded on the campus over a 3-year timeframe. CMU personnel concurred that, due to the lack of vehicle speed, very few crashes occur on campus outside of the parking lots.



South Mission Road at the Appian Way pedestrian crossing.

The non-motorized crash data for South Mission Road was also reviewed (see **Table 1**), which indicated that there were two crashes that involved non-motorized activity at the South Mission Road/Appian Way pedestrian crossing. This pedestrian crossing has an overhead illuminated sign and static signs mounted on the side of South Mission Road. However, the general visual distractions within the corridor make it difficult for motorists to anticipate pedestrian activity at the crosswalk. A significant number of vehicle crashes have occurred when the first vehicle stops for a pedestrian, only to have the second vehicle rear-end the first vehicle since the vehicle stopped in an unexpected location.

Table 1 - South Mission Road Pedestrian and Bike Crash Summary

Crash Type	Route	Cross Street	Surface Condition	Day	Date	Time	Severity**
Bike	S Mission Rd	Bellows St	Dry	Tues.	10/21/04	12:05 PM	Type C
Bike	S Mission Rd	Bellows St	Dry	Fri.	07/14/06	12:20 PM	No Injuries
Pedestrian	S Mission Rd	Preston St	Dry	Tues.	03/20/07	6:46 PM	Type C
Pedestrian	S Mission Rd	Appian Way	Dry	Sat.	10/30/04	1:03 PM	Type A
Bike	S Mission Rd	Appian Way	Dry	Wed.	09/07/06	7:23 AM	Type B
Pedestrian	S Mission Rd	Broomfield Rd	Wet	Mon.	12/06/04	11:14 PM	No Injuries
Pedestrian	S Mission Rd	Broomfield Rd	Dry	Thurs	11/17/05	11:43 PM	Type A
Bike	S Mission Rd	West Campus Dr	Dry	Mon.	09/12/05	1:06 PM	No Injuries

For South Mission Rd (US-127 BR) from Bellows St - West Campus Dr recorded from 10/01/2004 - 09/30/2007

**Severity Key:

Type A: Includes individuals who sustained incapacitating injuries, such as broken limbs or paralysis.

Type B: Characterized as non-capacitating injuries. These types of injuries are visible and generally include bruising and swelling.

Type C: Representative of probable yet not visible injuries, including soreness or stiffness in a joint or joints.

Source: Michigan Department of Transportation

The most notable traffic issues are described in the following sections.

South Mission Road. The South Mission Road intersections with Bellows Street, Preston Street, Broomfield Road, and West Campus Drive experience poor levels of service during the morning and afternoon peak periods. The South Mission Road traffic signal corridor currently operates at a 120-second cycle length, and as a result the traffic queues and associated delays are significant.

The South Mission Road/Broomfield Road intersection is particularly congested. The east and west approaches operate at different times during the traffic signal cycle, primarily to serve the large number of left-turning vehicles. Based on the significant traffic growth experienced on West Campus Drive south of Broomfield Road, it appears that Broomfield Road traffic is choosing to use West Campus Drive to access US-127 and the commercial businesses that are located on Bluegrass Road, and avoids the South Mission Road/Broomfield Road intersection.



Eastbound Bellows Street at the South Mission Road intersection.

Bellows Street. The Bellows Street corridor, with all-way stop-controlled intersections at Washington, University, and Franklin, experiences extended traffic queues on the Bellows Street approaches.

Two sections of Bellows Street are currently marked as 4-lane cross sections: between the railroad tracks and Washington, and between Fancher and Mission. These sections can be restriped as 3-lane cross sections (including a center two-way left-turn lane). Numerous studies have shown that a 3-lane cross section is safer than a 4-lane cross section. No adverse impacts are anticipated from an operational perspective, and drivers tend to favor a 3-lane cross section. This change could be implemented at any time, and does not require additional pavement.

Preston Street. The Preston Street/East Campus Drive intersection experiences poor levels of service for the East Campus Drive approaches. The delay on the northbound East Campus Drive approach is in part due to the traffic surge leaving Lot 33 at various times of the day. Similarly, traffic queues form on southbound East Campus Drive at Broomfield Road, which allows for a right-turn movement only.

Pedestrian Conflicts. Throughout the day, the large number of pedestrians crossing Preston Street and Washington Street at intersections and at mid-block locations reduces the vehicle capacity of these roadways, and traffic is often stopped until the pedestrians clear the roadway. Preston Street traffic is particularly impacted at the Washington Street intersection, where the pedestrian crossing volume on the east approach is nearly 500 pedestrians in a ½ hour period.



Wayfinding signage located on Broomfield Road.

3.2.5. Traffic Signing Issues

There are three specific areas where the traffic signs around the campus have significant issues: marked pedestrian crossings, wayfinding, and the Lot 22 railroad crossing.

The marked pedestrian crossings on campus utilize a variety of sign types, colors, and placement as it relates to vehicles. A non-standard approach may lead drivers to treat the marked crosswalks differently, which is not desired. A standard approach would assist motorists with anticipating pedestrian activity.



Wayfinding signage located at the intersection of Preston Street and Franklin Street.

The wayfinding signage on Broomfield Road at the crossovers includes lettering sizes so small that it is nearly impossible for motorists to follow the directions. The wayfinding information on these signs should be relocated to supplementary signs as allowed by the ICRC, using letter sizes appropriate for the speed limit on Broomfield Road. Similarly, wayfinding signage located on the stop sign for westbound Preston Street at Franklin Street should be removed and relocated to supplementary signs as allowed by the City of Mount Pleasant, using letter sizes appropriate for the speed limit on Preston Road.

The West Campus Drive driveway to Lot 22 crosses the Ann Arbor Railroad. There is a yield sign and crossbucks for westbound traffic, and signs for eastbound traffic. The railroad tracks are located immediately adjacent to the north/south driving aisle on the west side of the parking lot. The railroad-related signage and pavement markings for both directions should be addressed for safety and motorist sight distance considerations.

3.3. Parking

3.3.1. Capacity and Occupancy

CMU has a total parking supply of 11,047 spaces, of which 7,501 are located north of Broomfield Road (68%). The designated uses and capacities of the parking lots are shown in **Figure 6**.

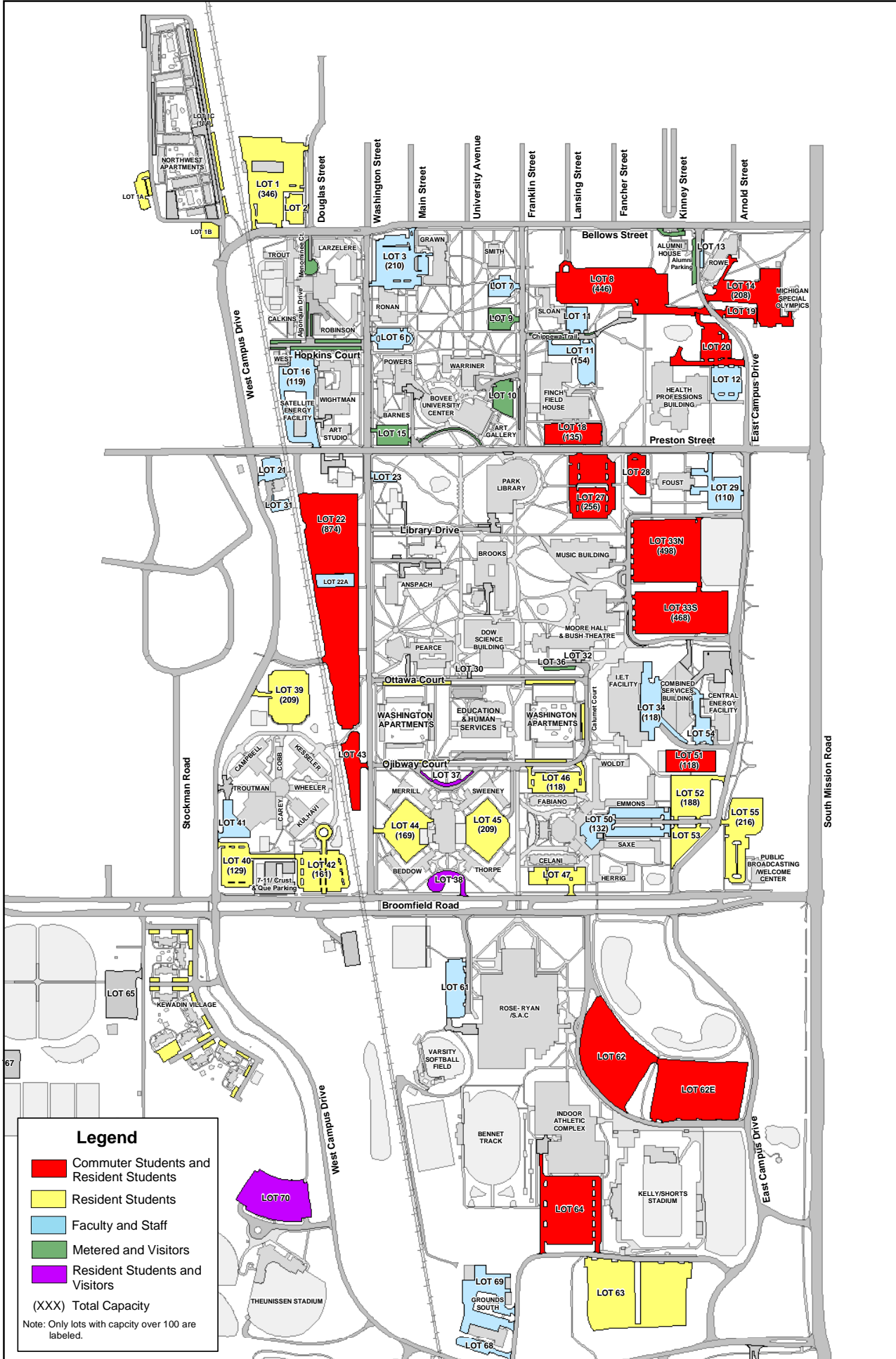
The occupancy of the parking lots located north of Broomfield are provided in **Figures 7 and 8**. The occupancy percentages represent mid-morning and mid-afternoon periods on a Tuesday or a Thursday, which are the weekdays representing peak campus activity. **Table 2** provides the parking occupancy by user group, and **Table 3** shows the currently underutilized parking lots where the occupancy was less than 75%. The detailed parking data for each parking lot is provided in **Appendix B**.

There are a total of 3,297 commuter parking spaces available to students north of Broomfield. The major commuter lots, 8, 22, 27, and 33, comprise 77% of the parking lot spaces used by students that commute to CMU. These lots are occupied at 72% during the morning and 89% in the afternoon.

There are a total of 1,361 parking spaces available to faculty and staff north of Broomfield. Faculty and staff lots 3, 6, 7, 11, 12, 16, 22A, 29, 34, 41, 50, and 54 collectively are occupied at 72% during the morning and 76% in the afternoon.

Metered spaces in lots 9, 10, and 15 and within the Bovee University Center circle drive are clustered near the University Center, and are occupied at 84% during the morning and 92% in the afternoon.

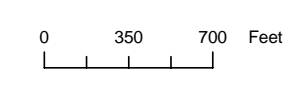
The parking lots located south of Broomfield Road are not currently occupied at the high levels experienced by the parking lots located north of Broomfield Road.



Legend

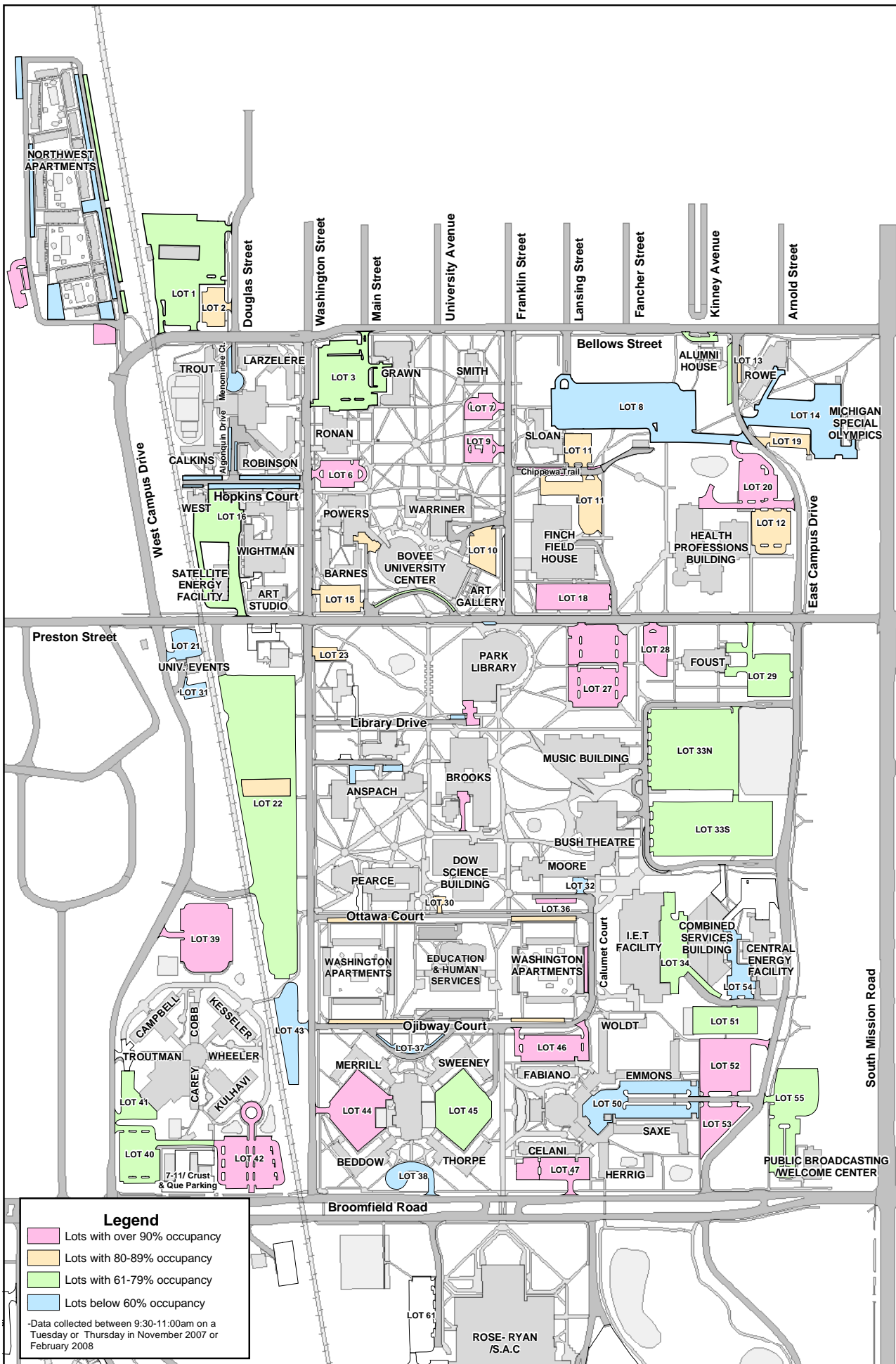
- Commuter Students and Resident Students
- Resident Students
- Faculty and Staff
- Metered and Visitors
- Resident Students and Visitors

(XXX) Total Capacity
 Note: Only lots with capacity over 100 are labeled.



**Central Michigan University
 Transportation Master Plan
 Existing Parking Lot Capacities**

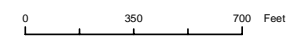


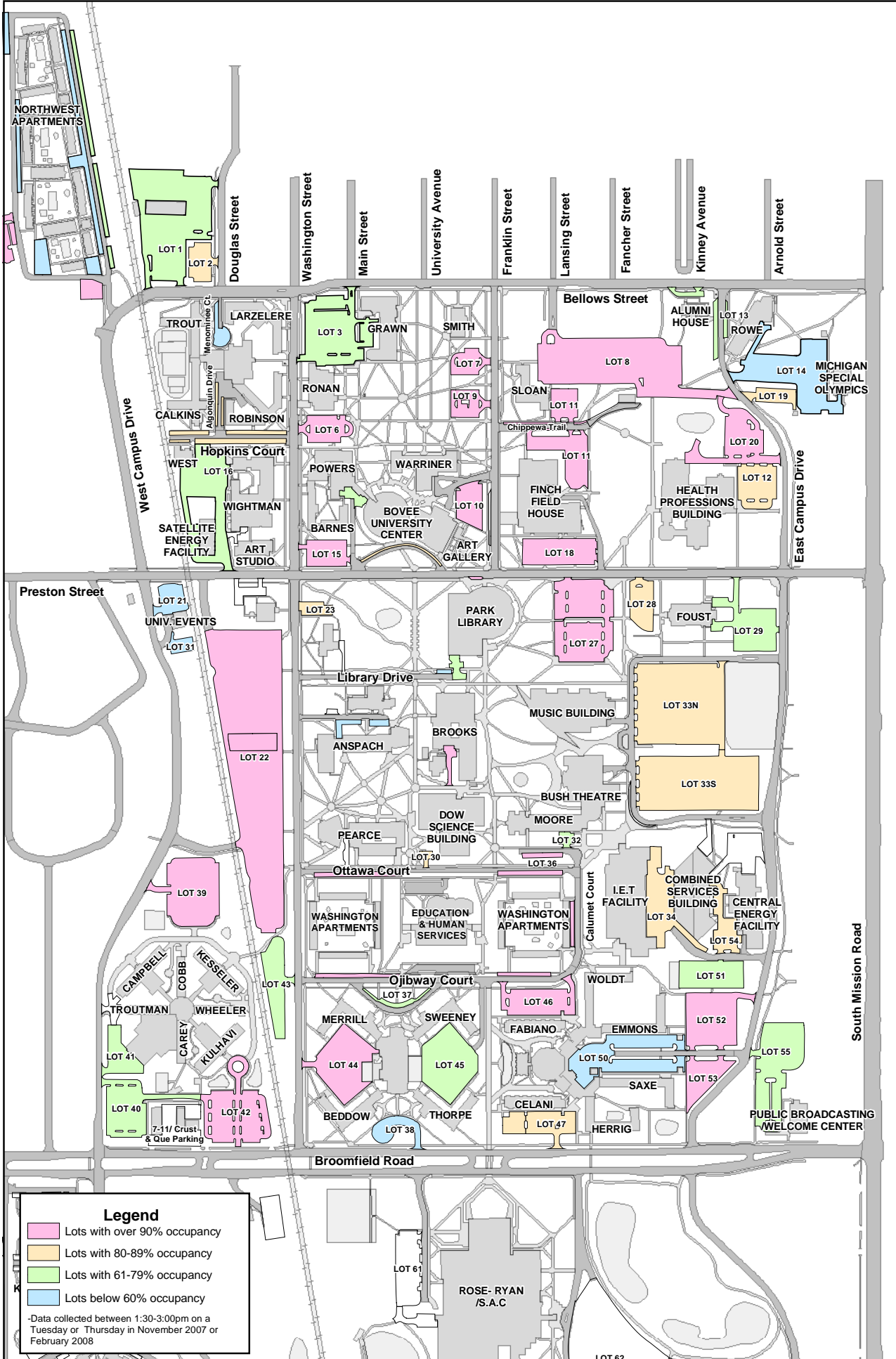


Legend

- Lots with over 90% occupancy
- Lots with 80-89% occupancy
- Lots with 61-79% occupancy
- Lots below 60% occupancy

-Data collected between 9:30-11:00am on a Tuesday or Thursday in November 2007 or February 2008





Legend

- Lots with over 90% occupancy
- Lots with 80-89% occupancy
- Lots with 61-79% occupancy
- Lots below 60% occupancy

-Data collected between 1:30-3:00pm on a Tuesday or Thursday in November 2007 or February 2008



**Central Michigan University
Transportation Master Plan
Existing Afternoon Parking Occupancy**



Table 2 - Existing Parking Lot Conditions Summary

Primary User Group	Primary Permit Type	Parking Spaces by Type					Parking Occupancy (1)	
		Regular	Handicap	Metered	Restricted	Total Spaces	AM	PM
Commuters	C	3168	45	52	32	3297	71%	86%
Residents	E, N, NW, S, T, W	2227	51	0	84	2362	83%	82%
Faculty/Staff	F	1165	50	0	146	1361	71%	75%
Visitors	Metered	0	17	198	11	226	81%	88%
	V	119	16	35	33	203	51%	73%
Handicap	Handicap	0	42	5	5	52	35%	54%
Total		6586	221	290	311	7408	74%	82%

Source: URS Corporation, 2008

(1) Represents CMU parking lots north of Broomfield Road. Counted on Tuesdays and Thursdays while CMU was in session in November, 2007 and February, 2008.

Table 3 - Existing Underutilized Parking Lots

Primary User Group	Permit Type	Lot Name	Total Spaces	Parking Occupancy sorted by AM lowest to highest (1)	
				AM	PM
Visitors	Metered	Menominee	18	22%	50%
Visitors	Metered, F	Algonquin	21	24%	86%
Commuters	A, C, F	Lot 14	208	30%	43%
Faculty/Staff	F	Lot 21	33	33%	24%
Visitors	V, F	Lot 38 TH/BE	27	44%	41%
Visitors	Metered	Lot 4	95	48%	82%
Faculty/Staff	F	Lot 50	132	50%	49%
Faculty/Staff	F	Lot 54	58	50%	81%
Visitors	V, F	Lot 37 ME/SW	22	50%	64%
Commuters	A, C, F	Lot 8	446	56%	90%
Faculty/Staff	F	Lot 31	23	57%	57%
Commuters	A, C, F	Lot 43	98	58%	76%
Faculty/Staff	F	Lot 41	48	60%	69%
Faculty/Staff	F	Lot 16	119	61%	70%
Residents	F, T	Lot 40	129	62%	64%
Commuters	A, C, F	Lot 33N	498	63%	80%
Residents	E, F(A)	Lot 55	216	64%	62%
Faculty/Staff	F	Lot 3	210	64%	63%
Residents	F, S	Lot 45	209	67%	67%
Commuters	A, C, F	Lot 51	118	68%	76%
Residents	A, F, K, N	Lot 1C	114	70%	68%
Faculty/Staff	F	Lot 29	110	72%	74%
Commuters	A, C, F	Lot 33S	468	74%	81%
Faculty/Staff	F	Lot 34	118	74%	79%
Visitors	Meter/Spec. Use	Alumni	20	75%	65%

 Parking occupancy below 75%

Source: URS Corporation, 2008

3.3.2. Parking Lot Access Issues

Lots 6, 22 and 33 currently have access issues, as described below.

The Lot 6 driveway on Washington Street is slightly offset from Hopkins Court. The Washington Street/Hopkins Court intersection is stop-controlled, however the Lot 6 driveway is not.



Preston Street at East Campus Drive intersection.

The Lot 22 driveway on Preston Street is located immediately next to the railroad crossing, and traffic queues were witnessed extending across the railroad tracks. In addition, the traffic surge created by Lot 22 causes backups on Preston Street at the Washington Street intersection, which is already impacted by the large pedestrian volumes.

The Lot 22 driveway on West Campus Drive crosses the railroad tracks. There are crossbucks and a yield sign for traffic entering the parking lot, but there are no signs or distance between the parking lot and the railroad for traffic exiting the parking lot.

The traffic surge created by Lot 33 creates excessive traffic queues at Preston Street and Broomfield Road. The traffic that turns north towards Preston Street cannot efficiently access or cross Preston Street. The proximity between the South Mission Road/Preston Street intersection and the Preston Street/East Campus Drive intersection has previously caused the City to not approve a traffic signal, and a roundabout is not feasible due to constraints near the intersection.



Limited sight distance along the east edge of Lot 33N.

Within Lot 33 North, there are minor issues with respect to vehicles cutting diagonally through the middle of the lot as they enter from the east. This activity may not necessarily be unsafe, but does create a negative atmosphere for others that are driving through the aisles of the lot. The lack of parking aisle endcaps also limits sight distance between vehicles exiting and aisles and vehicles on the access driveway along the east edge.

In Lot 33 South, traffic must circulate to the very west edge of the lot before entering the parking aisles, which requires passing by the transit center and/or through the pedestrians that are leaving or returning to parked cars.

3.4. Transit

3.4.1. Bus Routes

Currently, ICTC buses use Lot 33 as the transit hub, and all three bus routes pick-up and drop-off students at Lot 33. See **Appendix C** for ridership data for each route during the fall 2007 semester.



Bus shelter on northbound Washington Street, south of Anspach Hall.

3.4.2. Bus Shelters

Bus shelters are currently located in Lot 33 and on northbound Washington Street, south of Anspach Hall.

The bus shelters and staging area at Lot 33 are generally unusable in their current configuration. The bus shelters are small, typically resulting in only one student using a shelter. The bus staging area that loops west of the bus shelters cannot accommodate the turning radius of the buses, so buses stage along the parking lot perimeter road. This creates friction between the buses and vehicles, and results in an ineffectively operating transit center.

4. Future Traffic Conditions (2013)

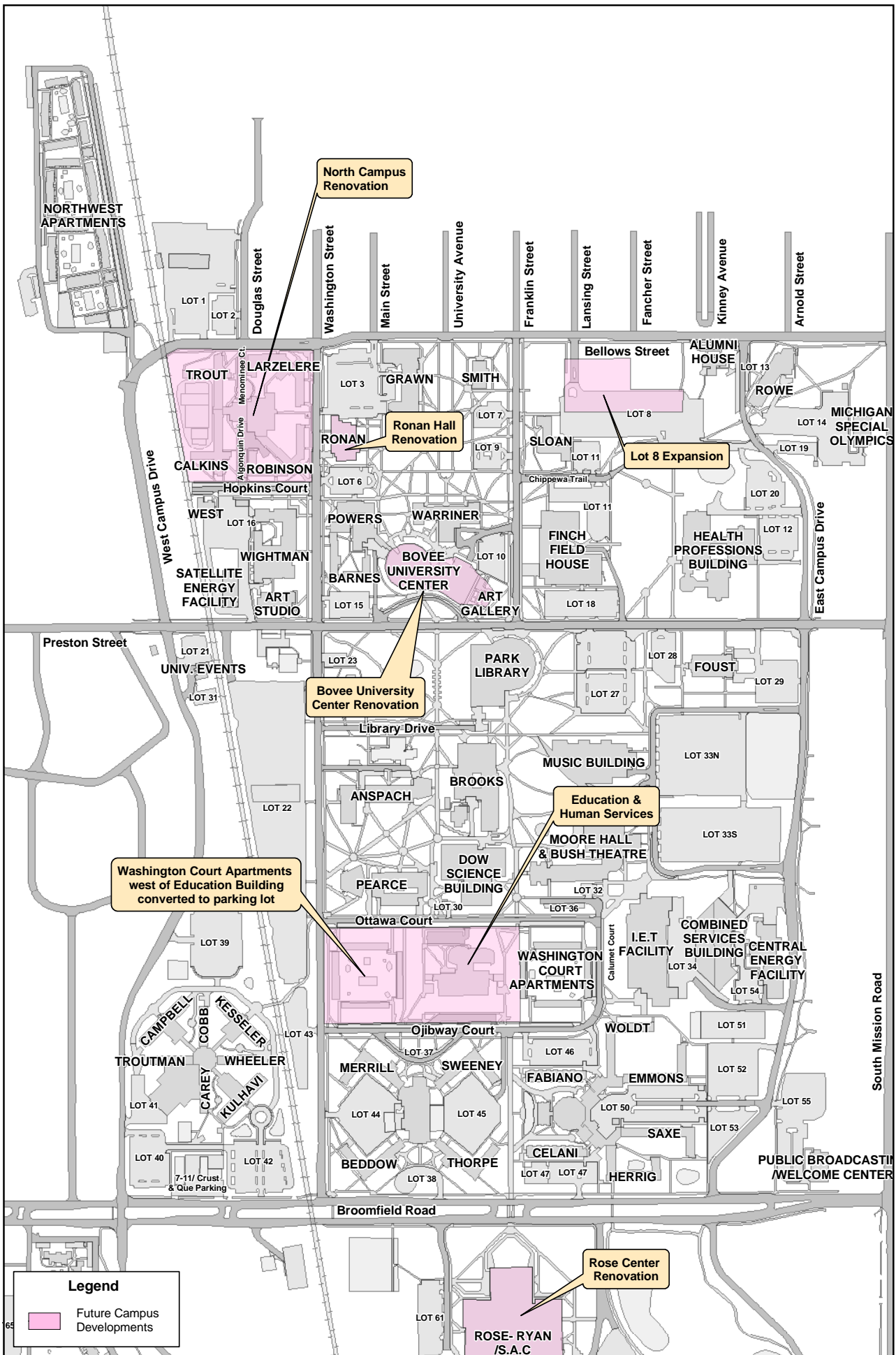
4.1. CMU Planned Developments

CMU currently has several initiatives for facility projects. In general, these projects will provide additional space for relocated departments or provide more space for existing services, rather than to accommodate more faculty or students.

The undergraduate student population has been near 18,000 for several years. The number of on-campus graduate students is expected to remain in the 100 – 200 range. No significant changes in the administrative or faculty levels are expected. As a result, the on-campus CMU population is anticipated to stay the same for the foreseeable future.

The CMU developments that are anticipated prior to 2013 are as follows (see **Figure 9**):

- 147,000-square foot EHS (construction is in progress), including 50 parking spaces.
- North Campus renovation (schematic design is in progress), but will not increase the building's capacity with respect to traffic generation.
- Rose Center renovation, but will not increase the building's capacity with respect to traffic generation.
- Bovee University Center renovation, which will provide for more student-oriented space. No building expansion is planned.
- Demolition of the Washington Court Apartments west of the EHS, and replace with a surface parking lot.
- Expand the capacity of Lot 8.
- Ronan Hall will be renovated, and a portion of the academic space will be replaced by office space. A small increase in traffic generated by Ronan Hall is expected.



Legend

Future Campus Developments

0 350 700 Feet

Central Michigan University
 Transportation Master Plan
 Future Campus Development Areas



Figure
 9

4.2. Nearby Planned Development

The City of Mount Pleasant experienced significant population growth and development between 1990 and 2000. However, the City does not anticipate measurable population growth in the near future.

The only substantive development currently under consideration near the campus is a 150-acre development on the southeast corner of Broomfield Road and Crawford, and includes 12 acres of commercial development and 2,000 beds. At most, the City anticipates that the development may possibly be partially developed within 5 years, since there is currently a housing surplus and CMU's enrollment is projected to be flat over the next few years. The future traffic estimate included 30% build-out of the residential portion of the development.

4.3. Estimated Traffic Volumes

To estimate the 2013 horizon year traffic volumes, the historical traffic volumes and the projected traffic volumes from other traffic studies were examined. Using this data, the annual traffic growth rates were estimated for each roadway in the study area.

The streets north of Broomfield Road and west of South Mission Road were assigned an annual growth rate of 0% (Bellows, Preston, Franklin, Washington, East Campus Drive, and West Campus Drive).

Broomfield Road and South Mission Road were assigned an annual growth rate of 2%. West Campus Drive south of Broomfield Road was assigned an annual growth rate of 5%.

The peak hour estimated traffic generated by the CMU and nearby planned developments is provided in **Table 4**. The resulting estimated 2013 traffic volumes are provided in **Appendix D**.

Table 4 - Peak Hour Trip Generation Estimates for Proposed Developments

CMU Development	AM Trip Generation (2013)			PM Trip Generation (2013)		
	In	Out	Total	In	Out	Total
Lot 8 Expansion (190 Spaces)	85	20	105	20	85	105
Education and Human Services (50 Spaces)	25	5	30	5	25	30
Washington Court Parking Lot (300 Spaces)	150	30	180	30	150	180
Nearby Development						
Crawford Development (30% Residential Build-out, 600 Beds)	20	90	110	90	45	135
Total	280	145	425	145	305	450

4.4. Intersection Level of Service

The intersection level of service for each intersection was determined for the 2013 horizon year, and is provided in **Appendix D**.

The following improvements are included in the 2013 horizon year analysis, which are also needed to mitigate the level of service for the existing conditions:

- Add an exclusive eastbound right-turn lane at the South Mission Road/Preston Street intersection.
- Add an exclusive eastbound right-turn lane at the South Mission Road/Bellows Street intersection.
- Install a traffic signal at the Preston Street/East Campus Drive intersection, which needs to be interconnected with the traffic signal operations at the South Mission Road/Preston Street intersection. A roundabout could be considered, however the Arby's drive-thru exit driveway on the northeast corner, the limited land availability on the southeast corner, and the decorative landscaping and terracing on the southwest and northwest corner would make the roundabout option much more expensive. Operationally, the traffic signal option will work satisfactorily, and the traffic volumes would most likely warrant the traffic signal.

- Install a traffic signal or roundabout at the Preston Street / West Campus Drive intersection. A roundabout is also an option, which would reduce the potential for traffic queues extending beyond the Ann Arbor railroad tracks. A traffic signal may require a railroad interconnect for the westbound approach, which may be costly in comparison to the roundabout.

MDOT, ICRC, and the City may implement improvements at other intersections, if funding becomes available.

5. Evaluation and Recommendations

5.1. Non-Motorized

Non-motorized mobility is critical to CMU. Walking is the primary mode of transportation on campus. Bicycling is a prime opportunity to and from the nearby apartment complexes. Non-motorized opportunities are critical to the sustainability aspect of the campus, since vehicle parking spaces are not needed for these users. Improving the non-motorized culture will allow CMU to reduce the land requirements for parking and provide for greater opportunity for future academic facility sites.

5.1.1. Framework Concept

Figure 10 provides the framework concept for non-motorized facilities, based on the 2001 Master Plan and the CMU Bike System Feasibility Report (2003).

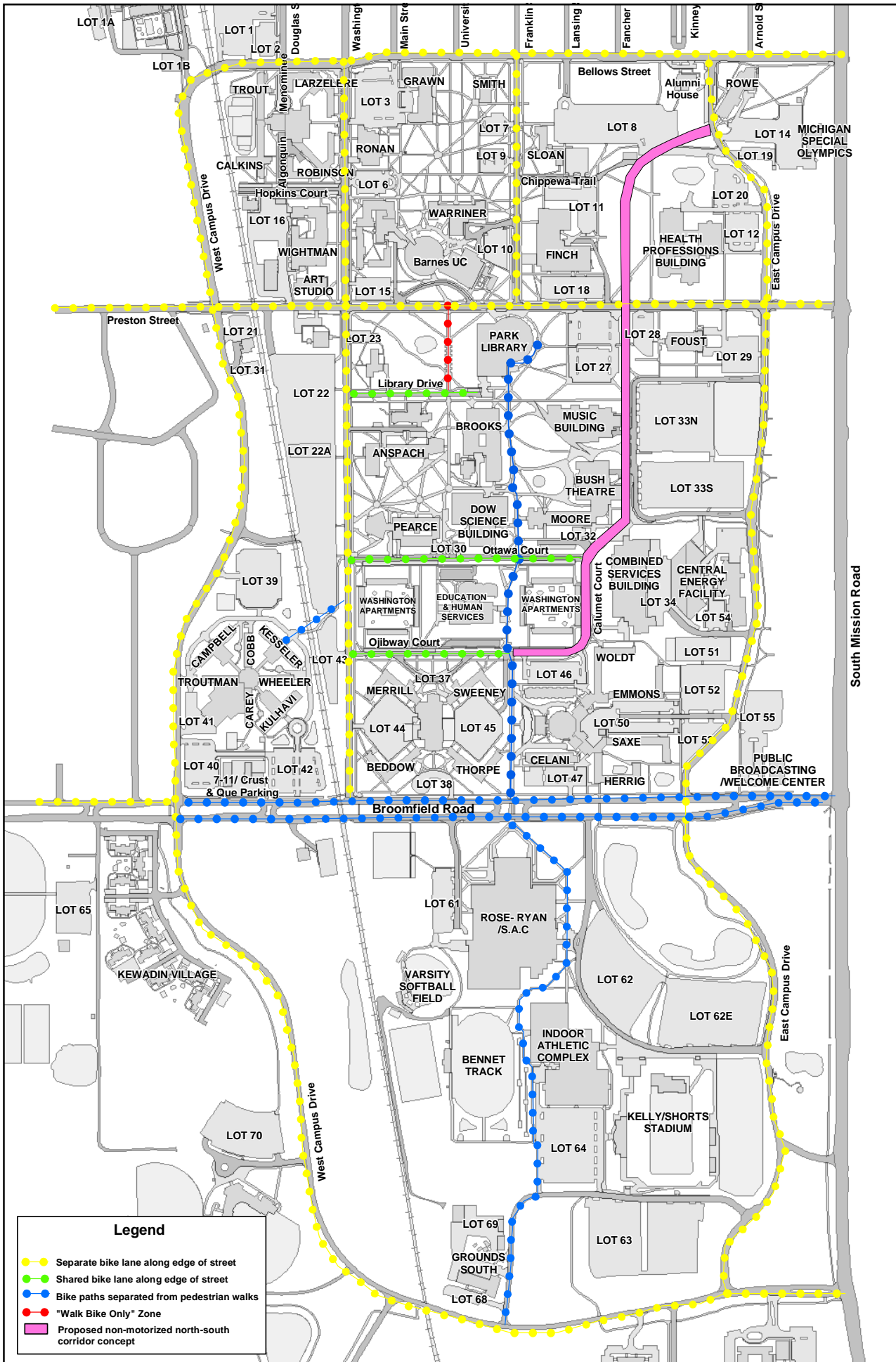
The CMU Bike System Feasibility Report (2003) indicated that on-street bicycle lanes (separate from the vehicle lane) are ultimately desired on Bellows, Preston, Franklin, and Washington, as well as East Campus Drive and West Campus Drive. Other CMU-owned streets, such as Library Drive, should be designated for shared bicycle facilities (shared with the vehicle lanes). The bicycle facility on Broomfield Road would remain separate from the roadway.



Shared bike and pedestrian path by the Library.

The on-street bicycle lanes can be accomplished as streets are considered for improvements, which may allow for the opportunity to widen the roadway to provide a dedicated bicycle lane. Some streets have sections that are already sufficiently wide, and could be restriped to accommodate a bicycle lane.

There are limited opportunities to implement off-street non-motorized facilities within the campus. These opportunities are primarily in the north-south orientation, since there are several east-west roadways (Library Drive, Ottawa Court, and Ojibway Court) that provide access within the campus. The opportunities include the existing bicycle and pedestrian path between Broomfield Road and Preston Street on the extension of the Franklin Street alignment, and the proposed north-south pedestrian corridor.



Legend

- Separate bike lane along edge of street
- Shared bike lane along edge of street
- Bike paths separated from pedestrian walks
- "Walk Bike Only" Zone
- Proposed non-motorized north-south corridor concept

0 350 700 Feet

5.1.2. Non-Motorized Paths

The off-street non-motorized facilities can be considered as separate paths or shared-use paths. **Table 5** provides a comparison of three options for the off-street non-motorized facilities. The major considerations for selecting an alternative are the availability of space, the desire and potential to create a non-motorized culture, and the need to enforce compliance to the path rules.

The major benefit to pedestrian-only and bicycle-only paths is that the two modes of travel, which operate at substantially different speeds, are physically separated. The result is a more comfortable and safe non-motorized environment. With dedicated paths comes the responsibility to enforce the rules of the path, so that pedestrians do not use the bicycle path and vice-versa. Universities that have implemented pedestrian-only and bicycle-only paths have had an enforcement period at the beginning of the school year to assist students with compliance of the path rules.

Table 5 - Non-motorized Path Alternatives Comparison

Alternatives	Advantages	Disadvantages
<p>1. Separate Paths <i>10' bicycle path and 10' pedestrian path, space in between depends on space availability.</i></p>	<ul style="list-style-type: none"> • More comfortable environment for each user • Fewer conflicts between bicyclists and pedestrians • Lower speed differential between users 	<ul style="list-style-type: none"> • More space is required • Enforcement is needed to ensure compliance, particularly at the beginning of each school year
<p>2. Shared-Use Path Option A. <i>10' shared bicycle and pedestrian path with 4" yellow centerline and directional arrows, 6" white edge stripes.</i></p>	<ul style="list-style-type: none"> • No enforcement needed • Less space is required 	<ul style="list-style-type: none"> • More conflicts between bicyclists and pedestrians • Higher speed differential between users • Pedestrian sight and hearing distance
<p>Option B. <i>12' to 18' wide shared bicycle and pedestrian path: 8' to 10' bikeway path immediately adjacent to a 5' to 8' pedestrian path. A mini rumble strip separates the two paths.</i></p>	<ul style="list-style-type: none"> • More comfortable environment for each user • Fewer conflicts between bicyclist and pedestrians • Lower speed differential between users • Requires less space, but still enough for users to be aware of each other without causing conflicts 	<ul style="list-style-type: none"> • Two different surface materials • Effects of rumble strip on snow removal equipment in the winter • Enforcement is needed to ensure compliance, particularly at the beginning of each school year



Exclusive pedestrian path example.

Universities have implemented similar paths for different reasons. The University of California Davis had a bicycle/pedestrian crash which left the pedestrian with serious head injuries. The University of Oregon determined that the increasing number of automobiles was not compatible with the vision of the University and the community because of noise, congestion, and pollution. This resulted in the construction of non-motorized transportation facilities, rather than investing in additional parking lots.

The Minnesota Bicycle Transportation Planning and Design Guidelines (Mn/DOT, 1996) recommends separating bicyclists and pedestrians under these conditions where:

- The pedestrian and bicycle peak traffic volume is greater than 2000 individuals a day, or
- The peak hour bicycle traffic is greater than 100 per hour

These thresholds should be considered as part of CMU's decision regarding further development of non-motorized paths.

Michigan State University has recently compiled shared-use path guidelines, which are included in **Appendix E**. The shared-use path that separates pedestrian and bicycle activity includes a rumble strip between the pedestrian path and bicycle path, and incorporates pavement colors and pavement markings to maximize compliance.

The following steps are recommended so that a non-motorized path alternative can be selected:

- Perform bicycle volume counts during warm weather when CMU is in session, to determine the current maximum bicycle usage.
- Develop a concept for a separate and/or shared path, to verify if there is sufficient space available.
- Conduct a student survey to verify if interest in bicycle transportation is substantial enough to invest in a separate or shared path facility.
- If implemented, commit to developing the bicycle culture by providing other bicycle-oriented amenities, such as bicycle racks on transit vehicles, bicycle lockers, and covered bicycle racks.



Exclusive bicycle path example.

5.1.3. Pedestrian Crossing Treatments

To further the development of a pedestrian-friendly campus environment, the pedestrian zone identified as a result of the data collection should be strengthened. Deploying pedestrian crossing treatments on the perimeter of the pedestrian zone would assist motorists with identifying when they should be particularly aware of pedestrian activity. Such a strategy would align with CMU's goal to be proactive about improving pedestrian safety, even though the historical record does not indicate that there are documented safety issues.

There are many pedestrian crossing treatments available that elevates the visibility of the pedestrian crossing, including:

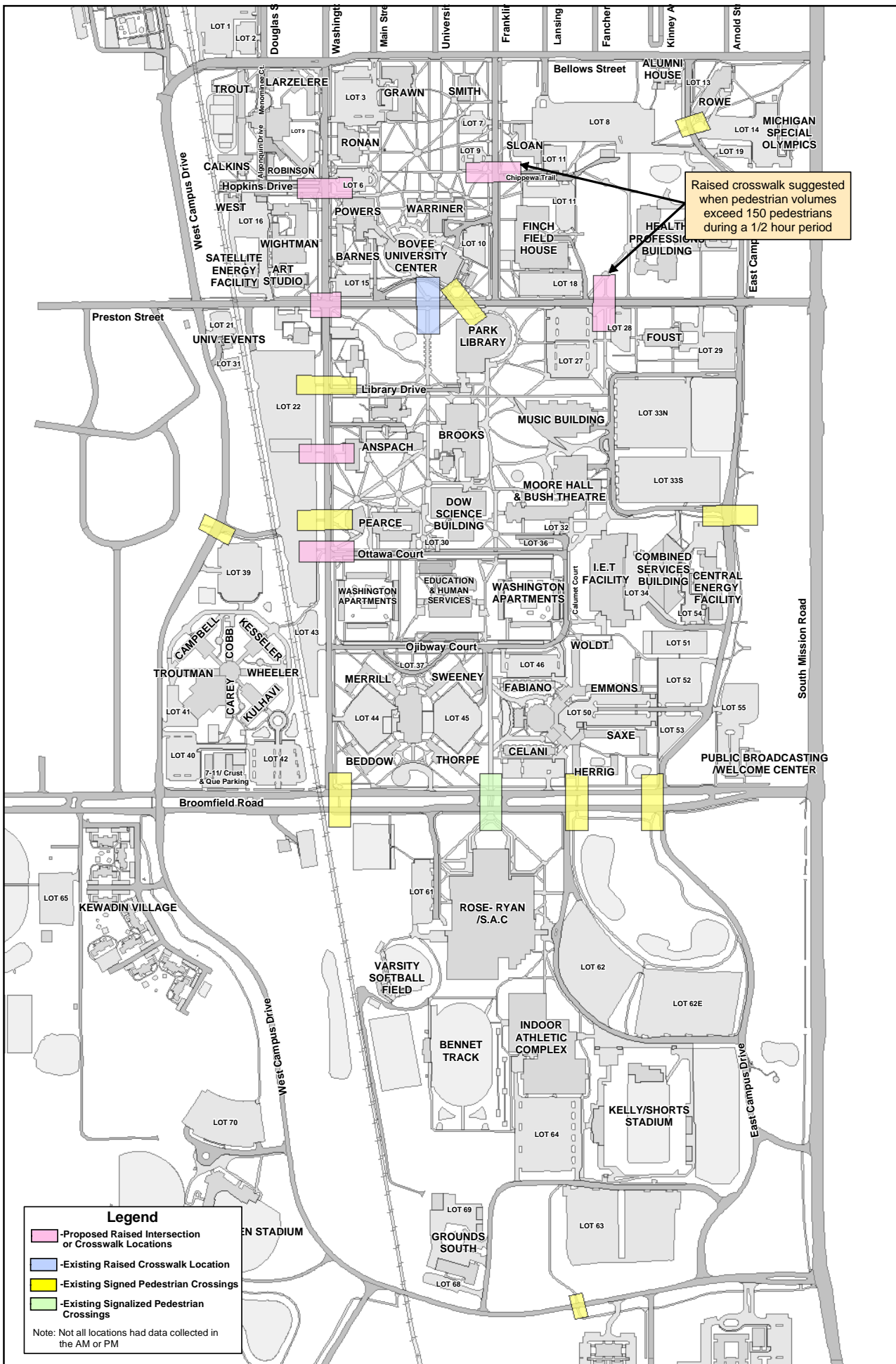


The pedestrian crossing on Washington Street at Ottawa Court.

- Crossing signs
- Yellow flashing warning lights (continuous flashing)
- Yellow flashing warning lights (pedestrian activated)
- In-pavement warning lights (pedestrian activated)
- Median refuge island
- Raised pedestrian crosswalk
- Raised intersection
- Traffic signal warranted by pedestrian activity

The selection of the appropriate treatment is a multi-faceted consideration. The following considerations led to the recommendation to install raised crosswalks and possibly a raised intersection, as shown on **Figure 11**:

- The vehicle/pedestrian conflict safety record on campus is good, and vehicle speeds are generally in conformance with the conditions.
- The existing raised crosswalk on Preston Street at University Center is operating effectively, and has been well-received by CMU and City staff.
- The raised crosswalks provide for vehicle speed control and excellent visual identification of the pedestrian crosswalk location.
- Illuminated treatments, such as flashing lights, would not provide a significant additional benefit, due to the large number of pedestrians.

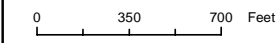


Raised crosswalk suggested when pedestrian volumes exceed 150 pedestrians during a 1/2 hour period

Legend

- Proposed Raised Intersection or Crosswalk Locations
- Existing Raised Crosswalk Location
- Existing Signed Pedestrian Crossings
- Existing Signaled Pedestrian Crossings

Note: Not all locations had data collected in the AM or PM



Raised crosswalks should be constructed of concrete, and a colored concrete would be preferable, similar to the existing Preston Street raised crosswalk. A raised crosswalk can be constructed to avoid impacting the drainage provided by the existing gutter elevations. It can also be designed so that the pedestrian crosswalk is level from curb to curb. The level crossing option would typically require additional drains, and will increase the cost of the raised crosswalk.

Typically, a raised crosswalk does not include stop signs, since the raised crosswalk acts as a speed control device. The existing Preston Street raised crosswalk includes stop signs for Preston Street traffic. As additional raised crosswalks are deployed, consideration should be given to a consistent traffic control treatment at all locations where raised crosswalks will be considered. The Washington Street/Hopkins Court intersection and the Washington Street/Ottawa Court intersection currently have stop signs, which may not be appropriate once the raised crosswalks have been installed. Removal of the stop signs at the existing University Center raised crosswalk should also be considered.



The pedestrian crossing on Franklin Street.

A raised intersection should be considered at the Washington Street/Preston Street intersection, if the City does not allow the closure of Preston Street in the future. The remaining marked pedestrian crossings can remain as signed crossings, utilizing the suggested standard pedestrian signing treatments included in this report.

5.1.4. South Mission Road at Appian Way Pedestrian Crossing

MDOT is planning to improve the existing pedestrian crossing at the South Mission Road/Appian Way intersection, which is located across the south leg. MDOT will fund this improvement and is planning to implement the pedestrian crossing improvement during the summer of 2008, and will likely include a median refuge island. This treatment will allow pedestrians to cross South Mission Road one direction at a time, and will provide a refuge area for pedestrians in the space where there is currently a two-way left-turn lane.

5.2. Vehicles

5.2.1. Improvements to Mitigate Existing Traffic Issues

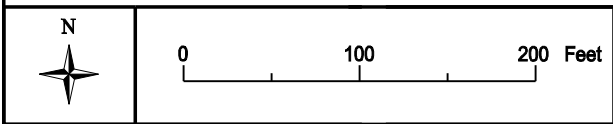
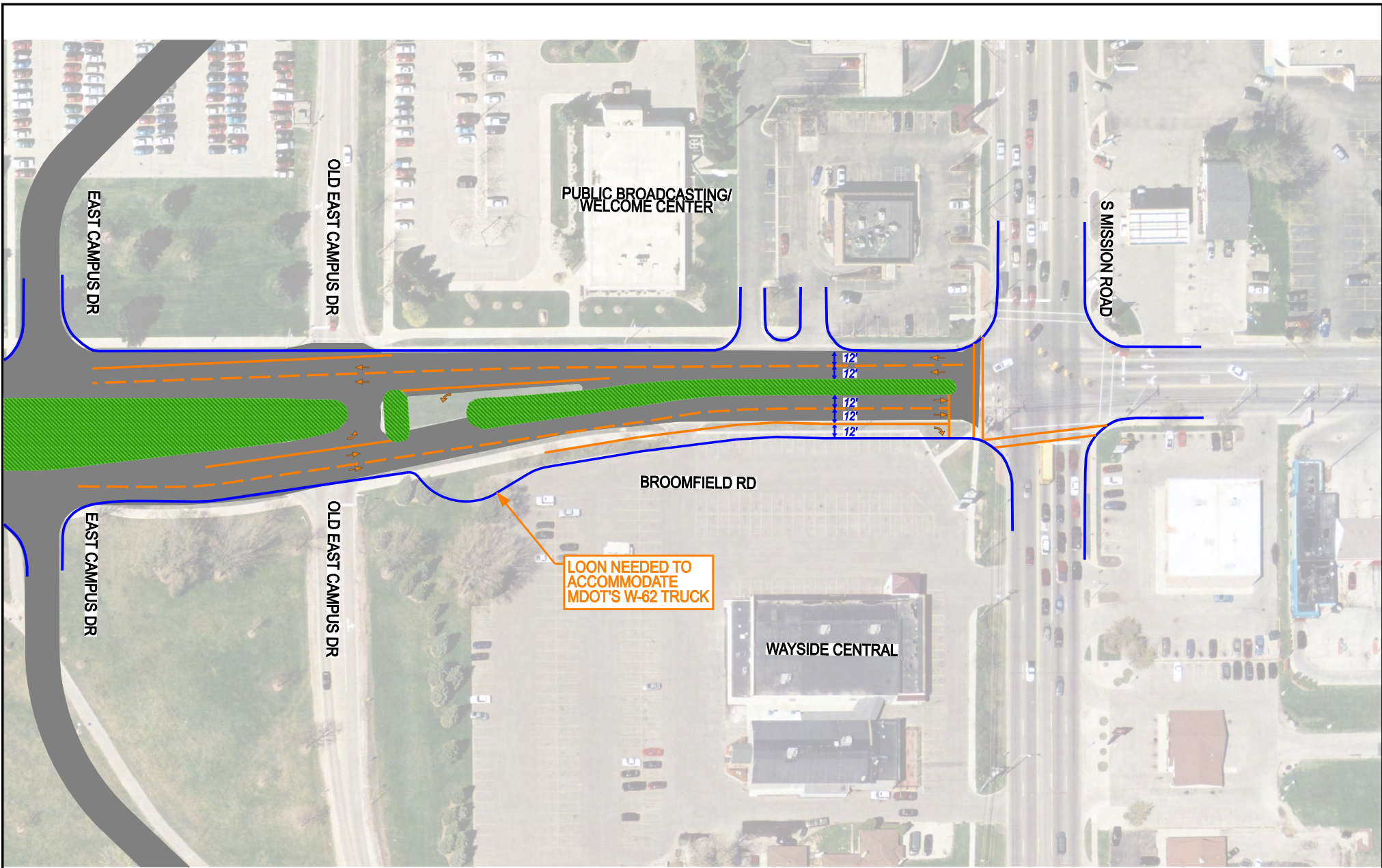
There are three additional improvements that are needed to mitigate the existing traffic issues. However, the details have not been sufficiently determined, and so they were not included in the future conditions (2013) analysis.



The South Mission Road at Broomfield Road intersection.

- The South Mission Road at Broomfield Road intersection has been identified by MDOT and the County as having a significant left-turn crash issue, and does not operate with a satisfactory level of service. Intersection improvements are in early stages of planning. If funding becomes available, MDOT may target 2011 for this improvement. **Figure 12** illustrates a crossover on Broomfield Road, which is intended to serve at the South Mission Road/Broomfield Road intersection.
- South Mission Road at West Campus Drive/Bluegrass Road has been identified by MDOT as a high-crash location for vehicle/pedestrian crashes, and does not operate with a satisfactory level of service. Similar to the concept for the South Mission Road/Broomfield Road intersection, the left-turn movements will likely take place at crossovers or roundabouts on each side of South Mission Road.
- The West Campus Drive and East Campus Drive intersection operates satisfactorily during typical weekday conditions. When special events occur, traffic control personnel are usually required at this intersection when the event lets out. A roundabout would facilitate smoother traffic flow associated with special events, without the assistance of traffic control personnel. The roundabout may possibly serve dual purpose: provide access to and from East Campus Drive, as well as service the left-turn movements relocated from the South Mission Road/West Campus Drive intersection. The roundabout may also serve as a gateway opportunity for the campus.

As opportunities arise, Bellows Street and West Campus Drive north of Preston Street should be strengthened to function as a ring road around the north side of the campus. Roadway reconfigurations and/or modifications may be useful to elevate the function of Bellows and West



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 Transportation Master Plan
 Broomfield Road Improvement Concept

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Figure
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Campus Drive, recognizing that traffic flow on Preston Street is heavily impacted by pedestrians for a substantial portion of the typical school day. Further discussions with the City will be useful to further define the way that Bellows Street should be modified to achieve this outcome. Some potential opportunities are described in the next section.

5.2.2. Street Configuration Modifications

Background. The number of Preston Street and Washington Street pedestrian crossings creates a large number of potential vehicle/pedestrian conflicts. There are number of reasons why a street configuration change should be considered to address this issue:

- The #1 goal of the Transportation Master Plan is to continue to develop a pedestrian-friendly campus.
- The number of pedestrians crossing the street exceeds the number of vehicles using Preston Street and Washington Street by a 6:1 ratio during the ½ hour class change periods.
- Traffic currently avoids Preston Street during class changes when pedestrian activity is particularly high.
- Approximately one-half to two-thirds of traffic on Preston Street is generated by CMU, so a closure of Preston Street would have a diminished impact on regional traffic.
- Future CMU facility opportunities near Preston Street may benefit from closing Preston Street.
- CMU would prefer to be proactive about improving pedestrian safety, even though the historical record does not indicate that there are documented safety issues.

The pedestrian/vehicle conflict issue has been the focus of several previous dialogues between CMU and the City, as summarized below.

In 1995, CMU petitioned the City for closure of Washington Street between Ottawa and Preston. The City indicated that Washington Street was a critical north-south link through the City, since very few other streets connect Broomfield Road and High Street. The value of Washington Street was too high to the regional mobility of the City to consider the closure petition. In addition, a

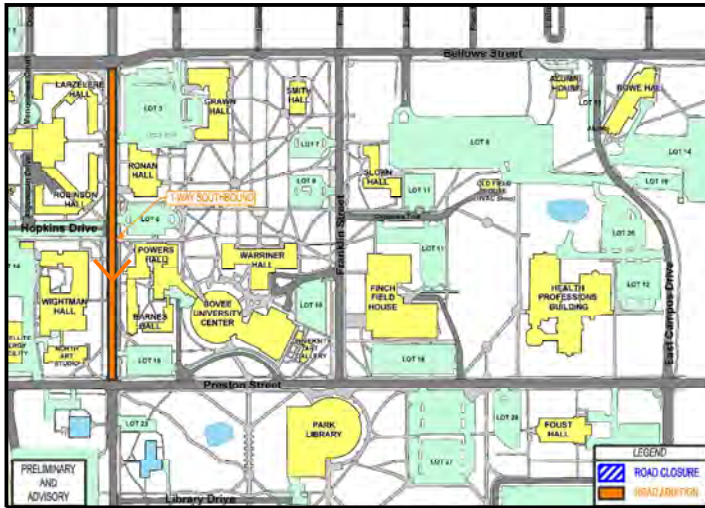
temporary closure of Washington Street yielded unintended consequences with regard to traffic displaced into nearby neighborhoods.

In 2006, CMU petitioned the City for closure of Preston Street between Franklin Street and Washington Street. The City correspondence stated that not enough information was presented to support a decision, and impact to public safety was noted as a major consideration.

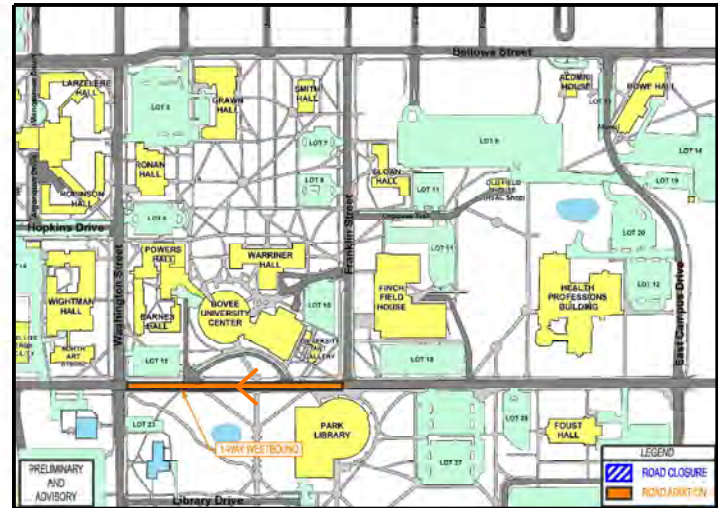
The City of Mount Pleasant Master Plan (2006) includes a strategy that states “maintain public road network within CMU campus.” Justifying a street configuration change will represent a significant task, and the City will likely require a detailed traffic analysis in order to address a street configuration modification or closure petition. The right-of-way would remain under the jurisdiction of the City, and so the City’s design standards and review process would still apply. Vacating a street so that it reverts to CMU ownership would likely require further coordination with the City, and may not be worth the additional effort.

Alternatives Description. In order to reduce the vehicle/pedestrian conflicts within the pedestrian zone, four street configuration alternatives were considered as described below, and illustrated in **Figure 13. Tables 6 and 7** summarize the advantages, disadvantages, and mitigation measures required to support each alternative.

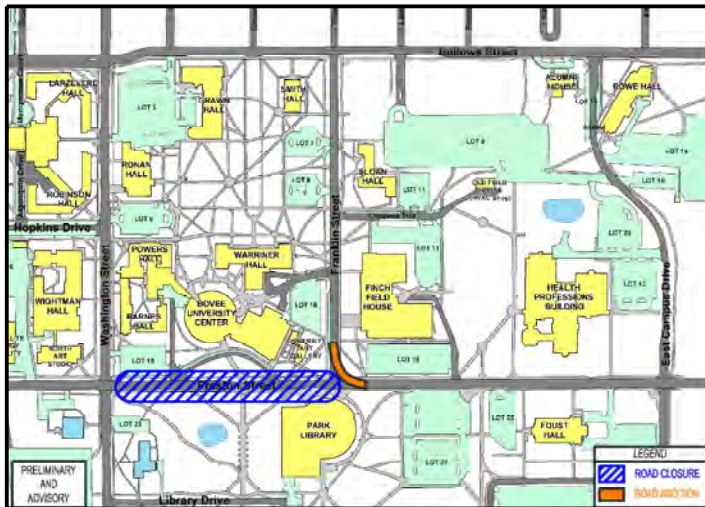
- **Alternative 1. Convert Washington Street to one-way southbound operation between Bellows and Preston.** This alternative would essentially extend the one-way southbound configuration of Washington Street one block further south than where the one-way configuration currently ends. One-way operation would simplify the pedestrian task of crossing the street, and allow the street to be narrower. Northbound traffic on Washington Street north of Preston Street is minimal, and so relatively little traffic would be displaced. However, more traffic will likely use the section of Preston Street between Washington and Franklin, which has the highest density of pedestrian activity. It may also make it more difficult to use Washington Street as the transit corridor that serves the campus. Campus wayfinding for visitors would be more challenging. *As a result, this alternative does not align with the objectives of the Transportation Master Plan.*



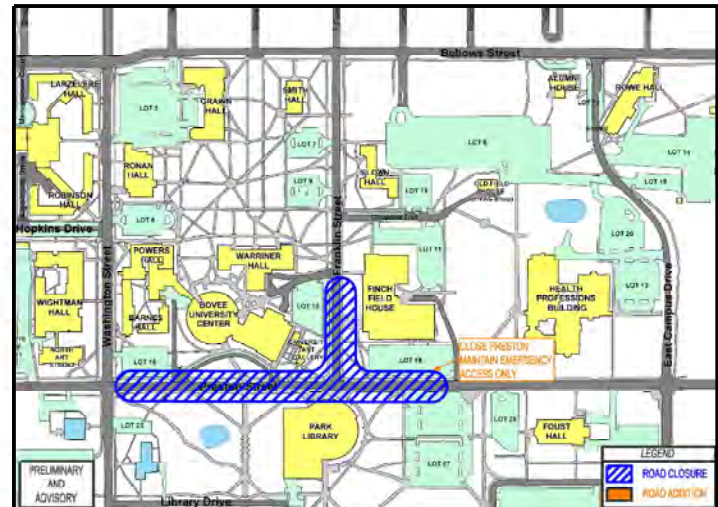
Alternative 1 - Convert Washington to 1-Way Southbound



Alternative 2 - Convert Preston to 1-Way Westbound



Alternative 3 - Close Preston West of Franklin



Alternative 4 - Close Preston and Franklin



Not To Scale

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 Transportation Master Plan
 Street Configuration Alternatives

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Figure
 13

Table 6 - Street Configuration Comparison Summary

Alternatives	Advantages	Disadvantages
<p>1. Convert Washington to 1-Way Southbound Operation Between Bellows and Preston</p> <p><i>Northbound Washington Street traffic would be diverted to West Campus Drive and Franklin Street.</i></p>	<ul style="list-style-type: none"> Displaces northbound traffic, resulting in a slightly more pedestrian-friendly zone for Washington Street. Least expensive alternative. 	<ul style="list-style-type: none"> 1 way street is confusing to campus visitors for navigation and wayfinding. More traffic will use Preston Street between Washington Street and Franklin Street, which is the most pedestrian-sensitive section of roadway on campus.
<p>2. Convert Preston to 1-Way Westbound Operation Between Washington and Franklin</p> <p><i>Eastbound Preston Street traffic would be diverted to Bellow Street.</i></p>	<ul style="list-style-type: none"> Only eastbound traffic is rerouted. Easier way finding for visitors arriving from South Mission Street and US-127 than if Preston Street was made 1-way eastbound. Fewer roadway improvements needed than with a full closure. 	<ul style="list-style-type: none"> 1 way street is confusing to regional traffic for navigation and wayfinding. Traffic still uses Preston Street.
<p>3. Close Preston Street West of Franklin</p> <p><i>Preston Street traffic would be diverted to Bellows Street. Maintain emergency vehicle access through Preston Street.</i></p>	<ul style="list-style-type: none"> Displaces traffic from Preston Street, resulting in an expanded pedestrian zone. 	<ul style="list-style-type: none"> The character of the Bellows Street corridor is changed significantly.
<p>4. Close Preston Street and Franklin Street</p> <p><i>Close Preston Street from west side of the University Center to the entrance of Parking Lot 27, and close Franklin St from the entrance to Parking Lot 10 to Preston Street. Maintain emergency vehicle access through Preston Street.</i></p>	<ul style="list-style-type: none"> Displaces traffic from Preston Street and Franklin Street, resulting in an expanded pedestrian zone. 	<ul style="list-style-type: none"> Closes a north/south street and an east/west street. The character of the Bellows Street corridor is changed significantly.

Table 7 - Street Configuration Improvements Summary

Alternatives	Improvements
<p>1. Convert Washington Street to 1-Way Southbound Operation Between Bellows and Preston <i>Northbound Washington Street traffic would be diverted to West Campus Drive and Franklin Street.</i></p>	<ul style="list-style-type: none"> • Add eastbound left turn lane on Preston at West Campus Dr* • Add westbound right turn lane on Preston at West Campus Dr* • Add signal for Bellows St / Franklin St intersection
<p>2. Convert Preston Street to 1-Way Westbound Operation Between Washington and Franklin <i>Northbound Washington Street traffic would be diverted to West Campus Drive and Franklin Street.</i></p>	<ul style="list-style-type: none"> • Add eastbound right turn lane on Bellows St at Franklin St • Add westbound right turn lane on Preston St at West Campus Dr* • Add eastbound left turn lane on Preston at West Campus Dr* • Add signal for Bellows St / Franklin St intersection • Add signal for Bellows St / University St intersection • Add signal for Bellows St / Washington St intersection
<p>3. Close Preston Street West of Franklin <i>Preston Street traffic would be diverted to Bellows Street. Maintain emergency vehicle access through Preston Street</i></p>	<ul style="list-style-type: none"> • Add northbound left turn lane on Franklin St at Bellows St • Add eastbound right turn lane on Bellows St at Franklin St • Add eastbound left turn lane on Preston at West Campus Dr* • Add southbound right turn lane on West Campus Dr at Preston St* • Add signal for Bellows St / Franklin St intersection • Add signal for Bellows St / University St intersection • Add signal for Bellows St / Washington St intersection
<p>4. Close Preston Street and Franklin Street <i>Close Preston Street from west side of the University Center to the entrance of Parking Lot 27, and close Franklin St from the entrance to Parking Lot 10 to Preston Street. Maintain emergency vehicle access through Preston Street.</i></p>	<ul style="list-style-type: none"> • Add eastbound left turn lane on Preston St at West Campus Dr • Add southbound right turn lane on West Campus Dr at Preston St* • Add signal for Bellows St / East Campus Dr intersection • Add signal for Bellows St / Franklin St intersection • Add signal for Bellows St / University St intersection • Add signal for Bellows St / Washington St intersection

* not required if roundabout is installed

- **Alternative 2. Convert Preston Street to one-way westbound operation between Franklin and Washington.** One-way operation would simplify the pedestrian task of crossing the street, and allow the street to be narrower. However, half of the Preston Street traffic would remain in conflict with pedestrians. Campus wayfinding for visitors would be more challenging. *This alternative can be considered, but does not fully align with the objectives of the Transportation Master Plan.*
- **Alternative 3. Close Preston Street west of Franklin Street.** This alternative provides complete closure of a section of Preston Street with the highest density of pedestrian crossings (Franklin Street to Washington Street), which comprises approximately 1,050 pedestrian crossings in the ½ hour surrounding class changes. Bellows Street becomes part of the campus ring road. However, Bellows Street is impacted significantly with the additional traffic load displaced by the Preston Street closure. *This alternative does align with the objectives of the Transportation Master Plan.*
- **Alternative 4. Close Preston Street and Franklin Street.** This alternative closes Preston Street between Washington Street and Lot 27 driveway, and Franklin Street between Preston Street and Lot 10 driveway. Bellows Street becomes part of the campus ring road, and East Campus Drive's role of the campus ring road is strengthened. However, this alternative has the largest scale of traffic impacts, since a north-south and east-west street is closed. *This alternative does align with the objectives of the Transportation Master Plan.*

In all cases, emergency vehicle traffic would be able to use Preston Street in emergency situations, and service vehicles would also be able to use Preston Street.

These alternatives were presented to the City and to MDOT, in conjunction with the pedestrian volume characteristics. The City and MDOT encouraged CMU to take a long-term and big-picture view, including elevating the function of Bellows Street to be part of the ring road around the campus. These comments appear to indicate a willingness to accommodate CMU's needs with regard to reducing vehicle/pedestrian conflicts, recognizing that Bellows Street will need to be improved to satisfactorily service the traffic displaced by the closure of Preston Street.

Evaluation. The four alternatives were evaluated for improvements necessary to support the reassignment of traffic. These improvements include pavement marking changes, traffic control improvements (such as changing stop signs to traffic signals), and roadway widening (such as adding a right-turn lane). The improvements were developed for each alternative, based on the needs of the afternoon peak hour of traffic estimated for 2013. The traffic conditions during the afternoon peak hour were significantly higher than the morning and mid-day peak hours. As a result, the morning and mid-day peak hours were not analyzed as part of the evaluation.

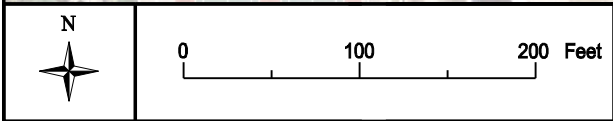
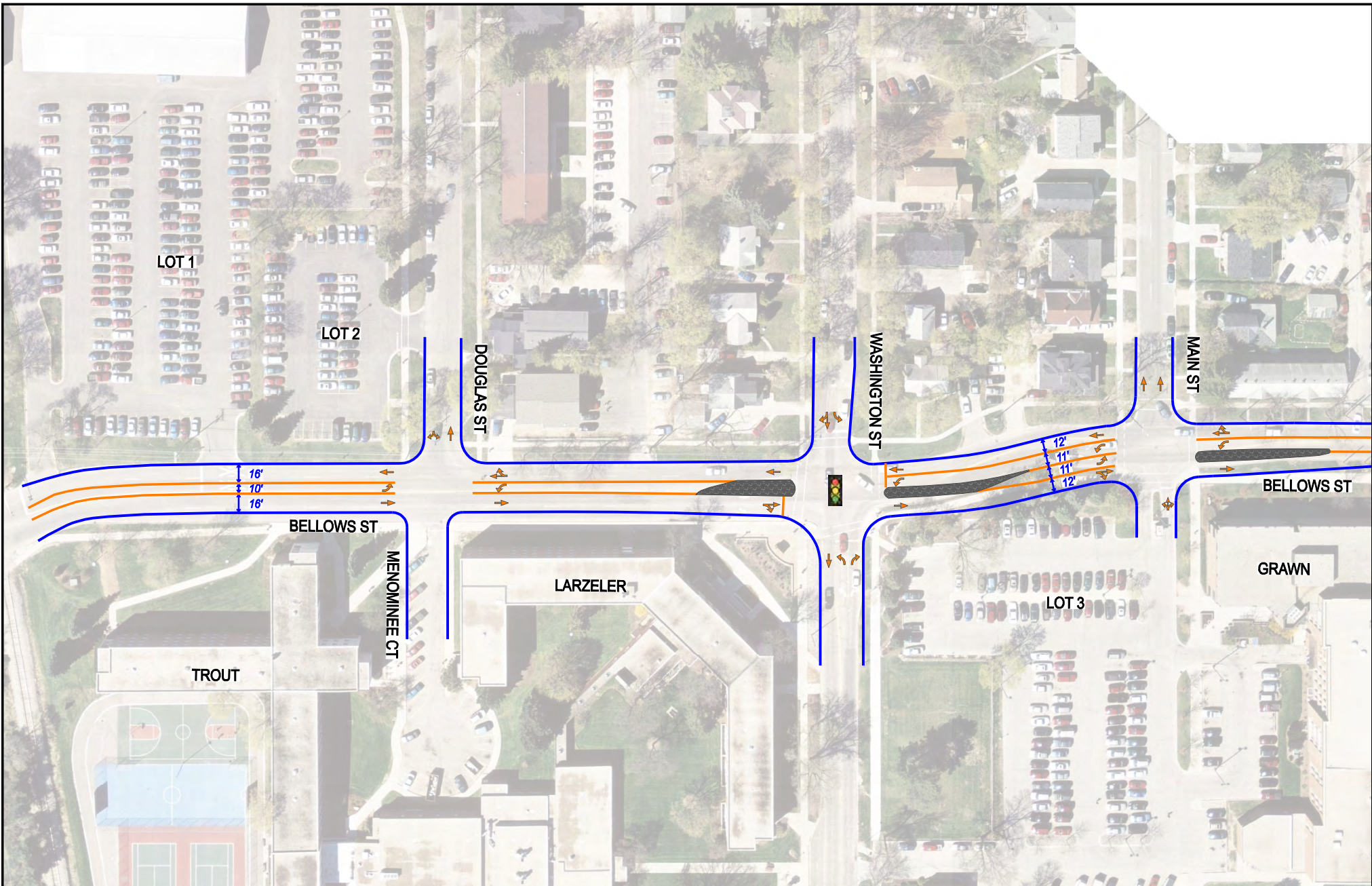


Bellows Street at University Street.

The substantial change in character for Bellows Street is the most significant mitigation measure necessary to support alternatives 2, 3, and 4. These changes are illustrated in **Figures 14** through **16**. Bellows Street is currently a 2-lane roadway between Washington Street and Franklin Street, with all-way stop-controlled intersections at Washington, University, and Franklin. It is likely that these intersections would require widening on the Bellows Street approaches and traffic control changes, such as traffic signals, to adequately handle the traffic displaced by the Preston Street closure. These changes will result in longer pedestrian crossing distances across Bellows Street and higher vehicle speeds for traffic on Bellows Street, which would reduce the existing pedestrian character of Bellows Street. However, the Preston Street closure would benefit the campus in a way that would justify the impact on the relatively small pedestrian volumes that cross Bellows Street.

In addition, other minor changes to Bellows Street can be implemented to assist with improving traffic flow. East of the railroad tracks, the existing sections that are 4 lanes wide can be restriped to a 3-lane cross section, providing a two-way center turn lane. West Campus Drive between Preston Street and the railroad tracks can also be considered for a similar treatment. Adjustments to the on-street parking may be required.

Changes are also needed at some of the Preston Street intersections, as illustrated in **Figures 17** and **18**. Some of these changes are warranted by existing conditions, as in the case of the proposed traffic signal at the Preston Street/East Campus Drive intersection.

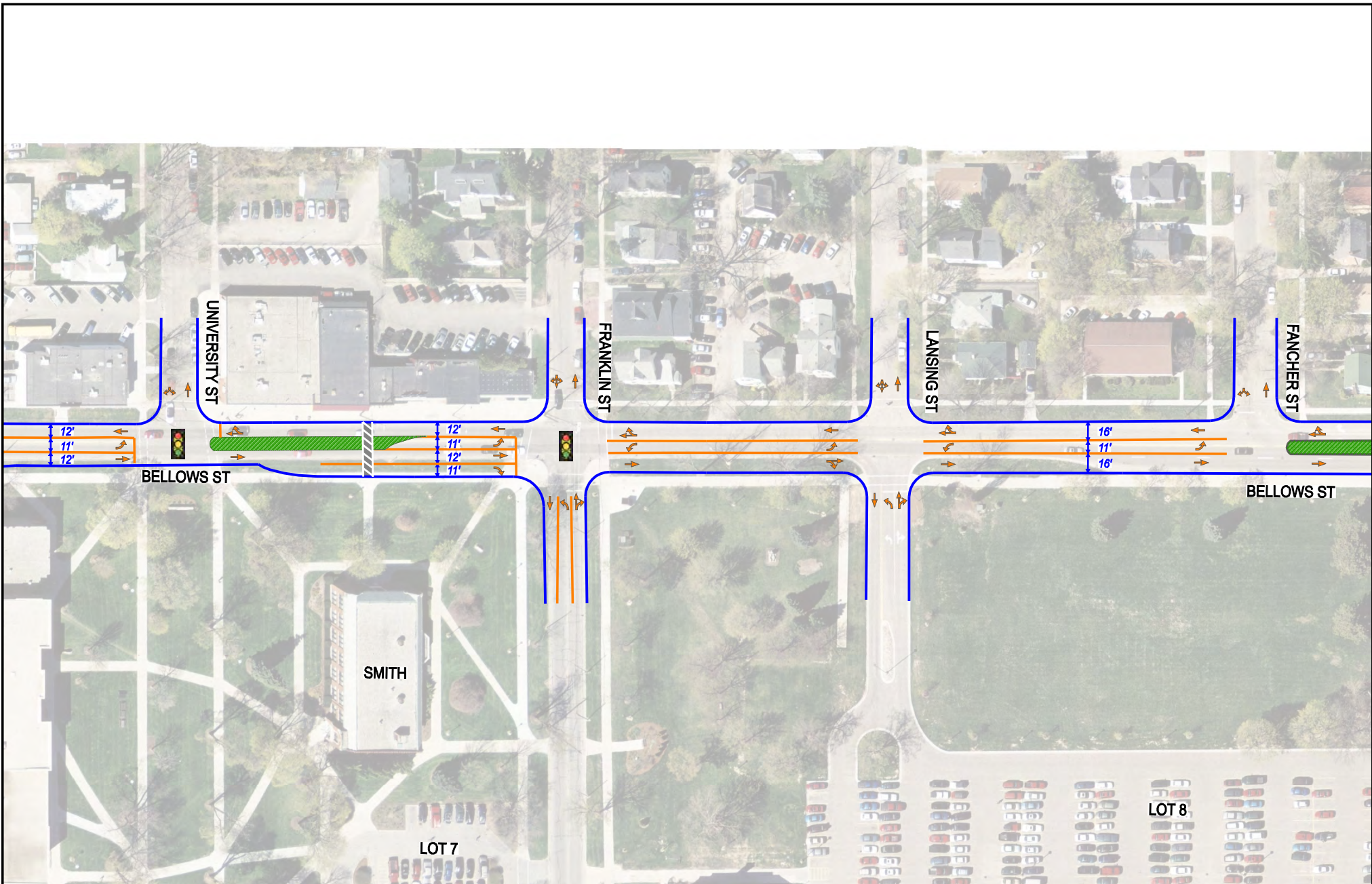


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 Bellows St Improvements Concept - (Railroad Tracks to Main St)

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Figure
 14



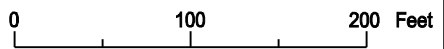
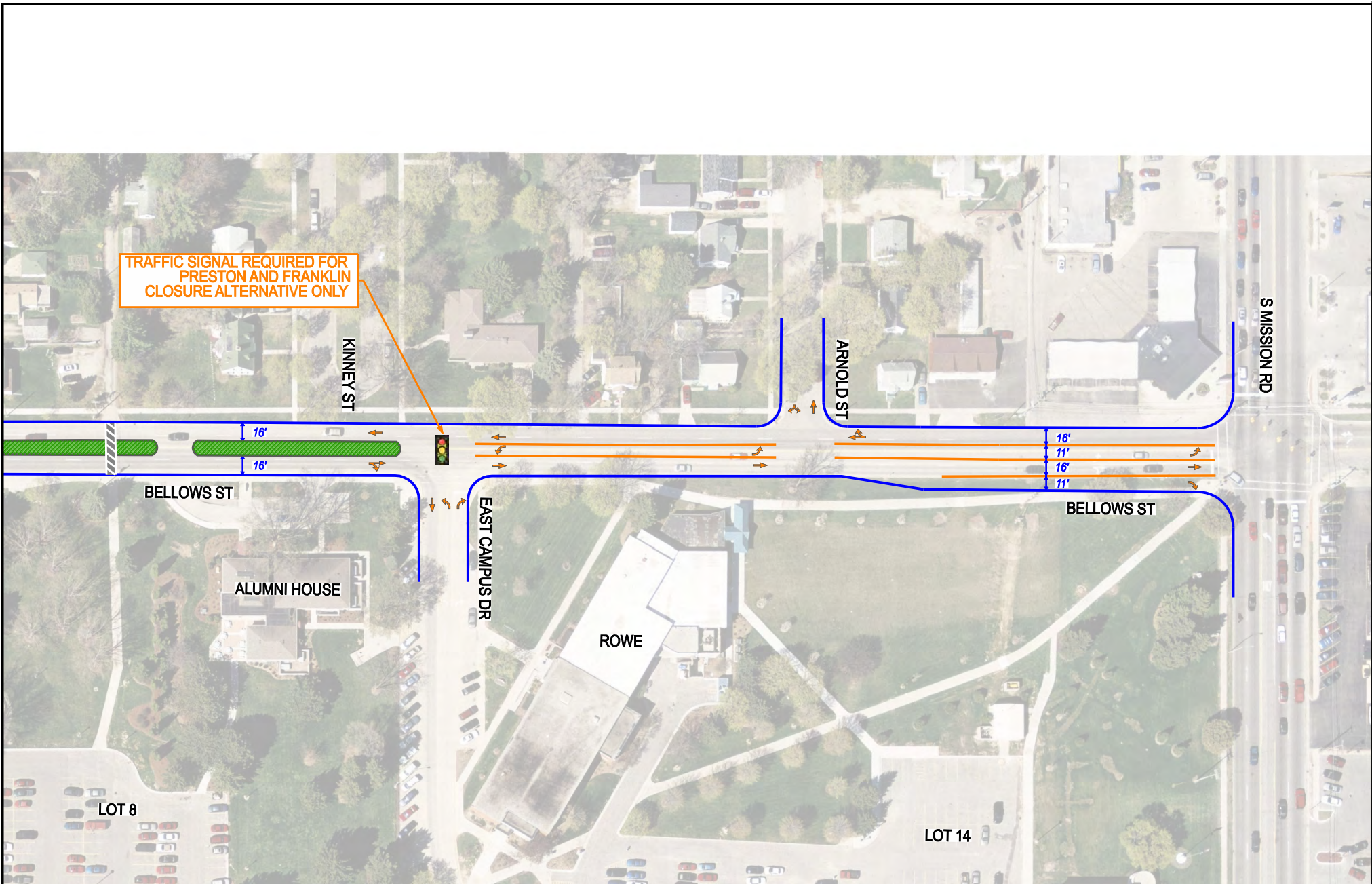
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Figure
 15

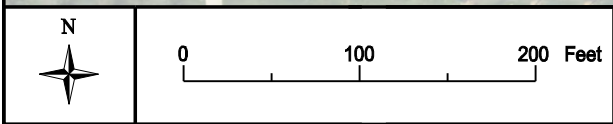
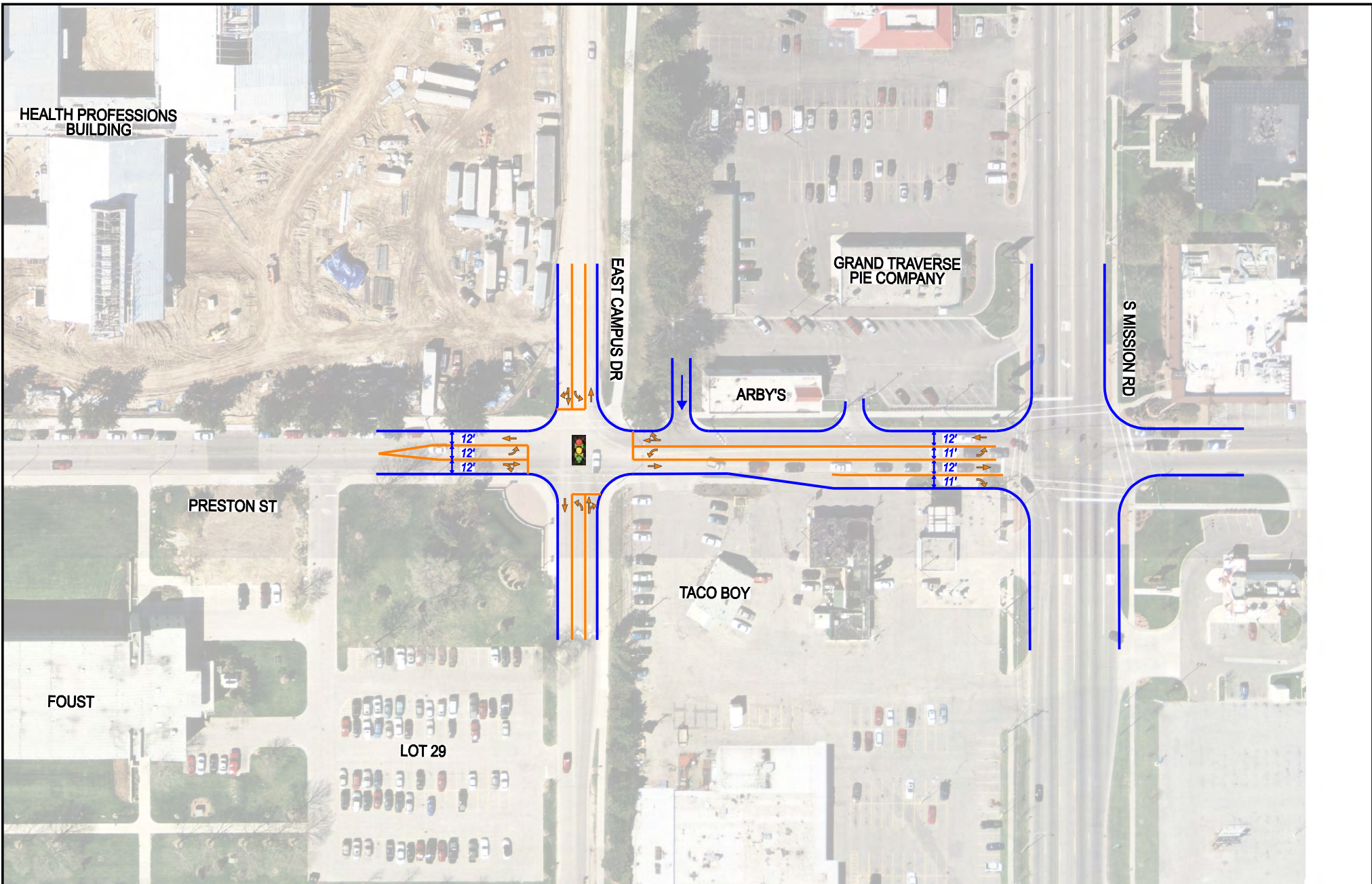


Central Michigan University
 Transportation Master Plan
 Bellows St Improvements Concept - (Fancher St to Mission Rd)

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Figure
 16

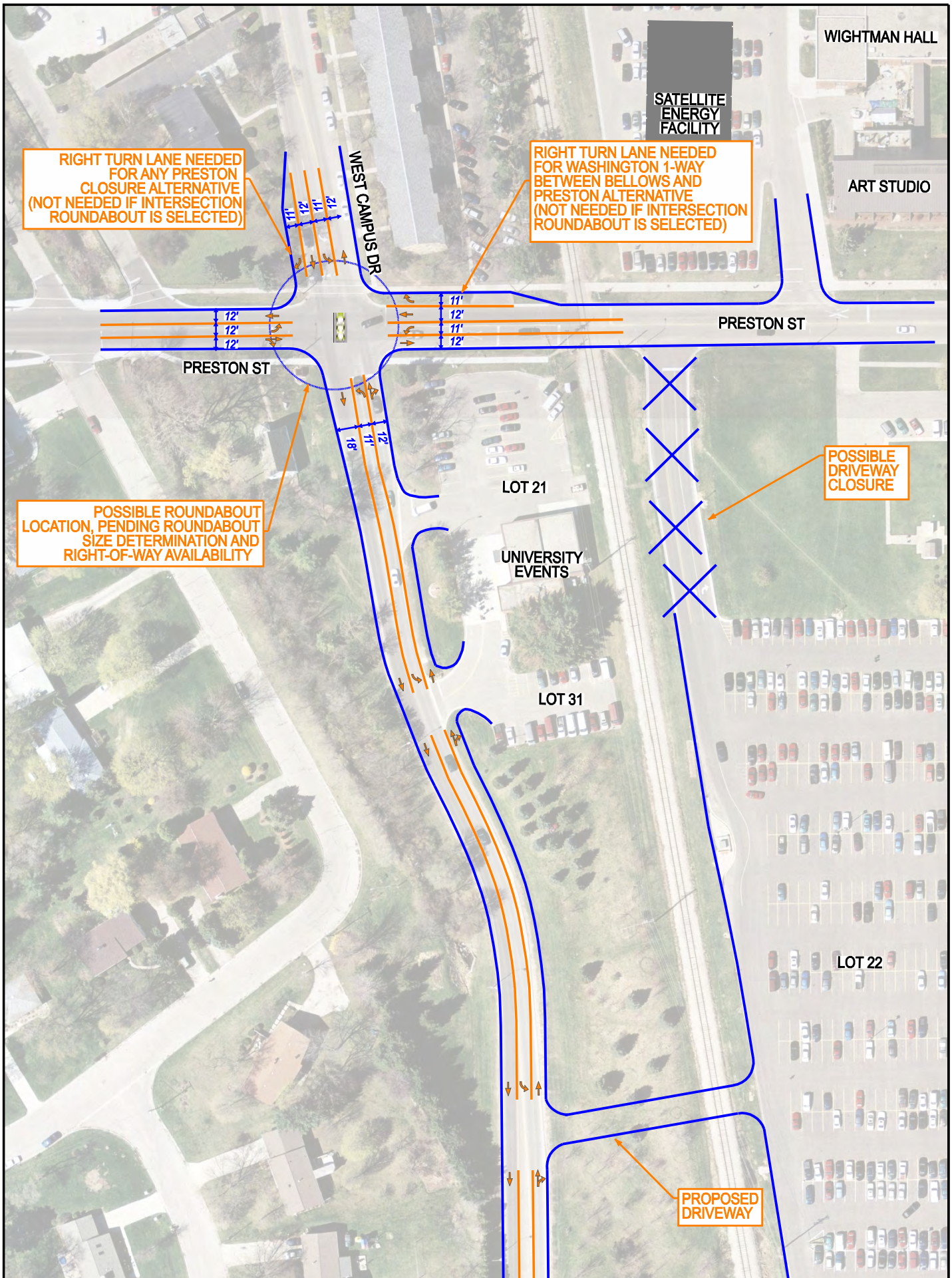


Central Michigan University
Transportation Master Plan
 Preston St Improvements Concept - (East Campus Dr to S. Mission Rd)

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Figure
 17



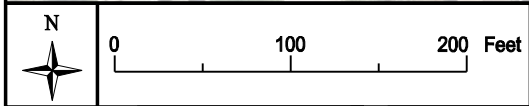
RIGHT TURN LANE NEEDED FOR ANY PRESTON CLOSURE ALTERNATIVE (NOT NEEDED IF INTERSECTION ROUNDABOUT IS SELECTED)

RIGHT TURN LANE NEEDED FOR WASHINGTON 1-WAY BETWEEN BELLOWS AND PRESTON ALTERNATIVE (NOT NEEDED IF INTERSECTION ROUNDABOUT IS SELECTED)

POSSIBLE ROUNDABOUT LOCATION, PENDING ROUNDABOUT SIZE DETERMINATION AND RIGHT-OF-WAY AVAILABILITY

POSSIBLE DRIVEWAY CLOSURE

PROPOSED DRIVEWAY



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 Transportation Master Plan
 Preston St Improvements Concept
 (West Campus Dr to Washington St)

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Figure
 18

Recommendations. In light of the advantages and disadvantages associated with each alternative and the public agency comments, Alternative 3 (close Preston Street west of Franklin Street) represents a reasonable balance between the need for vehicle access and mitigating the pedestrian issues on Preston Street. This alternative should be considered first. If the City cannot accommodate a petition that closes Preston Street, then Alternative 2 (convert Preston Street to one-way westbound between Franklin Street and Washington Street) should be considered.

Alternative #1 (convert Washington Street to one-way southbound between Bellows Street and Preston Street) does not align with the objectives of the Transportation Master Plan, and the traffic impacts associated with Alternative #4 (close Preston Street and Franklin Street) may exceed the incremental benefit associated with closing Franklin Street, in addition to Preston Street.

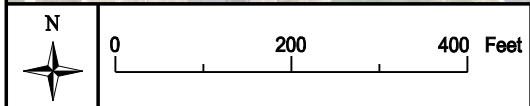
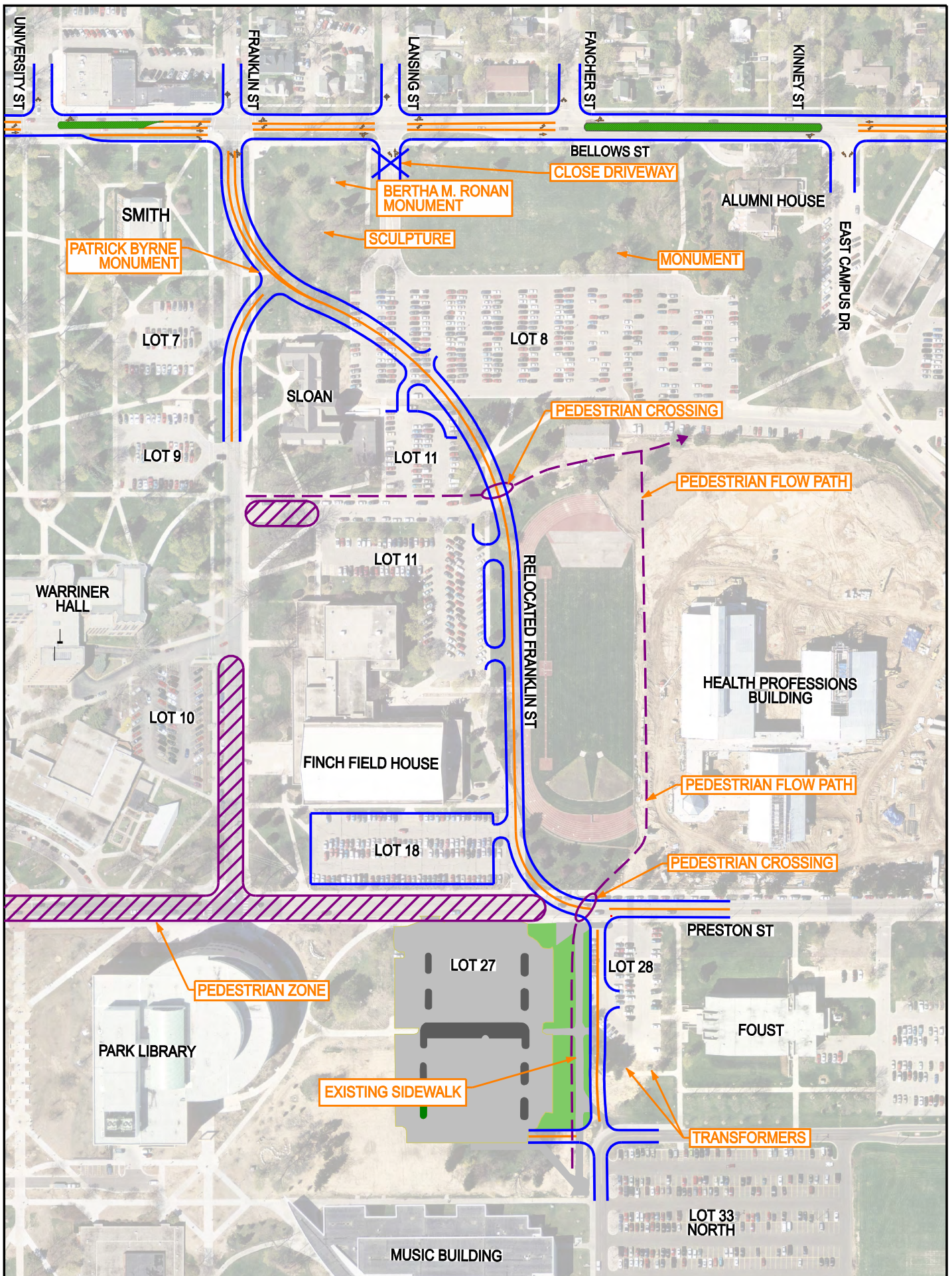
5.2.3. Franklin Street Relocation

There is a future opportunity to relocate Franklin Street, as illustrated in **Figure 19**. This opportunity may be beneficial to the campus, depending on a number of future considerations:

- Preston Street is closed between Franklin Street and Washington Street.
- Additional CMU facility sites are developed occurs in the northeast sector.
- A future facility site occurs at Lot 27, Lot 18, and/or the Finch Field House.

Depending on these factors, relocating Franklin Street to the east of Sloan and Finch Field House would provide the following benefits:

- Franklin Street would directly serve the existing parking areas in the vicinity, rather than indirectly via Chippewa Trail.
- The area of closure along Preston Street would stretch east to Lot 27, expanding the pedestrian zone in which there are no vehicle/pedestrian conflicts. The potential future facility sites at Lot 27, Lot 18, and Finch Field House would benefit from the expanded pedestrian zone.



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- The existing and expanded parking facilities would benefit from improved access to and from Preston Street, which would be particularly important if Lot 8 was selected for a future parking deck site.
- Lot 33 would benefit from more direct access to and from Bellows Street.

At this time, the relocation of Franklin Street is a future opportunity. This opportunity should be reviewed when future facility sites are considered in the northeast sector.

5.2.4. Ojibway and Ottawa Reconfiguration

The 2001 Master Plan illustrated a desire to close Ottawa Court. From the west, Ottawa Court would dead-end into the proposed EHS parking lot. Calumet Court would dead-end into parking facilities east of the EHS. These measures would allow the major north-south sidewalk that is east of the EHS to cross only Ojibway Court, rather than both Ottawa Court and Ojibway Court. Service vehicle access north of the EHS would be maintained via pedestrian paths for the service docks in the area.



2001 Master Plan image of the Ottawa Court and Ojibway Court area, with the EHS building shown.

From a traffic perspective, these concepts are sound and the impact to traffic flow is small. Sufficient turn-around areas may be required to service transit and fire trucks. The pedestrian paths that provide access for service vehicles would need to be constructed appropriately.

As a short-term measure, Ottawa Court can be closed at the main north-south pedestrian and bicycle path located along the east side of EHS. Other elements of the Ojibway Court and Ottawa Court reconfiguration concept can be implemented as the opportunity arises.

5.2.5. Washington Street Reconstruction

The current design plans for the Washington Street reconstruction were reviewed in light of the Transportation Master Plan objectives. The following comments were discussed with the City for further consideration:

- Install two northbound bus stops, anticipating the implementation of a new bus route in the fall of 2008.
- Narrow the approach of Hopkins Court, noting that service vehicles must be able to access the service docks located on Hopkins Court and Algonquin Drive.

- Relocate the driveway to Lot 6 to align opposite of Hopkins Court, and reconfigure Lot 6 accordingly.
- Install a raised crosswalk on the south approach of the Hopkins Court intersection. The drainage characteristics on Washington Street and Hopkins Court must be reviewed to determine the appropriate raised crosswalk design.
- Consider a radius change to the southeast corner of the Bellows Street/Washington Street intersection to accommodate the right-turn movement associated with a 50-foot bus, anticipating a future CMU shuttle service that would utilize this right-turn movement.

5.2.6. Traffic Signing and Pavement Marking Recommendations

The guidance included in this section is in conformance with the Michigan Manual on Uniform Traffic Control Devices (MMUTCD), 2005. There are other sign and pavement marking options available, which can be considered if desired.



Example of standard pedestrian crossing signs.

The campus traffic signing and pavement markings are generally in conformance with standard practices. There are three specific areas where signage improvements should be considered:

Pedestrian crossings

The pedestrian crossing signs at the marked roadway crossings should utilize the fluorescent yellow-green sign color that is approved for pedestrian warning signs.

The pedestrian zone defined around the campus core is defined by the raised pedestrian crossings. As traffic approaches this zone on all roadways, motorists should encounter the following for the raised pedestrian crossings:

- SPEED HUMP AHEAD and W13-1 (speed advisory plaque, typically 15 mph) in advance of the raised pedestrian crossing.
- W11-2 (nonvehicle crossing) and W16-7p (down arrow) at the crossing, similar to the standard pedestrian crossing signs example photo.
- Standard white pavement markings on the raised pedestrian crossings.



Example of existing pedestrian crossing signage on East Campus Drive.

At isolated marked pedestrian crossings, motorists should encounter the following:

- W11-2 (nonvehicle crossing) and W16-9p (AHEAD) in advance of the marked pedestrian crossing.
- W11-2 (nonvehicle crossing) and W16-7p (down arrow) at the crossing, similar to the standard pedestrian crossing signs example photo.
- Standard white pavement markings on the marked pedestrian crossing.

In some cases, CMU currently uses the school zone signage (the five-sided sign), and the STATE LAW STOP FOR PEDESTRIANS WITHIN CROSSWALK sign. The nonvehicle sign is preferred over the school zone sign since the CMU campus does not represent a typical school zone. The supplemental sign indicating that vehicles must stop for pedestrians in the crosswalk is currently not listed as an option in the MMUTCD, although a provision is made for a similar sign that uses LOCAL LAW in place of STATE LAW.

Wayfinding

There are a few locations where the wayfinding signage is not legible or placed in an inappropriate location. These signs are located on roadways under the jurisdiction of the ICRC and the City.

At the crossovers on Broomfield Road, the signs include lettering sizes so small that it is nearly impossible for motorists to follow the directions. The wayfinding information on these signs should be relocated to supplementary signs as allowed by the ICRC, using letter sizes appropriate for the speed limit on Broomfield Road.

Wayfinding signage located on the stop sign for westbound Preston Street at Franklin Street should be removed and relocated to supplementary signs as allowed by the City of Mount Pleasant, using letter sizes appropriate for the speed limit on Preston Road. It is also not appropriate to combine a wayfinding sign with a regulatory (stop) sign.

A wayfinding signage study is recommended periodically to assure that the signage is up-to-date, useful, and located in the appropriate locations.

Railroad Crossings

All railroad crossings should include the following traffic signs and pavement markings, in the order they appear when approaching the railroad crossing (see MMUTCD, p. 8B-11):

- W10-1 (railroad crossing) warning sign
- W14-3 (NO PASSING ZONE) sign (optional)
- White pavement markings (RXR) in advance of the crossing
- White stop bar pavement marking, typically 15 feet in advance of the railroad tracks

The existing driveway for Lot 22 should be reviewed for sight distance considerations between the driveway and railroad tracks to determine if a stop or yield sign is appropriate, if this has not previously been determined. The eastbound approach currently includes a yield sign, however the sight distance along the railroad tracks may not be sufficient for the 25 mph track speed rating. The westbound approach does not include a yield or stop sign. Lot 22 should be reconfigured to provide an adequate approach to the railroad tracks from the parking lot side, including the appropriate signs and pavement markings. The existing driveway and the proposed driveway (located further north) should be treated similar to a public roadway.

5.3. Parking

Parking facilities represent a significant investment for CMU in terms of land and cost. Parking facilities also create an environmental impact since the parking surface is typically impervious to water infiltration, which increases the amount of stormwater run-off into streams and lakes. These issues are directly related to the concept of sustainability.

To align with CMU's vision for sustainability, the operation of the existing parking facilities should be optimized, the need for additional parking facilities should be minimized, and the "footprint" of parking facilities should be minimized. This vision can be achieved through the elements described in the following sections:

- Parking lot expansions and reconfigurations
- New surface lot
- Future parking deck site
- Campus parking strategies

Transit and bicycling provide opportunities to reduce the parking demand, in addition to the campus parking strategies that optimize the operation of the parking system via policy, pricing, and communication with users.

The parking lot access modifications, removals, and reconfigurations are shown in **Figure 20** and tabulated in **Table 8**. If and when all of the parking modifications are implemented, the net gain in parking spaces is estimated to be approximately 315. In general, the parking lot modifications are a result of the following objectives:

- Remove parking lots that are accessed via the core of the campus, rather than the perimeter.
- Increase the capacity of the commuter lots.
- Improve commuter lot access so that it is orientated toward the campus perimeter roadways.
- Changes that result in parking lot circulation improvements.
- Changes that reduce vehicle/pedestrian conflicts.

5.3.1. Parking Lot Access Modifications

- **Lot 6.** The driveway to Lot 6 should be relocated to align with Hopkins Court, which will also require minor modifications to the parking lot. This may be implemented as early as 2008, when the City reconstructs Washington Street.
- **Lot 8.** The driveway on East Campus Drive should be aligned with the Lot 14 driveway, rather than have a slight off-set between the driveways.
- **Lot 11.** Access should be changed from Chippewa Trail to Lot 8, when Lot 8 is reconfigured.
- **Lot 15.** The Preston Street driveway to Lot 15 should be relocated in conjunction with the University Center circle drive replacement.
- **Lot 22.** The Preston Street driveway to Lot 22 may be considered for closure, and replaced by a new driveway on West Campus Drive. The Preston Street driveway is located too close to the railroad crossing, and promotes CMU traffic to use Preston Street and Washington Street. The new driveway on West Campus Drive would promote using West Campus Drive and Bellows Street, and strengthen the ring road function provided by West Campus Drive. However, the Preston Street driveway may be needed in the future, if Lot 22 is considered for a future parking deck of sufficient size to warrant three access points.



Existing circle drive in front of the University Center.

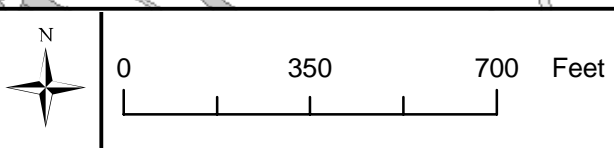
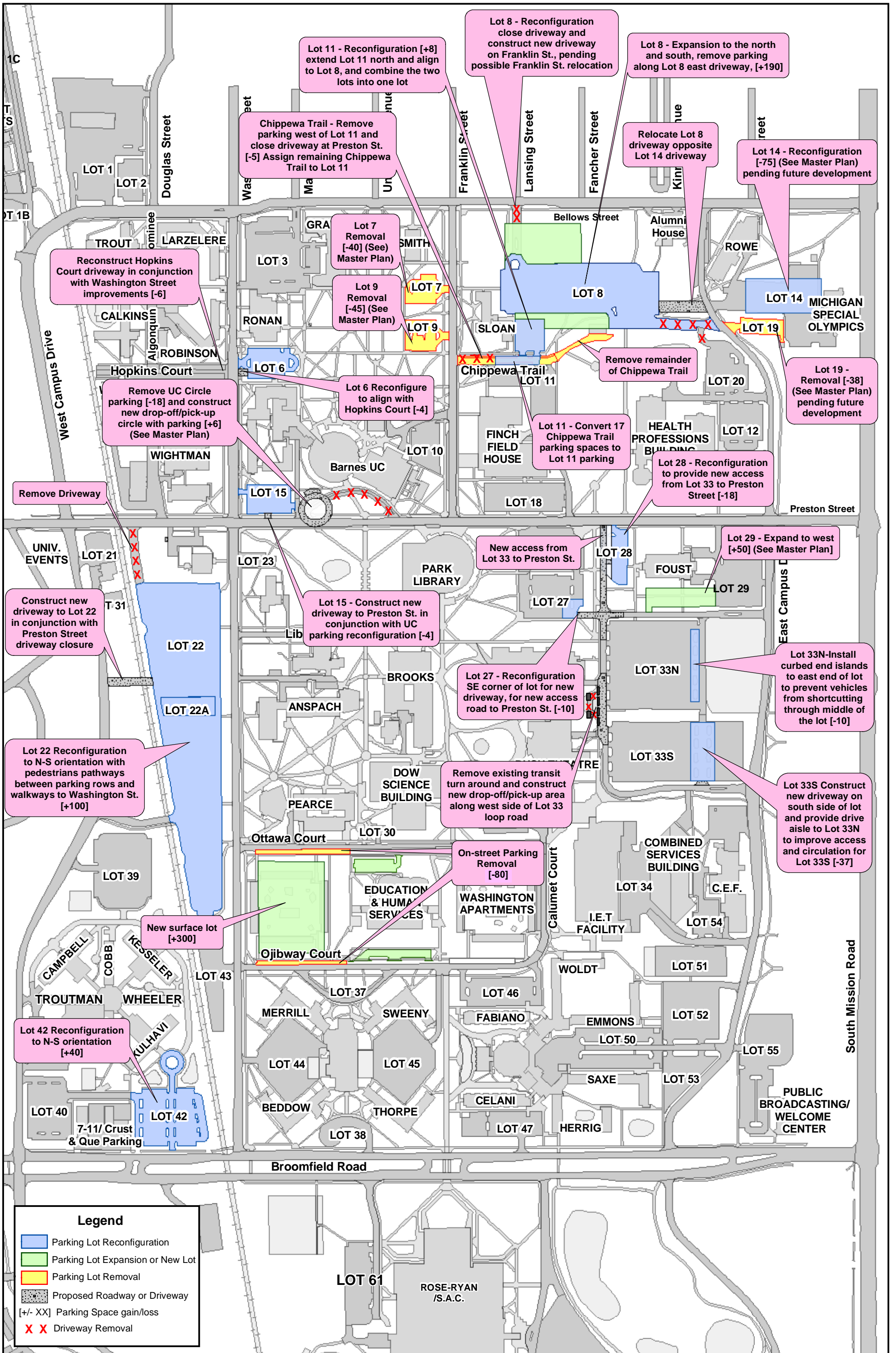


Table 8 - Proposed Parking Lot Conditions Summary

Lot	Existing Capacity	Spaces Net Change	Proposed Capacity	Master Plan and Other Notes
Proposed Parking Lot Removals				
Algonquin Dr	21	?	?	Remove parking along Algonquin Drive pending North Campus Renovation.
Menominee Ct	18	?	?	Remove parking along Algonquin Drive pending North Campus Renovation.
7	40	-40	0	Master Plan - Remove vehicles from Warriner Hall greenspace & open opportunities for future buildings.
9	45	-45	0	Master Plan - Remove vehicles from Warriner Hall greenspace & open opportunities for future buildings.
University Center Circle Drive	18	-18	0	Master Plan - Remove University Circle Drive and associated parking.
19	38	-38	0	Master Plan - New building with glass façade facing north to mirror a large campus green space.
Washington Ct Apartments	140	-80	60	Serve these residents with the planned 300-space parking lot at west end of complex. Removed parking is adjacent to new 300-space parking lot.
SUBTOTAL	330	-221	99	

Proposed Reconfigurations/Expansions				
Hopkins Ct	95	-6	89	Modify Hopkins Ct intersection in conjunction with Washington Street improvements.
6	69	-4	65	Relocate Lot 6 driveway opposite Hopkins Court Driveway.
Chippewa Trail	22	-5	17	Close driveway on Franklin Street to Chippewa Trail parking and remove parking west of Lot 11. Assign remaining 17 spaces to Lot 11.
8	446	190	636	Expand Lot 8 to the north and south while maintaining monument and preserving trees on the northeast side of the lot.
11	154	8	162	Chippewa Trail parking re-assigned to Lot 11 (+17 spaces) and extend/align north end of Lot 11 with Lot 8.
14	208	-75	133	Master Plan - Pending future site development, construct new building with glass façade to the north, & reconfigure Lot 14 north of building.
15	72	-4	68	Construct new driveway on Preston Street in conjunction with new UC circle drive.
29	110	50	160	Master Plan - Reconfigure parking lot access around Foust Hall, create efficient use of parking lots and better vehicle circulation.
42	161	50	211	Change orientation from E-W to N-S.
22/22A	947	100	1047	1. Add second driveway on West Campus Drive. 2. Change lot orientation from E-W to N-S. 3. Provide pedestrian walkways between parking rows, & walkways leading to each pedestrian connection to Washington Ave. Provide breaks in parking rows to discourage speeding in lot.
27	256	-10	246	Reconfigure SE corner of lot for new driveway, pending construction of new access road to Preston Street.
28	60	-18	42	Pending construction of new access road to Preston Street (and closure of Preston to the west of Lot 27).
33N	498	-10	488	Add end islands to eastern end of parking lot to prevent vehicles from shortcutting through the middle of the lot.
33S	468	-37	431	Construct new driveway on south side of lot and connect with backside of Lot 33N to improve access and circulation for Lot 33S.
SUBTOTAL	3566	229	3795	

Proposed New Parking Lots				
University Center Circle Drive	0	6	6	Located on the southwest side of the Bovee University Center, just east of Lot 15.
Washington Ct Apartments	0	300	300	New surface parking lot just west of new Education Building. Capacity range is between 300 and 400 spaces.
SUBTOTAL	0	306	306	

GRAND TOTAL	3896	314	4200	Grand Total may change slightly pending North Campus Renovation impact on Algonquin Drive parking and Menominee Court parking.
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- **Lot 33.** Due to the capacity and traffic surge characteristics associated with the Lot 33 parking lot, adding a driveway on Preston Street would help alleviate the congestion on East Campus Drive. The driveway would pass through Lot 28, and provide access to Lot 27 in the event that Preston Street is closed in the vicinity of the existing Lot 27 driveway on Preston Street in the future. This improvement should be considered in conjunction with the proposed traffic signal at the Preston Street/East Campus Drive intersection.

5.3.2. Parking Lot Removals

The following parking areas should be considered for removal:

- **University Center Circle Drive.** The existing circle drive should be removed and replaced with a circle drive that eliminates the existing vehicular conflicts at the front door of the Bovee University Center, as illustrated in **Figure 21**.
- **Lot 7 and 9.** These lots were considered for removal per the Master Plan, which aligns with the objective of minimizing the parking areas accessed via the interior of the campus.
- **Chippewa Trail.** These on-street spaces can be removed when Chippewa Trail is converted into a pedestrian area/green space when future facility site development is considered in the area. The on-street parking can remain during the interim.
- **Lot 19.** This lot can be removed when future facility site development is considered in the area.
- **Washington Court.** These on-street spaces can be removed if and when the 300-space parking lot is constructed west of EHS.

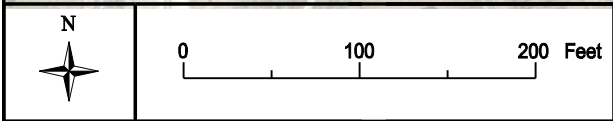
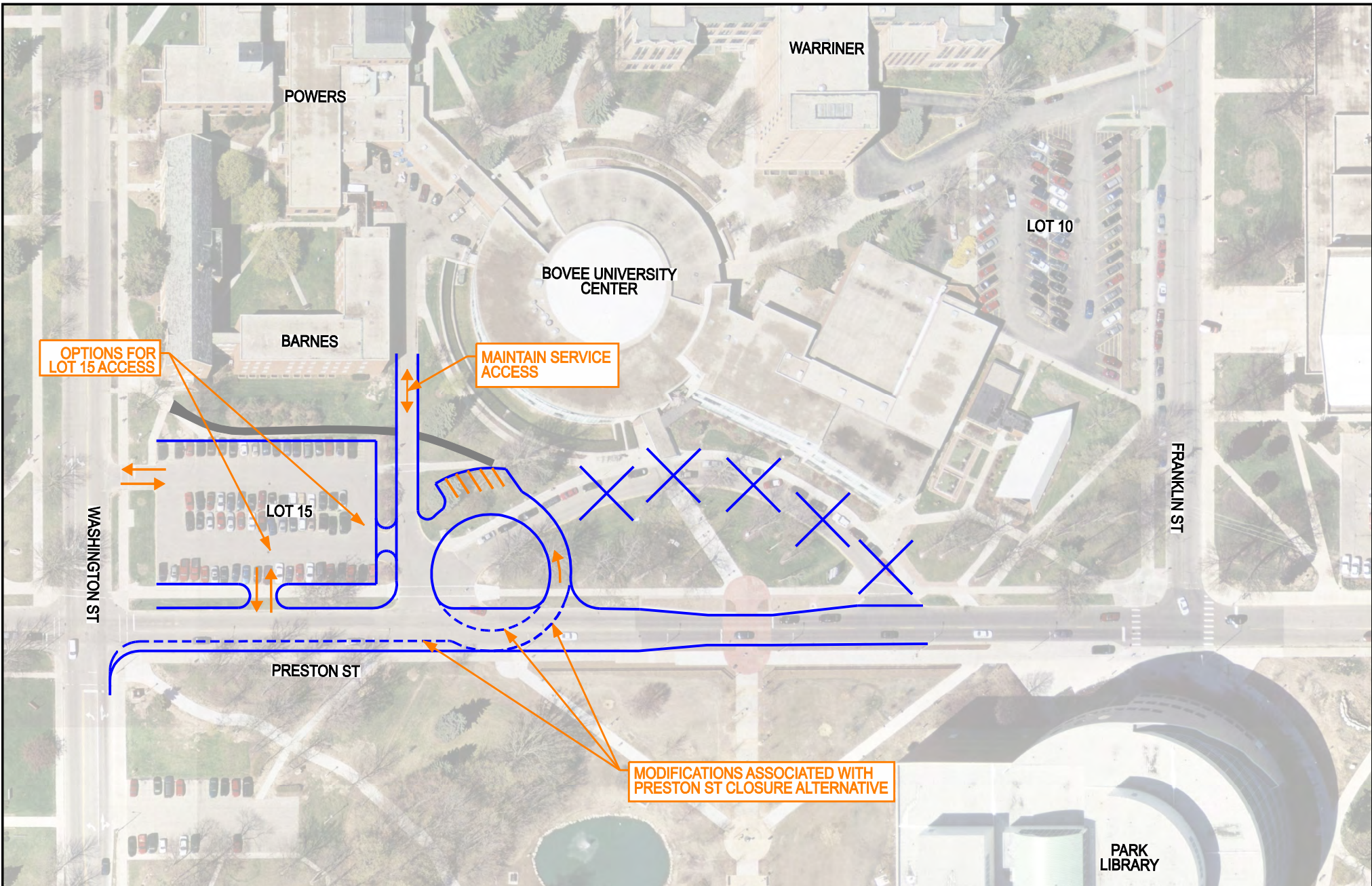


2001 Master Plan image of the University Center area, indicating removal of the circle drive by the University Center front door.

5.3.3. Parking Lot Expansions and Reconfigurations

The following parking lots should be considered for expansion and/or reconfiguration:

- **Lot 6 and Hopkins Court.** With the relocation of the Lot 6 driveway on Washington Street and narrowing of the Hopkins Court approach, a few parking spaces will be removed.



Central Michigan University
 Transportation Master Plan
 University Center Parking Reconfiguration

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Figure
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- **Chippewa Trail.** These parking spaces will be removed and converted to pedestrian-oriented space when future sites are developed in the northeast sector.
- **Lot 8 and 11.** These parking lots should be reconfigured and Lot 8 can be expanded. The access to Lot 11 should be changed to Lot 8, rather than via Chippewa Trail.
- **Lot 14.** Per the Master Plan, this lot will be reconfigured when future site development occurs in the area.
- **Lot 15.** This lot will require minor modifications when the Preston Street driveway is relocated, in conjunction with the relocated University Center circle drive.
- **Lot 29.** Per the Master Plan, this lot should be reconfigured to create efficient use of the parking lots and improve vehicle circulation.
- **Lot 42.** This lot would benefit from reorienting the parking aisles from east-west to north-south aisles.
- **Lot 22/22A.** This lot would benefit from reorienting the parking aisles from east-west to north-south aisles. Pedestrian walkways should be provided between parking rows that lead to each Washington Street pedestrian crossing. Breaks in the parking rows should be provided to discourage speeding within the lot.
- **Lot 27.** The southeast corner should be reconfigured when the Preston Street driveway is constructed for Lot 33.
- **Lot 28.** This lot will be impacted when the Preston Street driveway is constructed for Lot 33.
- **Lot 33N.** This lot would benefit from adding parking aisle endcaps along the east edge, which would prevent vehicles from shortcutting through the middle of the lot and improve vehicle sight distance.
- **Lot 33S.** This lot would benefit from a new driveway on the south side, which would connect with the aisle along the west edge of Lot 33N. This would improve the access and circulation for Lot 33S.

5.3.4. New Surface Parking Lot

The relocated University Center circle drive will include a few new parking spaces, although not as many as the existing circle drive.

When the useful life cycle of the Washington Court Apartments west of EHS has ended, this site could be redeveloped with an approximately 300 to 400-space surface parking lot. The on-street parking adjacent to Washington Court Apartments could be consolidated into the parking lot. Ultimately, the Master Plan illustrates a future facility on this site.

New surface parking lots should include drainage swales between parking aisles and trees for shade. These measures will reduce the stormwater impact of additional parking facilities and reduce the “heat island” effect.

5.3.5. Future Parking Deck Site

The opportunities for a future parking deck site were investigated. The primary considerations that were considered are as follows:

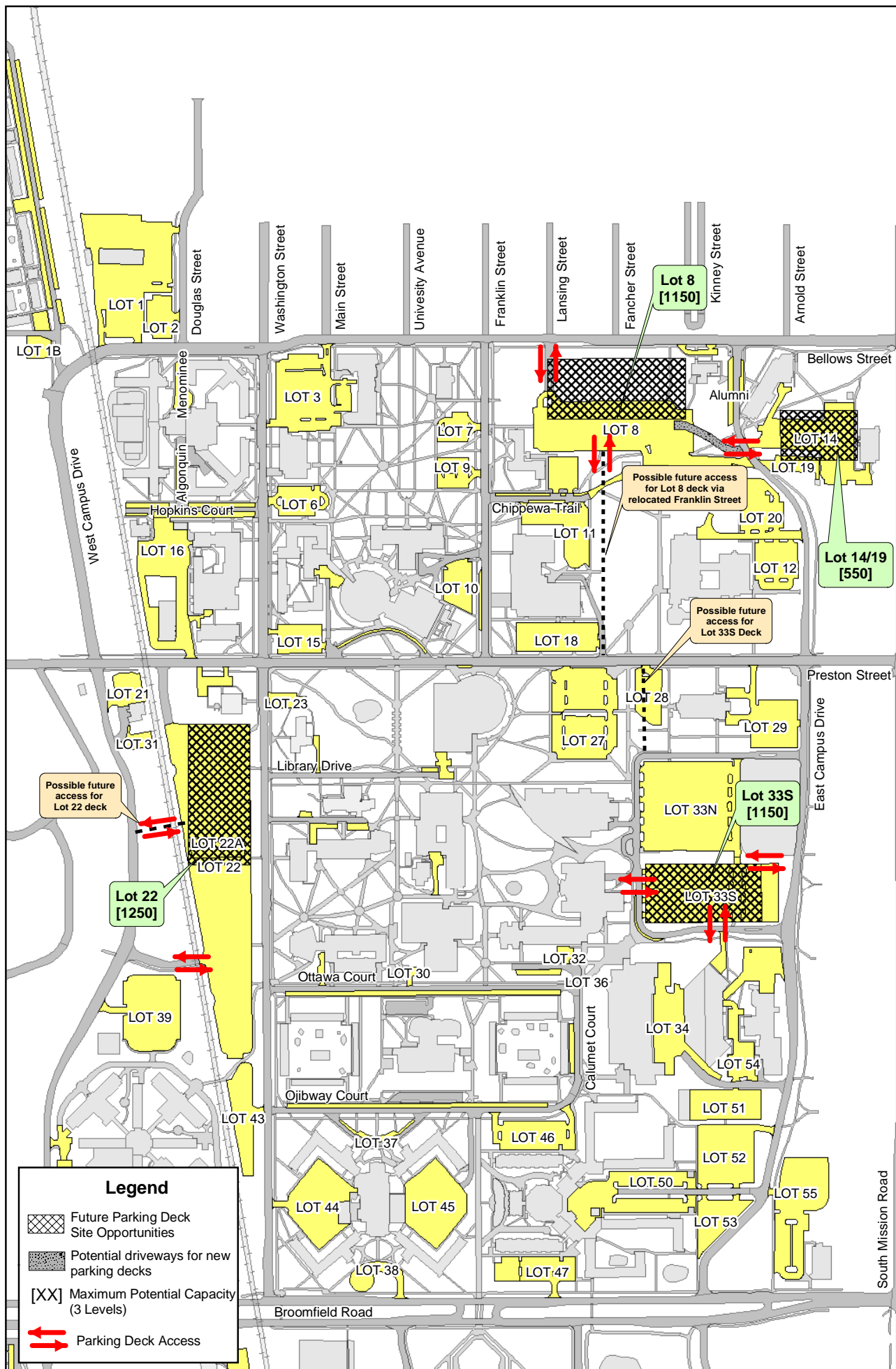
- Proximity to the campus core
- Access to the campus perimeter roads and major streets
- Multi-use opportunities (nights and weekends)
- Ability to serve future facility sites
- Proximity to neighborhoods
- Capacity and configuration flexibility

Table 9 and **Figure 22** illustrate the advantages, disadvantages, and locations of the parking deck siting opportunities. Four locations were considered and evaluated.




Lots 8, 22, and 33, the existing large commuter lots, appear to be best suited for a future parking deck site. They are close to the campus core and can accommodate a large capacity parking deck in a number of possible configurations. Lots 8 and 33 have the added benefit of proximity to future facility sites and excellent access to and from South Mission Road and US-127. Lot 33 has the added benefit of potential multi-use on nights and weekends, and is located next to the campus transit center for additional flexibility.

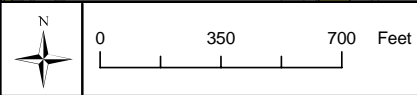
Table 9 - Future Parking Deck Site Comparison

Location	Advantages	Disadvantages
<p>1. Lot 22 - Potential Maximum Capacity (3 levels): 1250 spaces - Net Parking Increase: 750 spaces - Assumed Parking Deck Dimensions: 245' x 550'</p>	<ul style="list-style-type: none"> • Side of campus with fewer commuter spaces. • Parcel is not conducive to other facility development. • Large capacity possible. • Close to campus core. • Existing trees along Washington Street partially camouflages parking deck. • Opportunity for potential skywalk to Anspach Hall. 	<ul style="list-style-type: none"> • Access is limited to 2 driveways, unless additional driveway on West Campus Drive is constructed. • Existing Preston Street driveway to the railroad tracks is a potential safety issue. • Not likely to be used in the evenings or weekends for special events.
<p>2. Lot 33 (S or N) - Potential Maximum Capacity (3 levels): 1150 spaces - Net Parking Increase: 700 spaces - Assumed Parking Deck Dimensions: 245' x 510'</p>	<ul style="list-style-type: none"> • Access from East Campus Drive (33S or 33N) and Preston (33N) is sufficient. • Could possibly be used in the evenings and weekends for special events. • Close to potential future CMU facility development parcels along Preston, including Lot 27 and Lot 18. • Excellent access to/from Mission Street and US-127. • Close to campus core. • Large capacity possible. • Large site (Lots 33N or 33S) allows for flexibility in location and orientation of the deck. • Site of transit center, providing greater mobility flexibility. 	<ul style="list-style-type: none"> • Could be used as a future facility site.
<p>3. Lot 8 - Potential Maximum Capacity (3 levels): 1150 spaces - Net Parking Increase: 700 spaces - Assumed Parking Deck Dimensions: 245' x 510'</p>	<ul style="list-style-type: none"> • Large capacity possible. • Close to future facility sites in NE sector. • Excellent access to/from Mission Street and US-127. 	<ul style="list-style-type: none"> • Could be used as a future facility site. • Close to neighborhood. • Not likely to be used in the evenings or weekends for special events.
<p>4. Lot 14/19 - Potential Maximum Capacity (3 levels): 550 spaces - Net Parking Increase: 300 spaces - Assumed Parking Deck Dimensions: 185' x 320'</p>	<ul style="list-style-type: none"> • Close to future facility sites in NE sector • Excellent access to/from Mission Street and US-127. 	<ul style="list-style-type: none"> • Not close to campus core. • Could be used as a future facility site or gateway feature, as illustrated in the Master Plan. • Not likely to be used in the evenings or weekends for special events.



Legend

-  Future Parking Deck Site Opportunities
-  Potential driveways for new parking decks
- [XX] Maximum Potential Capacity (3 Levels)
-  Parking Deck Access



In summary, Lot 33 is the preferred site for a future parking deck site. Lots 8 and 22 could be considered if the campus needs and priorities change such that Lot 33 is not a desirable location for a parking deck.

5.3.6. Campus Parking Strategies

A number of parking strategies are potentially applicable to the Central Michigan University parking system. These strategies can enhance parking system operations and management and be used as tools to meet overall Master Plan and Transportation Master Plan goals and objectives.

Parking strategies that may be applicable are described below:

- **Parking Data Collection/Monitoring.** An ongoing parking occupancy count program for all user groups provides valuable information, which would augment the parking data collection already performed by the CMU Police Department. Regular counts of selected lots in the morning and afternoon for each user group provide a snapshot of existing parking usage. Parking occupancy data can be used to identify underutilized lots and the extent of improper parking. The parking lots that are currently utilized at less than 75% occupancy are identified in **Table 3**.
- **Parking Assignment/Re-Assignment.** Based on parking lot utilization and ongoing changes in parking demand and supply, parking assignment should be evaluated on a regular basis. Changes to parking assignment based on lot utilization and changes in demand or supply are an effective way to optimize the utility of the existing parking system. This parking strategy requires monitoring changing needs of user groups over time.
- **Underclassmen/Freshman Parking Policy.** The existing cap on permits for freshman on-campus parking should be evaluated. As core campus resident parking increases and parking availability decreases, alternatives to maintaining or increasing freshman on-campus parking need to be considered.

- **Remote Parking with Shuttle.** While this strategy may be geared primarily toward freshman residents, a shuttle program could be promoted to all residents as well as commuters. Convenience and cost (to the student) of the program is critical.
- **Tiered Fee Structure.** Parking permit fees could be implemented on a tiered basis. Rates could be set by parking location, by user group, and/or by class status. Rates could be set by parking convenience – premium rate (assigned space in a specific lot), regular rate (assigned lot or lots), and discount or no rate (remote shuttle lot).
- **Parking Communication.** A direct website link to parking registration, regulations, and the parking map would provide communication to the users. Parking information kiosks would be posted in and near building common areas most frequented by students and visitors.

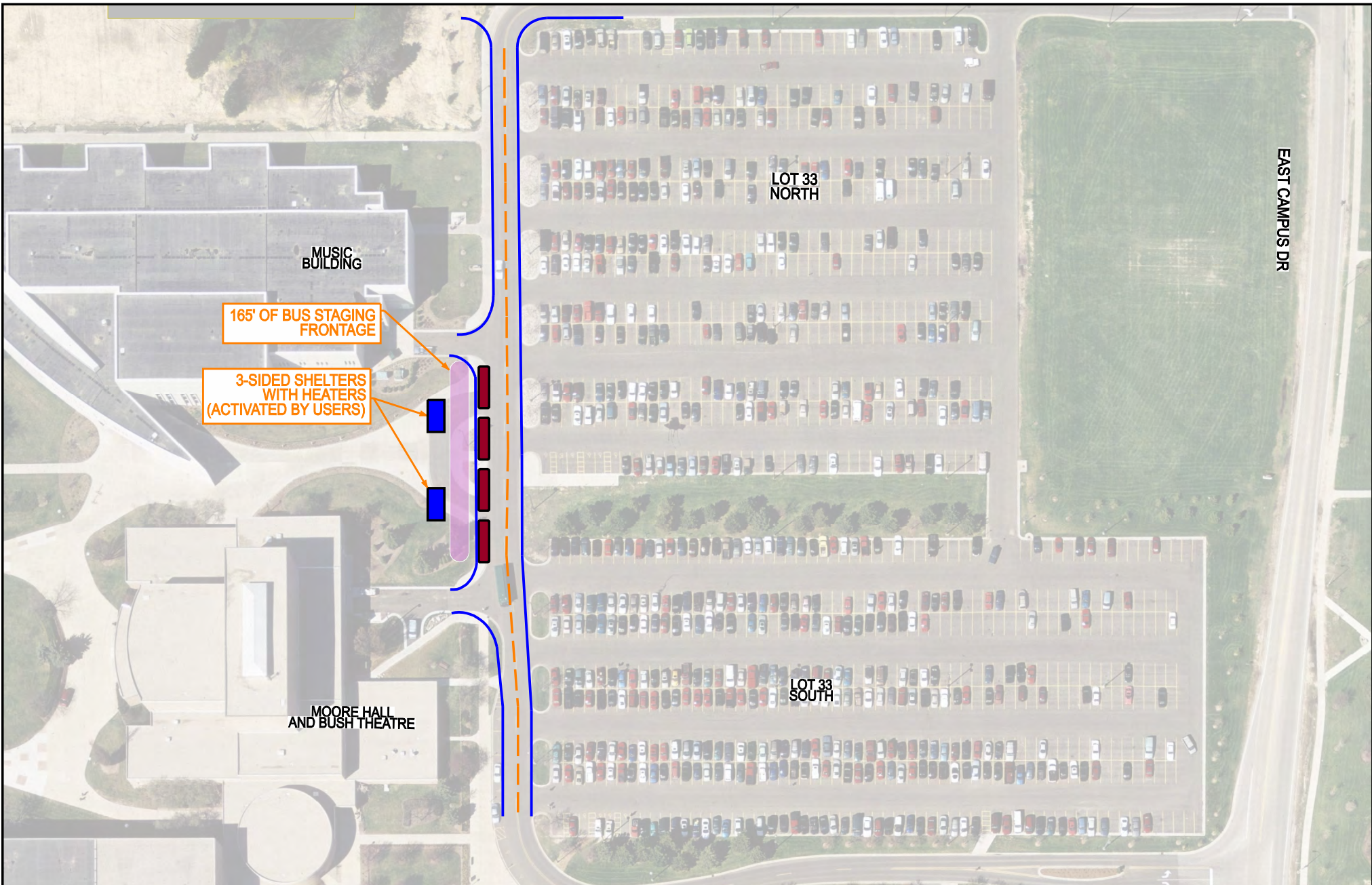
5.4. Transit

Transit mobility is currently an important part of mobility for CMU students. Transit opportunities are critical to the sustainability aspect of the campus, since vehicle parking spaces are not needed for these users. Fostering the transit culture will allow CMU to reduce the land requirements for parking and provide for greater opportunity for future academic facility sites.

5.4.1. Lot 33 Transit Center Improvements

The existing transit center in Lot 33 is the best location for this facility. The proximity to the campus core is excellent, and combining the major parking facility with the transit hub is an ideal arrangement. The parking and shuttle arrangement will assist with enhancing the mobility options on the campus, and can be used for large special events that occur elsewhere on the campus, such as football games.

A concept for improving the transit center is illustrated in **Figure 23**. The bus staging area is recessed from the Lot 33 ring road, allowing traffic to pass through the bus staging area. The four existing shelters are replaced with two larger 3-sided shelters, which functionally enhance the ability of the shelters to be useful to students waiting for the bus. Other transit center amenities could be considered as well. The existing shelters can be used at bus stops throughout the campus.



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 Transportation Master Plan
 Lot 33 Transit Center Improvements

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Figure
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5.4.2. ICTC Bus Routes and Shelter Recommendations

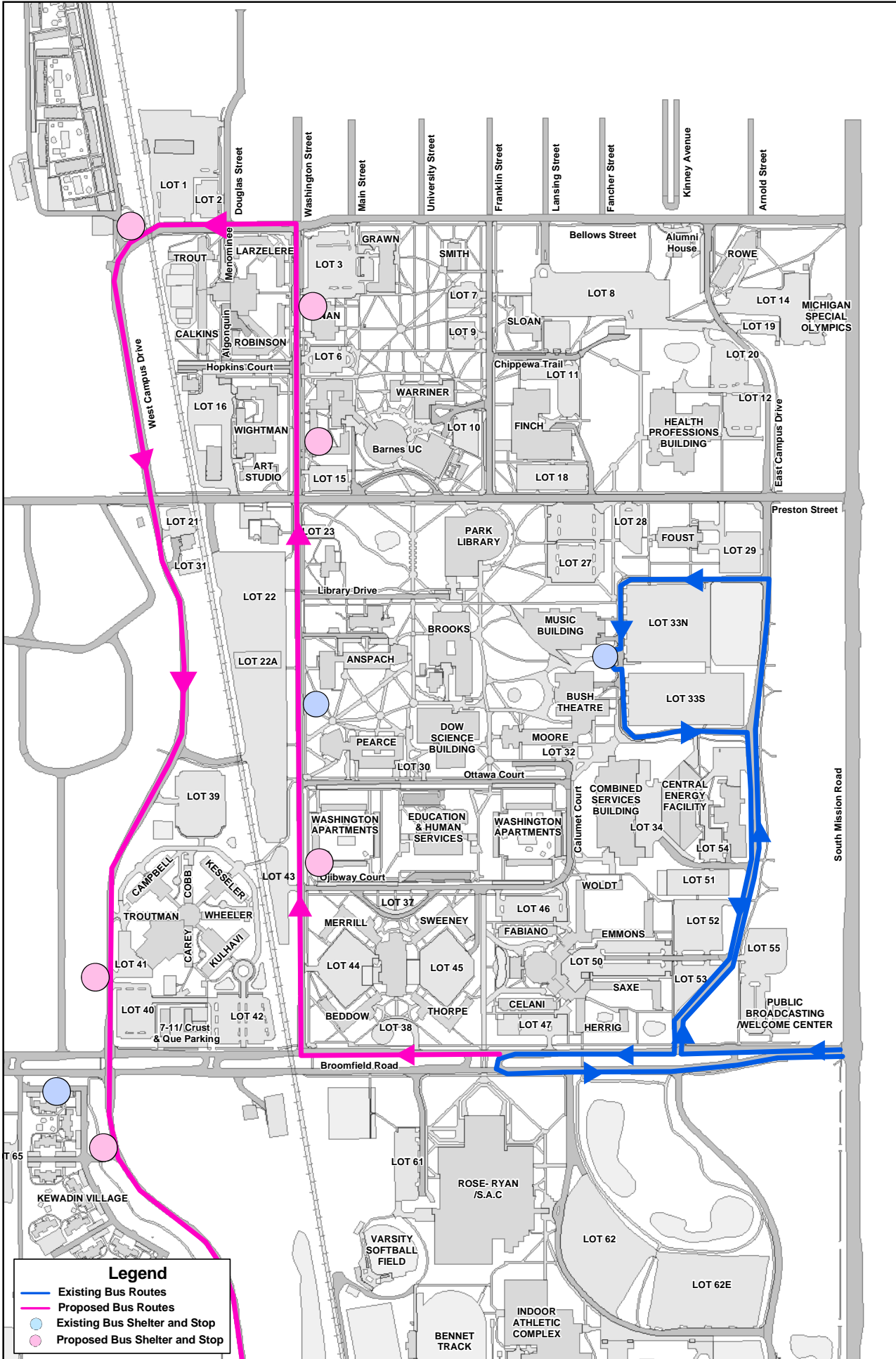
The ICTC bus routes and shelters are shown in **Figure 24**. Washington Street will be used as the primary transit corridor, which provides efficient and convenient access to a large portion of the campus. Access to and from Washington Street via Broomfield Road is also efficient and convenient. The other major commuter parking facility, Lot 22, is located on the proposed bus route.

The proposed bus route does not rely on Preston Street, which has a particularly high density of pedestrian crossing activity. However, a future campus shuttle could be operated around the north side of campus using Washington, Bellows, and Franklin.

At bus stops, a bus pull-out should be provided when space is available. ICTC has indicated that a bus pull-out that has a 25-foot taper, 50-foot staging area, and 25-foot taper (100 feet total) will accommodate its largest buses.

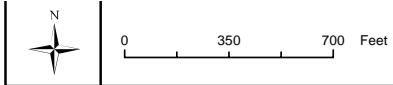
5.4.3. Future Remote Parking and Shuttle Operations

A concept for a future remote parking and shuttle operation is shown in **Figure 25**. This concept provides efficient access to over 2,600 parking spaces south of Broomfield Road, with the transit center in Lot 33 as the campus pick-up and drop-off site.



Legend

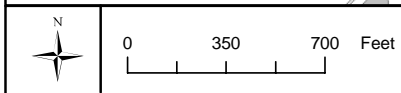
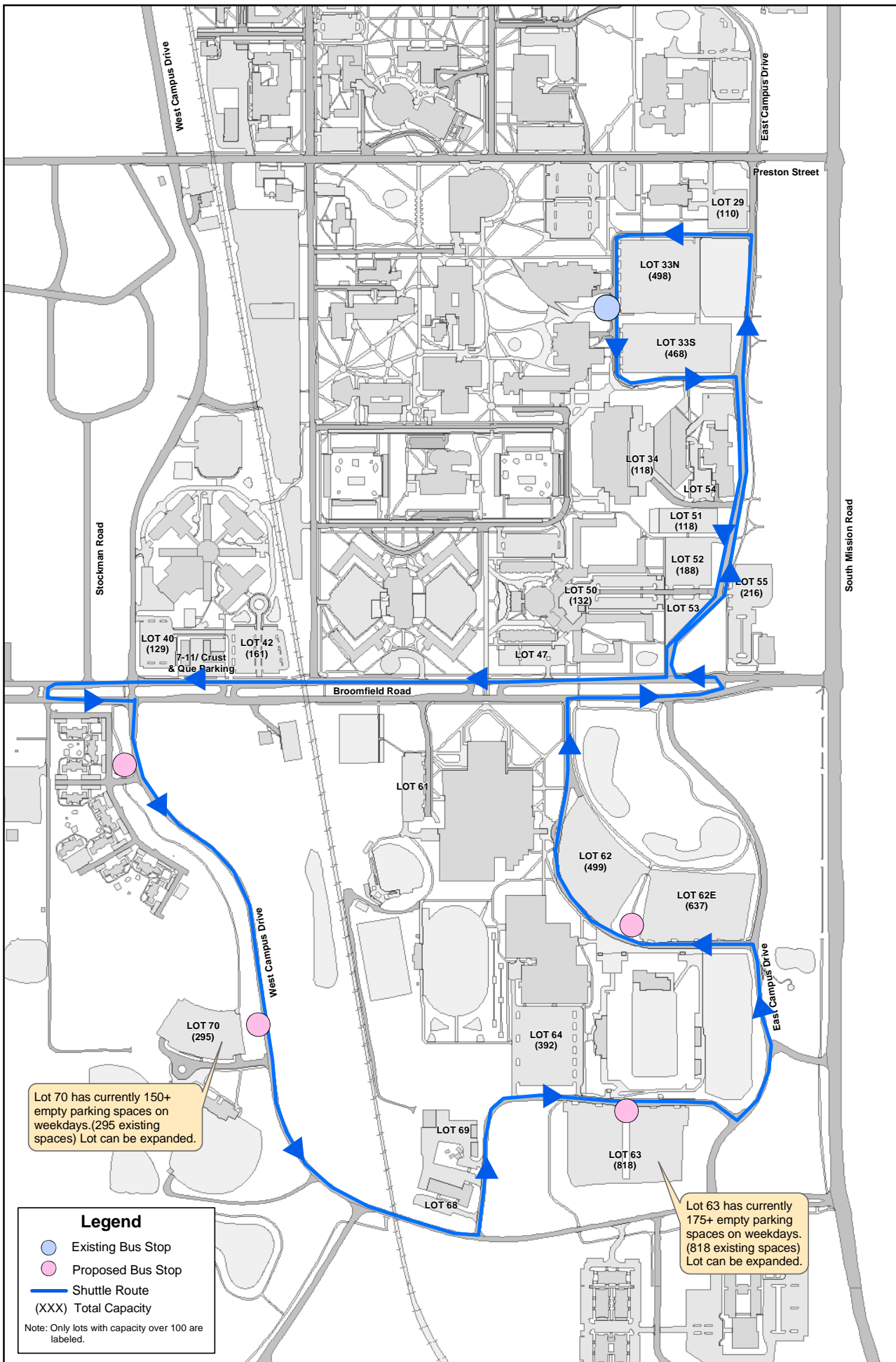
- Existing Bus Routes
- Proposed Bus Routes
- Existing Bus Shelter and Stop
- Proposed Bus Shelter and Stop



Central Michigan University
 Transportation Master Plan
 ICTC Bus Routes and Shelters



Figure
 24



6. Implementation Plan

6.1. Improvements Linked with Future CMU Facilities

The following improvements can be stand-alone improvements, or possibly be linked to future facility site developments.

- **University Center Circle Drive.** The Bovee University Center renovation may provide the opportunity to remove the existing circle driveway on Preston Street, and relocate the circle driveway so that it eliminates the vehicle/pedestrian conflicts at the front door to the University Center.
- **Northeast Sector Pedestrian Enhancements.** Future facility site development in the northeast sector may justify installing the raised crosswalk on Franklin Street (between Warriner and Finch Field House) and Preston Street (between Lot 27 and 28). It may also provide an opportunity to convert Chippewa Trail to a pedestrian-oriented function.
- **Northeast Sector Roadway Modifications.** Future facility site development in the northeast sector may precipitate the desire or need to relocate Franklin Street and convert Chippewa Trail to a pedestrian-oriented space.
- **Surface Parking Supply Increase.** Demolition of the Washington Court Apartments west of the EHS building may allow for the construction of a surface parking lot, and allow for the removal of on-street parking on Ottawa Court and Ojibway Court.
- **Parking Supply Enhancements.** Future facility site development in the northeast sector, Lot 27, Lot 18, and/or Finch Field House may increase the parking demand. The next step may include deploying the remote parking with shuttle operation or constructing a parking deck.

6.2.Improvements that May Require CMU Land

CMU can assist with facilitating the roadway improvements adjacent to and nearby the campus by providing the land necessary to support the roadway improvement. The roadway improvements will provide a significant benefit to campus mobility and regional mobility, and the CMU land impacted by the roadway improvements is not anticipated to adversely impact the campus in a meaningful way.

- **Preston Street Closure Mitigation Measures.** The Preston Street closure alternatives will likely require CMU property. The mitigation measures that are most likely to require CMU property are widening Bellows between Washington Street and Franklin Street, the Preston Street/West Campus Drive intersection improvements, and the Bellows Street/East Campus Drive intersection improvements.
- **South Mission Road/Bellows Street Intersection Improvements.** The proposed eastbound right-turn lane will likely require CMU property.
- **West Campus Drive/East Campus Drive Intersection Improvements.** The roundabout, which may also be utilized for future MDOT intersection improvements for the South Mission Road/West Campus Drive/Bluegrass Road intersections, will likely require CMU property.

6.3. Prioritization and Action Plan

Table 10 summarizes the project prioritization and action plan for deploying the recommendations. The order in which the recommendations are scheduled for implementation indicate the priority. The deployment is subject to budget and other resource limitations. CMU may choose to re-order the projects based on future changes to the campus priorities.

The immediate tasks are primarily associated with ongoing transportation projects conducted by other agencies. Coordination with the City, MDOT, and ICTC will ensure that the outcome of these projects will align with CMU's objectives.

The short-term tasks (2008-2009) are generally related to improving the pedestrian, vehicle, and parking elements east of Washington Street. These elements include a traffic signal at the Preston Street/East Campus Drive intersection, a new driveway for Lot 33, and replacing the circle drive in front of the University Center.

The medium-term tasks (2010-2011) include pedestrian, vehicle, and parking elements west of Washington Street, as well as other improvements. These elements include improvements to the Preston Street/West Campus Drive intersection and a new driveway for Lot 22. The proposed roundabout at the East Campus Drive/West Campus Drive is also included.

The long-term tasks (2012-2014) include the closure of Preston Street between Washington Street and Franklin Street, which may require a significant amount of coordination with the City in the years leading up to the closure.

The "when necessary" tasks can occur when campus improvements are considered which support or benefit from the implementation of the element

Table 10 - Transportation Priority and Action Plan

Year	Tasks
Immediate (2008)	<ul style="list-style-type: none"> • Coordinate with the City with regard to the Washington Street construction project, including installation of the raised crosswalk at the Washington Street/Hopkins Court intersection. • Design and construct the reconfiguration of Lot 6 and Hopkins Court, concurrently with the Washington Street reconstruction. • Coordinate with MDOT with regard to the pedestrian crossing improvement at the South Mission Road/Appian Way intersection. • Coordinate with the ICTC with regard to implementing a new bus route along Washington Street and West Campus Drive.
Short Term (2008-2009)	<ul style="list-style-type: none"> • Close Ottawa Court at the main north-south pedestrian and bicycle path. • Coordinate with City with regards to converting portions of Bellows from a 4-lane to 3-lane cross section (no new pavement necessary). • Develop justification for, design, and construct the traffic signal at the Preston/East Campus Drive intersection, including City (traffic signal justification) and MDOT (interconnect with South Mission Road) coordination. • Construct the new Lot 33 driveway on Preston Street. • Design and construct transit center improvements, parking aisle islands, and parking lot reconfiguration in Lot 33. • Remove the circle drive in front of the University Center and replace with a circle drive that eliminates the existing vehicular conflicts at the front door of the University Center. • Design and install the raised crosswalks on Washington Street, south of Preston Street. • Coordinate with MDOT and the City with regard to the proposed eastbound right-turn lane at the Preston Street/South Mission Road intersection.
Medium Term (2010-2011)	<ul style="list-style-type: none"> • Design and construct the new Lot 22 driveway on West Campus Drive, and possibly close the Preston driveway. • Design and construct the West Campus Drive/East Campus Drive roundabout. • Re-evaluate the Preston Street closure options, and provide the City with technical justification and identify mitigation measures for the option mutually acceptable between the City and CMU. • Design and construct a traffic signal or roundabout at the Preston Street and West Campus Drive intersection. • Coordinate with MDOT with regard to the design and construction of the proposed eastbound right-turn lane at the Bellows Street/South Mission Road intersection. • Coordinate with MDOT with regard to the design and construction of the anticipated improvements to the South Mission Road/Broomfield intersection.
Long Term (2012-2014)	<ul style="list-style-type: none"> • Design and construct roadway and intersection control improvements associated with the Preston Street closure. • Design and construct improvements to Preston Street (within the closure area) that maintain emergency access and provide a stronger pedestrian link to the University Center. • If Preston Street is not closed, design and construct the Washington/Preston intersection as a raised intersection.
Future (When Necessary)	<ul style="list-style-type: none"> • Implement separate or shared non-motorized paths. • Design and construct relocated Franklin Street in conjunction with a future facility site in the NE sector. • Design and construct the reconfiguration of Lot 22. • Design and construct the expansion and reconfiguration of Lot 8 and access changes to Lot 11. • Replace the Washington Apartments west of EHS with a surface parking lot. • Adopt parking strategies that optimize the utility of the existing parking system and/or restrict usage. • Implement remote parking and shuttle from lots south of Broomfield Road. • Design and construct a parking deck.

6.4. Additional Studies

Based on the findings of the Transportation Master Plan, the following studies should be considered:

- **Preston Street closure study.** A study should be undertaken to address the City's specific concerns relative to closing Preston Street. This study would align with the formal petition process, which would likely include a public meeting.
- **Campus traffic signage inventory.** From time to time, CMU should review the CMU-owned traffic signs and assess the applicability of traffic signs on campus that are under the jurisdiction of other agencies, including the City of Mount Pleasant, ICRC, and MDOT. This should include review of the posted speed limits on CMU-owned roadways.
- **Wayfinding study.** From time to time, CMU should review the wayfinding signage located throughout the campus. Specifically, campus entry points via the major roadways, such as Bellows Street, Preston Street, and Broomfield Road, should be addressed.
- **Raised pedestrian crossing traffic control.** The framework created by the proposed raised pedestrian crossings should be assessed for a consistent traffic control treatment, so that vehicles treat each raised crosswalk in a similar fashion.
- **Non-motorized path assessment.** A study should be undertaken to determine if shared or separate paths should be used for the off-street non-motorized paths on campus. Elements would include preliminary path alignment, bicycle volume data collection, student survey, and enforcement compliance alternatives.
- **Lot 22 driveway issues.** The existing driveway on West Campus Drive and the proposed driveway on West Campus Drive should be evaluated to determine the appropriate treatments at the Ann Arbor Railroad crossing. Elements would include traffic control signage, railroad warning devices, motorist sight distance along the railroad tracks, and driveway alignment across the railroad tracks.
- **Parking lot reconfigurations/modifications.** A study should be undertaken to determine the

details of reconfiguring Lot 22 and expanding Lot 8, including access changes to Lot 11.

- **Parking study.** As the utilization of the existing parking facilities approaches 100%, a study should be undertaken to determine which parking strategies are most appropriate for short-term and long-term implementation. Additional parking data may be required.
- **Parking deck feasibility study.** If and when a parking deck appears to be a reasonable next step for mitigating parking issues on campus, a parking deck feasibility study should be conducted. Elements of the study would include parking deck siting study, parking deck configuration, circulation, and size requirements, economic feasibility analysis, parking impact analysis on the adjacent areas (including residential neighborhoods and commercial areas), and traffic impact analysis.