Michigan Tech

Campus Transportation & Parking Plan
FINAL REPORT

Carl Walker

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EXECUTIVE SUMMARY

Introduction

The primary purpose of this transportation and parking study is to determine short-term and long-term recommendations to improve campus parking at Michigan Technological University (Michigan Tech). The parking study initially evaluated existing conditions, determined primarily through reviews of background materials, limited parking occupancy surveys, and stakeholder input meetings. The examination of existing conditions provided the foundation from which future parking operations, management, and allocation strategies could be developed. Finally, parking alternatives were considered to address future needs, as well as improve the utilization and efficiency of existing parking resources. Future parking alternatives included potential parking supply changes, as well as general parking operations/management strategies and improvements.

Current Conditions

The campus currently has a parking supply of 4,171 spaces to support a student enrollment of approximately 7,000 and a faculty/staff population of approximately 1,709. The current campus parking space to campus population (students, faculty, and staff) ratio is approximately .48. This ratio is significantly higher than the average ratio of .30 *Carl Walker* has observed elsewhere.

The overall observed campus parking occupancy was 2,785 spaces (or approximately 67% of the available campus parking supply). However, campus parking demand was primarily focused in and around the campus core (bounded by US 41 on the south and Cliff Drive on the north). The limited observation of campus parking occupancy for parking lots in and around the core of campus was 2,618 spaces (or 88% of the available supply of 2,989 spaces). Adjusting the parking supply to reflect the effective capacity of each parking area, 74% of the total effective campus parking supply was utilized. Removing Lots 22, 23, and 24 from the calculation, the remaining effective supply was approximately 97% utilized during limited occupancy observations. This means that most core campus parking lots are effectively full during peak parking time periods.

There were a number of strengths and weaknesses of current campus parking and transportation management identified by the project team. Significant strengths and weaknesses included the following (in no particular order):

Strengths

- Campus Parking Task Force
- Lots are in reasonably good condition
- Flexible allocation strategy for faculty/staff
- Faculty/staff have a convenient allocation of parking
- Many resident students can park close to residences
- Access controls are provided in core parking lots
- Most parking signs are in good condition
- An annual permit renewal/registration process has been implemented
- All vehicles parking on campus must be registered
- Student can register vehicles online
- Permit are sold/distributed at multiple locations (although the university encourages parkers to get their permits from the Department of Public Safety and Police Services)
- Citation fines are consistent with similar campuses
- Parking enforcement appears efficient
- A new appeals process has been developed
- Campus has a dedicated public safety department and a safety escort service
- A significant amount of parking information is available online
- Transit services are available in the area at a reduced fee (or free) to students

Weaknesses

- Parking is not financially self-supporting
- Parking and transportation is not managed by a single department
- No defined guiding principles
- Flexible parking allocations can negatively impact predictability and traffic
- Lack of available visitor parking
- Challenging climate and topography
- Parking pricing does not match the level of service provided
- Parking equipment is outdated and in need of replacement
- Parking lot perimeter controls are inadequate
- Sign messaging is sometimes inconsistent
- Sign placement is confusing in a number of locations
- Multiple permits are issued to some permit holders
- Parking permits are easy to counterfeit
- Parking fees are significantly lower than similar institutions
- The collection of enforcement fines is challenging
- Emergency call boxes and CCTV is not available in most parking areas
- Alternative forms of transportation are not actively encouraged or marketed
- Some pedestrian paths are in need of repair or are difficult to use
- Crossing US41 can be challenging
- No shuttle to remote parking lots
- Available transit is not convenient

Future Conditions

The university does not currently anticipate any significant changes in campus populations in the foreseeable future. Therefore, there will likely be no significant changes in overall campus parking demands due to increases in campus enrollments or

increases in university faculty and staff (although there may be changes in the mix of undergraduate and graduate student populations).

However, the 2006 "Fresh Look" Scenarios Plan detailed several options relative to future campus improvements. Some of these recommended improvements will result in the loss of core parking supplies, and others will result in the development of new surface parking lots and/or campus parking structures. The amount of parking lost/gained will depend on the concept plan (and associated alternatives) selected by the university. As there are no definite campus developments in the foreseeable future, it is not yet clear how much parking will be lost or added.
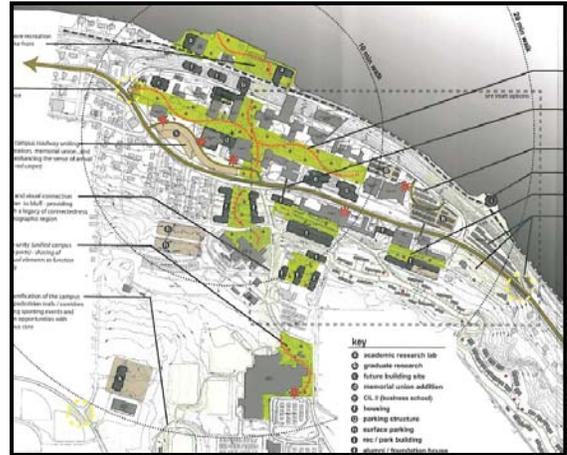
There is currently an effective surplus of approximately 969 spaces available on campus. Therefore, there are opportunities to lose some parking spaces to campus development projects without adding any supply. However, there will need to be some adjustments to parking allocations and management strategies to encourage the efficient use of available parking supplies.

In order to address parking demands related to future campus development projects, the following methodology is recommended:

1. The first step in planning for future parking needs is to determine typical parking demands. This is usually achieved by completing a campus parking supply and demand survey.

2. Determine how parking demand for the proposed development(s) will impact parking supplies during the period of greatest parking demand.

3. Determine how the development will impact existing conditions. If the development creates a parking deficit within the area it is located, additional parking supplies and/or demand strategies may be necessary.

4. While the parking demand for many land uses can be spread over greater distances, the creation of residential buildings should include sufficient, relatively adjacent parking.

5. Future developments should include sufficient ADA accessible parking accommodations.

6. It is important to provide adequate timeframes when planning for future parking needs. It can take between 18 and 24 months to design and construct a parking facility.

Summary Parking and Transportation Action Plan

The following is the action plan for implementing the recommendations in this report. Improvement recommendations include parking operations and management improvements, user group allocation adjustments, signage and wayfinding improvements, and alternatives for implementing transportation demand management programs. Improvement alternatives are detailed in Section 4.0 of the report.

Recommended Short-Term Improvements

1. Using the principles included in this report as a starting point, develop and approve a set of campus parking and transportation guiding principles.

2. Finalize recommended parking allocation adjustments and prepare for implementation in the 2012-2013 academic year. These adjustments include:

   a. Formalizing policies for off-campus faculty and staff to include:

      i. Regular campus permits for off-campus faculty and staff that need frequent access to campus.

      ii. Issuing transferable main campus parking passes to departments located off-campus that can be used by faculty and staff that need access to campus less frequently.

      iii. No main campus parking privileges for off-campus faculty and staff that do not need to travel to campus.

   b. Discontinuing the policy of allowing faculty and staff to park at campus parking meters for free.

   c. Discontinuing the practice of providing unlimited parking permits to faculty and staff. Instead, offer transferable parking permits that can be moved between vehicles.

   d. Implementing a lot-specific parking allocation system for graduate, commuter, and resident students. This would involve offering three tiers of options:

      i. Tier One – Core campus parking lots (Lots 5 and 9).

      ii. Tier Two – Resident and intermediate lots (e.g., Lots 26, 32, and 34).

      iii. Tier Three – Perimeter parking lots (Lots 22, 23, and 24).

   e. Reconsidering the current gender-based assignment policy for resident parking.

f. Improving the availability of campus visitor parking using the following strategies:

   i. Faculty, staff, and students should be discouraged from using visitor parking spaces to the greatest extent possible. This will help provide more visitor parking for weekday meetings and events.

   ii. Change the operating methodology of Lot 27 from pay-on-entry to traditional exit cashiering. This will help provide more visitor parking for weekday meetings and events.

   iii. Schedule large events/meetings during off-peak periods of parking demand when feasible.

   iv. Provide one or two loading zone spaces adjacent to event/meeting venues.

   v. Provide a small number of parking spaces (10 to 20 spaces) for Wadsworth Hall events/meetings.

   vi. Ensure sufficient ADA accessible parking is provided for visitors.

3. Improve the financial performance of the parking system by implementing the following strategies prior to the start of the 2012-2013 academic year.

   a. Set policies for rate increases and pay parking implementations:

      i. Implement pay parking for faculty and staff. Set the initial rate at $120 per year, allowing staff to pay small amounts each paycheck.

      ii. Create a tiered pricing structure for commuter student parking. Prices would range from $50 to $150 per year initially.

      iii. Implement pay parking for resident students. Set the initial rate at $100 per year.

      iv. Increase visitor and special event parking rates/fees to achieve a 50% increase in revenues.

      v. Improve enforcement collections from 68% to 85% within two years.

      vi. Increase parking fees/fines each year at a rate higher than expense increases until the system is self-supporting.

   b. Ensure special event parking rates and fees cover parking system direct and indirect costs.

   c. Select and then implement citation collection improvement strategies.

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4. Begin the development of a single transportation and parking management organization (TPMO). This would include:

   a. Hiring (or transferring) sufficient staff to operate and management the parking and transportation system. This includes:

      i. Parking and Transportation Manger (full-time)
      ii. Parking and Transportation Administrative Assistant (part-time)
      iii. Parking Office Cashiers (up to two, full-time)
      iv. Parking Enforcement Administrative Assistant (Full-time)
      v. Parking Appeals Officer (part-time)
      vi. Student Enforcement Officers (part-time, transfer staff if applicable)

   b. Developing and purchasing uniforms for all parking enforcement field staff.

   c. Finding suitable office space in or near the campus core.

   d. Updating all parking and transportation related policies, procedures, and processes to prepare for the transfer to the TPMO.

   e. Transferring all parking-related operations and management responsibilities to the designate TPMO (the initial TPMO is the Department of Public Safety and Police Services).

5. As necessary, replace outdated/malfunctioning parking access control gates in core parking lots.

6. Develop and approve parking permit renewal policies for all appropriate user groups in preparation of the 2012-2013 academic year.

7. Begin investigating options to provide a cost effective campus shuttle service between the SDC and the MUB. This would include outsourcing the service to an approved service provider.

8. Work to improve the utilization of certain parking lots, such as Lots 5, 8, and the perimeter parking areas.

9. Remove the ADA accessible parking in Lot 9 and add necessary ADA spaces in more appropriate lots.

10. Make the unimproved parking area north of the SDC building an official parking area and install permit required signage.

11. Ensure campus parking-related signage provides consistent messages concerning enforcement and hours of operation.

12. Update parking and transportation related marketing materials and improve the amount of information available on the university website.

13. Set standards and methodologies for the collection and tracking of parking occupancy and enforcement statistics.

14. Conduct safety and security inspections of all campus parking lots.

Recommended Mid-Term Improvements

1. Investigate and purchase a new parking enforcement and permit control system.

2. Investigate opportunities to centralize the control and management of the parking access control system.

3. Consider upgrading the access control system to include RFID tags and readers instead of magnetic stripe cards.

4. Consider removing single-space parking meters from campus in favor of multi-space meters.

5. Develop new marketing and communications materials/strategies to better inform and engage the campus community.

6. Consider implementing Transportation Demand Management (TDM) strategies to reduce parking needs, minimize campus traffic, mitigate future parking construction needs, and minimizing the environmental impacts of vehicle usage.

7. Research and implement strategies for reducing parking-related traffic on campus.

8. Consider installing emergency call boxes with appropriate identification signage in perimeter parking lots.

Recommended Long-Term Improvements

1. Adjust campus parking allocations to meet changing demands.

2. Consider expanding the campus CCTV system to include campus parking lots (especially those on the perimeter of campus).

3. Develop additional parking supplies if available parking surpluses will be exhausted.

4. Adjust parking and transportation operations and management to address changing campus needs.

1.0   INTRODUCTION

1.01.   Study Purpose and Approach

A parking task force at Michigan Technological University (Michigan Tech) was formed during the fall of 2009 to evaluate current parking registration and enforcement systems. The task force met regularly during the fall and spring semesters and made a final presentation of recommendations in March 2010. The parking system review process included input from the campus community solicited through a number of avenues, including a Campus Open Forum in March 2010. The task force evaluated a variety of components of the campus parking system and the management of campus parking resources.

The primary objectives of this project are as follows:

- Assess current and future parking supply and demand to develop a comprehensive Campus Transportation and Parking Plan.

- Develop strategies for effectively addressing varying user group needs (e.g., students, faculty, staff, daily visitors, event attendees, and other groups designated by the university).

- Review on-campus transit services and evaluate possible improvements to improve efficiency and effectiveness.

- Develop Transportation Demand Management strategies to reduce parking demand.

- Develop improved parking operations and management strategies that incorporate recommended best practices.

- Introduce and evaluate new parking technologies applicable to the Houghton campus environment.

- Develop alternatives for increasing parking supplies (if needed) and provide guidance on sustainable parking facility design and parking system management.

- Develop an implementable action plan for recommended parking and transportation improvements.

The overall approach to this project is to build upon the previous work of the task force by incorporating and expanding appropriate recommendations and strategies. This report addresses significant issues identified in previous planning efforts, as well as provides additional recommendations based on industry best practices and previous parking management experience. The primary focus is on providing pragmatic recommendations that will improve parking and transportation system operations and management, as well as prepare the university for addressing future parking and transportation needs.

1.02. Scope of Services

The three phase process used to develop this Transportation and Parking Plan for Michigan Tech University is summarized below.

Phase 1 – Review of Current Conditions

Task 1: Submit Initial Request for Information

    Review current system information and data

    Review current parking and transportation policies and procedures

Task 2: Multi-day Campus Visit

    Project team meeting

    Field work – Review existing conditions

    Preliminary Stakeholder Input Meetings

Phase 1 Summary Assessment Report and Conference Call

Phase 2 – Projection of Future Needs and Alternatives Analysis

Task 1: Projection of Future Needs

    Review projections of future conditions:

        Campus development projects

        Changes in campus populations

        Changes in programs and services

    Estimate future campus parking demands

    Determine future parking adequacies

    Phase 2 – Task 1 Summary Future Adequacy Assessment and Conference Call

Task 2: Transportation and Parking Alternatives Analysis

    Provide opportunities to maximize efficiency of available resources

    Provide operations and management improvements

    Provide opportunities to reduce parking needs through enhanced TDM strategies

    Develop recommendations to expand parking supplies

Phase 2 – Summary of Recommendations and Conference Call

Phase 3 – Draft and Final Plans

Compile draft transportation and parking plan

    Draft plan will include:

        Assessment of current conditions

        Project of future conditions

        Recommendations for addressing future needs

        Recommended implementation action plan

    Review draft plan with project team via conference call

    Conduct draft plan review for campus community

    Update draft and submit final plan

    Submit final plan and conduct final presentation

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2.0   ASSESSMENT OF CURRENT CONDITIONS

2.01.   Summary of the Campus Environment

The combination of topography, existing roadway alignments, and Portage Lake has significantly influenced the campus form; creating two distinct parts of campus. The lower campus and historic portion of the university is nestled between the lake and a significant hillside. In addition, US Highway 41 runs along the bottom of the hillside further confining the campus. The Student Development Center (SDC), health services, forestry building, athletic fields, and recreational facilities are located in the upper campus at or near the top of the hillside.   These geographic influences also have many direct impacts on the transportation and parking systems. For example, during typical weekdays many of the parking spaces in the upper campus are unoccupied while demand for parking in the lower campus is very strong. Understandably, the relatively long walk up the hillside renders the usually available parking spaces on the upper campus undesirable.

Currently there is no shuttle transportation service between the lower campus and the upper campus. However, a shuttle bus service is provided for residents of the Daniell Heights student apartments and the lower campus.

Because the lower campus is geographically constrained, presumably making expansion more costly, some administrative functions have been relocated to off-campus locations. Some university personnel are currently assigned to the Lakeshore Building in Downtown Houghton and the Citizens Bank Building in Downtown Hancock, as well as other off-campus buildings. Some of these off-campus employees must visit campus as part of their work responsibilities. In addition, students and faculty/staff must occasionally visit these remote locations.

An existing bicycle/pedestrian path is located along the Portage Lake shoreline connecting Downtown Houghton with the campus and points east. However, a significant elevation difference exists between the path and main portion of campus.   To minimize the elevation differences, much of the campus-bound pedestrian and bicycle traffic is concentrated along the US Highway 41 corridor.

Campus Populations

Current university enrollments are shown in the following graphic (from the university media kit):

Enrollment	Enrollment† (Fall 2010 Preliminary)	Percent of Total Enrollment
Total enrollment	6,957	—
Graduate (nondegree / master's / doctoral / total)	70 / 664 / 507 / 1,241	17.8
New undergraduate students (freshmen and transfers)	1,346	19.3
College of Engineering	3,977	57.2
College of Sciences and Arts	1,704	24.5
School of Business and Economics	469	6.7
School of Technology	365	5.2
School of Forest Resources and Environmental Science	275	4.0
Other (no college designated / Extended University Program)	167	2.4
Residents of Michigan	4,578	65.8
Nonresidents	1,389	20.0
International	990	14.2
†All enrollment numbers include online learning (40).		

Future plans for the university do not include significant growth in the total number of enrolled students. However, the percentage of graduate students is expected to increase slightly in the future with a corresponding decrease in the percentage of undergraduate students.

The current number of university employees is shown below. No significant growth is anticipated in the future.

Employees (October 1, 2009)**	
Number of faculty*	464
Number of staff	1,245
Total nonstudent employees	1,709

*Includes all tenured, tenure-track, non-tenure track instructional (447) and research (17) faculty. Also includes those faculty on sabbatical (10), faculty on unpaid leave of absence (2), visiting faculty (11). Deans (7), associate deans (3), department chairs (18), executives, and professional staff with tenure (6), are included in staff figures.
**October 1, 2009 data is most recent available information on Employees.

Current Campus Development Plans

Like many university campuses, a variety of campus plans and planning studies have been conducted over time. Some of the completed studies have had a broad focus while others were very specific in nature, including parking supply and demand studies.

The most recent campus master plan that was reviewed was the "Fresh Look" Scenarios Report prepared by HGA in December 2006. The "Fresh Look" Report presents a

comprehensive analysis of the university campus and provides a concept plan for the future.

The concept plan for the campus identifies welcome nodes/landmarks on the east and west ends of the campus and strengthens the pedestrian nature of the academic core. Some of the on-street parking at the west end of campus is eliminated to help extend the pedestrian oriented core and enhance the aesthetics of the western gateway to campus. The concept plan also reconfigures the surface parking lots along Highway 41 near the Memorial Union Building (MUB) and the existing Administration building. In addition, the concept plan proposes locations of new surface parking lots and a parking structure north of the Rosza Center. The "Fresh Look" concept plan also includes new pedestrian oriented areas on the campus and new buildings located, in some cases, on existing surface parking lots. The following graphics present the overall concept plan prepared by HGA and a detail of the concept plan with the proposed new parking facilities highlighted.

concept plan
DECEMBER 2006

MTU
MICHIGAN TECH UNIVERSITY
CAMPUS MASTER PLAN

key

a academic research lab
b graduate research
c future building site
d memorial union addition
e CIL II (business school)
f housing
g parking structure
h surface parking
i rec / park building
j alumni / foundation house
k grounds and maintenance
   major destination
   campus entry / visual arrival
   campus story (tech walk)
   framework elements (telling devices)

campus story - tech walk

establish pedestrian connections
between the housing precinct and
the academic core
(elevated or tunneled)

formal drop-off and visual connection
to lake front from rczsa lobby

recreation center along waters
edge connection to the region)

residential housing quads
(social recreation opportunities)

convert parking to open space
(recreation and park and space)
and establish the alumni /
foundation housing at campus
perimeter to enhance the
campus entry experience

20 min walk

see inset options

10 min walk

open space recreation
along lake front

arrival
experience

internal campus roadway uniting
administration, memorial union, and
library - enhancing the sense of arrival
(campus red carpet)

physical and visual connection
from water to bluff - providing
MTU with a legacy of connectedness
to the geographic region

typology unity (unified campus
of diverse parts) - sharing of
architectural elements to function
cohesively

physical unification of the campus
through pedestrian trails / corridors
connecting sporting events and
recreation opportunities with
the campus core

0 150 300 500

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The concept plan in the "Fresh Look" Scenarios Report includes two optional configurations for the campus. Option B moves the pedestrian spine of the academic core north of the Rosza Center and shifts the location of the potential parking structure to the east of the Rosza Center. Option C proposes a rerouting of Highway 41 to the existing alignment of Cliff Drive and presents several other locations of potential parking structures. The concept plan also recommends the consideration of including parking structures within new campus building developments.

Existing Transit Services

The City of Houghton currently provides a shuttle transit service within the community called the Houghton Motor Transit Line. The system provides two types of public transit service: 1) fixed route service on the Downtowner and Daniell Heights routes, and 2) an on demand, curb-to-curb service.

The route map and schedule for the Downtowner Route is shown on the next page.

Downtowner Route Schedule:
1 hour route, time is shown in minutes after the hour.
All times are approximate.

	Location	Time		Location	Time		Location	Time
❶	Memorial Union	:05	❽	City Center	:27	⓯	Arbor Green	:47
❷	SDC	:07	❾	Lode Theater	:28	⓰	Heritage Manor	:49
❸	Heights	:09	❿	Econo Foods	:34	⓱	Memorial Union	:52
❹	Memorial Union	:15	⓫	Shopko	:35			
❺	SDC	:18	⓬	Copper Country Mall	:38			
❻	Arbor Green	:23	⓭	Walmart	:40			
❼	Heritage Manor	:25	⓮	Blockbuster Area	:43			

The Downtowner route operates Monday through Friday from 10:00 a.m. to 5:00 p.m. Currently, the cost to ride the Downtowner Route is $2.00 for adults. Students, senior citizens, and children are offered a discounted rate of $1.00.

The Houghton Motor Transit Line also operates the Daniell Heights shuttle service on a contract basis. The Daniell Heights shuttle operates Monday through Friday From 7:00 a.m. through 10:00 p.m. and one additional run at 5:00 p.m. The Daniell Heights shuttle service is provided to students free of charge.

The on-demand transit services provided by the Houghton Motor Transit Line are as follows:

Day Demand Services
Monday - Friday, 7:00AM - 5:00PM
The cost for a one-way trip **within** the city limits:
$5.00 for adults.
$3.00 for Students.
$2.50 Senior Citizens 55 and older
$2.50 Children 12 and under.

The cost for a one-way trip outside the city limits:
$6.00 for adults.
$4.00 for Students.
$3.00 Senior Citizens 55 and older
$3.00 Children 12 and under.

Evening Demand Services

Monday - Sunday, 5:00 PM - 11:00PM
Curb to curb service is provided while MTU is in session, within Houghton City Limits. Buses are equipped with a wheelchair lift. We now go to Lot R and Mont Ripley at night.

The cost for a one-way trip **within** the city limits: $2.00/ride.

Bicycle Accommodations

In 2007, the City of Houghton developed a bicycle plan. The bicycle plan documented existing bicycle routes and paths, and identified necessary improvements needed throughout the community. The goal was to improve accommodations in order to increase the use of bicycles as a viable means of transportation. The vision statement for the city as presented in the bicycle plan was:

> "The vision of the City of Houghton is to create, through the assistance of this plan, a bicycle-friendly city where bicycling is an easy, safe and convenient form of transportation and recreation for people of all ages and bicycling abilities."

Michigan Tech Trails

Legend
— Bike Lane
— Bike Sidewalk
— Shared Use Path
---- Proposed Improvement Lane
---- Proposed Improvement Sidewalk
---- Proposed Improvement Path
---- Proposed Improvement Signed Shared Road

Members of campus community were included on the task force that helped prepare the plan. The plan recognized the importance of including the campus in its planning process. The portion of the existing and proposed Bicycle Network nearest campus is shown in the graphic on the previous page. The

portion of the network near the campus includes a proposed shared roadway along Cliff Drive and Woodmar Avenue / 7th Avenue. An extension of the sidewalk, as a bicycle friendly facility, is proposed along the east side of MacInnes Drive. The proposed bicycle network includes new connections from the Lakeshore path up to the campus.

In 2010 the City of Houghton was recognized as a 'Bicycle Friendly Community' by the League of American Bicyclists. The League of American Bicyclists recently published their inaugural list of 'Bicycle Friendly Universities.' Michigan Tech did not submit an application for the initial list. However, applying in the future could be worthwhile and any of the needed enhancements will help improve the campus transportation system.

During our initial trip to campus, a cluster of bicycle lockers was noted near the Chemical Sciences Building. However, it is not known at this time how well the lockers are used by bicyclists or if they are used more frequently for storing other materials/items (e.g., snowmobile gear).

Clearly, the community recognizes that bicycling as a viable means of transportation. The university has recently added bicycle racks on campus and commuter bicycles are available for rent from the university's Outdoor Adventure Program. The Michigan Tech Transportation and Parking Plan should include continuing improvements to bicycle accommodations.

Pedestrian Accommodations

Topography and Highway 41 significantly impact the pedestrian routes to and through campus. Pedestrian routes are a very important component of any university's transportation system. Enhancing pedestrian routes to and through campus will be very beneficial to the quality of life on the MTU campus. MTU should continue to work with the City of Houghton and the Michigan Department of Transportation (MDOT) to ensure that sidewalks and cross walks (particularly along Highway 41) are improved and maintained to accommodate the pedestrian activity generated by the university.

Conversations during our initial project trip indicated that the pedestrian routes to campus are sometimes neglected and are not promptly cleared of snow.   In addition, most of the side streets do not have sidewalks – resulting in pedestrians walking in the roadway. The College Avenue right-of-way is a primary pedestrian route to campus from the off-campus housing neighborhoods west of campus. There are sidewalks on both sides of the roadway immediately adjacent to the curb lines.

2.02.   Parking Supply and Demand

The following information provides *Carl Walker's* analysis of current parking supply and demand conditions at Michigan Tech.

2.02.1   Current Campus Parking Supply

The following graphic shows the location of existing campus parking lots as presented in the campus parking map. Table 1 on the next page presents a tabulation of the existing campus parking supply.
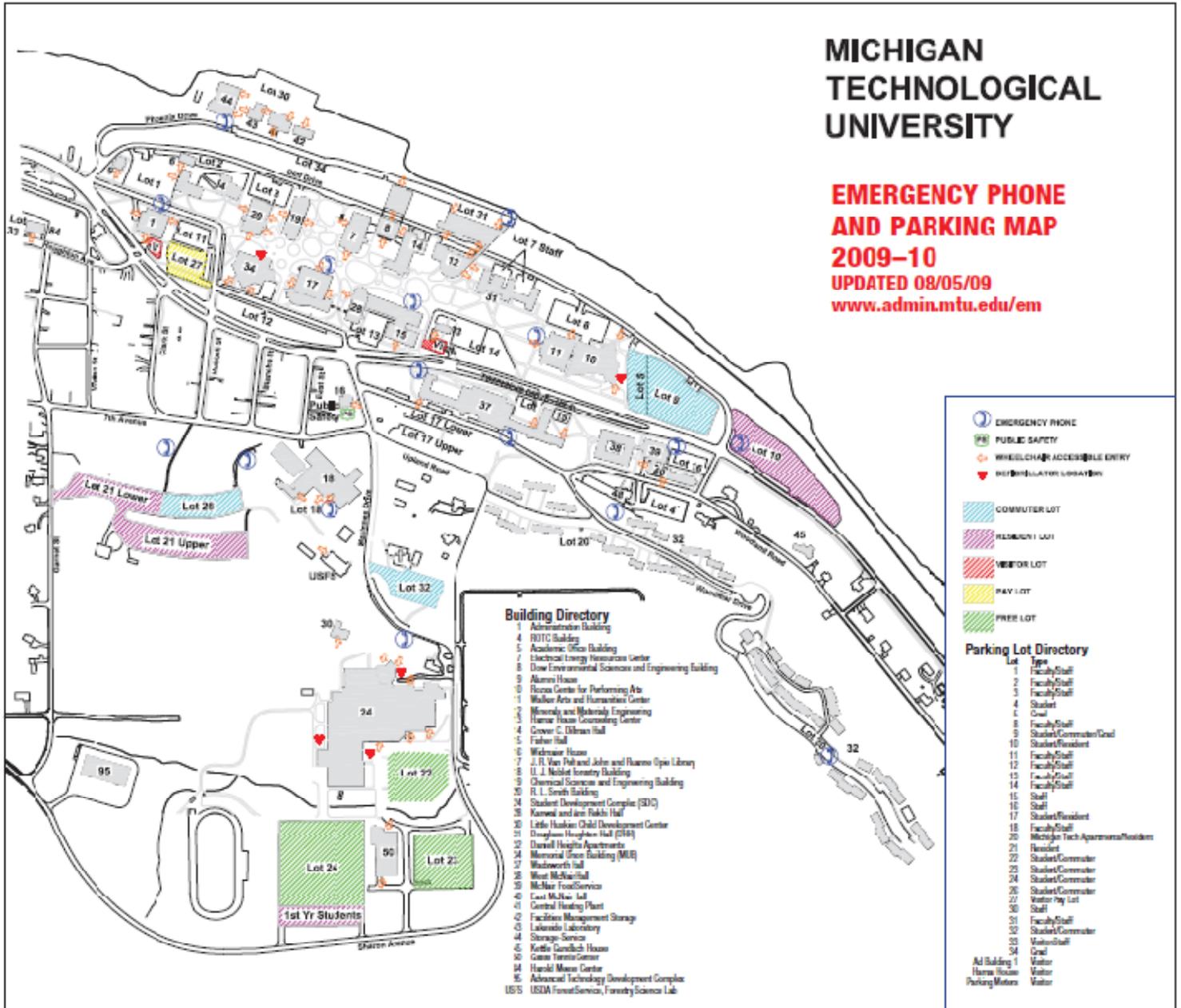
Table 1 – Existing Parking Supply

Lot Number	User Group	Total Capacity	Lot Number	User Group	Total Capacity
1	Faculty / Staff	154			
2	Faculty / Staff	36	27	Visitor - Pay	87
3	Faculty / Staff	73	33	Visitor / Staff	37
8	Faculty / Staff	97	95	Visitor / Staff	83
11	Faculty / Staff	62	Visitor - Admin.	Visitor	12
12	Faculty / Staff	108	Visitor - Hamar	Visitor	19
13	Faculty / Staff	37			
14	Faculty / Staff	59		**Subtotal Visitors**	**238**
18	Faculty / Staff	62			
31	Faculty / Staff	124		**TOTAL OFF-STREET**	**4,012**
7E	Staff	18			
7W	Staff	14		College Ave. - Meters	42
15E	Staff	26		Hubbell St. - Meters	32
15W	Staff	43		Houghton Ave. - Meters	67
16	Staff	35		Cliff Dr. - Meters	14
				Union / Library Circle	4
	Subtotal Faculty & Staff	**948**			
				TOTAL ON-STREET	**159**
5	Graduate Student	118			
34	Graduate Student	48		**TOTAL CAMPUS**	**4,171**
4	Student	64			
22	Student / Commuter	201			
23	Student / Commuter	254			
24	Student / Commuter	727			
26	Student / Commuter	215			
32	Student / Commuter	167			
9	Student / Commuter / Graduate	192			
10	Student / Resident	253			
17U	Student / Resident	98			
17L	Student / Resident	67			
21	Resident	422			
	Subtotal Students	**2,826**			

There are currently 4,171 parking spaces on the Michigan Tech campus. This total does not include parking spaces for service vehicles, police vehicles, delivery vehicles, Portage Health, or unimproved parking areas north of the SDC. In 2000, *Carl Walker, Inc.* prepared a parking study for the Michigan Tech campus. At the time of that study there were 4,382 spaces recorded in the campus inventory. The current inventory represents a loss of approximately 211 parking spaces. It is common for the inventory of parking spaces to fluctuate on a university campus

due to new developments or other campus changes. Construction projects, even very minor projects, can remove spaces from the supply. Spaces may be temporarily unavailable due to construction staging or maintenance projects. New parking facilities are created and some parking facilities inevitably are reconfigured for better circulation or access control.   Other facilities are reconfigured to accommodate other campus amenities. For example, Lot 14 was reduced in size to construct the broomball courts.

2.02.2   Current Campus Parking Demand

The scope of services to develop this plan did not include extensive data collection and documentation of current occupancy levels. Hourly parking occupancy data was collected during the 2000 parking study. At that time the entire campus had a daily average parking occupancy of about 68%. The peak parking occupancy for the entire campus was 78%.   However, if the spaces at the SDC, and the vehicles parked at the SDC, were removed from 2000 calculations, the average occupancy was 84% with a peak occupancy of about 95%.

To confirm the current utilization levels a "snapshot" occupancy survey was conducted between 10:00 a.m. and Noon on Wednesday, March 23, 2011. The results of that survey are presented in Table 2 (next page).

The occupancy levels observed on March 23, 2011 were very similar to the daily averages documented in the 2000 parking study (68% in 2000 vs. 67% in 2011 for the entire campus and 84% in 2000 vs. 88% in 2011 without the SDC lots). Based upon input received during the on-site meetings and our observations during our initial multi-day site visit these occupancy levels appear typical.

During the "snapshot" occupancy survey, as many as nine vehicles were observed waiting in queue to enter Lot 9 (see adjacent graphic). If these vehicles were actually parked in a campus parking lot the occupancy levels would have been slightly higher. The queued vehicles were waiting for vehicles to exit lot; vehicles can enter only if an empty legal space is available. Apparently, the queue occurs frequently during peak periods and is another indicator of the high demand for convenient parking spaces on the lower campus.

Table 2 – Snapshot Parking Occupancy Survey

Lot Number	User Group	Total Capacity	3/23/11 Observed Occupancy	% Occupied		Lot Number	User Group	Total Capacity	3/23/11 Observed Occupancy	% Occupied
1	Faculty / Staff	154	114	74%		27	Visitor - Pay	87	85	98%
2	Faculty / Staff	36	37	103%		33	Visitor / Staff	37	29	78%
3	Faculty / Staff	73	66	90%		95	Visitor / Staff	83	17	20%
8	Faculty / Staff	97	53	55%		Visitor - Admin.	Visitor	12	8	67%
11	Faculty / Staff	62	52	84%		Visitor - Hamar	Visitor	19	14	74%
12	Faculty / Staff	108	96	89%						
13	Faculty / Staff	37	38	103%		**Subtotal Visitors**		**238**	**153**	**64%**
14	Faculty / Staff	59	56	95%						
18	Faculty / Staff	62	76	123%		**TOTAL OFF-STREET**		**4,012**	**2,628**	**66%**
31	Faculty / Staff	124	121	98%						
						College Ave. - Meters		42	40	95%
7E	Staff	18	15	83%		Hubbell St. - Meters		32	32	100%
7W	Staff	14	15	107%		Houghton Ave. - Meters		67	67	100%
15E	Staff	26	26	100%		Cliff Dr. - Meters		14	14	100%
15W	Staff	43	39	91%		Union / Library Circle		4	4	100%
16	Staff	35	18	51%						
	Subtotal Faculty & Staff	**948**	**822**	**87%**		**TOTAL ON-STREET**		**159**	**157**	**99%**
5	Graduate Student	118	66	56%		**TOTAL CAMPUS**		**4,171**	**2,785**	**67%**
34	Graduate Student	48	29	60%						
						CAMPUS WITHOUT SDC LOTS		**2,989**	**2,618**	**88%**
4	Student	64	55	86%		(Lots 22, 23, 24)				
22	Student / Commuter	201	122	61%
23	Student / Commuter	254	8	3%
24	Student / Commuter	727	37	5%
26	Student / Commuter	215	160	74%
32	Student / Commuter	167	170	102%
9	Student / Commuter / Graduate	192	192	100%
10	Student / Resident	253	253	100%
17U	Student / Resident	98	97	99%
17L	Student / Resident	67	67	100%
21	Resident	422	397	94%
	Subtotal Students	**2,826**	**1,653**	**58%**
Subtotal Students Without SDC Lots		**1,644**	**1,486**	**90%**
(Lots 22, 23, 24)				

2.02.3   Current Campus Parking Adequacy

In determining the current parking adequacy for a study area, it can be important to adjust the observed conditions using two concepts: Effective Supply and Design Day Conditions. When a parking area's occupancy reaches 85-95% of the total capacity, depending on the user group, the area becomes effectively full. When parking lot occupancy exceeds effective capacity, users become frustrated as it becomes increasingly difficult to find an available parking space. Users will begin to either park illegally in the lot or leave the lot altogether and search for parking elsewhere. Given the current user groups, the accepted effective fill percentage for parking on campus is set at 90%. This 10% "cushion" of spaces is used to accommodate parking lost temporarily due to construction, improper or illegal parking, or snow impacts, as well as provide for shorter searches for available parking.

Design day parking conditions attempt to represent typical peak activity that may be exceeded only occasionally during the year. Due to the limited nature of the occupancy study for this project, specific demand day adjustments cannot be calculated. However, based on conversations with the university and available historical data, an estimated design day adjustment may not be necessary to better reflect parking conditions. It appears that the occupancy survey that was conducted provided an adequate "snapshot" of parking conditions during a typical parking period.

During the period of observed parking occupancy, 110% of the total effective on-street parking supply, 73% of the total effective off-street parking supply (including SDC lots), and 74% of the total effective campus parking supply was utilized. Excluding the SDC lots, 97% of the total effective parking supply was utilized. Essentially, the core campus parking supply (parking located between US 41 and Cliff Drive) is currently effectively full. Any changes in future parking supplies or demands will need to be addressed by reducing parking demands (e.g., encouraging the use of alternative forms of transportation), encouraging the use of parking on the south side of campus, and/or constructing additional parking facilities in the campus core.

2.03.   Parking Operations and Management – Strengths and Weaknesses

This section details the significant strengths and weakness of the current campus parking and transportation system. These strengths and weaknesses were identified during *Carl Walker's* review of the information submitted in response to our initial request for information, our on-site evaluation of current campus parking conditions, and our meetings with various campus stakeholders.

Within each category, the information is presented in order of priority/significance based on *Carl Walker's* professional judgment, our experience operating and managing parking in similar environments, and on the experience gained from our other university parking and transportation planning efforts.

2.03.1   General Parking Operations and Management

Campus parking is currently operated and managed by several university departments. University departments that are currently involved in parking operations and/or management include:

- **Registrar's Office** – Provides vehicle registration and permit sales services for students.

- **Housing Facilities Office** – Provides vehicle registration and permit sales services for resident students (excluding Daniell Heights).

- **Daniell Heights Housing Office** – Provides vehicle registration and permit sales services for Daniell Heights resident students.

- **Department of Public Safety and Police Services** – Provides vehicle registration and permit sales services for faculty, staff, and campus visitors. Also provides parking enforcement for all campus parking lots/spaces and parking meter collection and repair services.

Strengths:

The University has Created a Campus Parking Task Force – Involving many different campus stakeholders, the Campus Parking Task Force was tasked with reviewing and evaluating the campus parking system. The task force reviewed parking supplies, allocation strategies, lot controls, registration processes, and enforcement policies/procedures. Based on their review, several improvements have already been implemented.

Parking Lots Appear to be in Relatively Good Condition – With the exception of Lot 10, and instances of parking surface cracking, most parking lots appear to be in relatively good condition (especially given the climate). Parking stall lines were clearly visible in most parking lots.

Weaknesses:

The Parking System is Not Self-Supporting – According to information provided by the Campus Parking Task Force, the current campus parking system operates at an annual deficit of approximately $450,000. This means there are fewer resources available for improving campus parking conditions, implementing new transportation demand management strategies, developing alternatives for encouraging the use of alternative forms of transportation, or constructing additional parking facilities.

Parking Management is Not Managed by a Single Department/Unit – Since parking is not managed by a single university department, the management and operation of the system can become uneven. For example:

- certain inefficiencies can occur between managing departments (e.g., duplication of efforts, products, services, and systems);

- parking enforcement could be more strict in certain areas and less strict in others;

- parking permit prices can be different without associated differences in the levels of service offered;

- parking facility maintenance could be different from lot to lot;

- the support of alternative forms of transportation can vary between managing departments;

- parking marketing and communications can vary from department to department;

- parking policies and procedures can vary between managing units; and,

- parking operations and management priorities can be different depending on the department managing the parking.

Insufficient Staff is Currently Dedicated to Parking and Transportation Management – Currently, campus parking operations and management is essentially a part-time job for many of those involved. With the exception of the campus parking enforcement officer and the student enforcement staff, parking operations and management is just one part of the overall job duties for each person involved in parking. This can result in slow responses to certain requests for service and a slow pace of change and improvement implementation.

The University does not have a Set of Defined Guiding Principles – It can be difficult to determine appropriate parking and transportation strategies when there are no basic guiding principles from which to start. A statement of operating guidelines or principles is a worthwhile effort for any enterprise, but it seems especially useful for parking systems. Given the diverse base of customers that parking operations serve, defining operating philosophies and service parameters can help keep the operation focused on set goals and objectives. Parking principles are not intended to replace traditional policies and procedures. Usually, the parking principles should be kept short and concise, a maximum of one or two typed pages.

Parking and Transportation Management is Not Managed as a Single Unit/Service – Ideally, parking and transportation is managed as a single unit so that the priorities of each service remain in alignment with larger university goals and objectives. In situations where these services are not managed together, differences between the service philosophies can result in strategies that operate at cross purposes. While the system is not managed as a single unit, the university has taken steps to consolidate some responsibilities (e.g., encouraging all parkers to purchase their parking permits through Public Safety and consolidating parking enforcement).

2.03.2   Parking User Allocations

Parking at Michigan Tech is currently allocated in a similar fashion to most university campuses. Core parking areas are allocated to campus faculty, staff, and visitors, parking near residential housing is reserved for resident students, and parking located on the perimeter of campus is allocated to commuter students. Campus commuter student parking is further delineated between undergraduate and graduate students (Lots 5 and 34).

Strengths:

The Current Allocation Methodology is Very Flexible – The current allocation strategy provides a great deal of flexibility to both faculty/staff and students. Parkers are able to select from a number of parking locations on campus, with at least the chance to select parking closest to their desired destination. The current allocation strategy also provides faculty and staff members located off-campus with the same parking choices as those working on-campus.

The Current Allocation Structure is Easy to Understand – With only five primary user designations (faculty/staff, visitor, resident, graduate commuter, and undergraduate commuter), the current allocation strategy is simple to understand, explain, and administer.

The Flexibility of the Current Allocation Strategy Mitigates Concerns about too many Permits being Assigned to One Lot – The current allocation strategy allows the university to issue a greater number of parking permits to the major user groups without worries of over-assigned specific lots.

Faculty and Staff are Able to Park in the Campus Core – Faculty and staff parking is relatively convenient, and no faculty or staff parking is located a significant distance from most desired destinations.

Many Resident Students are able to Park Near Their Residences – Most of the campus residential buildings have resident parking adjacent to the buildings, and the parking is reserved for resident students. This allocation can dramatically improve the level of service provided to resident students and help make residential housing more appealing. The most notable exception to this is the parking provided in Lot 21.

Weaknesses:

The Flexibility of the Current Allocation Strategy can Negatively Impact the Predictability of Parking – While a strength of the current allocation strategy is its flexibility, it comes with a price. Since parking permit holders can park in a number of locations, parking lots close to the campus core tend to fill quickly. Parking permit holders are not guaranteed parking in any specific campus parking lot. This means that parking in a specific area may or may not be available depending on the time of day a person tries to park. This can lead to increased confusion, frustration, and campus vehicle traffic.

The Flexibility of the Current Allocation Strategy can Negatively Impact Campus Traffic Conditions – As parkers are able to search for parking in a number of locations, campus traffic volumes can increase. For example, a parker may select a parking lot adjacent to their primary destination first. Upon arriving to the lot, they may find that all of the parking spaces are occupied. Then, they will exit the lot to search for parking elsewhere. Campus vehicle traffic would be minimized if all parkers were able to park in their designated lot without having to search for parking among several choices.

The Flexibility of the Current Commuter Student Allocation Strategy can Negatively Impact Campus Traffic Conditions on Cliff Drive – The commuter student parking permit provides students with the option to search for parking among the various commuter student lots on campus. Naturally many students select Lot 9 due to its proximity to the campus core. However, Lot 9 cannot accommodate commuter student demand (the lot fills on a fairly regular basis). The access control system for Lot 9 will close the lot once it fills, forcing some students to decide to wait in the entry lane or on Cliff Drive until spaces become available. This creates an unsafe condition at the Lot 9 entry/exit point.

The Operation and Management of the Visitor Parking Allocation Results in a Lack of Available Parking Spaces for Visitors – Michigan Tech currently provides visitor parking in a number of areas on campus, including on-street metered parking, a pay-on-entry visitor parking lot, and a small visitor parking lot in front of the Administration Building (permit controlled). However, most of the visitor parking appears to be used by faculty, staff, and students. In some cases, the parking is used by faculty, staff, and students for extended periods of time. The use of visitor parking spaces by faculty, staff, and students creates a number of issues/concerns:

- It can be difficult for campus visitors, event attendees, alumni, and potential university donors to find parking on campus, as they cannot park

in permit parking areas.

- Allowing faculty and staff members to park for free at parking meters reduces the availability of parking for campus visitors and event attendees, as well as reduce parking system revenues.

- The lack of parking available for campus events (especially during weekdays) can negatively impact event attendance as well as the campus experience of those that do attend. Over time, this can result in fewer campus events as event planners move their events off-campus.

- As short-term parking spaces are occupied by longer-term faculty, staff, and student parkers, fewer spaces are available for necessary loading and unloading near campus core buildings.

The Climate and Topography of Campus Negatively Impacts the Use of Perimeter Parking – While the overall campus parking supply is more than adequate to meet current parking demands, the climate of the area and campus topography discourages the use of the parking lots located on the south side of campus (specifically Lots 23 and 24). Additional strategies will be necessary to encourage community members to park in these areas (shuttles, pricing differences, etc.).

Most Commuter Students are Unable to Park in Preferred Locations – While some commuter students are able to find parking in Lot 9, most are forced to park in less desirable locations. However, all students pay the same price for parking. Therefore, some students may perceive an unfair balance between the level of service provided and the price paid. This could lead to greater levels of dissatisfaction among student parking customers.

The Accessible Parking Spaces in Lot 9 Should be Relocated to a More Appropriate Area – While the provision of accessible parking is based on the parking count of each lot, it is usually allowed to provide the parking in a more convenient and better accessible location. Therefore, while the total accessible parking requirement should be based on individual lot counts, the accessible parking required due to the parking provided in Lot 9 should be relocated closer to the campus core. This would provide better accessible parking spaces for physically challenged students and more general commuter student spaces in Lot 9.

2.03.3   Parking Technologies and Lot Access

The university currently utilizes a number of parking access and enforcement technologies. Many of the core campus parking lots are access controlled using control gates, magnetic stripe cards and readers, and, in the case of Lot 9, a

space count control system and a lot full sign. The ages of the lot control equipment range from 2 to 20 years old. Due to the age of the equipment, service reliability can be poor and maintenance costs are increasing.

Some of the visitor parking supply is controlled using parking meters (both mechanical and electronic meters are utilized) and pay-on-entry equipment. The mechanical parking meters are outdated and in need of replacement in the near future. The pay-on-entry equipment in Lot 27 is also seriously outdated and in need of replacement.

Parking enforcement staff utilizes an outdated AutoCite system that is approximately 20 years old. This system still provides the necessary enforcement functions, but is not efficient. The current system is Windows 95 based, and requires a relatively high level of manual data entry and manipulation.

Strengths:

Many of the Campus Core Parking Lots are Gated – While equipment reliability can be spotty due to the equipment's age, control gates can help ensure only approved parkers can use their assigned lots. This helps minimize enforcement needs and costs, and helps provide a more predictable parking experience for permit holders.

Parking Revenue Controls are Utilized by the University – While some of the equipment is out of date (specifically the pay-on-entry machine and the mechanical parking meters), the university does utilize revenue controls for short-term and long-term visitor parking.

Weaknesses:

Most of the Parking Access and Revenue Control Technologies Used are Outdated and in Need of Replacement – Many of the parking control gates, the pay-on-entry machine, and the mechanical parking meters need to be replaced with modern parking access and revenue control equipment. This will improve the reliability of the equipment/systems, improve the amount of operations and management data available to the university, improve revenue control, and improve the products and services available to the campus community. New equipment could provide the following improved features/services:

- anti-passback capabilities to ensure access cards are not abused (e.g., using one card to allow multiple vehicles to park);

- improved parking occupancy and duration counts/data;

- parking revenue control reports that can be used in reconciliation processes;

- a new access control system could provide improved levels of access and product offerings (e.g., evening permits with controlled access and parking "debit" cards that provide set amounts of parking access by dollar value or days/times); and,

- more payment choices, such as being able to pay for daily parking with credit cards or university issued debit cards.

The Perimeters of Some Parking Lots are not Properly Secured – Some campus parking lots lack sufficient perimeter controls to ensure vehicles cannot enter the parking area without using the access control equipment. The lack of adequate perimeter controls negates the usefulness of the parking control gates, damages parking lot landscaping, and can lead to lost revenue.

The Current Parking Enforcement System is Outdated and in Need of Replacement – The current AutoCite system needs to be replaced to improve the efficiency and effectiveness of the parking enforcement program. A new parking enforcement and permit control system could seamlessly interconnect permit issuance, permit customer data, parking enforcement data, billing/invoicing, and payment processing in one system. Also, a new system (coupled with a unified parking management structure) could provide an opportunity to eliminate the issuance of handwritten parking citations.

Not all Campus Parking Lots are Gate Controlled – While many university parking systems do not use parking control gates, the lack of access controls increases the need for more costly parking enforcement. Control gates (when properly functioning and incorporating sufficient parking lot perimeter security) can help ensure the available parking supply is used only by designated user groups. Without gates, designated parking user groups can be inconvenienced when the available supply is improperly used by non-permit holders. To help reduce unauthorized use in a non-gate system, sufficient parking enforcement must be provided. This includes sufficient enforcement staff and equipment, ticket processing staff, parking citation appeals staff, adequate collections policies and procedures, etc.

Parking Lot Access can be Difficult for Snow Plows – Access control gates can make it difficult for snow plows to enter some of the campus parking lots due to narrow entry lanes. As snow is common during most of the regular academic year, this problem can be frequent.

2.03.4   Parking Signage and Wayfinding

Each campus parking lot is noted by a lot identification sign that denotes the lot number, permit color, intended user group(s), hours of operation, and restrictions. The campus parking map illustrates the location of each lot, but the lot colors shown on the map do not necessarily match the lot signage or parking permit colors.

Strengths:

Most Parking Signs are in Good Condition – Most of the campus parking lot signs are in good condition and easily visible. Messages are concise and easy to read while driving.

Parking Lot Sign Messages Convey Necessary Information – The parking lot signs include necessary parking information and do not include any extraneous messages. The colors used in the background of the intended user group text match current parking permit colors. Parking permit requirements and no parking timeframes are noted on each sign (when applicable). Some signs also included additional information on where to park if the lot was full.

Lots 9, 10, and 27 Include Lot Full Signs – While it is not clear if the lot full signs in Lots 10 and 27 currently work (*Carl Walker* staff did not see them active at anytime during the site visit), the sign in Lot 9 worked properly and provided sufficient notice when the lot was full. These signs can help parkers determine where parking is available without needlessly searching in full lots.

Weaknesses:

Inconsistent Signage Explaining Permit Required Timeframes – In some lots, there were instances of multiple signs that each displayed different timeframes for when parking permits are required. For example, the main lot identification sign would state that permits are required from 7:00 a.m. to 6:00 p.m., but a smaller sign mounted to the control gate would state that permits are required from 8:00 a.m. to 5:00 p.m. This inconsistency should be corrected. To make matters worse, the campus parking map states that parking permits are required from 5:00 a.m. to 5:00 p.m. Monday through Friday.

Signage Placement could be Improved in some Areas – Parking lot signs should be placed directly adjacent to the lot entrance. In some cases, parking signs are located either across the street from the lot or some distance away from the lot. This can sometimes make it difficult to locate specific lots and/or create confusion as to which lot the sign refers.

Some Frequently Full Lots Lack Lot Full Signs or Variable Message Signs Noting Parking Availabilities – In a permit system where permit holders can park in multiple lots, and some of the lots are frequently full, lot full or space availability signage can help minimize needless searching. Instead, parkers can avoid fully occupied lots and park in facilities with spaces available. This can help minimize search times and mitigate frustrations.

2.03.5   Parking Permit Issuance

As mentioned previously, parking permits are currently issued by multiple university departments. The Registrar's Office currently issues all student parking permits (both graduate and undergraduate students). Commuter students can register for parking online, and parking passes are either sent to students in the mail or purchased in the Registrar's Office. Resident parking permits are issued by either Housing Facilities or Daniell Heights Housing, depending on where the student lives. Similar to commuter students, residents can register online. However, resident parking permits are not sent to students (they must be issued through the housing offices). Finally, all other annual permits are issued by the Department of Public Safety and Police Services. Faculty and staff must register their vehicles and obtain their permits from the Department of Public Safety and Police Services.

There is currently a fee for commuter student parking. The current fee is $25 per semester or $50 per year. There is currently no fee for resident student, faculty, or staff parking.

Visitor parking passes can be obtained from either the Department of Public Safety and Police Services or staff in the Administration Building (for the Administration Visitor Lot). There is currently no fee for visitor parking passes.

Strengths:

The University has Instituted an Annual Registration and Parking Permit Renewal Process – In the past, some parking permits were valid for indefinite time periods. This means that there were a significant number of vehicles listed with active parking permits and access cards that were no longer affiliated with the university. In order to more effectively manage current parking demands, the university instituted an annual renewal process to ensure permit counts are current and accurate.

All Vehicles Parking on Campus must be Registered – This is a common practice on university campuses. This help the university identify each vehicle's owner in cases of emergency or significant parking violations.

Students and Employees can Register Vehicles Online – Allowing students and employees to register vehicles online can make complying with the university's registration policy easier and help automate the registration process.

Permits are Sold at Multiple Locations (based on User Group) – Selling permits in multiple locations by user group helps disperse the workload of fulfilling permit purchases over a greater work force. If all permit holders were required to purchase parking permits from one department, that department would need more dedicated staff to fulfill purchase orders.

University Parking Permits are Color-Coded – University parking permits are color-coded to denote the user group. This can help parking enforcement staff easily note whether or not the permit is being used in the proper parking lot.

University Parking Permits are Now Bar-Coded – University parking permits have been bar-coded to help enforcement track valid permit use.

Weaknesses:

The University Currently Issues Multiple Parking Permits to Some Permit Holders that can be Used on Different Vehicles – The issuance of multiple parking permits to permit holders can lead to significant abuse (e.g., one permit holder requests multiple permits and then gives those permits to friends or family members). This is especially a problem in situations where anti-passback controls are not in place. Instead of issuing multiple permits, the university should issue moveable permits that can be moved between vehicles (but only used in one vehicle at a time).

Campus Parking Permits Appear to be Easy to Counterfeit – Based on expired parking permits displayed by some vehicles on campus, it does not appear that campus parking permits

significantly change shape or design over time. Instead, it appears parking validators (or separate stickers that validate the date range of the permits) are used. This can make it more difficult for parking enforcement officers to detect invalid parking permits and make it easier to create duplicate or counterfeit parking permits.

Parking Permits are Sold through Multiple Departments – While selling permits through multiple departments can help spread the fulfillment workload, it can also make permit tracking more difficult.

There are Multiple Types of Visitor and Temporary Parking Passes – Depending on where the pass is issued, there are several significantly different types of campus visitor/temporary parking passes. Ideally, all visitor and temporary parking passes should have a similar shape, although colors could vary. This would help parking enforcement staff identify off-campus parking passes more quickly.

Resident Hall Motorcycle and Snowmobile Parking Permits are a Different Color than Resident Hall Parking Permits – Current resident hall parking permits are blue, but motorcycle and snowmobile permits are brown (but smaller than car/truck permits). Ideally, all resident hall permits should be the same color.

2.03.6   Parking Rates, Fees, and Fines

Current parking system revenue streams are fairly limited. Parking revenue is currently limited to commuter student parking fees, parking meter revenues, pay parking operations (Lot 27 and university events), and collected parking fines. Annual parking system revenues are approximately $330,000. The revenues collected are approximately $450,000 short of covering all parking system expenses.

The university currently charges only commuter students and some campus visitors for parking on campus. Commuter student pay $25 per semester or $50 per year for parking. Visitors must pay for parking if they use metered spaces or Lot 27 (flat fee of $2.00 per entry). The university also charges for event parking in certain cases. Visitors that use visitor parking permits are not required to pay for parking. Faculty, staff, and resident students are also provided free parking. Overall, parking permit rates at Michigan Tech for all user groups appear to be significantly lower than other similar university campuses.

Current parking citation fines were recently increased by the university. Parking enforcement fines range from $10.00 (overtime parking) to $100.00 (accessible parking violation), with most fines set at $25.00. Current citation fines appear to be consistent with other similar universities.

Strengths:

Parking Citation Fines are Consistent with Similar University Campuses – Based on a review of similar campuses, parking citation fines at Michigan Tech are consistent with or higher than similar campuses.

Weaknesses:

Parking Revenues do not Cover Parking System Expenses – With an approximate shortfall of $450,000 per year, the parking system is not able to improve services or develop additional parking facilities without additional subsidies. Also, the funds used to subsidize the parking program cannot be used for core university goals/objectives.

Parking Permit Rates are Not Tied to Service Levels – Current commuter student parking permit rates are the same no matter where they find parking. Some students may be able to park in Lot 9 everyday, while other students are forced to park in Lot 22. In addition, those provided with the best parking – faculty, staff, and resident students – are provided with free parking (in the case of resident students, their costs may be bundled into their housing fees – but parking is not a direct cost). The discrepancy between parking rates (or the lack thereof) and the level of service provided encourages vehicle use, as well as increased campus traffic as people search for the closest parking possible. This also distorts transportation choices and their associated costs.

Campus Employees are Strongly Against Paying for Parking – For the most part, most employees were decidedly against paying any fee for parking. Regardless of the current short-fall in parking revenues or the various parking services/facilities provided by the university (now or in the future), many employees appear to feel that parking is a benefit and/or job requirement. In fact, some employees equated parking to their office telephones or lights – openly wondering if the university would charge them for utilities next. This is a common perception on many university campuses. While transportation options are limited in Houghton and driving to work may be the only reasonable option for most, using non-parking related university funds to subsidize the parking for certain members of the university community is not a recommended best

Employee Parking Rates at Similar Campuses	
Ferris State Univ.:	*1 Free ($50 for 2nd)*
Northern Michigan Univ.:	*$130*
Saginaw Valley State:	*$20*
Univ. of Michigan – Flint:	*$150*
Univ. of Minn. – Duluth:	*$143 - $459*
Univ. of Wisc. – Green Bay:	*$90*
Colorado School of Mines:	*$55 - $200*
Lehigh:	*$24 - $96*
Rensselaer Poly. Institute:	*$135 - $375*
AVERAGE:	***$83 - $169***
Michigan Tech:	***Free (No Limit)***

practice. Ideally, the parking system would be fully funded by those that use the parking lots.

Some Campus Visitors are Provided Free Parking – Ideally, all people using the parking system should pay something (preferably a price that is related to the costs of the services provided). This will help create a financially stable parking and transportation program that can improve existing conditions and address future parking needs.

Parking Permit Rates are Low Compared to Similar University Campuses – Part of the reason the parking system does not generate sufficient revenue is that parking permit rates are considerably lower than those at similar universities.

Commuter Student Parking Rates at Similar Campuses	
Ferris State Univ.:	$170
Northern Michigan Univ.:	$130
Univ. of Michigan – Flint:	$150
Univ. of Minn. – Duluth:	$143
Univ. of Wisc. – Green Bay:	$90
Colorado School of Mines:	$55 - $125
Lehigh:	$50
Rensselaer Poly. Institute:	$80 - $375
AVERAGE:	**$109 - $154**
Michigan Tech:	**$50**

2.03.7   Parking Enforcement

In the recent past, parking enforcement services were provided by The Department of Public Safety and Police Services and the two housing offices. However, parking enforcement has been consolidated into one department (the Department of Public Safety and Police Services). The campus currently employs approximately 10 student enforcement officers (approximate 10 to 15 hours per week, per student) and one full time enforcement officer. Enforcement personnel utilize handheld citation issuing devices and an outdated AutoCite system.

In 2010, there were 19,128 parking citations issued on campus – equating to $305,625 (however, 1,121 citations were voided). Of the citations issued, the university collected $206,915 (approximately 68% of outstanding fines).

Strengths:

Based on Field Reviews, Parking Enforcement Appears Efficient – During the field reviews, it appeared that the parking enforcement personnel on duty were efficiently issuing citations to improperly parked vehicles.

The University has Developed a New Parking Citation Appeals Process – The university has developed a process for those receiving parking citations to appeal. People receiving a parking citation would have ten days in which to appeal their ticket (limited to six citation appeals per person, per year). Appeals can be submitted online or in person using a Citation Appeal form. Appeals would then be reviewed by an Appeal Processing Officer to determine if the appeal is valid. If

the appeal is considered valid, it would be forwarded to the University Appeals Board (which should be made up of representatives from students, staff, and faculty). Citations upheld by the appeals board would be subject to a $25 administrative fee.

The University has an Experienced Full-time Parking Enforcement Officer – While the bulk of enforcement personnel are part-time students, the university does have one full-time staff enforcement officer. The officer was experienced, professional, and knowledgeable about typical parking enforcement practices.

The Number of Citations Issued Appears to Show a High Level of Efficiency – During the 2010 calendar year, 19,128 parking citations were issued and only 1,121 were voided on appeal (approximately 6%). The university averaged almost 370 parking citations per week (more were likely issued during the normal school year opposed to the summer months). While there should be no set quotas, the level of enforcement appears consistent with field observations made during the site visit.

Parking Enforcement is Now Provided by One Department – In the recent past, multiple departments provided parking enforcement. This can lead to challenges in providing consistent enforcement, as well as uniform policies and procedures. However, the university has recently consolidated parking enforcement into one department (the Department of Public Safety and Police Services).

Weaknesses:

There are Challenges to Collecting Outstanding Parking Citation Fines – Currently, the Department of Public Safety and Police Services has limited options to collect outstanding parking citations. For students with outstanding citations, the university can stop students from registering for classes, hold grades, and withhold diplomas (if the outstanding citations are entered into the university accounting system in a timely fashion). For faculty and staff, the university does not currently have any effective means to collect outstanding citations. For citations issued to unregistered vehicles, the university can create account receivables that are billed to the registered owner of the vehicle. Clearly, additional penalties (and/or the improved utilization of existing penalties in the case of students) are required to improve the timely collection of outstanding fines.

The Technologies Used in Parking Enforcement are Outdated – As mentioned in Section 2.03.3, the equipment used by the parking enforcement staff is seriously outdated and in need of replacement. Newer parking enforcement and permit control systems can provide a significant number of enhancements that can improve efficiency, auditing capabilities, and customer service.

Hours of Enforcement May be Unclear – As stated previously, a discrepancy in the permit required hours stated on lot signage and in the campus parking map can make it difficult for parkers to know when the parking restrictions are enforced. Several student comments we received complaining about the confusion concerning parking enforcement.

Student Parking Enforcement Officers are not Provided with Uniforms – All parking enforcement staff should be issued a uniform of some type while working in the field. This will help staff appear more professional, be more visible to the campus community (for both officer safety and easy identification), and often engender a greater level of respect from parkers. Parking enforcement uniforms need not be "police" style uniforms. Instead, enforcement uniforms could consist of shirts, jackets, and hats using university colors (primarily gold as it would be more visible) with black pants (or even clean jeans) and appropriate footwear. Parking officers would also be issued handheld citation computers, small notebooks, cameras (optional), and radios (plus any additional materials as necessary such as bootlists, tire chalk, daily briefing information, do not cite lists, etc.).

The Lack of Access Controls in Some Lots Increases the Need for Enforcement – As some lots do not have control gates installed, increased enforcement is required. Increased enforcement can often create the perception that parking is too aggressive, even though it is required to discourage improper parking.

2.03.8   Parking Safety and Security

The Michigan Tech campus has been recognized as one of the safest university campuses in the country. Parking lot security is provided by the Department of Public Safety and Police Services. Lot security consists of periodic patrols conducted by campus police and parking enforcement officers. While the university does utilize both surveillance cameras and emergency call boxes on campus, these safety/security systems are not currently installed in campus parking lots.

The university also provides a safety escort service (Safe-Walk) free of charge to all campus community members. This service can be used for escorts to/from all on-campus locations, including the parking lots.

Strengths:

The Campus has a Dedicated Public Safety Department – The university has a strong reputation for providing a safe and secure campus environment. The campus Department of Public Safety and Police Services provide a number of services to help make the campus more secure, in addition to their parking enforcement and management responsibilities.

The Campus has a Safety Escort Service – The campus safety escort service can make walking to remote parking areas during evening hours (or any time of day) feel safer. This can help reduce the risks of crimes in the parking lots as well as encourage the use of perimeter parking areas.

All of the Campus Parking is Provided in Open Surface Lots – All parking areas are highly visible during all hours. Students walking in campus lots are generally visible to both people inside the parking lots and those walking around the lots. Also, most pedestrian paths to/from the parking lots are fairly open and visible (possibly excluding the pedestrian paths to/from Lots 21 and 26).

Weaknesses:

Emergency Call Boxes have not been Installed in Most Parking Lots – Currently, parkers needing assistance in some campus parking lots may need to travel a considerable distance to reach an emergency call box. Some call boxes are located in or near parking lots (e.g., call boxes located near Lots 1, 10, 16, 20, 31, and 34 or call boxes located on the pedestrian paths to Lots 21 and 26), but no call boxes are located in Lots 5 and 9 or in the parking lots around the SDC. This can negatively impact both real and perceived lot security, as well as negatively impact the utilization of remote parking lots.

There are No Surveillance Cameras in the Parking Lots – While there are cameras on campus, there are none currently installed in the parking lots. When operated appropriately, surveillance cameras in the parking lots can greatly improve both real and perceived security.

2.03.9   Parking Marketing and Communications

Communicating parking policies, regulations, and services to parkers is typically done through the use of parking maps, informational materials provided in new student and new employee orientation packets, informational materials available in university buildings, a parking information phone number, and on the university website. While not centralized, the university currently provides information using many of these methods.
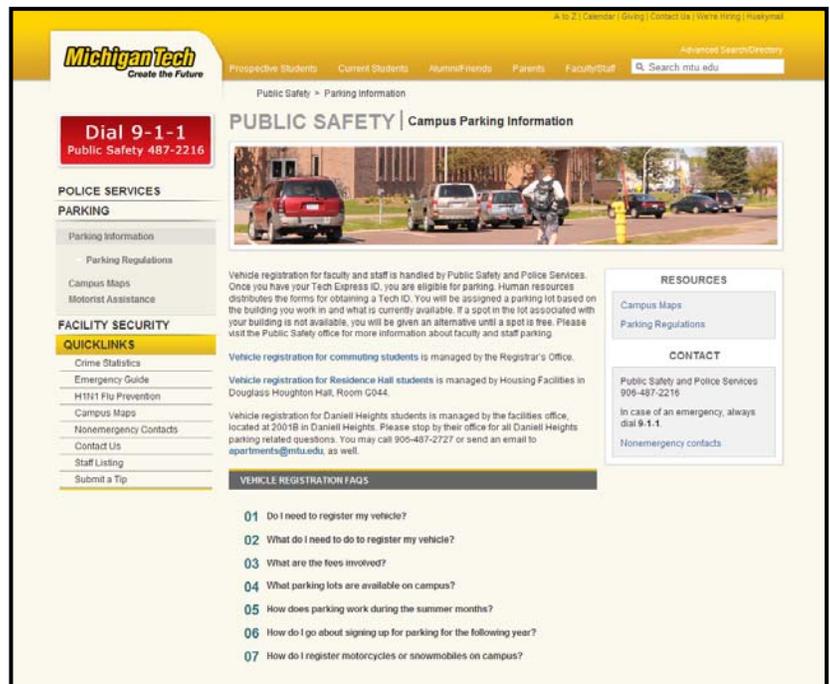
Parking information is currently available online and in printed materials (e.g., the campus parking map and other assorted flyers).   The parking information provided online is dispersed between the various departments that provide parking services; however, links are provided to access the information in other parts of the website. The university website also includes the answers to frequently asked questions about parking on campus. The printed parking map illustrates the location and name of each parking lot, notes the intended user groups for each lot, provides a building directory, and notes the location of emergency call boxes. The reverse side of the map provides the parking and traffic regulations for the current academic year and contact information.

Strengths:

The University Provides a Significant Amount of Information Online – The information provided online covers most of the basic parking system information needed by the campus community, including parking regulations, parking options, vehicle registration forms, and answers to frequently answered questions.

The University has Developed a Campus Parking Map that is Updated Each Year – The campus parking map clearly illustrates the location of each parking lot, as well as notes the intended user group for each parking facility. The map also includes all of the basic parking policies and regulations, including registration policies/procedures, campus parking requirements, and informational contacts.

The University Provided a Significant Amount of the Parking Task Force Information Online – The university has made several important pieces of information

generated by the Campus Parking Task Force available for review online, including meeting notes and PowerPoint presentations.

Weaknesses:

While There is a Significant Amount of Information Available, There are Still Members of the Campus Community That are Unclear About the Parking Services the University Provides – Based on the input received during some of the input meetings, there appears to be some members of the campus community that perceive little value in the current parking system. Therefore, it appears that some work is needed to help better educate the campus community about the goals, objectives, and responsibilities of the university parking system.

While the Website Includes Information on Transit Options, it Does Not Include Information Concerning Other Transportation Options In One Location – The university website includes information for local transit options, but it does not appear to include information concerning other alternative forms of transportation (bicycling, walking, carpooling, etc.). Ideally, this information should be easy to find, with information and/or links on parking information pages so that campus community members can explore all of their transportation options.

2.04.   Transportation Demand Management – Strengths and Weaknesses

The accommodations for significant non-parking related transportation options for the campus are summarized in Section 2.01. The following are the significant strengths and weaknesses of current transportation demand management strategies.

Strengths:

The Cities of Houghton and Hancock both Provide Community Transit Services – Both route and on-demand shuttle services are provide in the community for use by the campus community. Michigan Tech students are even provided with reduced prices. The fixed route service in Houghton provides students with the opportunity to travel to necessary shopping locations and entertainment venues without the need to own a vehicle and park it on campus.

In Cooperation with the City of Houghton, the University Provides a Free Shuttle Service from Daniell Heights – The Daniell Heights shuttle service is provided at no charge to the campus community and runs between Daniell Heights and the campus core. In 2010, the university paid approximately $24,250 to help cover the cost of the service.

There are a Significant Number of Bicycle and Pedestrian Paths Leading To/From the Campus – Bicycling and walking to/from campus appear to be relatively popular forms of transportation for the campus community, even during periods of inclement weather. There are a number of suitable paths for both bicycles and pedestrians surrounding the

campus. In addition, the waterfront path can be used as a snowmobile trail during winter months.

Weaknesses:

As with Other Campus Issues, Climate and Topography can make Alternative Forms of Transportation More Difficult – Poor weather conditions and extreme changes in elevation can make walking, bicycling, and waiting for shuttles difficult. Therefore, strategies designed to encourage the use of alternative forms of transportation must mitigate these challenges. This includes the bicycle/pedestrian path on the north part of campus (where the connection to the campus core is difficult due to the extreme elevation change).

Transportation Demand Management Marketing is Minimal – As mentioned previously, the marketing of alternative forms of transportation can be improved.

Based on Input Received During the Campus Input Meetings, Some Pedestrian Paths to/from Campus Lack Sidewalks, are in Disrepair, Do Not Provide Adequate Separation from Vehicle Traffic, and/or are Not Adequately Cleared of Snow – If the university wants to encourage more people to walk or bike to campus, safe paths are a necessity. There may be a need to work with the City of Houghton to ensure all pedestrian and bicycle paths are adequately maintained, sufficiently cleared of snow, and safely separate pedestrians/bicyclists from traffic lanes.

It can be Difficult for Pedestrians to Cross Townsend Drive (US 41) – Unlike most roads surrounding college campuses, the main road dividing Michigan Tech's campus is a highway. This essentially means that vehicles have priority over pedestrians (as evidenced in the pedestrian warning signage on the road). The amount and speed of traffic on this roadway can create a strong perception of unsafe conditions. While this issue has been investigated by the university and the Michigan Department of Transportation in the past, additional solutions may be necessary to help create a safer pedestrian environment on Townsend Drive.

There is No Dedicated Shuttle Service to Remote Parking Lots – In order to encourage the use of remote parking lots (such as Lots 22, 23, and 24), a dedicated shuttle service with minimal headways may be required.

Current City of Houghton Transit Service Headways may not be Convenient for Many Campus Community Members (Route Service) – The current city shuttle services makes several stops on campus each hour, stopping at the Memorial Union Building, the SDC, and Daniell Heights. However, depending on the time of day, students could have to wait as long as 30 to 40 minutes for the next shuttle. This likely discourages the use of the shuttle system.

There is a Strong Perception that a Vehicle is Required to Travel Around Town – This is a common perception, especially in locations with relatively few options for alternative forms of transportation or less convenient choices. This will need to be addressed in future information and marketing campaigns for the campus parking and transportation system.

The Campus Parking Map does not Include Any Information Concerning Other Forms of Transportation – While the campus parking map provides a significant amount of information concerning parking, the map does not provide any information on transit service, transit stops, bicycle paths, bicycle parking/storage, or recommended pedestrian paths.

3.0   FUTURE PARKING CONDITIONS

3.01.   Preliminary Future Parking Supply and Demand Projections

As stated previously, the university does not currently anticipate any significant changes in overall campus populations in the foreseeable future. Therefore, there will likely be no significant changes in overall campus parking demands due to increases in campus enrollments or increases in university faculty and staff. However, there may be changes in the mix of undergraduate and graduate students (fewer undergraduate students and more graduate students). Future changes in the student mix may require adjustments to campus parking allocations to provide more graduate student parking and result in increased parking durations.

However, there may be various changes in campus parking supplies in the future. The 2006 "Fresh Look" Scenarios Plan detailed several options relative to future campus improvements. These recommendations were geared toward improving the campus environment by enhancing campus gateways, increasing open spaces, improving pedestrian/bicycle paths, planning for future buildings, and replacing parking lost to development. Some of these recommended improvements will result in the loss of core parking supplies, and others will result in the development of new surface parking lots and/or campus parking structures.

The amount of parking lost will depend on the concept plan (and associated alternatives) selected by the university. The following information outlines potential parking space losses and gains due to the various concept alternatives (assuming all projects occur as illustrated in the plan):

- **Concept Plan**

    o   Parking Losses:

        - Administration Visitor Lot: -12 Spaces (Visitors)
        - Lot 3: -73 Spaces (Faculty/Staff)
        - Lot 4: -64 Spaces (Resident)
        - Lots 5 and 9: Approximately -90 spaces (Commuter)
        - Lot 10: -253 Spaces (Resident)
        - Lot 11: -62 Spaces (Faculty/Staff)
        - Lot 12: -108 Spaces (Faculty/Staff)
        - Lot 14: up to -59 Spaces (Faculty/Staff)
        - Lot 17 (Upper and Lower): -165 Spaces (Resident)
        - Lot 27: - 87 Spaces (Visitor)

        - Total Losses by User Group:

            - Faculty/Staff: -302 Spaces
            - Resident: - 482 Spaces
            - Visitors: -99 Spaces
            - Commuter: -90 Spaces

- TOTAL LOSSES: -973 Spaces (23% of the current campus parking supply)

o Parking Gains:

  ▪ Parking structures of undetermined sizes could be constructed as follows:

    - On Lots 1 or 3
    - On Lot 8
    - Under potential residential developments on Lot 17 (Upper and Lower)
    - Under potential residential developments south of Lot 26

  ▪ Surface parking lots/spaces of undetermined sizes/amounts could be constructed as follows:

    - On Lots 12 and 27
    - Two lots south of Lot 26

- **Concept Plan – Option B**

o Parking Losses:

  ▪ Same losses as the first Concept Plan, with the following adjustment:

    - Lots 5 and 9: -310 Spaces (Commuter)

o Parking Gains:

  ▪ Same parking structures as the first Concept Plan, with the following adjustments:

    - On Lot 4
    - On Lot 5/9
    - No structure on Lot 8

  ▪ Same parking lots as the first Concept Plan, with the following adjustments:

    - On Lot 10

- **Concept Plan – Option C**

o Parking Losses:

  ▪ Same losses as the first Concept Plan, with the following adjustment:

- Lots 5 and 9: -310 Spaces (Commuter)

  o Parking Gains:

    ▪ Same parking structures as the first Concept Plan, with the following adjustments:

      - On Lot 4
      - West of Wadsworth Hall
      - No structure on Lot 8

    ▪ Same parking lots as the first Concept Plan, with the following adjustments:

      - On Lot 5/9

As there are no definite campus developments in the foreseeable future, it is not yet clear how much parking will be lost or added. As stated in Section 2.02.3, there is an overall surplus of parking on campus (assuming the utilization of parking lots around the SDC can be improved). There is currently an effective surplus of approximately 969 spaces available. Therefore, there are opportunities to lose some parking spaces to campus development projects without adding any supply. However, there will need to be some adjustments to parking allocations and management strategies to encourage the efficient use of available parking supplies.

In order to address parking demands related to future campus development projects, the following methodology is recommended:

1. The first step in planning for future parking needs is to determine typical parking demands. This is usually achieved by completing a campus parking supply and demand survey. This would entail maintaining current parking space inventories and conducting periodic parking occupancy counts (ideally, at least twice per year approximately two weeks after the start of each semester). This will provide a baseline of demand data from which to project future parking needs.

2. Project the parking needs of each proposed development. Determine how parking demand for the new development (if any) will fluctuate during the day. Then, determine how parking demand for the proposed development will impact parking supplies during the period of greatest parking demand.

3. Once parking demands have been projected, determine how the development will impact existing conditions. If the development creates a parking deficit within the area it is located, additional parking supplies and/or demand strategies may be necessary.

4. While the parking demand for many land uses can be spread over greater distances, the creation of residential buildings should include sufficient, relatively adjacent parking. Residential projects that lack sufficient parking may be less marketable, and conflicts could arise should a significant use of other parking spaces be required to support residential projects.

5. Future developments should include sufficient ADA accessible parking accommodations. Sometimes, parking demand for accessible parking may be greater than typical minimum requirements. In order to ensure sufficient space is provided, periodic reviews of campus accessible parking demand should be part of larger parking inventory and occupancy surveys. Through periodic occupancy studies, and community input, the university will be in position to ensure sufficient accessible parking is provided.

6. It is important to provide adequate timeframes when planning for future parking needs. It can take between 18 and 24 months to design and construct a parking facility. Therefore, it is important to remain "ahead of the curve" when planning for future parking facilities.

4.0 PARKING AND TRANSPORTATION IMPROVEMENT ALTERNATIVES

4.01. Parking and Transportation Guiding Principles

When planning for parking there is a built in conflict to which all university administrators can easily relate. The conflict revolves around three primary factors: cost, convenience, and supply. Unfortunately, usually you can have only two of the three. Given this basic problem, keeping all customers satisfied is an on-going challenge. Having well-defined

parking principles is one way of framing the policy decisions required by this inherent conflict.
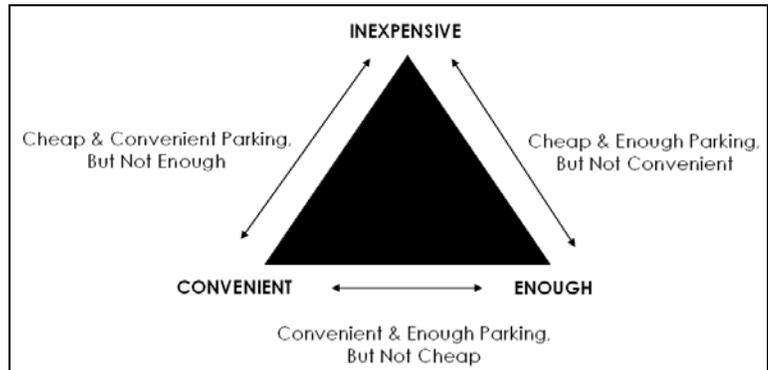
Guiding principles add value in three primary areas. First, the establishment of a set of approved operating guidelines helps define the role and relationships of parking and transportation within the larger organizational structure of the university. Secondly, guiding principles can emphasize the importance of planning for parking. Finally, guiding principles help communicate the goals and objectives of the parking and transportation system to the campus community.

However, guiding principles are not intended to replace policies and procedures. In general, the parking principles should be kept short and concise (a maximum of three pages). Some of the items typically incorporated in such a document by other universities include mission/vision, funding strategies, parking allocation strategies, departmental relationships, enforcement and maintenance responsibilities, etc.

Based on the information and input received by *Carl Walker*, the following set of preliminary parking and transportation system guiding principles are recommended:

Guiding Principle #1

"*All services related to parking and transportation will be provided and/or managed exclusively by the designated Transportation and Parking Management Organization (TPMO). This includes (but is not limited to) all parking permits, parking enforcement, parking facility maintenance, visitor and special event parking, and campus transit/transportation demand management programs.*"

Once a TPMO is designated (and *Carl Walker* recommends the Department of Public Safety and Police Services as the first choice), no other campus departments should be authorized to provide parking operations or management services, including special events, without the prior approval of the TPMO. This will help ensure parking services are uniformly managed and operated, as well as fairly allocated. Departments needing special event parking services should make prior arrangements with the TPMO. This would not necessarily preclude departments, such as athletics,

from operating campus parking resources during events. However, they would need to coordinate parking needs with TPMO prior to the event and the TPMO should be compensated for any reasonable direct and indirect costs.

Guiding Principle #2

"Available campus parking spaces will be allocated among the primary parking user groups as follows:

- *Core parking areas (lots between US 41 and Cliff Drive) will be reserved first for faculty and staff.*

- *Graduate student parking will be provided in both core parking areas and areas immediately adjacent to the core.*

- *Visitor parking will be located near the campus core in appropriate amounts based on observed and anticipated needs.*

- *Resident student parking will be provided first in parking lots adjacent to campus residences (or as close as reasonably possible), with overflow parking provided in perimeter lots as needed.*

- *While some commuter student parking may be provided in or adjacent to the campus core, the majority of spaces will be provided on the perimeter of campus (lots outside of the campus core).*

- *Accessible parking will be provided in parking areas throughout campus based on Americans with Disabilities Act (ADA) requirements and observed demand."*

Campus parking would be allocated first to faculty and staff, and then to students. As they generally spend more time on campus and require greater flexibility, faculty and staff will be provided with the most convenient parking. This will help reduce traffic in the campus core as faculty/staff vehicles tend to stay parked longer. Campus visitor parking should be provided in designated parking areas near the campus core and located as conveniently to the campus core as possible. This will minimize the impact of visitor parking on permit holders and better support campus needs.

Commuter student parking will be provided outside of the campus core, with a focus on providing sufficient parking and easier access to surrounding streets. Campus transit could provide a means for students parking in perimeter parking areas to reach the campus core more conveniently in the future. Resident student parking should be located as close to residences as possible to encourage on-campus living (improving convenience) and increase resident student safety.

Carl Walker

Accessible parking should be provided based on applicable ADA accessibility guidelines and observed parking occupancies. However, this does not mean that every parking lot needs dedicated accessible parking (e.g., Lot 9). While accessible parking needs should be calculated on a lot-by-lot basis, the parking should be located within the campus core (or adjacent to campus destinations as necessary).

Guiding Principle #3

"The TPMO is an auxiliary function of the university and will be organized and managed in a manner that allows the TPMO to fund its own expenses to the greatest extent possible, including any long-term maintenance needs and debt service. In order to ensure the financial viability of the system:

- *Campus parking and transportation services are to be considered commodities that are to be purchased by students, faculty, and staff. These services are not benefits of employment or enrollment.*

- *System funding will be provided through fees charged for parking permits, visitor parking, service charges, citation fines, and other approved revenue streams as follows:*

  - *Parking permit and visitor parking rates will be determined based on user group, the parking facility's proximity to campus buildings, the level of service provided, and/or the level of parking demand within a facility or group of facilities. Rates will be reviewed annually to ensure current and future funding needs are met to the greatest extent possible.*

  - *Parking citation fines will be designed to discourage illegal parking. Parking fines will be determined based on parking fines in other appropriate jurisdictions (e.g., city, state, state universities, peer universities), as well as on prevailing campus conditions and any legal restrictions.*

  - *Special event parking rates will be determined based on a parking facility's proximity to event venues, the level of service provided, and/or observed levels of parking demand. Rates will be designed to cover the direct and indirect costs of providing parking services to the greatest extent possible.*

  - *Expenses will be distributed throughout the parking and transportation system to minimize costs for all user groups.*

- *The TPMO will establish a three-year budget planning cycle to ensure all anticipated expenses are covered, and rate changes can be communicated in a timely fashion."*

The parking system must generate sufficient revenue to cover operating and maintenance expenses, as well as any future debt service to the greatest extent

possible. Instead of relying on general university funds that could be better spent furthering the educational and research goals of the university, the users of the campus parking and transportation system should pay reasonable rates for the services they use.

The TPMO will accomplish this by distributing costs through the system, charging all users of parking resources. It is recommended that the TPMO be authorized to charge appropriate fees for all campus parking user groups to help spread related expenses through all system customers. This will help mitigate potential future rate increases to any one user group, support parking operations and management, system improvements, new technologies (as appropriate), and future parking-related construction projects.

The TPMO should establish an appropriate budget planning cycle to plan for anticipated expenses (e.g., periodic facility maintenance needs), as well as provide sufficient time to communicate funding needs to the campus community.

Guiding Principle #4

"The TPMO will be an active member of the campus community by assisting the university in achieving overall goals and objectives, as well as communicating policies, regulations, and systems changes to all parking customers."

A significant issue discussed during the parking input sessions was a perceived lack of communication between the university and the campus community concerning parking. This perception was evident in several comments, such as:

- The permit fees are too high relative to the level of service provided;

- The university does not provide any parking-related services that warrant paying anything for parking;

- Special event parking options, requirements, and services are not communicated to the campus community;

- Alternative forms of transportation are not marketed;

- Parking lot restrictions are not clear and/or signage is not adequate.

The university and the TPMO must make a strong commitment to better market its services and accomplishments, as well as strengthen its communication with the campus community. This could be accomplished through printed materials (e.g., brochures, educational flyers, and maps), a TPMO-specific Internet presence,

broadcast e-mails to permit holders, improved parking-related signage and wayfinding, etc.

Guiding Principle #5

"The TPMO will be included in all future campus planning activities that impact the campus parking system. This includes planning endeavors that impact campus parking supplies, parking demands, or general parking operations/management. In order to ensure future parking needs are adequately addressed:

- *The TPMO will endeavor to provide sufficient services and facilities to meet the anticipated needs of the campus community.*

- *The TPMO will conduct periodic surveys of parking inventories and occupancies for use in planning projects.*

- *The replacement of any parking lost or displaced by campus development projects will be addressed during the initial planning stages of the development."*

Clearly, all future campus development projects will impact the parking system. Future development projects could eliminate existing parking spaces, increase parking demands, increase campus traffic, increase transit needs, etc. Therefore, PTS should be included in all applicable campus planning projects at the earliest point possible to ensure campus transportation needs are addressed.

Guiding Principle #6

"To the greatest extent possible, the TPMO will encourage the use of alternative modes of transportation to mitigate campus parking needs, reduce campus traffic, and minimize the environmental impacts of driving. This will be accomplished through the use of programs designed to encourage the use of available campus transit, local transit, carpools, bicycles, flexible work schedules, etc."

The construction of future campus parking facilities will be expensive, and can take significant amounts of land that could be used for buildings or green space. Also, additional parking facilities could increase campus traffic and air pollution. Therefore, encouraging the use of alternative modes of transportation can help reduce parking needs (and associated expenses), as well as help create a more pedestrian-friendly campus.

Future campus shuttles could be initiated to provide a means for students, faculty, and staff to travel to and around campus without using individual motor vehicles. Sufficient pedestrian and bicycle paths/facilities should be provided to encourage alternative modes of transportation when the weather permits.

Guiding Principle #7

"The TPMO will endeavor to incorporate appropriate new technologies into parking management initiatives to ensure the efficient use of available parking."

While the upfront costs of parking technology can sometimes be daunting, the benefits often outweigh the expense. Also, the latest parking technologies can provide enhanced utilization data that the TPMO can use to better manage parking resources. For example, the cost of providing updated access control equipment can be justified based on the reduced need for enforcement personnel, improved levels of customer service, and real-time utilization data for improved efficiency.

4.02. Allocation and Basic Operation of Campus Parking

In order to improve parking conditions at Michigan Tech, *Carl Walker* reviewed the following three user allocation strategies:

- Keep the Existing Flexible User Allocation System

- Institute a Lot Specific Allocation System

- Implement a Hybrid Allocation System

These parking user allocation models are currently in use by other major universities across the country, in one form or another.

Keep the Existing Flexible User Allocation System

The existing system provides the bulk of core parking to faculty and staff members, while providing a portion of core parking to campus visitors (although the visitor parking spaces are used extensively by faculty, staff, and students). The existing system is also extremely flexible, allowing many permit holders to park in multiple parking areas. This system provides the community with at least the opportunity to find parking convenient to the campus core, while keeping faculty and staff members within the campus core. Future campus development projects and parking supply changes will likely push some or all user groups toward the perimeter of campus or result in new campus parking structures.

Pros:
- Provides a highly flexible parking system. Based on input received from the community, faculty and staff members highly value the flexibility provided.
- Less of a learning curve for users, as they are accustomed to the existing system.

- Keeps all of the existing parking permits, therefore reassigning existing parkers to other parking lots would not be required.

Cons:

- Keeping the existing system could result in more traffic on campus than other approaches as drivers search for parking instead of driving to a specific lot each day.

- Parking for daily visitors and special events is difficult or impossible as the parking is used by faculty, staff, or students.

- Keeping the existing system may result in continued frustration in finding parking as it cannot guarantee parking to anyone in any specific lot (e.g., instances of searching for parking in full lots or difficulties finding parking when returning to campus after lunch or attending meetings). Since most permits can cross-park into other areas, spaces close to the campus core are taken early.

- Parking demand is not distributed uniformly through the system, resulting in uneven utilization of parking resources.

- With such a high level of cross-parking, it is difficult to accurately determine appropriate permit oversell factors, as the university cannot determine where permitted vehicles regularly park.

- The existing allocation system encourages vehicle use, which is inconsistent with university goals of promoting a pedestrian-friendly campus.

- Vehicle queuing concerns on Cliff Drive due to Lot 9 will continue.

- The existing system is difficult to enforce and manage, and accurately determining occupancy by permit is difficult.

Institute a Lot-Specific Allocation System

This option would involve creating a system of individual parking lots or areas that would require a specific parking permit during most of the day. For example, parking permits would be issued for Lot 1 that would only be valid in Lot 1 (no cross-parking). After a set time each day, possibly after 4:00 p.m., some permits could be permitted to cross-park in other areas. This would result in vehicles being parked, and remaining parked, for most of the time.

Pros:

- As no cross-parking is available, vehicles would be parking in one area for a longer period of time; thereby reducing search traffic.

- This type of system can guarantee parking availability to system users as permits for each area are sold to match utilization. This cannot be accurately measured in the existing system.

- A lot specific system could reduce confusion and frustration as each user is assigned to a specific parking area, and a space is always available to them.

- This system strongly discourages the use of personal vehicles to make any inter-campus trips.

- This system can allow the university to better manage the parking system, as more accurate utilization data would be available.

- Visitor parking could be provided in a more consistent and predictable fashion.

Cons:

- This allocation option has been used in the past. However, since the number of permits for each lot was not well regulated, users became frustrated as it became difficult to find parking in their assigned lot.

- A lot-specific system provides substantially less flexibility than other systems. This system would place a greater reliance on pedestrian connectivity and/or the utilization of other forms of transportation for inter-campus travel.

- As each parking lot or area would need a specific permit, this system would result in the need to create more permit types.

- The number of permits currently assigned to core parking areas may be higher than what some of the campus lots can effectively support. If this is the case, fewer core parking permits could be available in a lot specific system.

- The amount of small parking lots on campus would complicate the implementation of a pure lot-specific parking in the campus core.

Hybrid Allocation System

A hybrid allocation system is probably the most common form of parking allocation on university campuses across the country. This system utilizes a mix of both flexible parking allocations and lot-specific allocations as appropriate. For example, current university faculty and staff parking allocations could remain as flexible as they are today, whereas commuter student parking allocations could be more lot-specific. This approach would allow the university to maintain the flexible approach that is currently appreciated by most faculty and staff members and provide more options for commuter students. Commuter student parking pricing could be based on the level of service provided (lots closer to the campus core would be more expensive than lots located on the perimeter of campus) and student parking would be more predictable. In addition, limiting the access to Lot 9 to only a set number of lot-specific parking permits would eliminate vehicle queuing concerns on Cliff Drive.

Pros:

- The existing level of faculty and staff parking flexibility would be maintained.

- This type of system can better guarantee parking availability to commuter students as permits for each area can be sold to match utilization within each commuter lot.

- This system could help reduce confusion and frustration as each commuter student is assigned to a specific parking area, and a space is always available to them within their area.

- This approach will eliminate vehicle queuing concerns on Cliff Drive as the number of parking permits issued for Lot 9 will be limited to the capacity of the lot.

- Commuter student parking prices can be based on the level of service provided, providing students with a choice of how much they would like to spend.

- This system allows the university to better manage the system as more accurate utilization data is available for commuter student parking areas.

- Adjustments could provide an opportunity to improve campus visitor and special event parking.

Cons:

- This allocation option would result in a new parking system for users to learn.

- This system provides less flexibility for commuter students than the current system.

- This approach will not mitigate concerns about finding parking after lunch or after attending off-campus meetings.

- This system would place more importance on providing campus shuttles if more people utilize perimeter parking areas (e.g., Lot 24).

- This system will require more control over the number of permits issued in designated permit-specific lots.

After reviewing potential parking allocation strategies, final recommendations were developed. The recommendations outlined in the following subsections are based on the information and input received from the campus community. They are designed to address the primary concerns/challenges noted during the study process, as well as help improve the efficiency of the parking system. These recommendations represent a hybrid allocation strategy approach.

4.02.1 Faculty and Staff Allocations

Based on input received from faculty and staff members during the initial input process, the desire for continued flexibility appears to outweigh any concerns about consistency or predictability of parking availability. Therefore, it is generally recommended to maintain the current faculty and staff parking allocation

strategies – with a few adjustments. The following outline details the recommended allocation approach for faculty and staff:

- Overall, the current allocation of campus parking appears sufficient for faculty and staff needs. Current faculty/staff parking lots are approximately 87% utilized with significant space availabilities in Lots 1, 8, and 16. However, there are some lots with parking occupancies greater than 100% as some vehicles are improperly parked (this can occur in situations where permits are not lot specific and quantities are not controlled). Assuming all currently allocated parking spaces are utilized efficiently, no additional parking spaces are required. This condition would change if a significant number of additional faculty and/or staff are hired by the university.

- The current situation of flexible parking permits should be continued. This will allow faculty and staff to park in any appropriate lot with a valid university parking permit. However, the university should consider instituting more lot-specific allocation strategies should concerns about the predictability or consistency of parking availability increase. While this did not work in the past, it was not due to the strategy of lot-specific allocations. Instead, the challenges were due to inadequate controls over the quantity of parking permits issued. For faculty and staff parking lots, parking permit sales should be limited to approximately 120% of the available parking supply. A small oversell is acceptable as not all faculty/staff members are on campus at the same time (some faculty/staff are out sick, on vacation, attending conferences, working from home, etc.).

- Some faculty and staff members that work in off-site locations will need flexible parking arrangements so that they can travel to the main campus as needed. In cases where the need to travel to main campus is frequent, faculty and staff should have the option of acquiring (or purchasing) main campus parking permits. If the need to travel to the main campus is infrequent, off-campus departments could be issued a small number of main campus parking passes (different than parking permits) that can provide faculty/staff with the authorization to park in designated parking lots. Finally, if off-site faculty/staff members do not need to park on main campus they should not be given main campus permits. Instead, they would be issued parking privileges for the location where they work.

- The availability of parking in underutilized areas (e.g., Lot 8) should be communicated to the faculty/staff community to help improve the utilization of these areas.

- Overflow parking for faculty and staff would be in the perimeter lots. While not ideal, this strategy could be improved through the implementation of a shuttle service between the perimeter lots and the campus core. Another option could be to provide a limited amount of faculty/staff overflow parking in Lot 5. Lot 5 appears to be underutilized.

- The university should discontinue the policy of allowing faculty and staff to park for free in parking meter spaces. As faculty and staff are currently provided parking at no charge in permit lots, and parking is available in dedicated faculty/staff parking lots (as well as other campus lots), the policy of free meter parking is not necessary. The negative revenue impact of providing free faculty/staff parking is unnecessarily compounded by the policy of providing free parking in meter spaces. In addition, this policy negatively impacts parking availability for true campus visitors. Regardless of whether or not faculty/staff parking is provided at no charge in the future, providing free meter parking is not a recommended best practice.

- It is recommended that all community members (faculty, staff, students, campus visitors, etc.) parking a vehicle on campus pay a fee. This could be a monthly or annual permit fee, a daily or hourly fee, or paying to park at a parking meter. This would include faculty and staff members. This will help generate revenue to fund ongoing parking operations and management, minimize or eliminate general fund subsidies, provide a revenue stream for future parking projects (e.g., future parking structures), place the burden of parking costs of those that use the system, and better illustrate the true cost of providing parking services on campus. This issue is discussed further in Section 4.04.5.

- In order to better manage available faculty and staff parking allocations, it is recommended that the university discontinue the practice of providing unlimited parking permits to faculty and staff members. Instead, faculty and staff members can be issued (or purchase) a moveable parking permit that hangs from a vehicle's rearview mirror. In some cases, multiple parking permits may be warranted. In these cases, the parking permits should be issued (or ideally purchased) separately. This will reduce the possibility of permits being used improperly (e.g., parking multiple vehicles on campus at the same time) and better match parking demand and permit issuance/sales.

- The control of faculty and staff parking lots (and other core parking lots) could be provided using either parking control gates or increased parking enforcement (or perhaps in some cases both). After reviewing the various control options, the following is recommended:

Carl Walker

o The utilization of parking access control gates should be the preferred approach for parking lots located in the campus core as control gates will reserve core parking lots for intended user groups better than open lots with increased enforcement. However, new gates (or gate housings) may be required in some locations. Gates exclude unauthorized parkers from entering the lot and illegally using a space. Once a vehicle has parked improperly (or illegally) a legitimate parker is inconvenienced. This inconvenience will be even more significant if/when faculty and staff parking fees are instituted.

o Parking areas located outside of the campus core (lots north of Cliff Drive and south of US 41) do not need to be gated unless there are extenuating circumstances.

o The perimeter of each core campus parking lot should include barriers to ensure vehicles cannot enter the parking lots without utilizing a valid access card during normal business hours. Effective barriers could include railing, bollards, landscaping, large boulders, etc. In situations where lot perimeters cannot be properly secured due to snow removal issues, the parking gates should be removed and increased enforcement instituted.

o Parking control gates that are older than six years should be reviewed for possible replacement. Significant repair requirements and/or significant cabinet damage are signs that a gate should be replaced.

o With new gates, the university should consider incorporating centralized control. This would involve new hardware, software, and

communications conduit that would allow for the programming and control of parking access gates from a central location (e.g., the Public Safety and Police Services office). Centralized control could also provide additional management abilities, such as lot utilization counts, variable message sign integration, and enhanced revenue control.

o In addition to centralized control, the university should consider upgrading to radio frequency identification (RFID) tags instead of magnetic stripe access cards. This would provide a couple of service enhancements including;

- Parkers would not need to roll down their windows to swipe a card. Instead the system would automatically detect the presence of a valid RFID tag and raise the gate. Parkers would be less exposed to weather conditions.

- RFID systems provide for quicker entrances and exits to/from the parking lots as parkers are not required to swipe access cards.

4.02.2   Commuter Student Allocations

Concerns about parking predictability, location, and price appeared to be more important to commuter students than flexibility. In addition, there are concerns about overutilization and/or vehicle queuing in certain areas. Therefore, some changes to commuter student allocation strategies appear warranted. The following outline details the recommended allocation strategies for commuter students:

- Overall, the total parking supply available to commuter students is sufficient to meet current demands. The current total commuter student parking allocation is approximately 42% utilized. However, most of the available parking is in perimeter parking areas such as Lots 22, 23, and 24. If these lots are removed from the equation, commuter student parking utilization is approximately 90%. The only way to improve the utilization of perimeter parking areas and reduce core campus parking demands is to use pricing strategies to encourage perimeter lot use and institute a shuttle program.

- It is strongly recommended that the university consider implementing a lot-specific parking permit program for commuter students. With this approach, commuter students would be able to select a parking area based on the amount they would like to spend and/or the level of convenience desired. If their first choice is already full, they would be able to select the next best option. For example, a student may desire to park in Lot 9. The price for a parking permit in Lot 9 would be higher than other permits due to the location of the lot. If the lot is full, the student could select the next best option (perhaps Lot 26 or Lot 32). The least expensive parking would be in Lots 22, 23, and 24.

- If a lot-specific approach is approved, the university will need to control the number of permits issued for each lot. The number of permits issued for each lot should be limited to achieve approximately 90% utilization of the parking supply in each individual lot. This 10% "cushion" of spaces is used to accommodate spaces lost temporarily due to construction, improper or illegal parking, snow plowing, etc., and provides for shorter searches for available parking. Commuter student parking permits can be oversold at greater levels than faculty/staff spaces due to typical student schedules. It is recommended that student oversell rates be set at 140% of available supplies initially. Oversell factors can be adjusted after collecting utilization data and more permits can be sold if space permits.

- As stated previously, commuter student parking permit prices should be based on the level of service provided. Parking in the core should be the most expensive, with lower prices the further the lot is from the campus core. Based on current conditions, there could be an opportunity to create three pricing tiers. This issue is discussed further in Section 4.04.5.

- If desired, commuter student parking permits could be issued according to class. This would mean that graduate students would have the first choice of parking locations, then seniors, then juniors, etc. This is not a requirement, but some universities use this approach. Regardless of how the parking permits are issued initially, it is recommended that the university provide the opportunity for commuter students to "renew" their lot assignments each year before incoming students have the opportunity to purchase permits. This would provide the opportunity for continuing students to maintain their parking or possibly purchase parking in different locations. After the

renewal period, parking permits would be available on a first-come-first-served basis.

- The university will need to strongly consider implementing a parking shuttle program to encourage the use of perimeter parking areas. The cost for this program could be covered using parking revenues, general fund subsidies, or a student transportation fee. These issues are discussed later in this report.

- The current allocation of undergraduate and graduate commuter student parking should be maintained. In the future, commuter student allocations should be adjusted to ensure a sufficient supply of graduate student parking inside and immediately adjacent to the campus core.

- While there is no immediate need to change the location or allocation of commuter student parking, there may be an opportunity to improve the utilization of one core campus lot. Lot 5 is currently underutilized. If this condition persists, the unused spaces could be made available to undergraduate students or used as overflow for faculty and staff members.

- As with the faculty/staff core campus lots, Lots 5 and 9 should be gate controlled. The perimeter of each lot should include barriers to ensure vehicles cannot enter the parking lots without utilizing a valid access card during normal business hours. If the lot perimeters cannot be properly secured due to snow removal issues, the parking gates should be removed and increased enforcement instituted. Perimeter student parking lots do not need to be gate controlled.

- While the provision of ADA accessible parking is based on the parking count of each lot, it is usually allowed to provide the parking in more convenient locations. Therefore, while the total accessible parking requirement should be

based on individual lot counts, the accessible parking required due to the parking provided in Lot 9 should be located closer to the campus core. They do not appear to be utilized in their current location. The accessible parking spaces in Lot 9 could then be used for more general commuter student parking.

4.02.3   Resident Student Allocations

Resident student parking is currently provided in parking lots adjacent to residences or in lots located on the perimeter of campus. The current utilization of dedicated resident parking lots is approximately 100%. Therefore, any additional residence hall developments will require additional parking or the university will need to direct future residence hall parkers to perimeter lots (e.g., Lots 23 and 24). If this is the case, additional steps may be necessary to provide a higher level of security

for overnight parking (e.g., security fencing, CCTV cameras, and/or access control gates). The following outline details the recommended allocation strategies for resident students:

- No changes to the current allocation and/or location of resident parking are recommended at this time. However, future changes in resident student populations could warrant adjustments to parking allocations. These adjustments could include (in order of recommended priority):

  - Reallocating commuter student parking to resident student parking;

  - Creating secure resident student parking in Lots 23 and/or 24;

  - Constructing more resident student parking lots or structures;

  - Limiting resident student allocations by restricting campus parking for certain groups (e.g., freshman resident students cannot bring vehicles to campus, instituting parking fees, or using other TDM strategies).

- Resident students should be assigned to the closest available parking to their residences. This strategy may or may not also include the campus' current practice of assigning resident parking based on the number of credit hours earned.

- In some cases, parking is currently assigned based on student gender (e.g., female students are provided closer parking). This "unwritten" policy is understandable. However, this policy is atypical of most universities. The university should review whether or not this practice should be continued and if this policy is legal, and then develop a formal guidelines. Based on typical industry practices, *Carl Walker* would recommend discontinuing the practice of gender-based parking assignments. Instead, the university should initiate strategies to help make parking as safe and secure as

possible for all community members. Please see Section 4.04.4 for more information.

- As stated in Section 4.02.1, all campus community members should pay for parking. This recommendation should be expanded to include that all community members should <u>directly</u> pay for parking. The cost for residential parking is currently bundled into the cost for housing. It is recommended that the university reconsider this practice and instead unbundle the cost of parking from housing. Unbundling the cost of parking from housing fees will help on a number of levels. First, students will see the true cost of parking on campus and can make a better informed decision on whether or not to bring a vehicle. Second, students that do not bring a vehicle to campus will not be forced to subsidize the parking for other resident students. Third, direct parking fees will lower housing costs (if only fractionally) and could lead to lowered parking demands. Finally, the fees will help fund the ongoing operations and management of the parking program.

4.02.4   Campus Visitor and Special Event Allocations

The lack of available visitor parking was a significant concern raised during several of the input meetings conducted in March 2011. Concerns included faculty, staff, and students parking in visitor areas; lack of available short-term loading spaces; securing sufficient parking for weekday campus events; negative impacts on departments/organizations planning events; and, difficulties using some of the visitor parking lots (e.g., having to pick-up a parking pass and then return to the vehicle to display the pass). Providing visitors with positive campus experiences can have a profound impact on the university's success in meeting institutional goals. The following outline details the recommended allocation strategies for visitor and special event parkers:

- The university has a current visitor parking supply of approximately 277 spaces in the core of campus. The current rate of utilization is approximately 84%. Based on reviews of the vehicles parked in visitor parking areas, many displayed either faculty/staff or student parking permits (both commuter and resident permits). The amount of visitor parking available on campus appears reasonable given the typical levels of campus visitors and historical event attendances. In fact, there may be too much visitor parking if the parking meters and visitor parking lots are not used by students and faculty/staff. Therefore, adjusting the overall allocation of visitor parking does not appear necessary. However, the management of the allocation must change to better ensure sufficient visitor parking is available.

- In order to improve the availability of campus visitor parking for true campus visitors, the following strategies are recommended:

    o Campus parking regulations already state that all members of the campus community must register the vehicles with the university. This policy should be enforced to the greatest extent possible.

    o All faculty, staff, and students parking on campus should be required to acquire (or purchase) a parking permit and park in appropriate lots. Parking regulations should be updated to state that faculty, staff, and students should not park in visitor parking areas. Parking in visitor parking areas should be discouraged to the greatest extent possible.

    o Parking rates in visitor parking areas should be adjusted to discourage long-term stays (without prior authorization from the TPMO). For example, the first two hours of parking could be relatively inexpensive but longer durations would be priced so as to discourage faculty, staff, and students from parking all-day. Parking at parking meters could be limited to one or two hours, regardless of whether or not additional time is purchased. If after these adjustments some visitor parking areas are underutilized, the unused spaces could be converted to permit parking.

    o The current practice of providing parking in Lot 27 at a flat daily rate should be discontinued. Instead, hourly rates should be implemented. This operating methodology would work as follows:

        ▪ Parking access and revenue control equipment would consist of gates, a ticket dispenser, a climate-controlled cashier booth (with sufficient insulation and heating/cooling in a suitable booth designed for the Houghton climate), and a fee

computer. The estimated cost of this equipment would be approximately $65,000.

- Visitors would take a ticket from the entry lane ticket dispenser and the entry gate would automatically open.

- After their visit, visitors would return to their vehicle and drive to the lot's exit lane. Using the visitor's ticket to determine the length of their stay, a cashier would use the fee computer to calculate the appropriate fee. The visitor would then pay the fee and leave the lot.

- If the university (or a specific department) does not want a visitor or a group of visitors to pay a parking fee, validations could be provided that offer discounted or free parking. The TPMO could offer (or sell) validations as needed. Ideally, the departments would be charged for their validations. Without a charge back the validation process could be easily abused.

- As needed, university departments and event planners would be able to reserve parking in the lot. Departments/planners needing to reserve parking in the lot would first call or email the TPMO and request a reservation (at least 24 hours in advance). The lot cashier would then be able to control the utilization of the lot to ensure sufficient space is available to meet the scheduled reservations. This could provide up to 87 parking spaces for visitors and/or event attendees.

- Staffing for this methodology would require approximately 12 hours per weekday (7:00 a.m. to 7:00 p.m.), and can be composed entirely of part-time staff. Assuming an hourly rate of $10.00 per hour, the annual cost would be $31,320.

- The operation of the visitor lot could be automated using a pay-on-foot machine (or similar technology) to process payments. However, this approach would not provide the ability to adequately reserve parking spaces in the lot for events or special users.

- When financially feasible, the university should consider removing the single-space mechanical parking meters in favor of a more advanced technology such as multi-space meters (e.g., pay-and-display machines). These machines can control multiple spaces and can eliminate the clutter of meter poles. Like meters, customers would pay their parking fees to the machine after parking their vehicles. For example, after a customer has parked his/her vehicle, they walk up to a pay machine. They pay for the amount of parking they think they will need by inserting the payment into the machine. Payment could be accepted using cash, debit, credit or

some other prepaid card. Parking customers then would return to their vehicles and place a paid receipt on the dashboard (or stick the receipt to their driver side window. This technology can cost approximately $10,000 to $15,000 per machine (installed) and replace entire sections of meters.

- To the greatest extent possible, large-scale special events in the campus core should not be scheduled during peak periods of parking demand (e.g., Monday through Friday from 8:00 a.m. to 4:00 p.m. when school is in session). This will minimize conflicts between the user groups, as well as reduce the number of times each year that permit holders are displaced.

- There is currently a special event parking agreement for the Rozsa Center for Performing Arts that allows for the reservation of parking in Lot 9 for a nominal fee. In these cases, commuter students are advised of the lot closure and are directed to other parking resources. There are a few concerns about this arrangement:

   o The required fee to reserve the parking lot is only $250 per day (or approximately $1.30 per space). This fee seems fairly low given the cost of reserving the lot, the inconvenience to commuter students, and the cost of parking lot operations and management. In the future, this fee should be increased to better reflect the true costs of reserving the lot.

   o It is not clear if the cost of staffing required to reserve the lot is included in the $250 per day fee. If yes, the rental fee is far too low.

   o It is not clear if the university is currently alerting commuter students to the possibility that Lot 9 can be reserved by the Rozsa Center. This possibility should be clearly mentioned in the campus parking regulations, on the parking permit application, and in any materials provided with the parking permits.

- One or two loading zone spaces should be provided near each significant event venue (e.g., the Memorial Union Building, Wadsworth Hall, and the Rozsa Center) to provide parking for catering and special event loading and unloading. Parking durations should be limited to 20 minutes or less, unless the vehicle displays a parking pass extending the time limit. The spaces should include curbs painted yellow, pavement stencils noting "Loading Zone", and signage. These loading zones will need consistent parking enforcement to be effective.

- The visitor/event parking for Wadsworth Hall is an especially difficult issue. The parking surrounding the building is heavily utilized by resident students and campus staff, making parking for special events extremely difficult. Possible solutions to this issue could include:

    o Creating a small allocation of visitor parking spaces in Lot 17. The number of spaces necessary would be between 10 and 20 spaces. Obviously, this would have a negative effect on resident student parking.

    o Temporarily reserving spaces in Lot 15 or Lot 17 as needed to support events held in Wadsworth Hall. This would involve barricading sufficient space the day or night before an event. This approach would be very difficult due to the nature of parking activity in the lots, and would inconvenience people that typically park in the lots.

    o Construct a small visitor parking lot on the west side of Wadsworth Hall. The topography of the site is not naturally conducive to constructing a surface parking lot, so construction costs could be high.

    o Consider reserving parking spaces in the Hamar House Lot as needed, up to 19 parking spaces could be available. The drawbacks to this option are the location of the lot (across US 41 from Wadsworth Hall) and the negative impact on those that typically use the parking.

    o Assuming a small supply of visitor parking can be provided to meet most daytime demands (smaller events of 15 to 30 people), large-scale events should be scheduled during non-school (non-peak) days/hours. Parking for larger events could then be provided in nearby parking lots.

- The university athletic department currently charges for parking in certain parking lots for basketball, football, and hockey games ($5 per vehicle). The revenues generated go directly to the athletic department to fund on-going operations. As mentioned previously, athletics should coordinate parking needs with the new TPMO prior to the event and the TPMO should at least be compensated for any reasonable direct and indirect costs. Ideally, the revenues generated in university parking lots should help support parking and transportation expenses before supporting other university departments or activities.

- The accessible parking needs for the various event types should be reviewed by the university and sufficient parking should be allocated in the best manner possible. Unfortunately, *Carl Walker* was not able to review accessible parking needs for events as no suitable events were held during the field review and no historical data is available. Accessible parking can

be provided in a temporary fashion when necessary to meet event needs (e.g., reserving three standard spaces to create two accessible spaces and an access aisle). Accessible parking spaces (even those provided in a temporary fashion) should provide an accessible pathway to the destination (e.g., suitable surface with a slope less than 2% and no significant barriers) and should be adequately cleared of snow and ice.

4.02.5   Options for Reducing Parking-Related Vehicle Traffic

The recent change to a permit system where permits are not assigned for a specific parking lot is likely to have increased the amount of "cruising" from one lot to another with drivers in search of an available space. When permits are assigned to a group of lots there is more flexibility, accompanied with less predictability. The flexibility to utilize any lot in a group of lots means that occasionally a driver's lot of first choice will be full and they must then search out alternative parking locations. Cruising for an available space can be frustrating and adds to the overall traffic congestion on campus. Some drivers will abandon the search and park illegally or in an unauthorized location.

There are methods to reduce the amount of cruising from lot to lot in search of an available space. Michigan Tech already successfully uses a parking occupancy count system coupled with barrier gates to restrict access into some lots when the lots are full. This system could be expanded to include the other major parking facilities on campus. If the space availability information is posted at the entrance to each of the major lots some cruising will be eliminated even if the lot is not equipped with barrier gates.

An even more effective strategy is to display the information on space availability for all of the major parking facilities at key campus entry nodes. The signs can be programmed to display the number of spaces available and/or open - full. Static directional arrows on the sign faces could direct drivers towards the lots.

While most members of the campus community will drive cars and trucks, some will use other forms of motorized transit. This could include motorcycles and snowmobiles. The university should continue providing parking for these types of vehicles in appropriate areas of campus. The utilization of these areas should be monitored and adjusted as necessary to meet changing demands.

4.02.6   Parking Supply Alternatives to Meet Future Needs

The campus currently has an adequate number of parking spaces if all of the existing parking lots, including the SDC lots, are included. However, some of the existing surface parking lots, particularly near the SDC, are not convenient to the academic core of campus.

Better utilization of the existing campus parking supply should be the primary goal ahead of constructing additional parking facilities, especially parking structures, within or near the academic core of campus. Parking structures are costly to build, require increased parking revenues to support, and require a significant amount of daily, weekly, and monthly maintenance. In addition, substantial structural maintenance is required to assure an acceptable service life for parking structures. The construction of a parking structure should be delayed for as long as possible through the better utilization of the existing parking resources.

Developing a parking structure in the near-term future will be financially difficult. Current parking permit rates are too low to support the construction and financing of a new structure. Current revenue does not cover the expenses to operate and maintain even the existing parking resources. The parking system is currently being subsidized with operational funding from other sources.

There are no planned major construction projects for the academic core of the campus that would eliminate existing parking spaces. However, circumstances can change and new buildings may be proposed. Typically, new university buildings are proposed on existing surface parking lots.   If a significant number of parking spaces will be eliminated for a new building project or aesthetic improvements, then additional parking spaces may become warranted.

The 'Fresh Look' scenarios report and concept plans suggest several locations for additional parking facilities in or near the core academic campus. A discussion of the 'Fresh Look' parking facility suggestions is provided in the following bullets.

- <u>West Campus Core</u>

    Lots 1 and 3 are identified as likely locations for a parking structure. However, the aesthetics of the structure, especially on Lot 1, must be carefully considered during the design process. A parking structure on the Lot 1 site would front directly onto the proposed pedestrian spine through the campus.

    It is important to note that the long dimension of both Lots 1 and 3 measure about 260 feet. A parking structure designed for either site would require sloped floors along both long side facades of the structure. Level floors along at least one of the long sides of the parking structure are generally preferred for aesthetic reasons. The slopes of ramps inside a parking structure cannot be too steep to comply with Americans with Disabilities Act (ADA) design guidelines and to provide a high degree of user comfort.

The maximum ramp steepness combined with an efficient parking space layout, and a level floor façade along one long side dictates a minimum site length of about 300 feet.

Certainly, an attractive parking structure could be designed and constructed on either Lots 1 or 3, but the construction cost per parking space would be higher than for a parking structure constructed on a longer site. It is now a common practice to include 'liner buildings' in the design of parking structures to help camouflage the parking structure. The liner buildings could provide space for offices or other university-related uses.

Alternatively, a parking structure could be constructed on the combination of Lots 11 and 27. The structure could take advantage of the elevation drop from Lot 11 to Lot 27 to help reduce the visual mass of the building. The combination of lots would provide a site that could accommodate a parking structure with a 310 foot length. The structure could again include some liner building uses such as a university welcome center. In addition, a reconfiguration of Hubbell Street near the Union Building could create a plaza between the two buildings and connect to the proposed pedestrian spine through campus.

- East Campus Core

Lot 8 is suggested as possible parking structure site in the 'Fresh Look' concept plan. A parking structure on Lot 8 would certainly provide convenient parking for events at the Rozsa Center and be relatively convenient for non-event parking as well. The physical dimensions of Lot 8 are about 130 feet wide by 310 feet long and could be expanded westward. An efficient parking structure design could be used in Lot 8. However, the loading docks for the Rozsa Center and the Walker Arts Center both face out onto Lot 8. To maintain access for large delivery trucks the first supported level of the parking structure would need to be raised to provide clearance or the loading docks would need to be moved or reconfigured.

Lots 9 and 5 were also suggested as possible sites for a parking structure. Certainly the site dimensions would allow the design of a cost effective and attractive parking structure. The large site would allow the parking structure to include liner building uses. The site design associated with a structure on this site would need to incorporate circulation and drop of-locations for the Rozsa Center. Overall, the Lot 9/5 site appears to be a better location than Lot 8 for a parking structure.

- <u>Below New Residential Buildings</u>

  The 'Fresh Look' scenarios report and concept plans also suggests including parking structures below new residential buildings. Sites for new residential buildings were identified north of Cliff Drive and south of Highway 41. Including parking spaces below the new residential buildings creates conveniently located spaces for residents and the academic core as well. It is generally more expensive to construct parking spaces below a building than in a free standing parking structure. If the spaces are located below grade the spaces become even more costly. The costs to operate a below grade parking structure are also higher than for an above grade parking structure.

- <u>Surface Lots</u>

  New surface parking lots north of the existing Lots 21/26 are also included in the 'Fresh Look" concept plans. These new lots are closer to the academic core than the SDC Lots but are still relatively inconvenient for the academic core. The spaces in these new lots could be used to replace parking spaces that would be lost to development of outdoor recreational space south of Wadsworth Hall or other campus development projects. The cost of providing surface parking in this location will be more expensive than typical surface parking lots due to the topography of the location.

  A reconfiguration of the surface lots (Lots 11, 12, 27 and the Admissions Visitor Lot) and on-campus roadways just north of Highway 41 is also proposed in the 'Fresh Look' concept plan. The reconfiguration is apparently recommended to create a one-way traffic flow and improve the aesthetics of the area.

  Parking Lot 10 is currently an unpaved dirt lot. It was noted during the field reviews that parking conditions in the lot were less than ideal. There was a significant amount of mud and pot holes that made using the lot difficult and uncomfortable. If this area will be used for parking for the foreseeable future (longer than 3-5 years), the university should consider paving the lot.

  While an unofficial parking lot, another unpaved parking area frequently used is located just north of the SDC building. It is currently anticipated that a future expansion of Portage Health will close the area off from the west (main drive) and access will be limited. However, at least a portion of the area may remain available for parking. In the near term (before the

Portage Health expansion), the university should either designate the area as an official parking area (signing the area for permit parking and enforcing parking regulations) or the area should be designated as no parking.

4.03   Parking Signage and Wayfinding

The existing parking lot signs that identify facilities are generally in good physical shape. The design and layout of the sign faces are consistent throughout the parking system. The existing signs are effective in presenting:

- Identification as a Michigan Tech Lot
- Displaying the Lot Number
- Designated User Group

Some of the lot signs also provide suggestions of alternative parking locations if the lot is full.

However, some of the supplementary signage at the entry lanes conflicts with the information on the lot signs. For example, in some locations small signs affixed to the barrier gate housings present operating hours that differ from the primary lot signs. The information on all the signs for a specific lot should be consistent. The smaller signs should be removed or covered.

The sign panel near Lot 10 contains a dynamic lighted "full" sign module. However, the "full" sign does not apply to Lot 10. Rather the "full" sign is illuminated when Lot 9, across the street, is full.   It is acknowledged that regular users will learn that the "full" sign applies to Lot 9 and not Lot 10. The placement of the "full" sign is confusing and should be moved.

Consideration should also be given to supplementing the lot signs with similar wayfinding signs. Conceptually, the wayfinding sign faces would be perpendicular to the roadway and include arrows pointing towards the lot entrances.   These wayfinding signs are most needed for the parking lots open to visitors. The wayfinding signs pointing towards visitor parking facilities should also include location supplementary information such as: "Administration Building", "Rozsa Center", "Memorial Union Building", etc. The visitor wayfinding and lot designations signs should be consistent with the Michigan Tech signage theme; some of Rozsa Center visitor parking signs are not consistent with the standard Michigan Tech signage and are not graphically bold.

4.04   Parking Operations and Management

As stated previously, campus parking is currently operated and managed by several university departments. This section of the report outlines recommended improvements for the operation and management of the campus parking system.
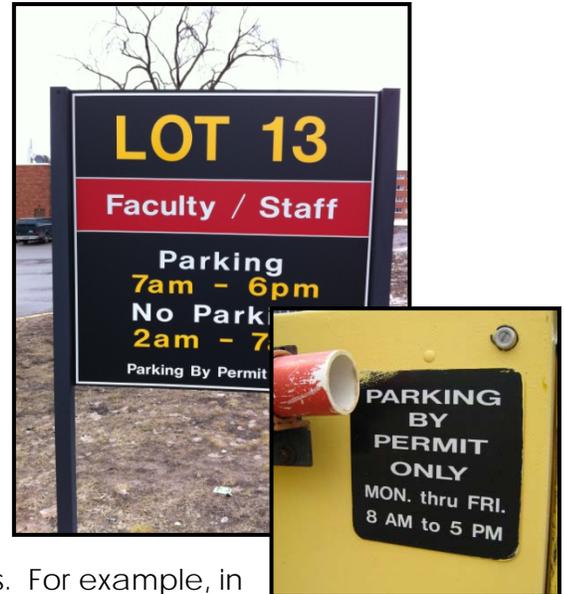
4.04.1   Unification of Campus Parking Management

There is currently no single department responsible for overall parking management. Some campus parking systems have evolved similarly over time into organizational structures that are "horizontally integrated." This means that various parking system components are spread among multiple departments or entities.

In a horizontally integrated parking program, where each department only manages one aspect of the parking system (such as residential parking, enforcement, or permit issuance), no one has responsibility, or the perspective, to manage all these interrelated components as a system. In one situation where different departments each managed a small amount of the parking supply along with responsibilities for several other areas, the observation was made that "parking was everyone's part-time job, but no one's full-time job."

It is recommended that the university work to create a vertically-integrated parking and transportation system. Initially, responsibility for the campus parking and transportation program should reside in the Department of Public Safety and Police Services. This department is the logical location (at least initially) due to the level of parking-related management services they already provide. Parking management responsibilities for many university campuses reside within public safety. As part of a parking management program, TDM strategies should also be managed by the TPMO.
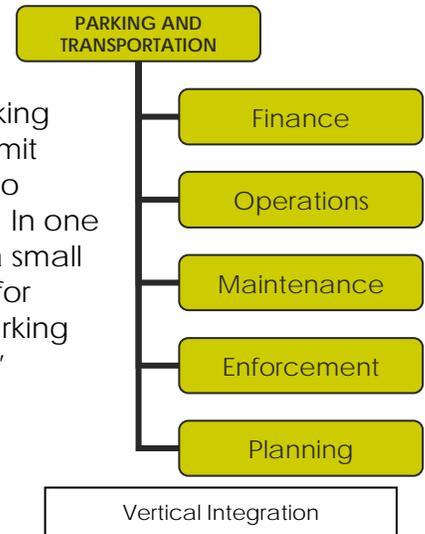
The process of organizing the management of the parking and transportation system will take time and should be set up to maximize the benefits of a coordinated parking and transportation system into the future, not just appeasing the needs of today. All campus parking assets should be incorporated into the new parking management structure including all parking lots and spaces, enforcement, fine collection, etc. All parking-related revenues and expenses should be accounted for in the TPMO, and revenues should flow toward the goals of the system in concert with the designated parking and transportation guiding principles. If the system is financially stable and achieving its goals, then revenue could be diverted to other associated needs (such as TDM initiatives). The parking system can also serve the following functions:

- A clearinghouse for campus parking and transportation information.
- Provide parking-related support for all campus departments/organizations.
- Participate in campus planning and development process.
- Develop policies and procedures based on approved guiding principles.
- Develop parking system mission and vision statements to reflect alignment with larger campus strategic plans and goals.

A unified parking management organization will require additional staff dedicated to the administration of campus parking. This would include a full-time campus

transportation and parking manager (approximate salary of $48,000, plus taxes and benefits – a total of approximately $60,000 per year assuming a taxes and benefits factor of 1.25) and a part-time administrative assistant (approximately 25 hours per week at $13.00 per hour, or $16,900 annualized).

While the primary responsibility for campus parking would reside with the Department of Public Safety and Police Services, other campus departments may still be involved with operating and maintaining parking lots. For example, the Facilities Department will still provide certain maintenance services. These services could be managed through periodic coordination meetings, defined service contracts, and/or set maintenance schedules. The departments providing parking-related services to the TPMO would charge for services to ensure that costs flow to TPMO budgets.

4.04.2   Parking Permit Issuance and Control

Ideally, all parking permits would be issued either directly by or through the TPMO. However, this may not be realistic initially. In the near-term, parking permit issuance may remain as it is today with the various departments issuing permits independently. Long-term, parking permits should be issued as follows:

- Commuter students should continue to have the option to register for parking at the same time they register for classes. The fees collected will be deposited in a designated parking system fund. Parking permits could be mailed to students by the TPMO, or they could be picked-up from the TPMO when the student arrives to campus. Commuter students that want to purchase parking after they register for classes should purchase their parking directly from the TPMO. All permit order fulfillment and tracking would be performed by the TPMO.

- Resident students should continue to have the option to register for parking at the same time they register for housing. The fees collected should be deposited in a designated parking system fund. Residential parking permits could be mailed to students, or they could be picked-up from either the TPMO or at their residences. Permit order fulfillment and tracking would be performed by the TPMO. Resident students that want to purchase parking after they register for housing should purchase their parking directly from the TPMO. Students wanting resident parking will need to furnish proof of residence prior to being issued a parking permit.

- Faculty and staff will continue to register for parking directly through Public Safety (the initial TPMO).

- All other specialty parking permits and passes will be issued through the TPMO.

- Parking permits should be valid for no more than one year.

- While the permit colors can remain the same each year, parking permit designs should vary. For example, parking permits could be square one year and round the next. Parking permit shapes should not be reused for at least four years. In addition, parking permits should incorporate counterfeit-deterrent features such as unique colors and fonts, watermarks, and/or holographic lettering or borders.

- The university should provide existing permit holders with a renewal period that occurs prior to opening general sales for the next academic year. Parking permit renewal could occur in March of each year and last for one month. Open parking permit sales could begin in May, after the renewal process is complete and available parking quantities and locations are determined.

- If the future, the TPMO should continue providing online vehicle registration and permit sales for all campus user groups.

The TPMO will be responsible for all parking permit, revenue, and access controls. To assist with this responsibility, it is recommended that the university consider investing in a parking permit control system. This system could be integrated with parking enforcement and/or parking access and revenue control systems to form a complete management package. Most permit systems also offer the ability to sell permits online.

In addition, office space will likely be required to provide space for permit sales, order fulfillment, and staff. Ideally, this space should be provided in a building that is close to the campus core with a sufficient amount of short-term parking. The office should provide space for up to two cashiers (e.g., traditional cashiering counter), office space for the transportation and parking manager and the appeals officer, desk space for the administrative assistants, an area for enforcement officers (e.g., small lockers for personal items, space for equipment and supplies, and small workstations for at least two officers), a storage space, and access to a restroom and a lunch room. The size of this space could be between 1,500 and 2,000 square feet. It does not appear that the Public Safety building has sufficient space for the additional demands of parking management.

Day-to-day permit sales and citation collections should not require a significant full-time staff. One to two full-time cashiers should be sufficient. Assuming a pay rate of $12.00 per hour and a taxes/benefits factor of 1.25, the annualized cost for two full-time cashiers would be $62,400. However, during periods of heavy order fulfillment (likely the beginning of the fall semester and to a lesser degree the beginning of the spring semester) additional part-time (seasonal) staff may be required. Part-time staff requirements could be between 6 and 8 people for two to three weeks. Assuming 8 part-time workers at $10.00 per hour are need for 3 weeks at 5 hours per day each, the estimated annual cost would be $6,000.

4.04.3 Parking Enforcement

The success of any parking management program requires effective enforcement. Regulations are intended to produce parking patterns that utilize the campus parking inventory efficiently, and this will only happen if permit regulations, meter payments, time restrictions, and other rules are enforced with sufficient frequency so that drivers see an advantage to parking legally.

Currently, the Public Safety and the Housing Facilities departments provide campus parking enforcement services. Parking enforcement includes one full-time enforcement officer and a staff of part-time student enforcement officers. Enforcement officers that work for Public Safety use an outdated computerized parking enforcement system and housing officers use handwritten tickets. In 2010, (the last full year in which citation information was available), the university issued 19,128 parking citations for a fine total of $305,625. Of the citations issued, the university collected $206,915 – or approximately 68% of the citations issued. Approximately 1,120 citations were dismissed on appeal (5.9% of the citations issued). Information is not currently available to determine current capture rates.

Building an effective enforcement program requires making many critical strategic decisions that can greatly impact a program's success and ability to adapt with changing conditions. The following bullet points summarize *Carl Walker's* recommended parking enforcement program improvements.

- *Responsibility for Parking Enforcement*

  Placement of enforcement within the public safety department is typical of many campuses, especially smaller colleges and universities. This strategy can have a number of advantages:

  o Reliance on an existing command structure.

  o Use of existing communications networks.

  o Availability of Parking Enforcement Officers (PEOs) for emergency duties, such as traffic control, as needed.

  o Greater respect for PEOs as members of the police organization.

  However, there can also sometimes be disadvantages:

  o Second class status, with enforcement not viewed as "real" police work.

o   Lack of available resources to dedicate to effective parking enforcement.

o   Separation from the larger parking management program, including failure to relate enforcement activities to other parking-related goals.

o   Public safety departments are not often experienced in managing the "backend" collection programs necessary to achieve high citation closure rates.

It is recommended that the responsibility for parking enforcement should rest within a vertically-organized department responsible for the campus parking and transportation program. As suggested above, placing all enforcement responsibilities within the recommended TPMO (the Department of Public Safety and Police Services) would increase the likelihood that enforcement goals and performance are aligned with overall parking system goals, as well as facilitate the coordination of all parking related resources.

Placing all parking enforcement within Public Safety would also provide the opportunity to transform the responsibilities of the PEOs from only parking enforcement to enforcement and basic parking lot security and assistance. Instead of only enforcing parking regulations or assisting with traffic direction, the PEOs could also provide visitors with information and directions, as well as provide a level of additional security in and between parking facilities. This will improve perceived security on campus and will help improve overall customer service.

Benefits of this approach include:

o   Directly linking enforcement activities and personnel to the larger parking mission.

o   Greater likelihood that performance will be evaluated in conjunction with parking goals and actual parking dynamics.

o   Devotion of all PEO hours to parking-related duties.

o   Citation fines and penalties become one component of a larger accounts receivable system managed by the TPMO.

o   Ability to share appropriate police resources (such as communications networks).

- *Parking Enforcement Goals, Technologies, and Staffing*

If the parking plan is to be successful, it is essential that enforcement activity not be driven by anecdotal evidence or become a response to the loudest voices. Rather, there must be a consistent thread running through the larger goals of the program, the policies established and strategies used to achieve those goals, the regulations which govern their application, the application of enforcement to achieve the goals, and how success is evaluated. That common thread is data, collected at regular intervals, on occupancy, turnover, violation rates, and capture rates, and the collection of direct parking revenues and citation fines.

To be most useful, industry "standards" should be adapted to local conditions and needs. The following standards are presented as possible starting points for setting goals for the campus parking enforcement program:

- o Overall occupancy rate in campus visitor areas: 85-90%;

- o Overtime violation rate: 10-15%;

- o Overtime violation capture rate: 20-25%;

- o Permit violation capture rate: 25-30%;

- o Average duration of stay in meters: 70-120% of time posted limits;

- o Citation fine collection rate 85% or greater.

- o Citation voids: 2% or less.

Ideally, the program's goals and policies would be developed through a formalized process led by the TPMO, but also incorporating input from the campus community.

Following this model has a number of key benefits:

- o It allows enforcement activity to be directly linked to clear, non-monetary goals.

- o It moves discussion from "what is happening" to what should be happening and how to move things in the proper direction.

- o It provides the university with specific data to evaluate complaints from students, faculty, and staff.

- o It supports better-informed decisions regarding the number of enforcement personnel needed and how/where they should be deployed.

In our experience, the existence of hard data and analysis often produces greater support for enforcement and other management strategies. For this reason, it is recommended that the TPMO have sufficient resources to conduct such analyses on a regular basis. This can be done by students, parking staff, contracted consultants, or a combination of the two.

One issue that often arises during the discussion of parking enforcement is the fear that increased parking enforcement will discourage people from visiting campus, or will unfairly inconvenience those that do visit. In order to help mitigate this fear, an approach that reduces the impact on campus visitors and increases the penalties on continual parking policy violators is recommended (if allowed by local and state statutes). This is typically achieved through the use of an escalating fine structure. For example, the first ticket for a specific offense received within a certain timeframe (e.g., every six months or per year) is an automatic warning. The second ticket received within the set timeframe would result in a fine, perhaps $10 to $25. The third ticket received for the same offense within the set timeframe would result in a higher fine, perhaps $15 to $30. The fine would continue to escalate to a set maximum fine to discourage breaking the same regulation. This would reduce the impact on visitors, as it is less likely they will continually break the rules. However, the penalties will continue to grow for habitual violators abusing the parking regulations.

Because so many decisions remain to be made concerning campus parking, it may not be practical to make specific recommendations regarding which parking enforcement technology the university should pursue at this time. Decisions regarding the introduction of multi-space meters, the extent of time limits and loading zones, the use of permit strategies, etc., will materially impact the type of technology needed and the level of sophistication needed to integrate those technologies and strategies. Moreover, the technology is advancing rapidly in both capability and the potential for integration; therefore, available solutions and options for implementation may be very different in as little as six months. However, the use of updated computerized parking enforcement equipment is recommended as soon as it is financially feasible. Preliminary technology cost estimates, issues, and recommendations would include:

- Purchasing updated handheld citation issuance computers and printers. The cost of handheld enforcement computers range between $4,000 and $7,000 per unit (including software, depending on the features selected). There may or may not be annual software subscription fees as well.

- Parking system software that provides both citation management and parking permit management capabilities. The software should also be Internet enabled to provide for remote system access, provide the ability to pay for parking citations and permits online, and provide for online citation appeals. The software is typically sold on a multi-year subscription basis. Estimated annual subscription costs could range from $9,000 to $12,000 per year (depending on the number of concurrent users access the back-end software at any one time).

- Additional assistance will be needed to install and implement the new system. This would include installation, training, data migration, and interfaces with accounting software. The prices for these services will vary depending on various circumstances but could be approximately $33,000.

- The total costs for a complete parking enforcement and permit system would be estimated to range between approximately $65,000 and $80,000 (depending on desired features, and assuming 5 handheld units and 5 concurrent licenses were purchased).

- A new citation system would provide the ability for citations to be automatically posted to faculty, staff, and student accounts on the same day.

- There are a number of companies that can provide these products and services. Typically recommended companies include:

    o T2 Systems (Indianapolis, IN)
    o Cardinal Tracking (Lewisville, TX)
    o Automated Issuance/Management Systems (Syracuse, NY)

- In order to select the most appropriate system, the university should develop a set of desired capabilities (or a formal set of equipment specifications) and conduct a formal request for proposals process.

With respect to staffing, a basic parking enforcement operation would need at least one full-time Parking Enforcement Officer (PEO) to function as the lead, one full-time administrative position (full-time position for community questions, necessary data entry, ticket tracking, collections, etc.), one part-time appeals officer, and part-time student enforcement staff.

Three PEOs (both full-time and part-time) should be sufficient to provide consistent coverage for the campus during daytime and early evening hours (two PEOs could be sufficient if both officers are provided with vehicles). PEO coverage should begin at 7:00 a.m. each weekday and end at approximately 10:00 p.m. (for evening resident parking coverage). Weekend coverage should also be provided if parking regulations are in effect. The estimated costs for parking enforcement would be similar to current costs (assuming staff savings from a unified system offset an increase in enforcement hours), with the exception of the full-time administrative assistant. Assuming a pay rate of $13.00 per hour and a taxes/benefits factor of 1.25, the annual cost of a full-time enforcement administrative assistant would be approximately $33,800.

All enforcement officers should be provided uniforms for easier identification while working in the field. The uniforms need not be police officer style uniforms. However, the uniforms should clearly indentify and distinguish the individuals as enforcement officers; thereby reinforcing their authority. The uniforms should be designed to be highly visible as the PEOs will be on foot in the parking lots. The uniforms will also help identify the officers to visitors who may have questions about the campus or need other assistance.

- *Administration of the Adjudication Process*

Adjudication is an important aspect of parking enforcement. Even the best enforcement programs issue some citations for which the vehicle owner is not ultimately liable. Thus it is critical that the campus community have a fair process by which they can contest a citation. In truth, a sound, fair adjudication process helps validate the entire enforcement effort.

Ideally, citation recipients wishing to contest a fine should be offered an administrative review by email, regular mail, or by telephone prior to more formal action being required. Parking system staff would be authorized to dismiss

certain citations based on specific documentary evidence (such as a valid disabled placard). If the citation is upheld and the recipient remains unsatisfied, he or she could be required to post the fine and have a hearing before a higher level appeals officer or appeals board. If the citation is upheld and the recipient is still unhappy, he or she can pay a fee and schedule a hearing in higher level court. At the last two stages, all posted fines and fees would be returned if the citation is dismissed.

The university has established a similar appeals process to the one outlined above and it is not necessary to materially alter this process. It is recommended that the hearing process be separated organizationally from enforcement (but can remain within Public Safety).

In order to process appeals in a timely fashion, it is recommended that the university hire a part-time parking appeals officer that reports directly to the transportation and parking manager to conduct first level reviews of all appeals. Assuming a pay rate of $17.00 per hour and a total of 20 hours per week, the annual cost of a part-time appeals officer would be approximately $17,680.

- *Collection of Fines and Penalties*

In the discussion of enforcement goals, it was stressed that revenue should not be the primary goal of parking enforcement. While this is true, parking managers must also do everything practical to collect all fines and penalties once imposed on violators. Citations lose their deterrent value if the university collects only a small percentage of the citations for which the vehicle owner is found liable. Fortunately, the collection tools and supporting technology available to campuses have improved in recent years, and the university can employ additional tactics (some of which are already used by Michigan Tech):

Imposition of late penalties

If citations remain unpaid or uncontested for a certain amount of time, the fine amount is increased. However, the longer one has to make up his or her mind about a parking citation, the greater the chance it will be forgotten or ignored. A 10-day window is typically ample and fair.

Noticing

Notices (invoices) could be sent to parking violators concerning outstanding parking tickets.

Permit Non-Renewal

Vehicle owners should be required to satisfy all outstanding parking citation debt before renewing or purchasing his or her parking permit.

Restrict Students from Registering for Classes

Students should be required to satisfy all outstanding parking citation debt before registering for classes.

Withholding Diplomas and Transcripts

Students should be required to satisfy all outstanding parking citation debt before being given diplomas or official copies of transcripts.

Employee Reprimands and Wage Withholding

If legally possible, employees with outstanding parking fines could receive administrative reprimands and/or wages garnishments until fines/debts are paid.

Booting/Towing

Vehicles found with a certain number of outstanding parking citations (perhaps three or more) could be immobilized (booted) and/or towed. While booting and towing programs can be very effective, they can also be labor intensive (since enforcement staff must also be assigned to release the boot once the debt is paid). In addition, if the owners of booted vehicles do not come forward within a reasonable period of time (usually 24 to 48 hours) the university must be prepared to tow the vehicles to a secure storage location. Many campuses contract out this service to a tow vendor who provides both towing and storage services.

It is recommended that the university consider utilizing a consistent booting/towing program, even if it were operated only a few days each week. This would not only provide some direct revenue from the booted/towed vehicles, but would also generate publicity that would cause other scofflaws to pay voluntarily. In addition, booting/towing can help stop individuals from incurring more citation debt than they can effectively manage.

Credit Bureau Reporting

Some parking systems are now reporting outstanding parking fines to one or more of the national credit reporting agencies. Some campuses would consider this tactic too harsh, and its use can lead to numerous complaints. It is important that the parking system obtain the informed consent and support of university officials before starting such a program.

Use of Collection Agencies

The university could contract with a collection firm specializing in parking fines. Such firms know the issues associated with parking citations, and have programming in place to accept vehicle-based

referrals and report payments for application to the correct plate/citation. If the university opts for additional collection services, collection fees could be passed to the violator.

4.04.4 *Parking Lot Safety and Security*

A common concern on many campuses is the need to improve security and lighting in parking lots and on pedestrian paths to/from parking areas. This section will provide options for improving parking facility security and lighting.

There are basically two types of parking facility security options: passive security and active security. Passive security refers to designing a facility to create a secure environment, without the need for an active human security response. This typically includes eliminating potential hiding places, appropriate lighting levels, low-level landscaping around the parking facility perimeter, etc. These elements promote a secure environment. Active security refers to the addition of systems that require a human response, such as panic alarms, closed-circuit television, etc. While passive security creates an environment that deters criminal activity, sometimes additional steps are necessary to further discourage crime or to improve perceived facility security.

Clearly, all parking facilities should embody the concepts of Crime Prevention through Environmental Design (or CPTED), and parking is no exception. According to the National Crime Prevention Institute, CPTED is "... the proper design and effective use of the built environment which may lead to a reduction in the fear and incidence of crime, and an improvement of the quality of life." Parking facilities and pedestrian paths to/from the facilities should be properly landscaped, lines of sight should be unobstructed, potential hiding places should be eliminated, and adequate lighting should be provided. Public Safety officers should be able to provide a CPTED review of campus parking facilities and provide additional security design recommendations.

Several active security methods could be included in campus parking facilities to improve real and perceived security. First, call boxes could be installed in parking areas. These devices would generate a loud noise when activated, and could also incorporate a pulsating light to indicate where help is needed. Several types of alarm systems are available including wireless systems with intercom features. The intercoms could provide a voice connection directly to Public Safety in the event of an emergency. Ideally, the alarms should be placed within a 100-foot walking distance from anywhere in the parking area. Other active security measures, such as closed-circuit television, could also be included.

Parking facility lighting should be sufficient to help avoid vehicle accidents, provide visibility of pedestrian hazards, deter criminal activity and meet parking industry lighting standards. A minimum horizontal illuminance of 0.5 footcandles (measured on the parking surface, without any shadowing effect from parking vehicles, trees, etc.) is recommended for enhanced security in parking lots by the Illuminating Engineering Society of North America (IESNA RP-20-98). The recommended minimum vertical illuminance (measured at 5.0′ above the parking

surface) is also 0.5 footcandles. In order to reduce the amount of light scatter, fixtures that direct light downward onto the parking lot (cutoff luminaire) are recommended. In order to determine if lighting is sufficient in parking areas and pedestrian pathways, it is recommended that the university conduct parking-facility specific and larger campus lighting studies in the future.

4.04.5   Parking System Financial Issues

In addition to designating a TPMO, the university will need to determine how to fund on-going parking operations, management, new equipment, new facilities, and transportation demand management initiatives. Current parking system revenue streams are fairly limited. Parking revenue is currently limited to commuter student parking fees, parking meter revenues, pay parking operations (Lot 27 and university events), and collected parking fines. Annual parking system revenues are approximately $330,000. Parking system expenses (e.g., permit registration, enforcement, snow removal, lighting, maintenance, and basic operations/management) total approximately $780,000. The revenues collected are approximately $450,000 short of covering all parking system expenses.

The university currently charges only commuter students and some campus visitors for parking on campus. Commuter student pay $25 per semester or $50 per year for parking. Visitors must pay for parking if they use metered spaces or Lot 27 (flat fee of $2.00 per entry). The university also charges for event parking in certain cases. Visitors that use visitor parking permits are not required to pay for parking. Faculty, staff, and resident students are also provided free parking. Overall, parking permit rates at Michigan Tech for all user groups appear to be significantly lower than other similar university campuses (as shown in Section 2.03.6).

Current parking citation fines were recently increased by the university. Parking enforcement fines range from $10.00 (overtime parking) to $100.00 (accessible parking violation), with most fines set at $25.00. Current citation fines appear to be consistent with other similar universities.

The creation of a unified parking management organization will increase parking system costs (although some of the increases will be offset by savings in other departments that will no longer be involved in parking management). Most of the on-going costs will be composed of parking-specific staffing including:

- Transportation and Parking Manager (Full-time): $ 60,000 per year
- Administrative Assistant (Part-time): $ 16,900 per year
- Enforcement Admin. Assist (Full-time): $ 33,800 per year
- Appeals Officer (Part-time): $ 17,680 per year
- Lot 27 Cashiers (Part-time): $ 31,320 per year
- TOTAL NEW STAFF COSTS: $159,700 per year

New equipment/technologies would be added to this amount. For example, initial costs for a new parking enforcement and permit tracking system could be $65,000 to $80,000 and ongoing annual software subscriptions could be $9,000 to $15,000 per year. Each new parking gate would cost approximately $5,000 each

(installed). Software and hardware to provide centralized control of the parking control gates and parking lot counts could cost over $45,000 (plus installation and necessary communications conduit and wiring). Finally, the purchase of parking and transportation office and field equipment/supplies (uniforms, desks, chairs, computers, telephones, etc.) could cost approximately $12,000 to $16,000.

As the parking system currently generates an overall deficit of approximately $450,000, current and future expenses must be covered by increased revenues. In order to improve the financial condition of the university parking system, the following recommendations are offered.

- **Increase campus parking rates** – As stated previously, current campus parking rates appear to be significantly lower than those at similar institutions. In order for the campus parking system to break even each year, the average annual revenue per parking space would need to be approximately $170. Increasing parking rates to this level in the near-term may not be politically feasible. However, the university must start the process to increase rates to better meet system expenses. The following rate adjustments are recommended:

  o The university should strongly consider implementing pay parking for faculty and staff. Assuming a rate that is roughly the average for the surveyed institutions ($120 per year), the university could generate an additional $135,000 or more per year to fund parking system expenses. In order to minimize the burden of this fee, it is recommended that faculty and staff have the ability to pay for their parking through pre-tax payroll deductions. This would help reduce the cost of campus parking to less than $10.00 per month or less than $4.62 per pay period (there would be an additional small tax savings).

    ▪ For faculty and staff that need only occasional parking privileges, the university could offer daily parking permits and/or multi-day permits. If access control gates are utilized, temporary access cards (or in the future AVI tags) could be provided that allow access for specific timeframes. There should be a charge for the temporary passes that at least equates to the per day cost of the annual parking permits (assuming approximately 250 workdays per year, the day rate could be $.50 per day).

  o The university should strongly consider implementing a three-tier approach to commuter student parking. Tier One would be the most

convenient commuter student parking on campus – Lots 5 and 9. This parking would cost $150 per year, or $75 per semester (close to the higher similar institution average shown on page 28). Tier Two would be the next most convenient level of parking – Lots 26 and 32. This parking would cost $100 per year, or $50 per semester (equal to the lower similar institution average). Finally, Tier Three would be the least convenient parking (Lots 22, 23, and 24). This parking would cost $50 per year, or $25 per semester (equal to one-half of the lower similar institution average). This fee structure could generate an additional $70,000 per year.

o The university should strongly consider instituting parking fees for resident students. Assuming a rate that is similar to the commuter student low average for similar institutions ($100 per year), the university could generate an additional $84,000 per year.

o The university should consider implementing an hourly parking fee in Lot 27 and increasing parking meter fees and event parking rates by an average of 50%. This could help generate an additional $60,000 or more annually.

o Increases to campus parking fees could generate as much as $349,000 in additional revenue each year (sum of faculty/staff, commuter student, resident student, and visitor rate changes). This revenue would help close some of the gap between parking system expenses and total revenues.

o Fees should be increased each year at a pace greater than expenses until the system becomes financially self-supporting.

- **Increase parking enforcement collection rates** – As stated previously, current citation collection rates are approximately 68%. Using enhanced collection techniques and improved software systems, Public Safety could increase collection rates to 85%. A 17% increase in citation fine collections could equate to a $35,176 increase in citation revenues per year. The TPMO would continue working to improve collection rates after achieving this goal.

The following table illustrates the possible impacts of the recommendations included in this report (based on a preliminary implementation program). *Carl Walker* cannot guarantee that financial projections developed for this report will be realized as actual financial performance will be determined by many factors including: the pace of future campus development projects, fluctuations in campus parking demands, the timing of strategy implementation, parking pricing strategies used by the university, managerial decisions made by Michigan Tech, and other decisions made by municipal, county, state, and federal government officials.

Revenues [1]	Current	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Existing Revenues	$330,000	$330,000	$363,000	$399,300	$439,230	$483,153	$531,468	$584,615	$643,077	$707,384
New Faculty/Staff Fees		$135,000	$148,500	$163,350	$179,685	$197,654	$217,419	$239,161	$263,077	$289,384
New Commuter Student Fees		$70,000	$77,000	$84,700	$93,170	$102,487	$112,736	$124,009	$136,410	$150,051
New Resident Student Fees		$84,000	$92,400	$101,640	$111,804	$122,984	$135,283	$148,811	$163,692	$180,061
New Visitor Fees		$60,000	$66,000	$72,600	$79,860	$87,846	$96,631	$106,294	$116,923	$128,615
New Enforcement Collections		$35,176	$35,176	$35,176	$35,176	$35,176	$35,176	$35,176	$35,176	$35,176
TOTAL REVENUE	$330,000	$714,176	$782,076	$856,766	$938,925	$1,029,300	$1,128,712	$1,238,066	$1,358,355	$1,490,673

Expenses [2]	Current	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Current Expenses	$780,000	$780,000	$803,400	$827,502	$852,327	$877,897	$904,234	$931,361	$959,302	$988,081
New Dedicated Parking Staff [3]			$159,700	$164,491	$169,426	$174,509	$179,744	$185,136	$190,690	$196,411
New Enforcement System				$95,000	$15,000	$15,450	$15,914	$16,391	$16,883	$17,389
New Control Gates				$25,000	$25,000	$25,000	$15,000			
New Centralized Control					$45,000					
New Equipment for Lot 27			$52,000							
New Supplies			$16,000				$16,000			
New Campus Shuttle		$192,000	$197,760	$203,693	$209,804	$216,098	$222,581	$229,258	$236,136	$243,220
TOTAL EXPENSES	$780,000	$972,000	$1,228,860	$1,315,686	$1,316,556	$1,308,953	$1,353,472	$1,362,146	$1,403,010	$1,445,100

	Current	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Estimated Net Income	-$450,000	-$257,824	-$446,784	-$458,920	-$377,631	-$279,653	-$224,759	-$124,080	-$44,655	$45,572

Potential Annual Permit Rates	Current	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Faculty/Staff	$0	$120	$132	$146	$161	$178	$196	$216	$238	$262
Commuter Students:										
Tier 1	$50	$150	$165	$182	$201	$222	$245	$270	$297	$327
Tier 2 (including Residents)	$50	$100	$110	$121	$134	$148	$163	$180	$198	$218
Tier 3	$50	$50	$55	$61	$68	$75	$83	$92	$102	$113

Notes:

1 - All revenues except new enforcement collections are increased 10% per year.

2 - Current expenses, new staff costs, on-going enforcement system costs, and shuttle costs are increased 3% per year.

3 - The impact of actual staffing costs on the university will likely be lower than those shown. University staff is already providing some parking services, so expenses in other departments will be reduced as parking is consolidated into one department.

4.05   Transportation Improvement Alternatives

4.05.1   Campus Shuttle Options

While the campus core is fairly pedestrian friendly, pedestrian access to the southern portions of campus can be a challenge. The extreme winter climate and natural topography makes the utilization of Lots 23 and 24 very unappealing. Therefore, the university may need to consider implementing a campus shuttle to these areas in order to improve the utilization of parking. While the university is not currently planning for any campus expansion or increases in total student populations, improving the utilization of Lots 23 and 24 could help push the development of campus parking structures further into the future.

Two possible shuttle routes were considered to improve access to the southern parking supplies. The two routes are as follows:

- **Route A – Lot 24 to the Memorial Union Building (MUB)**

    o   The route would run from Lot 24 using Sharon Avenue and MacInnes Drive. The route would then cross US 41 and travel to the MUB. After stopping at the MUB, the route would then cross US 41 at Hubbell Street and travel back to Lot 24 using MacInnes Drive.

- o The total length of this route is approximately 2.15 miles.

- o The estimated average speed of the shuttle is 25 miles per hour.

- o Up to four stops could be provided as follows:

    - ▪ Two stops in Lot 24 (depending on the utilization of parking)
    - ▪ One stop at the Student Development Complex (SDC)
    - ▪ One stop at the MUB

- o Assuming each stop takes up to 1 minute, and the non-stop travel time is 5 minutes, the estimated total route time would be approximately 9 minutes.

- o An additional stop at Lot 32 could be added is needed.

- **Route B – The SDC to the MUB**

    - o The route would run from the SDC (using the drive around Lot 22) using MacInnes Drive. The route would then cross US 41 and travel to the MUB. After stopping at the MUB, the route would then cross US 41 at Hubbell Street and travel back to the SDC.

    - o The total length of this route is approximately 1.50 miles.

    - o The estimated average speed of the shuttle is 25 miles per hour.

    - o As few as two stops could be provided as follows:

        - ▪ One stop at the SDC (people parking in Lots 23 and 24 could walk to the SDC stop)

        - ▪ One stop at the MUB

    - o Assuming each stop takes up to 1 minute, and the non-stop travel time is 3.6 minutes, the estimated total route time would be approximately 6 minutes.

    - o An additional stop at Lot 32 could be added is needed.

Of the two options, *Carl Walker* recommends Route B as the initial shuttle service route. This route is more efficient and direct, requires fewer stops, can provide

better headways, and does not require the shuttle to travel through a parking lot (this could be a liability concern).

Three of the similar institutions reviewed by *Carl Walker* for this study provide campus shuttles (Northern Michigan University, the University of Michigan – Flint, and Rensselaer Polytechnic Institute). At these institutions, shuttle services begin between 7:00 a.m. and 9:30 a.m. on weekday mornings and end between 5:00 p.m. and 11:00 p.m. on weekday nights. Rensselaer Polytechnic Institute also provides weekend shuttle service from 9:15 a.m. to 5:30 p.m. Based on these programs, *Carl Walker* recommends the university consider providing shuttle services from 7:00 a.m. to 9:00 p.m. each weekday during the school year.

It is recommended that the university outsource the operation of the shuttle program instead of trying to operate it in-house. This will help reduce initial capital costs and minimize day-to-day management. The university would develop a management contract and then involve local providers in a Request for Proposal process. Local providers could include existing transit providers such as Houghton Transit. The TPMO would be responsible for managing the shuttle contract.

Assuming two 25+ passenger shuttles are utilized with a fully loaded cost per hour of approximately $50.00 (including drivers, vehicles, fuel, insurance, maintenance, etc.), daily shuttle costs would be in the range of $1,200.00 (weekday service only). Assuming approximately 160 schools days each academic year, total shuttle costs could be in the range of $192,000 per year. Shuttle costs could be reduced by using two shuttles during busier periods and only one bus during slower periods (e.g., after 6:00 p.m.) – a potential savings of $24,000. In addition to the shuttle costs, enclosed bus stop shelters will need to be installed to provide riders with protection from the weather while waiting for a shuttle.

Comparing shuttle costs to the cost of constructing a parking structure would help determine which option is best for the university. Assuming a 400-space aboveground parking structure is constructed at a cost of $19,000 per space (construction costs plus design, testing, and legal costs), the annual debt service would be estimated at $495,432 (with a 5%, 30-year bond). At less than one-half the cost of constructing a new parking facility, implementing a shuttle program would appear to be the better option from a cost perspective.

4.05.2   Bicycle and Pedestrian Connections to Campus

Improving bicycle and pedestrian connections to/from the Michigan Tech campus are important components of the overall transportation plan. Encouraging and promoting walking and bicycling to campus should be part of the future TDM improvements. Reducing the demand for automobile parking spaces is an obvious benefit of TDM improvements. Bicycling and walking are viable transportation modes that should be encouraged through continuous improvement programs and maintenance of existing facilities.

The pedestrian sidewalks along College Avenue and Townsend Drive are key components of the transportation system. The university should work in

conjunction with the City of Houghton and private landowners to assure that the sidewalks are kept in good repair and are well-maintained, including prompt snow removal. Likewise, the university must continue to upgrade and maintain its existing pedestrian pathways and sidewalks.

The "Fresh Look" concept plan for the campus includes two locations for pedestrian bridges and/or tunnels to connect the residential areas south of US Highway 41 with the academic core of campus. Those pedestrian crossings should continue to be part of the planning considerations for any new campus development. In addition, a pedestrian underpass should be considered as part of the redesigned west end of campus recommended in "Fresh Look" concept plans.

As noted in the first summary report, the Houghton community recognizes the role of bicycles and utilizes them as part of the overall transportation system. The City of Houghton's bicycle plan identifies improvements and additions to the bicycle routes including new connections up from the lakeshore path to Cliff Drive. Michigan Tech should continue to work with the City of Houghton to implement this connection and the other bicycle route improvements affecting the campus.

To encourage and promote bicycling as a viable transportation mode, campus bicycle storage facilities are necessary. Currently, outdoor bicycle racks are located throughout the campus. The locations and number of racks should be continuously monitored. If the racks in a particular location are frequently filled additional racks may be warranted. In addition, if large numbers of bicycles near a particular building are locked to trees, fences, railings, etc, additional racks should be installed. Rack designs should allow users to lock both the frame and wheels to the rack.

In addition, other more secure storage locations should be provided on the university campus. Additional bicycle storage lockers that are rented to individuals provide a more secure storage method and protection from weather. Consideration should also be given to including indoor bicycle storage facilities in new construction projects. The adjacent photograph shows a new bicycle storage facility built into a parking structure at the University of Michigan. The locked storage facility, accessed with an access card, includes wall and floor mounted racks as well as an air compressor for inflating tires. A new office building also attached to the parking structure houses the university's parking department.
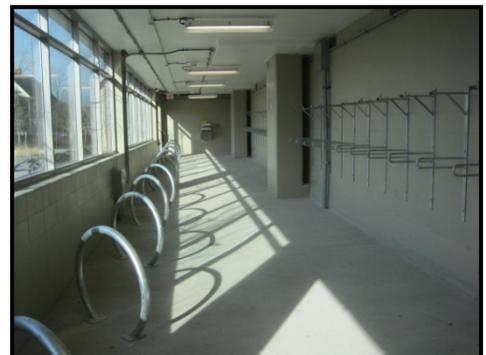
Several other strategies could be used to increase bicycle ridership. The locker room facilities on campus could be part of the strategy to encourage bicycling by university employees. Providing regular bicyclists with access to showers and locker rooms will encourage bicycle commuting. Guaranteed rides home in emergency situations can also encourage bicycling. On-call bicycle repair mechanics, from a local bike shop that can make "office" calls, may be a perk to help encourage bicycling.

The City of Chicago has constructed a bicycling center in Millennium Park in downtown. Services at the center include, showers, lockers, secure bicycle storage, bike rentals, repairs, and a car sharing program for running errands. Michigan Tech could include a similar bicycle facility to encourage bicycling to campus. Similar facilities are found in Long Beach, CA; Berkeley, CA; Palo Alto, CA; Seattle, WA; and Portland, OR. More details concerning the Chicago facility can be found at the website *www.chicagobikestation.com*.

4.05.3   *Transportation Demand Management Strategies*

The concept of integrating transportation and parking elements as part of the larger strategic vision for Michigan Tech would support the goals outlined in the "Fresh Look' report. However, the success of TDM strategies may be limited by existing environmental conditions and customer expectations. At least initially, TDM strategies may have a limited impact on parking demands (perhaps providing a small reduction in parking demand of between 1% and 5%). As TDM will be a relatively small component of the TPMO in the near-term, it is anticipated that the TPMO will be responsible for exploring and implementing TDM strategies (within the staffing levels defined in this report). In the future, demand for TDM services could grow large enough to support a separate TDM coordinator position.

The university should review the applicability of several key TDM elements that are needed to achieve this vision as outlined below:

- Provide clear transportation choices for the campus community. As campus parking management changes in the future (e.g., improved parking enforcement, increased utilization, implementation of pay parking for all parkers) other transportation options will become more attractive. Options could include (but not be limited to):

    o **Faculty/Staff Strategies** – These strategies are primarily focused on reducing the number of single-occupancy trips to campus. Possible strategies could include:

        ▪ Encouraging Telework and Compressed Work Weeks:

            • Compressed work week policies allow faculty/staff to work 40 hours in 4 days or 80 hours in 9 days. Encouraging these workplace policies allow faculty staff members to avoid work commutes once a week or once every two weeks.

- Establishing Pre-tax Transportation Benefits for Faculty/Staff:

  - Established in 2001 by the United States Internal Revenue Service (IRS), this benefit enables commuters to pay for transit passes, bicycle commuting costs, and parking costs on a pre-tax basis up to monthly limits set by the IRS. The limits vary by mode used and are generally updated annually by the IRS. For the 2009 tax year, the benefit levels were $230 per month for transit services and $220 per month for parking. A bicycling commuter benefit was recently introduced providing $20 per month.

- Transit Incentives for First-time Users

  - Special transit campaigns can be used to introduce faculty and staff members who do not currently use an alternative form of transportation. A typical campaign might include a one-month incentive program where the participant is provided a one month transit pass, enrolled in prize drawings, and given discounts or rewards to local retailers for reaching certain milestones using transit or other alternative forms of transportation.

  - If these programs are successful, the university may consider offering a permanent subsidy for transit users.

- Secure Bike Storage and Changing Rooms/Showers at Worksite

  - As mentioned previously, provide locker rooms where faculty and staff members who bike to work can store personal items, shower, and change clothes. This type of facility is becoming more popular in new developments, particularly if the developer is seeking LEED (Leadership in Energy and Environmental Design) certification.

o **Ridesharing and Carsharing Strategies**

- Due to the low density and auto-dominated nature of the area, carpooling could be the most realistic option for people to access the campus without driving alone. The following strategies are intended to increase carpooling in the short and long term.

  - Preferential Carpool Parking Spaces:

- o Dedicate reserved parking spaces closest to building entrances/elevators or other conveniences for carpoolers. Also, parking rates/fees could be less for carpools. To ensure the spaces are used efficiently, the number of spaces provided should be dependent on demand – adjusting as necessary. These spaces will also require sufficient enforcement to ensure the spaces are not used by unauthorized parkers and that the parkers are truly carpooling.

- Local Ridematching:

  - o Local ridematching programs automatically match participants with carpool partners based on their commute start and end locations and work hours. The future TPMO could operate an online ridematching database that could be used at no cost.

- Guaranteed Ride Home Service:

  - o Some people considering carpooling will choose not to due to concerns about getting home if their carpool partner leaves early or if they need to leave early. This concern can be mitigated by providing a guaranteed ride home service. If an employee needs to get home early, pick-up a sick child, or otherwise needs a ride home this service (typically provided by a local taxi service) would take them to their destination at no charge to the carpooler.

- Individualized Marketing Campaign Specific to Carpooling and Transit:

  - o Individualized marketing campaigns provide information on alternative transportation options that are individualized to the recipient. Participants generally indicate interest in specific transportation modes and programs and applicable information is provided to them either electronically, through the mail, or in person. These programs use survey instruments to identify individuals who are most likely to use alternative modes of transportation and focus marketing efforts on those individuals.

- Many university campuses across the country are implementing carsharing programs as a way to encourage students to not bring a vehicle to campus.

  - Instead of bringing a vehicle, students can register with a service that would allow them to rent a vehicle when necessary. For example, a couple of rental vehicles could be parked outside a residential building for resident student use. After registering with the carsharing service, students would be able to rent a vehicle for a certain number of hours or days. The rental of the vehicle would include fuel and insurance. At the end of the rental, students would return the vehicle to the same parking spot where their rental originated and their credit card would be charged for the rental.

  - Zipcar is one of the more popular carshare providers in the United States. They currently provide services at over 100 universities, including the University of Michigan and Michigan State University. The cost for registering and using Zipcar are as follows (per their website):

    - Registration: $25.00 (on-time fee)
    - Annual Fee: $50.00
    - Hourly Rates: Approximately $8.00 to $9.00 per hour
    - Daily Rates: $66.00 to $72.00
    - Mileage limits apply (approximately 180 miles per day)

  - According to Zipcar, each shared use vehicle can remove up to 15 personal vehicles from the community.

  - These programs can be very successful at universities with denser, more urban environments as well as at universities with higher parking fees and/or restrictions on student vehicles (e.g., freshman are not allowed to park on campus). Success may be limited at Michigan Tech due to relatively low student parking fees, available parking surpluses, high levels of vehicle ownership, and the lack of other transportation choices. However, the university should contact appropriate carsharing vendors to further determine the program's suitability at Michigan Tech.

o **Bicycling Strategies**

- Bicycling strategies include basic improvements such as ensuring sufficient bike parking is provided, as well as more sophisticated strategies such as implementing bikesharing programs. These strategies are summarized below:

  - Install Sufficient Bicycle Parking:

    - As mentioned previously, ensure sufficient bike parking is installed at each building or within short walks of groups of buildings. This could include outside racks as well as more secure bike lockers. If areas are identified where people are chaining their bicycles to improper structures (e.g., lamp posts or fences), additional parking is warranted.

  - Bikesharing Program:

    - Local bikesharing programs are emerging in the United States as a possible form of public transportation to link large demand generators with neighborhoods and mixed uses areas nearby. The elements of modern bikesharing systems include:

      - *User accountability.* Users must register online to checkout a bike and are charged for overtime use, as well as charged the full price of the bike plus an administrative fee if they don't return it.

      - *Liability Insurance.* This is still a big concern for many campuses, but insurance programs are realizing a new market exists.

      - *Location.* Station density should be no more than 330 yards apart. This ensures that users have a bike available at another station and that they can drop off bikes if one station is full. As few as two stations could serve the campus core.

      - *Staggered fee system.* Typically bikesharing programs only charge after the first 30 minutes. This incentivizes

> people to use the bikes for short trips and not overnight, etc. It also frees up the bikes so many people can use them.
>
> - *Creative sponsorship.* Typically local business, advertising agencies, or other private entities are large contributors to bikesharing programs to help defray the long term costs.
>
> o Similar to carsharing programs, bikesharing programs can be very successful at universities with denser, more urban environments as well as at universities with higher parking fees and/or restrictions on student vehicles. Success may be limited at Michigan Tech due to relatively low student parking fees, available parking surpluses, high levels of vehicle ownership, the prevailing climate, and the lack of other transportation choices. However, the university should contact appropriate bikesharing vendors in the future to determine the program's viability.

- Institute pay parking for all visitors, faculty/staff, and students to improve the utilization and turnover of existing parking supplies, encourage the use of alternative modes of transportation, and generate funds that can be used to properly fund ongoing operations, future campus shuttles, future parking-related construction projects, etc.

- Consider providing charging stations for electric vehicles with reserved parking spaces. As electric vehicles grow in popularity, there may be demand for charging stations. Universities across the country are incorporating limited numbers of charging stations (and associated spaces) in both existing and new parking lots/structures. The number of spaces to provide in the future will depend on the quantifiable demand for charging station access, or could be included as part of an electric vehicle program for university vehicles.

- Ensure both interior and adjacent streets and sidewalks adequately serve the needs of pedestrians, transit users, bicyclists, and vehicles with the focus on serving pedestrians first. This element can be supported by:

  o The creation of safe, attractive, shaded, and inviting pedestrian linkages to connect adjacent neighborhoods campus destinations, and parking facilities.

  o Where necessary, using traffic calming strategies such as speed humps, lower vehicle speed limits, on-street parking, etc.

- o Where possible, including bicycle paths on roadways. In some cases on-street angled parking may make bicycle lanes less safe, as vehicles must back out of the spaces (e.g., drivers may not see bicycles as they exit a parking space).

- o Ensuring all pedestrian and bicycle paths are cleared of snow and ice, and treated to minimize slipping.

- o Providing amenities such as improved lighting, signage, street furniture, landscaping, etc. in public right-of-ways to support and encourage pedestrian activity.

- o Sufficient bicycle racks, lockers or other bicycle friendly facilities should be provided throughout campus.

- Developing, managing, and operating parking as an essential component of campus infrastructure and reducing overall parking demands over time. This concept can be supported by:

  - o Distributing system costs throughout the campus community to support the funding of future parking resources, improved operations/management, campus shuttles, and TDM strategies.

  - o Ensuring all parking resources are efficiently and effectively designed and managed.

  - o Maximizing parking utilization by monitoring space utilization, duration, and turnover. Encourage the turnover of short-term parking resources by monitoring activities, communicating with the campus community, as well as through other means such as parking enforcement, appropriately pricing the parking, time limits, etc.

  - o Ensuring the proper allocation of parking through periodic parking occupancy counts and duration/turnover surveys.

  - o Incorporating ground floor commercial activity into parking facility designs (where appropriate) when a parking structure is developed in the future.

  - o Properly maintaining campus parking lots (e.g. paving, landscaping, lighting, identification signage, etc.)

- Modifying the identity of campus to make it more understandable and attractive to new and infrequent users. This element is supported by:

  - o Actively promoting campus parking and transportation programs including parking availability/locations and alternative transportation

options. This can be done using printed materials and an improved parking and transportation services website.

o Improving campus informational and directional (wayfinding) signage with a special emphasis on available parking resources.

o Marketing TDM options and communicating the health and environmental benefits of bicycling and walking. Marketing strategies could include TDM information on parking maps, information on the parking website, advertisements in campus newspapers, information in new student/employee packets, etc.

Due to the nature of transportation in and around campus, it is unlikely that some of the TDM strategies outlined in this report will make a significant impact on campus parking demands in the near future (at least outside of increasing parking rates). Also, the costs of implementing some of the strategies (such as carsharing and bicycle sharing) may not be financially viable at this time. Therefore, it is recommended that the university pursue only those strategies that will have a suitable impact or will be inexpensive to implement. These strategies would include:

- Telework and compressed work schedules;

- Pre-tax transportation benefits for faculty and staff;

- Educational and marketing programs for existing transportation options;

- Carpool matching services;

- Ensuring sufficient bicycle parking is provided;

- Instituting pay parking for all user groups;

- Ensuring all pedestrian and bicycle paths are cleared of snow and ice;

- Improving the management of the parking system;

- Implementing a campus parking shuttle program.

Other strategies can be explored, but may not be able to be implemented until certain conditions improve. Potential transportation system improvements/changes that would positively impact the use of alternative forms of transportation would include:

- Improved transit routes and frequencies;

- Increased parking and fuel costs;

- Improved carpool programs.

4.05.4   Transportation Funding Strategies

There are a number of strategies universities use to fund transportation initiatives. Typical strategies include:

- Direct user fees (e.g., fees for transit passes)

- Incorporating transit costs in parking permit prices

- Transportation fees charged to all students (although this could negatively impact tuition)

- Surplus parking revenues

- General university funds

- Public/Public partnerships with nearby municipalities and/or transportation authorities

5.0   TRANSPORTATION AND PARKING ACTION PLAN SUMMARY

The following is the action plan for implementing the recommendations in this report. A typical timeframe employed by universities for planning and implementing parking and transportation improvements is outlined below (modified slightly to better fit Michigan Tech's situation). This scheduling concept is reflected in the action plan.

- Prior to the Fall Semester:

    o Complete any parking and transportation planning projects started during the previous spring semester and prepare final recommendations.

    o Finalize all preliminary financial projections for improvement recommendations.

    o Finalize all preliminary improvement action plans.

- During the Fall Semester:

    o Finalize all recommendations to be implemented and communicate the changes with the campus community.

    o Finalize all financial projections.

    o Begin hiring process for new transportation and parking manager.

    o Begin preparing updated policies and procedures.

    o Begin RFP/RFQ/Bid process for all new equipment/supply purchases and other necessary services. These processes should conclude prior to the end of the fall semester so that any equipment can be purchased, installed, and tested prior to the next school year.

    o Finalize any recommended pricing changes. Pricing changes would be enacted for the next fall semester.

    o Begin preparing all new parking and transportation informational materials to reflect recommendations implemented. This would include maps, informational flyers, new student and employee information, website information, etc.

    o Begin marketing the upcoming changes to the campus community.

- During the Spring Semester:

    o Complete updated policies and procedures.

    o Complete updated informational materials.

    o   Complete the installation and testing of new equipment/systems.

    o   Conduct hiring process for lower level TPMO staff. Train and prepare new staff.

    o   As necessary, conduct informational workshops to explain parking and transportation system changes.

    o   Enact all system changes for the upcoming fall semester.

5.01. Recommended Short-Term Improvements

1. Using the principles included in this report as a starting point, develop and approve a set of campus parking and transportation guiding principles.

2. Finalize recommended parking allocation adjustments and prepare for implementation in the 2012-2013 academic year. These adjustments include:

    a. Formalizing policies for off-campus faculty and staff to include:

        i.   Regular campus permits for off-campus faculty and staff that need frequent access to campus.

        ii.   Issuing off-campus departments main campus parking passes (e.g., laminated parking placards) for off-campus faculty and staff that need access to campus less frequently.

        iii.   No main campus parking privileges for off-campus faculty and staff that do not need to travel to campus.

    b. Discontinuing the policy of allowing faculty and staff to park in campus parking meters for free.

    c. Discontinuing the practice of providing unlimited parking permits to faculty and staff. Instead, offer transferable parking permits that can be moved between vehicles. If multiple permits are warranted, each permit should be purchased separately.

    d. Implementing a lot-specific parking allocation system for commuter students and resident students. For this allocation strategy to work, parking permit sales will need to be closely monitored to ensure sufficient space is available for all permits issued. Initial permit sales would be limited to 140% of available parking supplies in each lot. This would involve offering three tiers of options:

        i.   Tier One – Core campus parking lots (e.g., Lots 5 and 9).

    ii.   Tier Two – Resident and intermediate lots (e.g., Lots 26, 32 and 34).

    iii.   Tier Three – Perimeter parking lots (Lots 22, 23, and 24).

e. Reconsidering the current gender-based assignment policy for resident parking. While this may not be a widespread situation, it is important to be consistent in the allocation of available resident parking spaces.

f. Improving the availability of visitor parking using the following strategies:

    i.   Faculty, staff, and students should be discouraged from using visitor parking spaces to the greatest extent possible. This could include pricing and enforcement strategies.

    ii.   Change the operating methodology of Lot 27 from pay-on-entry to traditional exit cashiering. This will provide a means to implement hourly parking rates and provide parking reservations.

    iii.   Schedule large events/meetings during off-peak periods of parking demand when feasible.

    iv.   Provide one or two loading zone spaces adjacent to event/meeting venues. Provide consistent enforcement to ensure the spaces are used appropriately.

    v.   Provide a small number of parking spaces (10 to 20 spaces) for Wadsworth Hall events/meetings. The spaces could be provided in Lot 15, Lot 17, the Hamar House Lot, or in a new surface lot on the west side of Wadsworth Hall.

    vi.   Ensure sufficient ADA accessible parking is provided for visitors.

3. Improve the financial performance of the parking system by implementing the following strategies prior to the start of the 2012-2013 academic year.

a. Set policies for rate increases and pay parking implementations:

    i.   Implement pay parking for faculty and staff. Set the initial rate at $120 per year, allowing staff to pay small amounts each paycheck.

    ii.   Create a tiered pricing structure for commuter student parking. Prices would range from $50 to $150 per year initially.

    iii.   Implement pay parking for resident students. Set the initial rate at $100 per year.

    iv.   Increase visitor and special event parking rates/fees to achieve a 50% increase in revenues.

    v.   Improve enforcement collections from 68% to 85% within two years.

    vi.   Increase parking fees/fines each year at a rate higher than expense increases until the system is self-supporting.

b. Ensure special event parking rates and fees cover parking system direct and indirect costs.

c. Select and then implement citation collection improvement strategies. Preliminary recommended strategies are:

    i.   Imposition of late fees;

    ii.   Monthly notices/invoices;

    iii.   Suspension of parking privileges;

    iv.   Restricting student class registration;

    v.   Withholding diplomas and official transcripts;

    vi.   Vehicle booting and/or towing.

4. Begin the development of a single transportation and parking management organization (TPMO). This would include:

a. Hiring (or transferring) sufficient staff to operate and management the parking and transportation system. Some university staff may already be filling some of these roles, so there may be opportunities to transfer staff from other positions or otherwise adjust job duties. This includes:

    i.   Parking and Transportation Manger (full-time)
    ii.   Parking and Transportation Administrative Assistant (part-time)
    iii.   Parking Office Cashiers (up to two, full-time)
    iv.   Parking Enforcement Administrative Assistant (Full-time)
    v.   Parking Appeals Officer (part-time)
    vi.   Student Enforcement Officers (part-time, transfer staff if applicable)

b. Developing and purchasing uniforms for all parking enforcement field staff. This could be as simple as polo type shirts, hats, and jackets.

c. Finding suitable office space in or near the campus core.

d. Updating all parking and transportation related policies, procedures, and processes to prepare for the transfer to the TPMO. This would include (but not be limited to):

      i.   Parking enforcement;
      ii.   Parking operations;
     iii.   Parking permit control, sales, and issuance;
     iv.   Parking planning;
      v.   Management of parking maintenance.

    e. Transferring all parking-related operations and management responsibilities to the designate TPMO (the initial TPMO is the Department of Public Safety and Police Services).

5. As necessary, replace outdated/malfunctioning parking access control gates in core parking lots.

6. Develop and approve parking permit renewal policies for all appropriate user groups in preparation of the 2012-2013 academic year. In addition, adjust the shape of the parking permits each year to help enforcement officers better identify old permits.

7. Begin investigating options to provide a cost effective campus shuttle service between the SDC and the MUB. This would include outsourcing the service to an approved service provider. The operation of the campus shuttle should coincide with the implementation of a lot-specific allocation strategy for students. Investigate opportunities to integrate local area transit services.

8. Work to improve the utilization of certain parking lots, such as Lots 5, 8, and the perimeter parking areas.

9. Remove the ADA accessible parking in Lot 9 and add necessary spaces in more appropriate lots. Some ADA permit parking spaces may need to be added in the campus core.

10. Make the unimproved parking area north of the SDC building an official parking area and install permit required signage, or make the area a no parking zone.

11. Ensure campus parking-related signage provides consistent messages concerning enforcement and hours of operation.

12. Update parking and transportation related marketing materials and improve the amount of information available on the university website.

13. Set standards and methodologies for the collection and tracking of parking occupancy and enforcement statistics.

14. Conduct safety and security inspections of all campus parking lots.

5.02. Recommended Mid-Term Improvements

1. Investigate and purchase a new parking enforcement and permit control system. This would include:

   a. New handheld citation computers and printers;

   b. New back-office hardware and software (with the ability to provide direct online permit sales and citation payments in the future);

   c. Necessary data migration, installation, implementation, and integration services;

   d. Additional supplies as necessary.

2. Investigate opportunities to centralize the control and management of the parking access control system. This would include additional hardware and software to remotely control, program, and monitor the access gate system. This could also include parking counting and utilization tracking features.

3. Consider upgrading the access control system to include RFID tags and readers instead of magnetic stripe cards.

4. Consider removing single-space parking meters from campus in favor of multi-space meters (pay-and-display machines).

5. Develop new marketing and communications materials/strategies to better inform and engage the campus community.

6. Consider implementing TDM strategies to reduce parking needs, minimize campus traffic, mitigate future parking construction needs, and minimizing the environmental impacts of vehicle usage. Recommended strategies include:

   a. Telework and compressed work schedules;

   b. Pre-tax transportation benefits for faculty and staff;

   c. Educational and marketing programs for existing transportation options;

   d. Carpool matching services;

   e. Ensuring sufficient bicycle parking is provided;

   f. Ensuring all pedestrian and bicycle paths are cleared of snow and ice;

   g. Improving the management of the parking system.

7. Research and implement strategies for reducing parking-related traffic on

campus. This would include signage and wayfinding improvements, allocation adjustments, and improved occupancy count monitoring.

8. Consider installing emergency call boxes with appropriate identification signage in perimeter parking lots.

5.03. Recommended Long-Term Improvements

1. Adjust campus parking allocations to meet changing demands.

2. Consider expanding the campus CCTV system to include campus parking lots (especially those on the perimeter of campus).

3. Develop additional parking supplies if available parking surpluses will be exhausted. The location(s) of future parking facilities will depend on future campus development projects. The development of additional parking resources can take up to two years, so it is important to plan ahead for any foreseen parking shortages.

4. Adjust parking and transportation operations and management to address changing campus needs.