"FRESH LOOK"
SCENARIOS PLAN REPORT

MichiganTech
MICHIGAN TECHNOLOGICAL UNIVERSITY

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Michigan Technological University
“Fresh Look” Scenarios Plan Report

December, 2006
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1.1 Purpose

In November, 2006 Michigan Technological University engaged HGA to facilitate a summary examination of its current facilities and programs, to assess future needs and expectations for academic facilities, student housing and athletic/recreational support facilities. The process was designed to take advantage of HGA’s recent working knowledge of the campus, its stakeholders and various constituent groups. The goal was to generate a series of optional, future-oriented schematic “visions” of what a “fully developed” MTU campus might look like. The outcome of this project was not intended to be a thorough Campus-Wide Facilities Master Plan. It was, however, designed to be comprehensive. Each development scenario was to be based upon national academic practices and to be reflective of the comprehensive institutional strategic planning process which MTU had recently undergone. It was the desired intent that this result in a final report which would serve as a guide to MTU’s Executive Team and Board of Control when making future facility location and planning decisions.

This process was structured to include a number of specific activities, the full detail of which can be found in the letter proposal submitted on October 30, 2006 to John Rovano. In summary, the process was to include the following:

- MTU’s submittal to HGA of all recent academic and physical strategic plans, surveys of the campus, parking and transportation summaries, student housing data, enrollment figures and other information which would serve as preparation for visiting campus.
- A three day, on-campus design “charrette” during which the Executive Team, “Fresh Look” Committee members and representatives from the Faculty, Staff, Students and Administration would be provided opportunities to review the current campus site plan, comment on future needs and participate in a discussion regarding how best to serve the institution for the next 20-year time frame.
- A guided tour of the campus (which was provided by a student representative and accompanied by John Rovano) to include most facilities on the main campus.
- During this three day on-campus period, the HGA team was to facilitate discussions with the Executive team and focus groups, provide drawings of possible solutions to planning issues and to interact with the “Fresh Look” Committee such that fundamental decisions could be
made regarding which scenario was to be developed further during the following off-campus project development.

- This single solution was to be further developed at HGA's offices to be consistent with the work done on campus and desire to be comprehensive and inclusive.
- A preliminary report was to be made to the Executive Team and "Fresh Look" Committee prior to the completion of the final report and its submission to the "Fresh Look" Committee.
- A final report was to be made to the "Fresh Look" Committee for its use.

1.2 Planning Team Members

The HGA planning team included Lew Moran as Principal-In-Charge and Senior Planner and Zachary Bloch as Landscape Architect and Planning Specialist. Members of the Executive Team included Glen Mroz, Dave Reed, Dale Tahtinen, Ellen Horsch, Les Cook, Dan Greenlee, and Shea McGrew. Members of the Fresh Look Committee included John Rovano, Teresa Coleman-Kaiser, Jim Baker and Blair Orr.

1.3 MTU History

MTU is an energetic institution that has risen to meet the higher education challenges of the State of Michigan over its 121 year history. With strong and consistent leadership the campus has grown to include 6,500 students. MTU offers a wide range of 4-year degree programs as well many at the masters and doctoral levels. Currently, the graduate division includes over 900 students and is expected to be the area within the university where substantial growth will occur in the future. The vast majority of students, some 3,600, are enrolled in the university's various engineering programs but campus academic life also includes highly successful programs in the Sciences and Arts, Business, Technology, Forest Resources and Environmental Sciences. The student body is comprised principally of Michigan residents but attracts a diverse non-resident population of over 1,600 students from other states in the US and 580 from abroad. The university employs over 400 faculty members, 1,100 staff and provides work opportunities for 1,500 students. In annual 2006 year, MTU expended nearly $170,000,000.
1.4 Facilities Planning Issues and Opportunities

In developing an effective "Fresh Look" at the master planning opportunities, MTU needs to carefully and thoughtfully project the future growth of the institution with respect to:

- Student enrollment both in the aggregate and to the level of individual degree programs for the next 10 years
- Resolution regarding the focus of the academic curriculum for a 10-year period by department and major
- Identifying peak classroom scheduling and staff attendance demands by building throughout the day
- Projection of the number of students who will live on campus as a percentage of the MTU student body
- Understanding how distance education and online learning will affect the delivery of the academic curriculum and the demands for specific types, locations and quantities of physical space
- Confirmation of the parking demands of students, staff and faculty
- Growth of satellite campuses (if any) and the associated programs and facilities necessary to support outreach efforts
- Understanding of the total project budgets likely to be supported by the Board of Control in funding future development
- The extent to which acquisition of additional property is advisable or necessary to accommodate future need

1.5 Campus Planning Issues and Opportunities

Land Use:

- Amplify current university land use zones; progressing from community "town/gown" interfaces to teaching/training to residential life areas.
- Preserve/identify strategic infill sites for completing, expanding, and linking each zone within the campus and without to the community.
- Identify the highest and best use of the campus core as both a landscape space and site for future construction of educational facilities
- Identify possible connections from the main campus to the buildings located on the canal to the north and to the
Forestry Building and Student Development Center to the south
- Identify the potential for development of sites along the canal made available if vacated by maintenance and physical plant facilities including several oil storage containers
- Evaluate possible synergy with adjacent businesses along Highway 41 including the entrances onto campus
- Develop nodes for both community links and visual buffers along Highway 41
- Suggest locations for One Stop and Visitor’s Centers to create a clear Welcome Center
- Preserve view corridors off-campus to the surrounding bluffs and water features
- Strengthen view corridors on-campus to the interior greenbelt and housing
- Evaluate locations for high-density parking structures as well as low-density (surface) parking facilities
- Evaluate locations for construction of student housing facilities predominantly of apartment or suite-style
- Evaluate potential site acquisition locations and campus expansion opportunities
- Consider resolution of the “wind corridor” issues that are present south of the mechanical engineering and chemical science buildings

Circulation:
- Create easy pedestrian connections that are aesthetically pleasing and safe to Wadsworth and McNair housing facilities as well as to the Forestry Building, Student Development Center, and off-site parking facilities south of Highway 41
- Integrate the Recreational Forest and Nordic Ski Trails property with the rest of campus if possible
- Balance final destinations for students, faculty and staff with respect to parking requirements and parking lot locations
- Refine Welcome Center traffic flow for safety, security, wayfinding and convenience.
- Create a means of reasonable pedestrian connection to the lower “canal” property including suggesting ways that the city bike and pedestrian trail can be continued through campus property in a safe and aesthetic manner
Introduction

Landscape Character:
- Preserve the “north woods” character of the surrounding landscape plantings that tell the story of the Upper Peninsula region.
- Increase ways in which the history of the University and its local economy can be illustrated in physical designs that integrate the campus way-finding system with experiential and achievement-based learning opportunities.
- Suggest ways in which campus academic achievement in the arts can provide outreach to students, faculty, staff and visitors via outdoor public sculpture.
- Put arts now hidden in galleries and studios in the public view and on the public path within buildings.

1.6 Process

In November, 2006 HGA visited the MTU campus to meet with representatives of the units that comprise academic, student and campus support services. Meetings included faculty, staff and students in the following areas: Science Labs, Admin Cabinet, Library Staff, Housing, MTU Foundation, Student Life Group – Athletics, Distance Education, Student Services, IT Directors, and Facilities Staff.

The focus of these meetings was to understand current and anticipated operational deficiencies, opportunities for better adjacencies, evolution of service and teaching methods, and technological advancements. Discussion centered on how these areas can support the strategic goals of the College. A summary of the campus discussion and observations was reviewed with the Leadership Team.

In December 2006, a single on-campus meeting was conducted by HGA with the Executive Team and “Fresh Look” Committee. This meeting was held to discuss the physical and functional assessment of all college facilities, preliminary recommendations for physical improvements, and the analysis of campus open space, circulation and utility networks. The purpose of this meeting was to gather comments and additional information to address academic and student life space issues. An additional goal was to confirm acceptable zones for future campus development including possible acquisitions. The final “Fresh Look” master plan recommendations will be presented in February 2007 to the Board of Control.
2.1 Physical Condition Assessment

Following is a list of the physical condition categories evaluated for the buildings during a two-hour walking tour of the campus.

**Structural Integrity:**
It was not the purpose of this study to evaluate the condition of the structural integrity of buildings on campus. However, all buildings on campus appeared to be of adequate structural integrity as to cause no concern that imminent failure is either likely or possible. It is important to note, however, that during the renovation of Wadsworth Hall, it was discovered that substantial “slippage” had occurred in the area of the center of the building where the structure was failing to provide necessary retaining support required to withstand the heavy loads imposed by soil conditions on the south side of the building. It should be noted that similar conditions may exist in McNair, although there is no physical evidence to support this. In addition, careful scrutiny of the buildings along the “canal” bluff would be prudent. Finally, there is reported to be a major “fault” line running beneath Wadsworth Hall. The affects of this fault on building footings and foundations should be watched over time.

**Building Envelopes:**
It was not the purpose of this study to evaluate the condition of the building envelopes on campus. Most buildings were noted as well maintained when exterior systems of brick, glazing, roofing and water intrusion (caulking) systems were considered. It is important to note, however, that older windows and doors, well-worn caulking systems and general maintenance of brick mortar and expansion joints are a constant problem on campuses with buildings of MTU’s varying ages. These maintenance conditions may not be easily detected by the naked eye, but with the use of technology systems, failures can be identified, conditions requiring maintenance can be repaired, and severe and costly future damage can be avoided while also reducing operational costs. A comprehensive exterior envelope inventory including destructive testing (where warranted) followed by an annual inspection of all buildings should be considered.

**Interior Systems:**
It was not the purpose of this study to evaluate the condition of the interior systems on campus. As are most publicly funded institutions of the size and sophistication of MTU, the interior systems of most buildings on campus were found to be in good condition; the paint and finish materials were generally in good repair, well-maintained, perhaps “dated” in many locations but
certainly of serviceable condition. Such high levels of maintenance and the commitment to installing high-quality materials provides MTU with a campus interior that, although looking dated, shows well to a visitor. Contemporary interior materials and systems are to be found in the new Library and renovated Fisher and Wadsworth Hall.

Accessibility:
It was not the purpose of this study to evaluate the condition of accessibility on campus. Generally speaking, most facilities appear to be accessible, although it may not be from the “primary path of travel” nor are all areas of all buildings (principally storage and mechanical areas) accessible to employees who may become disabled while on the job. Certainly, there are conditions in each building (with the possible exception of the new Library and renovated Wadsworth Hall) where a literal interpretation of the Americans with Disabilities Act would indicate some, if not great, exposure to a potential lawsuit. Since it is federal law which dictates compliance, there is substantial room for interpretation and a lawsuit can be made by anyone connected with the university in any way, it is HGA’s recommendation that an annual survey of building accessibility be performed.

Likely areas of concern include cracks and dips in sidewalks which are present throughout campus. Most pedestrian paths that link the main campus with the canal properties and Forestry/SDC buildings are too steep to be accessible. The Apartment Buildings are not likely to be accessible from the viewpoint of a visitor (friend or parent/guardian) who is unable to access upper rooms on levels not served by elevators. In addition, campus must maintain an inventory of units which have accessible bathrooms and kitchens. It is assumed that some units have been modified to be ADA compliant. ADA compliant seating in classrooms and labs is limited. The crowded nature of some classrooms makes accessibility by wheel chair bound persons very difficult due to the narrow aisles between desks.

Heating Ventilating and Air Conditioning Systems (HVAC):
It was not the purpose of this study to evaluate the condition of the HVAC Systems on campus. It is reported that odors generated in some of the science laboratories transfer to corridors and adjacent rooms. Return air plenum systems, which may be present in some buildings, is no longer code compliant or appropriate for contemporary classroom and science facilities. If these conditions are present, plans should be made to alleviate them. Generally speaking, however, the HVAC systems appear to be in good operational condition. From HGA’s experience
with the renovation of Wadsworth Hall the systems were in excellent running and operational condition, although many of the fans, motors, pumps and other air handling equipment was well past its useful life. It should be noted, however, that ventilation codes have changed considerably over recent years and although the equipment may be operating in expected fashion, it may not be servicing students, faculty and staff as contemporary facilities would be required to do. A survey of these operational discrepancies should be undertaken to identify possible areas of concern.

Boiler/Chiller Plant:
It was not the purpose of this study to evaluate the condition of the power plant on campus. With respect to the power plant location and the availability of steam and chilled water, it is unlikely that the university could afford to relocate the current facility because of the substantial costs associated with its current location and distribution system. It is, however, likely that this building will have to undergo renovation and perhaps upgrading from an aesthetic point of view in order for the lower canal level of the university development to be aesthetically compatible with the proposed Lake Superior Research Center and integrated public bike and walking trails. It is presumed that additional capacity will be required in both chillers and boilers to serve the campus if substantial future construction of academic and student service facilities is realized. It is also assumed that new facilities would be served by centralized systems as opposed to independent systems built into each facility. It is, however, possible (and common on other campuses) that a cluster of new facilities (like those contemplated on the main campus near the Rozsa Center) could be served by the construction of an additional chiller/boiler plant located in one of those buildings, thereby creating a new chiller/boiler precinct or loop.

Electrical:
It was not the purpose of this study to evaluate the specific nature of the campus electrical systems. That said, it is generally true that contemporary campuses are wired in all locations for computer access by students, faculty and staff and that wireless connections provide access to the university’s network and the internet at key locations around campus. It was noted that there were several well-equipped computer labs in the chemistry and mechanical/electrical buildings as well as in the new library. It was not noted whether significant wireless capability exists currently. Key spaces for wireless connectivity would naturally include the new library and any space where students gather to
study including the student union, departmental offices and student residence hall gathering spaces.

**Plumbing:**
It was not the purpose of this study to evaluate the condition of the plumbing systems on campus. It should be noted, however, that with many of the aging facilities on campus, there is likely to be substantial need to renovate or replace these systems within the next few years or as renovation is contemplated. It is generally advised that water quality testing be done on an annual basis to assure that potential toxins and other health hazards be minimized or identified in a preventative manner.

**Fire Protection:**
It was not the purpose of this study to evaluate the condition of the fire protection systems on campus. It should be noted, however, that the campus recently completed fire protection upgrades to the student residence halls and dining facilities.

**Hazardous Materials:**
It was not the purpose of this study to evaluate the condition of the hazardous materials on campus. It should be noted, however, that once physical materials such as asbestos are located and mitigation measures taken, that many additional toxins may be present which take the form of chemical residues, mold and other airborne materials. Annual testing should be administered to prevent the spread of these airborne materials. In addition, precaution should be taken during high humidity summer days when buildings are often “mothballed” (like residence halls) that conditions not be created which foster the development of mold in uninhabitable spaces like those found above finished ceilings and between conditioned an un-conditioned spaces.

**Energy Efficiency:**
It was not the purpose of this study to evaluate the condition of the energy efficiency systems on campus. However, it should be noted that the general response from students, faculty and administrators when asked about energy management and energy efficiency on campus was that the campus did not “walk the walk” of being a technology-based university. Principal concerns related to comments regarding additional work that could be done to reduce energy costs on campus, increase student awareness of use, beneficial impacts of monitoring energy systems management, and that the MTU campus could be much more of a working “laboratory” of energy management than it currently is. The introduction of photo-voltaic cells, wind power and other active energy reduction systems was noted by many as
an area requiring substantial study and implementation. In addition, additional energy management systems should be evaluated for implementation on the campus. These systems include the increased use of better glazing and insulation systems (typically implemented during renovation), CO2 monitored air exchange mechanical ventilation protocols (in lieu of code required air exchanges per hour), motion and light level triggered lighting systems and programmable room-by-room HVAC System monitoring and management.

**Security:**
It was not the purpose of this study to evaluate the condition of the security systems on campus.

**Infrastructure:**
It was not the purpose of this study to evaluate the condition of the university's infrastructure systems. However, it should be noted that campuses of similar size and sophistication to MTU are moving quickly to a fully integrated wireless delivery of all internet services in lieu of hard copper wiring and that cable and other communications provisions are being made with the collaboration of private sector with respect to funding systems planning, design and installation, offloading the university from this obligation. In addition, many university campuses are migrating all communications systems to the internet which can accommodate telephone, computing and cable access using Voice Over Internet Protocol (VoIP) systems.

Addition of multi-media classrooms and “smart boards” will generally require an increase in the demand for wireless or wired systems development enhancement to the classroom and office level. Although most classrooms are not equipped with this technology, it may soon be required of even the most minimally-high tech spaces. Considerable consideration should be given to the full integration of in-classroom high technology driven presentation techniques.

### 2.2 Functional Condition Assessment

Following is a list of the 7 functional condition categories that are generally evaluated when considering the quality of a building with respect to its appropriateness to purpose.
Suitability to Purpose:

Academic Buildings: Generally academic buildings lack space for spontaneous student interaction which would include areas immediately outside of classrooms where students can stop and meet with one another, study together in small groups and access the internet.

Classrooms (Capacity): It was not the purpose of this study to analyze the ratio of classroom sizes and the optimization of use with respect to curriculum delivery. However, it should be noted that substantially larger classrooms are being required on contemporary campuses that are equipped with wireless access as well as furnishing that are easily moved and reconfigured for different teaching activities and styles.

Classrooms (Space Limitations): Some classrooms contain too many students for the size of the room. In rooms where this is the case, the front row of student desks is often positioned too close (<6'-0") to the front of the room limiting the amount of space available for the instructor to teach the class. The recommended distance from the front row of student desks to the front of a classroom is 9'-0" with 10'-0" to 12'-0" preferred. Aisle widths between rows of student desks are often restricted as well. While tablet arm chairs provide the flexibility to be reoriented for students to work in small groups, rooms are often too small for this to occur.

Library: The library is new and should reflect the state of resource center design and construction. It was not noted whether the library has made any attempt to cull the size of its collection or migrate significant aspects of the collection to on-line media systems.

Student Services: The existing Student Services floor plan is not supportive of the function it houses. Student Services and other support offices for students are not located together and much staff time is allocated to providing directions to new students.

One Stop: A ‘One-stop Shop’ concept along with the addition of a ‘front door’ has been suggested to accommodate a seamless ‘start-to-finish’ process for new students beginning with the application process through registration. The addition of a center for intervention services could strengthen this concept further. By tying Counseling, Tutoring, Student Employment, possible Childcare, and other intervention services in one area, a student’s needs could be addressed completely in one location.
Facility Space Requirements

Food Service Areas: Food is generally available in a number of locations throughout campus, the Memorial Union, Wadsworth, McNair and Douglas Houghton Halls specifically. It is a contemporary campus trend to designate an area on campus, often in the student center or library, where 24-7 study and food options are available. It was not noted that such a space exists on the MTU campus although we received many requests for the creation of such a space.

Fitness Center: The Student Development Center is of high quality but located some distance from the core of campus making it difficult for many students to use on a casual, “in the mood” basis. There is a fitness facility in all of the residence halls that serve students living there. Consideration might be given to making this space available to a larger audience of students, faculty and staff. This would require additional locker and shower spaces, but may increase the utility of the current fitness space as well as providing additional reasons for non-residents to visit Wadsworth, use the food service, recreation and conference spaces provided there.

Rozsa Arts Center: It was not the purpose of this study to evaluate the condition of the facilities in specific buildings but it is important to note that the Rozsa Center is one of the most significant buildings with respect to community integration and outreach on campus. Although of relatively recent construction, the Rozsa Center should be evaluated for its ability to accommodate contemporary stage and musical events, given that it is the only location where “road shows” can be staged. It was noted in many conversations that the loading area of the Rozsa Center must be protected in the future when new construction of educational facilities and possible parking areas is considered. Generally, parking at the Rozsa Center is adequate given the availability of spaces on campus but, as in all campus outreach centers nationwide, proximity to the front door is a major complaint. The Rozsa Center front door also faces away from the majority of campus buildings requiring that attendees walk around the building to gain primary access. In addition, it has an interesting aesthetic opportunity to view the bluffs and canal, but suffers from the immediate presence of grade-level parking to the east.

Professional/Technical Center: The location of the Advanced Technology Development Complex is distant from the main campus making it difficult to integrate within the campus community. It is underutilized at present as an incubator for business development.
Campus Housing: Residence Halls are generally in good operational and aesthetic condition, Wadsworth was recently renovated and the facilities at McNair and Douglas Houghton Hall were upgraded to include new sprinkler systems. Douglas Houghton Hall is an older building with aging systems. The dining services facility appears to be in relatively good condition, recently renovated and adequately serves its student population. Access to the dining center in Douglas Houghton Hall is limited to the east side of the facility. The location of Douglas Houghton Hall within the core of the academic campus, suggests its future use might be returned to an academic purpose when the construction of new housing facilities is implemented. It is generally noted that the “dormitory” style rooms present in most of McNair, Wadsworth and Houghton Halls are not appropriate for upper class members, graduate students or families and that the construction of “apartment” style housing would increase the opportunity to retain a greater number of these students in campus housing. The apartments, which currently serve this purpose, are increasing in demand by students wanting more privacy and an alternative to Wads, McNair and Douglas Houghton. Although the apartments appear to be in relatively good condition, this style housing is often inadequate to serve students with disabilities and may require substantial upgrades to the exterior systems in the coming years to prolong their useful life.

Physical Plant Office: The building was recently renovated and seems to support its function and purpose well. The department benefits from being close to the shops building and power plant facility immediately adjacent, but its location is also in the “canal” area where the future Lake Superior Resource Study Center is thought to be located; possibly creating a conflict. Some consideration must be given to the best possible location of the facilities department and shops while also recognizing that buried tanks, the oil reserve supply and power plant are likely to be permanent in their present locations.

Acoustics: It was not the purpose of this study to evaluate the acoustical properties or capabilities of campus facilities. It should be noted, however that campuses throughout the country are becoming more integrated with respect to distance education including multi-location interactive TV and web Simulcasts which require more sophisticated acoustical support systems than do most classrooms. The further integration of “smart board” and high-technology equipped classrooms requires integration of sound support systems so that interactive, internet of video-based
media can be properly presented to a class; which may include individuals in multiple locations.

*Lighting:* It was not the purpose of this study to evaluate the lighting systems on campus. However, it should be noted that with the introduction of substantially more "smart board" and multi-media presentation techniques, it is becoming substantially more important that room lights be dimmable in ranks from the front of the room to the back. In addition, most current teaching pedagogy introduces the increased use of computers by students during classroom periods requiring that low-glare lighting systems be employed.

*Fixtures and Furnishings:*
*Student Desks:* While faculty members generally liked tablet arm chairs because of their flexibility to rearrange into different configurations, an insufficient amount of left-handed tablet arm chairs was observed to adequately accommodate the 10% (approx) of the overall population that is left-handed. Additionally, it was reported that existing student desks are not large enough to physically accommodate some students. Furniture in some of the classrooms is dated. In some cases, several styles of furniture are present in the same room.

*Storage:* Classrooms generally lack coat racks and storage provisions for backpacks.

*Instructor Tables:* Tables for instructors in the classroom are often old and outdated. More current instructor tables have wheels and are vertically adjustable.

*Student Center:* Some of the furniture in the Student Center is worn due to heavy use by students.

*Teaching Walls:*
*Projection Screens:* Projection screens in some classrooms cover a majority of the whiteboard space when fully extended. This leaves little remaining space for instructors to add additional information during multimedia presentations.

*Chalk Boards:* Chalk used on brown boards can damage multimedia equipment.

*TV Monitors:* TV monitors in some rooms are small and therefore difficult to see from the rear of the room.
2.3 Space Needs Assessment

It was not the purpose of this study to complete a detailed Space Needs Analysis for the campus Master Plan. As a general framework for development, however, there were several criteria which were considered to be essential to the successful development of the "Fresh Look" master plan study. They were:

- Plan for a modest growth, the future total headcount to be approximately 7,000 students, most of the growth to be in the graduate division; that body growing from 900 to 1,250 in the future. Based on the future enrollment of 7,000, it is estimated that the campus would require (based on a low average of 150 ASF/FTE) between 1,050,000 Assignable Square Feet (ASF) which is 1,750,000 Gross Square Feet (GSF) based on a 60% efficiency factor and 1,400,000 ASF which is 2,333,333 GSF in facility not including the residence halls and recreational sports facilities. Currently, MTU has approximately 1,694,100 GSF of non residential/sports facility, suggesting that it has a the right amount of space at present but will suffer a space deficit as it grows; requiring the construction of up to 700,000 GSF in new educational facilities.

- Student housing is a significant source of revenue on campus and a major tool in retaining students on campus. Students who live on campus are more likely to graduate in 4 years, maintain higher grades and become more engaged in campus life. Therefore to serve the needs of a growing student population, additional housing will be required beyond that which currently exists. Serving the campus today, is a total of approximately 820,000 GSF in Daniell Heights, McNair, Douglas Houghton and Wadsworth Halls as well as a number of private residences and apartments. Student housing will need to increase by approximately 400 beds, mostly in apartment style, single occupancy bedroom configurations. Assuming that the current housing supports the needs of the undergraduate population (that enrollment growth will be in the graduate population) new construction should provide additional beds for 30% of the future graduate school admissions (1,250 X .3 = 375). An average of 450 SF/Bed is required for apartment style housing resulting in a future need of 168,750 GSF of new housing.
The long term goal is to transition the university from its current perception in the academic marketplace to looking more like a "Carnegie Mellon" institution. This will require the addition of substantial new research laboratory and associated facilities rather than traditional classroom facilities.

Distance learning and e-education will increase but will not likely have a substantial impact on the current campus or student body with respect to this study.

The presence of US 41 bisects the campus and creates unsafe pedestrian/vehicular conflict. MDOT is aware of the condition and discussions are taking place concerning possible resolution. It is unlikely that US 41 will be relocated such that its current right of way between Wads Hall and the Rozsa Center can become pedestrian "green" space. However, if this were possible, routing traffic either south of campus or north of campus (along Cliff Drive), substantial benefit would result form the conversion of the roadway to vehicular-free building footprints, green space and recreation zones.

The east entrance to campus is unsightly and does not present the welcoming visual impact desired. Parking lots that exist to the north of Highway 41 are necessary to serve that end of campus.

The peninsula immediately to the northeast of the Rozsa Center parking lot has been discussed as a possible location for water sport and winter activity equipment rentals.

The broom ball courts in front of Rozsa Center are unsightly and not conducive to creating a positive first impression of campus. However, they are well used and convenient to the bulk of students who use them.

There is really no "old" campus core left. Most of the original buildings are gone, having been demolished. Many of the newer buildings are of relatively low architectural character and do not reflect highly on MTU other than creating an institutional image.

It is desired to expand the football seating and press box area to accommodate soccer and possibly Canadian style football.

The University recent purchased property and a "land bridge" between the Recreational Forest & Nordic Ski Trails and the golf course property, thereby creating a contiguous MTU-owned/controlled connection from
east to west along the southern border of the university.

- The President's home is currently unoccupied. The land associated with this facility is connected to the property of the Ruppe House and makes a logical and desirable extension along Highway 41 to the west. The original idea for use of the Ruppe House was to create a Welcome House/Gateway Center. Its location adjacent to the President's home and on the east side of the campus is a good location for these functions.

- Property to the north of the Forestry Building between East and Blanche Streets is owned by MTU with the exception of several residential parcels. Further acquisition of this property is advisable. Property east of MacInnes Drive and north of Upland Road is underutilized by the church and other functions and may be a good site for acquisition. The cemetery property might provide the necessary future expansion space for long-term campus growth but is an unlikely target for acquisition.

- The entrance corridor to the west of campus along Highway 41 is unattractive because of the condition of the properties along 41 and because of the lack of any "entry or welcome" signage or facility that would make a positive impression on a visitor to campus. The existence of substantial surface parking on that end of campus is a positive for the current admissions area.
3.1 Building and Land Use

Building Use Pattern:
The campus building uses can generally be grouped into four clusters: Academic Core, Student Housing, Physical Plant and Maintenance, and the Advanced Technology Development Center. In addition, the Mt. Ripley Ski Area and Golf Course are located off-campus.

*Academic Core:* The Academic Core consists of the primary academic and administrative buildings clustered along Highway US 41 on (approximately) the north half of the main campus. The Academic Core represents the clearest example of a distinct campus place. The buildings are comprised of a variety of architectural styles, due to remodeling and building additions completed over past years. This main cluster of buildings houses the majority of classroom/laboratory and administrative/office space on campus in addition to the bookstore, Rozsa Center (campus and community theatre), various gallery/exhibit spaces and library. In addition, it also is the location of the only residential hall north of US 41; Douglas Houghton Hall.

The buildings are configured in a linear west–east direction capturing northern views of the Hancock Bluffs, glimpses of the Mt. Ripley Ski Area, and water features of the canal area. All buildings, with the exception of the Rozsa Center, are oriented inward toward the center of campus and a highly articulated walking area that connects the campus in a single axis. If carried to the west through what now are parking areas, this mall would become a formal open space at the University’s main entry. Future development within this academic cluster should respect and expand upon the existing building adjacencies and spatial qualities. Existing open spaces to the north should be preserved and views should continue to be maximized to further enhance the campus sense of being a “north woods” place.

Although the Academic core is well configured to act as a framework for expansion, renovation, and repurposing it suffers from confused wayfinding and separated student services. Most of the building entrances are not visible to Highway 41 due to their placement on the north or south side of their facades. The creation of a clearly visible campus “front door” is a critical need. Inside the front door, students and visitors need to easily find directions, enrollment, financial aid, and counseling services. Currently these are separated between buildings.
**Student Housing:** Student housing is clustered together on the southeast side of campus along Highway US 41, south of the Academic Core. This housing cluster is comprised of three (3) primary buildings: The Apartments uphill to the south of Wadsworth and McNair Halls, Wadsworth Residence Hall, and McNair Hall. Similar to the Academic Core, student housing buildings range in architectural style and construction dates from the early 1950’s to the 2006 renovation of Wads.

The buildings are orientated east-west in a linear fashion generally parallel to US 41. Their configuration provides easy access to adjacent parking but lacks organized communal areas for residents. The facilities also lack capacity to address increasing demand from students for single bedroom, apartment style housing facilities.

**Physical Plant /Maintenance:** The Physical Plant/ Maintenance cluster is located north of the Academic Core, down the bluff along the canal. This area, although once utilitarian in nature, is now considered to be a likely location for future development of academic and student life facilities (principally the Lake Superior research Center). This cluster of buildings is comprised of the shops building, the power plant, several storage facilities (candidates for demolition) and four large capacity, above-ground oil tanks (only one of which is necessary for operation). Their orientation is the same as the Academic Cluster.

The buildings are located in close proximity to one another and have an industrial appearance. However, views of the facilities from the campus perimeter, particularly the campus entries, are limited due to their down-slope location. This location has become increasingly problematic due to the location of the Houghton public bike and walking trail which runs through this space and the desire to make an aesthetic feature of the canal area in general. College development around buildings, storage yards and vehicle parking impacts pedestrian safety, academic expansion and enjoyment of the Canal Area Green Belt. Future relocation of these facilities (all but the power plant) should occur in an area that is easily accessible but minimizes views of the facilities from the public (conceivably to the south of campus near the Advanced Technology Development Center).

**Advanced Technology Development Center:** The Advanced Technology Development Center is located on the southwest side of campus some distance from the academic core. The facility includes indoor academic and administrative support space. The building is different from all other buildings found on campus in that it is
isolated form all campus facilities and surrounded by parking areas.

**Land Use Relationships:**
The campus land use can generally be clustered into four main categories: Sports Fields and Courts, Campus Mall located in the heart of the Academic Core, Naturally-Wooded Areas, and Fields.

*Sports Fields and Courts:* Sports facilities are comprised principally of Sherman Field, outdoor practice fields located there, Mt Ripley Ski Area, the golf course, the Nordic ski trails acreage and the main Mall area. The sport fields and courts are located toward the edge of campus to the south.

*Campus Mall/Green Belt:* The Campus Green Belt is the area of campus specifically identified by MTU as designated for “open space preservation”. The Mall area is generally considered sacred and specifically designated as a no-build zone, in order to protect MTU aesthetic open space qualities, picturesque views of the surrounding bluffs and vistas of the college and canal area from Highway 41.

*Natural Woods and Fields:* Natural Woods and Fields include all areas of campus where the land is being utilized for purposes other than sport related activities, student gathering or open space preservation. Field areas primarily include the south end of campus and a small portion on the south west side of campus.

### 3.2 Open Space Character

The MTU campus has a variety of open spaces. The campus front lawn, framed by the primary Academic Core, creates a ceremonial formal entrance and public front door. The space is defined by street trees, pole lights, and the north and south façade of the Academic Core. This manicured open space contributes to the image and identity of the institution. The captivating view of the Hancock Bluffs and surrounding valley including the canal area to the north provides a unique amenity that contributes to MTU’s competitive advantage as a “northern” institution.

The spaces between buildings in the Academic Core create semieclosed outdoor rooms. The building entries, facades, sidewalks, vegetation, and public art all help create inviting outdoor gathering spaces for students and faculty. However,
because of the extreme climate, this main area is often snowed in deeply, windy and difficult to navigate comfortably.

The remaining portion of campus contains informal open outdoor spaces. Sidewalks connecting the Academic Core with Student Housing bisect large areas of open lawn with scattered vegetation and outdoor sculpture. There are also playground, volleyball, basketball, fitness stations and picnic areas that provide informal recreation and gathering areas scattered throughout the campus.

The extreme southern portion of campus is primarily open undeveloped land, acting as a buffer along the campus edge. This open land is a great college asset, enabling MTU to accommodate campus development, support the use of Nordic ski trails, connect to the eastern portion of Houghton where a substantial number of students and faculty drive from, and maintain a buffer of open space along the campus perimeter.

_Campus Sculpture/Public Art:_ The MTU campus has very little outdoor art or sculpture. If present, the introduction of public art would contribute to the distinctiveness of the campus and supports appreciation of the College’s visual arts program.

### 3.3 Parking and Circulation

MTU currently has adequate walkways that aid in separating the vehicular and pedestrian traffic, however, it is the desire of the Board and the administration to enhance the current pathways and sidewalks and make the campus more pedestrian friendly. Additionally, there are currently some problems with the traffic flow through campus, routing of some streets, and parking adequacy and location areas. Currently, some of these issues are being addressed by improving and resurfacing some of the existing parking areas. However, in order to satisfy the transportation need of the college for future expansions, a comprehensive site and traffic master plan is needed in the near future. This master plan should include pedestrian and vehicular traffic, parking, landscaping, easement consolidation for existing and future utilities, and grading and drainage, among other possible site issues.

In addition, a local developer is contemplating the construction of additional housing on College Avenue. Additional housing in the area could potentially impact the front entrance of the campus along Highway 41 from the west. A detailed traffic
analysis should be considered for the Highway 41 corridor prior to further development of any parking analysis or planning which could significantly increase the use of Highway 41 or adjacent roadways.

**External Roadways:**
The main entrance to MTU is located on the east side of campus along Highway 41. Highway 41 is a major arterial running in an east-west direction, connecting Houghton to the western portion of the Upper Peninsula (local community, regional community, and state). MTU is also accessed from other external roads to the south.

**Campus Roadways:**
*Entry Drive:* There is no Main or formal entry onto the MTU campus, providing access to the campuses main facilities and parking, perhaps other than from the west along Highway 41 at Cliff Drive and from the east entering into the Rozsa Center parking area.

The entry drive which is on the northwest side of campus is a two-way semi-circular roadway, with ingress and egress from Highway 41. The orientation is specifically intended to provide safety and security to visitor and pedestrian circulation; a result which is achieved but with an aesthetic treatment cost of this important visual center of campus.

*Campus Drives:* Three (3) major campus drives exist on campus; Highway US 41, Cliff Drive, and MacInnes Drive.

Highway 41 is at the virtual center of campus, south of the main campus academic facilities. US 41 is a two-lane highway running roughly east-west connecting through campus. The roadway prevents safe pedestrian access to student housing, the Forestry Building and Student Development Center.

Cliff Drive runs along the north side of the main campus along the bluff. Cliff Drive is a narrow two-lane roadway circling the campus to the north connecting Highway 41 to Highway 41. It provides access to many of the campus parking facilities as well as loading areas for most of the northern buildings along the main academic core.

MacInnes Drive runs roughly north-south from Highway 41 to the southern edge of campus connecting the main campus to the Forestry Building and Student Development Center, providing access from these facilities to the campus's main facilities as well.
as connecting satellite parking on the south east side of campus to the campus core. That MacInnes Drive is very steep creates walking challenges for students accessing the Forestry Building and Student Development Center.

**Service Drive:** The service drive that provides vehicular access to the canal area bisects the bluff area, where future development may take place, from the “flats” area where the power plant and associated buildings are located. At present, this is not an inconvenience. However, if the Lake Superior Research Center is located in the canal area, and the Houghton bike and walking trail is extended in a formal way through the lower canal area, this service road will become an issue that will require resolution. Such areas include the service entry/loading docks to several of the campus's main facilities: the boiler plant/maintenance facilities and public outdoor recreation spaces.

**Pedestrian Circulation:**

*Pedestrian Corridors:* The pedestrian corridors provide access to all the major building entries on campus, linking the student housing, academic, administrative, maintenance, and recreational sport facilities together. The majority of pedestrian corridors exist in the center of campus between the vehicular roadways. As mentioned in other sections of this report, the general condition of pedestrian connectors is good. The main Mall, between the Rozsa Center and the Administration Building, is a well-landscaped area that generally serves the campus pedestrian well. It is important to note, however, that there are substantial wind and weather concerns relating to the areas of this main Mall walking path that present significant discomfort to pedestrians especially in front of the Chemical and Mechanical/Electrical Engineering towers. Some mitigation of these conditions should be pursued. In addition, although signage on campus is generally good and helpful, a significant increase in the way-finding methods, possibly including electronic kiosks, would be a welcome addition to the campus walking paths. Finally, although some public art is evident along the major walking paths, a significant increase in the display of these objects, including other historical artifacts (depicting aspects of the University’s history, the geology of the region or other significant achievements of campus faculty, staff and students), could enhance the casual visitors appreciation of the campus, its history and mission.

**Regional Bike Trail:** A community bike trail runs through the edge of campus along the Canal area between the Shops and Power Plant buildings and the bluff which culminates in Cliff Drive. The bike trail connects the college with the public and private
amenities along the Canal area. Currently, the condition of this trail is awkward as it enters and leaves campus property, having to share the right-of-way with the roadway that connects all lower Canal area buildings and serves parking along this area. Substantial consideration should be given to the upgrading and integration of this trail into the landscape of the Canal area, presumably to the north of the Shops and Power Plant buildings at the time when the lake Superior Research Center programming/planning takes place.

Parking:
MTU has 37 parking lots on campus with a total parking inventory of approximately 4,500 parking stalls (according to the Carl Walker study completed in 2000). With a projected total campus population of approximately 7,500 (students and staff), a parking ratio of (0.6) parking spaces per person exists. This ratio is considered to be on the low side of adequate to serve campus parking needs, in comparison to ratios commonly found on many campuses across the country.

The main parking lots utilized for academic purposes are east along Highway 41 and south above the housing neighborhood along Highway 41. The far south lots adjacent to the Student Development Center are under-utilized during daytime academic conditions, but serve the SDC activities well, and may be slightly under-sized for these activities when the SDC is to capacity. The campus perception or proximity to the “front door” favors the parking lots near the Administration Building, although these lots are both metered and for visitors (primarily). Strategies to balance the use and demand for parking are critical to the success of adding new programs and facilities to campus. Creating a stronger link between parking and the main Mall and Rozsa Center doorways is also essential. The Rozsa Center is adequately served from the east lots. As the campus grows in academic facility square footage and the desire to maintain a low cost (suggesting grade level parking solutions) campus plan competes with the expense of land acquisition, structured parking will have to be seriously considered as a potential solution. Likely locations for these multi-level ramps are in the proximity of the Rozsa Center, south of Wads Hall in the bluff area (presumably constructed as the lower level of new housing development) and west of the ROTC Building along Cliff Drive. It should be noted, however, that structured parking is a substantially more expensive solution to parking demand, escalating the cost of a single stall from roughly $2,000/stall to over $10,000/stall. It is possible to reduce the cost of structured parking by incorporating it in other projects (where substantial foundation excavation is
made necessary by the topography or soils conditions like those found south of Wads Hall).

Student Housing is served by two lots immediately adjacent to Wads Hall (south of the building and in satellite lots southwest of the housing neighborhood) and McNair Hall (across Highway US 41) and adjacent to the apartment buildings themselves. Additional housing will be constructed on the campus. Serious consideration should be given to the inclusion of parking in the planning and development of those buildings (as lower levels to those buildings whether high-rise or 4 story). In addition, the lots that serve Wads Hall to the south should be considered to be temporary, to be replaced by green space for recreational uses when the new housing is constructed and significant additional parking is provided within these facilities.

3.4 Main Campus Infrastructure

Water:
It was not the purpose of this study to analyze the condition or expansion capabilities of the campus water supply system, but it has been reported that no significant issues are present that would prevent the campus from expansion.

Sewer:
It was not the purpose of this study to analyze the condition or expansion capabilities of the sewer system, but it has been reported that no significant issues are present that would prevent the campus from expansion.

Communications:

Telephone:
It was not the purpose of this study to analyze the condition or expansion capabilities of the telephone system, but it has been reported that no significant issues are present that would prevent the campus from expansion.

Internet:
It was not the purpose of this study to analyze the condition or expansion capabilities of the internet system, but it has been reported that no significant issues are present that would prevent the campus from expansion.
Grading & Drainage:
It was not the purpose of this study to analyze the condition or expansion capabilities of the grading and drainage or storm-water/watershed management systems, but it has been reported that no significant issues are present that would prevent the campus from expansion. It should be noted, however, that significant water issues were part of the civil engineering redesign of the south street along Wadsworth Hall and that considerable water still flow down the bluff from above Wadsworth and McNair Halls as well as in the area of Cliff Drive and the lower canal area. These conditions should be carefully monitored for degradation.

In addition to site drainage, it should be noted that the bridge which connects the new Van Pelt Library to Rekhi/Fisher Halls is often ice-bound in the winter and presents a real hazard to pedestrian traffic as well as the possible degradation of the bridge structure itself.
4.1 Main Houghton Campus Community Context

Campus Physical Setting:
The MTU campus is situated on the eastern edge of Houghton and is bisected by Highway 41, where the Keweenaw Waterway Canal and bluffs area meet, between the major body of Lake Superior and Keweenaw Bay of Lake Superior. Houghton has a population of approximately 16,000 residents serving as the commercial and educational hub of Upper Peninsula of Michigan. The campus and community lie at an elevation of roughly 1,000 feet in the Keweenaw Waterway Valley. The Keweenaw Waterway Canal connects commercial water traffic between Lake Superior to the northwest and the Keweenaw Bay to the southeast. The area has a wide range of topography within the relatively single environmental zone dominated by alpine forests and the lake itself. The varied landscapes and close proximity to Lake Superior and the Upper Peninsula provide an abundance of lakes, streams, forests, and outdoor recreational opportunities for the MTU and general Houghton/Hancock community. This is a fundamental aspect in the attractiveness of the university to students, faculty and staff.

MTU’s main campus (160 acres) is located along Highway 41 on the northeast side of Houghton between the central business district and the remainder of the Upper Peninsula. The area is served by the Houghton/Hancock Regional Airport which is north of the campus property outside of Hancock. The campus is bound by single-family uses to the west and southwest, the Keweenaw Waterway to the north, and residential areas to the west. Although the campus lies within the City Limits, the north and west side of campus form the boundary between the City and County. The campus’s location serves as a gateway to the west side of the Upper Peninsula. As a result, MTU is easily accessible and highly visible from Highway 41 which serves the city, county, and region. This is both a positive (in that it makes MTU highly accessible) and a negative (in that Highway 41 bisects the campus and presents substantial campus unification and safety concerns).

Community Importance:
The early settlements of Houghton and Hancock Michigan grew up on each side of the narrow end of Portage Lake with Houghton on the south side and Hancock on the north side. Hancock, as well as the northern part of the Keweenaw Peninsula, could only be reached by water so small boats were used to connect the two towns. Both towns began to prosper as copper mines were developed on each side of the waterway and commerce and shipping began.
Portage Lake and the Portage River provided a natural pathway across the Keweenaw Peninsula, dividing it almost in half. The Keweenaw Waterway was completed in the 1860's when a ship canal was built connecting Portage Lake on the east to Lake Superior on the west. Ships could now enter this ship canal from either side of the Keweenaw Peninsula and cross to the other side without having to go around. The Keweenaw waterway also made it possible for larger vessels to travel to Houghton and Hancock and it provided a Harbor of Refuge to protect these vessels from Superior's terrible storms. Completion of this canal made the Keweenaw an island, rather than a peninsula. A bridge was built to connect the two towns in 1875, rebuilt in 1898 and had major repairs in 1905-6. The present Portage Lake Lift Bridge built in 1959, the heaviest aerial lift bridge in the world, now spans the waterway.

MTU reaches far beyond its roll of providing educational services as it is the cultural center for the entire region, offering visual and performing art venues that are some of the finest in the area. MTU is also a community partner with local and regional businesses. MTU is the largest employer in the Upper Peninsula.

**Surrounding Context:**
MTU is bound by physical barriers: Highway 41 or Main Street to the northwest, Cliff Drive to the north of the upper campus, the Keweenaw Waterway to the north of the canal area, and Sharon Avenue to the south. The majority of institutional community activity lies north of campus along between Highway 41 and Cliff Drive which runs parallel to Highway 41 in a east-west direction. Cliff Drive currently provides a through-campus connection to the north between Highway 41 to the west and east.

### 4.2 Main Campus Development Zones

The recommendations for locating future campus facilities are guided by several criteria. New construction must strengthen the Campus Core. It must also promote connections with existing facilities. Programs that provide MTU a competitive advantage and provide a regional need should be linked. New development should frame campus entries, provide clear direction for visitors, and showcase unique facilities.

*Expansion Zones:* Several areas on campus are ideal as potential expansion zones in order to accommodate future growth and expansion of existing MTU programs. Specific expansion zones include: the residential neighborhood juts south of Highway 41...
and west of MacInnes Drive, the area south of Wadsworth Hall and the newly acquired area that connects the Nordic ski trails to the extreme south with the golf course property. This newly acquired property provides a contiguous “land bridge” connecting the University land along its southern border and provides a means of connecting to the public walking/biking trails nearby. The space between the Boiler Plant and Physical Maintenance buildings is best suited as expansion of the Lake Superior Research Center, should this project be funded.

**Outdoor Spaces:** Semi-enclosed outdoor spaces between Wadsworth Hall and the new student housing/structured parking facility proposed on the site of the current Wads Hall parking lots to the south would create gathering areas and bridge the gap between existing housing and the proposed new development zones west of MacInnes Drive. Additionally, new semi-enclosed outdoor spaces are proposed between the existing Central Core academic buildings to help set boundaries for potential expansion zones while preserving pedestrian routes, view corridors, outdoor sculpture, and entry plazas.

**Potential Acquisition:** The parcel of land between Highway 41 and 7th Avenue and MacInnes Drive and Blanche Street has been identified as a potential acquisition by the college in past discussions. Much of that property is already owned by the University. Plans should be made to acquire the remaining single family homes such that the entire 2-block zone is aggregated. Once this land is all in the university’s control, it will make an ideal location for student housing with structured parking below. This can be accomplished with university funds or through long-term lease of the property to a non-profit or for-profit entity; that entity being responsible for constructing the housing/parking facility. In such an arrangement, it is possible that the university could maintain management responsibility for the facility, if desired. Such developments, although once rare, are quite common in higher education.

Additionally, there is property between MacInnes Drive, Upland Road and Sharon Avenue that is underutilized with respect to its current uses. This land is ideal for student housing combined with structured parking or expansion space for academic programs. In the event that this property becomes available, MTU should seriously consider its acquisition.
Potential Roadway Reroutes / Extensions: US Highway 41 bisects the campus in a highly impactful manner. It is a US highway, controlled (apparently) by MDoT. Discussions have been had regarding its modification to provide a softer edge to its commercial condition. Considerable safety and dislocation issues result from Highway 41's right-of-way through campus. Although it might be considerably time consuming to negotiate, the benefits of re-routing Highway 41 are substantial. Possible relocations for Highway 41 re-routing include Cliff Drive along the bluff area (unlikely because of road width and over-roadway connections) and up MacInnes Drive (a far better route around campus). If successful, the current right-of-way could become green space for student recreation, outdoor performances, or building pads for additional academic facility construction. This would produce a fully contiguous campus connecting in a safe and secure, fully integrated manner, all buildings except the Forestry and SDC Buildings.
5.0  “Fresh Look” Scenario Plan Overview

The “Fresh Look” Scenario Plan recommendations are the final result of working interactively with the MTU “Fresh Look” Committee, Executive Team and members of the faculty, student and staff community. HGA solicited the input of these groups during various focus groups and meetings, including one-on-one interviews and conference calls. The plan identifies future building sites that incorporate existing campus facility and open space assets. The plan works to preserve, strengthen and expand the campus’ most valued functional and physical qualities. It also strives to improve adjacencies, image and identity where these qualities are missing.

The arrangement of future buildings, additions and renovations creates a clear organization of programs and spaces within the campus. The expansion of the main academic core creates a programmatic anchor and community outreach center at each end of campus.

**West Campus Core:**
The extension of the campus main mall to the west through the current parking areas, culminating in the intersection of Highway 41 and Cliff Drive will create a single visual and pedestrian axis connecting the academic and administrative core facilities with the Rozsa Center to the east. Visitors arriving from the west will be presented with a visual opportunity to “see” campus down this axial mall area and better orient themselves to campus’s organization while offering the university an opportunity to create a new and meaningful “front door” to campus; a facility that has never existed in its over 100-year history. Regardless of what building or monument (clock tower or statuary) is erected on this western-most site, it should have a presence that identifies to town and gown alike that one is entering into the academic province of Michigan Tech and leaving Houghton behind. The extension of the mall to the west also creates additional building sites and the opportunity to re-design the entry and parking sequence of the admissions area. This could become the site of the new “one-stop” or visitors center.

Lot 3 or Lot 1 are likely locations for the construction of additional structured parking which could serve the Memorial Union/Welcome/Admissions/One-Stop precinct of campus. Although Lot 3 is perhaps the better site for a two to three level parking deck, Lot 1 could accommodate such a structured facility. Design of the structured ramp on Lot 1 would require additional
consideration so the pedestrian mall area is not adversely affected by the "parking ramp aesthetic".

South Campus Core:
The Forestry Building and Student Development Center are disconnected from the main campus by their location to the south of Highway 41 and made relatively inaccessible by the steep incline of the MacInnes Drive approach to both; especially during the long and snow-filled winter months. Although a controlled intersection is located at Highway 41 and MacInnes Drive, there is no "visual" or "landscape " connection (other than MacInnes Drive) to these facilities that makes them feel like they are part of the main campus. With acquisition of the additional residential properties to the south of Highway 41 and west of MacInnes Drive, a new housing precinct could be designed and constructed that would provide an opportunity to create a central landscaped mall between housing buildings, which would mimic the character of the Academic Core mall and develop a new north-south axis culminating in arrival at the Forestry Building, integrating that facility into the campus proper. From Forestry, walking paths could be developed that would provide a safe and accessible means for pedestrians getting to the SDC facility and parking areas. Also, additional surface parking lots could be constructed in the wooded area to the south of 7th Avenue, north of Lot 26 or south of Lot 21, that would serve additional parking demands at low cost. Pedestrian connection to campus would, presumably, be through the new housing precinct north-south axis mall. Finally, it is possible that underground structured parking be constructed below the new housing precinct which would add substantially to the "near" campus parking capacity.

Lots 17 Upper and Lower are currently used by Wadsworth residents for parking. In addition, satellite Lot 21 is used by residents. Lower Lot 17 is an ideal location to eliminate surface parking and to construct a student green space for recreation (Wads Beach). Upper Lot 17 is an ideal location for construction of new apartment-style multi-level student housing complex above structured parking. It is very possible that an efficient parking ramp of approximately 350-700 spaces be constructed below 200-300 beds of student housing, all while providing green space between Wads Hall and the new housing to the south. This location provides good access to the facility from Upland Road, views of the surrounding valley (over Wads) from the new housing units and easy construction of below grade parking.

The Memorial Union facility requires additional space to provide for additional student organization functions and a more useful
facility in general. The addition currently being considered for construction is to be placed south and west of the existing building. Every consideration should be given to creating a new connection between the Memorial Union and the Van Pelt Library, linking these buildings in a ‘fully conditioned’ facility that serves the goal of creating an aggregated 24/7 student-focused resource center on campus. Temporary parking along the southern edge of these building (Lot 17 to the north of Highway 41) should be designed in such a manner that it serves the Welcome/Admissions/One Stop Center to the west, Memorial Union and Van Pelt Library while also connecting to the Rekhi and Fisher Halls. It should be designed in a one-way format such that it enters at MacInnes Drive and exits near Lot 27 while also masking Highway 41 from campus view. The westernmost area of this site (to the south of Rekhi Hall) could also be the location where above ground bridge access or below grade tunnel access connects the housing precinct, south of Highway 41, with the main campus proper. An additional above-grade bridge access from the housing precinct via the lower level of McNair Hall should be considered, terminating at the northeastern corner of Lot 9. The grade changes required for such a bridge connection would be minimal, only a two-story connection on the north side of Highway 41 would be necessary to bring pedestrians to Rozsa Center entrance elevation. If structured parking and/or housing and academic space is constructed on Lot 9, this bridge connection to McNair Hall could be made accessible as well, an added benefit to the housing precinct and campus at large.

**East Campus Core:**
Lot 10 should be considered as a likely site for the development of additional green space and a new entry portal from the east. This will be made more effective if the site is incorporated with the relocation of recreational storage and rental facilities to the land point just north of Lot 10 along the canal. Currently, the parked cars in Lot 10 are designated as resident parking. Although conveniently located for residents of McNair and Wads Halls, they present an unsightly vantage point to campus from the east along Highway 41 where the first view a visitor has of MTU is parking lot. If the current Lot 10 area was converted to a park-like environment and made useful by incorporation into the recreational program, this easternmost “portal” could be quite attractive. Replacement of Lot 10 could be considered if Lot 9 was converted all, or in part, to structured parking. Such a parking deck could be “edged” with new housing or academic buildings, thus masking it from view from Highway 41. Space to the east of Rozsa Center’s front door should be designed in such...
a manner as to create a new drop-off location, easy access to structured parking, all while being landscaped to divert views from the parking structure (by masking it) towards the canal and bluffs beyond. Lot 8 should be considered as another likely location for structured parking. Care should be given in the design of this facility to assure that the loading area for Rozsa Center is not compromised.

North Campus Core:
The area between the EERC Building and Chemical Science Building to the north and Van Pelt Library to the south is an ideal location to create the “center of campus” quadrangle or court area. It is in the heart of the academic and student life facilities, has access to the new north-south axis constructed across Highway 41 into the new housing precinct (culminating at the Forestry Building) and has remarkable views of the surrounding bluffs and canal area to the north. This is a good location for the construction of a “pedestrian bridge or deck” that continues the mall over Cliff Drive where it will terminate in a building or other structure that will transition pedestrians down the bluff (either via a new academic or housing facility or by way of a landscaped walk) to the lower canal area.

Lower Canal Area:
The lower canal area is the possible site for the Lake Superior Research Laboratory, considered to be possibly sited in a renovation and addition to the Facilities Building. Although this building has been recently renovated and is in good condition, close to the shops area and adjacent to the Power Plant Building, the facilities use is one that could easily be relocated to another part of campus. There are several facilities (underground fuel tanks, the above-ground oil reserve tank, the Power Plant) that are not easily relocated. Serious consideration should be given to the relationship between these facilities and the functions located in the Facilities Building prior to moving either. A perhaps more likely site for the Lake Superior Research Laboratory would be to the east of the easternmost above-ground reserve oil storage tank. Only one of these four tanks is required, the easternmost could be removed and its site made ready for the Lake Superior Research Laboratory building, thus eliminating the need for relocation of the facilities department. This location to the east of the lower canal area is also a more likely location for the construction of a boat pier required by the Lake Superior Research Laboratory for research vessel storage required to conduct on-Superior research. This lower canal area also provides parking to students, faculty and staff as well as shipping/receiving areas for Minerals & Materials and Dow
Environmental Sciences; services which must be maintained. In addition, the Houghton Bike and Walking Trails pass through this area using the same right-of-way as the roadway; a condition which should be modified when reconstruction of the lower canal area takes place.

A better location for the Bike and Walking Trail is on the north side of the Facilities, Power Plant and anticipated Lake Superior Research Laboratory buildings. Integration of appropriate landscape materials and other recreational amenities will make the lower canal area feel more connected to the canal and bluffs area. Finally, parking along the lower canal area compromises the quality of activity and safety of the exterior spaces desired here. Because of the steep nature of the bluffs, and the desire to connect the upper campus to the lower canal area, there is a good possibility that “transition” structures can be designed to accommodate the 80'-100' change in elevation while also serving the MTU campus long-term. These bluffs make ideal locations for the construction of student housing or academic; both building types could be supported with structured parking in the lower levels. The visual product of such new facilities would not be dissimilar from that which the Dow Environmental Sciences and Minerals and Materials Buildings create. Construction of additional facilities in the bluffs area will also make a more integrated site development of upper and lower campuses making the lower canal area feel less of an “orphan” because of the relatively small nature of academic uses located there. Access to these new bluff buildings could easily be accommodated via the existing access roadway.

Core Mall Area – “MTU Way”:
The main mall of the Academic Core terminates at the easternmost edge of Lot 11. Continuing this pedestrian space by eliminating parking Lots 27, 11 and 1 would create new building pads for future construction, the opportunity for a “signature” entry piece announcing MTU and the creation of a highly centralized academic core to the campus itself without increasing the density of buildings (i.e. the space between them). Lot 1 is a good location for structured parking with academic or administrative space “edging” the facility to the south along the main pedestrian way which connects all buildings along the main campus mall; perhaps to be called “MTU Way”. The “MTU Way” could be the pedestrian connector for all buildings as well as providing the key areas for the display of “way-finding” signage, art and sculpture location as well as the display of artifacts that signify and respect the great achievements of MTU faculty, staff and students. The principal thrust behind this idea
is derivative of the notion that institutions of the breadth, depth and quality of MTU would benefit substantially from the display of the ideas, things and people who made it great.; that visitors to the campus should be able to pick up a sense of the unique history of the institution by “osmosis”, not required to be told the story in person or by video. One simply needs to ask the question “If you were set into the middle of the main academic core without a guide, could one discover in a relatively short time, what, if anything, makes MTU unique among universities, what is its legacy and what are the main thrusts of its academic program?”. The creation of the “MTU Way” could provide a vehicle that brings the past, present and future together for faculty, staff and students, providing a place of honor for all those things real and experiential that makes MTU a destination place of exemplary higher education, research and social development.

5.1 Facility Development Recommendations

The Master Plan articulates the location and adjacencies of proposed buildings, additions and renovations based on the campus space needs requirements. As a result, a variety of different facility sites have been identified, encompassing new facilities, additions to existing buildings, as well as repurposing of existing space and program relocation. The proposed facility sites are divided into separate groups and identified in the attached drawings and constitute more space than the campus is likely to require for support of the enrollment projected.

5.2 Open Space Recommendations

The MTU open space framework is comprised of the non-built space on campus shaped by buildings, circulation, topography, and vegetation.

Open space is a key component in establishing balance, order, and character on the MTU campus. These objectives guide the layout and arrangement of new facilities and building additions within the natural site features.

Collectively, the campus open spaces contribute to the overall MTU sense of place, giving the campus a particular identity and image. It also provides gathering places to stimulate the mind and support the interaction between students and faculty. The open space framework creates a pedestrian environment that
Connects walkways, sports and recreation areas, and buildings. It also provides context and continuity between old and new buildings and various land uses. It ensures a uniform campus character that "tells the story" of MTU; especially if the display of artifactual materials, art and sculpture and way-finding graphics is incorporated as discussed in planning of the "MTU Way".

The open space recommendations are organized into 7 major components as discussed and described below:

1. Central Open Space
2. Pedestrian Corridors and Plazas
3. Outdoor Rooms
4. Residential Courtyards
5. Streetscapes and Buffers
6. Sports Fields
7. Environmental Areas

1. Central Open Space:
The central open space, which serves as the heart to campus, includes the campus main pathways system, passive and active (broomball courts next to the Rozsa Center) outdoor recreation areas and open undeveloped space. The majority of proposed campus development is positioned around the central open space in order to establish a "commons" for the entire campus. The space should be primarily pedestrian, and vehicles should be limited to service and emergency access. A series of informal campus walkways with small gathering areas at their intersections - should respond to direct lines of travel. The overall space should function as a campus commons for the majority of buildings on campus. As discussed above, a robust use of graphics, display of artifactuals and art/sculpture, combined with landscape material will make this a wonderful space for walking, gathering and outdoor classrooms.

2. Pedestrian Corridors and Plazas:
Pedestrian corridors are spaces that are created by the confluence of major walkways or the placement of buildings and site features that generate activity (e.g. the student center). Their function and activity is similar to what one would expect to find in a busy hallway of a building. They are the outdoor social spaces that connect various portions of campus together and are busy with the daily movement of student, faculty, and staff. They should be designed as part of the entry sequence to the Rozsa Center, the Memorial Union, and the new mall area created at the western most entrance to campus (Highway 41 and Cliff Drive) as well as all major buildings along the primary "MTU Way".
3. Outdoor Rooms:
Campus outdoor rooms should provide small, aesthetically pleasing centerpieces at the major entries to college facilities. They should be semi-tranquil spaces, offering an escape from the indoor environment, complete with small seating areas, sculpture, and planting beds. The character of outdoor rooms should vary in terms of scale, appearance, and shape, depending on the building use and microclimate of the entry. They should also provide a thematic or visual connection to the academic programs nearby. As discussed above, these rooms provide an ideal location for the display of heritage and learning on display. Such displays should be integrated with a series of changing displays that are located within the buildings themselves.

4. Residential Courtyards:
The campus residential courtyards are formed by the layout of student housing. They should support student use for unstructured outdoor activities. New courtyards should be developed as part of any expansion of student housing. They should also be considered between adjacent residential structures, along major pedestrian corridors and fronting the campus green belt. If Douglas Houghton Hall is replaced by academic or administrative programs and new apartment housing constructed, the space between it and Wads Hall is an ideal location for the creation of a new recreation “room” even if the Lot 14 area is used for a future building site. The sites occupied by Lots 17 Lower and Upper have been discussed earlier as good locations for outdoor recreation spaces for residents of Wads as well as new housing designed for location on Lot 17 Upper.

5. Streetscapes and Buffers:
Consistent campus streetscapes and buffers should be developed along Highway 41 as is possible and consistent with state and federal requirements for US 41. They will serve as the foreground to passers-by and contribute to the overall image and identity of the MTU campus. They are spaces which are constantly viewed by students, faculty, staff, and the general public yet are rarely inhabited by people. They also function as a physical buffer and transition zone between the college and off-campus land uses. Streetscapes and buffers should be heavily landscaped with a consistent plant palate.

6. Sports Fields:
The college soccer fields and tennis courts are used for structured outdoor athletics, physical education and recreational sports. To meet this multipurpose function they should be concentrated around the Student Development Center, Student Housing and
location of future Maintenance Facilities to the south of campus. The fields and courts also present an inviting image to the community. They should maintain their ability to shape or contribute to views from the campus perimeter.

7. Environmental Areas:
Campus environmental areas are designed to help buffer adverse impacts to the natural environment. Two types of environmental areas exist on campus - the bluffs into which the campus is built and the lower canal area and Keweenaw Waterway. Both types are critical areas with respect to storm water management and vegetation maintenance and assist in maintaining water supply and water quality issues. They also permit growth of vegetation to help stabilize the environment.

5.3 Parking and Circulation Recommendations

The “Fresh Look” Scenarios Plan reconfigures campus parking and circulation to support building and land use goals and address conflicts with pedestrian safety and campus security. It is discussed in more detail in the sections above.

5.4 Infrastructure Recommendations

Water:
The “Fresh Look” Scenarios Plan recommendations for the water system infrastructure include only relocations and extensions made necessary to accommodate proposed new facility locations, where current service may be inadequate.

Telecommunications:
The “Fresh Look” Scenarios Plan improvements should include the consideration of migration to Voice-Over-Internet protocols as well as significant enhancement of the campus “wireless” capability.

Sanitary Sewer:
The “Fresh Look” Scenarios Plan improvements for sanitary sewer infrastructure include extensions of existing sewer collection systems in order to serve new facilities.

Grading and Drainage:
The “Fresh Look” Scenarios Plan improvements - although they add impervious surfaces and result in increased runoff - will provide capital improvement projects that can incorporate
solutions to adjacent existing grading and drainage issues. Certainly, maintenance can be expected to reasonably address drainage issues in the short term, but the answer to serious drainage issues is budgeting for the drainage corrections with projects that touch on or overlap with the problem areas. For example, the Wads renovation served as the catalyst for renovations which can fix longstanding runoff drainage problems in this area (south of the facility coming down the roadway that connects to the apartments).

5.5 Land Disposition

Potential Acquisition: The parcel of land between Highway 41 and the 7th Avenue between MacInnes and Blanche has been identified as a potential acquisition by the college in past discussions. The underutilized land between the Upland Road and MacInnes should also be considered for acquisition.
what we were.....

what we are.....

what will we be???
TECH STORY (strategic plan)
Setting the framework to identify and expose the past/present/future of MTU through landscape, architecture, and social structures at multiple scales.
option b - (connection to water front)

- Open space helps to bridge the gap between the academic core and housing precinct.
- Physical and visual connection from campus core to waterfront (uniting with geographic location).
- Tech walk spans across multiple landscapes helping to bridge the story.
- Housing helps to extend the campus towards the waterfront and the natural features of the region (topographically and visually).

option c - (reroute of us 41)

- The front door to student housing opens onto the campus main core.
- Extension of the campus core helps to unite the entire campus (bridges the gap between family housing and core).
- Us highway 41 is rerouted along the bluff edge (cliff drive) connecting the housing precinct with the academic core.
- Campus core becomes more diverse and representative of campus life (academic on west - housing on east).
- Entry experience is changed providing a glimpse of the qualities which are encapsulated at the core of campus (providing opportunity to everyone passing by what MTU is all about).

 inset options - concept plan

MTU - MICHIGAN TECH UNIVERSITY
CAMPUS MASTER PLAN

DECEMBER 2006
idea - *plan*

framework elements

final form

**scholars walk** - *university of minnesota*