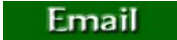




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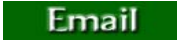
Non-Flowering Vascular Plant Collectio

The collection of Non-Flowering Vascular Plants (NFVPC), which include Gymnosperms and Pteridophytes, is an extension of the Plant Families collection. This collection represents a bridge between the Angiosperm (flowering plants) arranged in beds 1 through 40 and the non-vascular plant families which include the mosses, liverworts, and algae. Included in the collection are ephedras, conifers, ginkgo, cycads, ferns, horsetails and clubmosses.

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Plant Families

The systematic collection, located east of the crosswalk in beds 1 to 40 (not yet available), demonstrates the range of plants found within a plant family. Families are arranged in a semi-evolutionary sequence. The most primitive families of flowering plants begin in Bed 1. A walk through the collection is like traveling through evolutionary time. The most advanced successful plant family at present ends in Bed 40. Not surprisingly, this is the dandelion family (Asteraceae)!

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Useful Plants

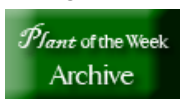
The economic plant collection includes plants that are useful to humans, and found in beds 41 to 90. Different beds are devoted to specific categories of products or usefulness. Refer to the tall labels to identify the category on display. These categories range from medicinal plants to poisonous plants and those that cause other injuries; from fiber plants used to make textiles and other products to plants that yield natural dyes; from aromatic plants used to make perfumes to plants and herbs; from wild and cultivated forms of vegetables to the many weeds that infest our crops and landscapes.

- | | | |
|---|------------------------------------|---|
| Main Collections | Plant Families | Landscape Plants |
| Wetlands | Useful Plants | Non-Flowering Vascular Plants |
| Endangered and Threatened Species | Forest Communities | |



W. J. Beal
Botanical Garden

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Wetland Plant Collection

The plant located in and around the pond represent species which need grow where the ground is constantly moist or totally submerged in water. Included in this collection of wetland plants are plants also associated with the Endangered and Threatened Species of Michigan Collection, and the Plant Families Collection.

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Category I

Natural areas managed at the highest level of protection and lowest level of usage.

These areas have been identified as having the greatest natural quality. All use shall be limited to non-destructive sampling, measurement, and observation. Scientific collecting shall be limited to those species where significant need has been demonstrated. In particular, an investigator must present evidence that scientific study of the species for which collecting is desired will not be possible without collecting. A scientific study is defined here to be a research project designed to acquire information for publication in the open, scientific literature. The investigator must also provide evidence that collecting will not inflict substantial or permanent damage to the natural area or the species under study. Methods of collection and collecting areas within the natural area must be clearly defined and adhered to. Class projects in Category I natural areas shall be limited to observation only, and from established trails, where available.

Baker Woodlot	Red Cedar Natural Area
Bear Lake Natural Area	Sanford Natural Area
Biebesheimer Woodland	Sycamore Creek Natural Area
Minnis Woodland	Toumey Woodlot

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Category II

High quality undeveloped areas; only limited impact allowed for research, teaching, demonstration and nature study.

These areas have significant natural attributes and provide opportunities for teaching and scientific study. Limited impact sampling, measurement, and observation is allowed where appropriate. Scientific and class collecting shall be limited to species where need has been demonstrated, in writing, by the investigator or instructor. Collecting must not damage the environment of the species to be collected, nor other species associated with it. Methods of collection and collecting areas within the natural area must be clearly defined and adhered to.

Elsesser East Woodland	Lott South Woodland
Elsesser West Woodland	Southworth Woodland
Hudson Woodland	

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Category III

Undeveloped area of scientific value; limited manipulation for research and demonstration may be allowed

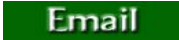
These areas have recognizable scientific value and offer excellent opportunities for research, teaching, and demonstration where some collecting or manipulation of the environment may be desirable and necessary. Scientific and class collecting are permitted when justified. Persons desiring to collect or manipulate species in these natural areas must describe in detail the species to be studied, methods of study, and locations where work will be done. Methods of collection and collecting areas within the natural area must be clearly defined and adhered to.

Allen Woodland	Gidley Woodland	Hicks West Woodland
Beal Pinetum	Gietzel Wetland	Lott North Woodland
Bennett Woodland/Wetland	Goritz Woodland/Wetland	Trumble Woodland
Box Woodland	Hicks East Woodland	Wieland Wetland
Clever Woodland	Hicks South Woodland/Wetland	

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Endangered and Threatened Species (M

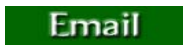
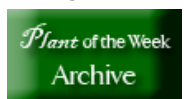
The Endangered and Threatened species exhibit in the W. J. Beal Botanical Garden includes selected Michigan native plants whose remaining populations are protected by the Endangered Species Act. The degree of endangerment for each species is based on the size and distribution of its populations and the vulnerability of those populations to various threats.

[Endangered and Threatened Species of MI: Cultivating Rare Plants](#)

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Landscape Plants

This ornamental plants collection displays superior forms of plants that be useful in designed landscapes. A wonderful array of spring flowering shrubs and bulbs, useful groundcovers, and medium sized trees are displayed in designed compositions that demonstrate landscape design principles.

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Main Collections

A system of descriptive labels provides information about the plants displayed in the four main collections. Plant labels contain common name, scientific name, place of origin of the plant, and in most cases additional information about the plant as it relates to the theme of the collections. The garden is therefore considered to be self guiding; however, guided tours are available upon request. To request a guided tour, please contact the W. J. Beal Botanical Garden at wjbeal_tours@cpp.msu.edu.

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Michigan State University

Campus Land Use Master Plan: Update 2017



February 2017

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PREFACE

PURPOSE OF THE CAMPUS LAND USE MASTER PLAN

The Campus Land Use Master Plan provides a flexible framework for guiding the physical organization of the Michigan State University (MSU) campus. The plan includes overarching campus planning principles, specific system recommendations, and the University Zoning Ordinance. The plan is updated every five years to provide University administration with a current and relevant decision-making tool in concert with additional planning documents that include but are not limited to:

- Mobility Plan (under development)
- Five-Year Plan and Capital Outlay Request
- Capital Renewal (deferred maintenance) Priorities
- Residential and Hospitality Services Strategic Plan
- Utility and Infrastructure Plans (water, steam, electric, gas, storm water)
- Power Plant Master Plans
- Storm Water Permit
- Barrier Free Accessibility Plan
- Energy Conservation Plan
- Well Head Protection Plan

Given the size and complexity of the campus's physical composition, coordinating the land use plan with a mobility plan will facilitate the University's ability to achieve its mission within a culture of high performance. Together, the land use and mobility plans will enable the connections, collaboration, and conversations required to drive academic success and research innovation. To this end, President Simon has directed the Executive Vice President for Administrative Services to lead the effort in developing a mobility plan.

SIGNIFICANT ACCOMPLISHMENTS SINCE THE 2011 UPDATE

Over the past five years, the Campus Land Use Master Plan: Update 2011 informed the implementation of the following major projects.

- Major building projects completed or under construction include: NSCL/FRIB (various projects), Brody Neighborhood (various projects), Bott College of Nursing Education, Case Hall Addition and Renovation, Shaw Hall Addition and Renovation, Old College Field (various projects), Wells Hall Addition, Molecular Plant Science, Landon Hall Addition and Renovation, Endocrine Research, Spartan Stadium North End Zone Addition, MSU Performing Arts and Teaching Lab, Parking Ramp 7, Bio Engineering Research, Breslin Center Upgrades and Hall of History, Intercollegiate Golf Facility, Poultry-Laying Hen Research, Sheep Lambing and Research, and 1855 Place.
- Close adherence to the University Zoning Ordinance, with only 5 projects requiring a zoning variance.
- Completion of the RHS Dining Services Master Plan.
- Major enhancements to the campus open space system including removal of parking to create open space adjacent to Shaw Hall and the Munn Field artificial turf field.

- Receipt of a Silver Bicycle Friendly University Award from the League of American Bicyclists. Today more than 68% of campus roads have bike lanes. The campus has six do-it-yourself fix-it stations in the residential neighborhoods and two secure bicycle storage facilities with fix-it stations (Grand River and Communication Arts Garages) and one secure storage facility within the FRIB complex. Nearly 60% of the MSU River Trail (dedicated bicycle and pedestrian trail) has been constructed from Harrison Road to Farm Lane.
- Completed the four-year West and East Circle Drive infrastructure enhancement project that improved non-motorized and motorized circulation within the North Academic District.
- Completed the Chestnut Road reconstruction from Shaw Lane north to Red Cedar Road.
- Reconfigured the Bogue Street and Shaw Lane intersection, removing the last vehicular traffic circle on campus along with closing the Bogue Street segment between Shaw Lane and Wilson Road to accommodate the FRIB project.
- Completion and full operation of the Capital Gateway Multimodal Transit Center operated by CATA.

CAMPUS PLANNING PRINCIPLES

INTRODUCTION

The University is committed to a comprehensive and continuous land use planning process that results in a flexible framework to guide future decision making. The University will consider the use of resources from environmental, regulatory, operational, economic, historic, and cultural perspectives in support of its teaching/learning, research, and outreach mission.

The following planning principles will guide future planning for, and development on, the Michigan State University campus. The principles are organized in the following categories: General Principles, Land Use and Facilities, Environmental Sustainability, Open Space, Parking, Circulation, and Utility Infrastructure.

GENERAL PRINCIPLES

- Arrange campus buildings, open space, circulation and utility systems to:
 - establish positive interactions among academic, research, outreach, cultural, and operational activities;
 - protect and strengthen the campus as a living-learning resource integral to the University’s mission;
 - protect and enhance campus beauty;
 - enhance environmental stewardship;
 - minimize energy impacts and increase/retain energy efficiencies; and
 - optimize safety and facilitate risk management.

PLANNING PRINCIPLES RELATED TO LAND USE AND FACILITIES

- Organize the campus in logical districts of compatible land uses.
- Implement compact campus development to achieve the following benefits:
 - preserve and protect existing natural areas and systems to support teaching and research;
 - conserve land and maximize land productivity;
 - protect contiguous agricultural teaching and research land;
 - encourage social interactions and vitality;
 - encourage collaboration, partnering, and interdisciplinary connections;
 - reinforce ties between research and undergraduate teaching;
 - control utility, transportation, parking, and infrastructure costs;
 - enhance functional efficiencies;
 - maximize efficient energy use; and,
 - minimize utility distribution extensions, which are inefficient and costly to maintain.
- Provide intramural recreation fields in locations that balance accessibility for both on- and off-campus participants.

- Protect and enhance campus open space, providing an appropriate balance (qualitative and quantitative) to the built environment.
- Protect the land south of Mount Hope Road from development to support AgBio Research and the College of Agriculture and Natural Resources’ teaching, research, and outreach mission.
- Protect existing and future drinking water well locations in the Agricultural District in accordance with the Well Head Protection Plan.
- Favor reuse, renovation, and repurposing of existing buildings after carefully assessing programmatic alignment, functionality, long-term capital renewal (deferred maintenance), historic significance, location, energy efficiency, and replacement costs.
- Organize the arrangement and design of campus buildings and exterior spaces to encourage human interaction and to foster a sense of shared community among the University’s diverse population. This may include, for example, incorporating “transitional spaces” outside of classrooms for pre- and post-class collaboration and “blended spaces” where food service, study space, and general meeting resources coexist.
- Design new buildings and renovations to be architecturally compatible with the best features of existing adjacent buildings and to be harmonious with their contextual surroundings.
- Maximize flexibility in the design of new and renovated space to accommodate changing needs and functions over time.
- Recognize historically significant aspects of the campus and the heritage of the campus as a park and as a living and learning laboratory.
- Acknowledge that the campus is part of the larger surrounding community. Build compatible land use relationships and circulation patterns.
- Consolidate support service facilities into the Services District as defined by the University Zoning Ordinance.
- Organize land uses, facilities, and infrastructure to encourage physical activity.

PLANNING PRINCIPLES RELATED TO ENVIRONMENTAL SUSTAINABILITY

- Minimize environmental impacts and maximize resource conservation through prudent and compact land use, protecting sensitive environmental systems, and incorporating low-impact development guidelines.
- Minimize negative impacts to the water quality of the Red Cedar River Watershed; incorporate Best Management Practices for storm water.

- Acknowledge the intrinsic value of biodiversity and enhance natural system integrity by creating, restoring, and maintaining large-block natural areas and improving their interconnections.
- Provide a suite of transportation options that maximize the movement of people and minimize the movement of cars, thus reducing congestion, vehicle miles traveled, and greenhouse gas emissions.
- Continuously pursue building and utility systems that encourage renewable resource use and that decrease waste and hazardous materials.
- Recognize land use issues associated with climate vulnerability including storm water management, flooding, snow removal, temperature extremes, and storm intensity.

PLANNING PRINCIPLES RELATED TO OPEN SPACE

- Protect and extend the park-like character of the historic circle campus in order to reinforce and enhance the University's distinctive physical identity.
- Enhance the landscape quality south of the Red Cedar River.
- Promote efficient land use that protects existing, and creates new, green space.
- Protect, maintain, and develop the campus as an arboretum to support the University's teaching/learning, research, and outreach mission.
- Provide opportunities for academic and social interaction.
- Provide a variety of open spaces that accommodate the full range of outdoor activity, for example, large athletic fields to intimate spaces for personal reflection and meditation.
- Preserve and protect existing natural areas and enhance their interconnectivity.
- Integrate public art appropriate to surrounding context (excluding Natural Areas).

PLANNING PRINCIPLES RELATED TO PARKING

- Safely and efficiently meet the parking needs of faculty, staff, students, and visitors.
- Integrate parking facilities into the campus setting in an aesthetically pleasing manner consistent with its park-like setting.
- Utilize a variety of parking resources including surface lots, decks, and parking garages; emphasize parking on the campus perimeter.
- Provide conveniently located barrier-free spaces across campus.

- Reclaim surface lots for green space and future building sites when appropriate.
- Relocate parking that contributes to unsafe traffic, bicycle, and pedestrian conditions.
- Minimize the loss of open space for small inefficient surface parking lots.
- Connect the campus transit system to major parking facilities.

PLANNING PRINCIPLES RELATED TO CIRCULATION

- Emphasize personal safety in the circulation system’s planning and design.
- Design all roads as complete streets (designed and operated to enable safe, attractive, and comfortable access and travel for all legal users).
- Provide a safe, efficient, and effective transportation network that enhances the overall quality of life on the campus.
- Incorporate traffic-calming measures where appropriate.
- Plan and design for the following circulation priorities:
 - pedestrians first;
 - bicycles and other forms of non-motorized transportation second;
 - mass transit and service vehicles third; and,
 - private vehicles last.
- Design for the safety of persons with disabilities in accordance with the Americans with Disability Act.
- Reduce private vehicular traffic in academic and residential districts.
- Effectively integrate with the regional transportation system.
- Establish a coordinated bicycle system including bike lanes within roadways, dedicated pathways and/or shared-use pathways, and convenient and appropriately sized storage facilities where appropriate.
- Enable an effective and efficient mass transit system including developing residential neighborhood transit centers to gain transit efficiencies.

PLANNING PRINCIPLES RELATED TO UTILITY INFRASTRUCTURE

- Develop campus buildings and infrastructure to foster energy conservation.
- Use centralized utility systems wherever feasible to maximize production efficiencies and to minimize life-cycle operational costs.

- Establish consolidated distribution corridors that co-locate utilities and accommodate maintenance with minimal campus disruptions.
- Provide adequate protection and security for critical system components including electric, steam, chilled water, potable water, existing and future water wells, fiber, and natural gas.
- Provide redundancy for steam, electric, water, and communication utilities.
- Enable resource conservation and management through appropriate system design and controls.
- Prepare for developing technologies and their integration into the campus infrastructure.
- Implement practices, install systems, and develop procedures that prolong the capacity of the power plant, increase reliability, protect health and wellness, reduce greenhouse gas emissions, while managing affordability.

LAND USE RECOMMENDATIONS

PROGRAMS AND FACILITIES

Academic and Planning Imperatives

The University's Bolder by Design strategic initiative employs six imperatives to guide the institution's teaching/learning, research, and outreach mission. The campus's physical organization directly and indirectly supports these imperatives.

- Enhancing the student experience
- Enriching community, economic, and family life
- Expanding international reach
- Increasing research opportunities
- Strengthening stewardship
- Advancing a culture of high performance

The Campus Land Use Master Plan recognizes that land utilization must be optimized to support the academic mission; that extensive infrastructure systems are expensive to maintain; and that land conservation, especially in the research farms area, is mission critical. As a result, the plan centers on these smart growth principles:

- Establishing a compact campus composition
- Providing a variety of transportation choices
- Preserving open space, farmland, and critical environmental areas
- Developing a mix of land uses
- Creating a walkable community

Facilities Planning Principles

The University continually examines the capital assets necessary to support academic programs and physical needs that involve new construction, comprehensive renewal, renovation, reprogramming of selected facilities, and renewal of major subsystems in other facilities. The assessment of existing facilities shows that the infrastructure components of many campus buildings have aged significantly. Despite ongoing maintenance and repair that extends the expected usable life of components well beyond industry standards, many buildings are now at a point where they require either significant investment or replacement.

Space planning seeks to support student success, growth of the research enterprise, infrastructure stewardship, and operational efficiencies by:

- aligning space resources with academic framework;
- allocating and utilizing space strategically;
- supporting a range of teaching and research methodologies;
- leveraging emerging technology;
- effecting operational efficiencies and cost effectiveness;
- anticipating evolving teaching and research environments;
- forecasting changes in demand and aging infrastructure;
- providing accessibility based on universal design and inclusion; and
- assessing strategic property acquisitions.

Projected Facility Needs

Michigan State University, through the Office of Planning and Budgets, employs a continuous capital planning process that integrates academic, support, fiscal, and physical planning. Institutional participation in the planning process ensures that consideration is given to relevant issues and that decisions support the University's direction and mission.

Following a very detailed and carefully conceived planning process, it was estimated that the University will need a 10 percent increase in building space over the next 20 years. The growth in space is driven by a planned increase in the number of faculty and the anticipated increase in funded scientific research, selective and qualitative changes in academic teaching programs; enhancement of common facilities that enrich campus life and community; and consolidation and upgrading of operational support facilities.

Capital needs are informed by the Campus Land Use Master Plan and planning activities that occur within major components of the institution at regular cycles throughout the year. These components include the annual academic program planning and review, administrative support planning and review, deferred capital renewal, technology, utility systems, energy and sustainability planning, as well as planning for motorized and non-motorized circulation and open space. In this context, budgetary and fiscal analyses at the local, state, and federal levels are taken into account.

Within each component of planning, a number of more detailed issues are reviewed and examined relative to their impact on facilities over the short and long term. One approach used for this more detailed planning is the Campus Infrastructure Planning Work Group. Bringing together a comprehensive cross section of University constituents, the group evaluates major construction projects on a number of dimensions to ensure conformity with the Campus Land Use Master Plan's planning principles, physical recommendations, and the University Zoning Ordinance as adopted by the Board of Trustees.

As a matter of operating philosophy and practice, facility planning encompasses the following issues:

- Renovations, as well as maintenance of existing campus facilities and new construction, are focused to support programs that are central to the University's academic mission.
- A fundamental guiding principle is that planning is holistic and comprehensive. In addition to capital renewal of existing facilities, academic program needs are considered and facility adaptation is planned accordingly. A premium is placed on reuse of existing facilities, on conservation of open space, energy conservation, and on health, safety, security, and regulatory requirements. Barrier-free modifications are given priority, and needs related to technology are considered. Where appropriate, fixed building equipment, particularly for laboratories and classrooms, is included in the plans.
- New construction and renovation of existing facilities are planned so a project's financial investment actively reflects the life cycle of the facility in relation to the needs of the program, while providing flexibility in the structure to accommodate

potential changes over the longer term. Through the “least life cycle cost analysis,” facilities are positioned to be responsive to immediate programmatic needs, as well as longer-term adaptation needs brought about by changes in programs, advances in technology, and related issues.

- The least life cycle cost analysis also enables project development to focus on designs that reduce the ongoing maintenance cost of facilities. Within this context, MSU’s high-quality construction standards intentionally create plans and assemble materials that “design out” as much near and long-term maintenance as possible. In summary, the anticipated expenses of a facility over its life cycle are carefully considered in relation to the initial investment in design and materials. Project decisions made within the context of MSU’s construction standards may, in some cases, be viewed as more expensive initially but, in practice, actually reduce the total cost of ownership.

Future Building Opportunities

Future building opportunities are depicted on two graphics. The first entitled Building Framework, illustrates future opportunities that do not require major demolition of existing facilities. The second graphic, entitled Major Redevelopment Opportunities, explores additional development parcels that will require careful assessment of existing facilities relative to highest and best land use, program relocation, deferred maintenance needs, and facility replacement costs. Both graphics employ the smart growth strategy of carefully conceived building “infill” to maximize land use capacity through greater building density.

The plans illustrate where future buildings can be assimilated into the campus context while reinforcing the Campus Planning Principles and University Zoning Ordinance. As such, the plans do not dictate when and where growth will occur, rather they identify development opportunities that can be evaluated to address specific programmatic needs when a project is identified and funding secured.

Each numbered site is measured and a potential building gross square foot yield is estimated by incorporating zoning allowances and important contextual features. Where development opportunity land areas are too large, and architectural speculation is not definable, a floor area ratio planning metric is assigned to estimate future building square footage.

Based on this assessment, the following quantifies future building opportunities for the campus lands north of Mount Hope Road. The estimated net potential represents future building opportunities less any existing building demolition. The campus has historically added, on average, approximately 2.0 million gross square feet (MGSF) every decade. At that rate, the net opportunities support nearly 58 years of future growth assuming each site is developed to its optimal capacity and all redevelopment zones are strategically implemented.

The following identifies future development potential based on opportunities that do not require significant redevelopment or removal of existing facilities.

Zoning Designation	Estimated Gross Potential	Estimated Net Potential
North Academic District	405,350 GSF	405,350 GSF
Central Academic District	1,832,615 GSF	1,832,615 GSF
South Academic District	2,457,686 GSF	2,457,686 GSF
Mixed Use District	4,538,950 GSF	3,733,890 GSF
Athletic/Recreation District	429,800 GSF	429,800 GSF
Service District	835,100 GSF	824,235 GSF
Residential District East	130,000 GSF	130,000 GSF
Total Opportunity (w/o redevelopment)	10,638,715 GSF	9,813,576 GSF

Adding in all redevelopment opportunities, the estimated future development potential increases as noted below.

Zoning Designation	Estimated Gross Potential	Estimated Net Potential
North Academic District	845,350 GSF	532,340 GSF
Central Academic District	3,560,115 GSF	3,169,583 GSF
South Academic District	2,457,686 GSF	2,457,686 GSF
Mixed Use District	4,538,950 GSF	3,733,890 GSF
Athletic/Recreation District	524,300 GSF	524,300 GSF
Service District	901,850 GSF	873,143 GSF
Residential District East	642,750 GSF	231,582 GSF
Total Opportunity (with redevelopment)	13,480,215 GSF	11,522,524 GSF

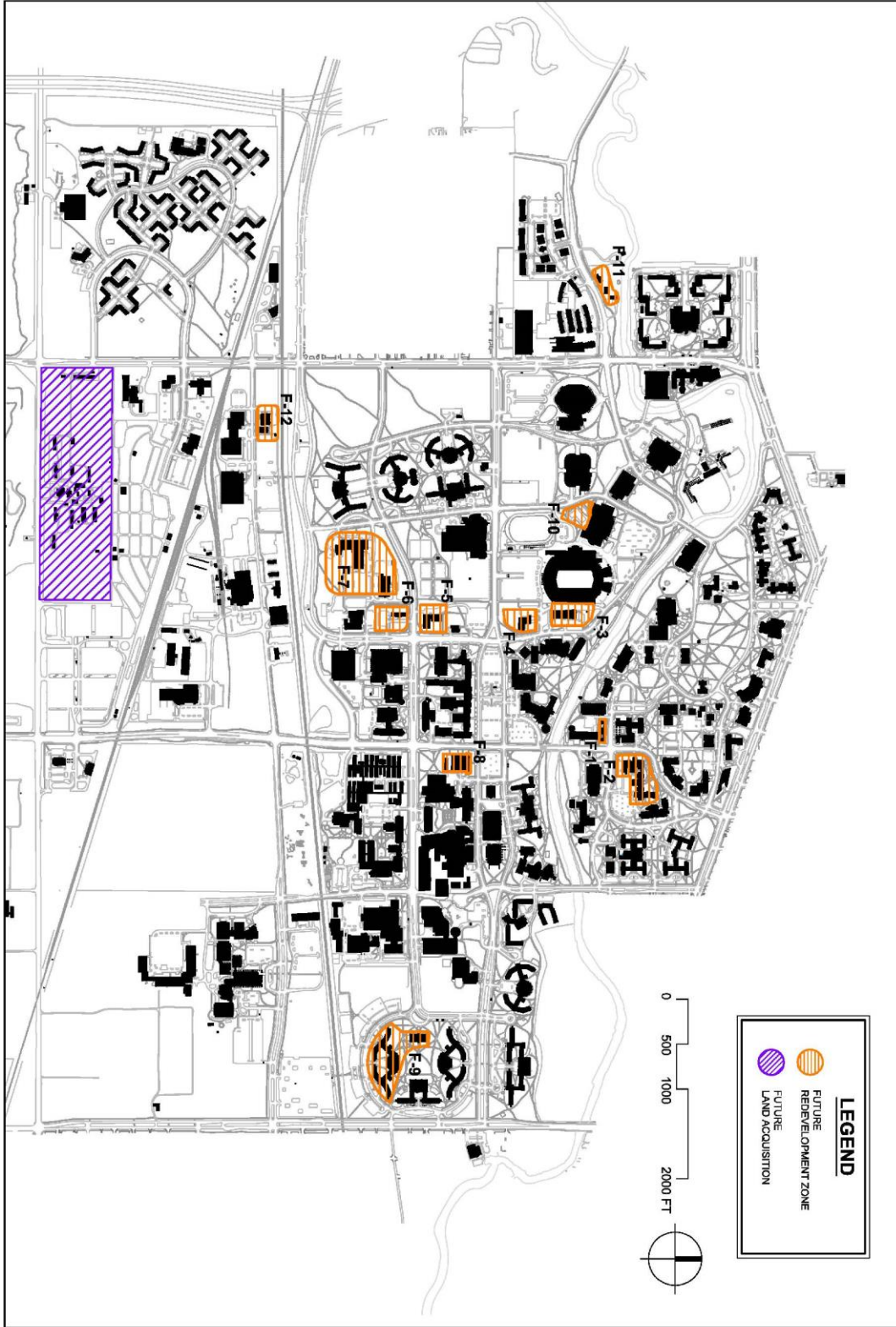
STRATEGIC LAND ACQUISITION

The University continually assesses land adjacent to the campus for acquisition to meet academic and research needs. The existing USDA Avian Disease and Oncology Lab at Harrison and Mount Hope Roads is a land acquisition priority due to its strategic location within the contiguous campus boundary. The University has communicated its intent to reacquire this parcel to congressional representatives and will communicate with the United States Department of Agriculture when a formal decision to relocate the facility is announced.

100-YEAR FLOODPLAIN AND STORM WATER MANAGEMENT

Campus land is reserved to provide future storm water management facilities that will address municipal storm water regulations under the Clean Water Act. Individual building projects are evaluated by the University Engineer and a technical work group to assess its ability to meet current storm water management regulations on site. If a project cannot meet its requirements on site, due to existing development constraints or other unique project attributes, then the University has the option of utilizing a sub watershed facility in another location on campus per Michigan Department of Environmental Quality agreements.

Two important Campus Land Use Master Plan recommendations will help reduce the impact on the Red Cedar River. First, the removal/relocation of Parking Ramp #2 (Auditorium Road) will convert a sizeable amount of land back to its function as floodplain. Second, the removal and relocation of approximately 1,000 surface parking spaces in the Central Academic District will remove an existing land use that has negative impacts both in terms of storm water quantity and quality.



	
TITLE PROJECT NO. DATE BY CHECKED BY APPROVED BY REVISIONS	CAPITAL PROJECT NO. 1041

MAJOR REDEVELOPMENT OPPORTUNITIES

MICHIGAN STATE UNIVERSITY | Infrastructure Planning and Facilities

Campus Master Plan - Update 2016
 Building Opportunity Framework Plan
 Updated 12/19/2016

District	#	Project	Estimated Envelope	Proposed Envelope Utilization (%)	Potential Footprint	Footprint Demolition	Proposed Height	Potential GSF	GSF Demolition	GSF Net New	Notes
NORTH ACADEMIC DISTRICT											
N	1	College of Music Addition	14,200	0.75	10,650		4	53,250		53,250	Restrict buildings from Adams Field
N	2	Library Addition	8,400	1	8,400		4	42,000		42,000	
N	3	Human Ecology Expansion	7,700	1	7,700		4	38,500		38,500	
N	4	New Academic Building	22,000	0.8	17,600		4	88,000		88,000	
N	5	Parking Garage	34,000	0.9	30,600		6	183,600		183,600	750 spaces approx.
F	1	Bessey Hall Office Wing Redevelopment	20,000	1	20,000	-20,000	4	100,000	-60,000	40,000	Demolish Bessey Hall north wing
F	2	New Academic Building	170,000	0.4	68,000	-55,974	4	340,000	-253,010	86,990	Demolish Giltner Hall
		District Subtotal			162,950			845,350		532,340	
CENTRAL ACADEMIC DISTRICT											
C	1	Parking Garage	63,000	0.9	56,700		6	340,200		340,200	1100 spaces approx.
C	2	International Center Vert. Expansion	10,000	1	10,000		1	10,000		10,000	
C	3	New Academic Building	53,000	0.75	39,750		6	278,250		278,250	
C	4	Engineering Addition	34,000	0.75	25,500		6	178,500		178,500	
C	5	Erickson Office Vertical Expansion	8,800	1	8,800		2	17,600		17,600	
C	6	Erickson Front Vertical Expansion	7,000	1	7,000		2	14,000		14,000	
C	7	Natural Resources Addition	24,000	0.9	21,600		6	151,200		151,200	
C	8	Special Feature	6,000	1	6,000		1	6,000		6,000	Possible amphitheater/stage
C	9	New Academic Building	38,000	0.75	28,500		6	199,500		199,500	
C	10	Chemistry Additions (East & West)	7,500	1	7,500		6	52,500		52,500	
C	11	Greenhouse Expansion	28,000	1	28,000		1	28,000		28,000	
C	12	Business College Graduate Pavilion	24,000	1	24,000		4	96,000		96,000	Per LMN program
C	13	FRIB Expansion	123,037	1	123,037		2	281,385		281,385	Per B. Bull
C	14	New Academic Building	32,000	0.75	24,000		6	168,000		168,000	
C	15	Veterinary Oncology Vert. Expansion	17,500	0.9	15,750		2	31,500		31,500	
F	3	New Redevelopment Zone	107,000	0.25	26,750	-22,922	1	275,000	-70,035	204,965	Demolish Central Service, per HOK study
F	4	Shaw Power Plant Redevelopment	80,000	0.25	20,000	-13,234	6	140,000	-40,661	99,339	Repurpose or demolish existing plant
F	5	New Academic Building	87,000	0.25	21,750	-18,634	6	152,250	-47,013	105,237	Demolish existing UPLA building
F	6	New Academic Building	93,000	0.25	23,250	-6,700	6	162,750	-19,896	142,854	Demolish Oyer Speech and Hearing
F	7	New Academic Zone	482,000	0.25	120,500	-88,371	6	723,000	-131,298	591,702	Demo IPF and LS
F	8	New Academic Building	61,000	0.75	45,750	-47,352	6	274,500	-81,629	192,871	Demolish Farrall Hall and Storage Building
		District Subtotal			684,137			3,560,115		3,169,583	
SOUTH ACADEMIC DISTRICT											
S	1	Life Science Addition	23,000	0.9	20,700		6	144,900		144,900	
S	2	New Academic Building	76,000	0.75	57,000		2	171,000		171,000	Assume two-story or high-bay massing
S	3	New Academic Building	33,000	0.75	24,750		6	173,250		173,250	
S	4	Radiology Vertical Expansion	30,000	1	30,000		1	30,000		30,000	
S	5	New Academic Zone	912,000	0.75	228,000		1	684,000		684,000	Assume FAR @ 0.75 with surface parking
S	6	New Academic Zone	300,000	0.75	75,000		1	225,000		225,000	Assume FAR @ 0.75 with surface parking
S	7	New Academic Zone	234,000	0.75	58,500		1	175,500		175,500	Assume FAR @ 0.75 with surface parking
S	8	New Academic Zone	1,085,000	0.75	271,250	-3,724	1	813,750	-9,214	804,536	Assume FAR @ 0.75, remove misc. structures
S	9	Automotive Research Addition	21,000	0.9	18,900		1	18,900		18,900	No basement
S	10	Fraunhofer Addition	34,000	0.9	30,600		1	30,600		30,600	No basement
		District Subtotal			814,700			2,466,900		2,457,686	
RESIDENTIAL DISTRICT EAST											
R	1	IM East Vertical Expansion	4,000	1	4,000		1	4,000		4,000	
R	2	IM East Additions	42,000	0.75	31,500		3	126,000		126,000	
F	9	Fee Hall Redevelopment	293,000	0.25	73,250	-94,055	6	512,750	-411,168	101,582	Demo Conrad and Fee Hall
		District Subtotal			108,750			642,750		231,582	
MIXED USE DISTRICT											
W	1	New Mixed use	618,000	0.75	tbd		1	463,500		463,500	Assume FAR @ 0.75 with surface parking
W	2	New Mixed use	447,000	0.75	tbd		1	335,250		335,250	Assume FAR @ 0.75 with surface parking
W	3	Visitor Center Expansion	8,000	0.9	7,200		1	7,200		7,200	No basement
W	4	New Mixed Use	4,940,000	0.75	tbd	-396,132	1	3,705,000	-793,857	2,911,143	Assume FAR @ 0.75, demo apts.
W	5	Tennis Center Addition	28,000	1	28,000		1	28,000		28,000	No basement
F	11	Demolition Zone	63,000	0.5	0	-8,149	0	0	-11,203	-11,203	Flood plain limitations, no basement
		District Subtotal			35,200			4,538,950		3,733,890	
ATHLETIC AND RECREATION DISTRICT											
A	1	Munn Addition	25,000	1	25,000		2	50,000		50,000	Per athletic's program
A	2	Parking Garage	62,000	0.9	55,800		6	334,800		334,800	1,000 spaces approx.
A	3	South Stadium Addition	35,000	1	35,000		1	35,000		35,000	Per athletic's program
A	4	Breslin Addition	10,000	1	10,000		1	10,000		10,000	
F	10	IM West Expansion/Renovation	63,000	0.75	47,250		2	94,500		94,500	Expansion of IM West
		District Subtotal			173,050			524,300		524,300	
SERVICE DISTRICT											
SD	1	New Support Building	14,000	0.85	11,900		4	59,500		59,500	
SD	2	Simon Power Plant Addition	138,000	0.75	103,500		1	103,500		103,500	
SD	3	Future Development Zone	142,000	0.35	49,700	-4,620	1	49,700	-4,872	44,828	Assume FAR @ 0.35, demo misc. structures
SD	4	Future Development Zone	260,000	0.35	91,000		1	91,000		91,000	Assume FAR @ 0.35
SD	5	Future Development Zone	125,000	0.35	43,750		1	43,750		43,750	Assume FAR @ 0.35
SD	6	Future Development Zone	396,000	0.35	138,600		1	138,600		138,600	Assume FAR @ 0.35
SD	7	Future Development Zone	350,000	0.35	122,500		1	122,500		122,500	Assume FAR @ 0.35
SD	8	Future Development Zone	232,000	0.35	81,200	-4,778	1	81,200	-4,786	76,414	Assume FAR @ 0.35, demo misc. structures
SD	9	Data Center	181,000	0.35	63,350	-1,207	1	63,350	-1,207	62,143	Assume FAR @ 0.35, demo misc. structures
SD	10	Future Development Zone	24,000	0.75	18,000		4	72,000		72,000	
SD	11	Recycling Center Addition	10,000	1	10,000		1	10,000		10,000	
F	12	New Academic Zone	89,000	0.75	66,750	-17,792	1	66,750	-17,842	48,908	Assume FAR @ 0.75, demolition of housing office
		District Subtotal			800,250			901,850		873,143	
		TOTAL GSF			2,779,037			13,480,215		11,522,524	

Key:

Academic / Research
Athletic / Intramural
University Support
Mixed Use / Residential
Parking
Common Facilities
Solar
Stormwater Management
Future Redevelopment Opportunities

Potential building GSF includes above ground stories as indicated plus basement unless indicated.

OPEN SPACE AND LANDSCAPE

THE CAMPUS AS AN ARBORETUM

In 1980, President John A. Hannah remarked, “*Long ago it was planned that the campus should be an outdoor laboratory, with all the variety of trees, shrubs, and woody plants that could be made to grow in Michigan, labeled and tagged not only for students in botany and silviculture and landscape architecture, but for all students and faculty and people in the community.*”

President Hannah was reflecting on Professor William Beal’s 1872 proposal for a campus arboretum. Professor Beal hoped this would lead to a more formalized campus tree planting program. At the time, trees were grown in an arboretum located between what are today, Mary Mayo and Campbell Halls; from there they were transplanted across campus. Professor Beal conducted the first inventory of campus trees in the 1880’s and began the labeling program identifying trees by common name, scientific name, family, and geographic origin, a program which continues today (Telewski 2010). As envisioned by Professor Beal, the campus arboretum serves as a valuable resource for teaching, research, and outreach.

The MSU campus is renowned and beloved by students, faculty, staff, alumni, and visitors. As such, detailed recommendations are required to protect and enhance its open space and landscape aesthetic while maintaining an appropriate balance with the evolving built environment.

The Campus Land Use Master Plan provides a unifying vision for the campus open space and landscape aesthetic. The plan directs stewardship and preservation of the historic campus park and guides future enhancement of the built environment, including the campus as an arboretum for teaching, research, and public outreach.

PROTECTED GREEN SPACE

Based on a detailed classification for the open space system, the following areas are deemed sensitive to development and are subject to protection from any new building footprint or material change to the campus landscape under the definitions and regulations of the University Zoning Ordinance.

Component 1 areas identify and protect landscape areas that have an ecological or historic aspect. *Component 2* areas identify and protect green space that provides a unique programmatic or research land use.

DISTRICT CHARACTERISTICS AND PLANNING GUIDELINES

Historic and Historic Contributing

The park-like setting that students, alumni, and visitors endear is directly influenced by the historic campus landscape(s). The West Circle Drive area from Grand River Avenue to the Red Cedar River and from the Beal Entrance to the Lab Row building group is the site of the

original built campus founded in 1855. The prairie-style landscape and informal grouping of buildings provides a picturesque campus park, unique among American college campuses. The trees and undulating lawns within the West Circle Drive area were recognized by O.C. Simonds as “sacred space” (circa 1905). The historic landscape shall be protected from future development and enhanced through landscape stewardship.

Park-Like Academic

The academic districts of campus, comprised of a diverse collection of trees and shrubs, lend themselves to supporting teaching, research, and student life activities.

The Prairie School patterning of “sun openings” is prevalent in the North Academic District. This concept consists of creating alternating areas of deep shade and sunlit lawns that are reminiscent of the indigenous savannah that once covered much of the northern Midwest. The trees and undulating lawns within the Circle Campus area were recognized by O.C. Simonds as “sacred space” (circa 1905) and remain so today.

The extensive roadway network and large building massing within the Central Academic District creates an intensive built aesthetic that requires substantial landscape interventions to mitigate for human comfort. Much of what a pedestrian perceives is strongly influenced by the adjacent roadways and architectural design. Therefore, a strong streetscape and front-yard landscape is essential to mitigate these elements and to properly transition the landscape scale from the roadway to the building entrances. Special focus should be on safety and providing a pleasant experience and sense of scale along pedestrian walkways.

The South Academic District is defined by large architectural structures that collectively do not provide a sense of place or a pleasant relationship with the pedestrian realm. This requires that the landscape mitigate for this poor composition; creating a comfortable pedestrian environment. The landscape needs to be strengthened to better unify the visual aesthetic and to provide places for social interaction, academic collaboration, and personal health/relaxation.

Park-Like Residential

Approximately 17,500 students call the University’s seven residential neighborhoods home. The landscape design for the neighborhoods must address a wide variety of issues including: scale transition, screening of service functions, providing room for informal recreation, and more intimate areas for relaxation and mental restoration. Transitioning the scale from large roadway spaces to more intimate building entrances is important in the front yards. Recreational amenities and areas for personal relaxation are appropriate in the back yards.

Park-Like Service

The Campus Land Use Master Plan strategizes consolidating support services south of the Canadian Northern railroad tracks. The landscape should reinforce this area as a vital part of the overall campus, while acknowledging its purpose and functionality.

Athletic and Recreation

Intercollegiate athletics and intramural recreation activities require a landscape capable of handling large volumes of people, heavy foot traffic, and various activities that can stress the landscape (e.g., event parking on intramural fields). While the venues themselves require a very utilitarian design, this must be balanced with the fact that they are also gateways for thousands of visitors each year, and as such, must present a high quality aesthetic that properly represents the University along with mitigating for each venue's architectural scale.

River Corridor

The Red Cedar River is an iconic campus element that is a core attribute of the campus park. It is an active natural system that is constantly impacting the campus landscape. A large collection of ash trees inhabit the river corridor and with the ongoing destruction by the Emerald Ash Borer, most of these will not survive. The University needs to invest in the river corridor from a historic, cultural, aesthetic, and environmental perspective.

Signature Landscapes

Signature landscapes are focal points throughout the campus. They vary in size and purpose; are associated with a heightened design aesthetic; utilize high-quality materials; are often associated with public art, fountains, or historic features; include irrigation; and, demand elevated maintenance standards and practices. They are important for encouraging community interaction and can be considered as eddies within the larger campus park wherein people can slow down and enjoy a more intimate sense of scale. Signature landscapes require either priority or elite maintenance levels.

Gardens and Arboreta

These areas are delineated and overseen by a curator or established administrative group. They are actively designed, planted, and managed - not naturalized. A primary goal for the use of these areas is education and research with elite maintenance required to sustain the integrity of the plantings and collections.

Natural Areas

The natural areas are designated by Board of Trustee action and are overseen by the Campus Natural Areas Committee. They are classified into three categories of protection and academic use based on their overall quality and their potential for sustained use. They serve as protected examples of Michigan's native landscape and wildlife.

Conservation and Demonstration

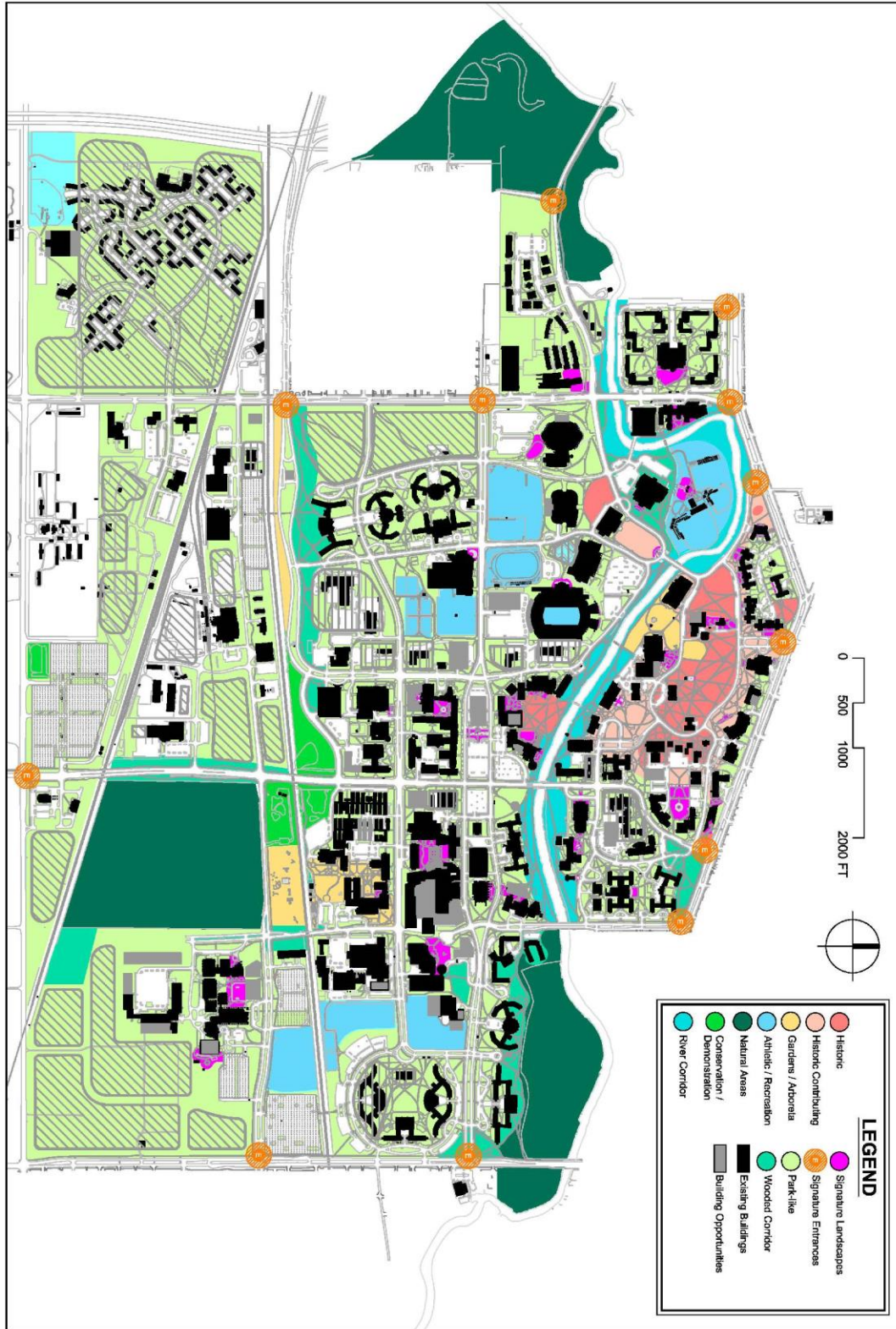
Conservation and demonstration areas are built landscapes for the purpose of storm water management, education, and research. They are actively designed, planted, and managed, requiring a moderate amount of maintenance to ensure integrity of the plantings and operation of the storm water management features.

Campus Entrances

Campus Entrances (vehicular and pedestrian) provide an opportunity to strengthen the University's image and reinforce its reputation for excellence. High quality landscape design and maintenance practices (elite and priority) are required. Consistent signage and a homogeneous landscape treatment are desirable for assisting visitor wayfinding and the efficient movement of goods and services.

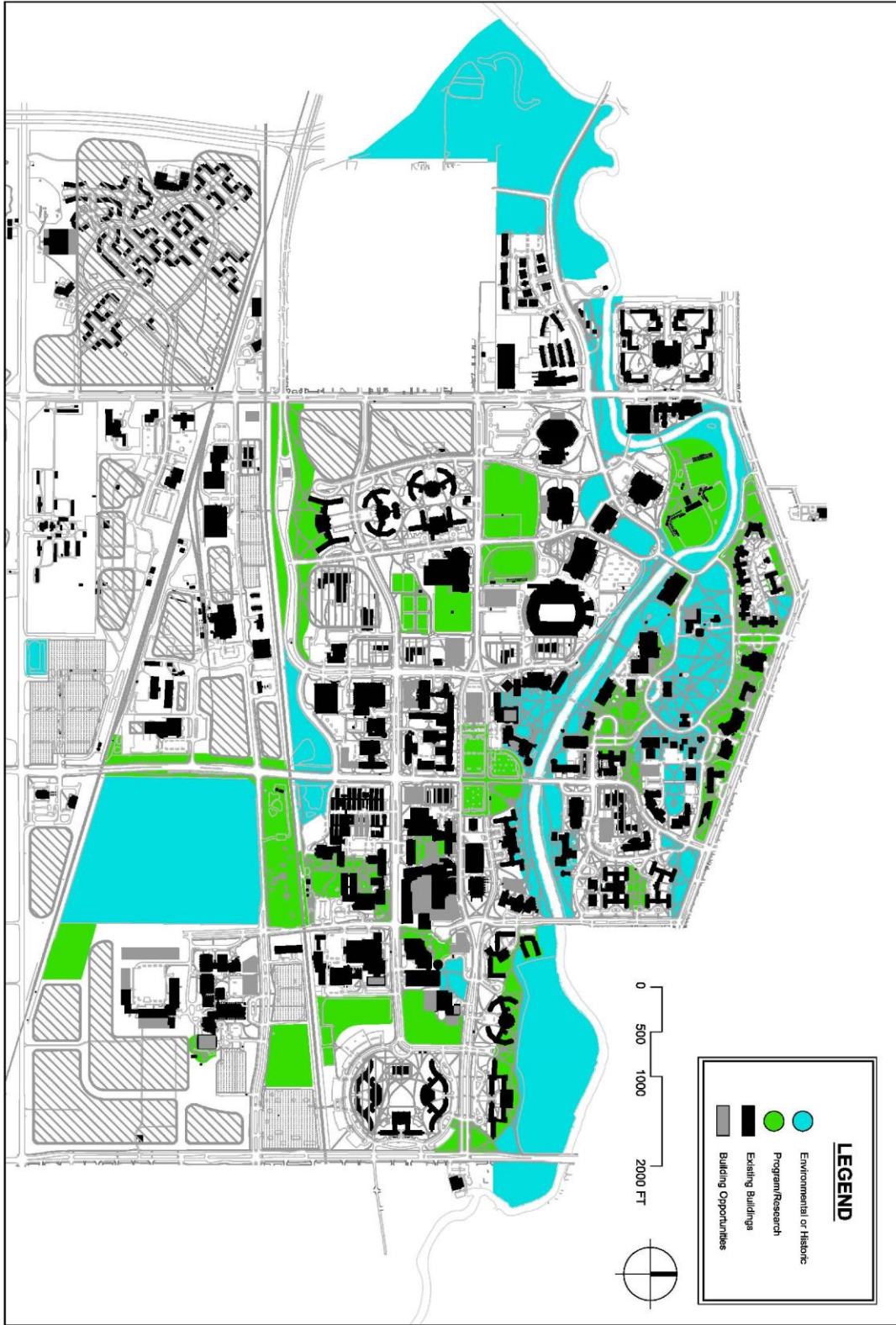
Streetscapes

The campus roadway system provides approximately 18 miles of opportunity to establish a quality image for the University. The streetscape (the landscape setting adjacent to the road) must address numerous design issues, including safety, image, environmental sustainability, and wayfinding all within what is often a harsh growing condition.



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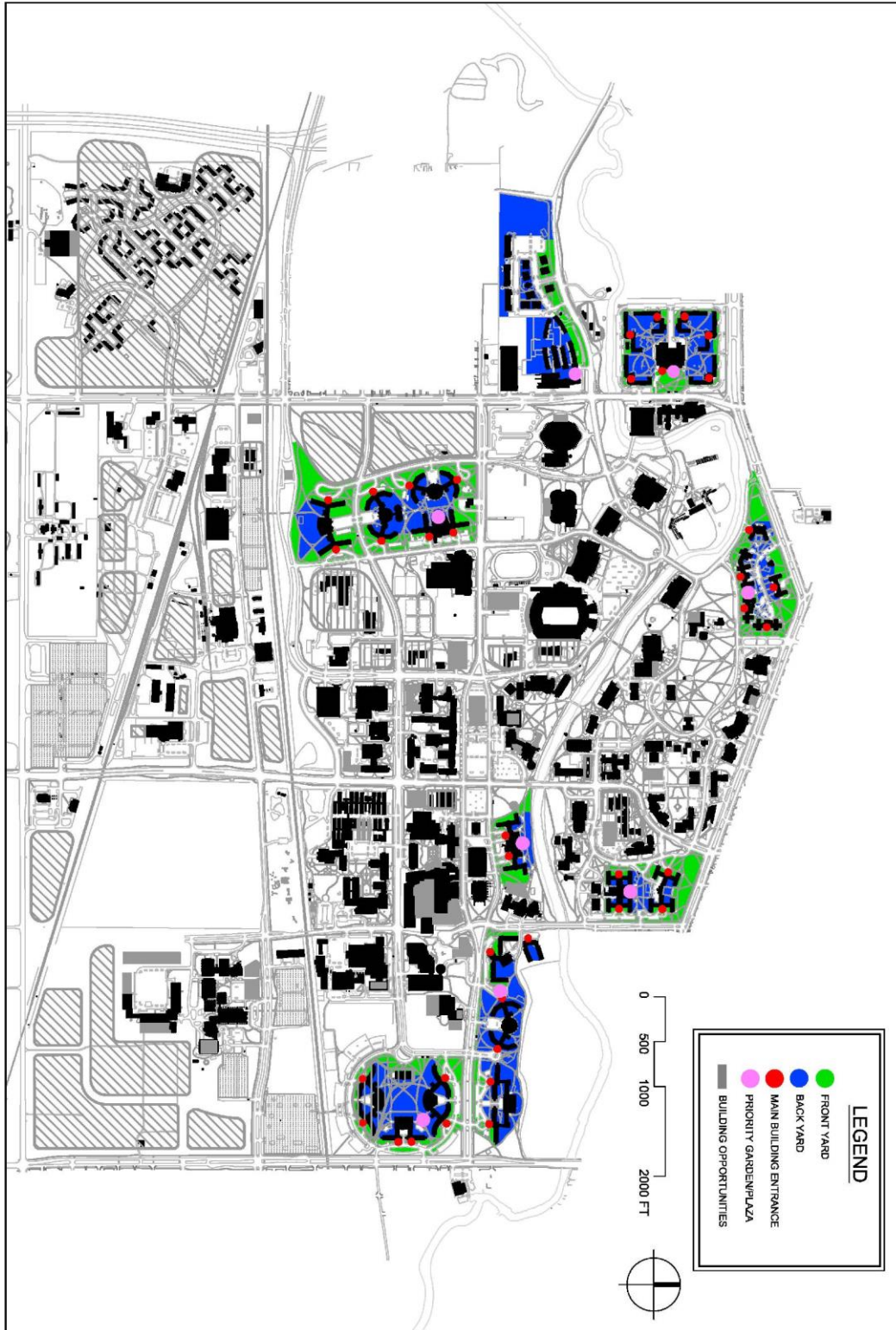
OPEN SPACE FRAMEWORK



	
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PROTECTED GREEN SPACE

MICHIGAN STATE UNIVERSITY Infrastructure Planning and Facilities



LEGEND

- FRONT YARD
- BACK YARD
- MAIN BUILDING ENTRANCE
- PRIORITY GARDEN/PLAZA
- ▨ BUILDING OPPORTUNITIES

CAPITAL PROJECTS
 2017
 1 OF 1

**RESIDENTIAL NEIGHBORHOODS
 LANDSCAPE FRAMEWORK**

MICHIGAN STATE UNIVERSITY | Infrastructure Planning and Facilities

MOTORIZED CIRCULATION FRAMEWORK

NEAR-TERM PRIORITIES

The following motorized projects and initiatives are anticipated in the near term (five- to ten-year planning horizon).

- Develop a comprehensive mobility plan that addresses the movement of people to, from, and around campus.
- Extend Wilson Road to Hagadorn Road with the goal of improving safety by reducing traffic within the East Residential District, relocating parking adjacent to Fee Hall, and providing a signalized intersection to aid pedestrians crossing Hagadorn Road.
- Remove Parking Ramp #2 when engineering analysis directs and restore the river floodplain. Address parking replacement consistent with the mobility plan (under development) and planning principles guiding more parking on the campus periphery.

LONGER-TERM OPPORTUNITIES

The following projects should be considered in long-range planning to address various motorized circulation issues.

- Redesign the Farm Lane and Grand River intersection including a new traffic signal at East Circle Drive to improve operational efficiency and safety.
- Reconstruct the section of Farm Lane between North and South Shaw Lane to provide appropriate vehicular turning movements and bike lanes.
- Extend Bogue Street through the South Academic District as a two-lane roadway with center-turn lane as required.
- Redesign the Bogue Street and Service Road intersection, removing the awkward transition from the boulevard cross section.
- Extend East Crescent Road through the former Agriculture Exposition site.
- Reconfigure Red Cedar Road to provide greater distance from the Kalamazoo and Beal Streets intersection.
- Close the segment of North Shaw Lane between Red Cedar and Science Roads to private automobile traffic, change South Shaw Lane into a two-way street, and relocate surface parking.

NON-MOTORIZED CIRCULATION

NEAR-TERM PRIORITIES

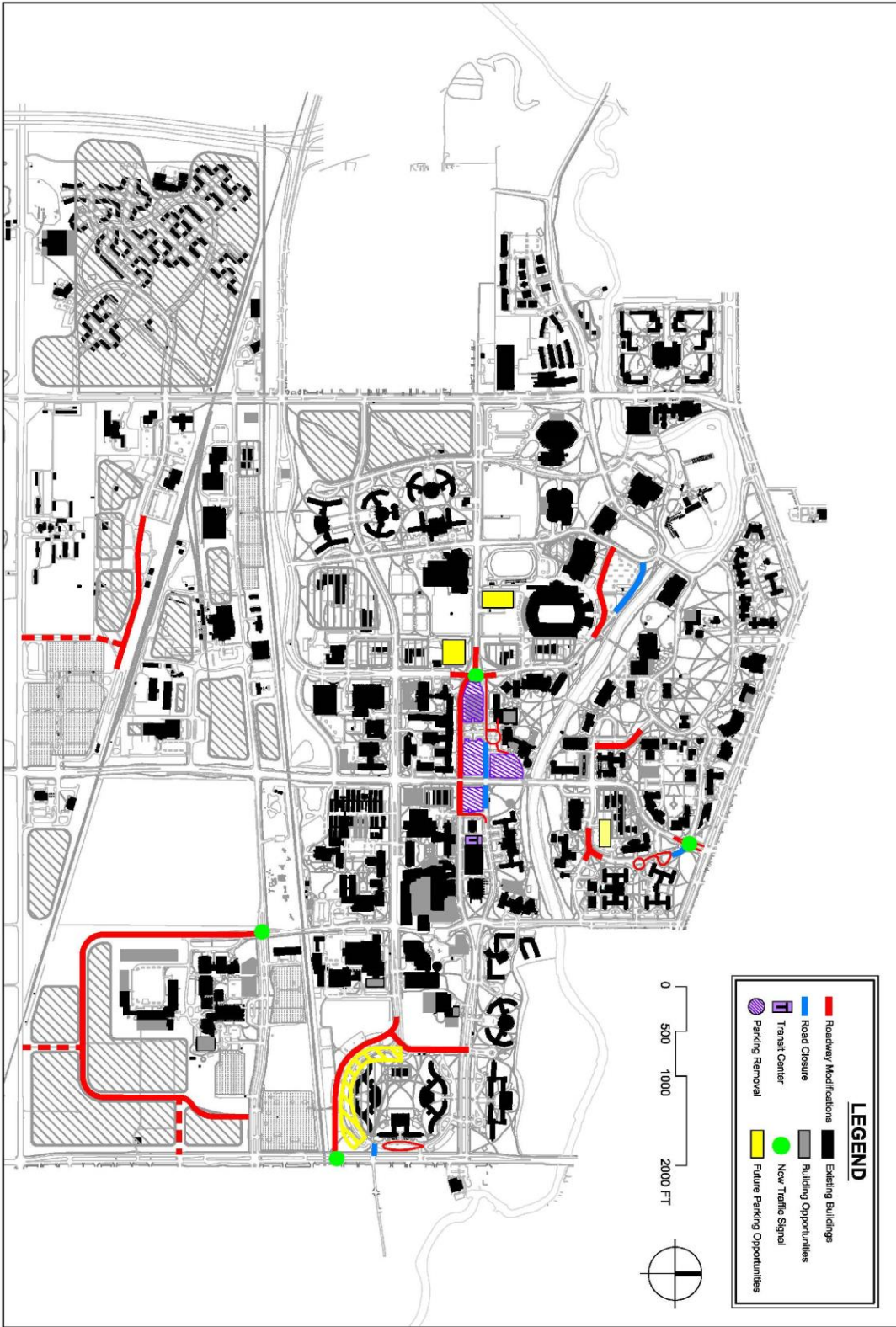
The following non-motorized projects and initiatives are anticipated in the near term (five- to ten-year planning horizon).

- Continue to design all roadways as complete streets in accordance with State of Michigan Public Acts 134 and 135 of 2010 wherein all roadways are to be planned and designed to meet the needs of all legal users.
- Continue to meet the needs of persons with disabilities working through the Accessibility Committee that includes IPF, FPSM, RCPD, RHS, and athletics.
- Continue bringing crosswalk pathway ramps up to ADA standards (e.g., maximum slopes, truncated domes).
- Provide infrastructure to support a suite of transportation options that discourage single-occupancy vehicle trips to, from, and around campus (e.g., CATA Clean Commute and Zipcar car-sharing programs) in alignment with the mobility plan.
- Fund and construct the final segments of the MSU River Trail.
- Enhance and expand bicycle parking within the academic and residential districts with a goal to accommodate 30% of the resident population.

LONGER-TERM OPPORTUNITIES

The following projects should be considered in long-range planning to address various non-motorized circulation issues.

- Study and implement site improvements at the southwest corner of Chestnut Road and Shaw Lane to curtail existing J-walking and to enhance pedestrian safety.
- Convert dirt-worn paths to permanent walkways.
- Continue working with the City of Lansing, City of East Lansing, and Meridian Township on interconnecting campus and municipal trail systems.
- Construct an accessible route from Bessey Hall under the Farm Lane Bridge to Auditorium Field.
- Continue working with the City of East Lansing on reconstructing the Bogue Street bridge over the river and incorporating the MSU River Trail along the river and east of Van Hoosen Hall.
- Develop a system of sidewalk shared-use pathways along major bicycle travel routes not adjacent to roadways.
- Establish a pedestrian and bicycle pathway along with the North Shaw Lane road closure between Red Cedar Road and Science Drive.
- Consider protected bike lanes where enhanced safety is required.



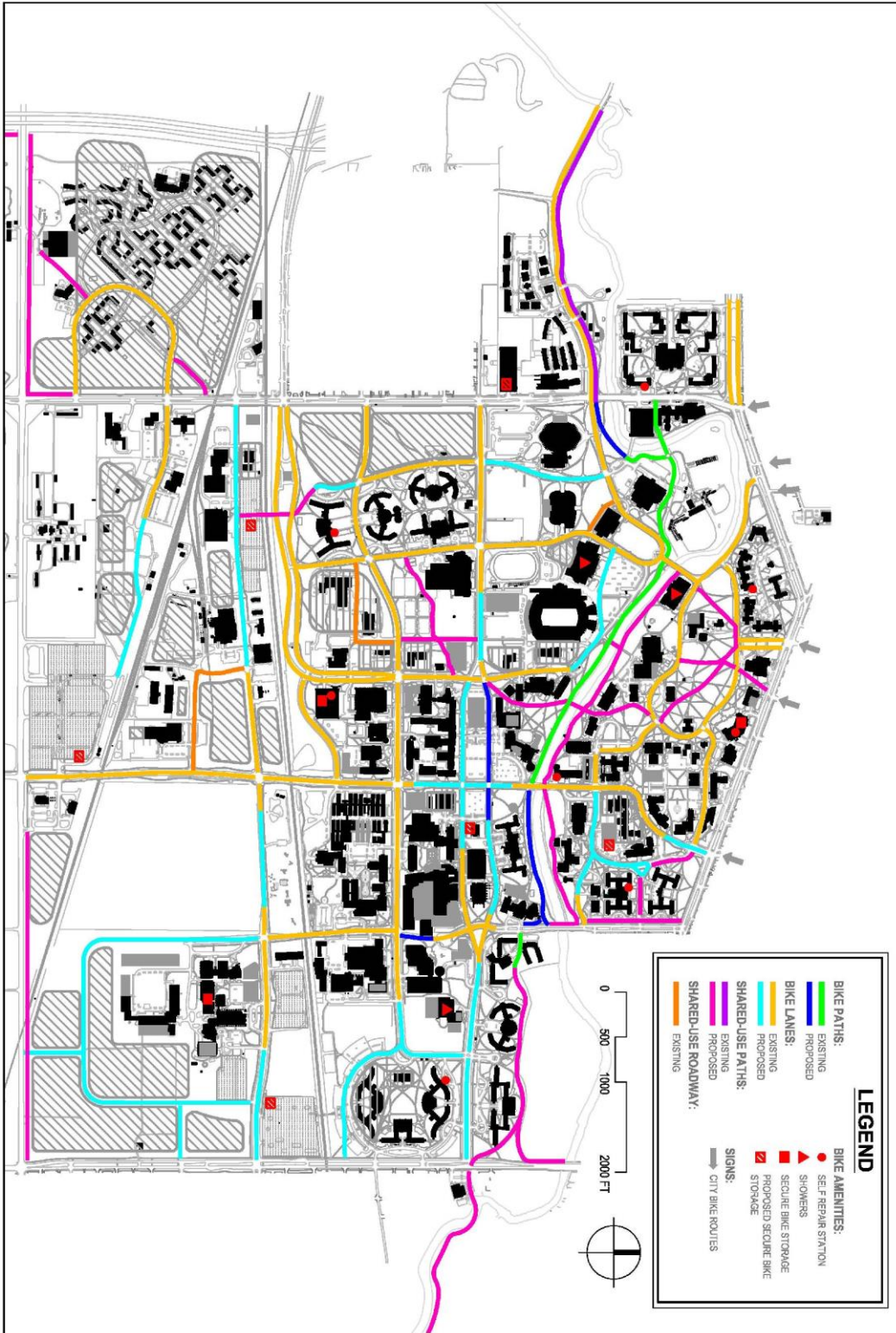
LEGEND

- Roadway Modifications
- Road Closure
- T Transit Center
- Parking Removal
- Existing Buildings
- Building Opportunities
- New Traffic Signal
- Future Parking Opportunities

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**MOTORIZED
CIRCULATION FRAMEWORK**

MICHIGAN STATE UNIVERSITY Infrastructure Planning and Facilities



	NON - MOTORIZED CIRCULATION FRAMEWORK	MICHIGAN STATE UNIVERSITY Infrastructure Planning and Facilities

MICHIGAN STATE UNIVERSITY ZONING ORDINANCE

CERTIFICATION

I HEREBY CERTIFY that the following Act to Codify Regulations Affecting Campus Planning, Designating Land Area Uses, Establishing a Campus Land Use Master Plan, and Providing for the Administration Thereof, for the Benefit and Protection of the Property of the Board of Trustees of Michigan State University, was passed by the Board of Trustees at a meeting duly called and held at East Lansing, Michigan, on the seventeenth day of February, 2017, at which a quorum was present and voted.

Bill Beekman, Vice President and Secretary of the Board of Trustees

Dated: April 19, 1968

Revision Date: February 17, 2017

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AN ACT TO CODIFY REGULATIONS AFFECTING CAMPUS PLANNING, DESIGNATING LAND AREA USES, ESTABLISHING A MASTER PLAN, AND PROVIDING FOR THE ADMINISTRATION THEREOF, FOR THE BENEFIT AND PROTECTION OF THE PROPERTY OF THE BOARD OF TRUSTEES OF MICHIGAN STATE UNIVERSITY, PURSUANT TO AUTHORITY CONFERRED BY THE CONSTITUTION AND STATUTES OF THE STATE OF MICHIGAN.

1.00 - STATEMENT OF PURPOSE

- 1.1 The Board of Trustees of Michigan State University believes that regulations are essential to preserve the campus environment of spaciousness and landscape beauty, promote order and unity, and minimize congestion on the property governed by the Board, and to provide guidelines affecting the improvement thereof, the Board hereby adopts the following provisions:

2.00 - EFFECTIVENESS OF ORDINANCE

- 2.1 This ordinance became effective at 12:01 a.m. September 1, 1968. This Ordinance is coordinated with and becomes an integral part of the Campus Land Use Master Plan and all updates.

3.00 – AUTHORITY OF BOARD OF TRUSTEES

- 3.1 This ordinance is enacted by the Board of Trustees of Michigan State University pursuant to, and in accordance with, the authority and responsibility of said Board contained in the Constitution of the State of Michigan and Public Acts relating thereto.

4.00 – DEFINITIONS

- 4.1 The term “institution” pertains specifically to Michigan State University at East Lansing, Michigan.
- 4.2 The term “academic use” encompasses any building or portion thereof that is used for the teaching of classes, research facilities and administrative and operational facilities, or any similar function and use for the educational and research purposes of the institution.
- 4.3 The term “building” refers to principal-use and accessory structures, and all attached architectural elements including stairs, areaways, ramps, and retaining walls that are integral to the design and function of the building.
- 4.4 The term “accessory building” includes a subordinate building or portion of a main building, located within the same block or district, which is secondary in nature to the principal use.
- 4.5 The term “accessory use” refers to a use that is subordinate to the principal use within the same block or district, comprising purposes secondary in nature to those of the principal use.
- 4.6 The term “ground area of a block” includes all land from the centerline of adjacent streets and roads or abutting use area established by description on the Zoning District Map. Such lines may be established by curb lines, section lines, institution property lines, other property lines, or those lines as shown and described on the Zoning District Map which is a part of this ordinance.
- 4.7 The term “curb line” is defined by the back of curb on either side of a road that is used for the general movement of motor vehicles, and encompasses those existing or extended, but does not include the curb line of parking bays, bus turnouts or similar variations. If no curb exists, the location of a proposed curb will be considered as the curb line. All setbacks are measured from the back of curb.
- 4.8 The term “nearest roadway” means that road which lies nearest any side of a building that is used for the general movement of motor vehicles, and does not include service drives or related variations thereof.

- 4.9 The term “non-conforming use” includes any building or land occupied and used at the time of the original adoption of this zoning ordinance which use does not conform with the use regulations established therefore.
- 4.10 The term “coverage” refers to the amount of ground area covered by buildings within a specified block of land defined by the adjacent roadway centerlines.
- 4.11 The term “protected green space” includes any land area essentially kept in an open lawn, wooded or landscaped condition, that is free of parking and buildings, and reserved for the general use and enjoyment by students, faculty, staff, alumni, and the general public. Protected green space areas may include recreation fields, walkways, bicycle paths, bicycle parking, bridges, sculpture, pavilions, amphitheaters and other related structures that are compatible with the purpose of these areas.
- 4.12 The term “service use” refers to any building or land area that is primarily involved with utility services and functions, and other accessory uses essential to the operation of the institution.
- 4.13 The terms “story” and “story height” refer to that portion of a building that is included between the surface of any floor and the surface of the next floor above it.
- 4.14 The term “setback” refers to the dimension between a building and the adjacent roadway curb line.
- 4.15 The terms “footprint” and “footprint change” refers to existing buildings or the modification of any existing building’s footprint.
- 4.16 The term “material change to the campus landscape” refers to all new buildings. It also refers to new constructed site features deemed of significant impact to the campus landscape by the Zoning Administrator.

5.00 - GENERAL REGULATIONS

- 5.1 Footprint Change: The modification of any existing building footprint requires BOT review.
- 5.2 Material Change to the Campus Landscape: All new buildings require BOT review. Any non-building project that has a significant impact on the campus landscape, and not already covered by the BOT project authorization process, will be identified by the Zoning Administrator and referred to the Vice President and Secretary of the Board of Trustees for clarification regarding the need for BOT action.
- 5.3 Districts Established: In order to regulate and restrict the location of buildings and other structures erected or altered for specified uses, the campus is hereby divided into the following Zoning Districts:

AC-N	North Academic District
AC-C	Central Academic District
AC-S	South Academic District
R	Residential District
AR	Athletic and Recreation District
SE	Service District
N	Natural Areas District
AG	Agricultural and Natural Resources District
MU-N	North Mixed Use District
MU-S	South Mixed Use District
- 5.4 Area Boundaries: The boundaries of Zoning Districts are established on the Zoning District Map attached hereunto and made a part hereof, and all notations, references, and other descriptions contained thereon are made a part of this ordinance.
- 5.5 Compliance: Except as herein provided, no land shall be used, and no building shall be erected, converted, enlarged, reconstructed, or substantially altered, which does not comply with the district regulations established by this ordinance for the district in which the building or land is located.

- 5.6 Essential Utility Services: Structures required in conjunction with the distribution and maintenance of essential utility services may be permitted in any location when approved by the Zoning Administrator (refer to Section 7.0 Administration), who shall submit a determination of necessity to the Vice President and Secretary of the Board of Trustees for clarification regarding the need for BOT action.
- 5.7 Except as provided herein, no buildings, roads or parking spaces shall be located in the Protected Green Space areas designated within the Zoning Districts as shown on the Protected Green Space map. The design of all elements proposed within the protected areas shall be approved by the Zoning Administrator. Such elements include walkways, bridges, sculpture, pavilions, amphitheaters, bicycle storage, essential utility services, storm water management features, and modifications to pre-existing disallowed elements such as parking lots, roads, and service drives. Expansion of existing buildings that abut Protected Green Space areas requires approval from the Zoning Administrator and shall be allowed only when other alternatives are proven to be unreasonable and when the expansion will only cause a minor change in the character of the Protected Green Space.

6.00 - DISTRICT REGULATIONS

- 6.1 “AC” Academic Districts: The following provisions shall apply to the Academic Districts AC-N, AC-C, and AC-S:
- 6.1.1 Permitted Uses: Permitted Uses for the AC Districts shall include the following Principal and Accessory Uses. All uses not listed are not permitted in the AC Districts unless otherwise provided for in this ordinance:
- 6.1.1.1 Principal Uses and Buildings:
- Teaching facilities, including classrooms, lecture halls, instructional laboratories, and similar facilities used for general educational purposes.
 - Research laboratories, general student facilities other than student housing, faculty offices, public/private business incubators, and facilities for administrative and operational functions.
- 6.1.1.2 Accessory Uses and Buildings:
- Surface parking and parking garages.
 - Uses and structures necessary for the operation of the principal uses and buildings.
 - Recreation fields and buildings.
 - Solar or wind power generation and storage.
- 6.1.2 Building Height Requirements:
- 6.1.2.1 All buildings shall be limited to six stories of occupied space plus any required rooftop equipment in Districts AC-C and AC-S, and to four stories of occupied space plus any required rooftop equipment in AC-N.
- 6.1.2.2 Teaching facilities shall be located in the lowest floors possible, and not above the fourth floor of any building.
- 6.1.2.3 Parking garages shall be limited to six parking levels above and including the ground level.

- 6.1.2.4 Accessory buildings shall be no higher than necessary to accommodate the proposed use, and under no circumstances shall exceed the height of principal uses in the district.
- 6.1.3 Set Back Requirements: All buildings shall be set back a minimum of 40 feet from the nearest curb line of the nearest roadway.
- 6.1.4 Building Coverage:
- 6.1.4.1 Buildings shall not cover more than 30% of the ground area of any given block within the AC District unless otherwise specified herein.
- 6.1.4.2 Buildings shall not cover more than 35% of the ground area of any given block within the specific area defined by Red Cedar Road to the west, the CN Railroad to the south, the Residential District to the east, and South Shaw Lane to the north unless otherwise specified herein.
- 6.1.4.3 Buildings shall not cover more than 42% of the ground area for the block of land defined by South Shaw Lane to the north, Farm Lane to the west, Wilson Road to the south, and the Residential District to the east.
- 6.2 “R” Residential District: The following provisions shall apply to the Residential District:
- 6.2.1 Permitted Uses: Permitted Uses for the “R” District shall include the following Principal and Accessory Uses. All uses not listed are not permitted in the R District unless otherwise provided for in this ordinance:
- 6.2.1.1 Principal Uses and Buildings:
- Residence halls and facilities used to provide associated services, such as food services, and health and wellness.
 - Multiple unit dwellings.
 - Primary schools, daycare centers, playgrounds, and other outdoor recreation facilities.
- 6.2.1.2 Accessory Uses and Buildings:
- Limited academic uses.
 - Limited retail, recreation, and commercial uses to serve residents.
 - Other uses necessary to the operation of the principal uses and buildings.
 - Surface parking and parking garages.
- 6.2.2 Building Height Requirements:
- 6.2.2.1 Residence Halls: Height shall be limited to six stories plus any required rooftop equipment.
- 6.2.2.2 Accessory Uses and Buildings: Height shall be limited to three stories.
- 6.2.2.3 Parking garages shall be limited to six levels above and including the ground level.
- 6.2.3 Set Back Requirements: All buildings shall have a set back of a minimum distance of 50 feet from the nearest curb line of the nearest roadway.

- 6.2.4 Building Coverage: Buildings shall not cover more than 20% of the ground area within any given block in the “R” Districts.
- 6.3 “AR” Athletic and Recreation District: The following provision shall apply to the Athletic and Recreation District:
- 6.3.1 Permitted Uses: Permitted Uses for the “AR” District shall include the following Principal and Accessory Uses. All uses not listed are not permitted in the AR District unless otherwise provided for in this ordinance:
- 6.3.1.1 Principal Uses and Buildings:
- Facilities related to recreational, intramural, and sporting events.
- 6.3.1.2 Accessory Uses and Buildings:
- Other uses and buildings necessary to the operation of the principal uses and buildings.
 - Surface parking and parking garages.
- 6.3.2 Building Height Requirements:
- 6.3.2.1 All buildings shall be limited to four stories in height or to the height necessary to accommodate the particular sport function and design.
- 6.3.2.2 Parking garages shall be limited to six levels above and including the ground level.
- 6.3.3 Set Back Requirements:
- 6.3.3.1 All recreation, intramural, or sport fields and courts shall have a set back of a minimum distance of 50 feet from the nearest curb line of the nearest roadway.
- 6.3.3.2 All buildings shall have a set back of a minimum distance of 65 feet from the nearest curb line of the nearest roadway.
- 6.3.4 Building Coverage: Buildings shall not cover more than 25% of the ground area within any given block in the “AR” District.
- 6.4 “SE” Service District: The following provisions shall apply to the Service District:
- 6.4.1 Permitted Uses: Permitted Uses for the “SE” District shall include the following Principal and Accessory Uses. All uses not listed are not permitted in the SE District unless otherwise provided for in this ordinance:
- 6.4.1.1 Principal Uses and Buildings:
- Power plants, including solar or wind energy generation and storage.
 - Maintenance centers.
 - Water storage and treatment facilities.
 - Institutional stores.
 - Storage facilities.

- Recycling facilities.
- Office buildings.

6.4.1.2 Accessory Uses and Buildings:

- Other uses and buildings necessary or similar to the principal uses and buildings pertinent to the operation of the institution.
- Surface parking.

6.4.2 Building Height Requirements: All buildings shall be limited to six stories in height. The only exceptions allowed will be power plant chimneys, water storage, and similar accessory uses.

6.4.3 Set Back Requirements: All buildings shall have a set back of a minimum distance of 50 feet from the nearest curb line of the nearest roadway or from the edge of the pavement where curbs do not exist.

6.4.4 Building Coverage: Buildings shall not cover more than 30% of the ground area within any given block of the “SE” District.

6.5 “N” Natural Areas District: The following provisions shall apply to the Natural Areas District:

6.5.1 Permitted Uses: Permitted Uses for the “N” District shall include the following Principal and Accessory Uses. All uses not listed are not permitted in the N District unless otherwise provided for in this ordinance:

6.5.1.1 Principal Uses:

- Permitted uses include observation, nature study, teaching, research and demonstration in Category I, II, and III Natural Areas as defined by the Campus Natural Areas Committee and shown on the most recent version of the MSU Campus Natural Areas Map and Zoning District Map.

6.5.2 Special Provisions: The Natural Areas District shall remain undeveloped. No buildings, roads, improved walks, utility, or other structures and alterations are permitted in the Natural Areas District.

6.6 “AG” Agricultural and Natural Resources District: The following provisions shall apply to the Agriculture and Natural Resources District:

6.6.1 Permitted Uses: Permitted Uses for the “AG” District shall include the following Principal and Accessory Uses. All uses not listed are not permitted in the AG District unless otherwise provided for in this ordinance:

6.6.1.1 Principal Uses and Buildings:

- Program-related single-family dwellings.
- Agricultural and natural resources research, teaching, and outreach facilities for plants and animals.
- Farm areas for experimentation, teaching, outreach, and cultivation or production of plants and animals for institutional use.
- Associated agricultural facilities not operated by the institution.

6.6.1.2 Accessory Uses and Buildings:

- Other uses and buildings that are necessary to the operation of the principal uses and buildings, such as silos, wells, and pumping stations. Potable water storage and treatment, and maintenance facilities shall be allowed.
- Surface parking.
- Solar or wind energy generation and storage.

6.6.2 Building Height Requirements: All buildings shall be limited to a height of two stories, with the exception of silos and similar structures that are necessarily of greater height.

6.6.3 Set Back Requirements: All buildings shall be set back a minimum distance of 100 feet from the centerline of the nearest public roadway.

6.7 “MU” Mixed Use Districts: The following provisions shall apply to the two independent mixed-use districts, MU-N and MU-S:

6.7.1 Permitted Uses: Permitted uses for the MU Districts shall include the following Principal and Accessory Uses. All uses not listed are not permitted in the MU Districts unless otherwise provided for in this ordinance:

6.7.1.1 Principal Uses and Buildings MU-N:

- Teaching facilities, including classrooms, lecture halls, instructional laboratories, general student facilities, and similar facilities used for general educational purposes.
- Research laboratories.
- Public/private business incubators.
- Student and visiting faculty housing.
- Faculty and administrative offices.
- Health and wellness facilities.
- Academic support.
- Auxiliary retail services.

6.7.1.2 Principal Uses and Buildings MU-S

- Research laboratories.
- Public/private business incubators.
- Student, faculty, and alumni retirement housing.
- Administrative offices.
- Health and wellness facilities.
- Auxiliary retail services.

6.7.1.3 Accessory Uses and Buildings:

- Surface parking and parking garages.
- Uses and structures that are necessary to the operation of the principal uses and buildings.
- Athletic/recreation fields and buildings.
- Solar or wind energy generation and storage.

6.7.2 Building Height Requirements:

6.7.2.1 All buildings in the MU-N District shall be limited to six stories of occupied space plus any required rooftop equipment. Buildings within the MU-S District that incorporate parking, office space, and housing space are limited to eight stories of occupied space plus any required rooftop equipment.

6.7.2.2 Teaching facilities shall be located in the lowest floors possible, and not above the fourth floor of any building.

6.7.2.3 Parking garages shall be limited to six parking levels above and including the ground level.

6.7.2.4 Accessory buildings shall be no higher than necessary to accommodate the proposed use and under no circumstances shall exceed the height of the principal use buildings in the district.

6.7.3 Set Back Requirements: All buildings shall be set back a minimum of 40 feet from the nearest curb line of the nearest roadway.

6.7.4 Building Coverage: Buildings shall not cover more than 30% of the ground area of any given block within the MU-N District and 35% of the ground area of any given block within the MU-S District.

6.8 Non-Conforming Uses and Buildings:

6.8.1 Non-conforming uses: The use of any land area existing at the time of the adoption of this ordinance, or any amendment to it, may be continued although such use does not conform to the provisions thereof.

6.8.2 Non-conforming buildings: The use of any building existing at the time of the adoption of this ordinance, or any amendment to it, may be continued although such use does not conform to the provisions thereof. Such non-conforming use may be extended throughout a building.

7.00 - ADMINISTRATION

7.1 The Campus Planner shall serve in the role of Zoning Administrator and shall be responsible for the administration of this ordinance, the District Map, the Protected Green Space map, and the Campus Land Use Master Plan, all as hereafter amended and modified.

7.1.1 The Campus Planner is specifically granted authority to:

7.1.1.1 Assure that University projects are in compliance with the University Zoning Ordinance and Campus Land Use Master Plan, including Campus Planning Principles.

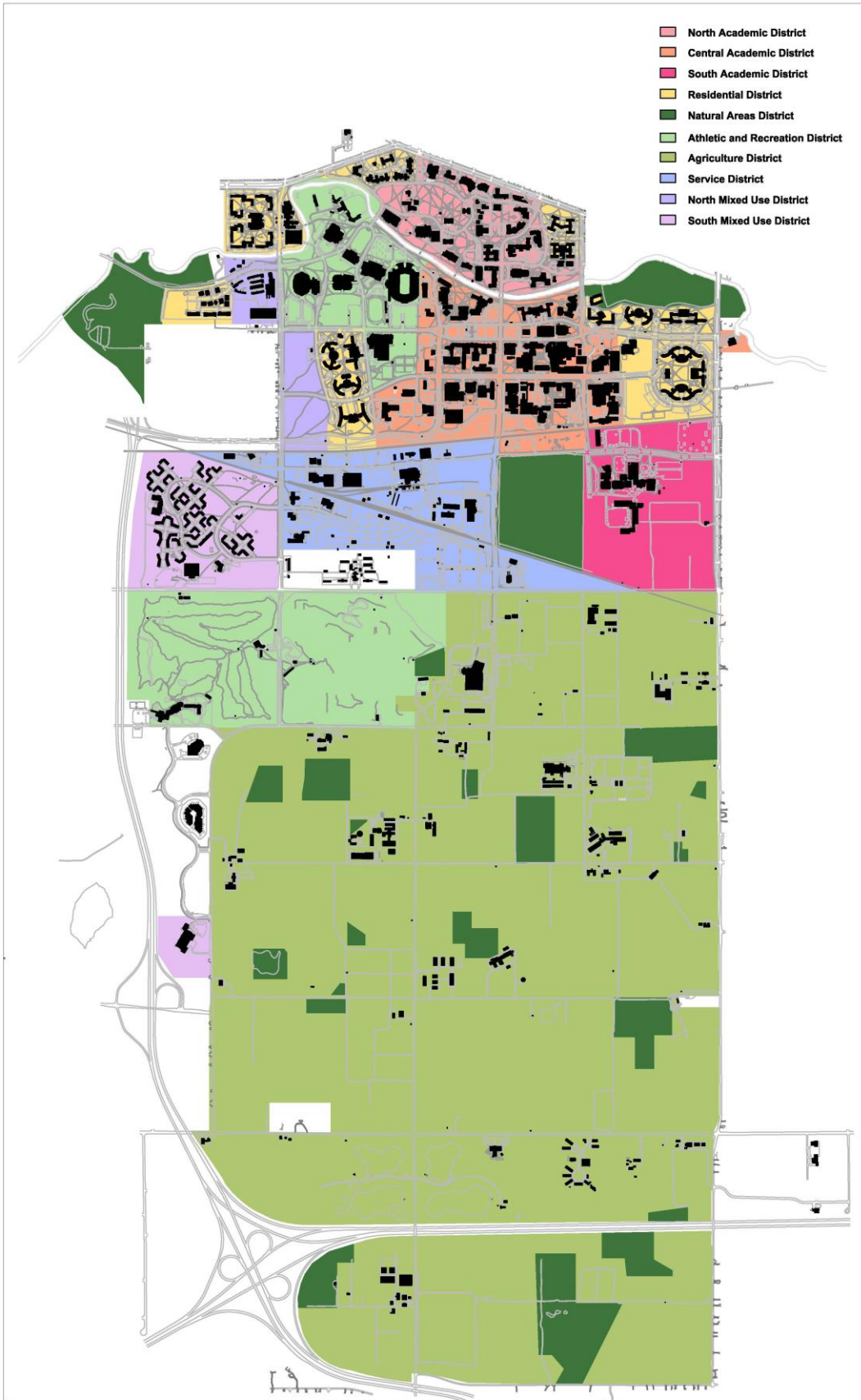
7.1.1.2 Approve the extension, reduction, revision, or interpretation of a zoning district or building coverage block boundary.

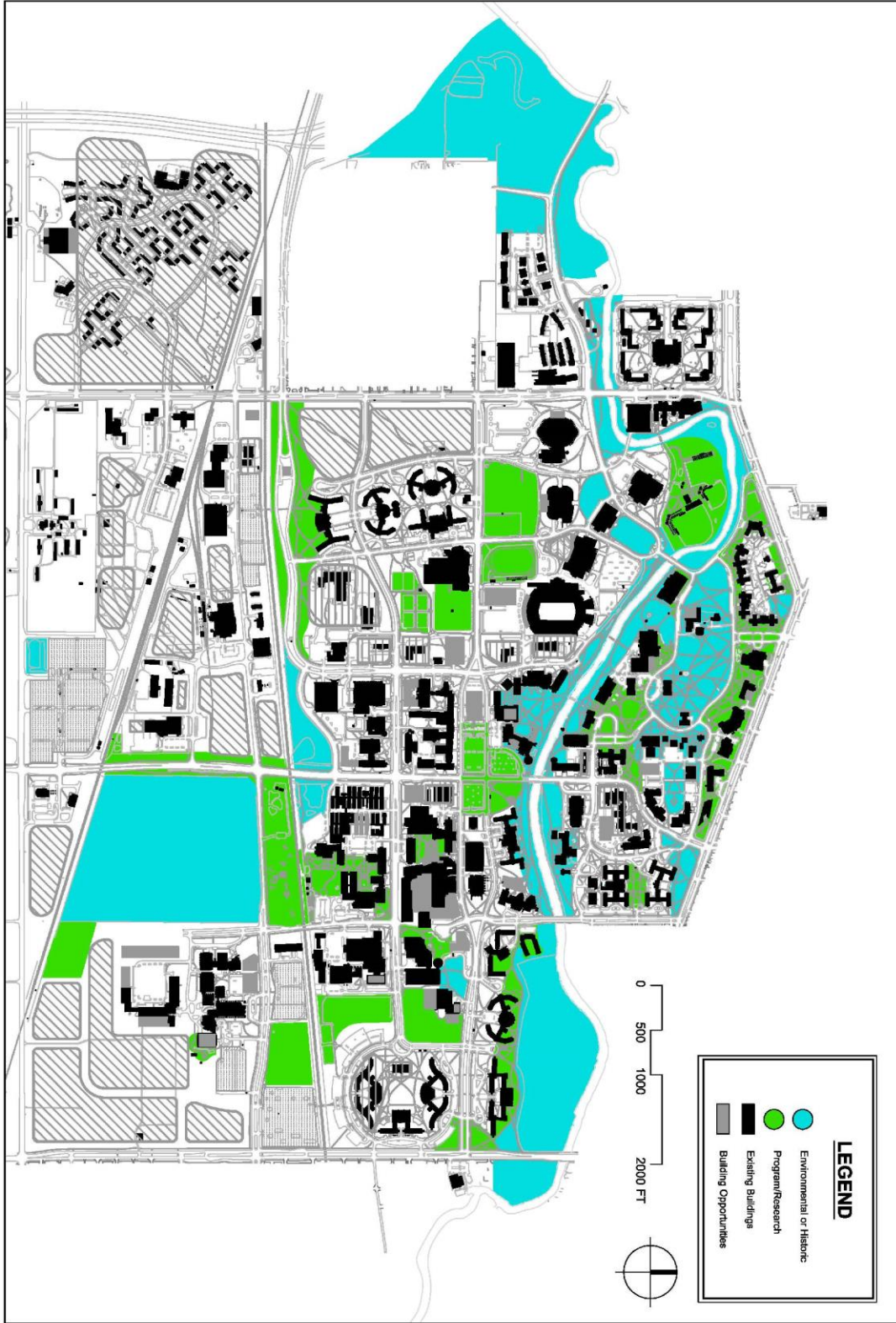
- 7.1.1.3 Approve the reconstruction of a non-conforming building that has been destroyed or partially destroyed.
- 7.1.1.4 Approve the erection and use of a building or the use of land in any location for an essential utility service, or allow for the enlargement, extension or relocation of these existing uses.
- 7.1.1.5 Interpret the provisions of this ordinance where the street layout actually on the ground varies from the street layout as shown on the Zoning District Map.
- 7.1.1.6 Determine whether the use of a planned building is permitted in the district in which it is to be erected, and whether the planned building will cause the ground area covered by the buildings to exceed the maximum percentage allowed within the block in which it is to be erected.
- 7.1.1.7 Approve the design of all building and site features, modifications, and improvements within Protected Green Space areas when a variance has been authorized.
- 7.1.1.8 Refer any specific request for a variance to the Vice President and Secretary of the Board of Trustees for clarification regarding the need for BOT action.

8.00 - AMENDMENTS

8.1 This ordinance may be amended through approval by the Board of Trustees.

End





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PROTECTED GREEN SPACE

MICHIGAN STATE UNIVERSITY Infrastructure Planning and Facilities

Michigan State University

Phase II NPDES Stormwater Progress Report

Covering the Period

January 1, 2014 – March 31, 2016

Permittee: MICHIGAN STATE UNIVERSITY

Contact Person:

Thomas Grover
Environmental Compliance Officer
Office of Environmental Health and Safety
293 Farm Lane Road, Room #150
Michigan State University
East Lansing, MI 48824
517-355-6651

Submitted to the

Michigan Department of Environmental Quality

April 1, 2016

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Appendix 1 - MSU Stormwater 2014-2015 BMPs and Impervious Surface Summary

General Information and Regional Stormwater Management

This progress report is being submitted by Michigan State University (MSU) in partial fulfillment of the requirements of the Phase II Stormwater National Pollutant Discharge Elimination System (NPDES) Permit No. MI0059342. The permit allows for discharges from a municipal separate storm sewer system (MS4). The Michigan Department of Environmental Quality (MDEQ) requires that a progress report be submitted on the implementation status of the current permit (usually submitted every 2 years). This report covers the period January 1, 2014 – March 31, 2016.

MSU is working to meet its permit requirements by implementing campus-based stormwater management activities and collaborative activities with other communities within the Greater Lansing urbanized area. The regional and campus-based frameworks for these activities are described below.

Greater Lansing Regional Committee (GLRC)

The Greater Lansing Regional Committee (GLRC) for Stormwater Management is a guiding body comprised of participating Phase II communities within the Greater Lansing Region. The committee has been established to guide the implementation of the Phase II Program for the communities within three identified urbanized watersheds: the Grand River, the Red Cedar River and the Looking Glass River watersheds.

GLRC Background

Beginning in November 1999, nine communities and three counties in the Greater Lansing Area organized to discuss the Federal Regulations for the Stormwater Phase II Program. The result of this organization was an agreement to pool resources on a regional basis to fulfill the requirements of the program. Initially, based on 1990 census population data, these nine communities and three counties were the only entities in the Greater Lansing Area that were designated to participate in the Phase II “Voluntary Permit Program” by the Michigan Department of Environmental Quality (MDEQ). Following several meetings of this group during late 1999 and early 2000, a resolution was drafted to establish the “Greater Lansing Area Regional NPDES Phase II Stormwater Regulations Committee” and representatives from each jurisdiction were named to serve on the committee.

Soon after the organization of the committee in 2000, the Tri-County Regional Planning Commission (TCRPC) began to assist the committee in providing contractual, fiduciary, and administrative support. Tetra Tech was selected to produce a permit strategy study, and later to prepare the Voluntary Grant Permit Applications for each community. Again in 2002, Tetra Tech was retained to prepare watershed management plans (WMPs) for the Grand River and Red Cedar River watershed areas, and would later prepare a WMP for the Looking Glass River watershed area.

Based on the increased population data following the release of the 2000 Census, ten additional communities were designated to meet the stormwater Phase II requirements under Federal and State regulations. Ultimately seventeen communities and the three counties agreed to participate in a regional approach until April 30, 2008. Most recently the GLRC’s Memorandum of Agreement (MOA) was updated to align with the current permit cycle (2013 – 2017). The updated MOA was adopted by GLRC members and therefore establishes the GLRC legally through April 30, 2017. There are also a number of interested parties that are consistently involved with the planning activities associated with this project

such as county drain and road commissioners, school districts, utility authorities, and transportation authorities. The participating communities recognize the substantial benefits that can be derived through cooperative management of the watersheds and in providing mutual assistance in meeting the stormwater permit requirements.

GLRC Members

The participating MS4 entities that make up the GLRC are as follows:

- City of DeWitt
- City of East Lansing
- City of Grand Ledge
- City of Lansing
- City of Mason
- Delhi Charter Township
- Delta Charter Township
- DeWitt Charter Township
- Lansing Charter Township
- Meridian Charter Township
- Oneida Charter Township
- Lansing School District
- Windsor Charter Township
- Waverly Community Schools*
- Clinton County
- Clinton County Road Commission
- Eaton County
- Ingham County
- Michigan State University

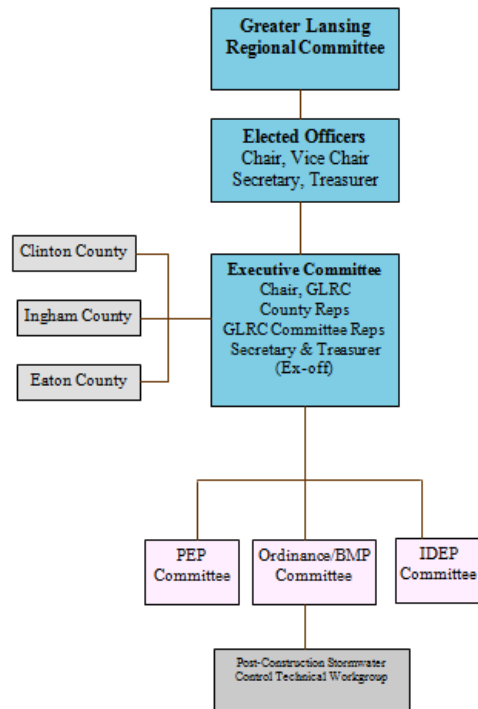
*Waverly Community Schools joined the GLRC in 2016

Although they are not permitted, Oneida Charter Township and Windsor Charter Township are associate members of the GLRC in order to benefit from the group's efforts to improve stormwater management and reduce pollution within the region. They also benefit from the public education materials developed by the GLRC.

GLRC Organization and Committees

Within the GLRC, a number of committees have been established to guide various components of the Phase II Program. Other committees may be established as needed throughout the course of the project.

GLRC Organization effective May 1, 2013



A list of the GLRC committees including a brief description of their responsibilities follows.

Executive Committee

The GLRC Executive Committee is comprised of a maximum of eight voting members consisting of the Chair and Vice Chair of the GLRC, one representative from each of the three counties, and the chairs of the Illicit Discharge Elimination Program (IDEP) Committee, Public Education Program (PEP) Committee, and Ordinance/Best Management Practices (BMP) Committee. The Executive Committee meets five times a year and the Full Committee meets twice a year.

Public Education Program (PEP) Committee

The PEP Committee guides the overall public education, participation, outreach, and involvement process. This also includes evaluation of the program and assessment of public knowledge and activities.

Illicit Discharge Elimination Program (IDEP) Committee

The IDEP Committee guides the organization and implementation of the Illicit Discharge Elimination Program, mapping guidelines, field-sampling protocols, and how the watershed will be monitored for progress. The IDEP Committee has reviewed pet waste reduction techniques, septic tank maintenance issues, staff training and IDEP ordinances.

Ordinance/Best Management Practices (BMP) Committee

The Ordinance/BMP Committee is responsible for reviewing and making recommendations on updating existing ordinances and developing new ordinances for compliance of the MS4 program. In addition, the committee provides educational opportunities to GLRC members related to good housekeeping techniques, staff training, Low Impact Development (LID) and BMPs that reduce pollution.

Post-Construction Stormwater Control (PCSWC) Technical Workgroup

The PCSWC Technical Workgroup is a workgroup of the Ordinance/BMP Committee and was developed to address post-construction stormwater control requirements listed in the 2008 General Watershed Permit. The workgroup developed both a policy and procedures manual and a design standards manual for communities to implement at the local level. In addition, a draft ordinance was developed and provided to all GLRC members. This workgroup continues to meet as members implement the PCSWC standards in their communities.

Watershed Partnerships and Related Efforts

Middle Grand River Organization of Watersheds (MGROW)

MGROW is an outgrowth of the Grand River Expedition 2010, founded in 2011 and established as a 501c3 in February 2012. MGROW is striving to bring together local communities, watershed groups and other stakeholders in the Middle Grand River Watershed to build a greater understanding of and stewardship for our water resources. MGROW's mission: *To protect and preserve the history and the natural resources of the Middle Grand River Watershed by promoting education, conservation, restoration, and wise use of watershed resources.* While the Upper Grand River Watershed Alliance (Jackson area) and the Lower Grand River Organization of Watersheds (Grand Rapids area) assist local watersheds in their respective regions, serving as umbrella organizations to network and share ideas with local watersheds, the Middle Grand River Watershed has been without such support until the formation of MGROW. Local watersheds and program administrators in the MGROW area include: Friends of the Looking Glass River; Friends of the Maple River; GLRC; Middle Grand River Watershed Planning Project; Red Cedar River Watershed Planning Project; local conservation districts; Michigan State University Institute of Water Research (MSU-IWR); TCRPC and Mid-Michigan Environmental Action Council (Mid-MEAC). These groups have been operating independently from one another but have been exploring avenues for collaboration. The GLRC Coordinator continues to work with MGROW to identify collaborative opportunities related to education, recreation and monitoring. MGROW has established a Grand River Heritage Water Trail (booklet and smart phone application) to bring awareness to historical locations on the Grand River. They have volunteered to maintain the Lansing rain gardens, and supported expeditions on the tributaries of the Grand River. More information can be found on the website:

<http://www.mgrow.org/>

Looking Glass River Watershed Efforts

Friends of the Looking Glass River Watershed Council host local paddling events and log jam clean ups. The GLRC partners on related events and activities to promote recreation and awareness of the river.

Red Cedar River Watershed Management Planning Project (319)

The MSU Institute of Water Research was awarded a nonpoint source planning grant for the Red Cedar River in the fall of 2011, and developed a Watershed Management Plan (WMP) for the watershed. The comprehensive plan includes all watershed monitoring data, public education efforts, evaluation and a detailed implementation plan to address pollutants, sources and causes in the watershed. The GLRC supports this effort, by attending meetings, providing data and collaborating on public education ideas using GLRC survey results. The WMP was approved in 2015. The TCRPC applied for an implementation grant to fund the implementation of the WMP. Awards are expected to be announced in the spring of 2016. More information can be found on the website: <http://www.iwr.msu.edu/redcedarriver>

Middle Grand River Watershed Management Planning Project (319)

The Eaton Conservation District (ECD) was awarded a nonpoint source planning grant for the Middle Grand River in the spring of 2011. This effort mirrors the Red Cedar River Watershed Management Planning Project. The plan was also approved in 2015. The ECD has applied for funding to implement the

Middle Grand River WMP. More information can be found at: <http://www.eatoncd.org/middle-grand-river-watershed.html>

Greening Mid-Michigan (GMM)

Greening Mid-Michigan is a green infrastructure policy/poster plan that was developed and adopted by the TCRPC and partners in 2010. After a multi-year planning process and with more than \$90,000 in funding, GMM provides a benchmark and a vision for the communities in Clinton, Eaton and Ingham Counties to protect potential conservation areas, connect parks and trails across jurisdictional boundaries and for promoting sustainable land use policy. GMM gives communities a snapshot of where future conservation activities should occur, where low impact development would be most appropriate, and where communities can best link their recreation facilities. Most recently, the GLRC has collaborated on several video public service announcements. They can be found at <http://www.greenmidmichigan.org>.

The region is implementing the GMM vision is through formal adoption of the poster plan by local jurisdictions. Once the vision is adopted by a community, they can amend their master plan to include GMM language and data sets and they can amend zoning codes to more fully support the recommendations of GMM. GLRC members and partners that have adopted the GMM vision include: Eaton County Board of Commissioners, Clinton County Board of Commissioners, Ingham County Park Commission, Eaton Conservation District, Ingham County Road Department, Delhi Charter Township, Delta Charter Township, Lansing Charter Township, Meridian Charter Township, the City of Lansing, and the City of East Lansing.

IMPLEMENTATION COMMITTEE ACTIVITIES

Public Education Program (PEP) Committee

The PEP Committee met on the following dates:

- October 16, 2014
- November 16, 2015

Committee Activities:

The PEP Committee has developed a variety of educational materials and implemented a number of outreach activities that are described in detail in the Public Education Plan later in this report. In addition to those activities, the committee has worked on the following:

Regional Water Quality Survey – As stated in previous progress reports, the survey results continue to be used as a tool for the PEP Committee regarding all educational efforts and public participation. In November 2012 the survey was re-administered to evaluate progress in raising the public’s awareness of their impact on water quality in the region. The survey results can be found on the GLRC website here: <http://mywatersheds.org/resources/publications/>

Education and Outreach Library – The library was developed on the website to allow GLRC members and the public to review files for education purposes. These files include brochures, presentations, press releases and other information that municipalities may wish to use to promote our purpose. The website continues to be updated regularly to include many educational materials to encourage public involvement and education.

“For Educators” Webpage – The PEP Committee maintains a webpage on the GLRC website just for

educators in the region. The page serves as a resource guide for local teachers, workshop leaders, or anyone interested in environmental education. State and federal environmental curriculum is highlighted as well as links to local resources for field trips, in-classroom presentations, etc. It includes resources and example projects that the schools can integrate into their current activities. The webpage also serves as a toolbox for teachers and school district officials that are required to meet MS4 permit requirements. This page continues to be updated on a regular basis.

Environmental Education Curriculum – The Michigan Environmental Education Curriculum Support (MEECS) provides environmental curriculum to all school districts in Michigan. The MEECS curriculum is posted to the GLRC website.

Adopt A River – The GLRC display was part of the environmental fair at the Adopt A River events held on May 3, 2014 and May 9, 2015. A demonstration of stormwater runoff was included. More than 500 residents participate in this event each year.

Radio Show – The GLRC Coordinator was interviewed on the local 92.9 FM WLMI Tim Barron morning radio show on April 11, 2014, July 10, 2014, October 16, 2014, and March 16, 2015. Topics included septic tank maintenance, fertilizer use, leaf pick up, reporting of spills and overall awareness of rivers and streams.

Public Presentations – The following public presentations were made on behalf of the GLRC within the reporting period:

- August 18, 2014: Presented the Totally Topography activity to 25 young students at the Educational Child Care Center in Lansing. The activity demonstrates runoff using play dough and spray bottles.
- October 17, 2014 and September 23, 2015: The TCRPC hosted two Ultimate Mid-Michigan Bus Tours for elected officials to tour the region and learn about green infrastructure, downtown redevelopment and local farming initiatives. The GLRC Coordinator shared the importance of stormwater and natural resources management on both tours. More than 50 people attended each tour.
- November 12, 2014: Provided the TCRPC Program and Grant Committee with an overview of the Pollution Isn't Pretty outreach campaign.
- January 22, 2015: Presented on GLRC and MGROW activities at the TCRPC Sustainability Symposium. More than 100 people attended.
- May 1, 2015: Participated in a panel discussion with the City of Lansing to answer general stormwater questions at the Michigan Environmental Council – Mid-Michigan Regional Meeting.
- August 26, 2015: Presented to the Kiwanis Club of Mason Golden K about stormwater management, the purpose of the GLRC, and what homeowners can do to reduce pollution. Approximately 30 people attended.
- September 17, 2015: In partnership with the Eaton Conservation District and several other organizations, the GLRC participated in a Celebrate Our Rivers event on the Michigan

Princess Riverboat. The GLRC Coordinator shared the message about the work of the GLRC municipalities. More than 130 people attended.

- November 19, 2015: Shared the REACH Studio Art Center storm drain awareness project video with the TCRPC Commissioners. The young artists were presented with a resolution of recognition for their efforts.
- March 10, 2016: Presented to more than 75 students at the MSU Science Festival about stormwater runoff using the Totally Topography activity.
- March 29, 2016: Presented at the MWEA Watershed Summit about ordinance manuals and different land use policy recommendations for protecting water quality.

GLRC Annual Report – The first GLRC Annual Report was developed in early 2012 (reporting on 2011). The intent of the 10-page report is for GLRC members to share it with their boards, councils and commissions in order to demonstrate the work completed throughout the year. TCRPC also shares the report with all commissioners and uses it to provide several different audiences with an overview of GLRC activities. The effort continues with reports developed through 2015.

GLRC Quarterly Newsletters – The GLRC began publishing quarterly newsletters in January 2010 and continues to do so. The newsletters are posted online and sent to an email distribution list of 150 stakeholders. It is recommended that GLRC members share the newsletters with elected officials and appropriate boards, councils and commissions.

Social Media – The GLRC joined Facebook and Twitter in December 2009. Regular posts/updates are related to watershed stewardship, public involvement and participation. GLRC and partner events are also posted frequently. Currently 113 people “like” the GLRC on Facebook (an increase of 67 since 2013) and 229 individuals “follow” the GLRC on Twitter (an increase of 212 since 2013). The committee hopes to strengthen the GLRC presence through these avenues in the future. Facebook ads have been purchased to boost some messages directing people to the GLRC website. Pages can be accessed at: <https://www.facebook.com/GLRC4stormwater/> and <https://twitter.com/GLRC4stormwater>.

Calendar Updates – The committee is continuously updating the GLRC calendar with applicable meetings, webinars, educational opportunities, recreation and cleanup activities throughout the watersheds. The calendar can be viewed by both GLRC members and the public.

General Outreach/Education Efforts – The GLRC partners with several different groups, agencies and organizations in the region. Activities completed within this reporting period include:

- MWEA Watershed Committee – GLRC Coordinator attends MWEA Watershed Committee meetings and provides some support to the group related to the MS4 permit application process.
- December 2014; 2015 – Promoted annual MWEA Watershed Seminar. GLRC Coordinator attended.
- March 2014; 2015; 2016 – GLRC display was on exhibit at the MWEA Watershed Summit.
- March 2014 – Provided letter of support to Mid-MEAC regarding a grant application to MiCorps Volunteer Stream Monitoring Program.

- August 2014 – Provided 25 posters to the Grand Learning Network to share with their partner schools. Posters were displayed in classrooms and lobbies.
- May 2015: Attended three training sessions (over 12 weeks) from Water Words that Work, LLC. The sessions focused on improving education and outreach, finding the target audience, and using appropriate language in outreach campaigns.
- August 2015: Provided input, guidance, and recommendations for the TCPRC report: *Tri-County Water Policies & Programs Guide*. The report can be accessed at: <http://www.mtcrpc.org/env.htm>
- August 2015: The Bill Earl Fishing Map was printed and the GLRC provided language and PIP graphics to discuss the importance of riparian buffers. Five thousand copies have been printed.
- August and October 2015: HOMTV interviewed the GLRC Coordinator twice. Topics included stormwater management and pet waste management.
- January 2016: Provided letter of support to Ingham Conservation District in support of a Red Cedar River Clean-up grant application.
- The GLRC Coordinator has consistently provided notices to GLRC members regarding anything relevant to the MS4 program including seminars, training, webinars, legislative updates, etc.

IDEP Committee

All GLRC members are well into implementation of their individual IDEP programs. The GLRC Coordinator is partnering with the local watershed management planning efforts to expand efforts related to pet waste reduction techniques, on-site septic system management, and other ways to reduce illicit connections. Providing staff training for GLRC members is the main focus of the Committee.

The IDEP Committee met on December 3, 2015 for a roundtable discussion and staff training. The Excal Video: *Illicit Discharge Detection & Elimination: A Grate Concern* video was shown to the 39 attendees. Videos are available for use by GLRC members.

Ordinance/ BMP Committee

The Ordinance/BMP Committee's main function is to provide guidance related to facility inspections and conduct staff training. This is done in conjunction with the IDEP Committee staff training. On December 3, 2015, the IDEP Committee met and conducted staff training for both IDEP and good housekeeping techniques. The Excal Video: *Rain Check: Stormwater Pollution Prevention for MS4s* was shown to the 39 attendees.

Committee Activities:

MDEQ Industrial Stormwater Operator Training – On May 28, 2015, 24 people attended the MDEQ training to certify new Industrial Stormwater Operators and recertify existing Industrial Stormwater Operators. The GLRC Coordinator was recertified through this training. The MSU Industrial Stormwater Operator attended this training session.

Good Housekeeping Training Videos - In the spring of 2012 the Ordinance/BMP Committee purchased

the Excal Video: *Rain Check: Stormwater Pollution Prevention for MS4s* to assist GLRC members in meeting their MS4 permit requirements for good housekeeping/pollution prevention training. The video complements another available Excal video the GLRC has used for several years: *Storm Watch: Municipal Stormwater Pollution Prevention*. Both videos are available for all GLRC members to use. Members can also ask the GLRC Coordinator to conduct the training.

GLRC PCSWC Manuals – In February 2011, the PCSWC Technical Workgroup provided GLRC members with template PCSWC manuals for both design standards and policy/procedures. This effort also included a draft ordinance. This regional approach creates an equitable environment for future development and redevelopment that meets federal permit requirements. GLRC Members are implementing these guidelines into their site plan review and development processes.

Other GLRC Activities

Water Quality Mapping Database - Data management is an important part of evaluating success and challenges in the watersheds. The committee has been maintaining the water quality database originally created in 2007 with GIS capability. The main purpose of the database is to organize past, current, and future water quality data in conjunction with available land use data to help protect and improve water quality in the region. The database is primarily used for viewing current information in a comprehensive, visual format. The pending 319 watershed implementation grant proposal includes additional work pertaining to water quality monitoring and tracking.

Ingham County Surface Water Monitoring Program (*E. Coli*) – The Ingham County Health Department tests regular sites for *E. Coli*. Sampling has been conducted through this program for more than ten years. The GLRC continues to compile the data for inclusion in the water quality database.

Recreation Efforts

The GLRC promotes partner efforts and recreational events through the website and social media.

Michigan State University Stormwater Management Program (SWMP)

Stormwater is managed on the MSU campus by a team of faculty, staff and students representing a broad cross-section of the University. Units and Departments that are playing a role in managing stormwater runoff and implementing the University's Stormwater Management Program (SWMP) include the Office of Environmental Health and Safety (EHS), IPF Planning, Design and Construction (PDC), IPF Landscape Services, IPF Power and Water, Land Management Office, Campus Planning and Administration, Office of Campus Sustainability, Residential and Hospitality Services, Institute of Water Research, MSU Police, Department of Community Sustainability, Department of Biosystems and Agricultural Engineering, and Department of Horticulture.

A Stormwater Committee comprised of representatives from a subset of these units and chaired by the University Engineer guides the implementation of the SWMP. The committee meets monthly to oversee SWMP activities and to direct additional campus-based stormwater activities. A list of committee members is available here: <https://ipf.msu.edu/green/water/stormwater-committee.html>

STORMWATER MANAGEMENT PROGRAM COMPONENTS

The following are required components of the SWMP:

Public Education Plan (PEP), to promote, publicize, and facilitate education for the purpose of encouraging the public to reduce the discharge of pollutants to stormwater to the maximum extent practicable.

Public Participation/Public Involvement (PPP), to share components of the SWMP and encourage participation in its review and implementation

Illicit Discharge Elimination Program (IDEP), to detect and eliminate illicit connections and discharges to the MS4.

Post Construction Stormwater Runoff for New Development and Redevelopment Projects, to address post-construction stormwater runoff from projects that disturb one acre or more, including projects less than one acre that are part of a larger common plan of development that would disturb one acre or more.

Construction Stormwater Runoff Control, to augment Part 91 rules dealing with soil erosion, offsite sedimentation and other construction-related wastes.

Pollution Prevention and Good Housekeeping Program, to minimize pollutant runoff to the maximum extent practicable from municipal operations that discharge stormwater to the surface waters of the state.

Public Education Plan and Public Participation

The MSU Stormwater Public Education Plan (PEP) seeks to promote, publicize, and facilitate watershed education for the purpose of encouraging the public to reduce the discharge of pollutants in stormwater to the maximum extent practicable. The PEP has been developed to ensure that the targeted audiences are reached with the appropriate messages for the following topics:

- A. *Promote public responsibility and stewardship in the applicant's watershed(s).*
- B. *Inform and educate the public about the connection of the MS4 to area waterbodies and the potential impacts discharges could have on surface waters of the state.*
- C. *Educate the public on illicit discharges and promote public reporting of illicit discharges and improper disposal of materials into the MS4.*
- D. *Promote preferred cleaning materials and procedures for car, pavement, and power washing.*
- E. *Inform and educate the public on proper application and disposal of pesticides, herbicides, and fertilizers.*
- F. *Promote proper disposal practices for grass clippings, leaf litter, and animal wastes that may enter into the MS4.*
- G. *Identify and promote the availability, location, and requirements of facilities for collection or disposal of household hazardous waste, travel trailer sanitary wastes, chemicals, yard wastes, and motor vehicle fluids.*
- H. *Inform and educate the public on proper septic system care and maintenance, and how to recognize system failure.*
- I. *Educate the public on, and promote the benefits of, green infrastructure and Low Impact Development.*
- J. *Promote methods for managing riparian lands to protect water quality.*
- K. *Identify and educate commercial, industrial, and institutional entities likely to contribute pollutants to stormwater runoff.*

As required by the stormwater permit, the GLRC PEP Committee prioritized the public education topic areas into high, medium and low categories. Many factors were considered in this process including survey results, available resources, cost effective outreach methods, existing public knowledge levels and potential for collaborating with other programs currently underway (e.g., Greening Mid-Michigan).

High priority topics areas include:

- *Inform and educate the public about the connection of the MS4 to area waterbodies and the potential impacts discharges could have on surface waters of the state.*

- *Educate the public on illicit discharges and promote public reporting of illicit discharges and improper disposal of materials into the MS4.*
- *Educate the public on, and promote the benefits of, green infrastructure and Low Impact Development.*

The following PEP activities were undertaken by MSU and the GLRC during the period January 2014-March 2016. Activities in the PEP include those that are watershed-wide and thus implemented in partnership with the GLRC as well as activities planned and implemented solely on the MSU campus.

PEP Implementation Plan

Activities listed below correspond directly with the eleven topic areas A - K for compliance. For all applicable topics, the PEP identifies:

1. Target audiences
2. Applicable topic areas and priority level
3. Key messages
4. Delivery mechanisms
5. Timetable
6. Responsible party (or parties)
7. Evaluation techniques

(A) Promote public responsibility and stewardship in the applicant’s watershed(s).

Activity: Participate in the Greening Mid-Michigan (GMM) Project, a regional green infrastructure (GI) vision video production
Corr. topic area: A
Priority: High
Target audience: Public
Key message: A video was produced with WKAR that promotes GI techniques, demonstrating how they lead to improved land use and water resources management. It includes shorter sound bites specifically related to stormwater management.
Delivery Mech.: GLRC website, social media, WKAR local TV, municipal TV, and MSU-WATER website
Timetable: 2014
Responsibility: GLRC Coordinator and MSU-IWR
Evaluation: Available at: <http://msu-water.msu.edu/what-is-stormwater/>

Activity: Continue to maintain watershed signage at road and river crossings.
Corr. Topic area: A, C
Priority: Medium
Target Audience: Public
Key message: Promoting local water resources, connecting the public to their surrounding environment. Signs read “Please Protect the Red Cedar River Watershed.”
Delivery Mech. Passing vehicles, people biking, walking or running will view the signs.
Timetable: Signs are in place and maintained by Landscape Services
Responsibility: MSU Landscape Services

Evaluation: More than 50,000 students are enrolled at the East Lansing campus. Signage is maintained at the Farm Lane Bridge, which is a main roadway through the campus.

Activity: Use “Do you know your watershed?” brochure and update as appropriate.

Corr. Topic area: B

Priority: Medium

Target audience: Public

Key message: The brochure educates the public about what a watershed is, our local watersheds and general information about watershed protection.

Delivery Mech: Posted on the GLRC website, handed out at public events.

Timetable: The brochure is used at all public events (Adopt A River, Quiet Water Symposium, Michigan Water Environment Association (MWEA Watershed Summit), and updated as appropriate.

Responsibility: PEP Committee and MSU

Evaluation: The brochure is accessible on the MSU-WATER website: <http://msu-water.msu.edu/wp-content/uploads/2014/06/Watershed-Brochure-EDIT.pdf>

Activity: Use informational display and handout materials for use at various campus events.

Corr. Topic area: B, C, I

Priority: Medium

Target audience: MSU Students faculty, staff and visitors to campus

Key message: Our actions affect our local watersheds; report illicit discharges; take individual action to protect water quality

Delivery Mech: Display is used at a variety of local events.

Timetable: An MSU-specific watershed display, using the Pollution Isn’t Pretty tagline, was developed in 2014 for use at various events.

Responsibility: MSU-IWR

Evaluation: Events included Autumnfest in November 2014 and 2015 (estimated 700 attendees per year), Grandparents University in June 2014 and 2015 (50 attendees per year), Ag Expo in July 2014 (1000 attendees), Red Cedar Salmon Run in November 2014 and October 2015 (125 attendees), Children’s Water Festival, May 2014 (100 students).

Activity: Update basic educational graphic with tag line and GLRC website

Corr. Topic area(s): B, C, D, E, F, G, H, I, J, K (all)

Priority: Medium

Target audience: Public

Key message: Pollution awareness using the tagline “Pollution Isn’t Pretty

Delivery Mech: Various handout materials, billboard and website links

Timetable: 2014-ongoing

Responsibility: PEP Committee

Evaluation: The graphics are displayed on the GLRC and MSU-WATER Website and are included in all education materials.

Pollution Isn’t Pretty (PIP) - Originally funded by TCRPC’s Mid-Michigan Program for Greater Sustainability; MGROW has facilitated the use of the water resources education campaign entitled: Pollution Isn’t Pretty. The PIP campaign was professionally designed and is being used consistently across the region. For more information visit the website: <http://www.pollutionisntpretty.org>



Billboard Public Service Announcement (PSA) – In 2014 the PEP Committee partnered with the ECD to have 10 billboards displayed across the urbanized area. The PIP campaign was used. The following table summarizes the average daily traffic:

Billboard Statistics - March 3, 2014 - May 14, 2014				
2014	Location Description	Average Daily Traffic	No. of Days	Total Traffic
Location 1	Larch St/Kalamazoo St	12,700	72	914,400
Location 2	Holmes Rd/Washington Ave	8,774	72	631,728
Location 3	Lansing Rd/Canal Rd	12,100	72	871,200
Location 4	Grand River Ave/DeWitt St	13,600	72	979,200
Location 5	Cedar St/Willoughby Rd	45,853	72	3,301,416
Location 6	Pennsylvania Ave/Tisdale St	13,400	72	964,800
Location 7	MLK Blvd/Haag	18,100	72	1,303,200
Location 8	Lansing Rd/Waverly Rd	7,900	72	568,800
Location 9	I-96/Jones Rd	40,600	72	2,923,200
Location 10	East St/Fredrick St	14,300	72	1,029,600

Total number of traffic for length of campaign: 13,487,544

Average Daily Traffic Counts provided by Tri-County Regional Planning Commission



PIP Movie Theater Ads/PSA – The GLRC worked with Clear Water Media to develop four, 15-second public service announcements. They are used on social media and websites. They were shown at the local movie theaters (Studio C, Celebration Cinema and the Lansing Mall NCG) in October and November of 2015. In addition, the Charlotte Allive Center and Charlotte Public Schools Public Access channel ran the videos. They can be viewed here: https://www.youtube.com/channel/UCm-2OdB67N_dSAnR5osYSFw.

Storm Drain Art Awareness – The GLRC and ECD partnered with the City of Lansing and the REACH Studio Art Center Teen Open Studio to complete four murals around storm drains in the urbanized area. The murals are in close proximity to the Grand River. The GLRC Coordinator gave a presentation to the teen artists on stormwater, how it is managed through the MS4 and why it is important to protect our rivers. You can learn more about the project here: <https://www.youtube.com/watch?v=HHU1VsXxnJ4>. The murals are expected to last approximately 5-7 years with re-sealing every couple of years.



City Pulse Advertisements – In partnership with the ECD, the GLRC purchased ad space in the Lansing City Pulse for the months of January and February 2016. The ads include ¼ page space and 30 days of an

online ad was included. The images change every week and are from the PIP campaign. The City Pulse has an audience of over 50,000 readers each week for the weekly print newspaper and over 30,000 people each week online. They have more than 500 distribution locations in the Greater Lansing area.

Activity: Utilize existing news articles and update them to be more flexible with different media outlets (Twitter, shorter columns, etc.).
Corr. Topic area(s): B, C, D, E, F, G, H, I, J, K (all)
Priority: Medium
Target audience: Public, elected officials
Key message: Articles cover the following topics:

What is a Watershed	Pet Waste
Riparian Areas	Storm v. Sanitary Sewer
Who/What is the GLRC	Car Washing
Onsite Septic Systems	Adopt Your Catch Basin
Fertilizers	Illicit Discharges
Vehicle Maintenance	Wetlands

Delivery Mech: Articles are posted on the GLRC website and MSU-WATER website.
Timetable: Ongoing
Responsibility: GLRC Coordinator, PEP Committee and MSU-IWR
Evaluation: The articles are available at: <http://msu-water.msu.edu/what-is-stormwater/>

Activity: Children’s Water Festival Participation
Corr. Topic area(s): B, C, D, E, F, G, H, I, J, K (all)
Priority: Medium
Target audience: Elementary students, teachers and parents
Key message: Water resource awareness, pollution prevention, source water protection, water conservation, infiltration, etc.
Delivery Mech: Direct communication with teachers (mail, phone, etc.)
Timetable: May 2014
Responsibility: GLRC Coordinator. The University provided financial support, offered volunteer presenters for the festival, and provided the venue for the event.
Evaluation: MSU provided two presenters for the May 2014 Children’s Water Festival. One of the sessions focused specifically on stormwater pollution prevention.

Activity: Red Cedar River Cleanup Events
Corr. Topic Area(s): B, C, I
Priority: Medium
Target Audience: Students, visitors, faculty and staff
Messages: Individual involvement in stewardship has a synergistic effect
Description: The MSU Fisheries and Wildlife Club, Residential Instruction on the Study of the Environment (RISE) and other student organizations host fall and spring cleanup events on the Red Cedar River.
Timetable: Fall and Spring of each year
Responsibility: Student organizations, Landscape Services, Residential and Hospitality Services, Surplus Store & Recycling Center

Evaluation: Cleanup events were held on April 7 and October 19, 2014. The 2014 events drew more than 200 volunteers and collected 4,200 pounds of bikes and metal materials. Cleanups were also held on April 19 and October 18, 2015, with a total of approximately 250 volunteers and 5,043 pounds of bikes and metal materials collected.

Activity: Website Development

Corr. Topic Area(s): B, C, D, E, F, G, H, I, J, K (all)

Priority: Medium

Target Audience: Students, faculty, staff, citizens

Key messages: Watershed management is an important concept; MSU and the GLRC are taking a proactive approach toward it.

Description: Various stormwater-related materials are provided.

Timetable: Ongoing

Responsibility: GLRC and MSU-IWR

Evaluation: Website statistics

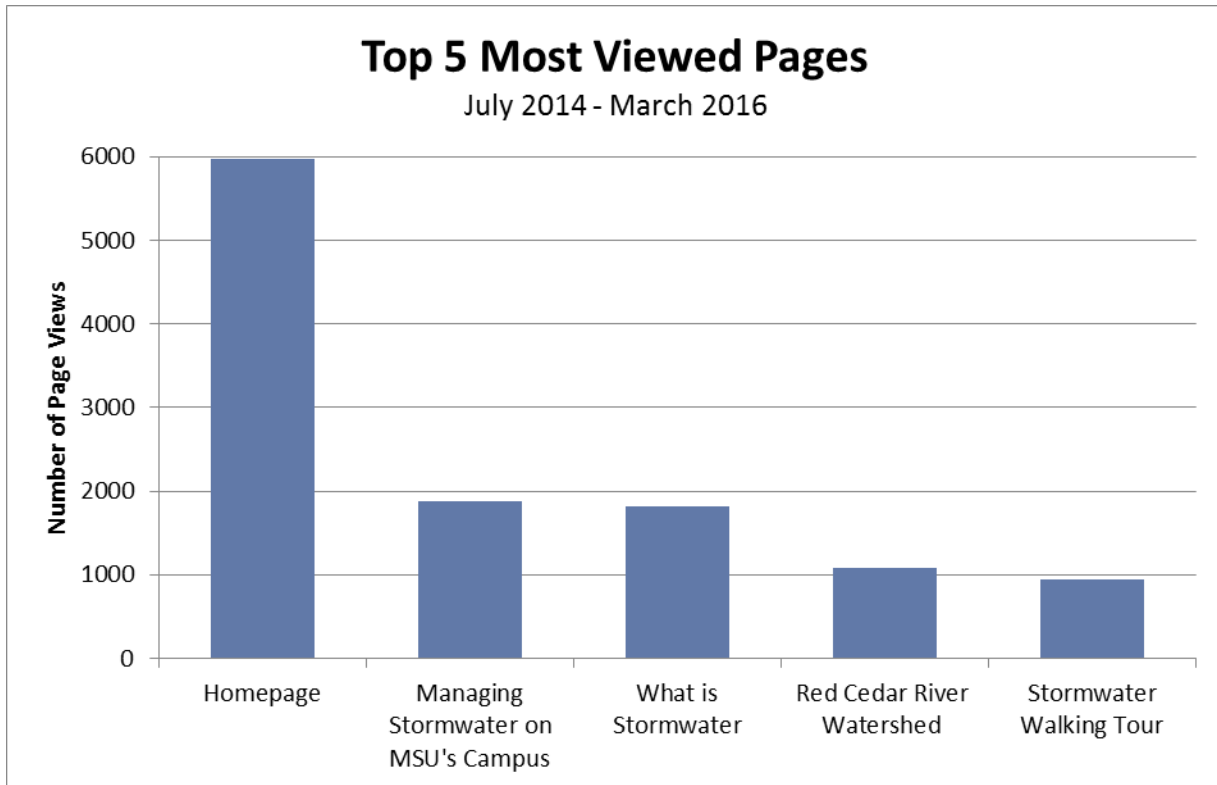
GLRC Website www.mywatersheds.org - the public website for the GLRC is maintained and updated on a regular basis. The website includes information relating to watersheds, stormwater stewardship, GLRC reports, educational information, links to other environmental organizations and more. All public education outreach materials developed by the GLRC direct the viewer to the website. The website was updated in the spring of 2015.

The PEP Committee reviews the website stats on a regular basis. In 2014 the website had 3,861 page views (an increase of 691 views from 2013) and 1,738 visitors (an increase of 328 from 2013). In 2015, the website had 7,115 page views (and increase of 3,254 from 2014) and 4,412 users (an increase of 2,674 from 2014). There has been a significant increase in website traffic with the website redesign along with a multi-media outreach effort.

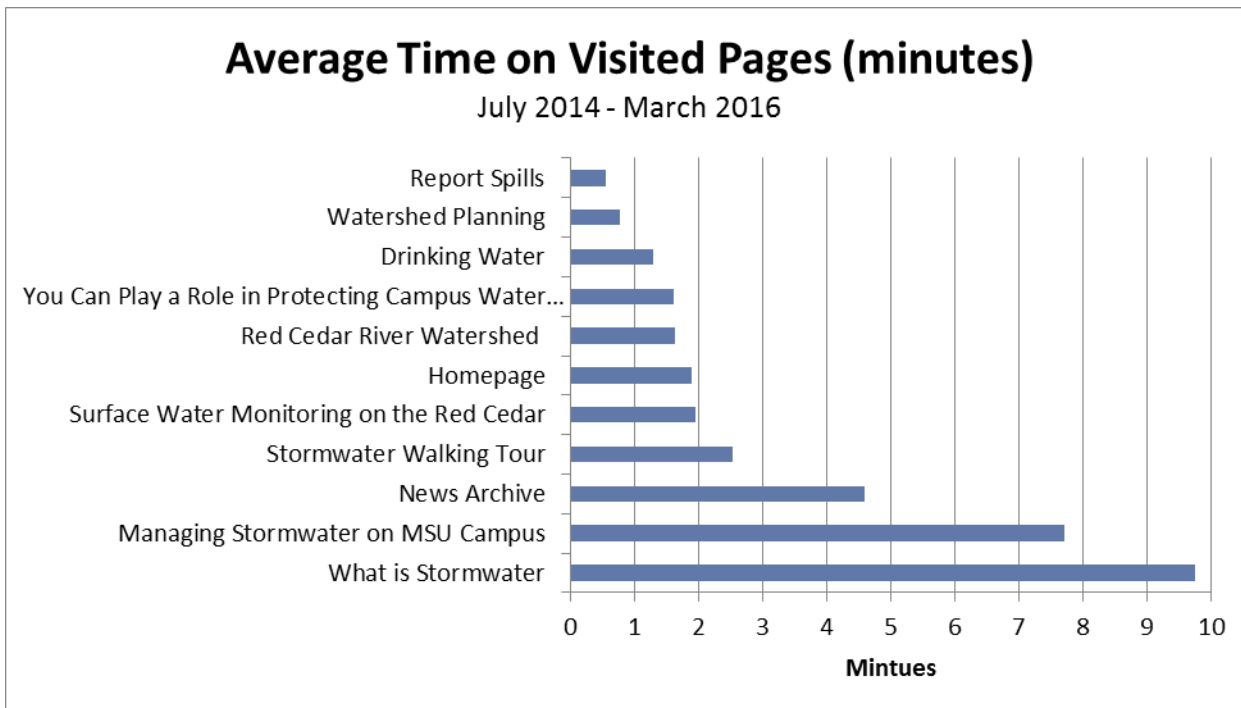
On July 30, 2015, a Website Workshop was held for GLRC. An MSU representative participated in the workshop. The workshop shared example websites and offered suggestions for stormwater-related materials that could be shared via community websites.

MSU-WATER Website www.msu-water.msu.edu – the website includes information about the Red Cedar River, educational materials, upcoming events and links to the GLRC website and other stormwater-related sites. The website was redesigned in 2014 to address MS4 permit requirements and to incorporate additional information about the Red Cedar River watershed planning process. The site includes a link to MSU’s stormwater permit and SWMP: <http://msu-water.msu.edu/managing-stormwater-on-the-msu-campus/>

Google Analytics data collection on the redesigned site began in July 2014. The following data and charts represent data from July 2014 to mid-March 2016. Bot traffic (i.e., traffic from software applications) was removed from the data. A total of 4,074 sessions were logged from July 2014-March 2016, 72% of which were new users. The overwhelming majority of sessions were from the Mid-Michigan area.



The top 5 most viewed pages on the MSU-Water website are displayed above. Note that the chart figures include repeated views of each page.



This chart displays the average amount of time in minutes a user spent on a given page on the website. The

time spent on the “What is Stormwater” page averaged 9.8 minutes between July 2014 and March 2016. This may indicate that users spent time reading through the various Q&As about stormwater runoff, watched a portion of the “Protecting Mid-Michigan’s Waterways” video or browsed through the various resources available on the page.

(B) Inform and educate the public about the connection of the MS4 to area waterbodies and the potential impacts discharges could have on surface waters of the state.



Activity: Affix curb markers to catch basins
Corr. Topic area: A, C
Priority: High
Target Audience: Students, faculty, staff, visitors
Key message: Bring awareness to the general public that storm drains flow to waterways of the state, to not dump pollutants into the drains.
Delivery Mech. Continue the campus curb marker labeling program, and provide ongoing maintenance for catch basin curb markers.
Timetable: Continued from second permit cycle.
Responsibility: MSU Environmental Health and Safety (EHS) and IWR
Evaluation: Curb markers are checked each summer season. In 2014, 442 labels were replaced, and in 2015, 315 labels were replaced. EHS maintains records of label replacements.

Activity: Student Outreach
Corr. topic area: A,C
Priority: High
Target audience: Students (both on- and off- campus)
Key message: Stormwater runoff and how students can play a role in protecting water quality
Delivery Mech.: Displays at RHS Neighborhood Engagement Centers
Timetable: 2014-2016
Responsibility: Residential and Hospitality Services, MSU-IWR
Evaluation: Posters were developed in 2014, and two posters were displayed in all residence halls over the course of the 2015-2016 school year. That includes 283 floor boards and 26 lobby boards, for a total of 309 locations. Approximately 17,000 students live in the residence halls.

Six posters were developed for use with student and faculty/staff education programs. The posters include the PIP graphics and MSU-WATER website address.

(C) Educate the public on illicit discharges and promote public reporting of illicit discharges and improper disposal of materials into the MS4.

Activity: Maintain the GLRC website for community-specific pollution reporting phone numbers for illicit discharges.
Corr. Topic area: N/A
Priority: High
Target audience: Public
Key message: To report illicit discharges (description provided), illegal dumping, etc.
Delivery Mech. GLRC website and social media, MSU IPF website
Timetable: Currently in place, ongoing activity.
Responsibility: GLRC Coordinator, PEP Committee, MSU IPF

Evaluation: Reporting information is available at <http://msu-water.msu.edu/report-spills/>

Activity: Employee Information Dissemination – Written Materials

Corr. Topic Area(s): A, B, I

Priority: High

Target Audience: Campus Community, IPF Staff Members

Key Message: General watershed and stormwater information; How to spot and report illicit discharges

Delivery Mech.: Articles and videos that discuss stormwater-related issues, including reporting illicit discharges, benefits of low impact design and how the campus is managing stormwater

Timetable: Current Permit Cycle

Responsibility: Campus Sustainability, IPF communications staff and IWR

Evaluation: The following article and video were developed in 2015:

Stormwater Video:

Protecting and preserving Michigan State’s water resources
https://www.youtube.com/watch?v=XIfZYECE_SE

Total views: 287

Stormwater Article:

Protecting and preserving our shared water resources
<http://bespartangreen.msu.edu/news.php?id=2015-07-01-protecting-and-preserving-our-shared-water-resources>

Total views: 245

Activity: Employee Information Dissemination – Staff Training

Corr. Topic Area(s): A, B

Priority: High

Target Audience: RHS and IPF Environmental Stewards

Key Message: General watershed and stormwater updates; How to spot and report illicit discharges

Delivery Mech.: As part of ongoing Environmental Stewards training, provide stormwater information and materials

Timetable: Current Permit Cycle

Responsibility: IPF communications staff, RHS Sustainability and IWR

Evaluation: Stormwater collaboration was discussed at a Sustainability breakfast meeting in March 2016. Ongoing collaborations with MSU Sustainability, RHS and IWR were strategized. In addition, a PIP information campaign timeline was developed by Campus Sustainability and IWR. Online stormwater training is also offered. During the reporting period, 279 individuals completed the online training program.

(D) Promote preferred cleaning materials and procedures for car, pavement, and power washing.

Activity: Series of posters and brochures covering: car washing, pet waste, motor oil and fertilizer reduction.

Corr. Topic area(s): A, B, F, G

Priority: Medium
Target audience: Public
Key message: The posters and brochures describe the impact that bad practices related to car washing, pet waste disposal, motor oil disposal and fertilizer application can have on water quality. They also provide alternatives or best management practices for each of the four topics.
Delivery Mech. Posters and brochures are available in hard copy for use at various events. They are also posted to the GLRC and MSU-WATER website.
Timetable: Continuous use at public events (Adopt A River, Quiet Water Symposium, MWEA Watershed Summit), etc., update as appropriate.
Responsibility: GLRC Coordinator, PEP Committee and MSU-IWR
Evaluation: Posters are available on the GLRC website.

(E) Inform and educate the public on proper application and disposal of pesticides, herbicides, and fertilizers.

See corresponding topic area G below.

(F) Promote proper disposal practices for grass clippings, leaf litter, and animal wastes that may enter into the MS4.

Activity: Promote existing materials related to grass clippings and leaf litter.
Corr. Topic area(s): A, K
Priority: Medium
Target audience: Public, small businesses
Key message: Use the best management practices for management of grass clippings and leaf litter.
Delivery Mech. Website and social media postings, promoted through the GLRC educational display.
Timetable: Ongoing
Responsibility: GLRC Coordinator
Evaluation: Information is available on the GLRC website.

(G) Identify and promote the availability, location, and requirements of facilities for collection or disposal of household hazardous waste, travel trailer sanitary wastes, chemicals, yard wastes, and motor vehicle fluids.

Activity: Promote local Household Hazardous Waste Collection and Recycling Events.
Corr. Topic area(s): D, E,
Priority: Medium
Target audience: Public, small businesses
Key message: Pollution prevention by using available resources for appropriate disposal of waste.
Delivery Mech. GLRC website, social media
Timetable: Continuous, updates as necessary and as events are scheduled.
Responsibility: GLRC coordinator. MSU Surplus Store and Recycling Center promotes recycling and community reuse days.
Evaluation: Materials are available on the GLRC website.

A fact sheet describing locations for campers to dump their travel trailer waste was developed. The GLRC

fact sheet providing an overview of the group and six minimum measures was updated to utilize the PIP campaign. The fact sheets can be found here: http://mywatersheds.org/wp-content/uploads/2015/07/GLRC_RV-Dumping-Site-Directory.pdf
http://mywatersheds.org/wp-content/uploads/2015/02/GLRC-Fact-Sheet_new.pdf

(H) Inform and educate the public on proper septic system care and maintenance, and how to recognize system failure.

Activity: Promote and post local Point of Sale/Time of Sale septic/well inspection ordinances in Eaton and Ingham Counties. Also partner with local 319 groups addressing existing *E.coli* TMDL, post materials developed, explore educational opportunities, etc.

Corr. Topic area(s): A

Priority: Low

Target audience: Public

Key message: Maintain your septic system; it could be contaminating local water bodies through stormwater runoff.

Delivery Mech.: GLRC website, social media

Timetable: Continuous

Responsibility: GLRC coordinator

Evaluation: Not yet completed

(I) Educate the public on, and promote the benefits of, green infrastructure and Low Impact Development.

Activity: LID Signage

Corr. topic area: A

Priority: High

Target audience: Students, faculty, staff and visitors to campus

Key message: Signs promote the benefits of GI

Delivery Mech.: Signs will be posted at various LID practices on campus

Timetable: At least two signs posted over the permit cycle

Responsibility: IPF, Surplus Store and Recycling, MSU-IWR

Evaluation: In 2014 MSU completed the development of a Stormwater Walking Tour and associated signage. Information is available at the MSU-WATER website: <http://msu-water.msu.edu/stormwater-walking-tour/>. The tour has been used in 2014 in CSUS 354, an undergraduate water resources management class, in 2015 in CSUS 200, Introduction to Sustainability, and with the Lake and Stream Leaders Institute in 2015.

(J) Promote methods for managing riparian lands to protect water quality.

Activity: Riparian buffer brochure developed, other resources posted to the GLRC website

Corr. topic area: A

Priority: Medium

Target audience: Riparian landowners

Key message: The brochure provides general information about native riparian buffers and why they are important for water quality and habitat.

Delivery Mech.: GLRC website, social media, use with educational display, MSU-WATER website
Timetable: Ongoing
Responsibility: GLRC Coordinator
Evaluation: The brochure is available on the GLRC website.

Activity: Grow Zone Signage
Corr. topic area: A
Priority: Medium
Target audience: Students, faculty, staff and visitors to campus
Key message: Signs emphasize importance of buffers for protecting waterways
Delivery Mech.: Signs are posted along the campus stretch of the river corridor
Timetable: Ongoing
Responsibility: Landscape Services
Evaluation: Signage is being maintained.

(K) Identify and educate commercial, industrial, and institutional entities likely to contribute pollutants to stormwater runoff.

Activity: Explore opportunities to connect with local business regarding pollution prevention through stormwater runoff. This may include business publications, presentation to associations and focus groups.

Corr. topic area(s): A
Priority: Medium
Target audience: Businesses, industries, institutions
Key message: Improve stormwater management to reduce pollution.
Delivery Mech.: TBD
Timetable: GLRC Coordinator will outreach to local businesses twice per permit cycle.
Responsibility: PEP Committee
Evaluation: Not Yet Completed

Activity: Proper Waste Disposal Information Dissemination
Corr. Topic Area: N/A
Target Audience: Faculty, Staff and Students
Key Message: Proper waste disposal
Delivery Mech: The Office of Environmental Health and Safety (formerly ORCBS) at MSU is an independently-reporting administrative support unit created to provide educational and consultative programs and services to the faculty, staff and students of Michigan State University. Through onsite visits and training programs, EHS personnel address proper handling, transportation and disposal of generated hazardous waste; various Chemical, Radiation, Environmental and Biological support training; Laboratory Safety and Inspections; State and Federal regulation compliance requirements
Timetable: Ongoing
Responsibility: EHS
Evaluation: EHS documents visits to various campus units.

Other MSU Stormwater Outreach Activities

Networked Neighborhoods for Eco-Conservation Online (NECO) – MSU-IWR continued to promote the NECO website, which uses both social networking and mapping technology to link people together with common goals of improving the environment in the Great Lakes Basin, their watershed, city, town or own back yard. More information can be found at the NECO website:

www.networkedneighbors.org



February 2014 and May 2015 - Meetings to discuss the campus stormwater permit and management activities were held with the Vice President for Finance and Operation's (VPFO's) office.

Spring Semester 2014, 2015, 2016 – MSU stormwater information and BMPs were included in CSUS 354, Water Resources Management course. 30 students per year.

March 2014 - Stormwater and watershed information was provided by MSU during a HOM-TV interview.

June 2014 and 2015 - MSU offered training programs to approximately 50 attendees at the annual Grandparents University event. The training included information about the Red Cedar River and stormwater management.

September 2014 – MSU watershed planning and stormwater information was presented to the MSU WorldTAP International Water Management Short Course.

October 2015 – A tour of campus stormwater BMPs was provided to the Michigan Lake and Stream Leaders Institute, with 25 participants.

November 2014 and October 2015 – MSU provided a display at the Red Cedar Salmon Run 5K.

November 2014 and 2015 - MSU provided a watershed display and distributed stormwater materials at the MSU College of Agriculture and Natural Resources Autumnfest event. The event is open to the public and draws approximately 700 people each year.

Fall Semester 2015 - MSU stormwater information and BMPs were included in CSUS 354, Water Resources Management course. 30 students.

Spring Semester 2016 – MSU stormwater information and BMPs were included in CSUS 200, Introduction to Sustainability course. 40 students.



Illicit Discharge Elimination Program

The Illicit Discharge Elimination Program (IDEP) describes current and proposed Best Management Practices (BMPs) to meet the minimum control measure requirements to the Maximum Extent Practicable. The following definitions apply to the IDEP:

- **Illicit Discharge:** Any discharge to, or seepage into, an MS4 that is not composed entirely of stormwater or uncontaminated groundwater except discharges pursuant to an NPDES permit.
- **Illicit Connection:** A physical connection to an MS4 that primarily conveys non-stormwater discharges other than uncontaminated groundwater into the MS4; or a physical connection not authorized or permitted by the local authority, where a local authority requires authorization or a permit for physical connections.

In addition to prohibiting illicit connections as part of the Plumbing Code in the University's Construction Standards, Standard Operating Procedures that prohibit illicit discharges into the University's storm sewer system are in place, and are under the purview of MSU's Office of Environmental Health and Safety (EHS).

IDEP Inspections and Corrective Actions

In 2015, 44 of MSU's 52 outfalls were located and visually inspected. Of those 44, nine had dry weather flow present and were sampled. Another eight outfalls were submerged, and it could not be verified if they had any active flow.

The nine outfalls that were sampled were tested for temperature, pH, ammonia, surfactants and E. coli. (Temperature was checked in the field; all other parameters were checked by Brighton Analytical Laboratory.) All sampling parameters came back within normal range except for two E. coli levels that came back high (one at 1966 CFU/100mL and one at >2419 CFU/100mL). One of these high E. coli outfalls was resampled, and came back at 189 CFU/100mL, and it was determined that human error in sampling was the most likely explanation for the original high sample. The other outfall became submerged and could not be resampled.

In 2016, all remaining outfalls will be located and any previously submerged outfalls will be re-inspected. Any outfalls with dry weather flow will be sampled with the same procedure used in 2015, and any abnormally high parameters will be investigated. Any outfalls that are submerged will be traced back to the nearest manhole and sampled from there if water flow is present.

The MSU Environmental Health and Safety (EHS) Office responds to all concerns or questions regarding potential illicit discharges to the Red Cedar River. Calls from the public and the campus community are routed from either the MSU Police or the IPF to the Environmental Compliance Office of EHS. The Environmental Compliance Office then makes a record with the time/date of the call and the nature of the concern. As soon as practicable, a staff member physically verifies any issues. If any discharges are noted, a sample is taken and analyzed, and further investigation is undertaken to determine the source of the discharge. If no issues are verified by the MSU staff, a note will be made on the record, and the approximate location will be watched in the future to see if the issue arises again. Records of these calls and responses are maintained by the MSU EHS Department.

One illicit discharge investigation was conducted over this reporting period. EHS maintains records of

these investigations.

MSU also works to minimize the potential for seepage from the sanitary sewer system. MSU was awarded a SAW grant which will start in spring 2016. The first year of the grant will focus on cleaning, televising and condition assessment of both the storm and sanitary sewer collection system. The data gathered will be organized and incorporated with the University's current GIS system and will be the basis for developing asset management plans. This work will be ongoing for the next three years.

MSU continues to collaborate with the Ingham County Health Department and other jurisdictions within the county on the Ingham County Surface Water Roundtable, which conducts weekly *E. coli* sampling throughout the Red Cedar River Watershed April-October. That data is available as a link from the MSU-WATER website.

IDEP Staff Training

In addition to online stormwater training that includes an illicit discharge detection component (see Good Housekeeping section), in **August, 2015**, seven staff members participated in a field-based IDEP investigation training program, which was conducted by Tetrattech. The training session covered illicit detection protocol, sampling procedures and QA/QC techniques.

The following table includes IDEP-related commitments included in MSU's SWMP.

Minimum Measure	BMP	Begin By	Complete By	Evaluation Methods	Comments
IDEP	Update map and listing of all MS4 annually to DEQ if new discharges are added.	Apr-08	Ongoing	No. of new discharges added, mapped & provided to DEQ	None added in this reporting period
IDEP	GPS all MS4 outlets to Waters of the State and provide latitude and longitude to DEQ for their use.	Apr-08	Long Term	No. of outlets tracked through GPS	On file at EHS and IPF
IDEP	Inspect all on-campus discharge points	2013	2014-2017	Summary of each discharge point, including photographs	Substantial progress in 2015. To be completed in 2016
IDEP	Staff Training on IDEP inspection procedures	Continued from first permit cycle	Ongoing	List of staff trained on IDEP protocol	Available at EHS
IDEP	Staff Training on identifying and reporting illicit discharges	2010	Ongoing	List of staff trained	Available at EHS
IDEP	Identify illicit discharges and take corrective actions	On-Going	Long Term	No. of illicit discharges identified and database of corrective actions taken.	None identified in this reporting period

Post Construction Stormwater Runoff

Post-construction stormwater runoff controls are necessary to maintain or restore stable hydrology in receiving waters by limiting surface runoff rates and volumes and reducing pollutant loadings from sites that undergo development or significant redevelopment. Under Michigan's MS4 stormwater permit, post-construction stormwater runoff from all new and redevelopment projects that disturb one acre or more, must meet the following stormwater discharge criteria:

- Treatment methods shall be designed on a site-specific basis to achieve discharge concentrations of total suspended solids (TSS) not to exceed 80 milligrams per liter (mg/l) resulting from up to one inch of rainfall.
- The channel protection criteria shall maintain post-development site runoff volume and peak flow rate at or below existing levels for all storms up to the 2-year, 24-hour event (2.42 inches).

Stormwater Design Standards and Off- Site Mitigation

The approach for MSU views the campus as one parcel with the Red Cedar River as its outlet. Each individual development or redevelopment project is required to evaluate a method of complying with the stormwater requirements at the site and prepare a cost estimate for construction, following the procedures in the MSU Stormwater Design Standards, which will then be submitted to the campus Stormwater Review Committee. The methodology used in the development for the design standards was vetted through DEQ staff in a series of meetings. Design standards can be accessed at:

<https://ipf.msu.edu/green/water/stormwater-committee.html>

Projects that may alter the stormwater volume or peak-rate characteristics are tracked on a campus-wide basis and tabulated in a credit system or bank. Projects contributing to the bank will include demolition projects (e.g., buildings, parking lots, roadways) and stormwater improvement projects (e.g., porous pavement parking lots, bio-retention areas, etc.).

Recognizing that new projects located in highly developed zones of campus will have difficulty meeting the stormwater permit standards without incurring excessive costs or without resorting to impractical solutions such as stormwater pumping, the Stormwater Committee may recommend that a project use credits from the campus bank to meet its stormwater requirements under the new general permit. This decision will be made on a project-by-project basis after a site-specific evaluation and cost estimate has been completed. If a project applies for bank credits, the project may be charged a proportionate cost to help pay the capital costs associated with a larger, regional project that would be implemented to maintain the stormwater bank. Under the alternative approach, regional projects would have to demonstrate effectiveness of a 1.2 multiplier for all permit parameters over a site specific solution. Larger development projects that have enough land area available for LID techniques that exceed their stormwater requirements may also contribute to the campus bank. If the offset bank has been expended and an offsite project is deemed necessary, the regional stormwater control project must be completed concurrently with the development or within one calendar year of substantial completion of the project.

Documentation of Existing System

The MSU IPF Division is responsible for maintaining the storm sewer maps and infrastructure records for

the campus. All storm sewer pipes and structures have been mapped and documented in a Geographic Information System (GIS) database. MSU has 52 storm sewer pipes that discharge directly via outlets to the Red Cedar River between Hagadorn Road at the eastern edge of campus and the Kalamazoo Street Bridge at the western edge. The storm sewer pipes range in size from 12 inches to 84 inches and provide stormwater conveyance for approximately 2,200 acres of north campus. All storm sewer revisions completed on construction projects are recorded as the projects are completed so the GIS system stays current. A number of LID techniques have been implemented across the campus over the first two stormwater permit cycles, including bioretention areas, green roofs and porous pavement. Proprietary treatment systems have been installed as well, including numerous stormwater separators located throughout campus and a nutrient-separating baffle box that was installed at Birch and Wilson Roads.

Stormwater BMPs are tracked by MSU IPF. As required by the NPDES Stormwater Permit, **the BMP and impervious summary for 2014-2015 is included as Appendix 1 of this report. Upcoming BMPs are also included as part of that report.**

Site Specific Requirements

The Stormwater Committee is also responsible for reviewing the use of infiltration BMPs to meet the water quality treatment and channel protection standards for new development or redevelopment projects in areas of soil or groundwater contamination in a manner that does not exacerbate existing conditions. The committee meets monthly to discuss upcoming development projects, including proposed stormwater treatments options. Design review methodology discourages infiltration BMPs in areas of known soil or groundwater contamination. In these areas, alternative BMP designs are discussed and proposed.

The committee reviewed this procedure at its December 2015 regular meeting. The committee maintains that the monthly meetings and ongoing discussions regarding these site-specific considerations is effective and appropriate.

Upcoming Activities

New BMPs that are slated to come online beyond this reporting period are included in the summary report, which is included as Appendix 1.

Construction Stormwater Runoff

The Federal National Pollutant Discharge Elimination System (NPDES) Stormwater Program is part of the Clean Water Act administered by US Environmental Protection Agency. One aspect of this program addresses runoff from construction activities. Administration of the NPDES Stormwater Program in Michigan has been delegated to the MDEQ. These permit requirements specifically reference discharges from construction activities where the pollutants enter the MS4 owned or operated by the permittee and when the pollutants are in violation of any of the following:

- Section 9116 of Part 91 of the Michigan Act- *Sec.9116. A person who owns land on which an earth change has been made that may result in or contribute to soil erosion or sedimentation of the waters of the state shall implement and maintain soil erosion and sedimentation control measures that will effectively reduce soil erosion or sedimentation from the land on which the earth change has been made.*
- Michigan's Permit-by-Rule at R 323.2190(2)(a)- *Not directly or indirectly discharge wastes such as discarded building materials, concrete truck washout, chemicals, lubricants, fuels, liter, sanitary waste, or any other substance at the construction site into the waters of the state in violation of Part 31 of the Act or rules promulgated there under.*

Procedure to Ensure that Construction Activity One Acre or Greater in Total Earth Disturbance with the Potential to Discharge is Conducted by an Approved Authorized Public Agency

The University works with the City of East Lansing, Ingham County and Meridian Township, which are designated by DEQ as Authorized Public Agencies and Municipal Enforcing Agencies pursuant to Part 91. As such, campus development projects must obtain a Grading/Soil Erosion and Sedimentation Control permit from the City, County or Township. A number of staff members from the MSU IPF Division and Land Management Office (LMO) have successfully completed the Certified Stormwater Operator (CSWO) training and passed the CWSO/SESC Inspector exam. These individuals serve as the campus project representatives to ensure that all SESC requirements are met for new development projects.

Procedures to Ensure Adequate Allowance for Soil Erosion and Sedimentation Controls on Preliminary Site Plans, as Applicable:

As part of standard design and construction procedures on campus, staff members from IPF Planning, Design and Construction (PDC) or the LMO review or prepare all Soil Erosion and Sedimentation Control Plan drawings and specifications. These documents are produced by a consultant or internally, PDC or LMO staff members begin site analysis in the Schematic Design stage or earlier. The SESC document is being produced by a consultant, they are provided with the SESC/Stormwater Discharge checklist and other information as appropriate.

The acreage of the project and proximity to surface waters determines whether the proposed construction will require a permit. If a permit is required, the site location determines the appropriate governing agency; City, County or Township. The SESC documents are reviewed by PDC or LMO staff, in cooperation with the appropriate governing agency, multiple times throughout the design process to ensure that the appropriate controls will be in place according to the specific site. Documents are put out for bid and PDC or LMO staff confirm that all necessary SESC devices and techniques are clearly located and quantifiable.

Throughout the construction process regular site visits are performed by PDC or LMO staff members, who are Certified Storm Operators.

More than 1,000 SESC reports were filed, pertaining to approximately 30 campus projects, throughout the reporting period. Documentation is available at IPF PDC.

Procedures to Provide Notice When Pollutants Are Discharged from Construction Activities:

Where any pollutants are discharged from a construction activity in violation of any of the above noted statutes, to MSU's storm sewer system, the University will provide the following notifications:

- If soil, sediment or any other wastes that may adversely affect adjacent properties or public rights-of-ways, are discharged from a site, the University's CSWO assigned to that project location will notify the Authorized Public Agency within 24 hours of becoming aware of the discharge and consult with them regarding DEQ notification.
- If the University suspects that the discharge may endanger public health or the environment, the violation will be reported within 24 hours of becoming aware of the discharge. The CSWO assigned to that project location will work with the MSU Office of Environmental Health and Safety (EHS), which will ultimately report the discharge to MDEQ.

No reports were filed during this reporting period.

Procedures for the Receipt and Consideration of Complaints or Other Information Submitted by the Public Regarding Construction Activities Discharging Wastes to the MS4:

The University's CSWOs from the IPF and LMO inspect all permitted construction sites on a regular basis. As part of the Public Education Plan activities, individuals will be instructed to contact the IPF main dispatch number at 517-353-1760 with concerns about construction activity discharges. If a complaint is received dispatch operators will then notify the CWSO assigned to that location for immediate review. All complaints will be reviewed by no later than the next business day after receipt. Any action required by the contractor will be processed immediately.

Pollution Prevention and Good Housekeeping Program

The NPDES stormwater requirements stress the importance of developing proper pollution prevention procedures and maintaining good housekeeping practices on municipal property.

Municipal operations cover a wide variety of activities and land uses that are potential sources of stormwater pollutants. These include, but are not limited to roadways; parking lots; transportation and equipment garages; fueling areas; warehouses; stockpiles of salt and other raw materials; open ditches and storm sewers; turf and landscaping for all municipal properties, including parks; and waste handling and disposal areas.

The Greater Lansing Regional Committee (GLRC) Ordinance Committee developed the “Good Housekeeping and Pollution Prevention for Municipal Activities” manual. The manual included specific source control Best Management Practices (BMPs) that could be used by individual GLRC members to address many of the requirements of their permit. Staff members in IPF Landscape Services have used portions of this BMP manual to guide their operations. In addition, operating procedures pertaining to specific requirements in the stormwater permit are included below.

High-Priority Sites

The MSU Stormwater Committee identified the following facilities as high-priority:

- 1) MSU Transportation Services
- 2) MSU Surplus Store & Recycling Center
- 3) Forest Akers Golf Course Maintenance Facility.

MSU maintains separate Stormwater Pollution Prevention Plans (SWPPP) for these facilities. MSU EHS conducts monthly housekeeping inspections at each of these locations, looking specifically at areas of high concern (e.g., fuel tanks, outdoor storage, etc.). In addition, EHS staff also conduct quarterly comprehensive site inspections at each location to verify that the entire site is in compliance with the SWPPP. Inspection records are available at EHS.

Medium-and Low-Priority Sites

MSU’s parking lots and parking ramps have been identified by the Stormwater Committee as medium-priority facilities. For these and the remaining facilities identified as lower-priority sites, standard operating procedures as included in the GLRC “Good Housekeeping and Pollution Prevention for Municipal Activities” guide as well as procedures documented in the SWMP.

Structural Stormwater Control Operation and Maintenance Activities

Landscape Services is responsible for collecting and disposing of debris and wastes from MSU’s sewer and catch basin cleaning; street sweeping and other sources of pollution that may otherwise be discharged into the separate stormwater drainage system. MSU’s Office of Environmental Health and Safety (EHS) oversees compliance with Part 121 rules dealing with liquid industrial wastes, including ensuring that contractors meet all applicable requirements. The IPF Division is responsible for ensuring compliance with Part 115 solid waste disposal.

In 2014, 692 catch basins were serviced, with 245,558.3 lbs. of debris collected. Fourteen oil separators were serviced, with 9,910 gallons of water/slurry removed. In 2015, due to contractor issues, only three

structures were cleaned with approximately 1500 pounds removed. Additional cleaning will be completed in summer, 2016.

Municipal Operations and Maintenance Activities

IPF staff members have developed a stormwater facilities inspection spreadsheet that includes various BMPs and routine inspection and maintenance tasks for each. IPF also maintains a map of BMPS, with an accompanying spreadsheet to document inspection and maintenance dates and labor hours for each BMP. The spreadsheets are housed on the IPF server.

In May of 2015 15 BMPs were inspected. Ten were inspected in September 2015. One Landscape Architect from Planning Design and Construction and two Gardening Supervisors from Landscape Services attend the inspections. Each BMP has been assigned an equipment number which is used to track costs of inspection and maintenance. A map-based mobile application, typically used on iPads, is being used in the field to track scheduled inspection and maintenance activities such as catch basin cleaning, and will be used to input BMP inspection and maintenance data starting in 2016. This application allows the user to locate items on an interactive map that are scheduled for maintenance or inspection. Elements (Equipment) are only highlighted when they are due for an action.

Street Sweeping, Parking Lot, Sidewalk and Bridge Maintenance

Landscape Services is responsible for sweeping streets and parking lots on the MSU campus. All equipment is maintained on a fixed schedule; streets and parking lots are currently swept a minimum of two times per year. Structures are swept monthly and washed annually or as needed. Sweepings are stored in a rolloff bin and hauled to an approved landfill. No street sweepings are composted. Parking lots are swept on a regular basis following the street sweeping rotating schedule. During this reporting period, roadways and parking lots sweepings collected approximately 140 cubic yards of debris per year. Documentation is available at MSU Landscape Services.

Cold Weather Operations

Snow and ice removal on the Michigan State University campus is a major priority of MSU Landscape Services. During the 2014-2015 snow season, 1,876 tons of salt were applied, 57,000 gallons of salt brine was applied, and \$137,346 was spent on deicing products.

Employee/Contractor Training Related to Stormwater Management Activities

MSU has an online stormwater training program in place. The training program includes the Excal video entitled *Rain Check: Stormwater Pollution Prevention for MS4s*. MSU-specific information is included at the end of the training video, as well as a short quiz. During this reporting period, 279 staff members, representing the Land Management Office, IPF Landscape Services, IPF PDC, IPF Maintenance Services and several academic departments have completed the online training. Additional individuals will be trained within this permit cycle and beyond.

MSU staff members also attended the Michigan Green Infrastructure Conference in May 2014 and a training program entitled “Stormwater Pollutant Chemistry: Applications to Monitoring and BMP Effectiveness” in March 2015.

Contractor training pertaining to stormwater was incorporated into the Woody Plant Protection training sessions that are regularly conducted by Landscape Services staff members. In this reporting period, 36 contractors were trained. Records are available at MSU Landscape Services.

Managing Vegetated Properties

University employees who apply pesticides and fertilizers are required to possess a valid commercial applicator's license from the State of Michigan. As part of the continuing education/recertification requirements, employees are trained in proper storage, handling and use of pesticides, herbicides, and fertilizers on the MSU campus.

The following table includes Good Housekeeping-related commitments included in MSU's SWMP.

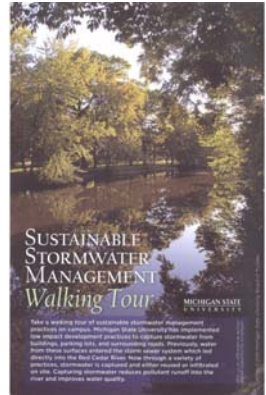
Minimum Measure	BMPS	Begin By	Complete By	Evaluation Methods	Comments
Pollution Prevention and Good Housekeeping	Identify areas along the river corridor as candidates to install riparian buffer preservation (no mow).	Continued from second permit cycle	Ongoing	Map of river corridor with buffer areas delineated	In place and maintained by IPF Landscape Services
Pollution Prevention and Good Housekeeping	Install Grow Zone Signs	Continued from second permit cycle	Ongoing	Number of signs installed along the river corridor	Eight "Grow Zone" signs continue to be maintained on the campus.
Pollution Prevention and Good Housekeeping	Staff Stormwater Training	2008	Ongoing	No. of staff trained. Freq of training.	Online training is conducted and tracked.
Pollution Prevention and Good Housekeeping	Review existing salt application practices; make changes if necessary		2016	Existing practices reviewed, improvements implemented, number of staff trained	Snow management plan is in place.
Pollution Prevention and Good Housekeeping	Sweep/clean University parking lots and streets		Ongoing	Freq of sweeping, amount of material collected	Reports are available through IPF Landscape Services
Pollution Prevention and Good Housekeeping	Clean catch basins on a regular basis and ensure proper disposal of waste materials			Half of catch basins are cleaned each summer	Freq of cleaning and amount of material collected. Waste is handled by a licensed contractor. Reports are available through IPF Landscape Services
Pollution Prevention and Good Housekeeping	Develop stormwater training materials for contractors.		2014		Training materials have been incorporated into Woody Plant Protection training program.

Other Actions

Partnerships with campus service units, faculty members and students are an important component of MSU's stormwater management activities. A number of projects are underway that promote service learning opportunities for both undergraduate and graduate students.

In 2014, a Sustainable Stormwater Management Walking Tour of the MSU campus was finalized, which includes a summary brochure and signs that are posted at seven campus stormwater BMP locations. Hard copy brochures have been printed, and signs for each of the sites were installed. Tour information is also included on the MSU-WATER website: <http://msu-water.msu.edu/stormwater-walking-tour/>

Faculty members from MSU's Departments of Biosystems and Agricultural Engineering and Horticulture are engaging students in research activities at several BMP sites across the campus. For example, ongoing monitoring has been underway for several years at the Farm Lane Underpass bioretention site. Students are monitoring the effectiveness of various plant species in treating stormwater runoff, and produce annual monitoring reports that are shared with the MSU Stormwater Committee. In support of actions included in the MSU SWMP, MSU continues to incorporate the Red Cedar River and stormwater management issues into existing coursework.



Nested Drainage System Agreements

This section does not apply to Michigan State University.

Summary

The University is committed to continuing its commitment to managing campus water resources in a holistic manner. A watershed management plan was developed for the Red Cedar River Watershed, with an emphasis on *E. coli* bacteria. MSU faculty, students and staff members are working with numerous local partners in this effort. Along with those broader, watershed-wide efforts, good working relationships have developed among the members of the Greater Lansing Regional Committee for Stormwater Management (GLRC), and MSU will continue to be a full partner with these communities in the urbanized portion of the watershed as a member of this organization. In addition, the campus Stormwater Committee, comprised of staff members from multiple service units and departments, continues to emphasize an integrated approach to managing stormwater on campus.