

2014

FACILITIES AND **INFRASTRUCTURE** REPORT

MICHIGAN STATE
UNIVERSITY

Infrastructure
Planning and Facilities



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EXECUTIVE SUMMARY



Welcome to the 2014 Facilities and Infrastructure Report for Michigan State University. This report is compiled annually to reflect the current state of MSU's facilities and infrastructure as well as to highlight future planning.

NEW ORGANIZATION

This past year has been one of significant change for the facilities operation at Michigan State University, with the dawning of a new unit, Infrastructure Planning and Facilities, or IPF, replacing the former Physical Plant Division.

The new organization has pulled together nearly all of the facilities responsibilities of the university, enabling greater collaboration and enhanced efficiencies.

While the unit is new and its future focus areas are expanding, its core function is to keep the university's facilities and outdoor spaces operational, allowing students, faculty and staff to concentrate on their endeavors. The unit's experienced team of professionals delivers these core functions without fail, keeping MSU running 24/7/365. IPF delivers a large menu of services: reliable

heating, cooling, electricity, water, telecommunications, trash removal and recycling support, and transportation options. IPF also designs, constructs and maintains buildings, utilities systems and the campus park, and maintains the university's facility records. All of these services are provided with the safety of the campus community and the long-term sustainability of the environment in mind.

IPF's functions are most often provided under the radar, with the campus community only knowing when there is an interruption of reliability. Fortunately, that doesn't happen often.

Departments comprising the new unit are: Administration, Building Services (including Commissioning Services, Custodial Services and Maintenance Services), Campus Planning and Administration, Communications, Engineering and Architectural Services, Energy and Environment, Facility for Rare Isotope Beams Civil Infrastructure, Land Management, Landscape Services, Occupational Safety and Compliance, Power and Water, Support Services, Sustainability, Telecommunication Systems and Transportation Services.

NEW CULTURE, NEW FOCUS AREAS

President Lou Anna K. Simon envisioned the new unit, and urged that IPF develop a corresponding new culture that forwards Bolder by Design's newest imperative of "advancing a culture of high performance." To that end, IPF is committed to reenergizing our focus on superior customer service. Additional focus areas in this vein include increasing communication with campus customers, increasing our focus on supervisors and their critical role in leading and inspiring teams to provide superior customer service and investing in focused, high-energy customer service training for all IPF team members.

As a new unit, IPF developed a collective vision to: "Be the most high-performing, innovative, leading-edge facilities organization in the nation, with a focus on quality, customer satisfaction and value in all we do."

We will achieve that vision by living the values IPF developed in tandem with its new vision. Our values are, first and foremost, MSU's values of quality, inclusiveness and connectivity. Additional IPF values include: honest and transparent communication, value, reliability and responsiveness, innovation and strategic planning, stewardship, expertise, accountability, dedication and collaboration.

TEAM IPF

Administration

Building Services

(including Commissioning Services, Custodial Services and Maintenance Services)

Campus Planning and Administration

Communications

**Engineering and
Architectural Services**

Energy and Environment

**Facility for Rare Isotope
Beams Civil Infrastructure**

Land Management

Landscape Services

Occupational Safety and Compliance

Power and Water

Support Services

Sustainability

Telecommunication Systems

Transportation Services



Photo courtesy of IPF

OUR VISION:

“Be the most high-performing, innovative, leading-edge facilities organization in the nation, with a focus on quality, customer satisfaction and value in all we do.”



NEW LEADERSHIP

With the new unit also comes a passing of the leadership torch from Vice President Ron Flinn to Vice President Kemel Dawkins. This is a significant change as Flinn has served MSU for more than 50 years, arriving as a student in the fall of 1957 and choosing to never leave. During his tenure, Flinn has been involved in the design and construction of nearly 75 percent of the campus's buildings and infrastructure. He played a significant role in the development of south campus, and facilities such as the National Superconducting Cyclotron Laboratory, the Veterinary Clinic, the Chemistry and Biochemistry buildings and the new T.B. Simon Power Plant. Flinn will serve as senior advisor to IPF for the duration of 2014, at the end of which he will retire.

Kemel Dawkins took the reins from Flinn in January 2014. Prior to coming to MSU, Dawkins served as the chief business and administrative officer for Rutgers University's Newark campus and held responsibility for the campus budget, business services, student financial services, public safety, facilities and capital planning, grants administration, and purchasing.

LOOKING AHEAD

It's incumbent upon the facilities organization to provide high-quality results at the lowest possible cost.

The staff at Infrastructure Planning and Facilities is committed to tackling this challenge to provide superior and efficient facilities planning, management and service in support of MSU's education, research and outreach missions.

Kemel Dawkins

*Vice President for Strategic Infrastructure
Planning and Facilities*



INDICATORS OF HIGH-PERFORMANCE



IPF is the organization that, across the board, keeps MSU running 24/7/365 and is at the ready to address any facility emergency that arises.

- As many as 430 students are employed by IPF, at any given time, in various assignments and internships throughout the organization. Frequently, MSU alumni will relate how important this experience was, along with their degree, in obtaining the job of their choice.
- After losing the ability to clean faculty offices monthly via a budget cut several years ago, the recent implementation of high-performance cleaning techniques allows custodians to visit faculty offices once a week.
- Even though MSU's daily maintenance budget is one of the lowest in the Big Ten, all building envelopes are secure and all building systems and utility distribution systems function reliably.
- Frequently, one hears "the roads were terrible coming to work, until I got to the campus." This winter has put the staff of Landscape Services to the test and they have responded as true Spartans.
- Sustainable efforts continue to significantly reduce the quantity of material going to landfill by selling or recycling and sending food waste to the digester.
- Energy-conservation efforts are lowering fuel consumption and emissions without impeding research or campus expansion.

- The telephone operators, who are the “voice of MSU” for many stakeholders, are also the dispatchers of the IPF workforce, providing very quick response to campus issues.
- Land and building leases and purchases are expeditiously executed.
- A fleet of high-quality vehicles, many of which are environmentally friendly, are available to support the university’s mission at a very competitive price.
- With rare exception, construction projects are delivered on time and within budget.
- Master planning and design incorporates enhancements which are compatible with one of the most beautiful campuses in the nation.
- MSU enjoys an extremely reliable electrical supply — self-generation, grid access and black-start capability.
- In addition to Construction Junction, which is a monthly construction project update meeting, in 2013 IPF enhanced its customer communications by launching a new website (www.ipf.msu.edu), and expanding its social media outreach, specifically with MSU students, who are now sending facilities alerts to IPF via Twitter.

Moving forward into 2014-15 and beyond, Infrastructure Planning and Facilities will continue to research the most innovative technologies, sustainable practices and streamlined work processes in order to achieve the highest level of customer service for Michigan State University and in support of Bolder by Design imperatives.

SPARTANS WILL.



DESIGN AND CONSTRUCTION



Adequate facilities are vital for Michigan State University to perform its missions of education, research, and outreach. The university continues to invest heavily in design and construction projects, and 2012-13 was an extraordinary year because Board of Trustees construction project actions more than doubled in project value from 2011-12, and more than tripled the value of projects authorized in 2010-11. Design and construction payments were \$125.9 million, just above the five-year average of \$121.7 million. This equates

to 5.7 percent of the university's \$2.18 billion expenditures in 2012-13.

The Annual Construction Report reviews completed projects as part of a required reporting process for MSU's Board of Trustees. This report is included in Appendix A and lists 44 major and minor capital projects that were closed in fiscal year 2012-13, with a total value over \$226 million. These projects were completed 4.5 percent under budget, on average, resulting in the return of approximately \$10.5 million to the original funding sources.

CONSTRUCTION ACTIVITY AND SPENDING

Projects Authorized for Planning (step 1) are approved to begin the design process, including retaining design consultants. The estimated costs are conceptual at that point, pending validation of the scope and schedule. Projects Authorized to Proceed (step 2) have a defined scope, schedule and project budget. If the project is using a construction manager or design-build delivery method, construction can proceed. If the project is design-bid-build, the project must return for bid and contract award (step 3).

There were 16 projects Authorized to Plan in 2012-13. Of the 16 projects Authorized to Plan, four were funded by MSU Athletics (\$26 million), two were funded by Residential and Hospitality Services (\$30 million), and the remaining 10 were general fund projects (\$152 million). Projects Authorized to Proceed included 16 for the general fund (\$232 million), four for RHS (\$68 million), and three for Athletics (\$32 million), totaling more than \$332 million. Figure 1 shows the number and value of Board of Trustees authorizations, by project step, for the past five fiscal years.

Value and number of Board of Trustees construction authorizations

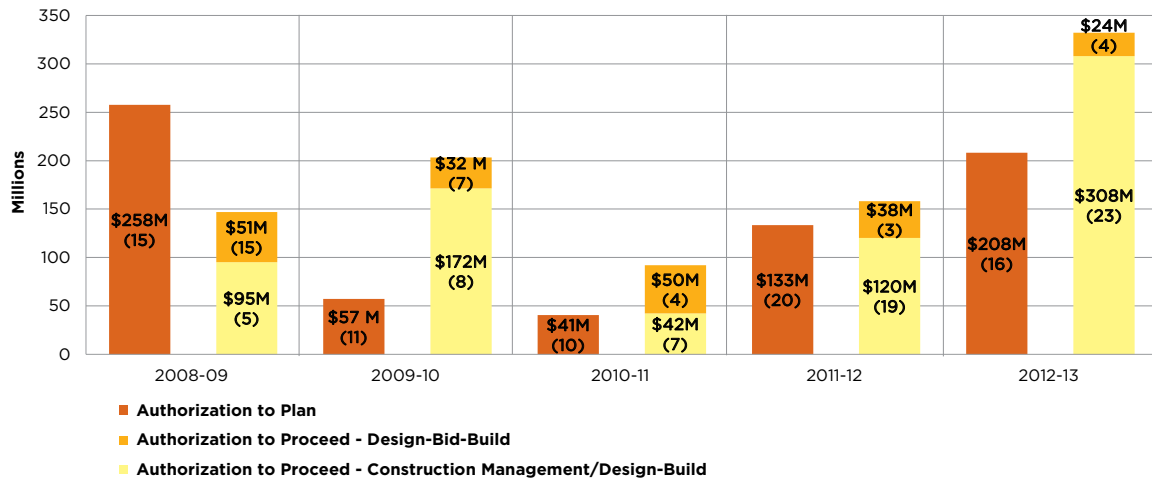


FIGURE 1

Value and number of Board of Trustees authorizations.

DESIGN AND CONSTRUCTION PAYMENTS

Design and construction payments decreased in 2012-13 compared to 2011-12. Design activity increased slightly in 2012-13, approximately 10 percent above the five-year average. The university can expect design activity payments to increase in the following years due to the large volume of projects Authorized to Plan. While the number and value of projects that are Authorized to Plan can fluctuate from year to year, design activity remains fairly stable due to the leveling out of design

resources that are required to meet project design schedules over time.

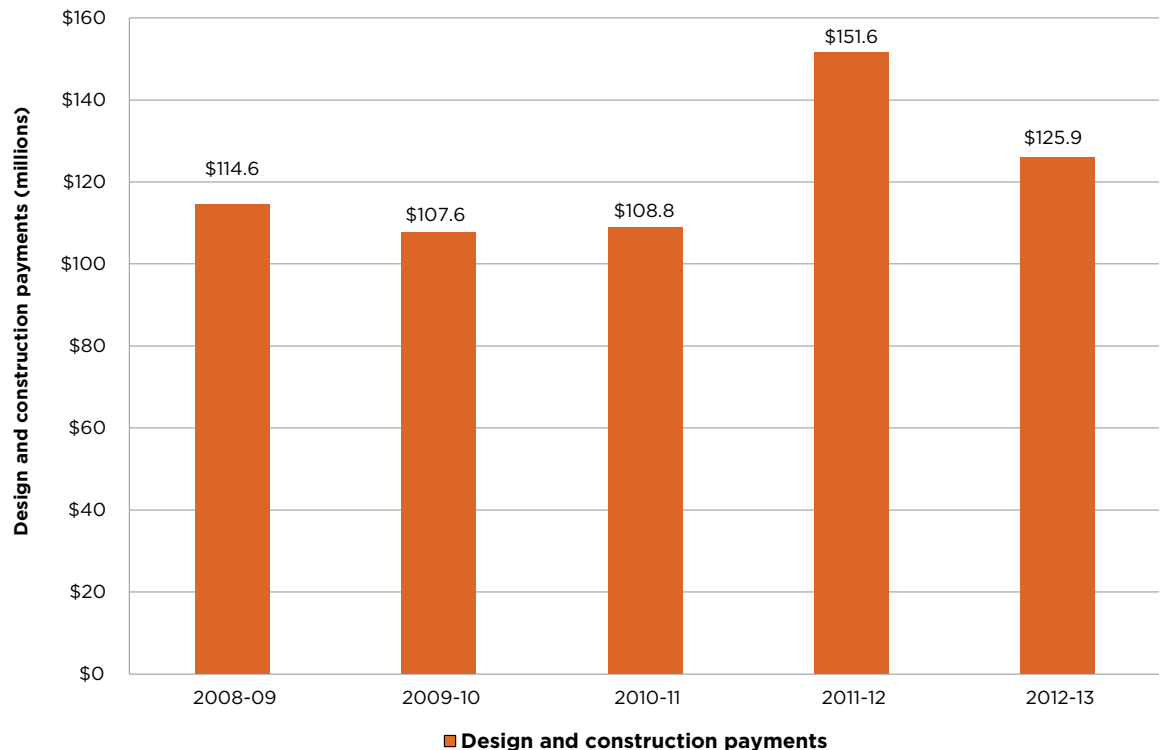
It should be noted that while construction payments decreased, the volume of payments to constructors remains slightly above the five-year average. The university will likely realize a significant increase in construction spending in the near term due to the large volume of projects Authorized to Plan and Authorized to Proceed in 2012-13.

Figure 2 below illustrates design and construction payments for the past five years.

Design and construction payments by fiscal year

FIGURE 2

Design and construction payments by fiscal year.



HIGH-PROFILE PROJECTS COMPLETED IN 2012-13

In a given year, IPF facilitates hundreds of construction and renovation projects on campus, ranging widely in dollar amounts, scope and impact to campus users. Following is a representative sample of some of the most high-impact/high-profile projects completed in 2012-13.

Armstrong and Bryan Halls Renovation

Armstrong and Bryan Halls, located on the west side of the Brody Neighborhood, were the fourth and fifth residence halls to be renovated in the complex. The Brody Neighborhood is designed to allow for the optimal planning of the complex, which consists of a central student building and six residence halls. The renovations were similar in nature to recently renovated residence halls such as Emmons, Mary Mayo, and Snyder-Phillips. The program

is designed to create a desirable place to live and learn for students of any class-level. Improvements were made to the building infrastructure, common spaces, amenities and the surrounding site to maximize and support the Outstanding Spartan Experience. The result is a more efficient, pleasant, easily navigated, secure and vibrant home for residents. The new Armstrong and Bryan Halls have a sense of community both within the halls and the Brody Neighborhood.

OTHER SIGNIFICANT PROJECTS COMPLETED IN 2012-13:

- Old College Field Renovation Entrance Plaza
- The New College of Music Community Music School
- Kellogg Center Renovation to Big Ten Room
- The McDonel Hall Riverwalk Neighborhood Engagement Center
- Demolition of the State Police Post Building and Reclamation of the Property
- Transportation Services – New Fuel Station





**Life Science Addition No. 1
(Bott Building for Nursing
Education and Research)**

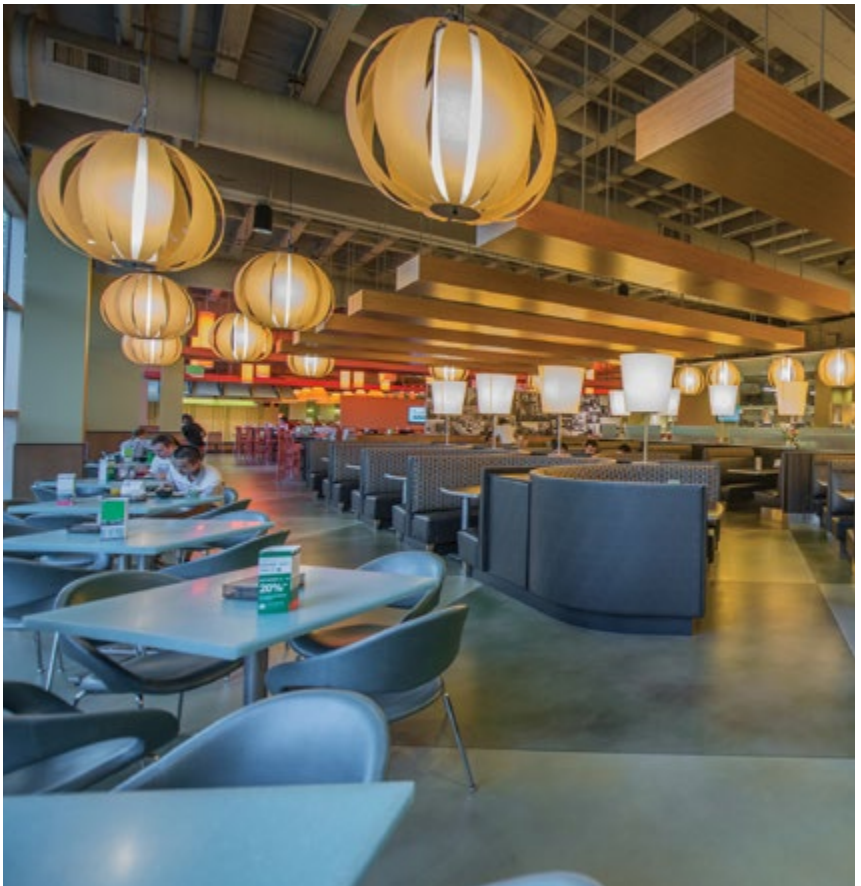
The College of Nursing is challenged to increase research and opportunities for interaction and collaboration among students, faculty and staff. The Life Sciences Building could not adequately accommodate these activities. Thus, this project involved a three-story, 50,000-gross-square-foot building that links to the existing Life Sciences Building. Two floors house dedicated research space and one floor includes classrooms, student commons, student services, external relations, conference rooms, and a new atrium and reception lobby. The building provides gathering space for the community, students, faculty, and staff, and supports the college's teaching, research and outreach missions.





Shaw Hall Dining Center — ‘The Vista’

Due to Shaw Hall’s central location on campus and the age of its facilities, it was a high-priority project for dining renovations. This project coordinated with the Residential and Hospitality Services Dining Master Plan, which aims to create an integrated approach to campus dining and align dining facilities with growing housing capacities. This project involved creating a state-of-the-art new dining hall for Shaw Hall. Other renovations included a new elevator to connect to the terrace level, new loading dock, and improvements to the lobbies and lounges on the first floor adjacent to the dining hall. The project also included removing the parking lot west of Shaw Hall and replacing it with grass, and replacing the deteriorated water main piping south of the building.



Spartan Stadium Scoreboards

This project involved replacing the former Spartan Stadium scoreboards, including sound system and video display, with more energy-efficient and cutting-edge technology more on par with other highly competitive football stadiums. There are now two scoreboards located on the north end with a ribbon panel that spans the north end of the bowl and one larger scoreboard on the south end. The new scoreboards also include structural improvements.





Music Building Auditorium Renovation

The Music Building auditorium has had limited renovations since its construction in 1940. It lacked proper heating, ventilation and air conditioning, had acoustical deficiencies, and was in need of general maintenance. This project included acoustical enhancements such as installation of an orchestra shell, ceiling modifications, balcony demolition, and new side walls; air conditioning, heating, and ventilation modifications; installation of a new fire alarm system throughout the building; new seating; upgrades to house and stage lighting; replacement of doors; exterior card access; and modifications to the exits and floor slopes to meet ADA standards.

HIGH-PROFILE PROJECTS IN PROGRESS



A rendering of the Bio Engineering Facility.

OTHER SIGNIFICANT PROJECTS IN PROGRESS:

Steam Distribution and Road Reconstruction — West Circle Drive

Clinical Center — C-Wing HVAC Renovation and Addition 1

Munn Ice Arena — HVAC Upgrades Ice Making System

Chittenden Hall Renovation

Bio Engineering Facility

The Bio Engineering Facility will provide a unique opportunity to bring together research teams from engineering and biomedical research to promote the development of bio-engineering and engineering health sciences at Michigan State University. This project involves a four-story, 130,000-square-foot research laboratory building that is designed to facilitate interdisciplinary research and interaction amongst all occupants/users, and the sharing of specialized research equipment, such as imaging. The building will be physically connected to the existing Clinical Center C-Wing and Life Science B-Wing, with proximity to the Radiology Building to facilitate the sharing of core research resources. *Substantial completion: Fall 2015*

Grand Rapids — Real Estate and Research Facility Development

The Secchia Center, headquarters for the MSU College of Human Medicine, is

a privately-funded medical education building located in Grand Rapids along the “Medical Mile.” Since the Secchia Center’s opening in 2010, CHM has reached its expansion goal of 800 students and has built a successful research platform in West Michigan. To sustain and advance the trajectory in research growth, it is critical to develop a comprehensive strategy to establish appropriate research facilities. In January 2012, the MSU Board of Trustees authorized the purchase of several parcels of property in Grand Rapids, including the former Grand Rapids Press building, which is located west of the Secchia Center. The university also holds other parcels in Grand Rapids, including one on College and Michigan avenues. Proximity along the “Medical Mile” reinforces the connection between educational programs and scientific discoveries, and builds upon the well-established programs of MSU’s partners in the West Michigan community. *Substantial completion: Fall 2017*

**Spartan Stadium —
North End Zone Addition**

In June 2013, the Michigan State Board of Trustees approved a \$24.5-million addition to the north end of Spartan Stadium that will feature a two-story, 50,000-square-foot addition as well as an entrance plaza, renovated gates, and additional restrooms and concessions. The building will include new locker rooms for teams, coaches and officials, including a 4,500-square-foot home locker room and a 700-square-foot home training room, in addition to a 3,600-square-foot media center and a 4,000-square-foot recruiting lounge for all varsity sports.

Substantial completion: July 2014





Akers Hall Dining and Life Safety

Akers Hall, originally constructed in 1964, requires major infrastructure repairs to the electrical, mechanical and plumbing systems to meet current life-safety and accessibility code requirements. Additionally, the Residential and Hospitality Services (RHS) Dining Master Plan calls for creating an integrated approach to neighborhood dining across campus, aligning dining capacities with projected changes in housing occupancy to meet demands and needs for any given part of campus.



This project includes the complete renovation of the existing Akers Hall dining room and serving area; life-safety upgrades in the student wings; alterations to student lounges on all living-wings floors; barrier-free modifications to the first-floor restrooms; a new elevator from the ground floor to the dining level; replacement of the HVAC system and lighting in lecture room 137; a new chiller to serve the dining hall; new water service; and replacement of the exterior curtain wall on the south side of the first and second floor. *Substantial completion: December 2014*

Landon and Yakeley Dining Facility and Food Emporium

Landon and Yakeley Halls are located in the North Neighborhood on the northwestern side of Michigan State University's campus. The goal is to consolidate dining for the residence halls in the North Neighborhood. This project is coordinated with the RHS Dining Master Plan, which aims to align dining capacities with projected changes in housing capacity. This project includes the creation of a signature first-floor 300-seat dining facility including display cooking venues.

The project also includes changes to the loading dock; an updated fire alarm and fire suppression system throughout the building; accessibility across the first floor level and residential wings, including a select number of student rooms; power and data connectivity updates in student living wings; window refurbishment and community restroom renovations. Additionally, two new elevators will be installed to accommodate accessibility. *Substantial completion: July 2014*





Facility for Rare Isotope Beams

In January 2014, the Department of Energy Office of Science (DOE-SC) gave the Facility for Rare Isotope Beams (or FRIB, pronounced F-RIB) official notice that it can now begin construction. This notice completes the process begun when President Obama signed into law the 2014 federal budget approved by the U.S. House of Representatives and the Senate, which includes \$55 million to support construction of FRIB in the coming year.

In February, the Michigan Strategic Fund (MSF) Board held its regular meeting at FRIB, where they induced more than \$90 million to go toward the community cost share of FRIB. The inducement brings FRIB one step closer to successful completion. FRIB will be a new national user facility for nuclear science, funded by the Department of Energy Office of Science (DOE-SC), Michigan State University (MSU), and the State of Michigan.

Under construction on campus and operated by MSU, FRIB will provide intense beams of rare isotopes (that is, short-lived nuclei not normally found on Earth). FRIB will enable scientists to make discoveries about the properties of these rare isotopes in order to better understand the physics of nuclei, nuclear astrophysics, fundamental interactions, and applications for society. *Project completion is expected in 2022, managing to early completion in 2020.*

JUST-IN-TIME CAPITAL RENEWAL



The “Just-In-Time” (JIT) facilities condition database represents a comprehensive assessment of all campus infrastructure components. It is called the “Just-In-Time” database to highlight the effort to complete the renewal needs of our infrastructure “just in time,” before operational failures, to most prudently use MSU’s resources.

The process used to develop the database assesses the condition of a particular component and estimates the expected failure date based on the assessment. A priority list and schedule of repair, replacement and maintenance needs is developed. The industry-predicted life cycle of infrastructure systems (average number of years before a replacement is normally needed) is

used as the starting point for projecting the timing of required work. At MSU, however, this estimated replacement year is adjusted based on observations made in the field by IPF preventative maintenance and repair crews. As a result of these observations, the time for replacement or repair of a particular piece of equipment or utility segment is adjusted so that funding resources can be used most effectively. The JIT annual maintenance and replacement costs are then projected over a 10-year period to allow long-range planning.

Facilities Planning and Space Management and IPF’s Commissioning Services, and Energy and Environment offices use the database when coordinating campus construction and

renovation projects. The most critical projects are determined each year using the following “risk-based” criteria:

- Imminence of system failure.
- Potential for human or research safety to be jeopardized.
- Potential for disruption of university and personnel, and the impact of the disruption.
- Probability of escalating damage to other systems or property.
- Near-term programmatic planning affecting JIT projects already identified; opportunities for coordination and cost savings.

Over the past year, the IPF departments of Campus Planning and Administration, Engineering and Architectural Services and Landscape Services have committed to collaboratively identify and track ongoing campus needs beyond what has traditionally been included on the

JIT list. Some broad categories include pedestrian and vehicular systems, natural systems, accessibility, bridges, wayfinding, and the campus arboretum. This group evaluation results in a holistic approach toward identifying site issues that are distinctly separate from the myriad of planned construction projects.

ANALYSIS

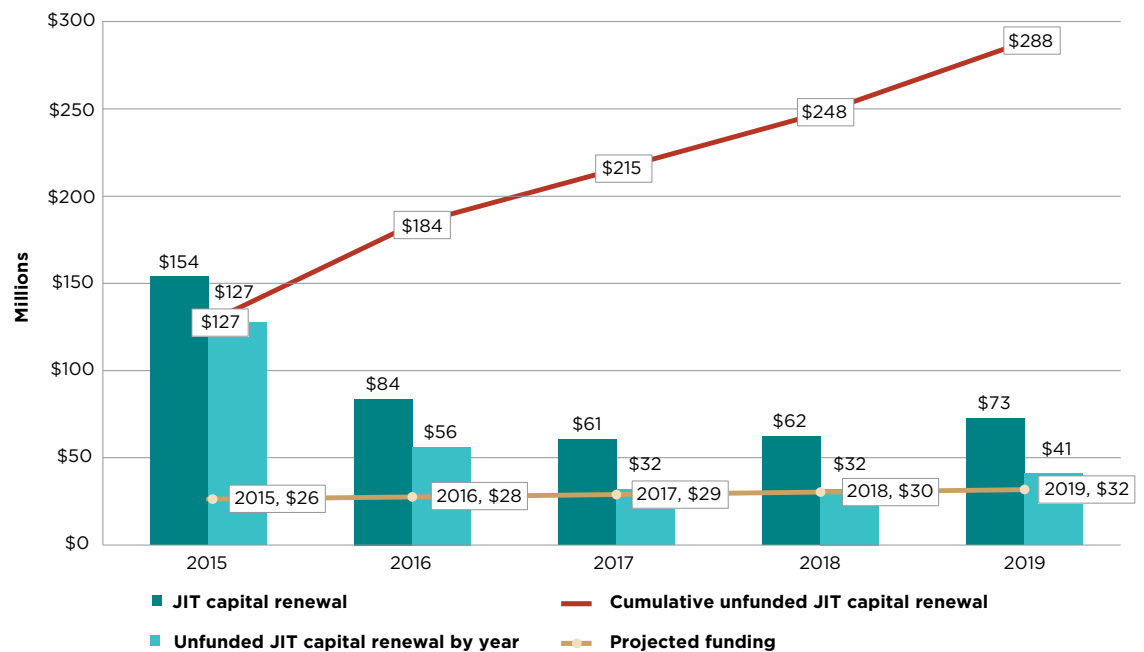
With the chronic underfunding of capital renewal at MSU, and the further reduction over the last five years of available funding from the Endowment Trust proceeds, the accumulation of unfunded JIT Capital Renewal has greatly increased, particularly for campus buildings.

Figure 1 shows a five-year projection of JIT Capital Renewal needs in all facilities categories, and funding amounts expected from known sources. The known sources include the balance of the annual fuel budget, after-bond debt payments and annual power plant major maintenance and repair.

Cumulative unfunded JIT capital renewal

FIGURE 1

Cumulative unfunded JIT capital renewal.



CONTINUED DEFERRALS INCREASE RISK

Fiscal year 2014–15 funding needs include all accumulated unfunded needs from past years, totaling more than \$127 million. This will result in increased instances of significant disruption to campus operations due to unpredicted system failures. Figure 1 illustrates the accelerated accumulation that will continue, without an aggressive plan of action that adequately addresses this significant risk.

Building-wide window replacements for Student Services, Linton Hall, the MSU Museum, Central Services, Giltner Hall, Old Botany, and others have been deferred repeatedly over the last five years as more critical projects have competed for the limited funding. The scale and cost of these projects are large and the disruption to occupants is potentially significant. Yet leaving them for the future puts them in competition with other high-priced needs that are looming. Within the next five years, major HVAC equipment in 12 buildings will reach the end of its life expectancy. At the same time, five science buildings are under review for substantial funding to renew laboratory ventilation equipment to help meet Energy Transition Plan goals.

COMPREHENSIVE APPROACH VS. COMPONENT REPLACEMENT RECOMMENDED

More and more frequently, a component of an HVAC system is identified as old and failing, but funding just the replacement of that component (as JIT is defined) makes little sense when the entire system has major energy losses, or the use of the space is changing in the near future. This means that what starts as a JIT \$600,000 multiple-exhaust-fan replacement needed at the MSU Museum, for example, should most prudently become a multi-million dollar upgrade for energy-efficient variable-air



volume and cooling systems. However, the past and current rates of JIT funding cannot keep pace with comprehensive building needs. Identifying energy-efficient upgrades in conjunction with old equipment replacement, however, provides a long-range plan for the sustainability of each building.

This summary of JIT requirements shows the financial challenges that must be met to preserve the university's infrastructure framework. Although many infrastructure components may continue to operate, the likelihood of a disruptive failure grows yearly due to their age and deteriorating condition. The challenge of maintaining and keeping these systems operating until funding can be identified to address the full extent of the needs becomes steadily more precarious.

ENERGY MANAGEMENT



Photo courtesy of IPF

The Energy Transition Plan, adopted by the Board of Trustees in April 2012, defines MSU's goals toward a sustainable-energy future. The plan set high-level overarching goals to improve the physical environment, increase research in renewable energy and establish MSU as an educational leader in sustainable energy. IPF has the main responsibility for meeting the first goal of the Energy Transition Plan, Improving the Physical Environment (see Figure 2 for goal 1 targets). To that end several initiatives have been established to reduce energy use and explore energy alternatives. As of the end of fiscal year 2013, MSU has reduced greenhouse gas emissions by 17 percent and increased renewable energy to 8 percent from a 2009-10 baseline.

The 2013 Sustainability Report provides a more detailed look at ways MSU is meeting all of the goals of the Energy Transition Plan and can be found at www.sustainability.msu.edu/report/2013.

ENERGY-CONSERVATION MEASURES

The university is making the investment in energy conservation as a first step and has implemented many energy-conservation projects in the past three years. The most cost-effective strategy for the university, as determined by the Energy Operations Team, was to implement energy-conservation measures (ECMs) with less than a five-year payback in all 110 major facilities on campus.

Fuel distribution at T.B. Simon Power Plant, 2012-13

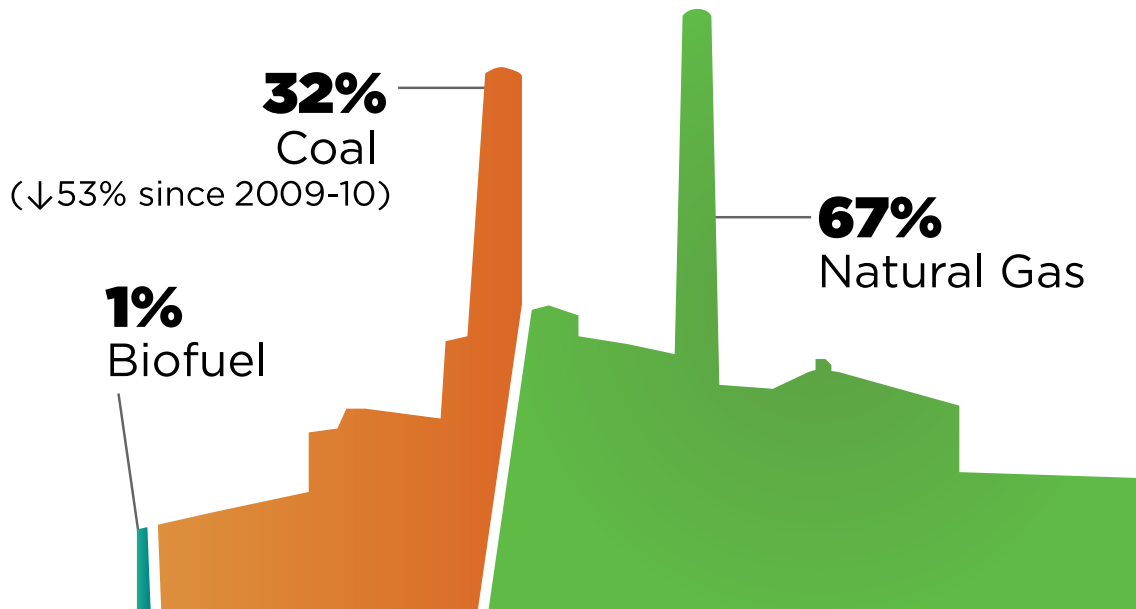


FIGURE 1

The fuel mix at the T.B. Simon Power Plant, which is a co-generation plant that is 60 percent efficient.

Energy Transition Plan targets

| | % Greenhouse gas emission reduction | % Campus renewable energy |
|---------------|-------------------------------------|---------------------------|
| FY2015 | 30 | 15 |
| FY2020 | 45 | 20 |
| FY2025 | 55 | 25 |
| FY2030 | 65 | 40 |

FIGURE 2

Energy Transition Plan Targets for Goal 1: Improve the Physical Environment.

New energy-conservation strategies are being explored to evaluate their potential for additional energy reduction. They include:

Commissioning

Building commissioning and energy audits are taking place in 110 major buildings on campus. The commissioning team works to optimize building operational efficiency through the following activities:

- organizing building operational information;
- establishing energy/performance benchmarking;
- identifying operational inefficiencies and faulty equipment;
- identifying ECMs; and
- validating and prioritizing ECMs for implementation consideration.

To date, the commissioning process has been completed in 55 buildings (both new and existing facilities) and 19 more are underway. Many of the energy-conservation measures implemented thus far were identified through the existing-building commissioning process. ECMs and other commissioning-related operational improvements have been implemented or are underway in 30 campus buildings. Upon completion of work in just these 30 buildings (making up just 32.7 percent of main campus's square footage), it is estimated that total campus-wide energy avoidance will be 8.3 percent. This equates to an average of 15.2 percent per building and \$4.8 million in fuel savings.

Lighting upgrades

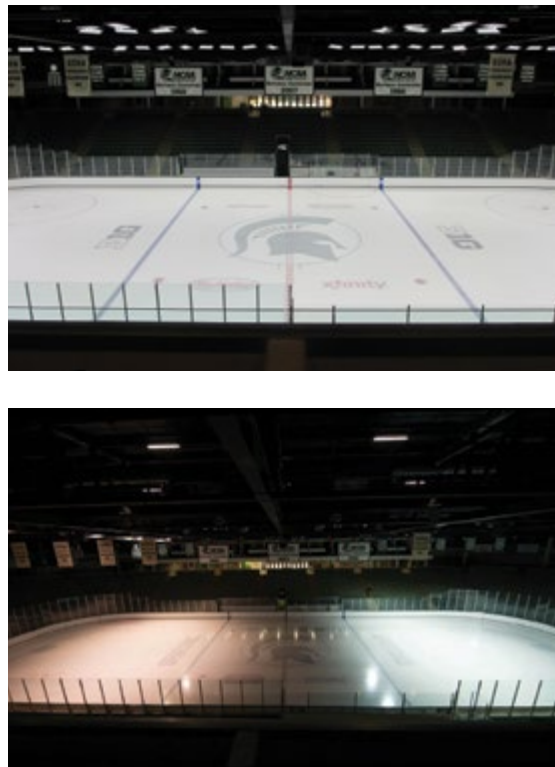
Lighting upgrades have also been implemented to reduce energy use. LED, or light-emitting diode, technology in particular is being integrated into campus lighting projects. LEDs use a fraction of the energy of traditional lighting. One success story is Munn Ice Arena, which was upgraded to LED lighting. The lighting upgrade in Munn will reduce energy consumption from lighting by more than 40 percent while producing an increased light level (see Figure 3).

Additionally, Parking Ramp 5, adjacent to the Communication Arts and Sciences Building, was also upgraded to LED lighting. The LEDs include controls to turn off fixtures during the day when the sunlight is adequate, and at night, lower light levels during unoccupied periods using occupancy sensors to return light levels to normal when individuals walk or drive into the ramp (see Figure 4). The LEDs use 40 percent less energy than the previous lighting system and have an annual energy savings of approximately \$25,000. Additionally, using LEDs will reduce the long-term maintenance costs associated with traditional lighting.

FIGURE 3

Munn Ice Arena — LED lighting upgrade: Top photo is the completed project and bottom photo is a before-and-after comparison of the lighting systems.

Photos courtesy of IPF



Communication Arts and Science parking ramp hourly average electrical load



FIGURE 4

Communication Arts and Science - LED lighting upgrade.

Average difference = 42 KW

Daytime difference = 30 KW

Nighttime difference = 49 KW

GE Treasure Hunt

MSU partnered with GE to learn a systematic method of finding energy conservation opportunities in buildings. In the inaugural treasure hunt, faculty, facilities staff, and students identified 84 projects with an estimated potential energy savings of \$1,989,786. The teams said that by fully engaging the building

occupants and facilities staff, they discovered energy-savings opportunities that may have otherwise been overlooked. The treasure hunt method also looked at behavioral and policy changes that could lead to energy use reduction. As a result, the GE Treasure Hunt process will be incorporated into the commissioning process beginning mid-2014.



FIGURE 5

GE Treasure Hunt teams for BioMedical Physical Sciences and Engineering buildings.

Photo courtesy of IPF

Connecting energy use to the end user

The Energy Transition Plan recommended that the university explore ways of connecting energy use directly to the user. Consequently, a pilot incentive program was developed and currently has five participating university departments. Infrastructure Planning and Facilities will work with these departments to help identify energy-conservation opportunities within their building space. If the department saves energy, they will be given 50 percent of the energy cost savings resulting from their efforts. The program launched in 2013 and will have its first set of metrics in 2014 to determine its efficacy and success.

ADDITIONAL ENERGY PROGRAMS

Utility billing system

The utility billing system is one of the strategies outlined in the Energy Transition Plan. Implementing a real-time utility billing system with data readily available on the web is expected to provide incentives to reduce consumption based on users understanding the real monthly cost of energy.

Energy and water monitoring

Every major building on campus is controlled through a central energy monitoring system and has smart electrical meters that track energy use in real time. This real-time data is displayed on the energy dashboard and utility billing system. The energy dashboard is online at energydashboard.msu.edu and is viewable by the campus community. The dashboard is used to raise awareness among students about energy consumption in the residence halls. Connecting energy use with the campus community is an important aspect of creating a culture of conservation at MSU.

Water use on campus is monitored by metering the main well pumps that deliver water to the main campus reservoir. The majority of water provided

to main campus comes from the reservoir, with a few buildings being served by local utilities such as the City of East Lansing or Lansing Board of Water and Light.

Safe sustainable labs initiative

Laboratories are energy-intensive spaces, using approximately two-thirds of the total energy consumed at research universities like MSU. Through strategic application of innovative technologies, energy consumption in labs can be reduced significantly with little or no impact to research or safety. Infrastructure Planning and Facilities is working in partnership with Environmental Health and Safety and Facilities Planning and Space Management staff to develop Safe Sustainable Labs, an integrated approach to energy conservation with enhanced safety in research spaces on campus.

As part of this effort, Aircuity's OptiNet system was recently installed to reduce excessive airflow in selected laboratories in Anthony Hall, Biochemistry, Food Science and Molecular Plant Sciences buildings. The system will also be used in the new Bio Engineering Facility. OptiNet is an intelligent demand-control ventilation system that provides continuous measurement and validation of laboratory conditions. This ensures that ventilation and air flow in lab spaces is responsive to the safety needs of users, while allowing energy to be reduced when the lab is not in use.

Better Buildings Challenge

The Better Buildings Challenge (see www4.eere.energy.gov/challenge/home) is a federal initiative through the U.S. Department of Energy that asks the nation's leaders in energy proficiency to be at least 20 percent more energy efficient by 2020. Michigan State University is one of only a handful of university partners to join the challenge and has adopted the challenge for the 20 million square feet of contiguous campus building space.



Infrastructure Planning and Facilities is a major player in meeting the BBC commitment. IPF is embracing its commitment through a variety of tactics, including existing-building commissioning and other energy-conservation measures, revisions to the MSU construction standards that require meeting Leadership in Energy and Environment Design (LEED) guidelines, and through education and outreach efforts led by the Office of Campus Sustainability.

To date, MSU has reduced its average energy-use intensity by 10 percent in 20 million square feet. Energy-use intensity means the total amount of energy used per square foot, including all electrical, lighting, heating and cooling services.

The university uses a unique building profiling system to assess 110 major campus buildings to determine which buildings provide the best opportunity for energy savings. The profiling system uses historical data about the structure

including type, age of systems, energy use per square foot, etc., to determine an “opportunity rank.” The ranking system helps in the selection of target buildings for funding. The existing-building commissioning process is then deployed to the target buildings to achieve the 20-percent reduction.

Anthony Hall (see www4.eere.energy.gov/challenge/showcase/michigan-state-university/anthony-hall) is the first building at MSU to undergo this complete upgrade process and is MSU’s “Showcase Project” in the BBC. Built in 1957, Anthony Hall is a 317,200-square-foot multi-purpose building that houses the Department of Food Science and Human Nutrition as well as the University’s Meats Lab and Dairy Store. The comprehensive energy-efficiency upgrades to Anthony Hall have an expected annual energy savings of 34 percent. The efficiency upgrades are about 95 percent complete with testing and balancing underway for the laboratory controls. The expected completion date is April 30, 2014.

ANTHONY HALL

Anthony Hall has been chosen to serve as the “Showcase Project” in the Better Buildings Challenge.

Photo courtesy of IPF



Integrated Energy Planning Model (IEPM)

One key component of the Better Buildings Challenge is collaboration and problem-solving. Partners are urged to share information that can be replicated by other entities to help them achieve greater energy-efficiency. MSU's Integrated Energy Planning Model was selected by the BBC as MSU's "implementation model" that others may benefit from replicating (www4.eere.energy.gov/challenge/implementation-model/michigan-state-university).

The Integrated Energy Planning Model has been a steady fixture in MSU's energy planning since 2010. The model allows planners to explore a variety of scenarios and predict their impact on cost, reliability, capacity and environmental/

health factors. The IEPM is being updated to include the ability to run optimization scenarios so that MSU can look at optimal solutions with multiple variables.

FUTURE DIRECTIONS

The university has made a significant investment in energy conservation that has led to greenhouse gas emission reductions.

As the university looks to the future, a concrete strategy on how to meet energy needs as the campus grows must be finalized. The campus will continue to add energy intensive research per its mission. Cost-effective, sustainable energy solutions must be implemented to meet those energy needs. Intense investigation into efficiency improvements as well as renewable technologies has been underway and strategies to meet MSU's future energy needs, while staying true to the Energy Transition Plan, will be presented to the MSU Board of Trustees and the Administration this fiscal year.

WASTE REDUCTION



Photo courtesy of IPF

MSU Sustainability manages solid waste through a comprehensive system of reuse, recycling, composting, anaerobic digestion and waste disposal. More than 14 million pounds of university waste were diverted from landfills in fiscal year 2013 with another 4 million pounds of recycling being collected through the public drop-off center.

The MSU Surplus Store has evolved from a small post-World War II campus reuse operation to a multi-million dollar enterprise which sells university materials ranging from art to laboratory

equipment. All university-owned equipment is sent through the Surplus Store per MSU's Manual of Business Procedures. The Surplus Store team collects the materials, assigns value and then uses their marketing expertise to sell the items in the store, via auction or online. Departments receive credit from the sales of the items and community members have access to products at a reasonable cost. From 1999 to 2013, annual revenue has steadily increased from \$400,000 to \$3 million and credits returned to departments have increased from \$100,000 to \$1.2 million.



\$1,268,000

Total returned to departments from the MSU Surplus Store in 2013

In addition to the financial value that the Surplus Store provides to the university, it serves a key role in meeting the waste reduction goals for the university by diverting more than 8 million pounds of waste from the landfill in fiscal year 2013. The Surplus operation diverts a variety of materials – books, clothing, e-waste, equipment, furniture, carpet and more – that would otherwise end up in landfills.

The recycling operation contributes to aggressive waste-reduction goals by collecting recyclables across campus

and the local community via the public drop-off center. More than 6 million pounds of recyclables are collected from campus while the public drop-off center contributes 4 million pounds. The current campus recycling rate (percentage of materials recycled that are recyclable) is 36 percent and the diversion rate (percentage of materials that are diverted from the waste stream) is 56 percent as of end of fiscal year 2013. Through higher diversion rates and increased collection efficiencies annual waste disposal costs have decreased by 87 percent over the past five years.



Photo courtesy of IPF

INFRASTRUCTURE DATA SUPPORT



The Facilities Information Services office within IPF's Engineering and Architectural Services department includes the MSU Geographic Information System (MSUGIS) team. MSUGIS serves as a central repository point for a variety of information with respect to campus infrastructure and operations. Originally developed as a tool to analyze deferred infrastructure maintenance needs (now embodied in the Just-In-Time, or JIT, reporting system), it has been expanded to encompass a wide variety of topics.

MSUGIS is in continual development and focuses on three primary areas: managing the complex data systems that feed into it, maintaining applications in hardware and software to remain compatible with end-user technology, and developing new applications.

EMERGENCY OPERATIONS SUPPORT

MSUGIS plays an important supporting

role in MSU's Emergency Operations Center, providing mapping and data analysis to support administrators and first responders during emergency events. MSUGIS also provides a special reporting capability to the University Physician's office to help identify vulnerable individuals during infectious outbreaks, contamination events or other circumstances where tracking the contact between affected individuals is critical. MSU was fortunate in 2013 to have little need to utilize these capabilities.

BUSINESS CONTINUITY AND DISASTER RECOVERY

Business continuity and disaster recovery was a major focus for MSUGIS in 2013. Operations were thoroughly reviewed and areas of improvement were identified. Additional equipment was acquired to ensure that the backup site in the Emergency Operations Center can sufficiently handle the

operation of MSUGIS if the primary system becomes unavailable during an emergency. Security scanning hardware has been installed that audits the software stack in order to identify and mitigate vulnerabilities in a timely manner. New procedures and software have been implemented to handle change management consistently. Efforts to complete documentation of the back-end systems and associated procedures were started in 2013 and will continue into 2014.

The new version of the Research Emergency Defense Information System (REDIS) went live in 2013. REDIS is a database-backed web application designed to advise first responders of potential hazards in campus facilities (chemical, biological, etc.), to protect the campus community from related hazards, and to protect the university's investment in research. Data entry into the new system is in the early stages, but the feedback to date has been largely positive. Adjustments to the system will continue throughout 2014 to best accommodate the needs of principal investigators and first responders alike. Efforts to integrate with the regional 911 dispatch system will begin when a final determination is made by the county regarding their preferred software.

MAPPING AND WAYFINDING

Throughout 2013 MSUGIS worked with Dr. Richard Enbody and his team of engineering students from the Computer Science and Engineering department on the development of a mobile wayfinding application. Dr. Enbody's team is working on an application for both Android and IOS devices to help students, faculty, staff and visitors find their way around campus. The primary target audience for this application is users with special needs, particularly the visually impaired. The effort is being conducted in coordination with the Resource Center for Persons with Disabilities. MSUGIS is

providing a custom data feed service, built to the team's specifications, that the application relies upon.

FUTURE DIRECTIONS

Facilities Information Services will collaborate with Facilities Planning and Space Management (FPSM) to create an interior mapping tool. Initially this tool will be developed to serve FPSM's need to provide departmental representatives access to floor-plan drawings and room-allocation data in an intuitive manner. This access will allow those representatives to enter their own departmental and personnel space assignment information with the goal of managing a much more accurate space inventory. The tool will be developed in such a way that it will be reusable, and will be incorporated into REDIS to allow for visual drag-and-drop inventory editing. This tool, like many others provided by MSUGIS since its inception, will depend heavily upon the data, drawings, and services managed by Facilities Information Services.

MSUGIS is also working with Communications and Brand Strategy (CABS), Information Technology Services (ITS) and others to completely revamp the maps provided at www.maps.msu.edu. MSUGIS took on the responsibility of producing both the interactive and PDF maps that CABS publishes. The new maps will be updated regularly to ensure that the most accurate information is published.

Additionally, MSUGIS and Facilities Information Services staff is collaborating with the IPF Communications department to enhance the functionality of IPF's construction detour maps. The new interactive construction detour application at <http://gis.msu.edu/detours> will make it easier for the campus community to access accurate, timely detour information.

APPENDIX A:

ANNUAL CONSTRUCTION REPORT

The Annual Construction Report, as requested by the Board of Trustees, includes construction projects that have been completed and project accounts that have been closed.

Major capital projects are those that are \$1 million or greater and require Board approval. Minor capital projects are those that are greater than \$250,000 and less than \$1 million. The Board requests a listing of these projects on an annual basis. In addition to the annual report, the Board receives quarterly construction reports reflecting current construction projects.

This report highlights two key areas for the 19 major capital projects that were closed during fiscal year 2012-13. These areas include planned budget and actual cost of the project.

The following table also includes data for the 25 minor capital projects that were closed during the fiscal year.

The approved budgets for the projects totaled nearly \$237 million. The final cost of these projects was above \$226 million, a difference of approximately \$10.5 million, or 4.5 percent, which was returned to the appropriate units.

| Capital Project Number | Capital Project Name | Project Type | Close Date | Consultant | Contractor | Delivery Method | Authorized Budget | Final Cost |
|------------------------|---------------------------------------------------------------------------------|--------------|------------|------------------|----------------------------|-----------------|-------------------|--------------|
| CP06263 | THE SECCHIA CENTER | MAJOR | 9/21/2012 | URS/ELLENZWEIG | THE CHRISTMAN COMPANY | CM | \$87,000,000 | \$85,851,980 |
| CP04085 | WHARTON CENTER FOR PERFORMING ARTS - ADDITION NO. 1 AND NO. 2 - AND RENOVATIONS | MAJOR | 11/28/2012 | TMP | THE CHRISTMAN COMPANY | CM | \$18,630,000 | \$18,623,419 |
| CP07491 | CYCLOTRON - OFFICE AND LOW ENERGY RESEARCH ADDITIONS | MAJOR | 5/10/2013 | HARLEY ELLIS | GRANGER CONSTRUCTION | CM | \$18,600,000 | \$18,276,897 |
| CP07177 | T.B.SIMON - FUEL HANDLING MODIFICATIONS & CONSTRUCT COAL STORAGE BLDG. | MAJOR | 4/29/2013 | BLACK AND VEATCH | EAS | CM | \$18,500,000 | \$17,205,939 |
| CP06591 | EMMONS HALL - RENOVATION | MAJOR | 5/15/2013 | DESIGN PLUS | CLARK CONSTRUCTION | GC | \$13,800,000 | \$13,661,513 |
| CP06166 | MSU SURPLUS STORE & RECYCLING CENTER | MAJOR | 3/19/2013 | FTC&H | IRISH CONSTRUCTION COMPANY | GC | \$13,300,000 | \$13,182,463 |

| Capital Project Number | Capital Project Name | Project Type | Close Date | Consultant | Contractor | Delivery Method | Authorized Budget | Final Cost |
|------------------------|----------------------------------------------------------------------------------------------------|--------------|------------|-----------------------|----------------------------|-----------------|-------------------|-------------|
| CP06520 | STEAM DISTRIBUTION AND ROAD RECONSTRUCTION - WILSON AND BIRCH ROADS | MAJOR | 11/15/2012 | FTC&H | CLARK CONSTRUCTION COMPANY | GC | \$10,000,000 | \$9,448,232 |
| CP08464 | CHERRY LANE/FACULTY BRICKS APARTMENTS - DEMOLITION | MAJOR | 11/13/2012 | FLEIS AND VANDENBRINK | E.T MACKENZIE | GC | \$7,146,577 | \$4,198,045 |
| CP10057 | CYCLOTRON - FRIB UTILITY RELOCATION PHASE 1 | MAJOR | 10/24/2012 | SMITH GROUP | CHRISTMAN COMPANY | CM | \$6,008,500 | \$5,841,928 |
| CP10159 | CYCLOTRON - ADDITION 15 - NEW HIGHWAY ADDITION | MAJOR | 2/15/2013 | URS | SKANSKA | CM | \$5,800,000 | \$5,381,322 |
| CP08181 | OLD COLLEGE FIELD RENOVATIONS - PHASE III - BASEBALL | MAJOR | 10/10/2012 | HAMILTON ANDERSON | BARTON MALOW | CM | \$4,384,000 | \$4,381,592 |
| CP07086 | STEAM/WATER/COM DISTRIBUTION - REPAIRS AND IMPROVEMENTS - PHYSICAL PLANT/GROUNDS/DPPS/AUDIO/SPEECH | MAJOR | 11/27/2012 | FTC&H | IRISH CONSTRUCTION | GC | \$4,300,000 | \$3,920,874 |
| CP07089 | STEAM DIST - STEAM TUNNEL TO SPARTAN STADIUM & CENTRAL SERVICES - 2011 | MAJOR | 11/28/2012 | FTC&H | IRISH CONSTRUCTION | CM | \$3,000,000 | \$2,510,354 |
| CP07023 | KELLOGG CENTER - CULINARY MANAGEMENT EDUCATION LABORATORY RENOVATIONS | MAJOR | 3/8/2013 | TMP | EAS | CM | \$2,600,000 | \$2,445,433 |
| CP08181 | OLD COLLEGE FIELD RENOVATIONS - PHASE III - BASEBALL | MAJOR | 10/10/2012 | HAMILTON ANDERSON | BARTON MALOW | CM | \$4,384,000 | \$4,381,592 |

| Capital Project Number | Capital Project Name | Project Type | Close Date | Consultant | Contractor | Delivery Method | Authorized Budget | Final Cost |
|------------------------|-------------------------------------------------------------------------------------|--------------|------------|-------------------|------------------------------------|-----------------|-------------------|-------------|
| CP07170 | ROADS - EAST CIRCLE DRIVE (BETWEEN STUDENT SERVICES AND BERKEY HALL) RECONSTRUCTION | MAJOR | 2/21/2013 | HAMILTON ANDERSON | BARTON MALOW | CM | \$2,390,000 | \$2,374,520 |
| CP09108 | BRODY COMPLEX - UTILITY INFRASTRUCTURE IMPROVEMENTS - PHASE 3 | MAJOR | 1/16/2013 | FTC&H | GRANGER CONSTRUCTION | GC | \$2,350,001 | \$1,959,684 |
| CP08355 | SPARTAN STADIUM - ALTERATIONS TO VARIOUS ROOMS ON LEVELS 200 AND 300 | MAJOR | 3/1/2013 | EAS | IPF - PROJECT SERVICES | DB | \$2,200,000 | \$2,094,644 |
| CP08042 | DOBIE TOWER TV & FM TRANSMITTING - REPLACEMENT OF TOWER FOR WKAR TV/WKAR FM | MAJOR | 11/26/2012 | KPFF | ELECTRONICS RESEARCH, INC. | GC | \$2,200,000 | \$1,658,602 |
| CP09306 | HANNAH ADMINISTRATION - GROUND FLOOR ASBESTOS ABATEMENT | MAJOR | 8/14/2012 | BERNATH COAKLEY | CERTIFIED ABATEMENT SERVICES, INC. | GC | \$2,000,000 | \$1,775,589 |
| CP12158 | STEAM DISTRIBUTION - EMERGENCY REPAIRS TO VAULT 121 AND VAULT 60 | MINOR | 5/8/2013 | FTCH | EAS | CM | \$980,000 | \$828,923 |
| CP10338 | SHAW HALL - ELEVATOR REPLACEMENT | MINOR | 5/15/2013 | BERNATH-COAKLEY | DOBIE CONSTRUCTION | GC | \$950,000 | \$921,368 |
| CP09337 | HOLDEN HALL - NEW DINING PLATFORM UPGRADES | MINOR | 10/9/2012 | EAS | EAS | CM | \$950,000 | \$831,048 |
| CP11163 | BRODY COMPLEX - UTILITY IMPROVEMENTS - PHASE IV | MINOR | 5/8/2013 | FTC&H | CLARK | GC | \$850,500 | \$761,724 |

| Capital Project Number | Capital Project Name | Project Type | Close Date | Consultant | Contractor | Delivery Method | Authorized Budget | Final Cost |
|------------------------|----------------------------------------------------------------------------------------------------|--------------|------------|---------------------------------|----------------------------|-----------------|-------------------|------------|
| CP08460 | KEDZIE HALL - MASONRY RESTORATION | MINOR | 10/26/2012 | WIGEN, TICKNELL, MEYER & ASSOC. | RENAISSANCE RESTORATION | GC | \$850,000 | \$821,984 |
| CP10237 | HUBBARD HALL - RENOVATE ROOMS G23 AND G24 | MINOR | 2/27/2013 | | MOORE TROSPER CONSTRUCTION | GC | \$700,000 | \$667,090 |
| CP10345 | MCDONEL HALL - ROOF REPLACEMENT | MINOR | 10/15/2012 | ROOFING TECHNOLOGIES | MID-MICHIGAN ROOFING | GC | \$656,000 | \$573,420 |
| CP10155 | ENGINEERING RESEARCH COMPLEX - INSTALL THERMAL CHAMBER IN ROOM E131 | MINOR | 10/9/2012 | DSD | LAUX CONSTRUCTION | GC | \$630,000 | \$601,952 |
| CP07275 | CHEMISTRY - FIRE ALARM UPGRADES | MINOR | 11/20/2012 | . | CENTENNIAL ELECTRIC | CM | \$497,000 | \$447,175 |
| CP10346 | HUBBARD HALL - ROOF REPLACEMENT | MINOR | 8/3/2012 | ROOFING TECHNOLOGY ASSOCIATES | LADUKE ROOFING | GC | \$495,000 | \$434,992 |
| CP10254 | STEAM DIST.- N. CAMPUS SUBST. TO HUMAN ECOLOGY - REPAIRS TO STEAM PIPING SUPPORTS AND ARCH TUNNEL. | MINOR | 11/15/2012 | EAS | IPF - PROJECT SERVICES | GC | \$450,000 | \$439,493 |
| CP11060 | PARKING RAMPS 2 (AUDITORIUM RD) AND 5 (COMM ARTS) - RESTORATION AND TESTING | MINOR | 10/25/2012 | WALKER PARKING | RAM CONSTRUCTION SERVICES | GC | \$440,000 | \$287,514 |
| CP11148 | HUBBARD HALL - ROOF REPLACEMENT AREAS 8 AND 9 | MINOR | 3/4/2013 | ROOFING TECHNOLOGY | BORNOR RESTORATION | GC | \$430,000 | \$399,193 |
| CP11362 | SPARTAN VILLAGE COMPLEX - ROOF REPAIR - VARIOUS BLDGS | MINOR | 1/17/2013 | RTA | MID MICHIGAN ROOFING | GC | \$400,000 | \$425,669 |
| CP08474 | PARKING - IPF STORAGE BUILDINGS 1 & 2 - PARKING LOT IMPROVEMENTS | MINOR | 1/7/2013 | EAS | IPF-LANDSCAPE SERVICES | GC | \$400,000 | \$399,690 |

| Capital Project Number | Capital Project Name | Project Type | Close Date | Consultant | Contractor | Delivery Method | Authorized Budget | Final Cost |
|------------------------|------------------------------------------------------------------------------------------------------|--------------|------------|------------|---------------------------|-----------------|-------------------|------------|
| CP09310 | COMM. DIST. - INSTALL COMM DUCTLINE UNDER HARRISON RD. | MINOR | 11/27/2012 | FTC&H | GRANGER | GC | \$400,000 | \$225,762 |
| CP10253 | STEAM DISTRIBUTION - VAULT 95 WEST OF MUSIC TO VAULT 86 - REPAIR STRUCTURAL ANCHORS FOR STEAM PIPING | MINOR | 11/16/2012 | EAS | IPF - PROJECT SERVICES | GC | \$400,000 | \$326,158 |
| CP11144 | FOOD SCIENCE BUILDING - LAB AND OFFICE ALTERATIONS - BASEMENT, FIRST AND SECOND LEVELS | MINOR | 5/28/2013 | EAS | NIELSEN | GC | \$327,000 | \$367,384 |
| CP11057 | LIFE SCIENCE - RENOVATE ROOMS B200, B203 AND B208 | MINOR | 11/20/2012 | TMP | NIELSEN COMMERCIAL CONST. | GC | \$308,000 | \$295,274 |
| CP05081 | ENGINEERING BUILDING - NEW CARD READERS ON EXTERIOR AND MECH ROOM DOORS | MINOR | 10/17/2012 | EAS | IPF - PROJECT SERVICES | GC | \$305,000 | \$276,464 |
| CP10334 | LIFE SCIENCE - ALTERATIONS TO ROOMS B205 AND B205A | MINOR | 11/20/2012 | TMP/PBA | NIELSEN COMMERCIAL CONST. | GC | \$296,000 | \$278,372 |
| CP11361 | FOOD STORES - REPLACE ROOF #3 | MINOR | 4/10/2013 | RTA | BORNOR | GC | \$275,000 | \$252,495 |
| CP08366 | ENGINEERING BUILDING - RENOVATE ROOM 3515 | MINOR | 3/5/2013 | | NIELSEN | GC | \$266,000 | \$247,993 |
| CP10336 | WELLS HALL A-WING-MATH LEARNING CTR | MINOR | 4/16/2013 | | J. PEREZ CONSTRUCTION | GC | \$259,900 | \$285,129 |
| CP10264 | COLLEGE OF OSTEOPATHIC MED - DETROIT MED CENTER - EXAM ROOM RENOVATIONS | MINOR | 8/8/2012 | IDS | COMDEC | GC | \$220,000 | \$206,774 |

Closed capital projects for fiscal year 2012-13

| Budget for Closed Projects | FY 08-09 | FY 09-10 | FY 10-11 | FY 11-12 | FY 12-13 |
|-----------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Authorized Budget: | \$206,398,900 | \$139,244,363 | \$84,843,838 | \$52,410,475 | \$236,944,478 |
| Final Cost: | \$198,930,659 | \$132,931,212 | \$80,362,824 | \$48,451,752 | \$226,396,069 |
| Total Returned: | \$14,890,367 | \$6,313,151 | \$4,481,014 | \$3,958,723 | \$10,548,409 |
| Total % Returned: | 7.2% | 4.5% | 5.3% | 7.6% | 4.5% |
| Contract: | \$164,066,096 | \$109,341,206 | \$59,054,199 | \$33,789,257 | \$155,668,557 |
| Number of Projects Closed | 59 | 48 | 41 | 41 | 44 |

APPENDIX B: REAL PROPERTY HOLDINGS



Photo courtesy of IPF

Leeland Art School, Long-term lease with MSU

**Prepared by:
Land Management Office**

Real Property Holdings - Table of Contents

MICHIGAN STATE UNIVERSITY

As of July 1, 2013

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Real Property Holdings - Real Estate Facts

MICHIGAN STATE UNIVERSITY

As of July 1, 2013

Summary of Acres

- Michigan State University (MSU) lands comprise 25,499.978 acres.
- Main campus lands (North of Mt. Hope) comprise 2,055.702 acres.
- Research, education, and outreach lands (South of Mt. Hope) comprise 2,743.667 acres.
- The golf course is 325 acres.
- Campus lands leased to others include 74.116 acres.
- Off-campus properties include 20,295.015 acres.
- Property for sale comprise 2.140 acres (included in off-campus total).

Acreage Changes

- MSU purchased approximately 3.260 acres on Hagadorn Road to provide the new site for the Community Music School.
- MSU purchased approximately 7.768 acres in Grand Rapids for College of Human Medicine expansion.
- Approximately 2.250 acres in Barry County were gifted to MSU and will be used as a research support site.
- Approximately 1.290 acres of Morris Property were sold.

Long-Term Leases

- Leases of a term of ten years or greater require Board of Trustee approval. No long-term leases were entered into during the period July 1, 2012 through June 30, 2013.

State Building Authority Projects

- MSU has four State Building Authority bond-financed projects. The project site is deeded to the State Building Authority and leased back to MSU. Current projects are: Anthony Hall Dairy Plant and Meat Lab (to be repaid 2032); Biomedical and Physical Sciences Building (to be repaid 2037); Diagnostic Center for Population and Animal Health (to be repaid 2040); and the Chemistry Building renovation project (to be repaid 2043). State Building Authority bonds are typically issued for 35 years but the State may retire them before their maturity date.

Agreement to Restore Title

- A 50-year lease between MSU and the State of Michigan was entered into February 1956 for approximately six acres on Harrison Road. The Department of Agriculture constructed a lab on the parcel known as the Geagley Laboratory. In 2002, the parcel was deeded to the State of Michigan in order for the State to convey the property to the State Building Authority to obtain bond financing for needed improvements. Title was restored to MSU on May 6, 2013. A new long-term lease is being developed.

Notice fo Federal Intent

- The National Institutes of Health awarded MSU a grant for the Life Sciences Complex: Nursing Research Addition. The award terms and conditions include restrictions on property usage for 10 years (anticipated to be December 2022). The property may not be (1) used for any purposes inconsistent with the authorized grant program, (2) mortgaged, or (3) sold or transferred to another party. The entire Notice of Federal Intent is on file in the Land Management Office.

Real Property Holdings - Summary

MICHIGAN STATE UNIVERSITY

As of July 1, 2013

| <u>PROPERTY</u> | <u>ACRES</u> | |
|-----------------------------------------------------|--------------------------------------|-------------------|
| East Lansing Campus | | |
| North of Mt. Hope | 2,055.702 | |
| Golf Course | 325.000 | |
| Research, Education, and Outreach south of Mt. Hope | 2,743.667 | |
| Campus Property Leased to Others | 74.116 | |
| | | |
| | Total Campus Acres | 5,198.485 |
| | | |
| Off-Campus | 20,303.743 | |
| | | |
| | Total Deeded Acres | 25,502.228 |
| | | |
| Property Leased to MSU Long-Term | 219.000 | |
| | | |
| | Total Leased and Deeded Acres | 25,721.228 |

Real Property Holdings - Acquisitions and Properties Sold

MICHIGAN STATE UNIVERSITY

July 1, 2012 - June 30, 2013

ACQUISITIONS

ACRES

Property: University Reform Church Property 3.260
4930 and 4950 S. Hagadorn Road
East Lansing, Michigan 48823
Ingham County

Acquisition Date: 10/2/2102
Purchase Price: \$1,300,000.00
How Acquired: Purchase

Property: Grand Rapids Press 7.768
155 Michigan Street NW
432 Monroe Street NW
533 Monroe Street NW
544 Monroe Street NW
601 Monroe Street NW
601 Ionia Street NW
Grand Rapids, Michigan
Kent County

Acquisition Date: 9/12/2012
Purchase Price: \$12,000,000.00
How Acquired: Purchase

Property: Marshall Property 2.250
1006 W. Hickory Road
Hickory Corners, Michigan
Barry County

Acquisition Date: 6/27/2013
Property Value: \$95,000.00
How Acquired: Gift

Real Property Holdings - Acquisitions and Properties Sold

MICHIGAN STATE UNIVERSITY

July 1, 2012 - June 30, 2013

PROPERTY SOLD

ACRES

| | | |
|-------------|------------------------------------------------------------------------------|-------|
| Property: | Morris Property Vacant Land Eagle Township, Michigan Clinton County | 1.290 |
| Sale Date: | 8/22/2012 | |
| Sale Price: | \$33,000.00 | |

PROPERTY FOR SALE

ACRES

| | | |
|-----------|-----------------|-------|
| Property: | Gantos Property | 2.140 |
|-----------|-----------------|-------|

Real Property Holdings - Active Mineral Leases

MICHIGAN STATE UNIVERSITY

As of July 1, 2013

MSU owns the Martin Property, the Management Education Center, and Hidden Lake Gardens. The Mancelona Property, Homer Nowlin Property, and Merillat Property were sold; MSU retained the mineral rights on those properties.

| <u>PROPERTY</u> | <u>ACRES</u> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Mancelona Property (MSU owns mineral rights) Section 16, Mancelona Township, Antrim County Leased to Mercury Exploration Co. Lease is continued with producing well | 31.400 |
| Martin Property (Rose-Dell Seed Orchard, MSU owns surface and mineral rights) Sections 23 and 24, Albion Township, Calhoun County Leased to West Bay Exploration Three-year lease (commenced December 2007) | 160.000 |
| Homer Nowlin Property (MSU owns mineral rights) Sections 28 and 23, Rich Township, Lapeer County Leased to Total Petroleum, Inc. Lease is continued with producing well | 313.000 |
| Management Education Center (MSU owns surface and mineral rights) Section 9, Troy Township, Oakland County Leased to West Bay Exploration Company Lease is continued with producing well | 24.320 |
| Hidden Lake Gardens (MSU owns 750.265 surface acres and 712.655 mineral acres) Sections 17, 18, 19, and 20, Liberty Township, Lenawee County Leased to West Bay Exploration Company Three-year lease (commenced August 2009 - lease extended for an additional three years) | 712.256 |
| Merillat Property (MSU owns mineral rights) Section 29, Adrian Township, Lenawee County Leased to Savoy Energy, L.P. Three-year lease (commenced August 2010) | 80.000 |
| VanHoosen Jones Property (MSU owns mineral rights) Sections 1, 2, 11, 12, Avon Township, Oakland County Leased to West Bay Exploration Company Three-year lease (commenced April 2013) | 344.520 |

Total Acres Under Mineral Leases

1,665.496

Real Property Holdings - Mineral Rights Reserved on Sold Properties

MICHIGAN STATE UNIVERSITY

As of July 1, 2013

| <u>PROPERTY</u> | <u>ACRES</u> |
|-------------------------------------------------------------|---------------------|
| Allegan County | |
| Section 21, Saugatuck Township | 53.275 |
| Antrim County | |
| Section 16, Mancelona Township | 29.900 |
| Clinton County | |
| Section 22, Eagle Township | 24.000 |
| Sections 22 & 27, Eagle Township | 61.300 |
| Section 26, Eagle Township | 1.290 |
| Section 34, Eagle Township | 2.700 |
| Delta County | 4.040 |
| Section 17, Wells Township | |
| Ingham County | 20.369 |
| Section 1, Delhi Township | |
| Lapeer County | |
| Section 28, Rich Township | 10.000 |
| Section 33, Rich Township | 303.000 |
| Lenawee County | |
| Section 29, Adrian Township | 80.000 |
| Monroe County | |
| Section 21, Milan Township | 80.000 |
| Oakland County | |
| Sections 2, 11, 12, Avon Township | 234.434 |
| Section 32, Bloomfield Township | 5.000 |
| Ontonagon County | |
| Section 6, Bohemia Township; Section 12, Greenland Township | 78.000 |
| Section 23, Bohemia Township | 40.000 |

Real Property Holdings - Mineral Rights Reserved on Sold Properties - continued

MICHIGAN STATE UNIVERSITY

As of July 1, 2013

| | |
|----------------------------------|--------|
| VanBuren County | |
| Section 6, Geneva Township | 29.000 |
| Section 23, South Haven Township | 53.230 |

Total Mineral Acres Reserved: 1,109.538

Real Property Holdings - Gas and Oil Royalty Income

MICHIGAN STATE UNIVERSITY

As of July 1, 2013

Mancelona Property

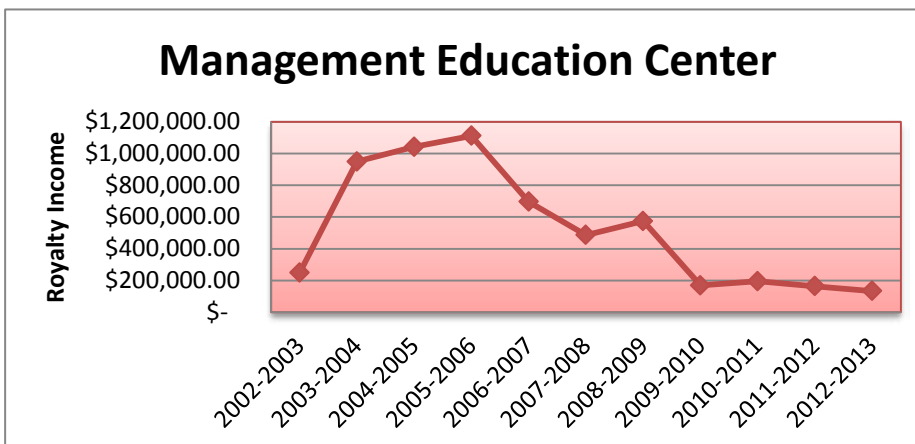
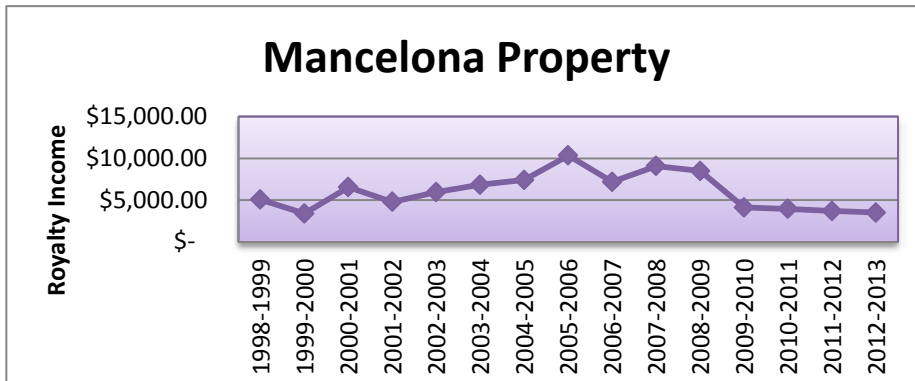
(Income funds the Land Fund Account)

| | |
|-----------|--------------|
| 1998-1999 | \$ 5,068.62 |
| 1999-2000 | \$ 3,390.42 |
| 2000-2001 | \$ 6,547.95 |
| 2001-2002 | \$ 4,789.45 |
| 2002-2003 | \$ 5,958.69 |
| 2003-2004 | \$ 6,833.60 |
| 2004-2005 | \$ 7,415.27 |
| 2005-2006 | \$ 10,337.62 |
| 2006-2007 | \$ 7,192.83 |
| 2007-2008 | \$ 9,082.79 |
| 2008-2009 | \$ 8,484.09 |
| 2009-2010 | \$ 4,114.23 |
| 2010-2011 | \$ 3,941.64 |
| 2011-2012 | \$ 3,691.88 |
| 2012-2013 | \$ 3,512.94 |

Management Education Center

(Income funds Eli Broad College of Business Programs)

| | |
|-----------|-----------------|
| 2002-2003 | \$ 248,679.62 |
| 2003-2004 | \$ 949,191.09 |
| 2004-2005 | \$ 1,041,242.41 |
| 2005-2006 | \$ 1,111,581.83 |
| 2006-2007 | \$ 695,627.95 |
| 2007-2008 | \$ 486,734.28 |
| 2008-2009 | \$ 573,939.94 |
| 2009-2010 | \$ 169,303.36 |
| 2010-2011 | \$ 195,046.47 |
| 2011-2012 | \$ 164,242.13 |
| 2012-2013 | \$ 134,223.59 |



Real Property Holdings - Gas and Oil Royalty Income

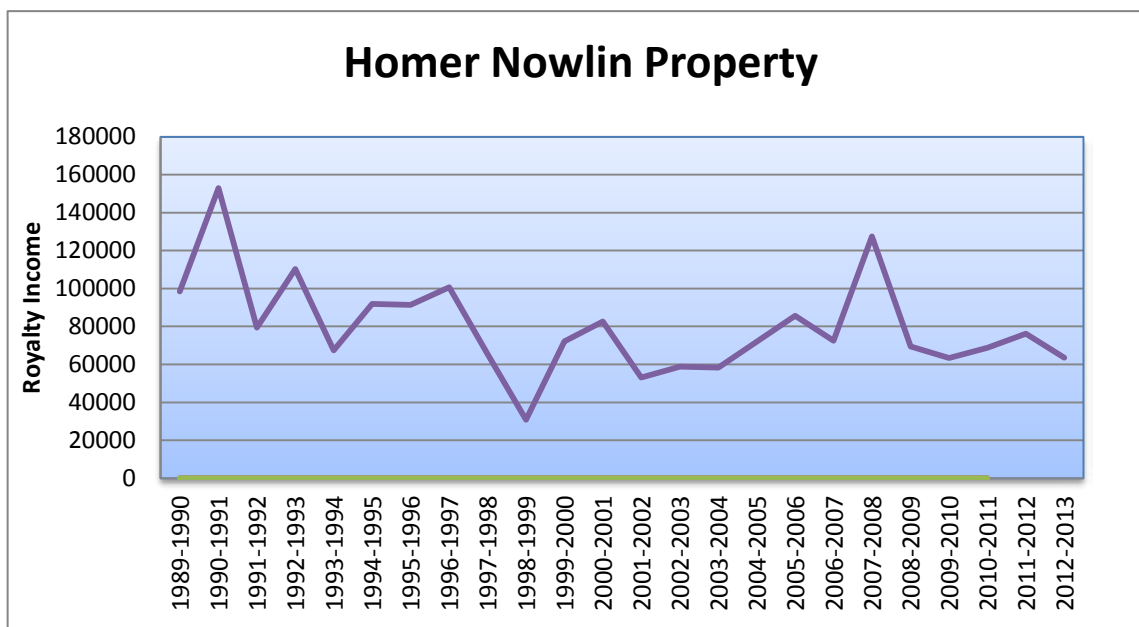
MICHIGAN STATE UNIVERSITY

As of July 1, 2013

Homer Nowlin Property

(Income funds endowed chair in the College of Agriculture and Natural Resources)

| | | |
|-----------|----|------------|
| 1989-1990 | \$ | 98,404.78 |
| 1990-1991 | \$ | 153,008.72 |
| 1991-1992 | \$ | 79,323.99 |
| 1992-1993 | \$ | 110,311.26 |
| 1993-1994 | \$ | 67,355.68 |
| 1994-1995 | \$ | 91,965.81 |
| 1995-1996 | \$ | 91,421.59 |
| 1996-1997 | \$ | 100,641.83 |
| 1997-1998 | \$ | 65,468.04 |
| 1998-1999 | \$ | 30,788.53 |
| 1999-2000 | \$ | 72,118.88 |
| 2000-2001 | \$ | 82,535.99 |
| 2001-2002 | \$ | 53,000.00 |
| 2002-2003 | \$ | 58,819.50 |
| 2003-2004 | \$ | 58,386.86 |
| 2004-2005 | \$ | 71,997.24 |
| 2005-2006 | \$ | 85,676.23 |
| 2006-2007 | \$ | 72,534.18 |
| 2007-2008 | \$ | 127,494.63 |
| 2008-2009 | \$ | 69,521.30 |
| 2009-2010 | \$ | 63,304.32 |
| 2010-2011 | \$ | 68,704.58 |
| 2011-2012 | \$ | 76,248.53 |
| 2012-2013 | \$ | 63,548.88 |



Real Property Holdings - Leased/Licensed Properties

MICHIGAN STATE UNIVERSITY

As of July 1, 2013

Leases of 10 years or longer require MSU Board of Trustee approval. The following leases meet that criteria. Only real property leases are included in the Real Property Holdings annual report.

| <u>MSU as TENANT</u> | <u>ACRES</u> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Northwest Michigan Horticultural Research Center Administrative Unit: College of Agriculture and Natural Resources Department of Horticulture MSU Extension | 100.000 |
| Tollgate Education Center Administrative Unit: College of Agriculture and Natural Resources Land Management Office MSU Extension | 100.000 |
| MSU Forest Biomass Innovation Center Administrative Unit: College of Agriculture and Natural Resources Department of Forestry | 9.000 |
| MSU Forest Biomass Innovation Center Administrative Unit: College of Agriculture and Natural Resources Department of Forestry | 10.000 |
| Total Leased Acres: | 219.000 |

Real Property Holdings - Leased/Licensed Properties

MICHIGAN STATE UNIVERSITY

As of July 10, 2013

Leases of 10 years or longer require MSU Board of Trustee approval. The following leases meet that criteria. Only real property leases are included in the Real Property Holdings annual report.

| <u>TENANT</u> | <u>MSU PROPERTY</u> | <u>ACRES</u> |
|---------------------------------------------|---------------------------------------------------|------------------|
| Prairieville Township | Lux Arbor Reserve | 0.800 |
| Berrien County Extension Service | Southwest Michigan Research & Extension Center | 1.380 |
| Cass County Historical Commission | Russ Forest | 1.800 |
| Cass County Park & Recreation Commission | Russ Forest | 14.000 |
| Marcellus Community School | Russ Forest | 21.450 |
| Department of Natural Resources | Dunbar Forest | 9.400 |
| MSU Federal Credit Union | Campus | 4.711 |
| MSU Federal Credit Union | Campus | 3.960 |
| Sewage Plant | Campus | 16.500 |
| Consumers Energy | Campus | 0.100 |
| Northstar Cooperative, Inc. | Campus | 9.710 |
| University Rehabilitation Alliance | Campus | 35.000 |
| Candlewood/Vista I, LLC | Campus | 3.235 |
| LBWL/METC | Campus | 0.900 |
| Gull Lake Bible Conference | Kellogg Biological Station | 10.000 |
| Sherman Lake YMCA (License) | Brook Lodge | 415.000 |
| Sherman Lake YMCA (Lease) | Brook Lodge | 40.000 |
| Leland Township | Leland Property | 0.700 |
| Avon Players | VanHoosen Jones | 1.793 |
| Pete Clark | Morris Property | 1,385.000 |
| | Total Acres Leased/Licensed to Others: | 1,975.439 |

Real Property Holdings - Inventory

MICHIGAN STATE UNIVERSITY

As of July 1, 2013

BioEconomy Research and Development Center Holland, Ottawa County

| Purpose | Status | Acres |
|-----------------------------------------------------|---------------------------------------|--------------|
| Research | Active | 6.300 |
| | Land use or resource use restrictions | |
| Administrator | Comment | |
| Vice President for Research and Graduate Studies | None | |

Brook Lodge Augusta, Kalamazoo County

| Purpose | Status | Acres |
|--------------------------------------------------------|-----------------------------------------------------|--------------|
| Conference center, teaching, research, and outreach | Inactive | 633.240 |
| Administrator | Comment | |
| Kellogg Center Land Management Office | Long term lease on 40 acres to Sherman Lake YMCA | |

Clarksville Research Center Clarksville, Ionia County

| Purpose | Status | Acres |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------|
| Horticulture research on small fruit and tree fruit | Active | 440.000 |
| Administrator | Comment | |
| Department of Horticulture Land Management Office | AgBioResearch Field Research Center Coordinator: Dr. Doug Buhler Farm Manager: Gerald Skeltis | |

Dobie Road Okemos, Ingham County

| Purpose | Status | Acres |
|------------------------|------------------------------------------|--------------|
| WKAR Broadcasting Site | Active | 114.431 |
| Administrator | Comment | |
| Land Management Office | Location of WKAR tower T-Mobile tower | |

Real Property Holdings - Inventory

MICHIGAN STATE UNIVERSITY

As of July 1, 2013

Dunbar Forest Sault Ste. Marie, Chippewa County

| Purpose | Status | Acres |
|--------------------------------------------------|----------------------------------------------------------------|--------------|
| Forest research and demonstration | Active | 5,759.815 |
| | Title restricted on 4,668.84 acres | |
| | Land reverts to State if not used solely for forestry purposes | |
| Administrator | Comment | |
| Department of Forestry Land Management Office | AgBioResearch Field Research Center | |

Forest Biomass Innovation Center Escanaba, Delta County

| Purpose | Status | Acres |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------|--------------|
| Research and demonstration in forestry and crops | Active | 1,745.400 |
| Administrator | Comment | |
| Department of Forestry Land Management Office | AgBioResearch Field Research Center Coordinator: Dr. David McFarlane Resident Forester: Dr. Ray Miller | |

Gantos Property City of Kentwood, Kent County

| Purpose | Status | Acres |
|------------------------|----------------------|--------------|
| Donation for resale | Property is for sale | 2.140 |
| Administrator | Comment | |
| Land Management Office | None | |

Hidden Lake Gardens Tipton, Lenawee County

| Purpose | Status | Acres |
|----------------------------------|-----------------|--------------|
| Arboretum and plant conservatory | Active | 756.618 |
| Administrator | Comment | |
| Land Management Office | Manager: Vacant | |

Real Property Holdings - Inventory

MICHIGAN STATE UNIVERSITY

As of July 1, 2013

Hulett Road Engineering Okemos, Ingham County

| Purpose | Status | Acres |
|-------------------------------------------------------------------|----------------|--------------|
| Former facilities and site for College of Engineering research | Active | 5.691 |
| Administrator | Comment | |
| Land Management Office | None | |

Human Medicine, College of Grand Rapids, Kent County

| Purpose | Status | Acres |
|---------------------------|---------------------------------------------------------------------|--------------|
| Medical School | Active | 9.503 |
| Administrator | Comment | |
| College of Human Medicine | Includes Condominium #5 | |
| Land Management Office | Includes Condominium #29 (Parking Spots) .005 acres sold to MDOT | |

Jolly Road Engineering Okemos, Ingham County

| Purpose | Status | Acres |
|------------------------------------------------------------|----------------|--------------|
| Facilities and site for College of Engineering research | Active | 3.260 |
| Administrator | Comment | |
| College of Engineering Land Management Office | None | |

Real Property Holdings - Inventory

MICHIGAN STATE UNIVERSITY

As of July 1, 2013

Kellogg, W.K. Biological Station (Including Farm and Bird Sanctuary) Hickory Corners, Kalamazoo County

| Purpose | Status | Acres |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Teaching, research, and extension activities in the environmental sciences focusing on the interdependence of natural and managed landscapes. The programs treat integrated study of biology, wildlife, and production agriculture, including animal input. | Active Title on original gift restricted. Property needs to be maintained and operated for educational purposes. | 1,690.850 |
| Administrator | Comment | |
| Director, Biological Station College of Agriculture & Natural Resources College of Natural Science Land Management Office | AgBioResearch Field Research Center Director: Dr. Katherine Gross Farm Manager: Jim Bronson Bird Sanctuary Coordinator: Tracey Kast Farm Acreage: 944.674 Bird Sanctuary Acreage: 746.176 4.92 acres acquired in 2009 | |

Kellogg, W.K. Biological Station Lux Arbor Reserve Delton, Barry County

| Purpose | Status | Acres |
|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------|
| Research and education in the agricultural, biological, botanical, and horticulture sciences | Active | 1,323.000 |
| Administrator | Comment | |
| Same as Kellogg Biological Station | Included with Kellogg Biological Station as an Agricultural Research Station Farm Manager: Steve Norris | |

Kellogg, W.K. Experimental Forest Augusta, Kalamazoo County

| Purpose | Status | Acres |
|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------|
| Forestry research, teaching, demonstration, and public use | Active Title restricted on 280 acres. To be used for reforestation, education, and experimental purposes | 715.995 |
| Administrator | Comment | |
| Department of Forestry Land Management Office | AgBioResearch Field Research Center Coordinator: Dr. David McFarlane Resident Forester: Greg Kowalewski | |

Real Property Holdings - Inventory

MICHIGAN STATE UNIVERSITY

As of July 1, 2013

Lake City Research Center Lake City, Missaukee County

| Purpose | Status | Acres |
|------------------------------------------------|---------------|--------------|
| Research in beef cattle, forages, and potatoes | Active | 810.010 |

| Administrator | Comment |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Department of Animal Science Land Management Office | AgBioResearch Field Research Center Coordinator: Dr. Jason Rountree Farm Manager: Doug Carmichael |

Leland Property Leland, Leelanau County

| Purpose | Status | Acres |
|------------------------------------|---------------|--------------|
| Long-term lease to Leland Township | Active | 0.700 |

| Administrator | Comment |
|------------------------|----------------|
| Land Management Office | None |

MacCready Forest and Wildlife Reserve Clark Lake, Jackson County

| Purpose | Status | Acres |
|-------------------------------------|---------------|--------------|
| Wildlife and forestry demonstration | Active | 408.000 |

| Administrator | Comment |
|----------------------------------------------------------------------------------------|----------------|
| Department of Forestry Department of Fisheries & Wildlife Land Management Office | None |

Management Education Center Troy, Oakland County

| Purpose | Status | Acres |
|-------------------------------------|---------------|--------------|
| Advanced management training center | Active | 24.327 |

| Administrator | Comment |
|----------------------|--------------------|
| College of Business | Manager: Tom Freed |

Marshall Property Hickory Corners, Barry County

| Purpose | Status | Acres |
|------------------|---------------|--------------|
| Research support | Active | 2.250 |

| Administrator | Comment |
|------------------------|----------------|
| Land Management Office | |

Real Property Holdings - Inventory

MICHIGAN STATE UNIVERSITY

As of July 1, 2013

Martin Property (Rose-Dell Seed Orchard)

Calhoun County

| Purpose | Status | Acres |
|--------------------------------------------------|----------------------------------------------------------------------------------------|--------------|
| Tree seed orchard and demonstration site | Active | 160.000 |
| | Proceeds from leases and timber sales to be used for farm maintenance and scholarships | |
| Administrator | Comment | |
| Department of Forestry Land Management Office | None | |

Mason Research Farm

Mason, Ingham County

| Purpose | Status | Acres |
|--------------------------------------------------------------|----------------|--------------|
| Cereal grains and soybean research | Active | 117.000 |
| Administrator | Comment | |
| Plant, Soil and Microbial Sciences Land Management Office | None | |

Michigan State University Campus

East Lansing, Ingham County

| Purpose | Status | Acres |
|-----------------------------------|---------------|--------------|
| Research, education, and outreach | Active | 5,198.485 |

Montcalm Research Center

Lakeview, Montcalm County

| Purpose | Status | Acres |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------|
| Potato production research and cash crops | Active | 57.250 |
| Administrator | Comment | |
| Plant, Soil and Microbial Sciences Land Management Office | AgBioResearch Field Research Center Coordinator: Dr. Dave Douches Farm Manager: Bruce Sackett | |

Morris Property

Grand Ledge, Clinton and Eaton Counties

| Purpose | Status | Acres |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Income generating property to fund endowments established by David and Betty Morris | Active | 1,527.010 |
| Administrator | Comment | |
| Land Management Office | Long-term crop lease restricts near-term sale of property; includes eight residential leased properties, cell tower lease, research crop lease, billboard lease, and option to the Grand Ledge School District | |

Real Property Holdings - Inventory

MICHIGAN STATE UNIVERSITY

As of July 1, 2013

MSU Sailing Club Haslett, Ingham County

| Purpose | Status | Acres |
|-------------------------------------------|----------------|--------------|
| Sailing and wind surfing lessons | Active | 0.760 |
| Administrator | Comment | |
| Intramural Sports and Recreative Services | None | |

Muck Soils Research Center Laingsburg, Clinton County

| Purpose | Status | Acres |
|--------------------------------------------------------------|-------------------------------------|--------------|
| Organic soil vegetable and crops research | Inactive | 447.048 |
| Administrator | Comment | |
| Plant, Soil and Microbial Sciences Land Management Office | AgBioResearch Field Research Center | |

Rau Property Thompsonville, Benzie County

| Purpose | Status | Acres |
|------------------------|----------------|--------------|
| Chestnut research | Active | 5.000 |
| Administrator | Comment | |
| Land Management Office | None | |

River Terrace Property East Lansing, Ingham County

| Purpose | Status | Acres |
|------------------------|----------------|--------------|
| Investment | Active | 1.210 |
| Administrator | Comment | |
| Land Management Office | None | |

Rogers Reserve Jackson, Jackson County

| Purpose | Status | Acres |
|---------------------------------------------------------------|-----------------------------------|--------------|
| Botanical and horticultural sciences research and teaching | Active | 115.850 |
| Administrator | Comment | |
| Plant, Soil, and Microbial Sciences Land Management Office | Coordinator: Dr. Dennis Fulbright | |

Real Property Holdings - Inventory

MICHIGAN STATE UNIVERSITY

As of July 1, 2013

Russ (Fred) Forest Decatur, Cass County

| Purpose | Status | Acres |
|------------------------------------------|-----------------------------------------------------------------------------|--------------|
| Forestry plantings and genetics research | Active | 938.750 |
| Demonstration and public use | Title restricted on 269 acres Land to be used for educational purposes | |
| Administrator | Comment | |
| Department of Forestry | AgBioResearch Field Research Center | |
| Land Management Office | Coordinator: Dr. David MacFarlane Non-Resident Forester: Greg Kowalewski | |

Saginaw Valley Research and Extension Center Frankenmuth, Saginaw and Tuscola Counties

| Purpose | Status | Acres |
|-----------------------------------------|----------------------------------------------------------|--------------|
| Dry bean, sugar beet, and crop research | Active | 310.040 |
| Research, outreach, and teaching | | |
| Administrator | Comment | |
| Plant, Soil and Microbial Sciences | AgBioResearch Field Research Center | |
| Land Management Office | Coordinator: Dr. James Kelly Farm Manager: Paul Horny | |

Southwest Michigan Research and Extension Center Benton Harbor, Berrien County

| Purpose | Status | Acres |
|---------------------------------------------|-------------------------------------|--------------|
| Horticultural research and extension center | Active | 350.000 |
| Administrator | Comment | |
| Department of Horticulture | AgBioResearch Field Research Center | |
| Cooperative Extension Service | Coordinator: Dr. Thomas Zabadal | |
| Land Management Office | Farm Manager: Dave Francis | |

Stranahan-Bell (WaWaSum) Grayling, Crawford County

| Purpose | Status | Acres |
|------------------------------------------|----------------|--------------|
| Inland stream and reforestation research | Active | 251.000 |
| Small conference center | | |
| Administrator | Comment | |
| Land Management Office | None | |

Stuckman Property St. Johns, Clinton County

| Purpose | Status | Acres |
|-----------------------------|---------------------------------------|--------------|
| Educational and/or research | Active | 40.000 |
| Land Management Office | MOU on file in Land Management Office | |

Real Property Holdings - Inventory

MICHIGAN STATE UNIVERSITY

As of July 1, 2013

Sycamore Creek Holt, Ingham County

| Purpose | Status | Acres |
|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------|
| Support campus water management plan; controlled access to Sycamore Creek flood plain | Active Title restricted on 52 acres Deed covenants restrict use | 54.500 |
| Administrator | Comment | |
| Land Management Office | None | |

Tollgate Education Center Novi, Oakland County

| Purpose | Status | Acres |
|---------------------------------------------------------------------|----------------------------|--------|
| Agricultural and environmental education and leadership training | Active | 56.675 |
| Administrator | Comment | |
| Cooperative Extension Service Land Management Office | Farm Manager: Roy Prentice | |

Trevor Nichols Research Center Fennville, Allegan County

| Purpose | Status | Acres |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------|---------|
| Fruit pest research | Active | 156.100 |
| Administrator | Comment | |
| Department of Entomology Land Management Office | AgBioResearch Field Research Center Coordinator: Dr. John Wise Farm Manager: Jason Seward | |

Upper Peninsula Research Center Chatham, Alger County

| Purpose | Status | Acres |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------|-----------|
| Dairy, forestry, and crops research | Active | 1,262.227 |
| Administrator | Comment | |
| Department of Animal Science Land Management Office | AgBioResearch Field Research Center Coordinator: Dr. Dan Buskirk Farm Manager: Paul Naasz | |

VanHoosen Property Rochester, Oakland County

| Purpose | Status | Acres |
|---------------------------------------------------------------------|-------------------------------------------------------------|-------|
| Long-term lease to Avon Players | Active | 1.793 |
| Administrator | Comment | |
| Vice President for Finance and Operations Land Management Office | Remaining land of Sarah Van Hoosen gift acquired in 1956 | |

Total Acres: 25,502.228

Real Property Holdings - AgBioResearch Centers

MICHIGAN STATE UNIVERSITY

As of July 1, 2013

AgBioResearch Centers owned by MSU

Clarksville Research Center
9302 Portland Road
Clarksville, MI 48815

Dunbar Forest
12839 S. Scenic Drive
Sault Ste. Marie, MI 49783

MSU Forest Bomass Innovation Center
6005 J. Road
Escanaba, MI 49829

Kellogg, W.K. Biological Station
3700 E. Gull Lake Drive
Hickory Corners, MI 49060

Kellogg, W.K. Experimental Forest
7060 N. 42nd Street
Augusta, MI 49012

Lake City Research Center
5401 W. Jennings Road
Lake City, MI 49651

Montcalm Research Center
4747 McBride Road
Lakeview, MI 48850

Saginaw Valley Research and
Extension Center
9923 Krueger Road
Frankenmuth, MI 48734

Fred Russ Forest
20673 Marcellus Highway
Decatur, MI 49045

Trevor Nichols Research Center
6237 124th Avenue
Fennville, MI 49408

Southwest Michigan Research and
Extension Center
1781 Hillandale Road
Benton Harbor, MI 49022

Upper Peninsula Research Center
E3774 University Drive
P.O. Box 168
Chatham, MI 49816

AgBioResearch Centers leased by MSU

Northwest Michigan Horticultural
Research Center
6686 S. Center Highway
Traverse City, MI 49684

Real Property Holdings - Land Acquisition by Decade

MICHIGAN STATE UNIVERSITY

As of July 1, 2013

| | Acres | |
|---------------|-----------|------------|
| | Campus | Off-Campus |
| Prior to 1920 | 1,026.380 | 1,060.327 |
| 1920's | 564.350 | 2,007.112 |
| 1930's | 284.614 | 795.026 |
| 1940's | 1,605.236 | 6,281.322 |
| 1950's | 1,266.862 | 862.190 |
| 1960's | 767.850 | 2,417.390 |
| 1970's | 188.747 | 861.049 |
| 1980's | 13.943 | 3,265.245 |
| 1990's | 66.338 | 1,775.765 |
| 2000's | 1.069 | 1,566.310 |
| 2010's | 3.260 | 1,662.338 |

Real Property Holdings - Land Available for Agricultural and Natural Resources Research

MICHIGAN STATE UNIVERSITY

As of July 1, 2013

| <u>Off-Campus</u> | <u>Acres</u> |
|------------------------------------------------------------------------------------------------|-------------------|
| 12 Outlying Stations (owned) | 15,559.437 |
| 1 Outlying Station (leased) | 100.000 |
| Dobie Road Property, Okemos | 114.431 |
| Off-Campus owned land used for agricultural research (Not designated as a research station) | 1,153.600 |
| Off-Campus leased land used for agricultural research | 219.000 |
| <u>Campus</u> | |
| Land used for agricultural research - south of Mt. Hope | 2,737.492 |
| Total Acres: | 19,883.960 |

Real Property Holdings - Warranty Deeds to State Building Authority

MICHIGAN STATE UNIVERSITY

As of July 1, 2013

The following parcels have been or will be deeded to and leased back from the State Building Authority, for financing pursuant to earlier Board of Trustees approval.

- Anthony Hall Dairy Plant and Meats Lab
- Biomedical and Physical Sciences Building
- Diagnostic Center for Population and Animal Health
- Chemistry Building Renovation Project

Real Property Holdings - Maps

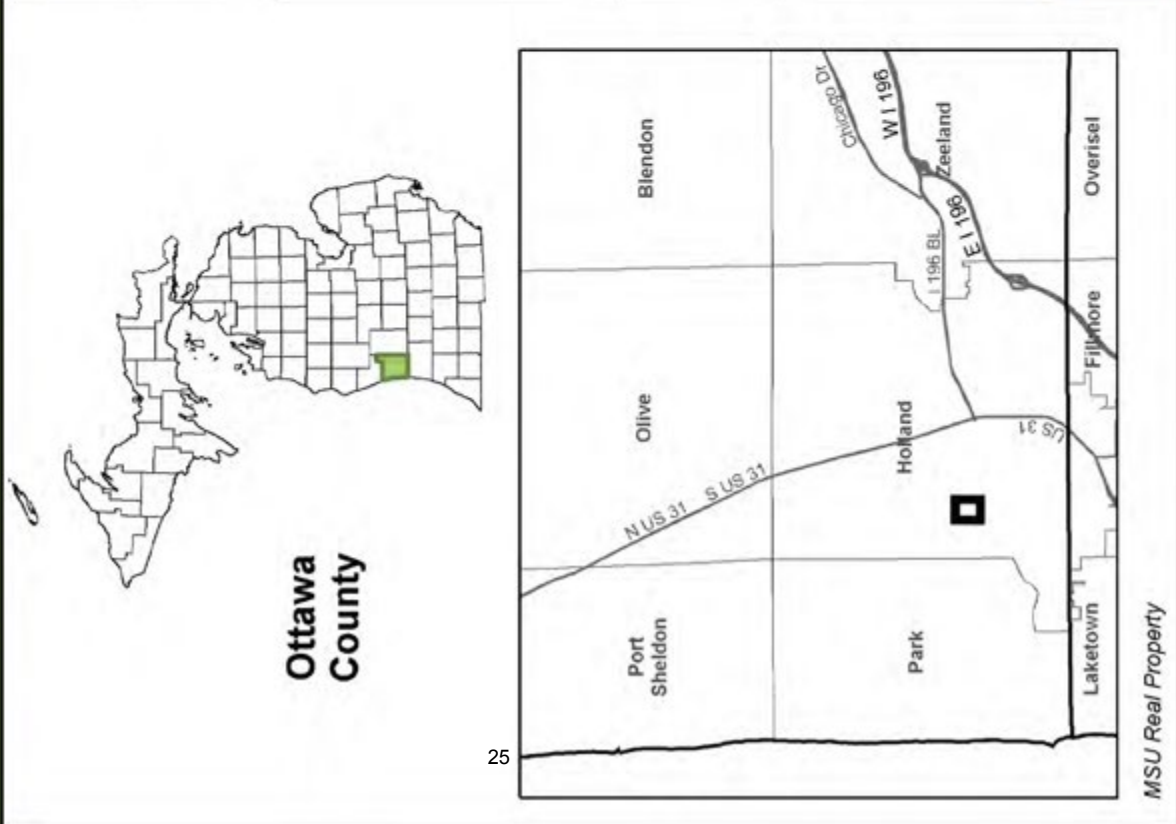
MICHIGAN STATE UNIVERSITY

As of July 1, 2013

Location Maps of Michigan State University Properties Alphabetical by County

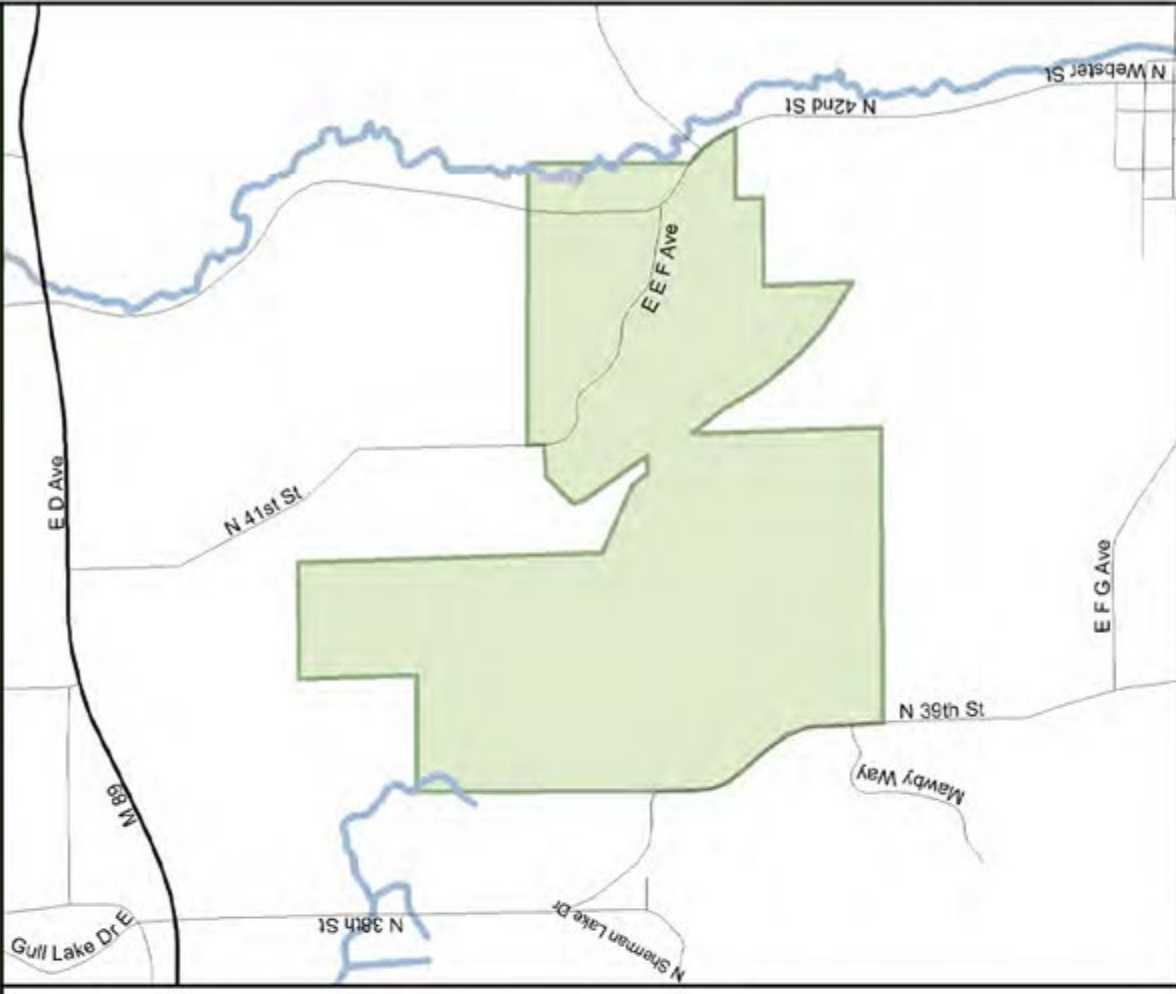
BioEconomy Research and Development Center

Holland Township, Section 19



Brook Lodge

Ross Township, Section 21, 27, 28, and 29



| | | | | | |
|------------|---------------|-------------|--------------|--------------|-------------|
| Trowbridge | Oisego | Gunfiam | Prairieville | Barry | Johnstown |
| Pine Grove | Alamo | Cooper | Richard | Bedford | Springfield |
| Almena | Oshemo | Parchment | Comstock | Battle Creek | Leroy |
| Antwerp | Texas | Portage | Pavilion | Climax | Athens |
| Porter | Prairie Ronde | Schoolcraft | Brady | Wakeshma | Leonidas |
| Marcellus | Flowerfield | Park | Mendon | Sherrwood | |

MSU Real Property

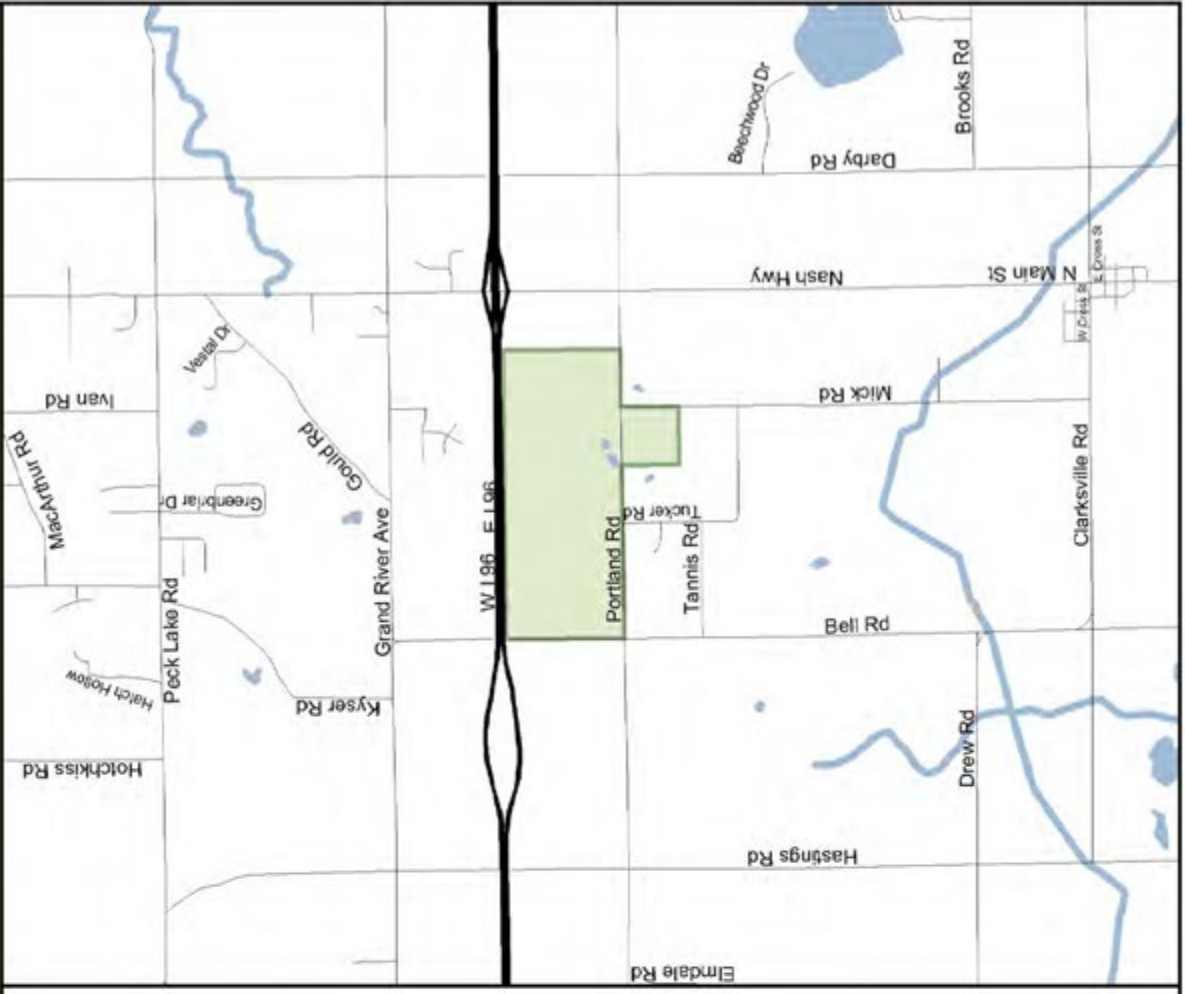
Clarksville Research Center Boston Township, Sections 27, 28, and 33



27

| | | | | | |
|-----------|----------|-----------|----------|-----------------|---------------------------|
| Oakfield | Eureka | Fairplain | Bushnell | Bloomer | North Shade |
| Grattan | Otisco | Keene | Ronald | North Plains | Lebanon |
| Vergennes | Keene | Easton | Jonia | Lyons | Dallas |
| Lowell | Boston | Berlin | Orange | Portland | Westphalia |
| Bowne | Campbell | Odessa | Sebewa | Danby | Eagle |
| Irving | Cariton | Woodland | Sunfield | Roxand | Grand Lodge Onetida |

MSU Real Property



Dobie Road Property Meridian Township, Section 27



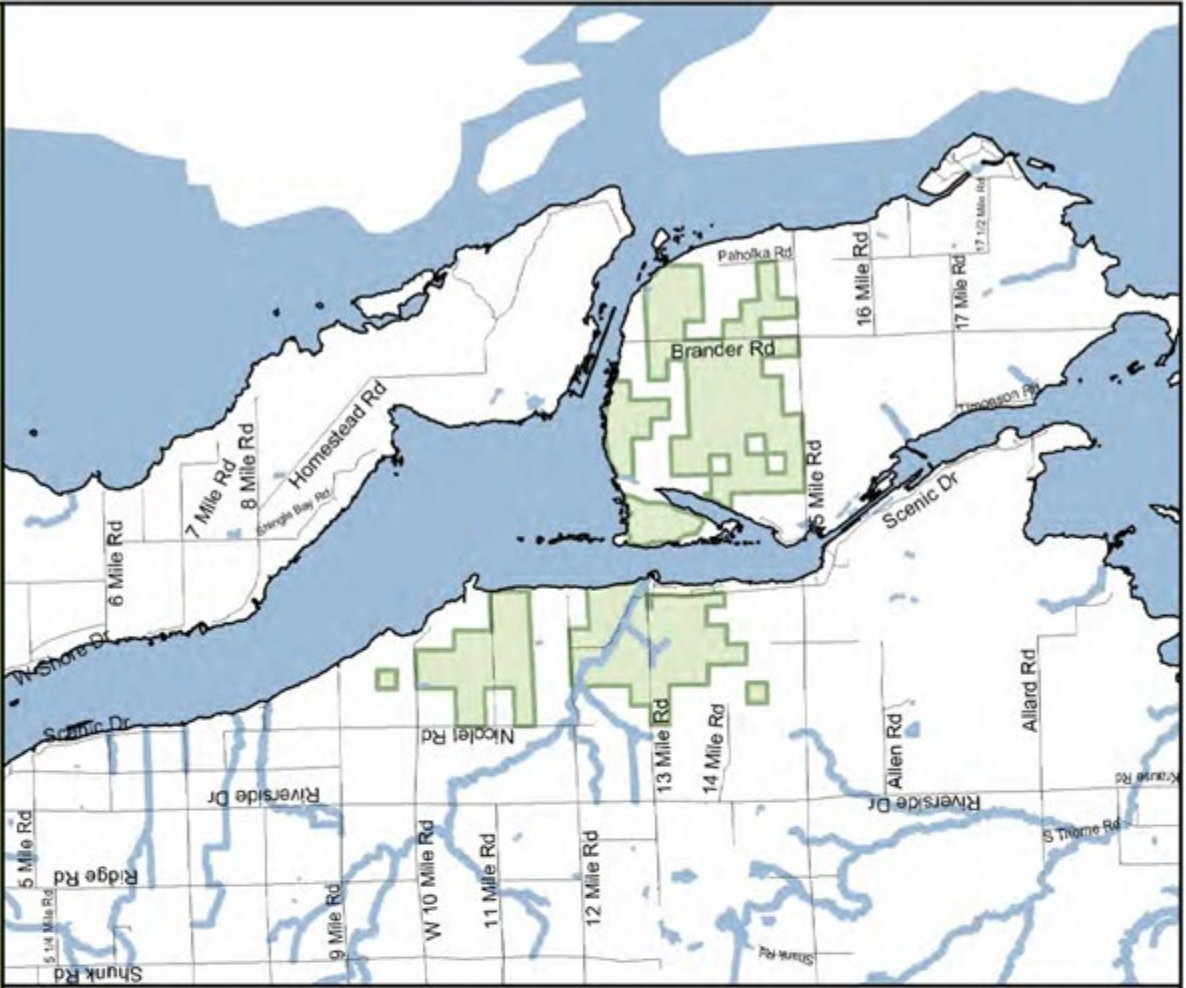
**Ingham
County**



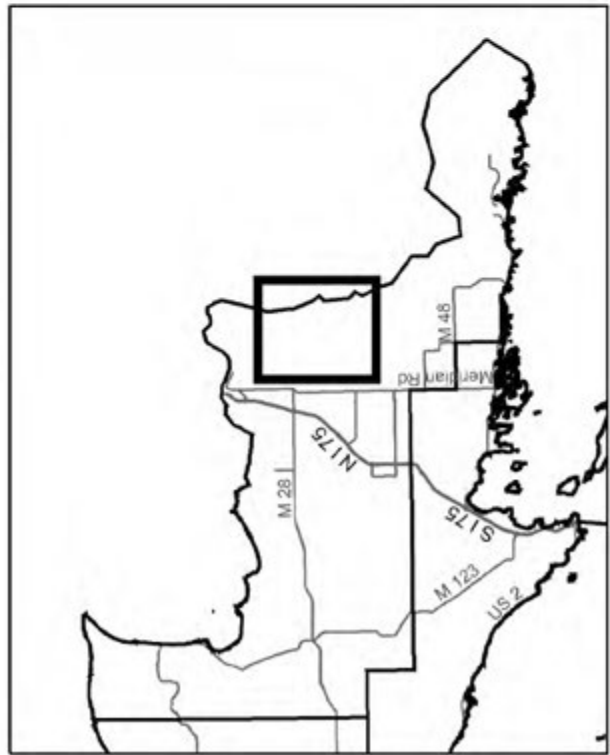
MSU Real Property

Dunbar Forest

Soo Township, Sections 3, 4, 5, 8, 9, 10, 11, 14, 15, and 16; Bruce Township, Sections 1, 6, 7, 12, 13, 24, 25, 30, 31, and 36



Chippewa
County

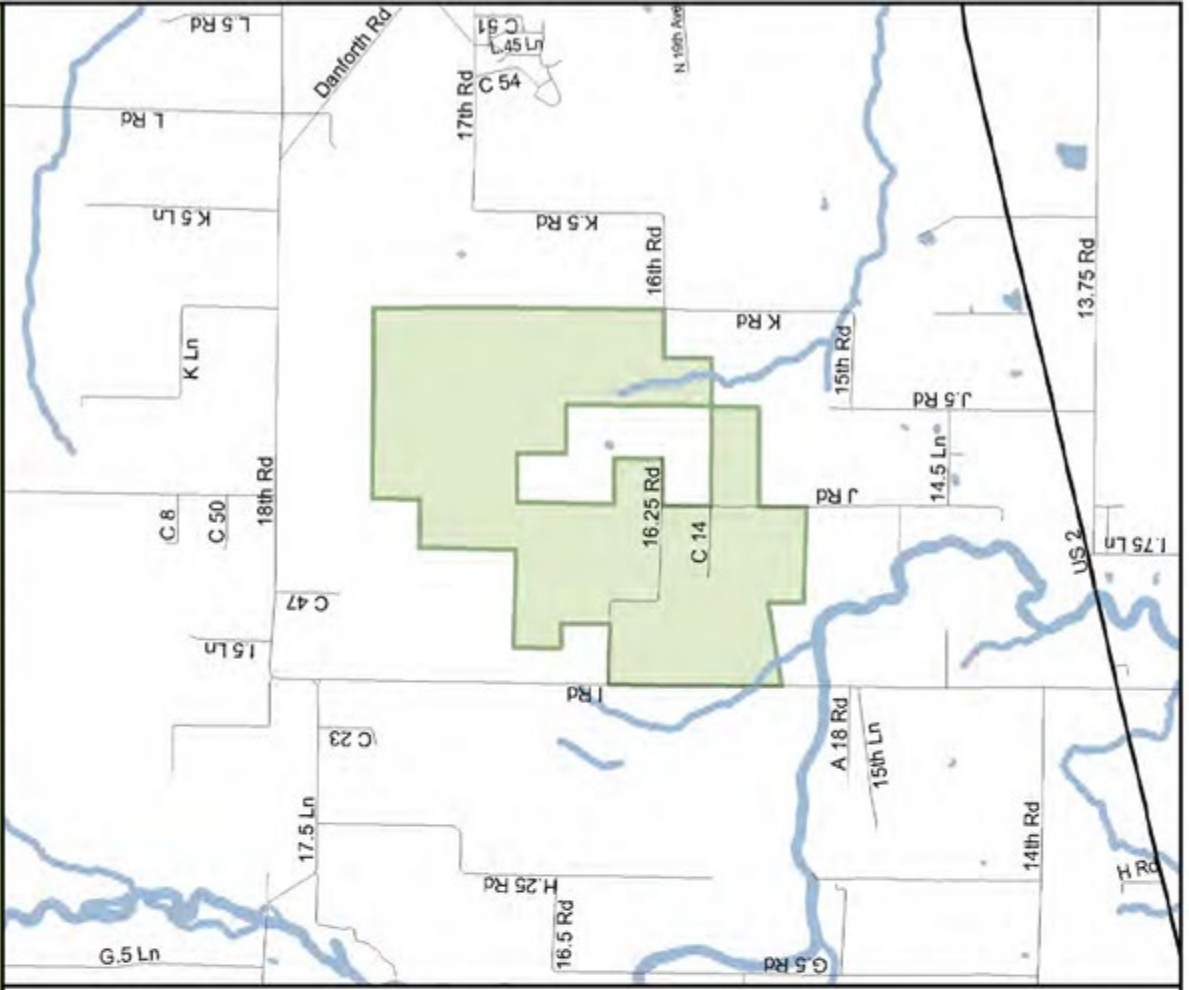


MSU Real Property

Forest Biomass Innovation Center
Wells Township, Sections 8, 17, 18, 19, and 20

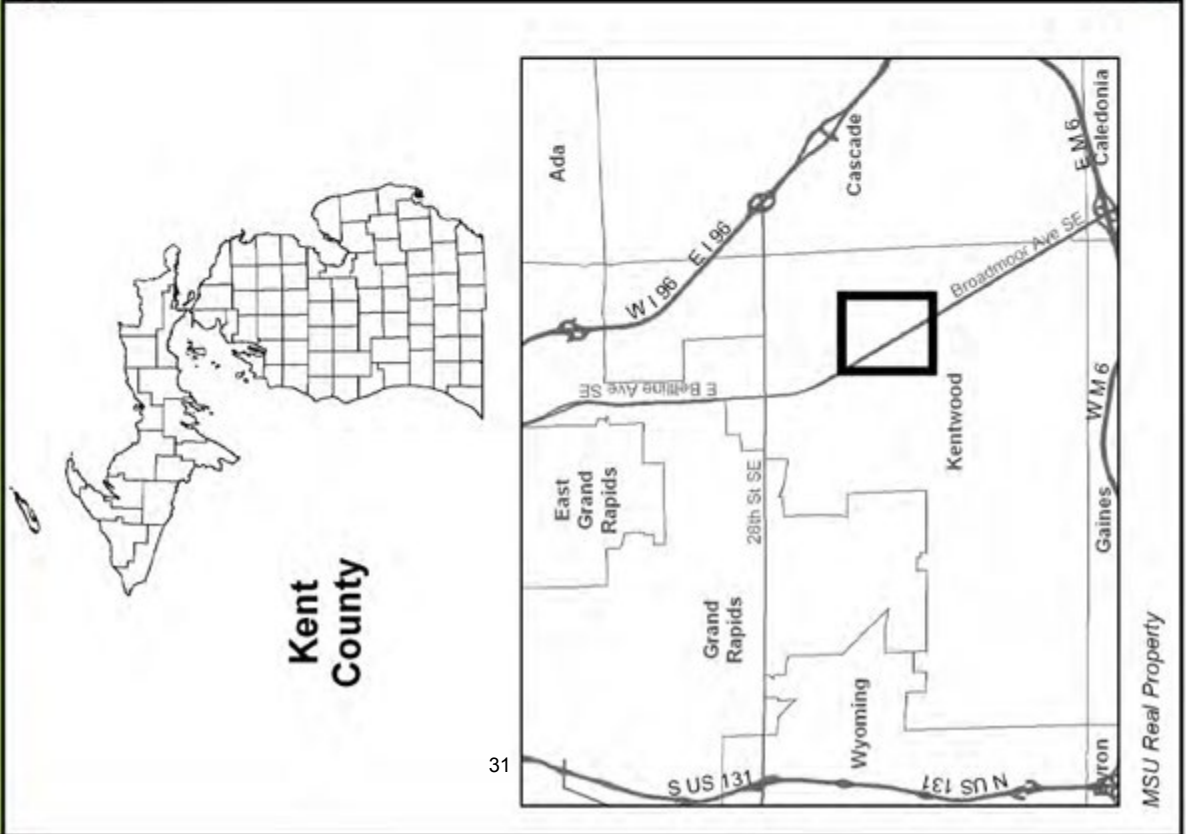


**Delta
County**

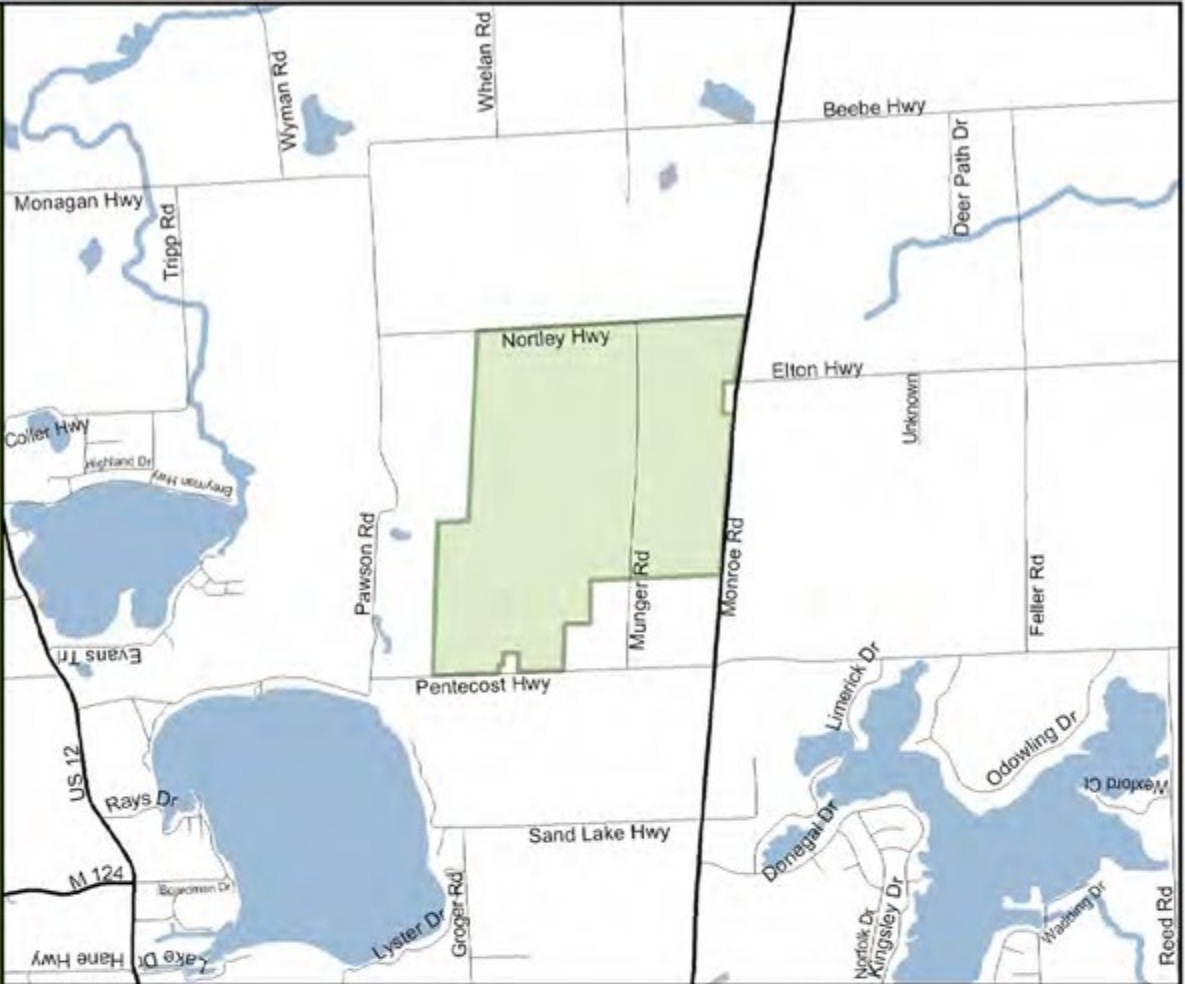


MSU Real Property

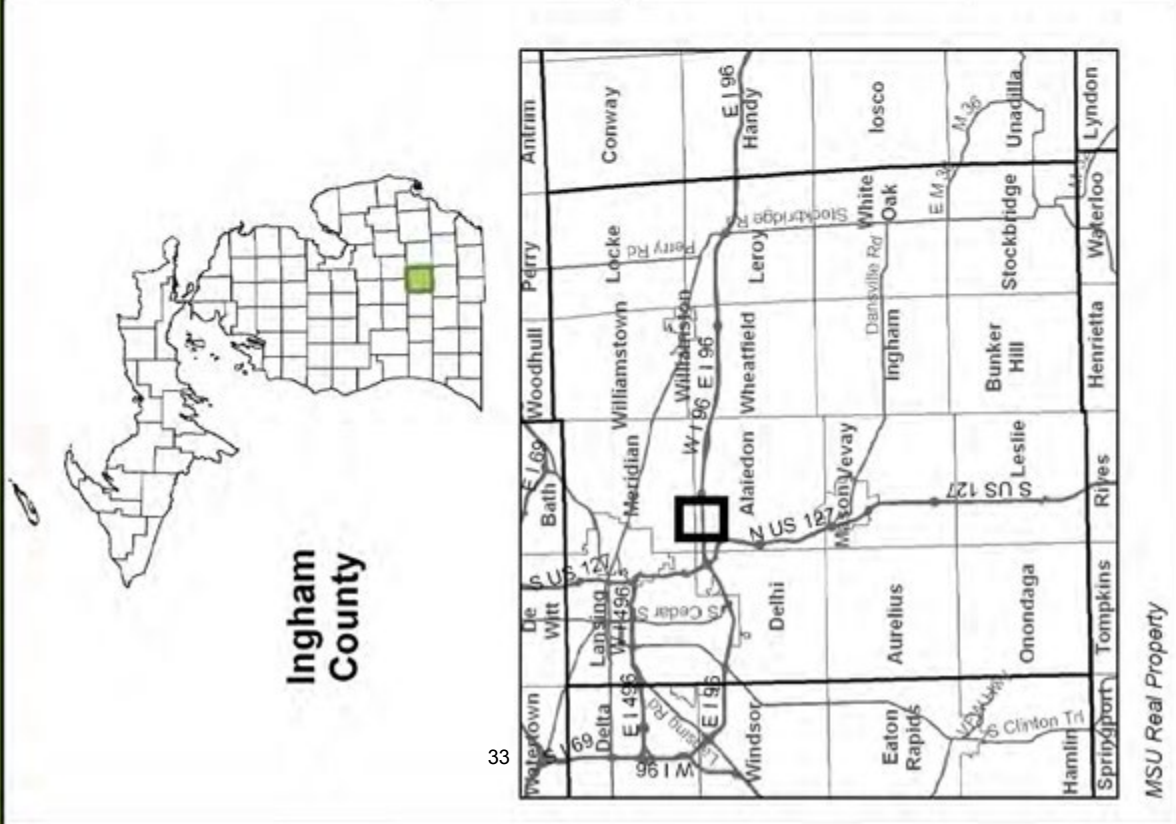
Gantos Property Kentwood Township, Section 23



Hidden Lake Gardens Franklin Township, Sections 17, 18, 19, and 20

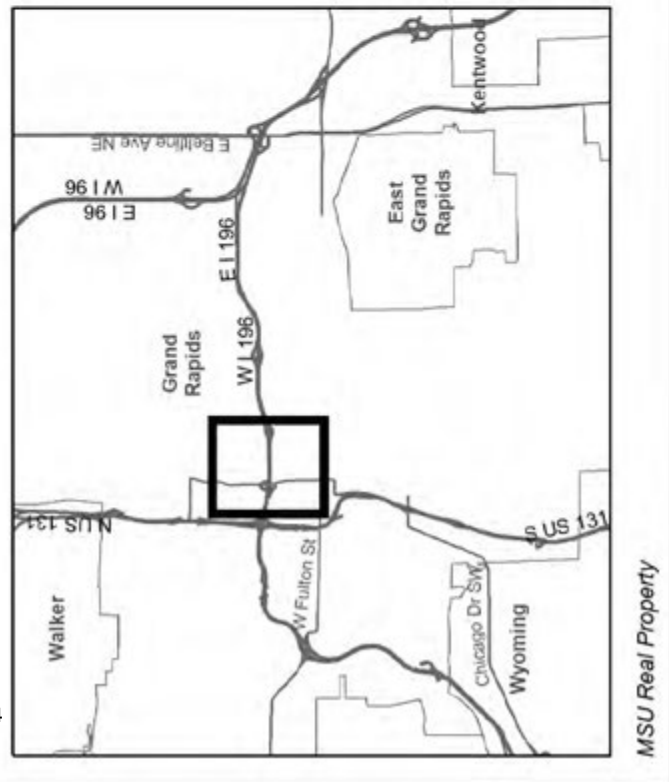
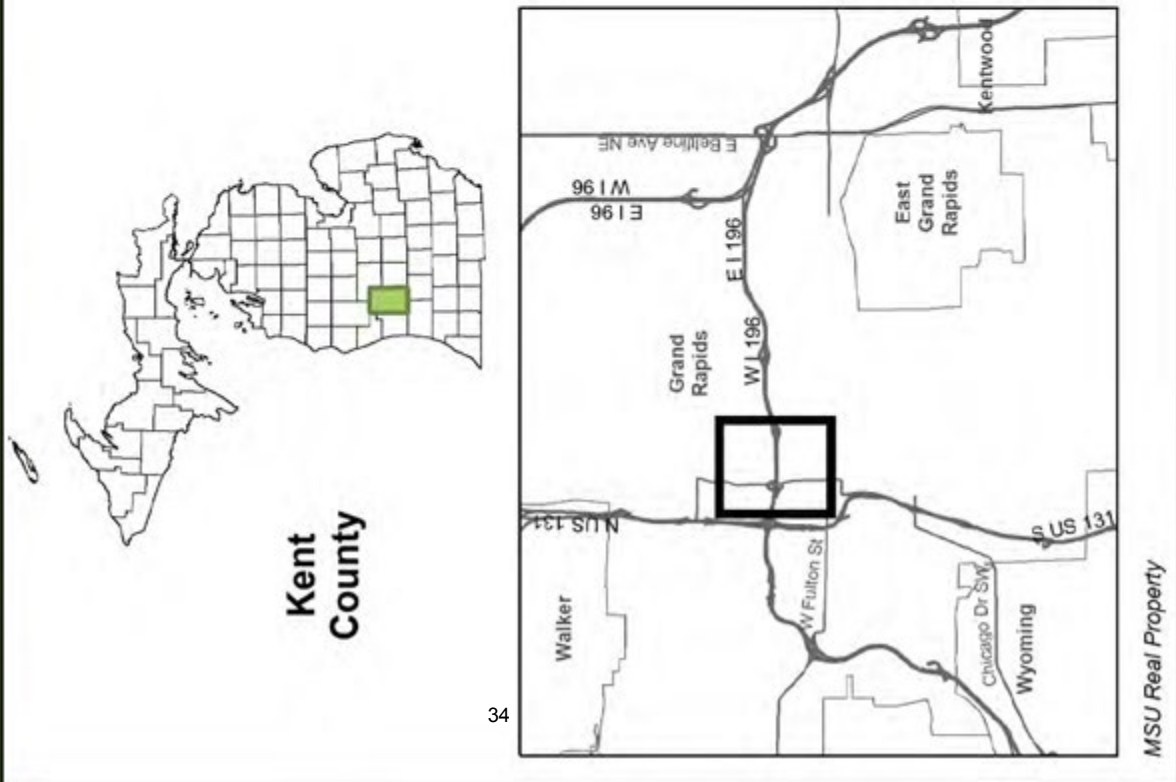


Hulett Road Engineering Alaiedon Township, Section 5



College of Human Medicine - Grand Rapids

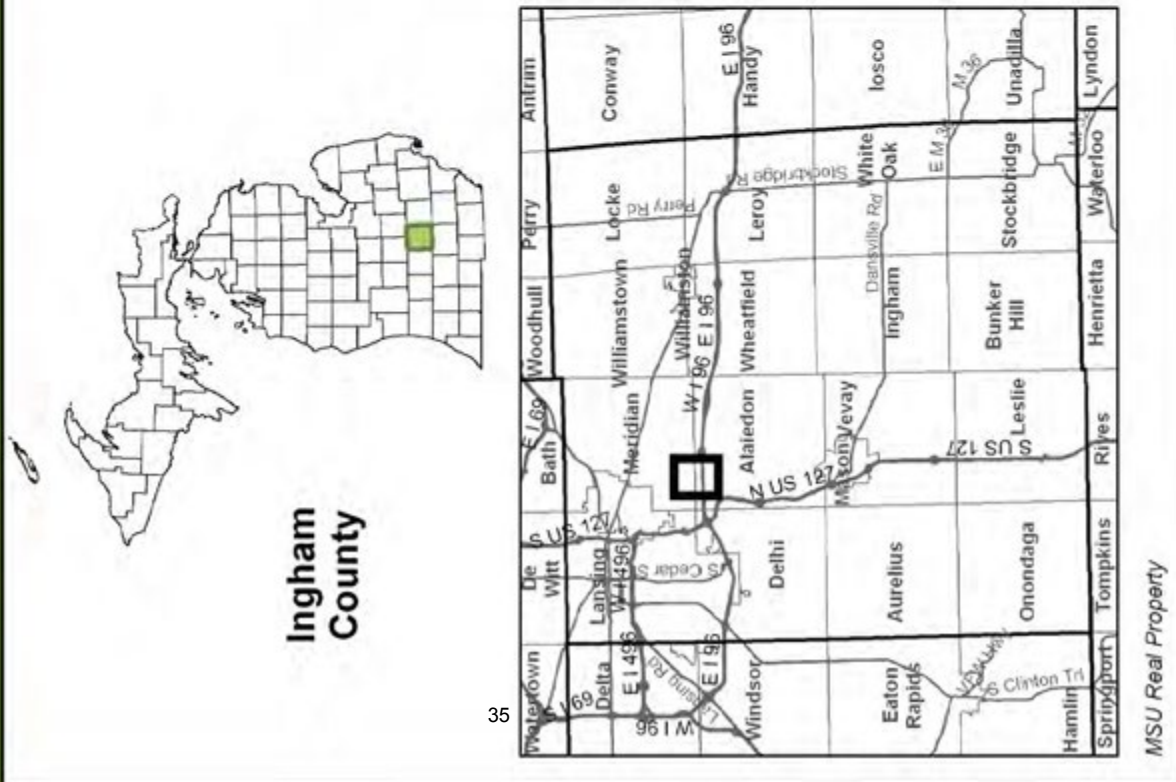
Grand Rapids Township, Section 19



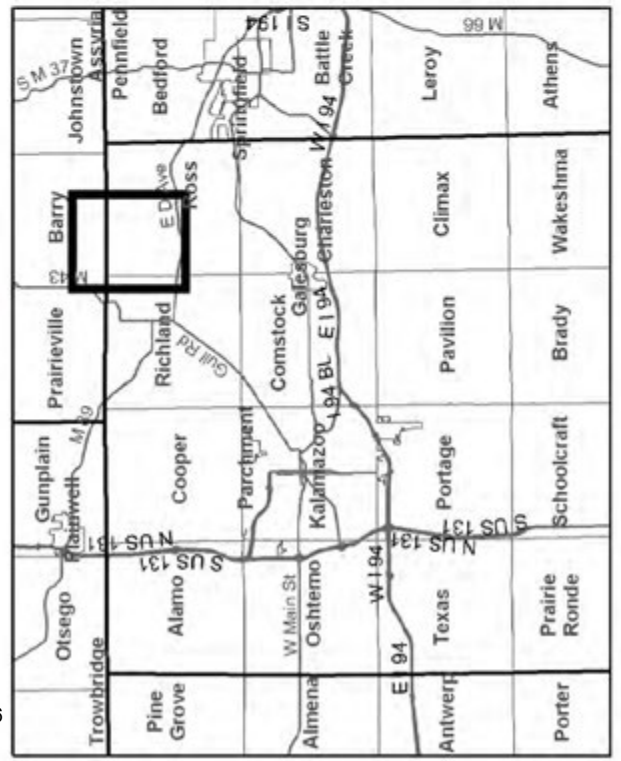
MSU Real Property

Jolly Road Engineering and Civil Infrastructure Lab

Alaiedon Township, Section 5

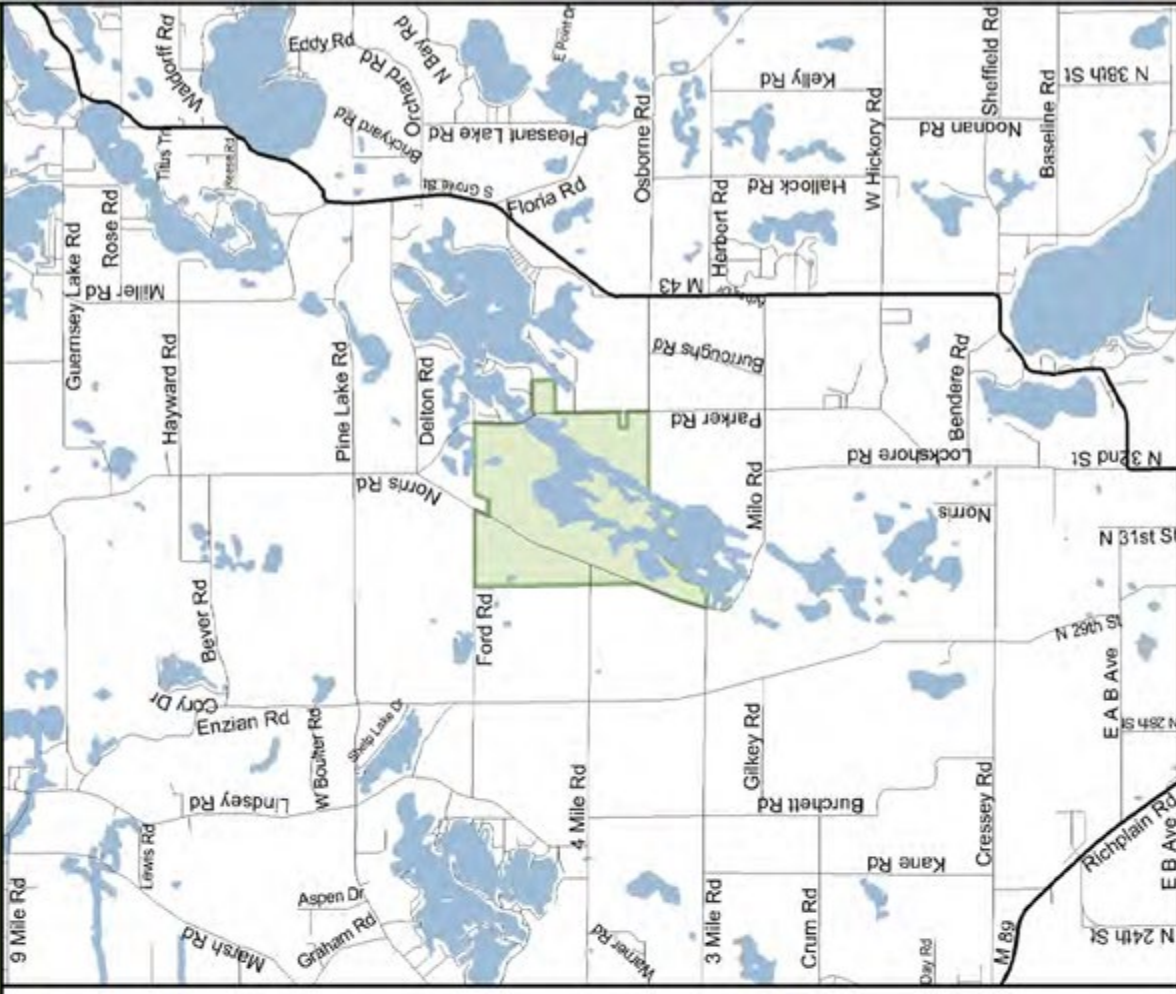
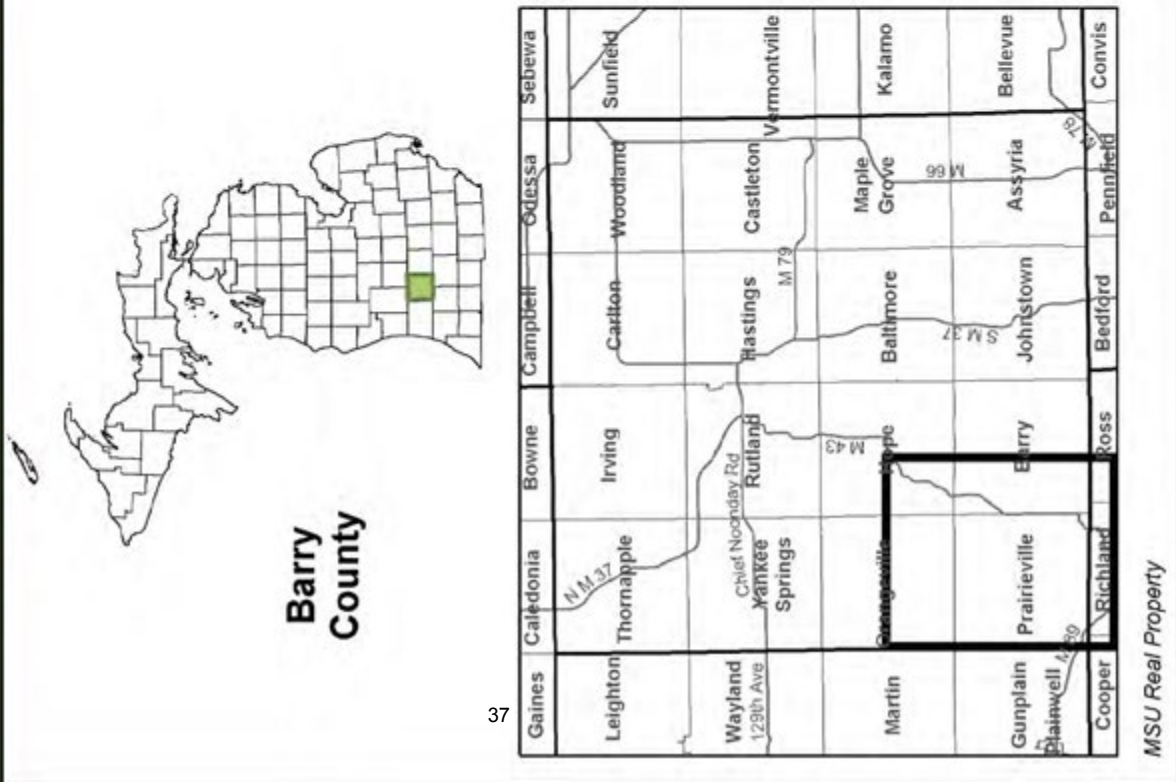


W.K. Kellogg Biological Station, Bird Sanctuary, and Farm City of South Gull Lake and Ross Township, Sections 4, 5, 6, 8, and 9



MSU Real Property

W.K. Kellogg Biological Station (Lux Arbor Reserve) Prairieville Township, Sections 10, 11, 14, and 15

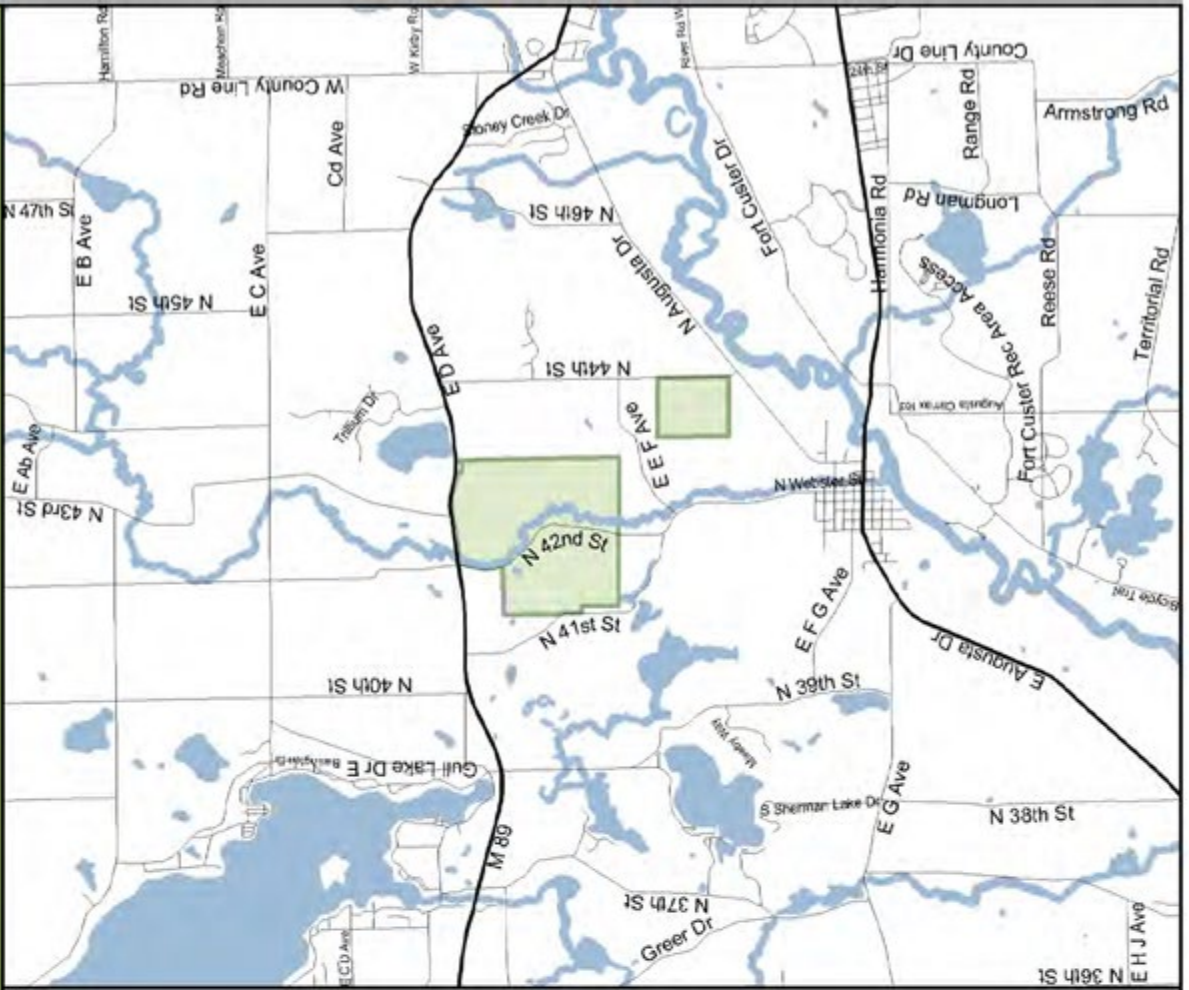


W.K. Kellogg Experimental Forest

Ross Township, Sections 21, 22, 27, and 28



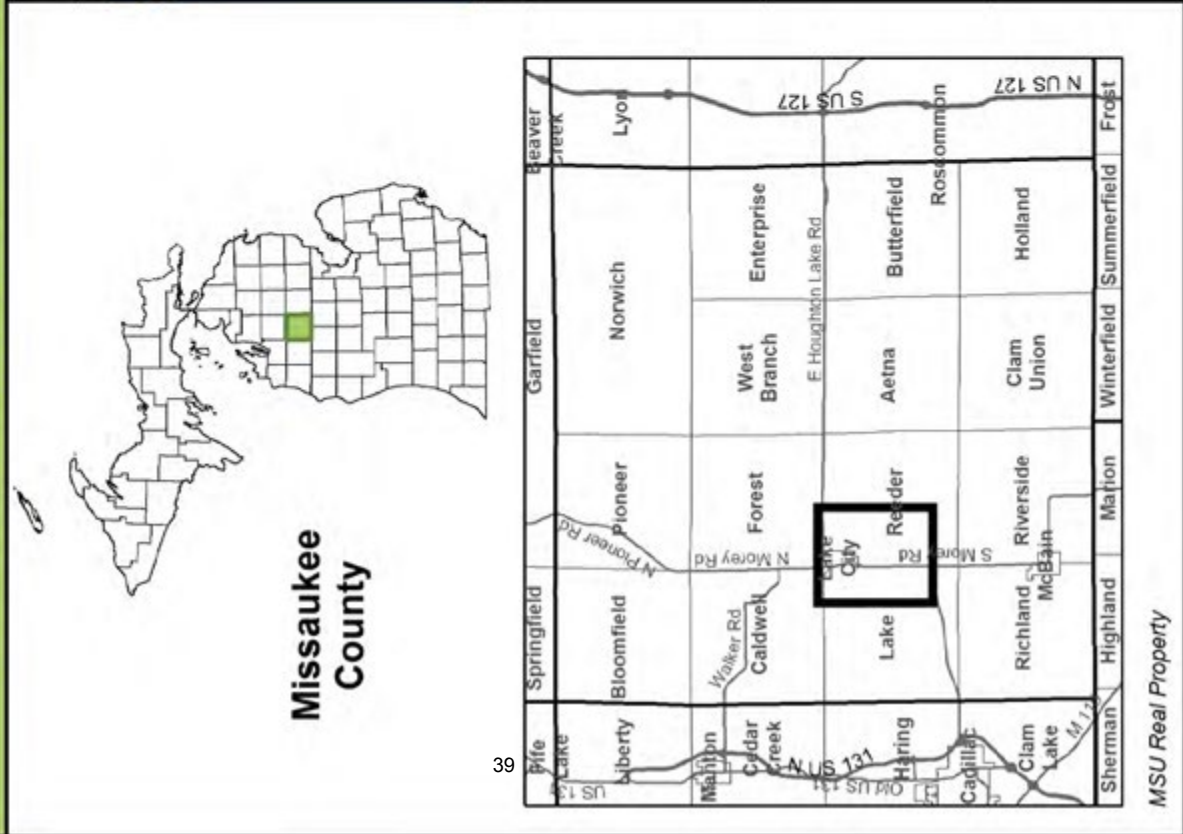
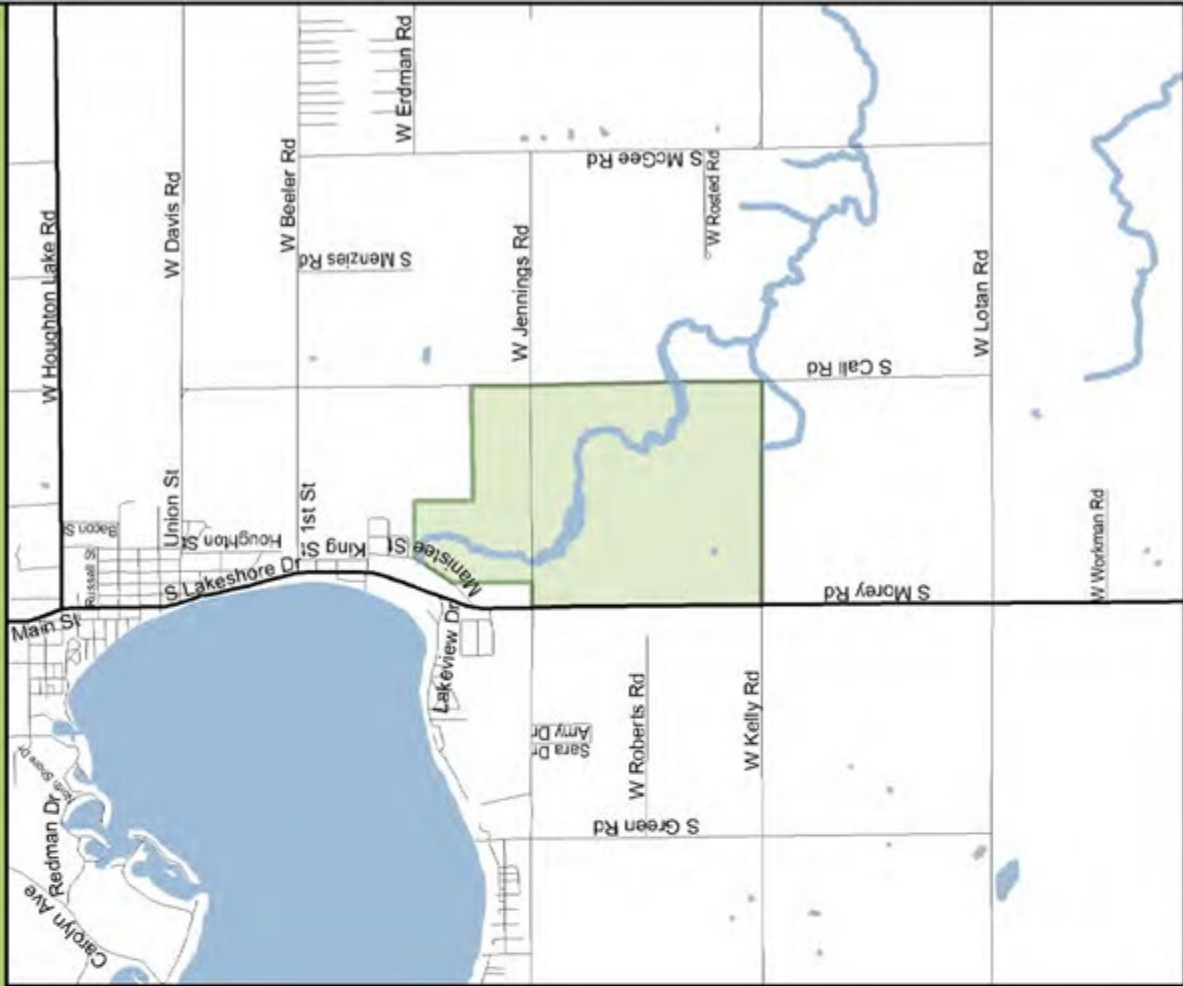
Kalamazoo County



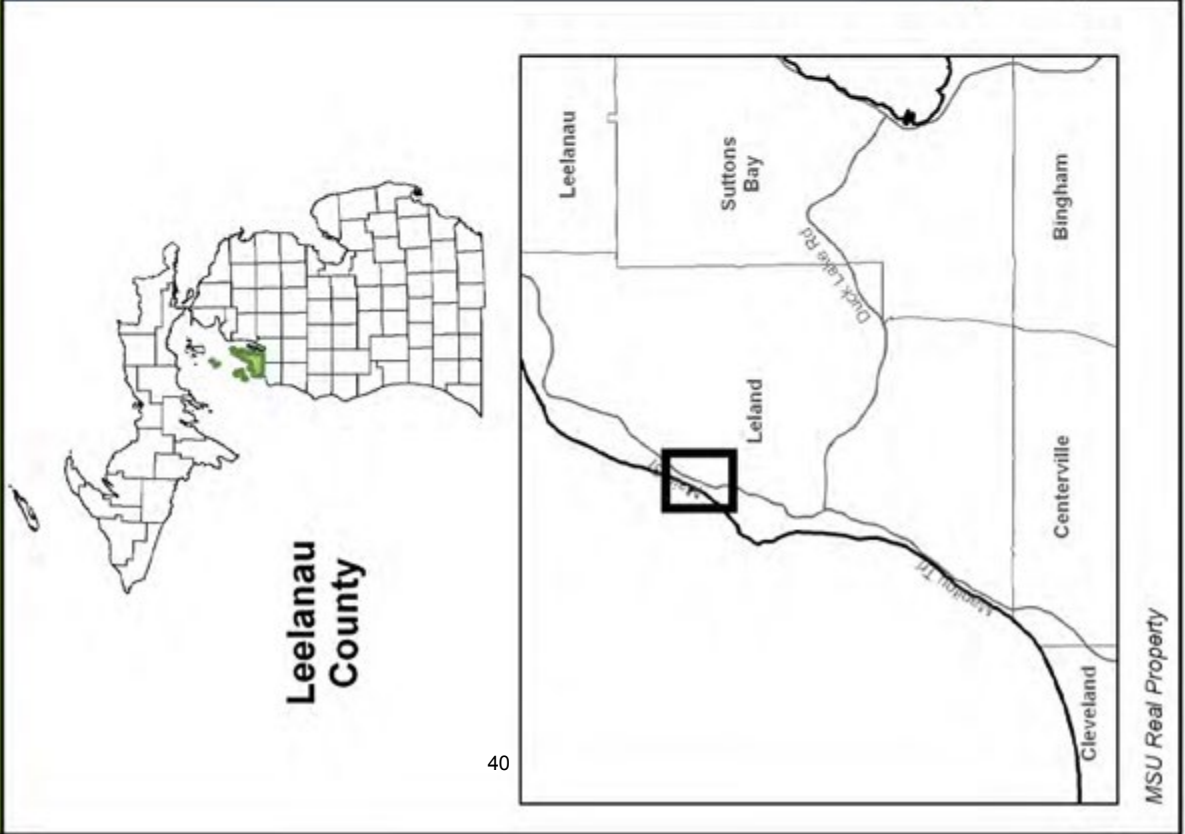
| | | | | | |
|------------|---------------|-------------|--------------|-----------|-------------|
| Trowbridge | Ossego | Gunflam | Prairieville | Barry | Johnstown |
| Pine Grove | Alamo | Cooper | Richard | Ross | E D Ave |
| Almena | Oshemo | Parchment | Comstock | Galesburg | Springfield |
| Antwerp | Texas | Portage | Pavilion | Climax | Leroy |
| Porter | Prairie Ronde | Schoolcraft | Brady | Wakeshma | Athens |
| Marcellus | Flowerfield | Park | Mendon | Leonidas | Sherrwood |

MSU Real Property

Lake City Research Center Reeder Township, Sections 7 and 18

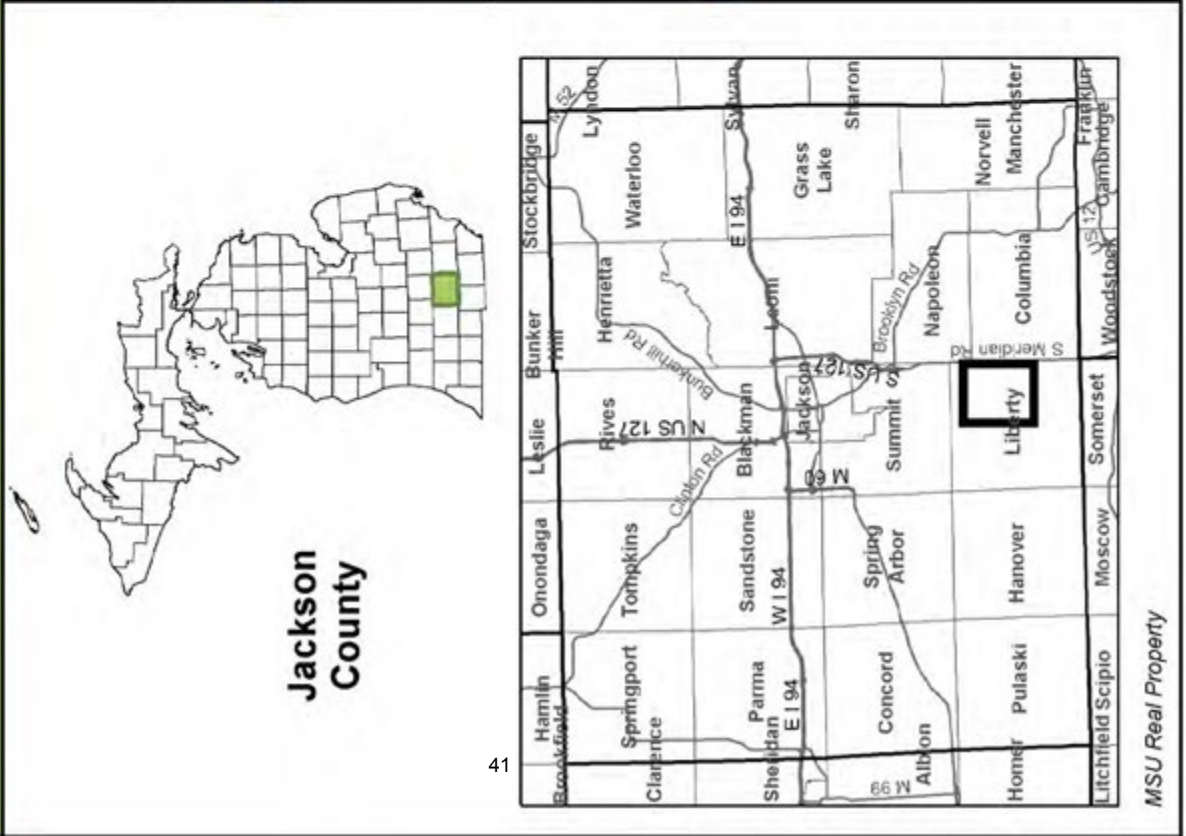


Leland Property
Leland Township, Section 9



MacCreedy Forest and Wildlife Reserve

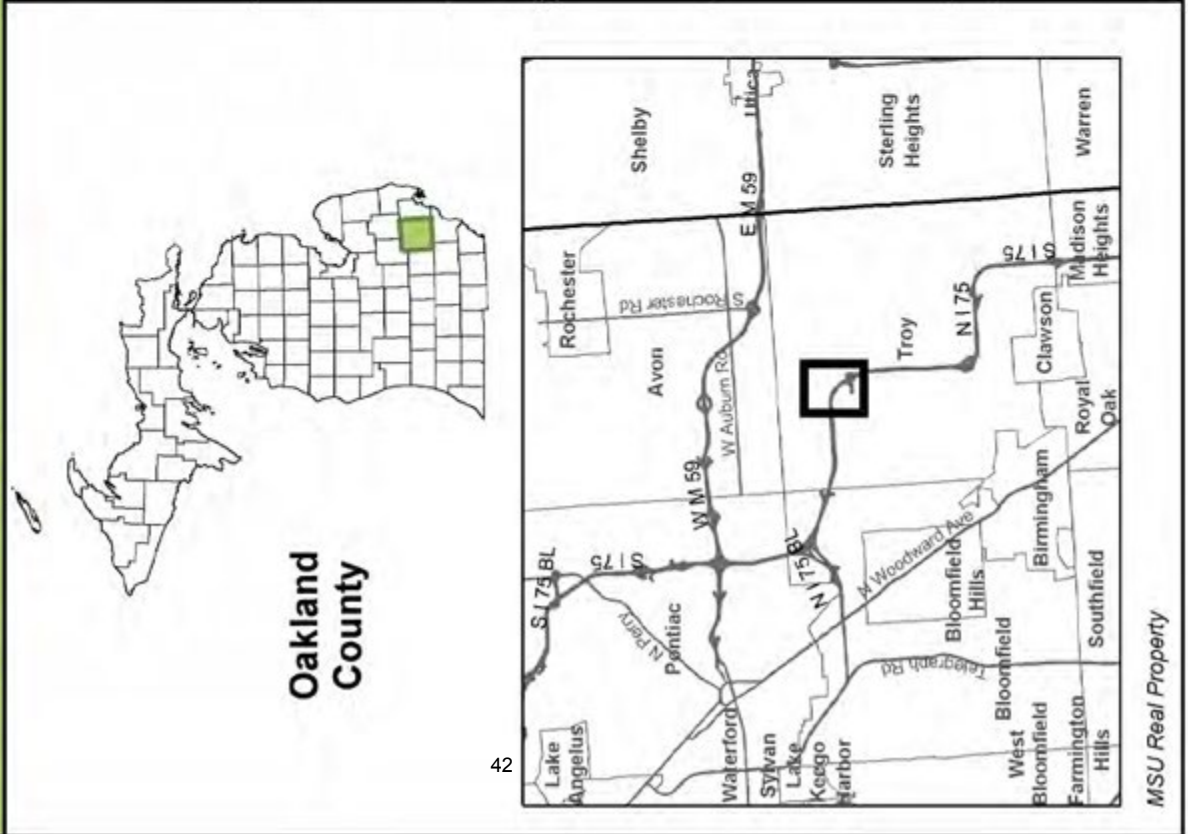
Liberty Township, Sections 11 and 14



MSU Real Property

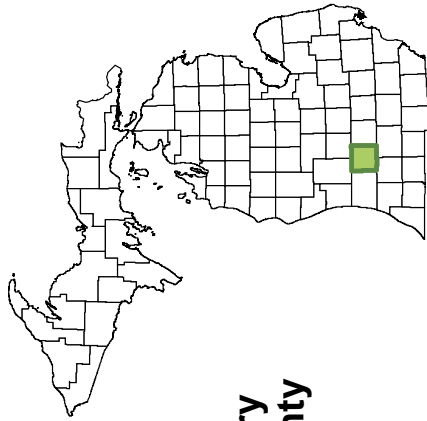
Management Education Center, Troy

City of Troy, Section 9



Marshall Property

Barry County, Barry Township, Section 25



Barry County

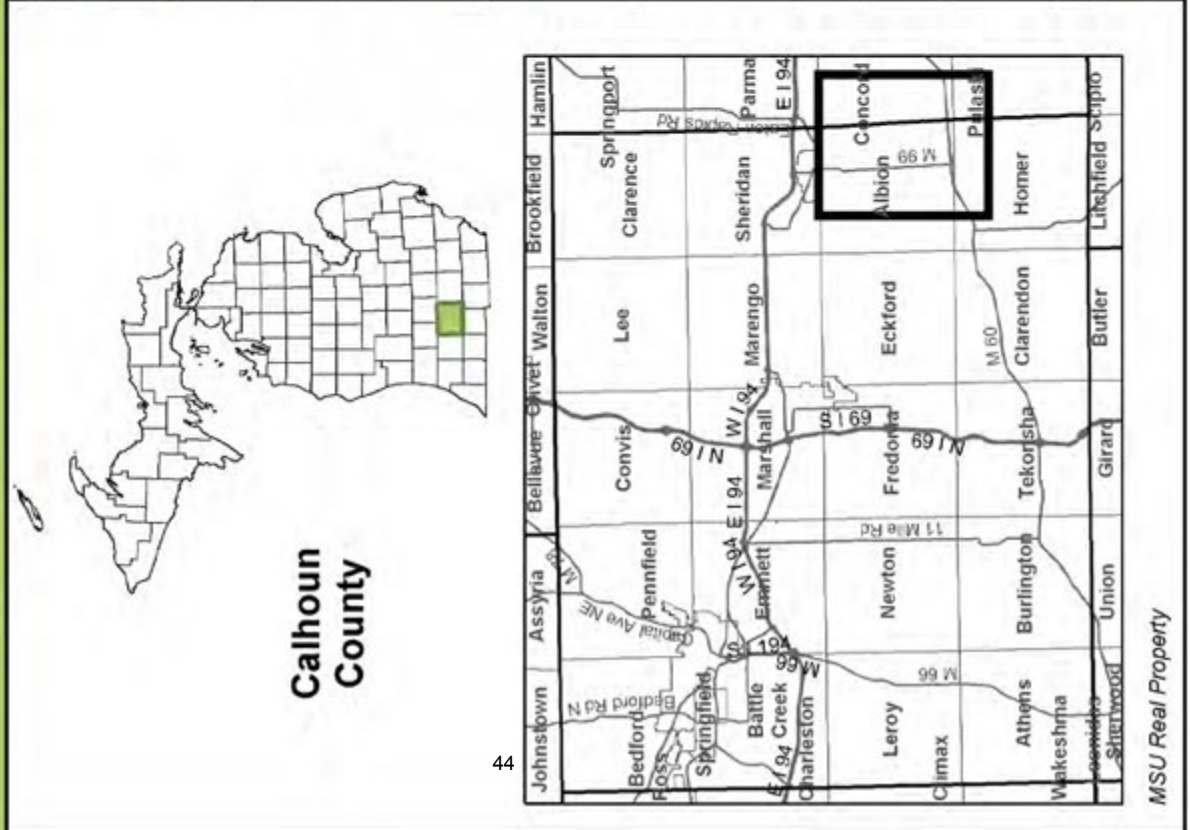
43

| | | | | | |
|----------------------|----------------|---------|-----------|-------------|--------------|
| Gaines | Caledonia | Bowne | Campbell | Odessa | Sebewa |
| Leighton | Thornapple | Irving | Carlton | Woodland | Sunfield |
| Wayland 129th Ave | Yankee Springs | Rutland | Hastings | Castleton | Vermontville |
| Martin | Orangeville | Hope | Baltimore | Maple Grove | Kalamo |
| Gunplain | Prairieville | Barry | Johnstown | Assyria | Bellevue |
| Blainwell | Cooper | Richard | Ross | Penfield | Convis |

MSU Property



Martin Property (Rose-Dell Seed Orchard) Albion Township, Sections 23 and 24



Mason Research Farm Alaiedon Township, Section 21

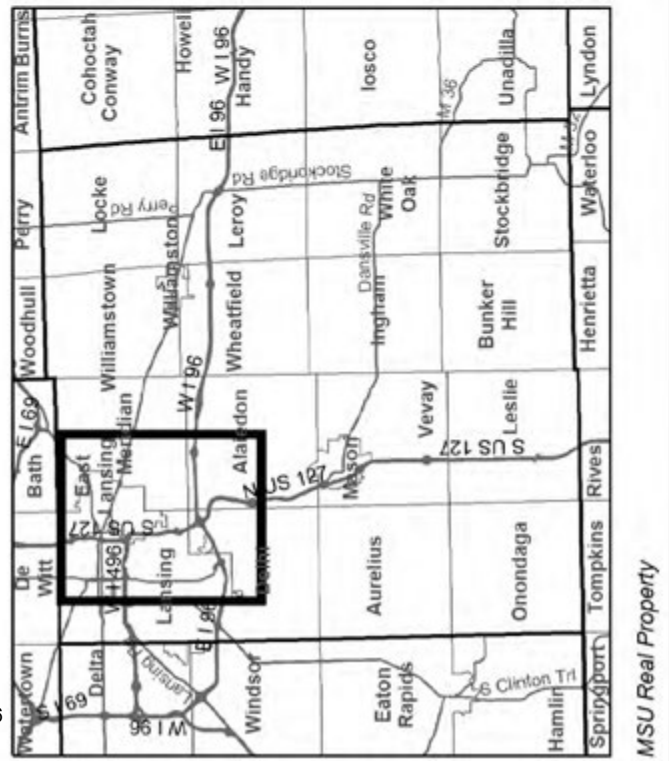
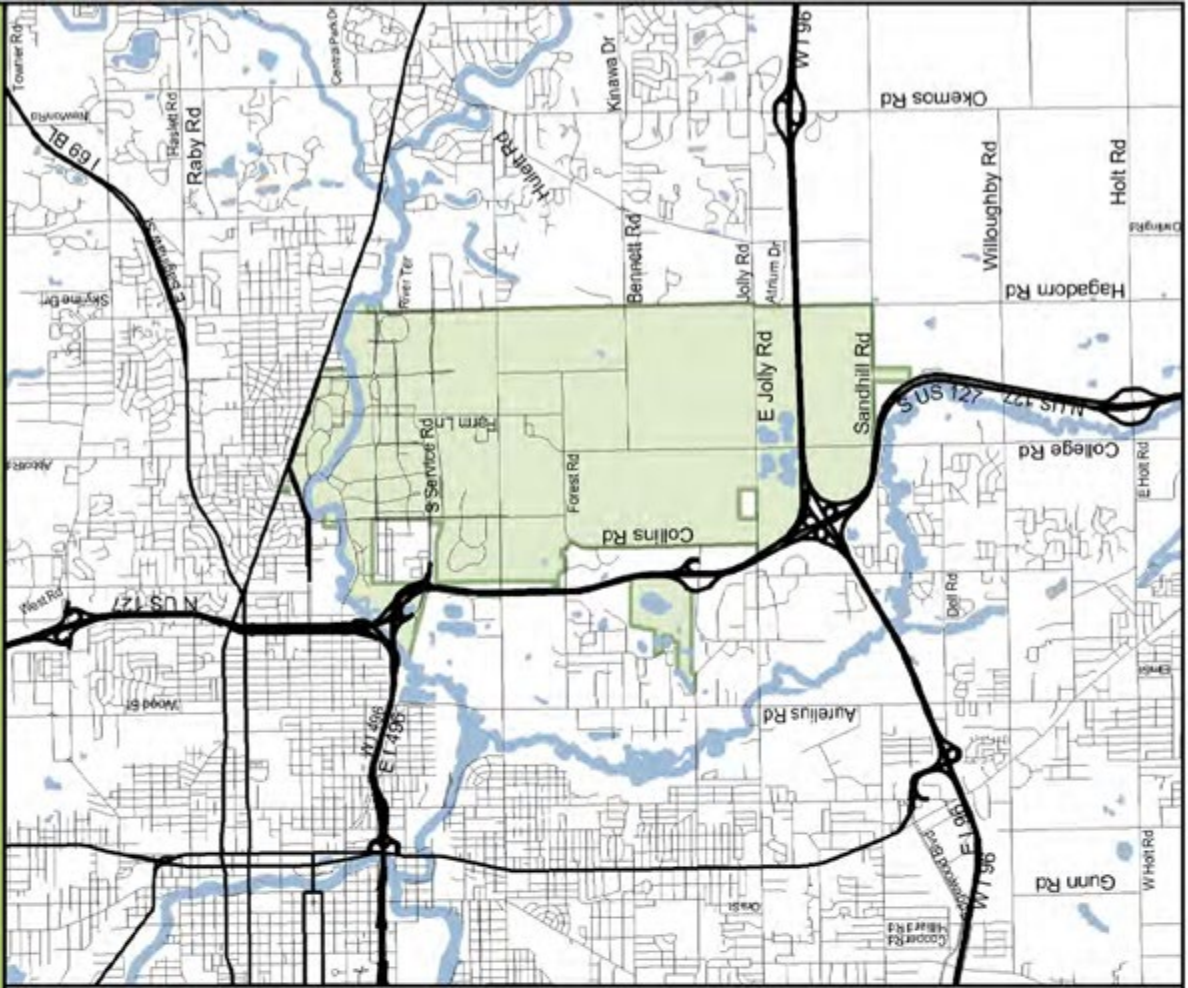


Ingham
County



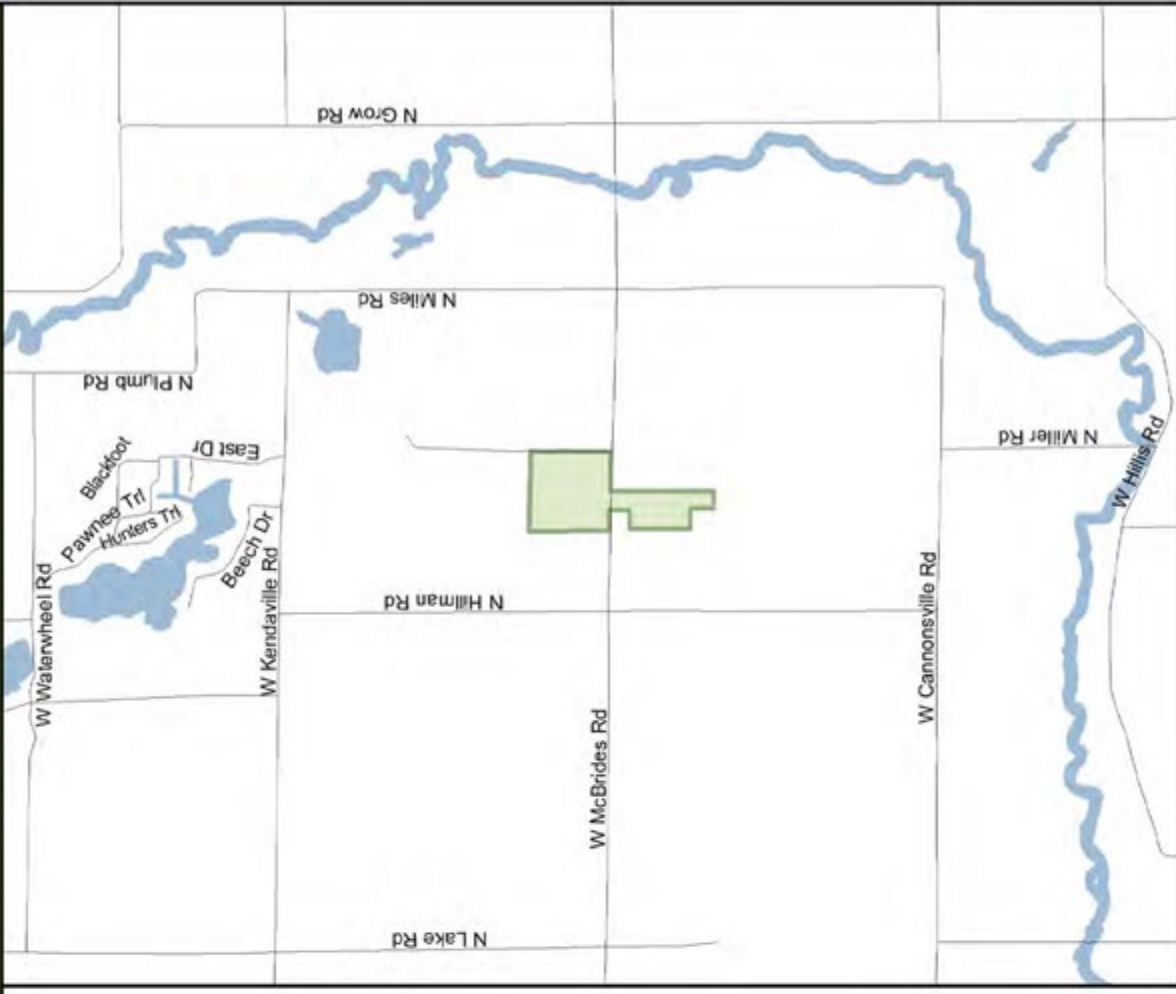
MSU Real Property

Michigan State University Campus, East Lansing Alaiedon, Delhi, Lansing, and Meridian Townships



MSU Real Property

Montcalm Research Center Douglass Township, Sections 8 and 17



| | | | | | | |
|---------------|--------------|--------------|-----------|--------------|----------|---------|
| Big Prairie | Deerfield | Hinton | Millbrook | Rolland | Fremont | Lincoln |
| Reynolds | Winfield | Cato | Belvidere | Home | Richland | Seville |
| Enley | Maple Valley | Pine | Douglas | Day | Ferris | Sumner |
| Sagon | Spencer | Montcalm | Sidney | Evergreen | Crystal | Npw |
| Cedar Springs | Courtland | Celesteville | Fairplain | Bushnell | Carson | Hayden |
| Rockford | Oakfield | Eureka | Orleans | Ronald | North | Shade |
| Plainfield | Grattan | Bellevue | Bloomer | North Plains | Bloomer | Lebanon |
| Cannon | | Otisco | | | | |

MSU Real Property

Morris Property

Oneida Twp, Sections 1 and 2; Delta Twp, Section 6; Eagle Twp, Sections 23, 25, 26, 27, 34, 35; and Watertown Twp, Section 30



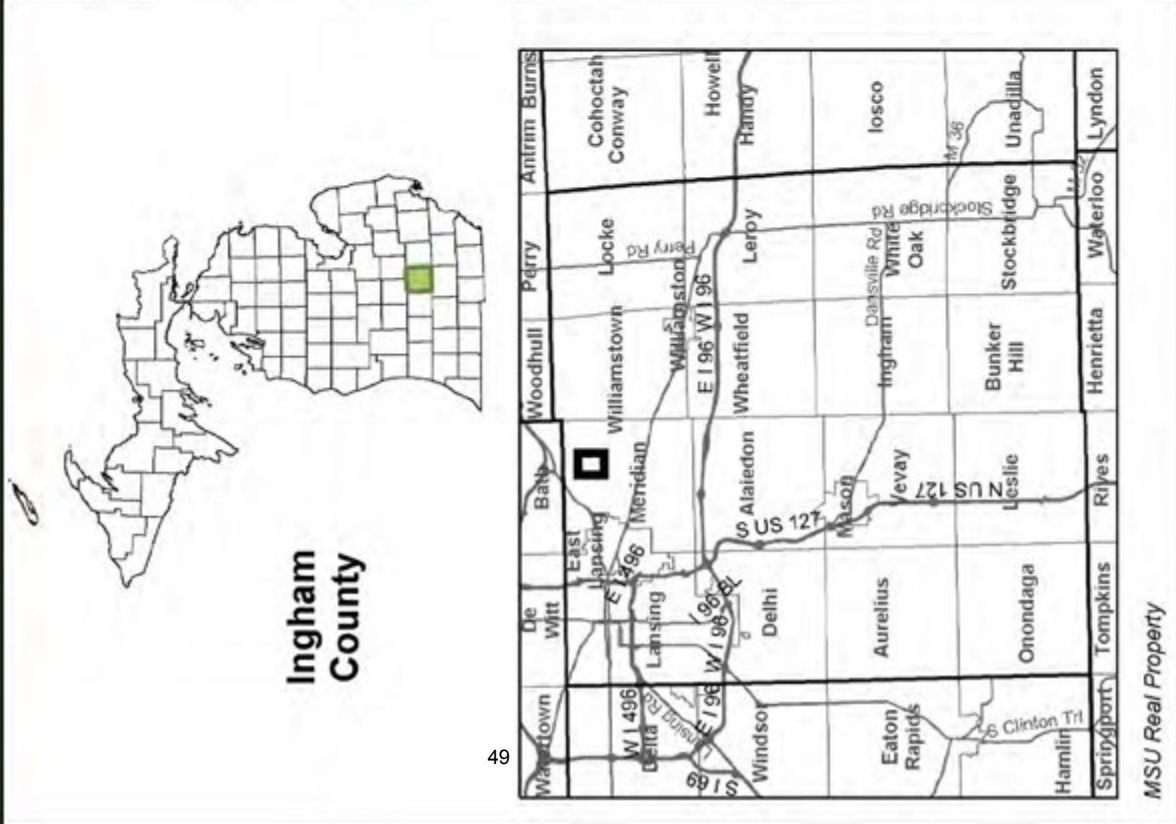
48



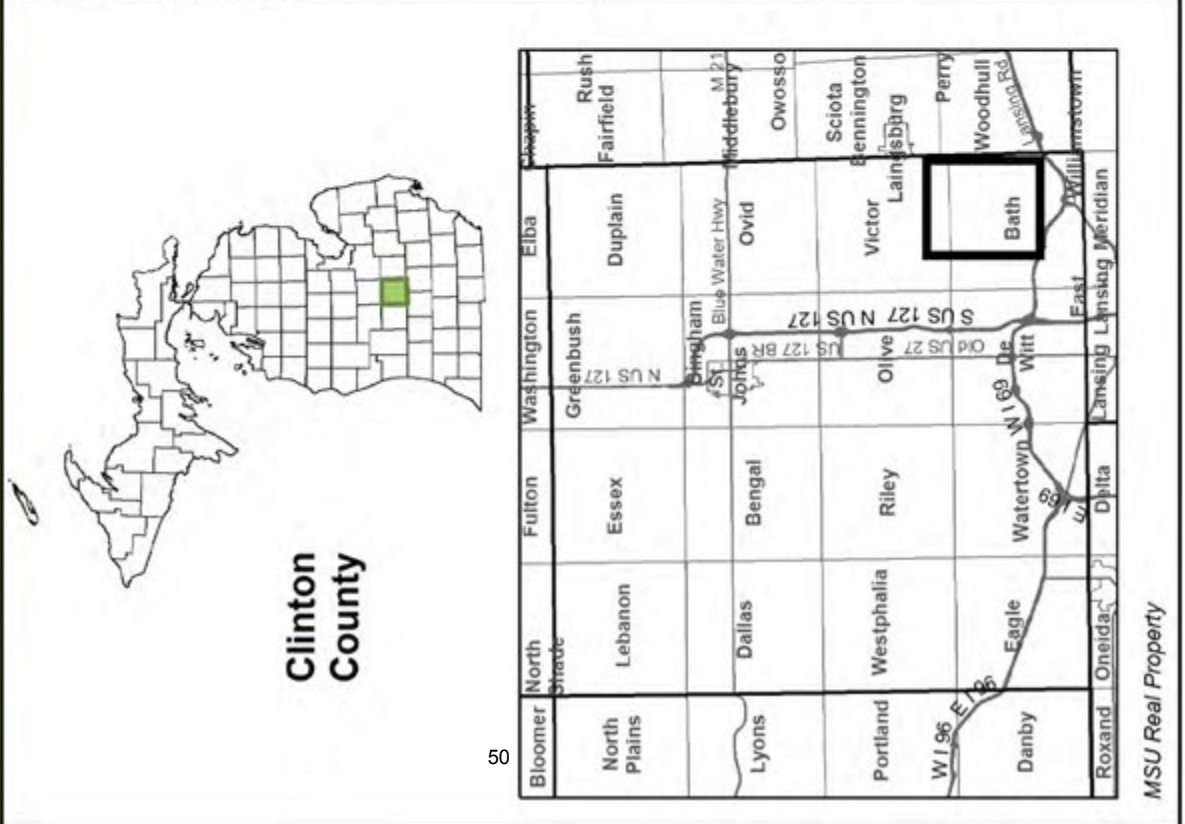
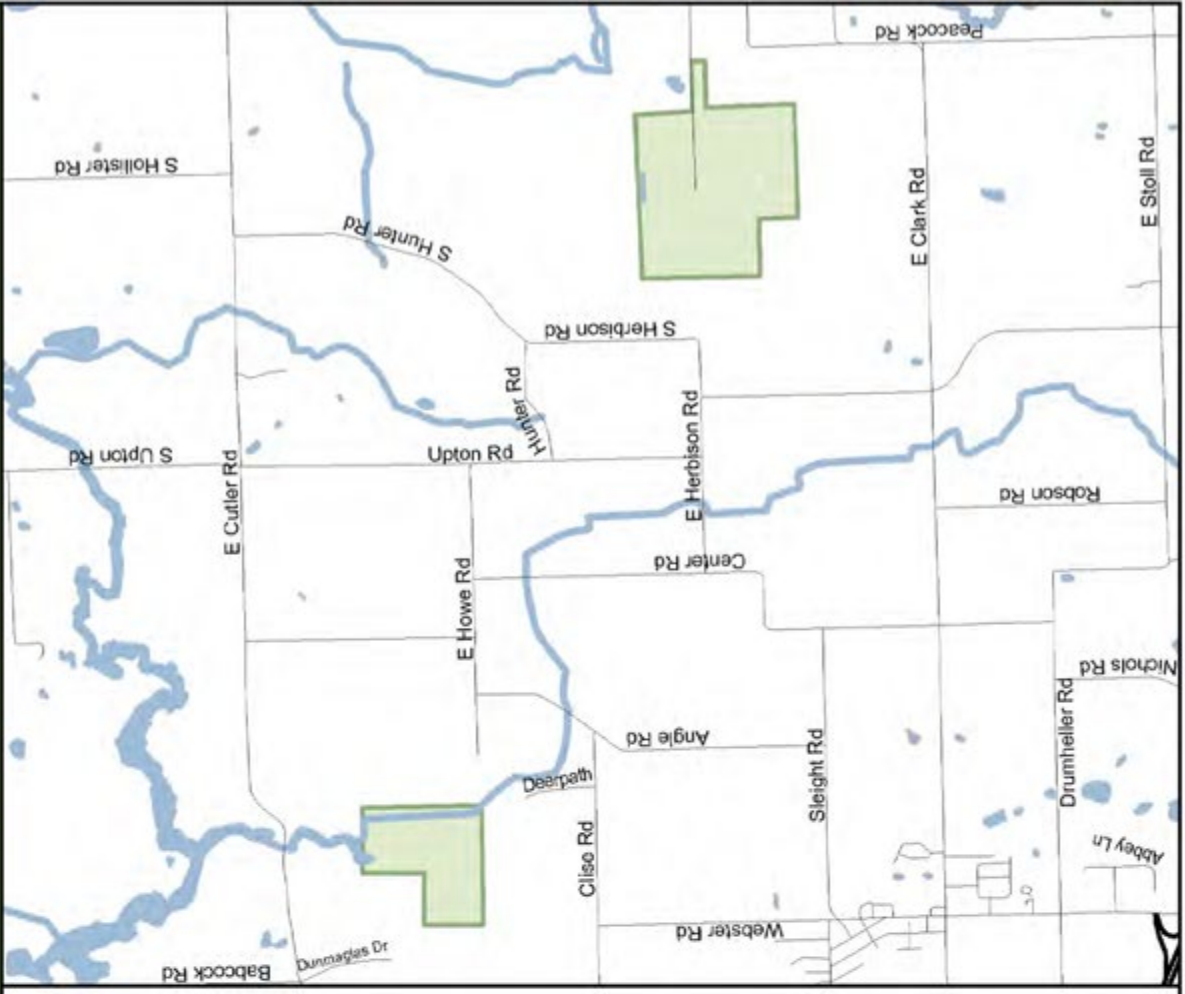
MSU Real Property



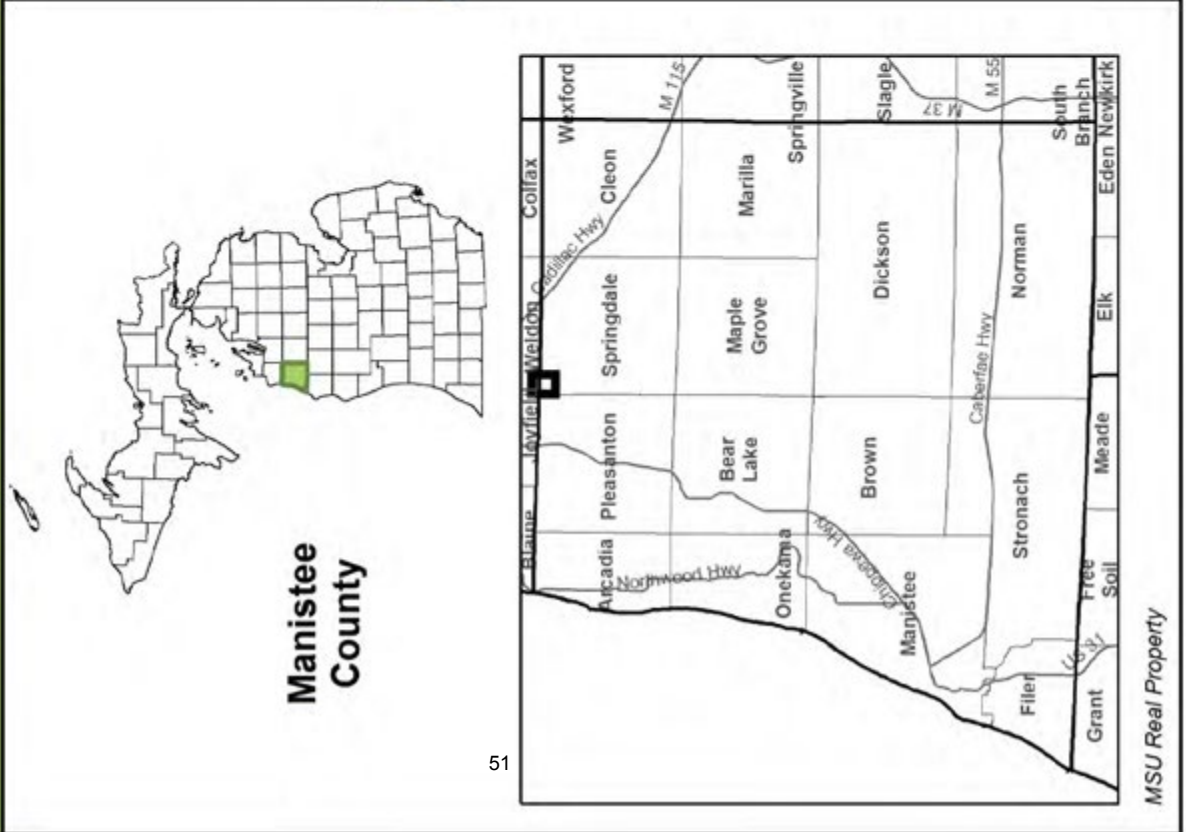
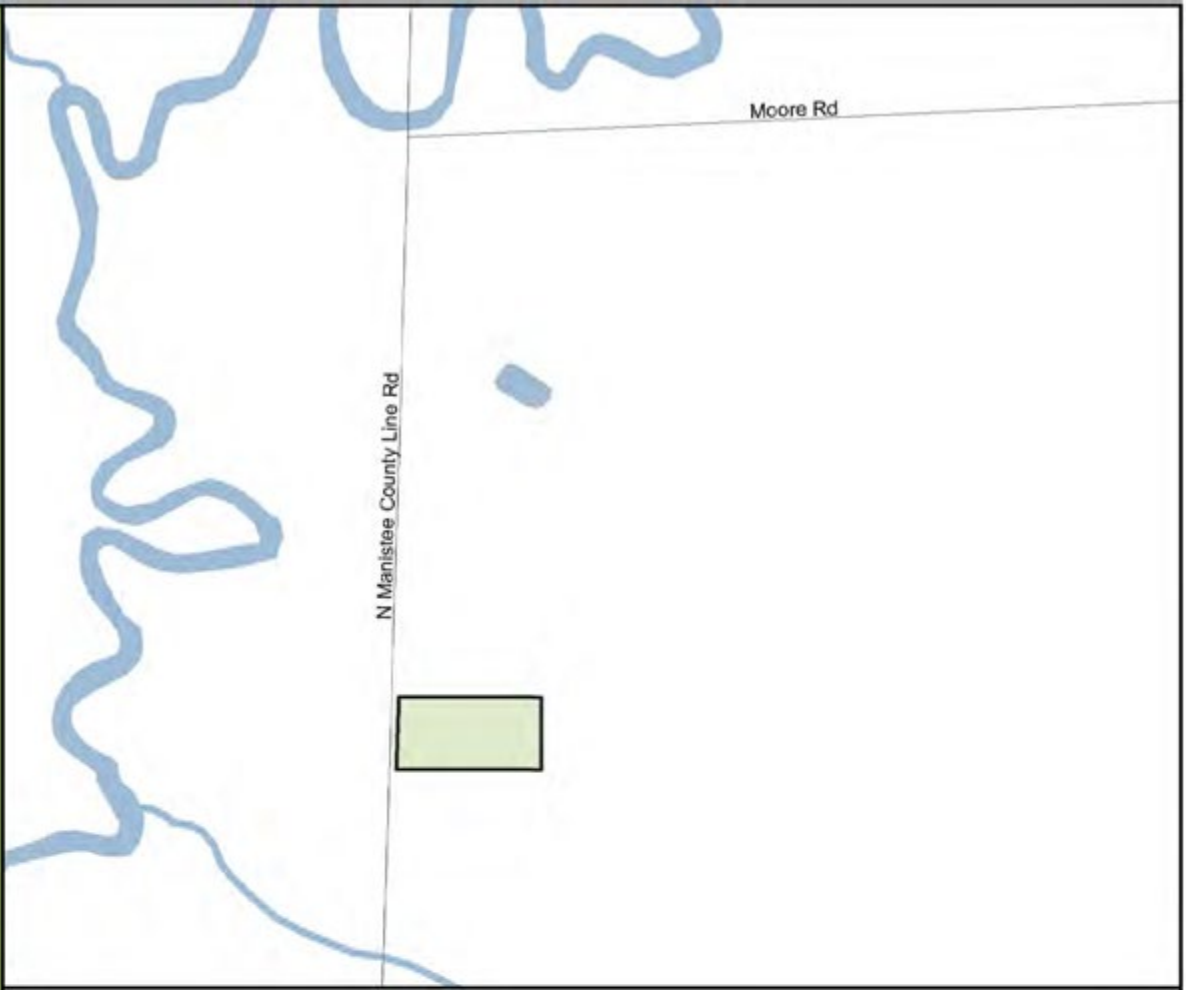
MSU Sailing Club Meridian Township, Section 11



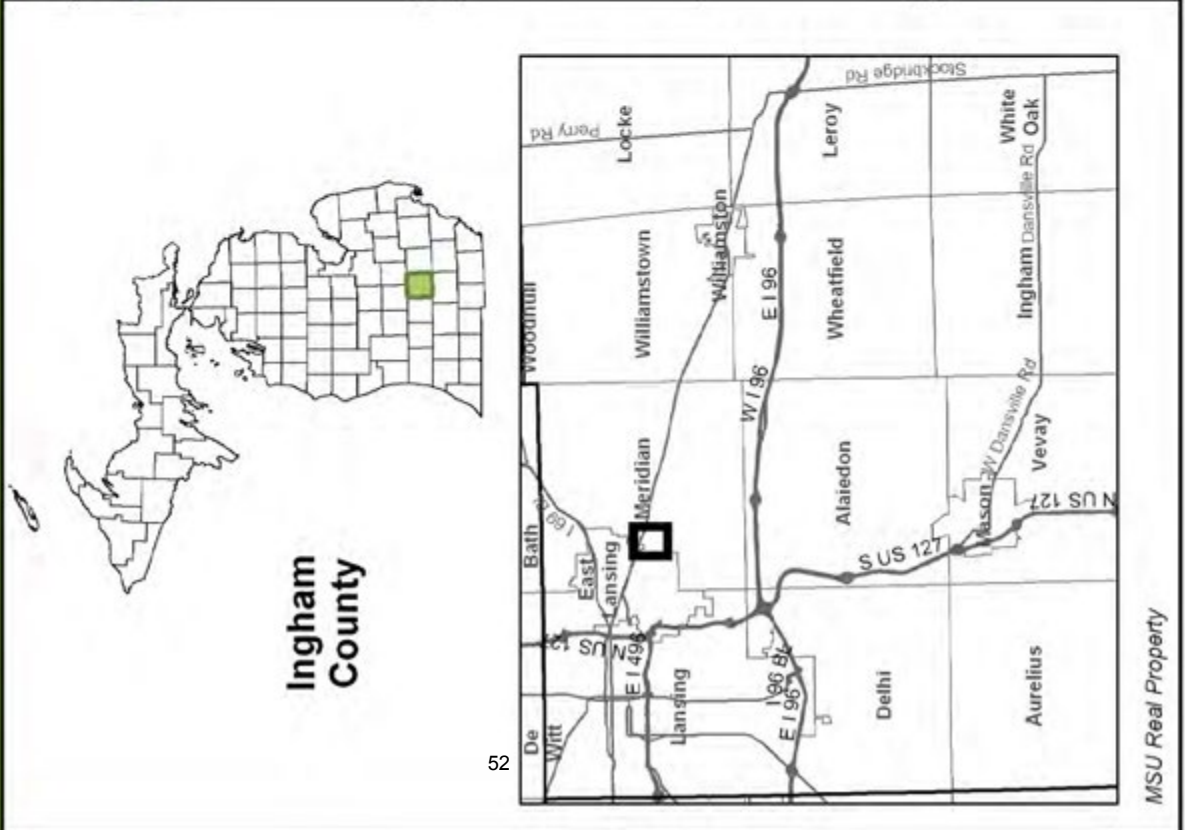
Muck Soils Research Center Bath Township, Sections 4, 5, 11, 12, 13, and 14



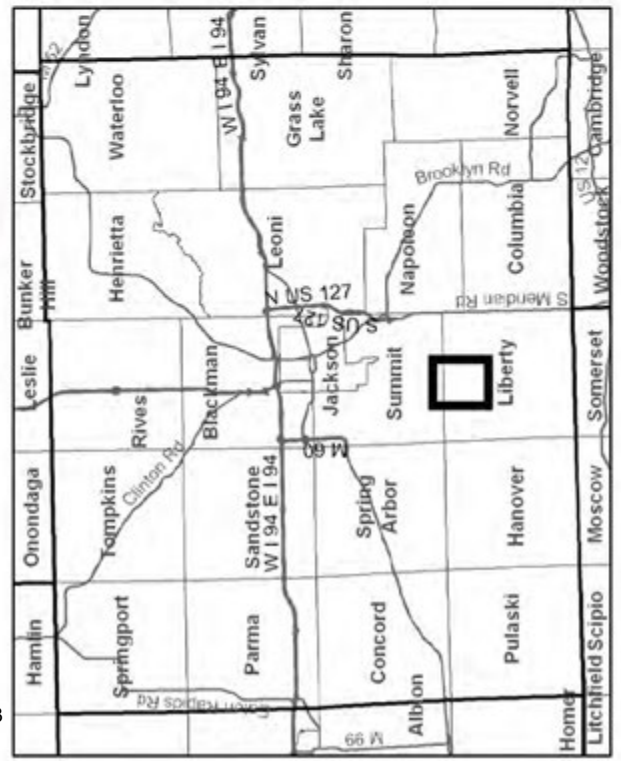
Rau Property Springdale Township, Section 6



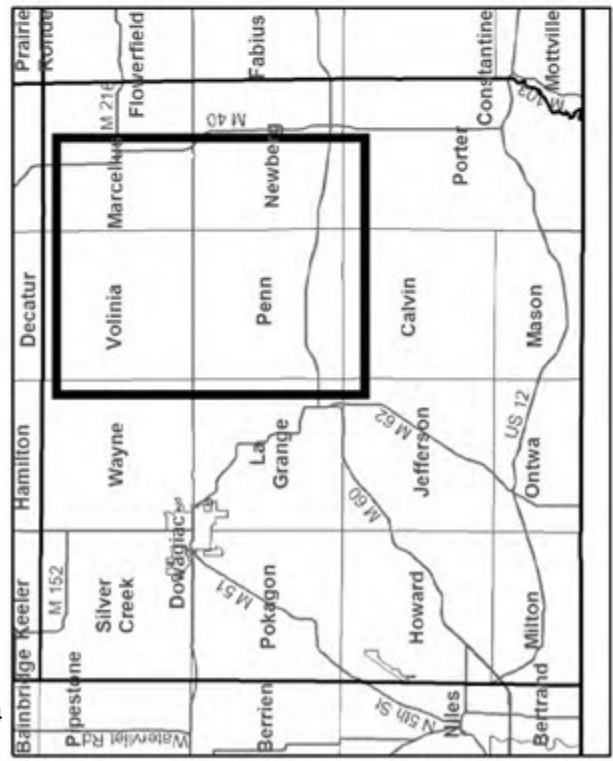
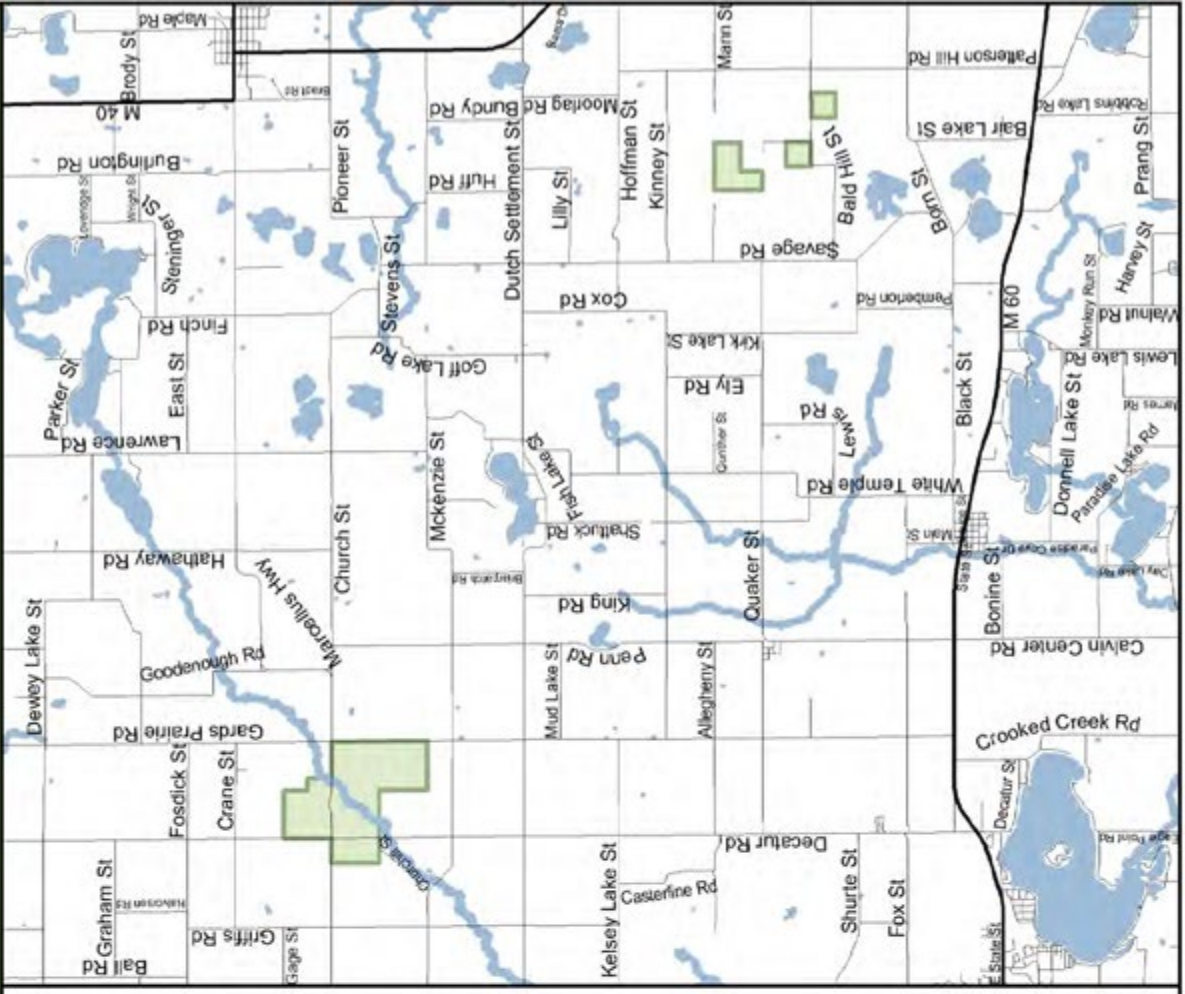
River Terrace Property Meridian Township, Section 20



Rogers Reserve Liberty Township, Section 4



Russ Forest
Cass County, Volinia Township, Sections 20, 29 and 30;
Newberg Township, Sections 16, 17, and 21

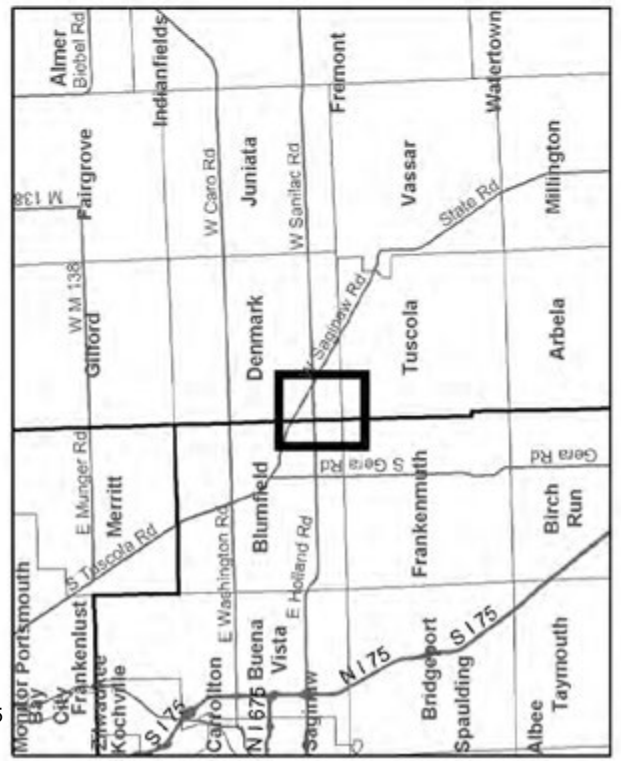


MSU Real Property

Saginaw Valley Research and Extension Center Blumfield Township, Section 25; Denmark Township, Section 31

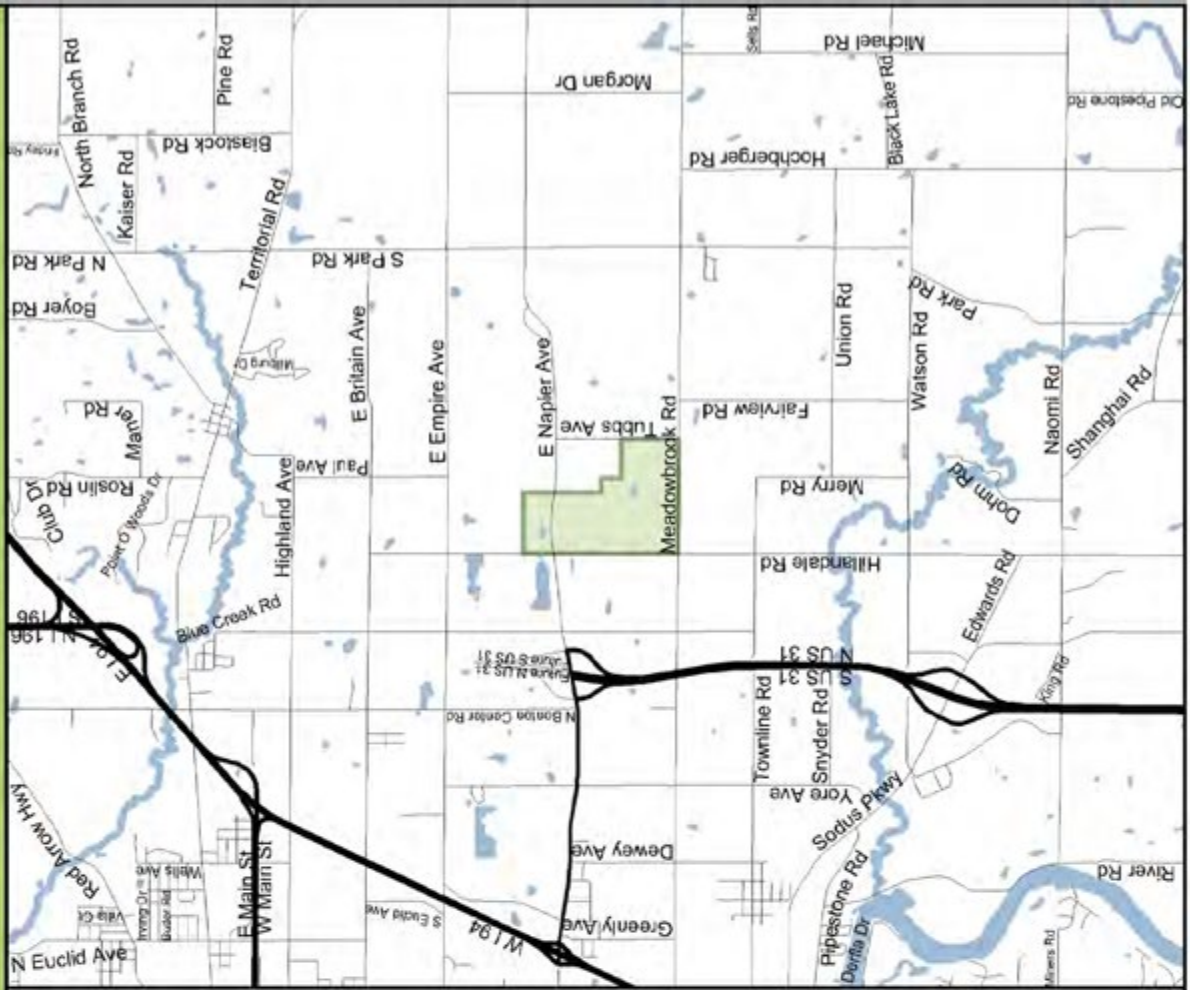


**Saginaw County &
Tuscola County**



MSU Real Property

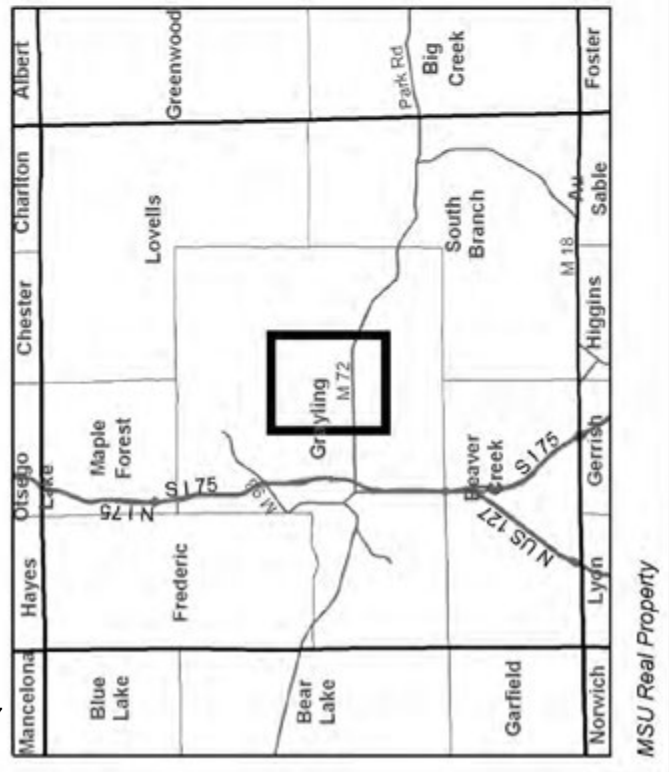
Southwest Michigan Research and Extension Center Benton Township, Sections 25 and 36



**Berrien
County**

MSU Real Property

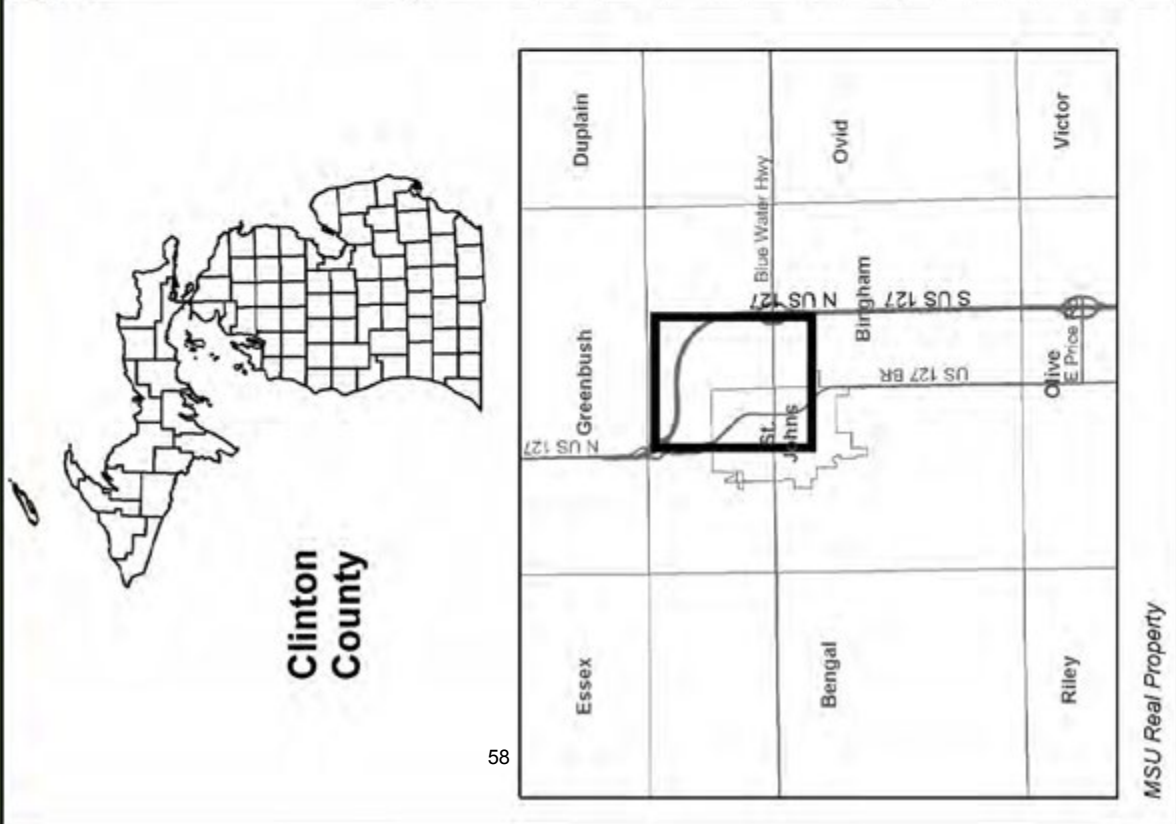
Stranahan-Bell Property (Wa Wa Sum) Grayling Township, Sections 1, 6, and 12



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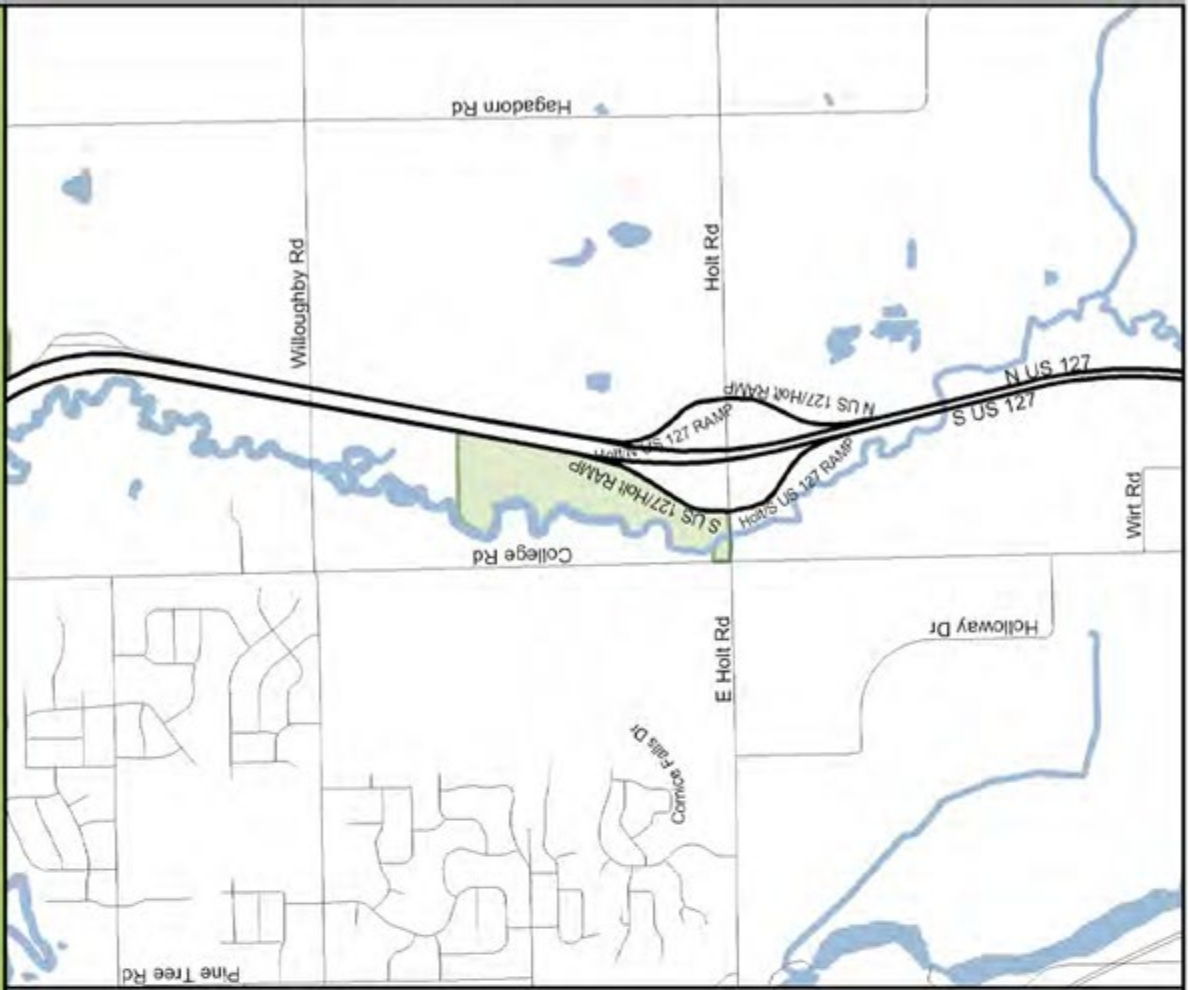
MSU Real Property

Stuckman Property Bingham Township, Section 10



Sycamore Creek Property

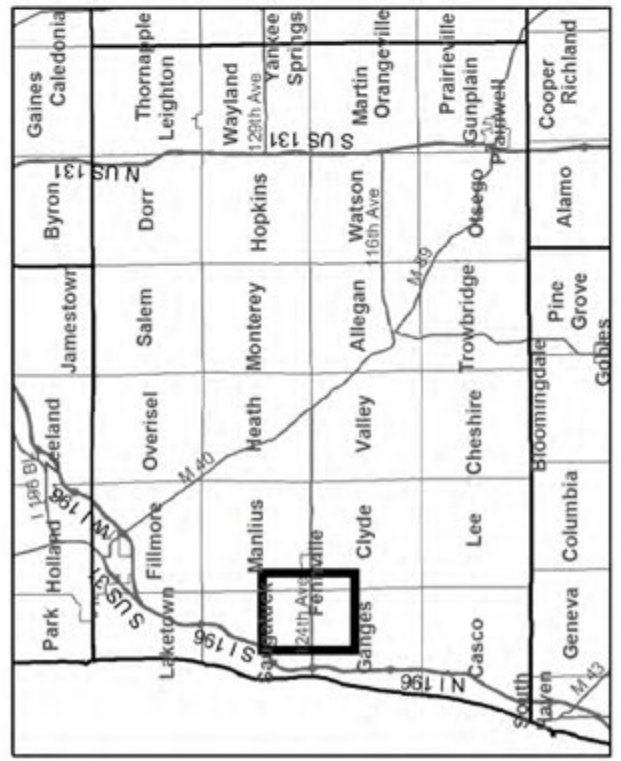
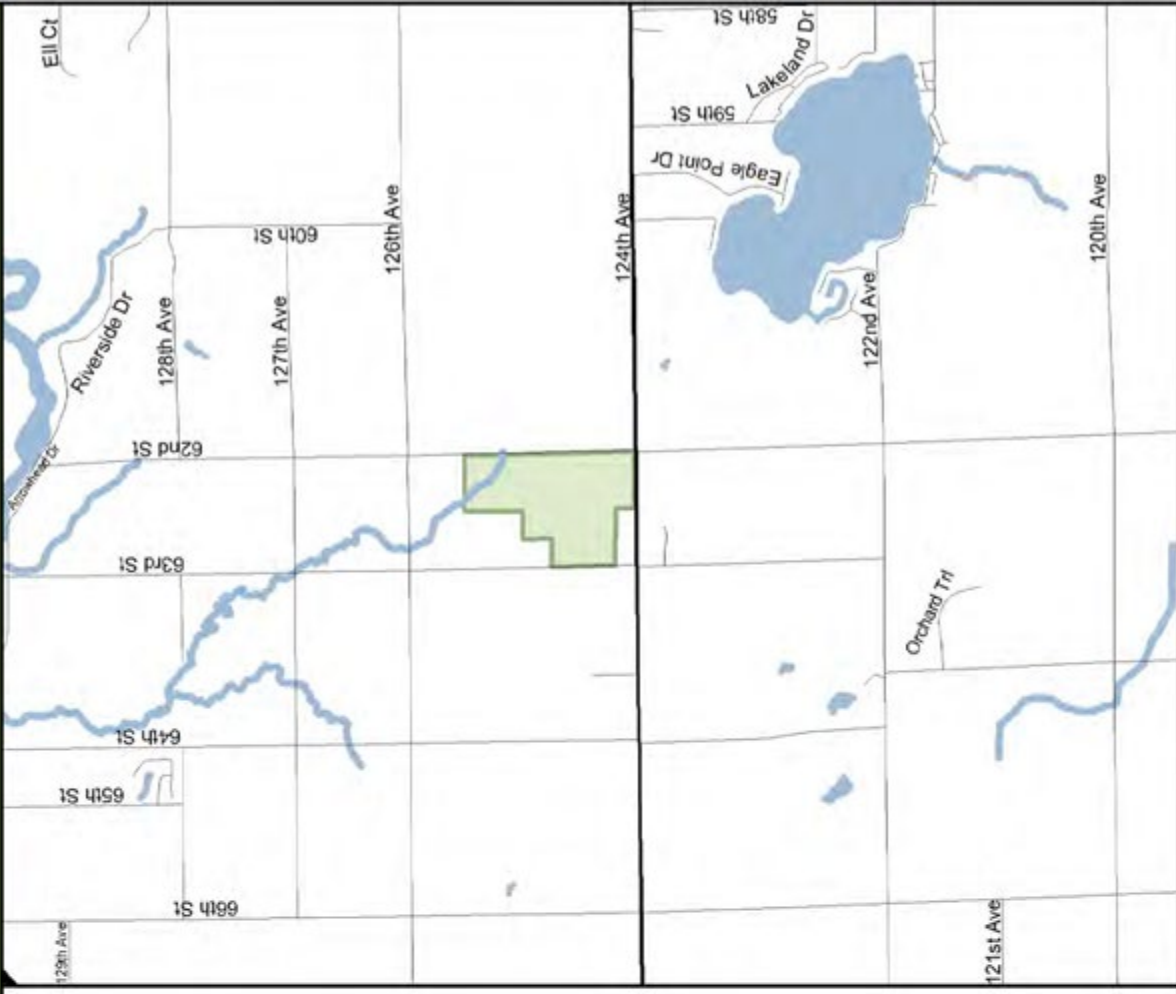
Alaiedon Township, Section 18



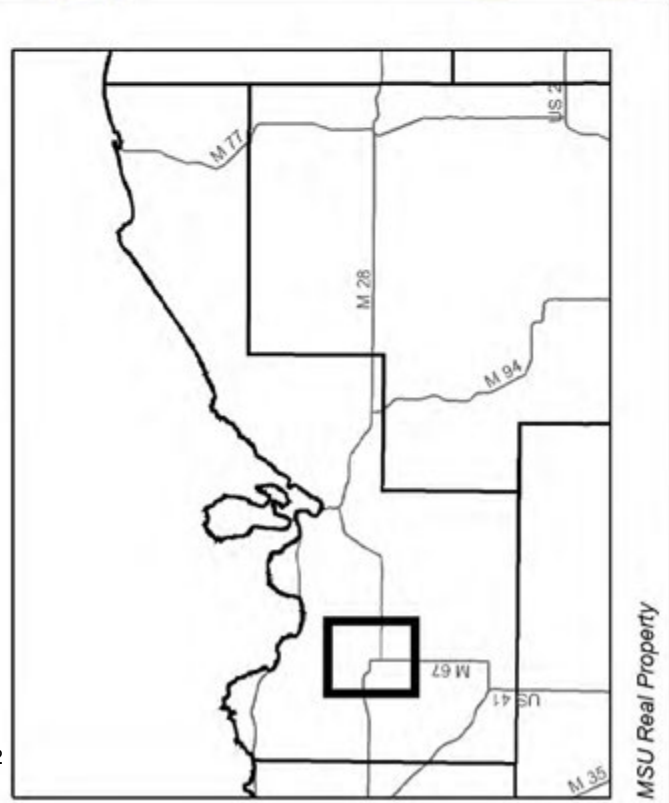
Tollgate Education Center and Americana Foundation Property City of Novi, Section 11



Trevor Nichols Research Center Saugatuck Township, Section 35



Upper Peninsula Research Center City of Chatham and Rock River Township, Sections 24, 25, 27, 28, and 34

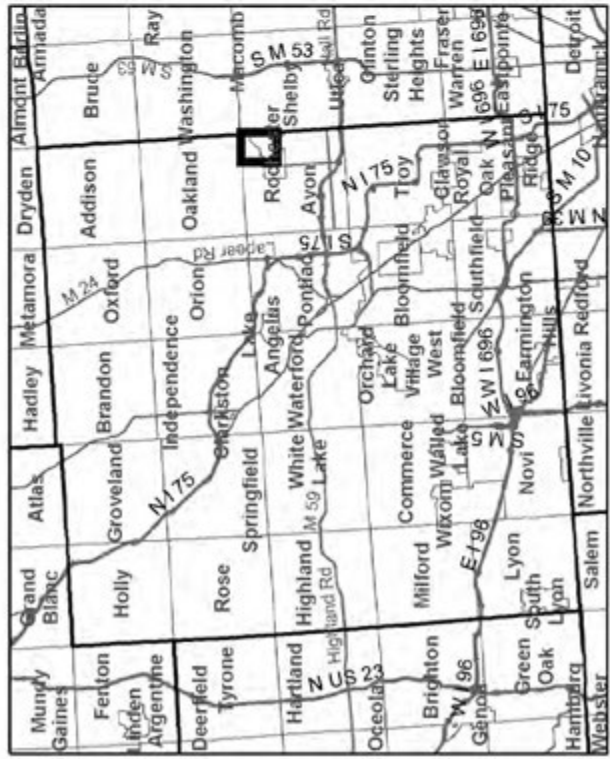


Van Hoosen Property Avon Township, Section 1



**Oakland
County**

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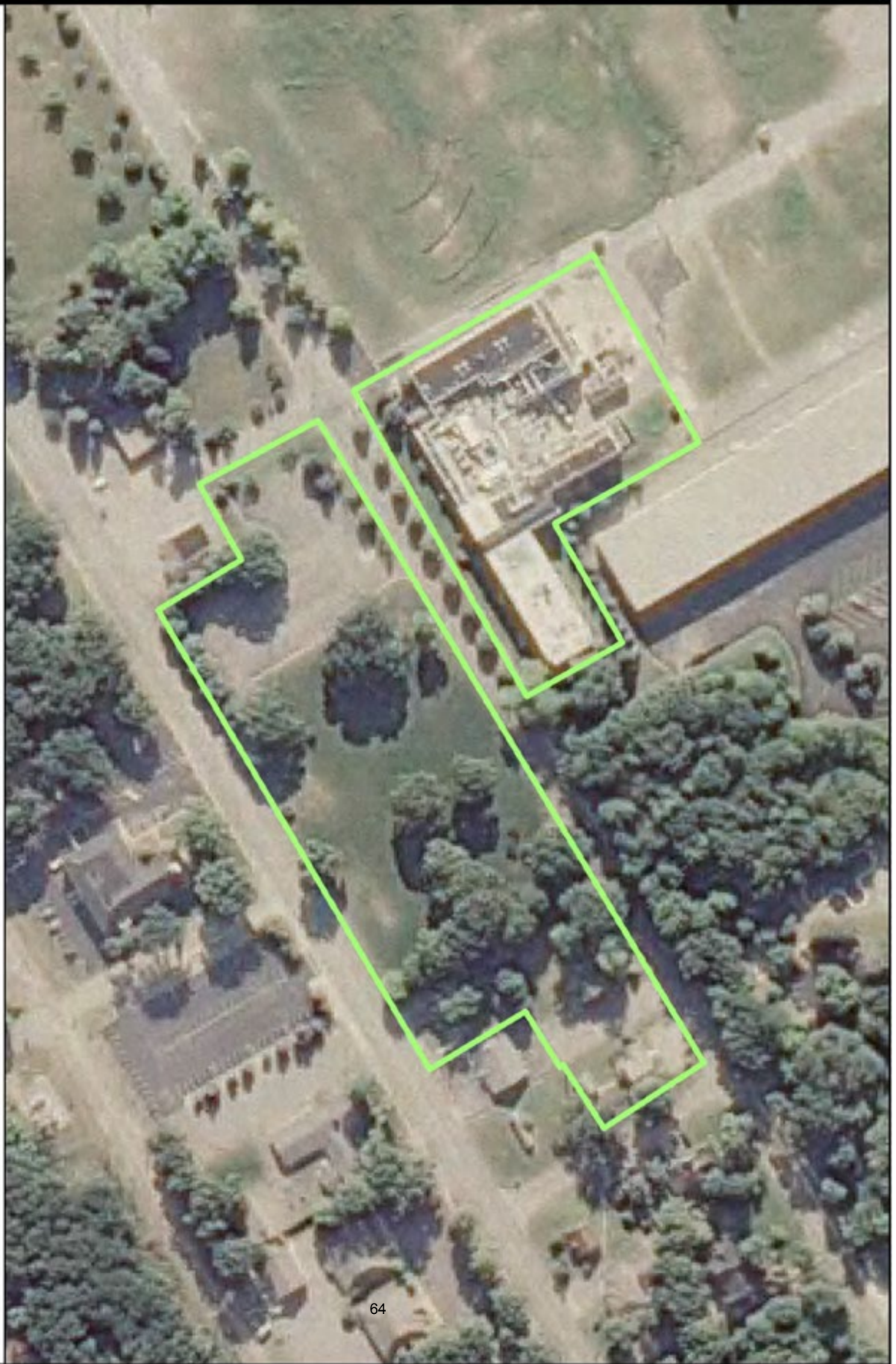


MSU Real Property

BioEconomy Research and Development Center

Ottawa County, Holland Township, Section 19

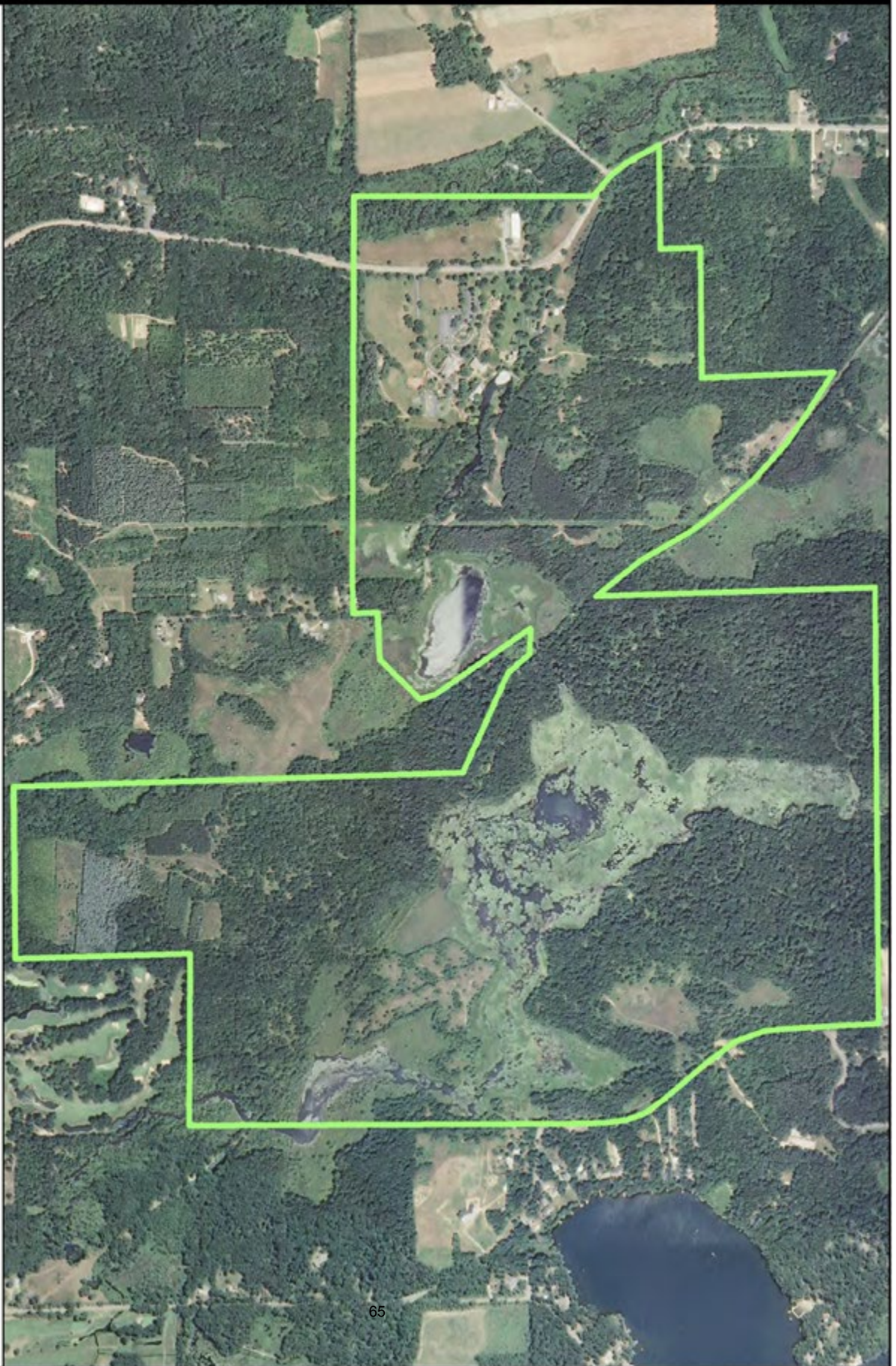
Image Year: 2009



Brook Lodge

Kalamazoo County, Ross Township, Section 21, 27, 28, and 29

Image Year: 2009



Clarksville Research Center

Ionla County, Boston Township, Sections 27, 28, and 33

Image Year: 2010



Dobie Road Property
Ingham County, Meridian Township, Section 27

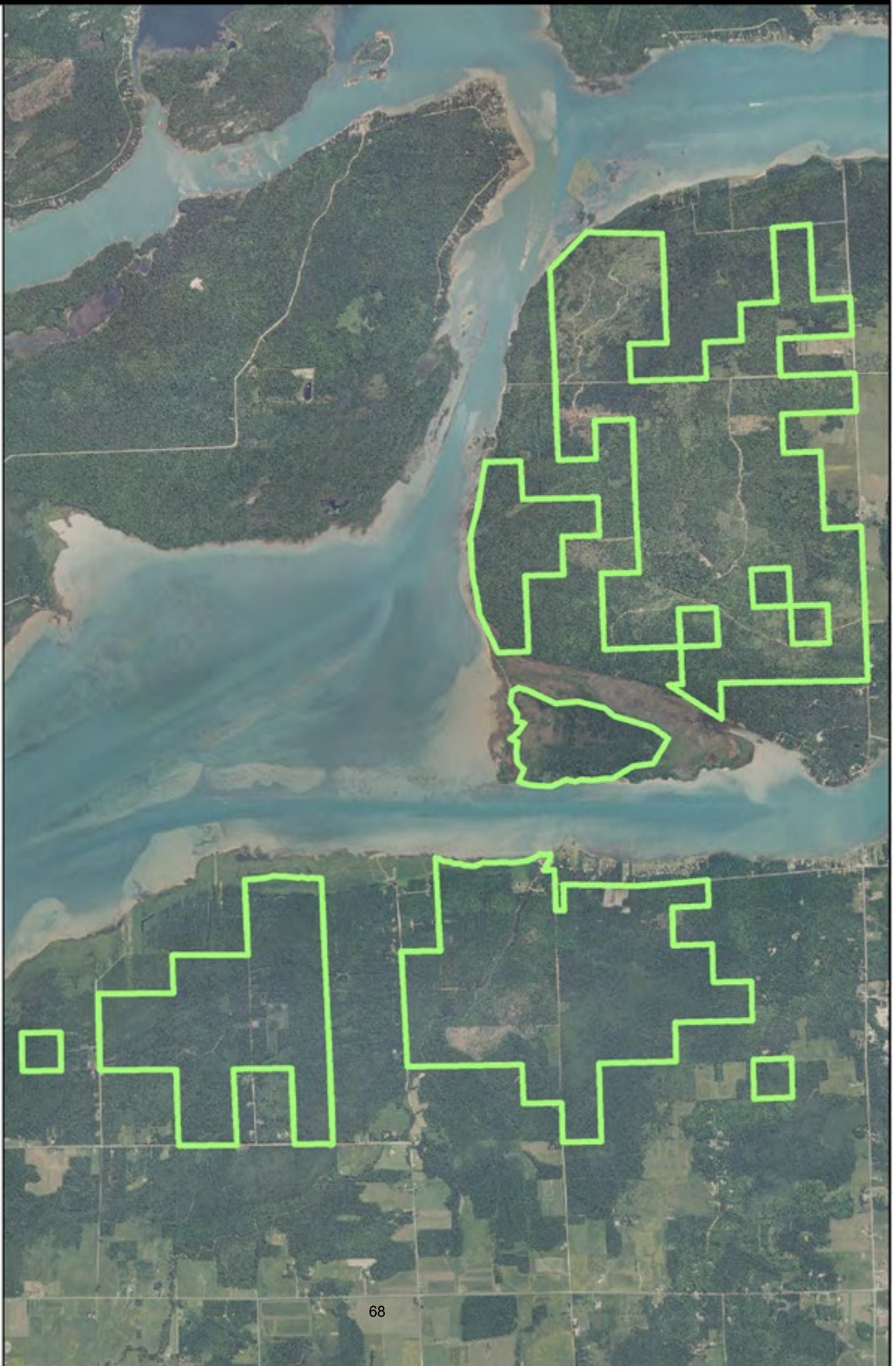
Image Year: 2009



Dunbar Forest

Chippewa County, Soo Township, Sections 3, 4, 5, 8, 9, 10, 11, 14, 15, and 16;
Bruce Township, Sections 1, 6, 7, 12, 13, 24, 25, 30, 31, and 36

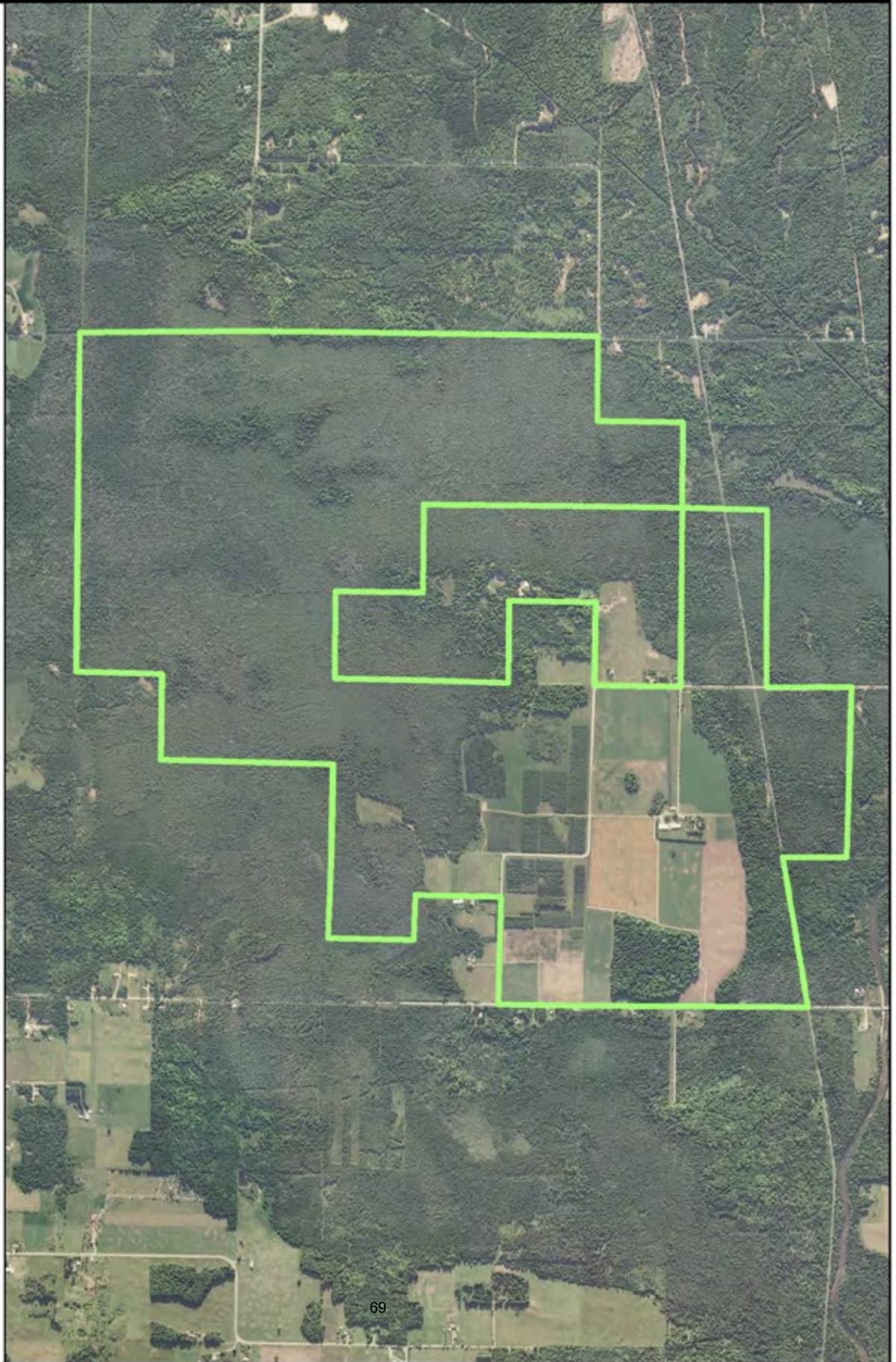
Image Year: 2010



Forest Biomass Innovation Center

Delta County, Wells Township, Sections 8, 17, 18, 19, and 20

Image Year: 2009



Gantos Property

Kent County, Kentwood Township, Section 23

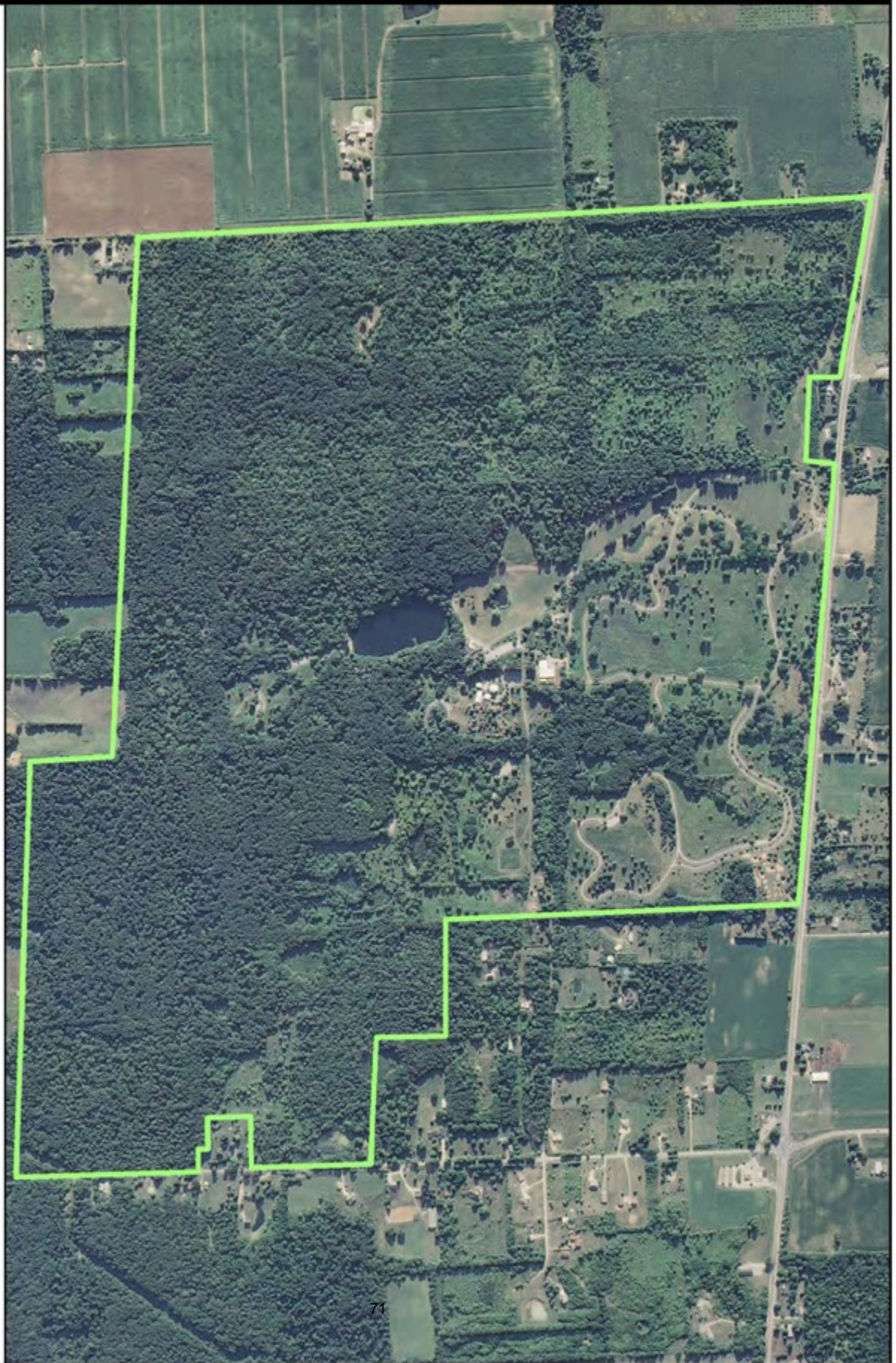
Image Year: 2009



Hidden Lake Gardens

Lenawee County, Franklin Township, Sections 17, 18, 19, and 20

Image Year: 2009



Hulett Road Engineering

Ingham County, Alameda Township, Section 5

Image Year: 2009



College of Human Medicine - Grand Rapids

Kent County, Grand Rapids Township, Section 19

Image Year: 2012



Jolly Road Engineering and Civil Infrastructure Lab

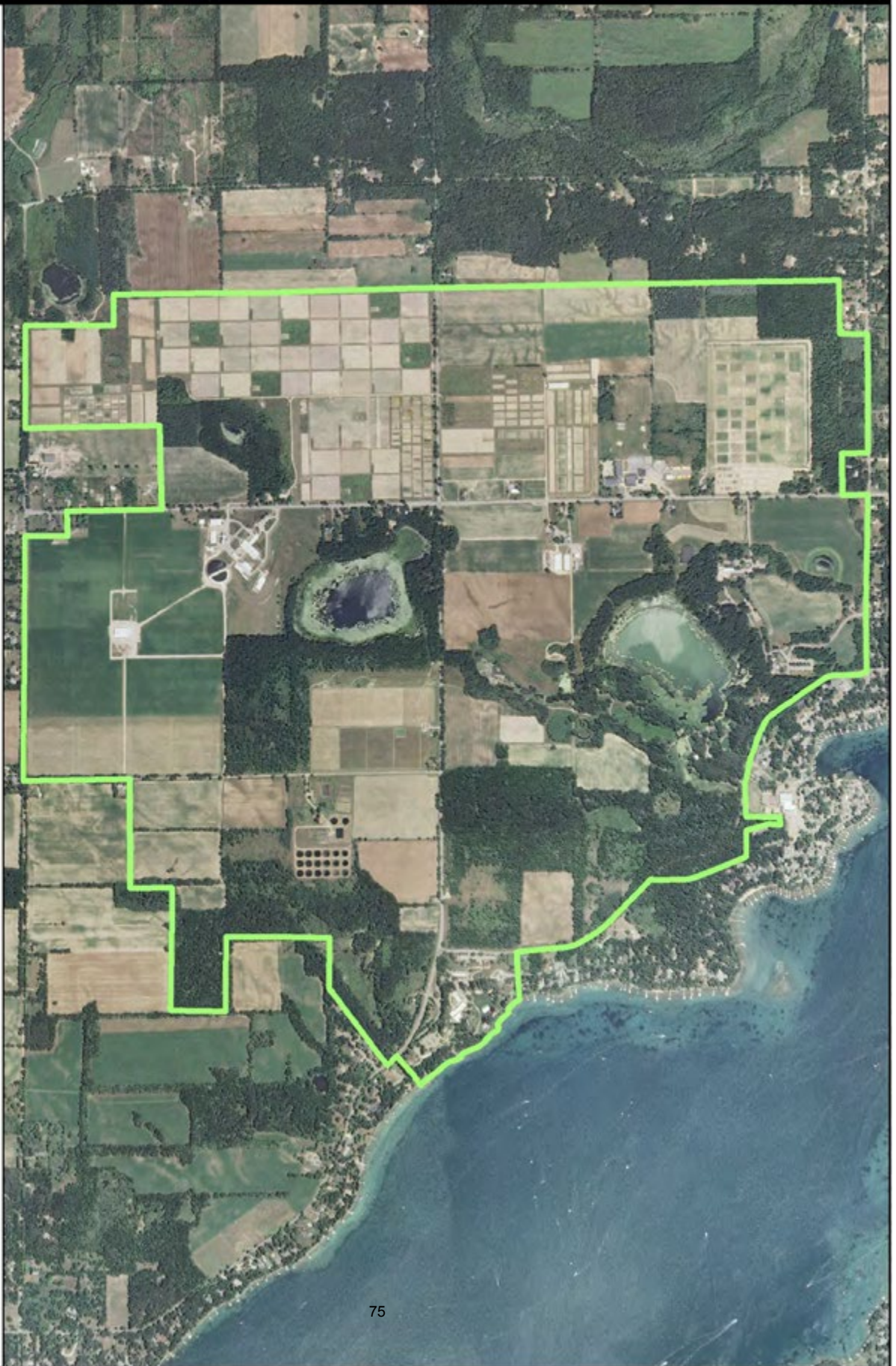
Ingham County, Alameda Township, Section 5

Image Year: 2009



W.K. Kellogg Biological Station, Bird Sanctuary, and Farm
Kalamazoo County, City of South Gull Lake and Ross Township,
Sections 4, 5, 6, 8, and 9

Image Year: 2009



W.K. Kellogg Biological Station (Lux Arbor Reserve)

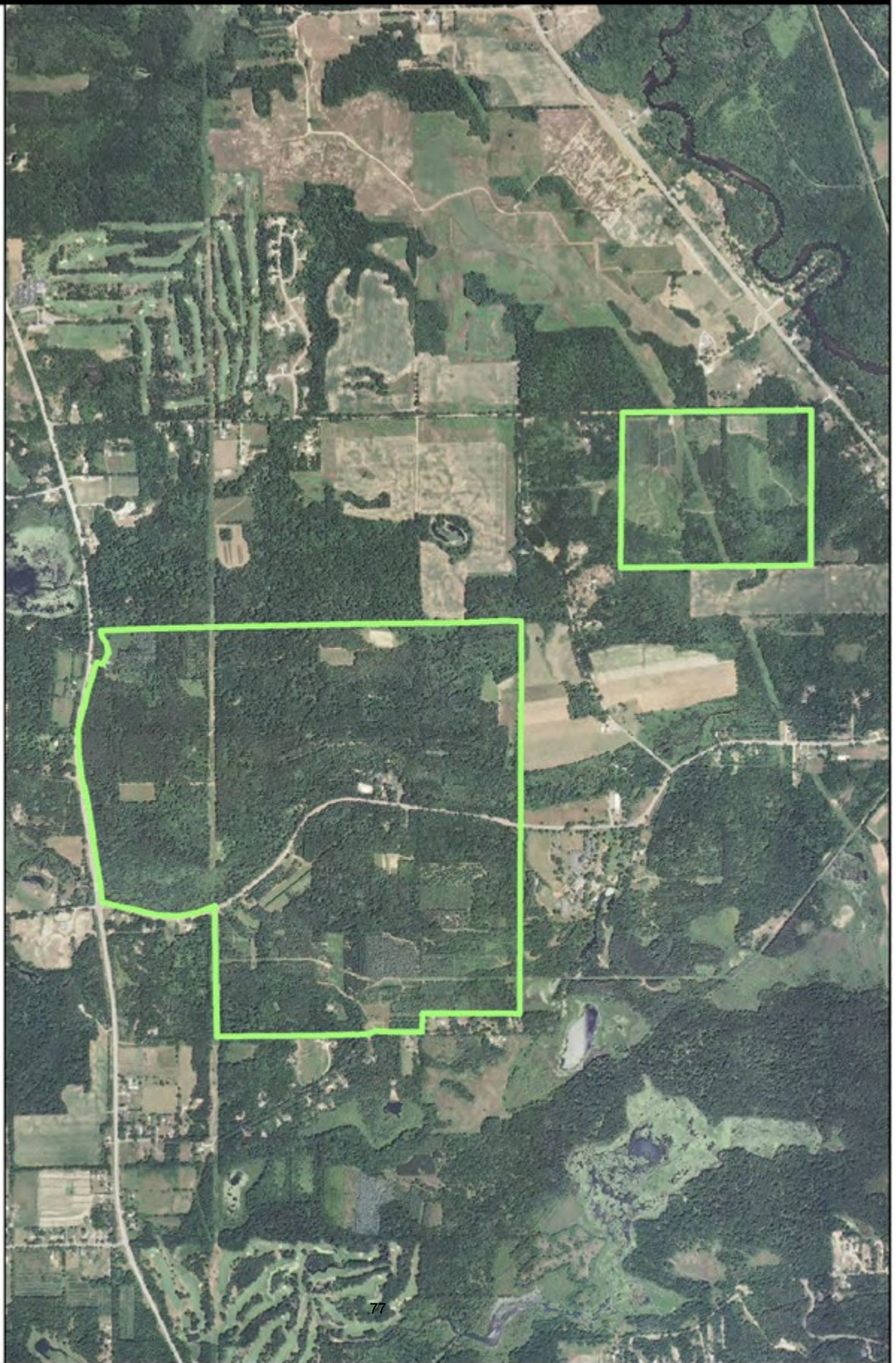
Barry County, Prairieville Township, Sections 10, 11, 14, and 15

Image Year: 2009



W.K. Kellogg Experimental Forest
Kalamazoo County, Ross Township, Sections 21, 22, 27, and 28

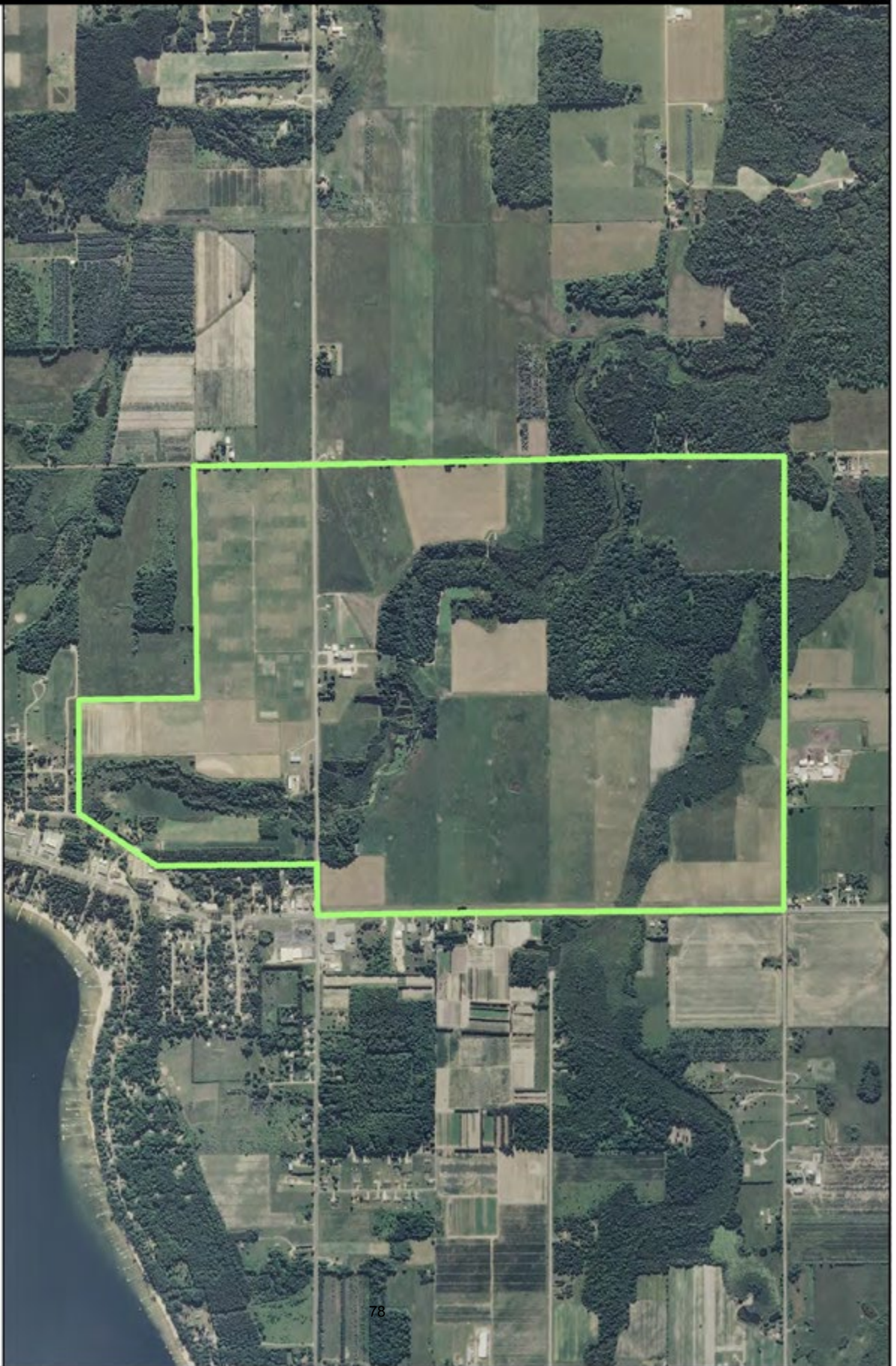
Image Year: 2009



Lake City Research Center

Missaukee County, Reeder Township, Sections 7 and 18

Image Year: 2010



Leland Property

Leelanau County, Leland Township, Section 9

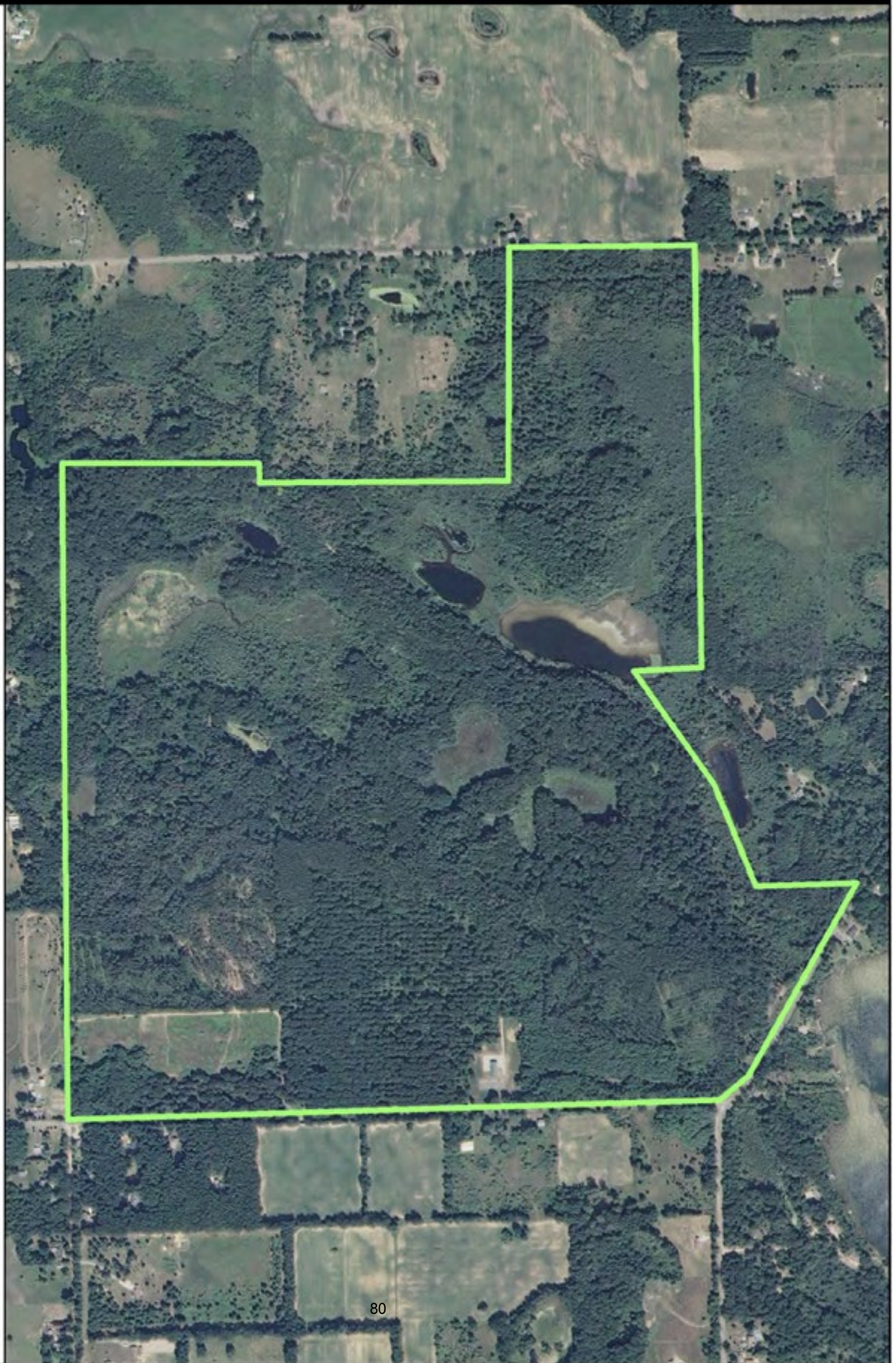
Image Year: 2009



MacCready Forest and Wildlife Reserve

Jackson County, Liberty Township, Sections 11 and 14

Image Year: 2009



Management Education Center, Troy

Oakland County, City of Troy, Section 9

Image Year: 2009



MSU Property

Image Year: 2010

Marshall Property

Barry County, Barry Township, Section 25



Martin Property (Rose-Dell Seed Orchard)

Calhoun County, Albion Township, Sections 23 and 24

Image Year: 2009



Mason Research Farm

Ingham County, Alaiedon Township, Section 21

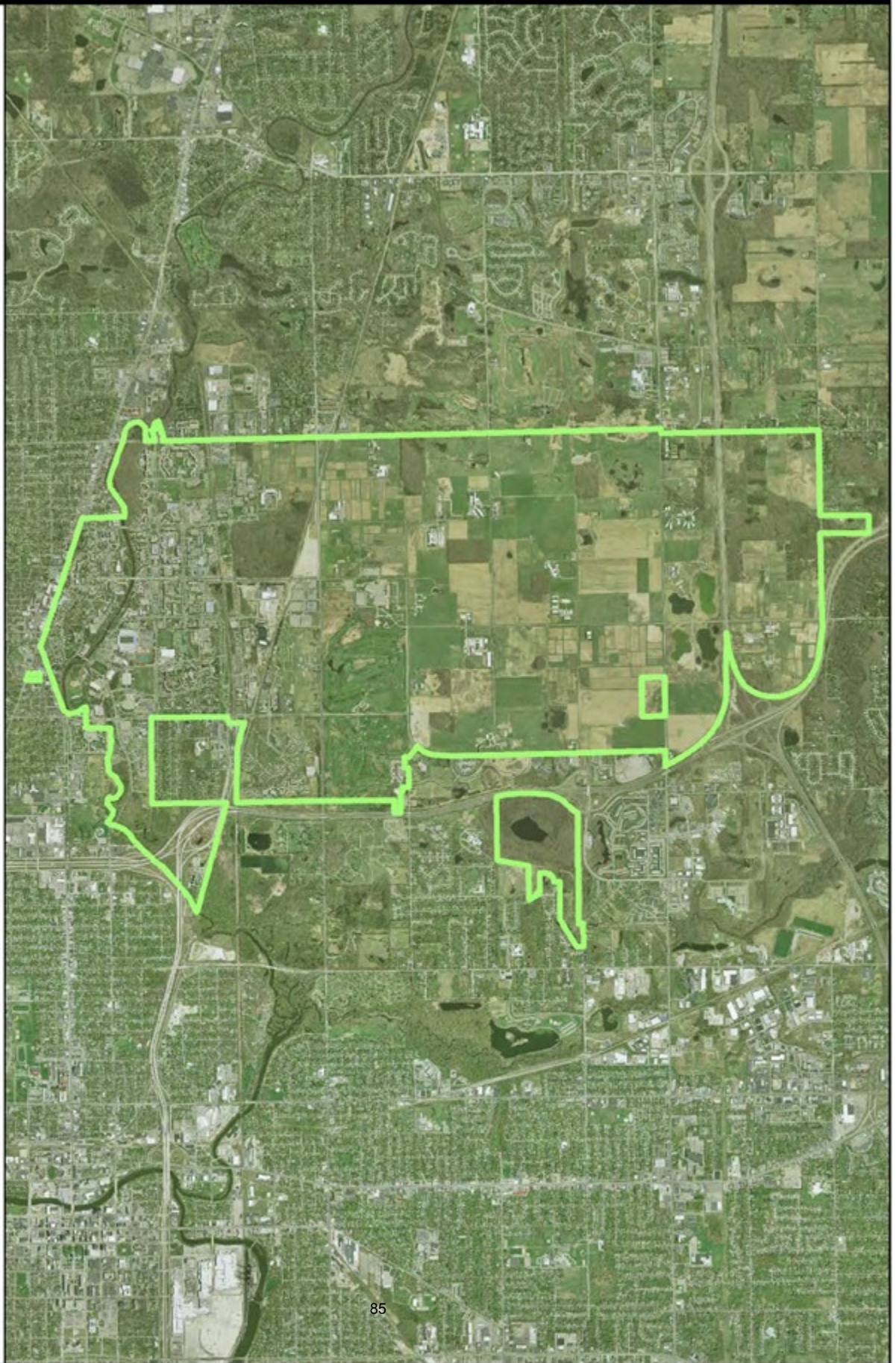
Image Year: 2009



Michigan State University Campus, East Lansing

Ingham County, Alaiedon, Delhi, Lansing, and Meridian Townships

Image Year: 2010



Montcalm Research Center

Montcalm County, Douglass Township, Sections 8 and 17

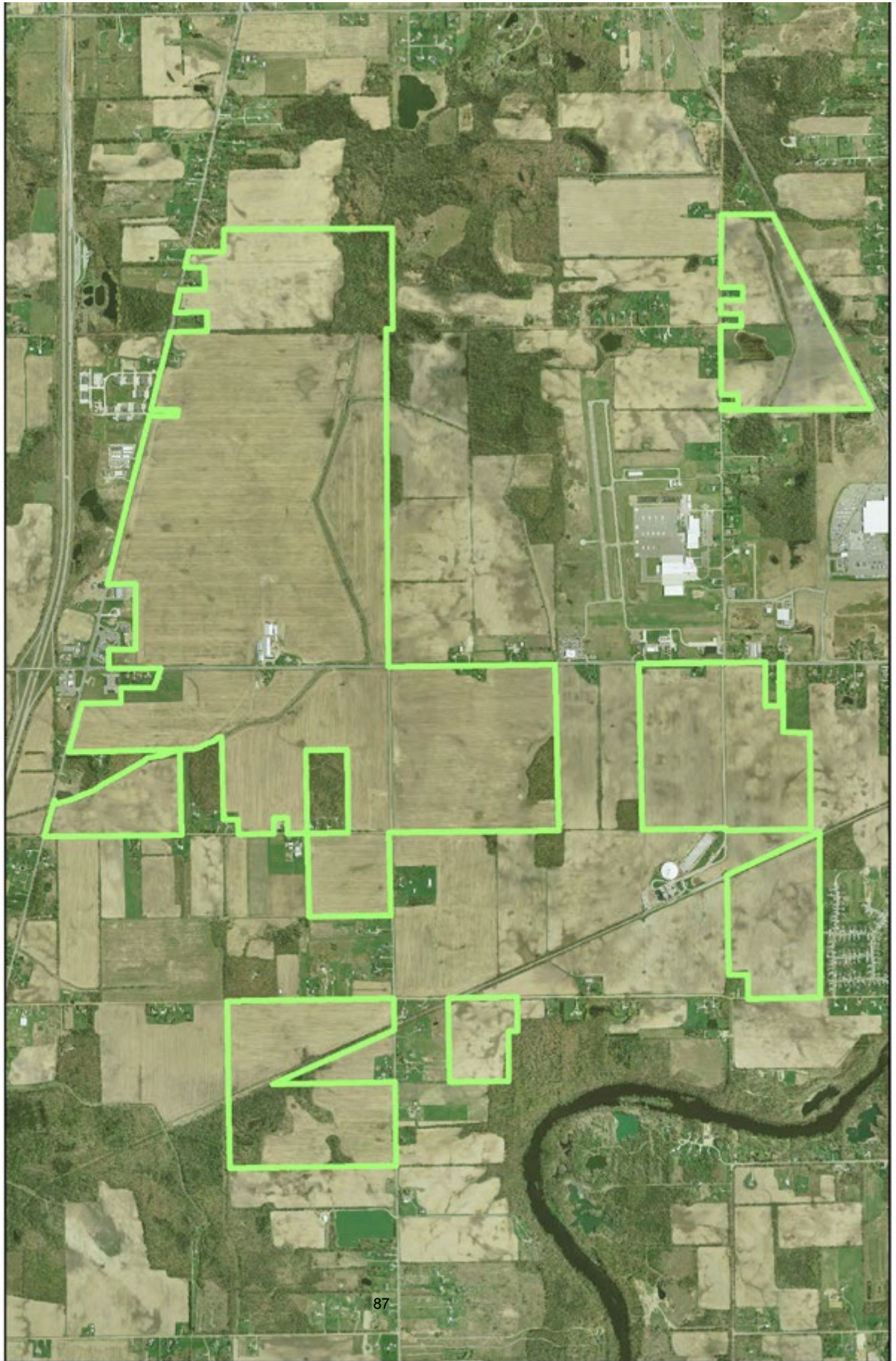
Image Year: 2010



Morris Property

Clinton & Eaton Counties, Oneida Twp, Sections 1 and 2; Delta Twp, Section 6;
Eagle Twp, Sections 23, 25, 26, 27, 34, 35; and Watertown Twp, Section 30

Image Year: 2010



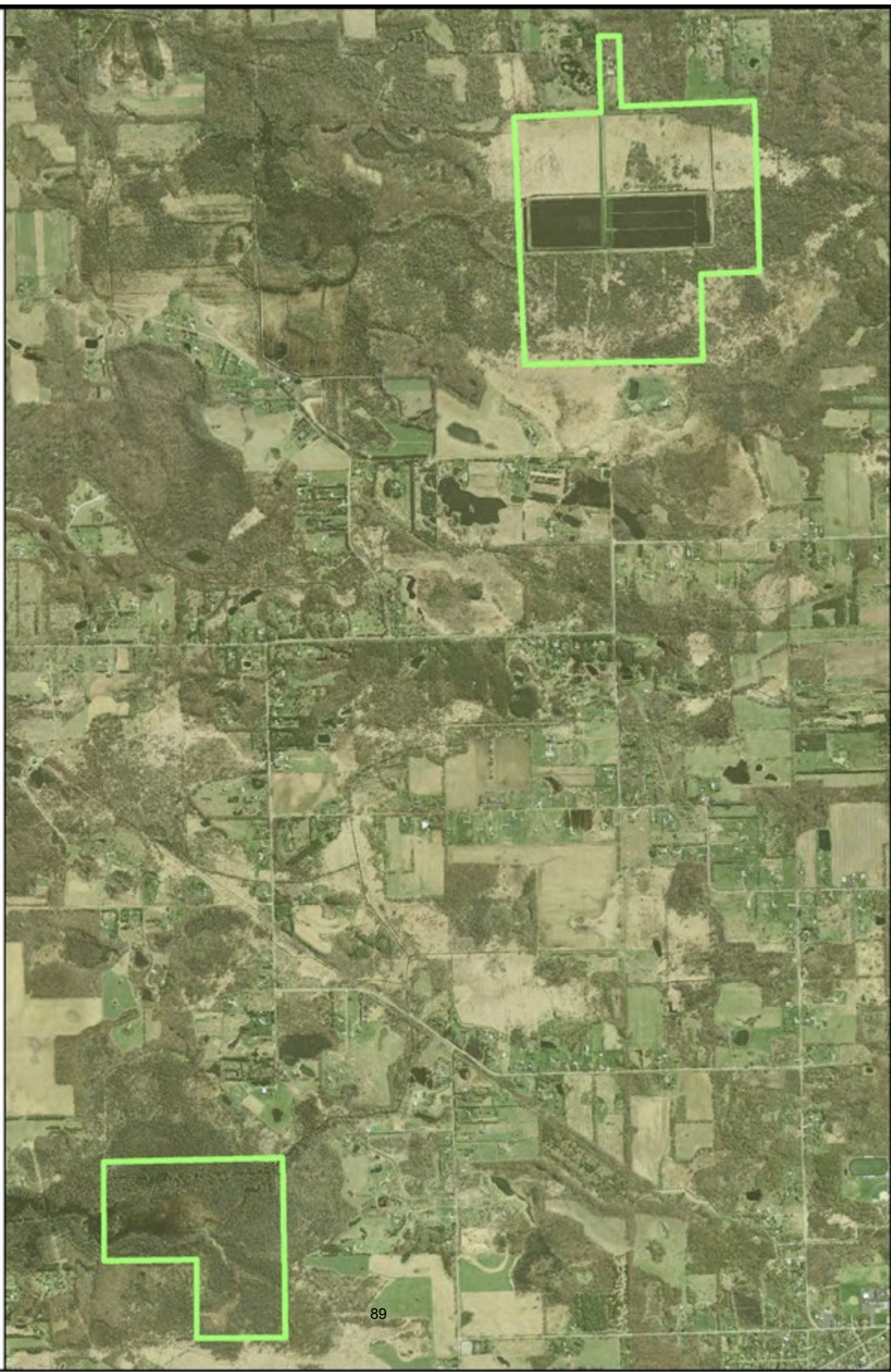
MSU Sailing Club
Ingham County, Meridian Township, Section 11

Image Year: 2009



Muck Soils Research Center
Clinton County, Bath Township, Sections 4, 5, 11, 12, 13, and 14

Image Year: 2010



Rau Property

Manistee County, Springdale Township, Section 6

Image Year: 2009



River Terrace Property

Ingham County, Meridian Township, Section 20

Image Year: 2009



Rogers Reserve

Jackson County, Liberty Township, Section 4

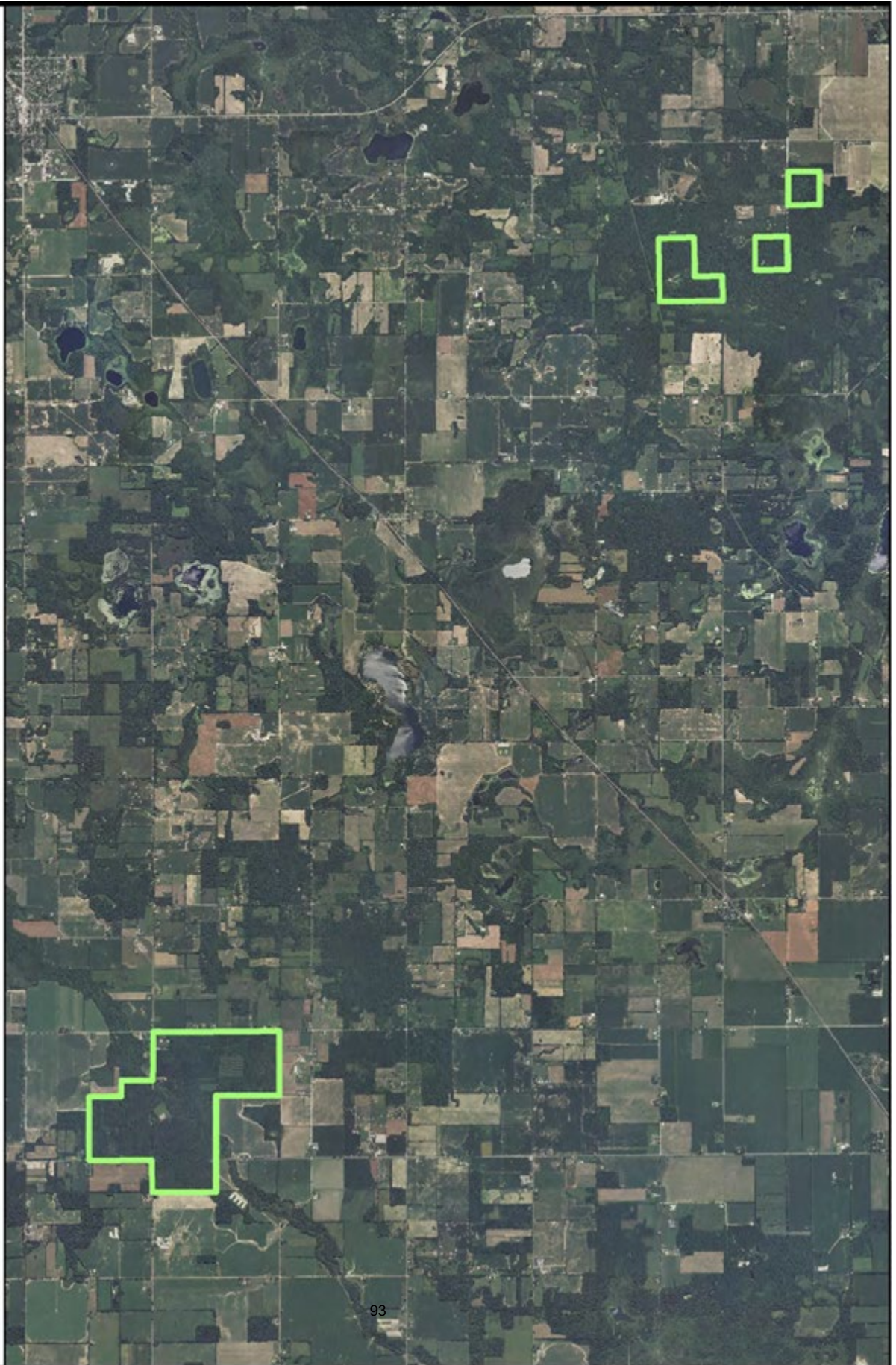
Image Year: 2009



Russ Forest

Cass County, Volinia Township, Sections 20, 29 and 30;
Newberg Township, Sections 16, 17, and 21

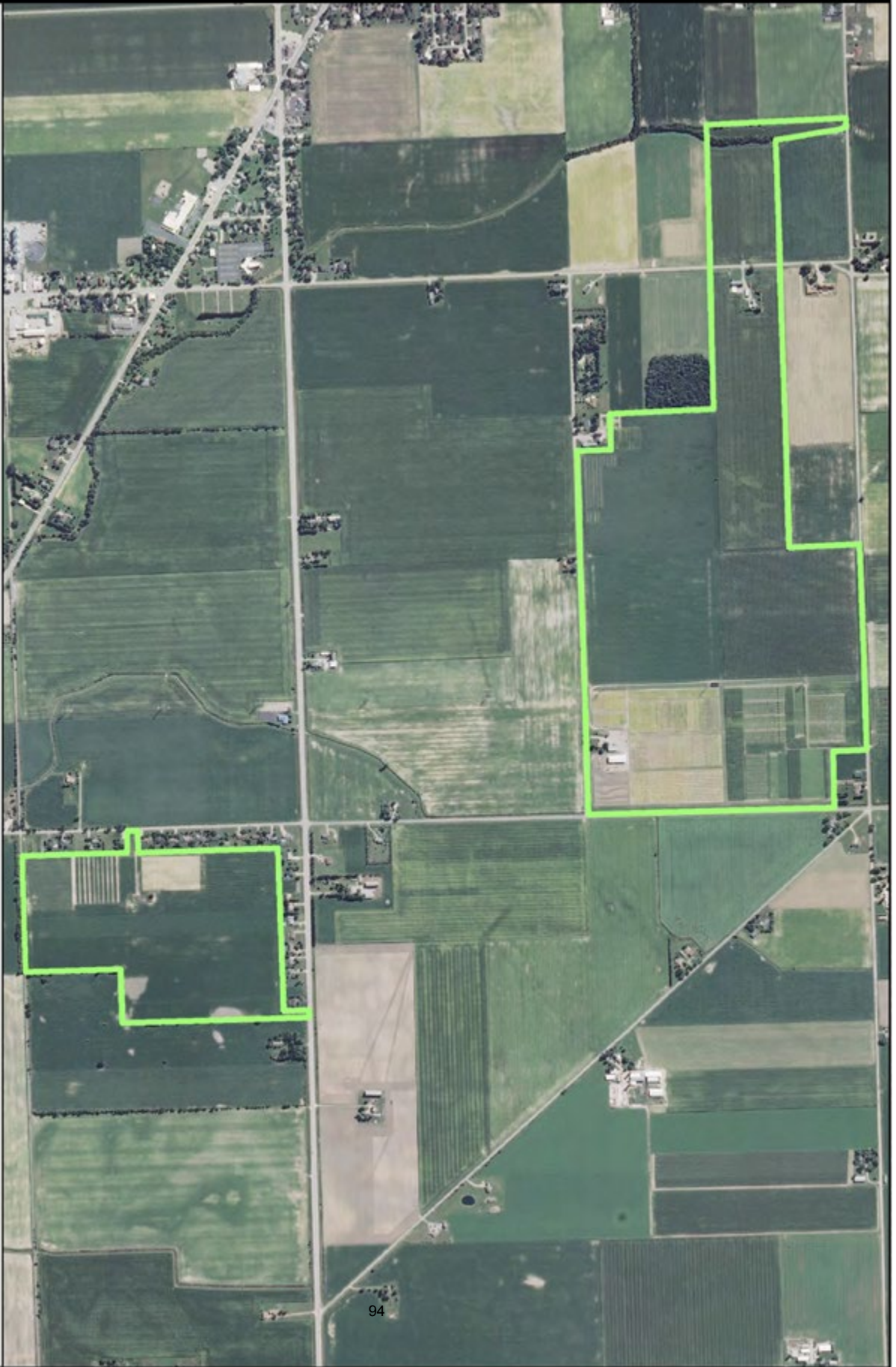
Image Year: 2010



Saginaw Valley Research and Extension Center

Saginaw County, Blumfield Township, Section 25; Tuscola County,
Denmark Township, Section 31

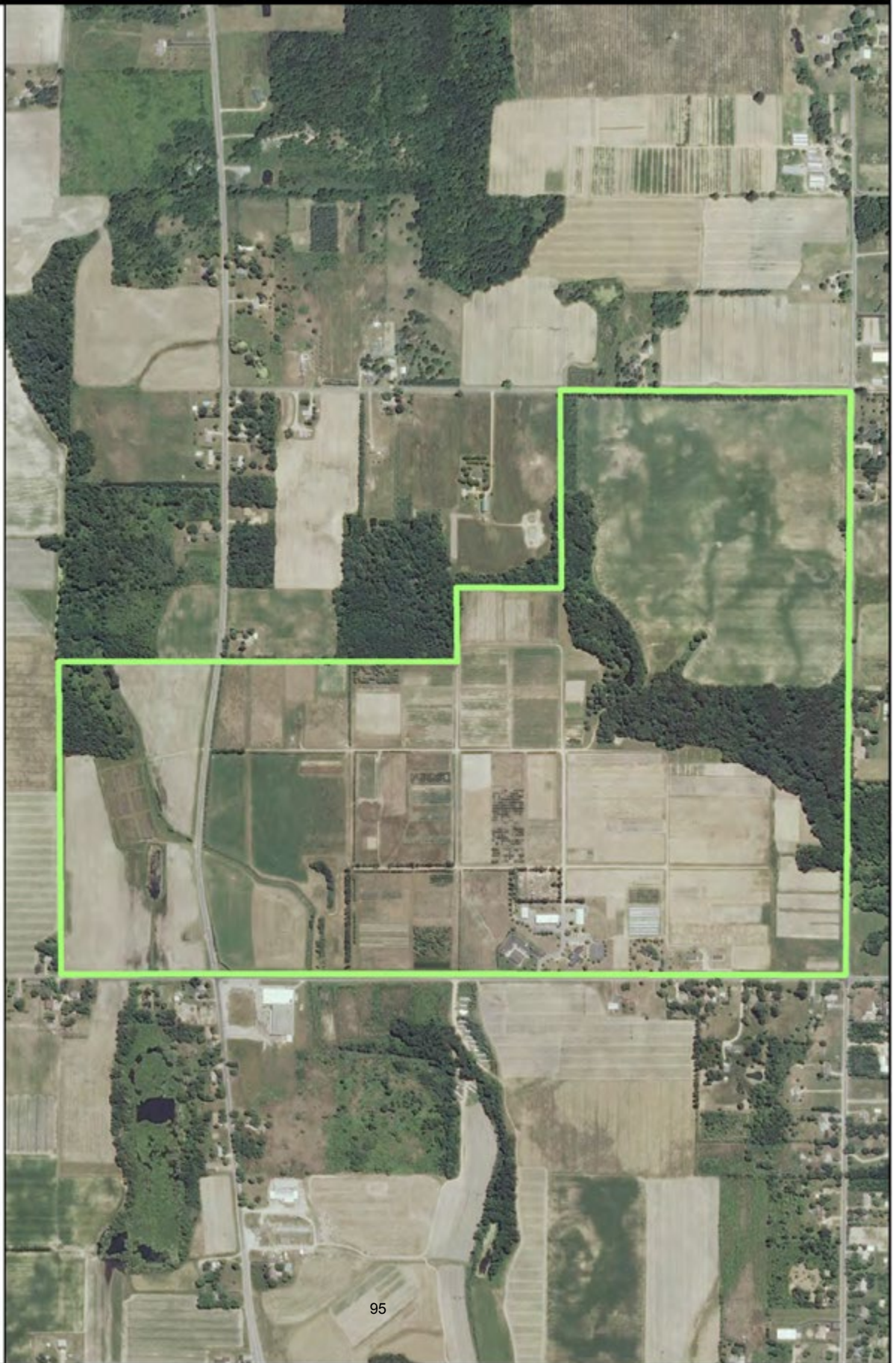
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Southwest Michigan Research and Extension Center

Berrien County, Benton Township, Sections 25 and 36

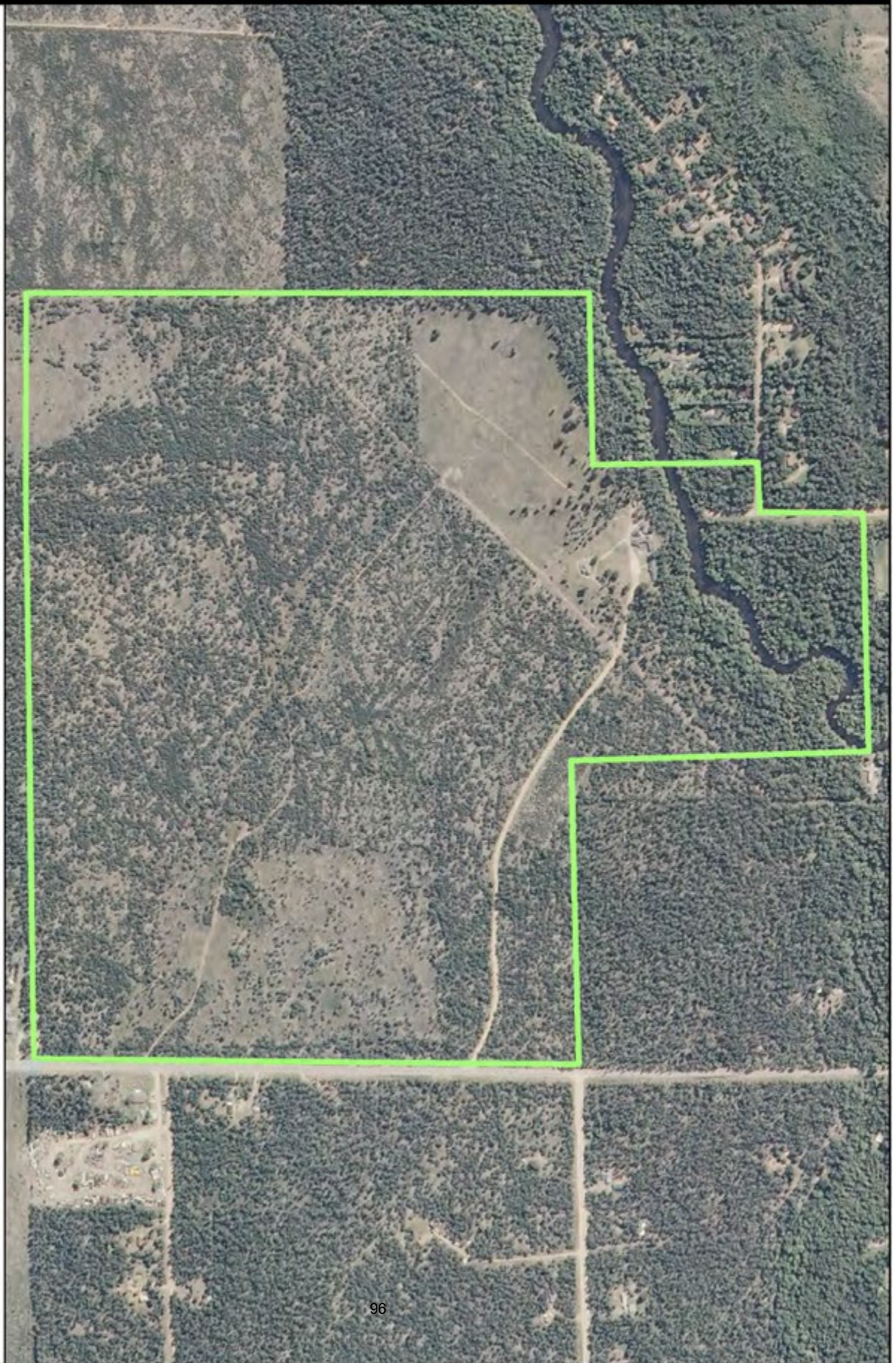
Image Year: 2009



Stranahan-Bell Property (Wa Wa Sum)

Crawford County, Grayling Township, Sections 1, 6, and 12

Image Year: 2009



Stuckman Property

Clinton County, Bingham Township, Section 10

Image Year: 2009



Sycamore Creek Property
Ingham County, Alaiedon Township, Section 18

Image Year: 2009



Tollgate Education Center and Americana Foundation Property

Oakland County, City of Novi, Section 11

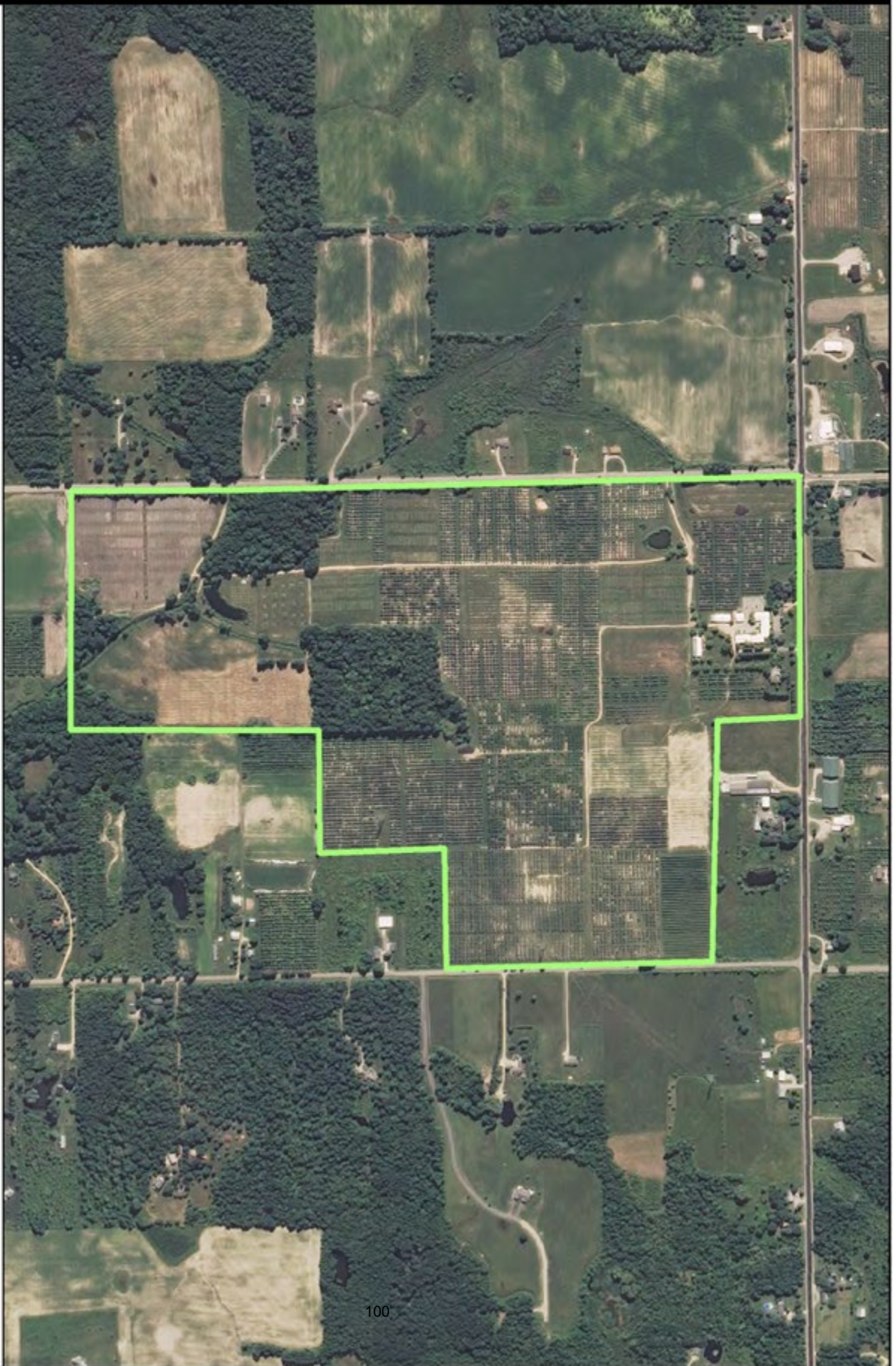
Image Year: 2009



Trevor Nichols Research Center

Allegan County, Saugatuck Township, Section 35

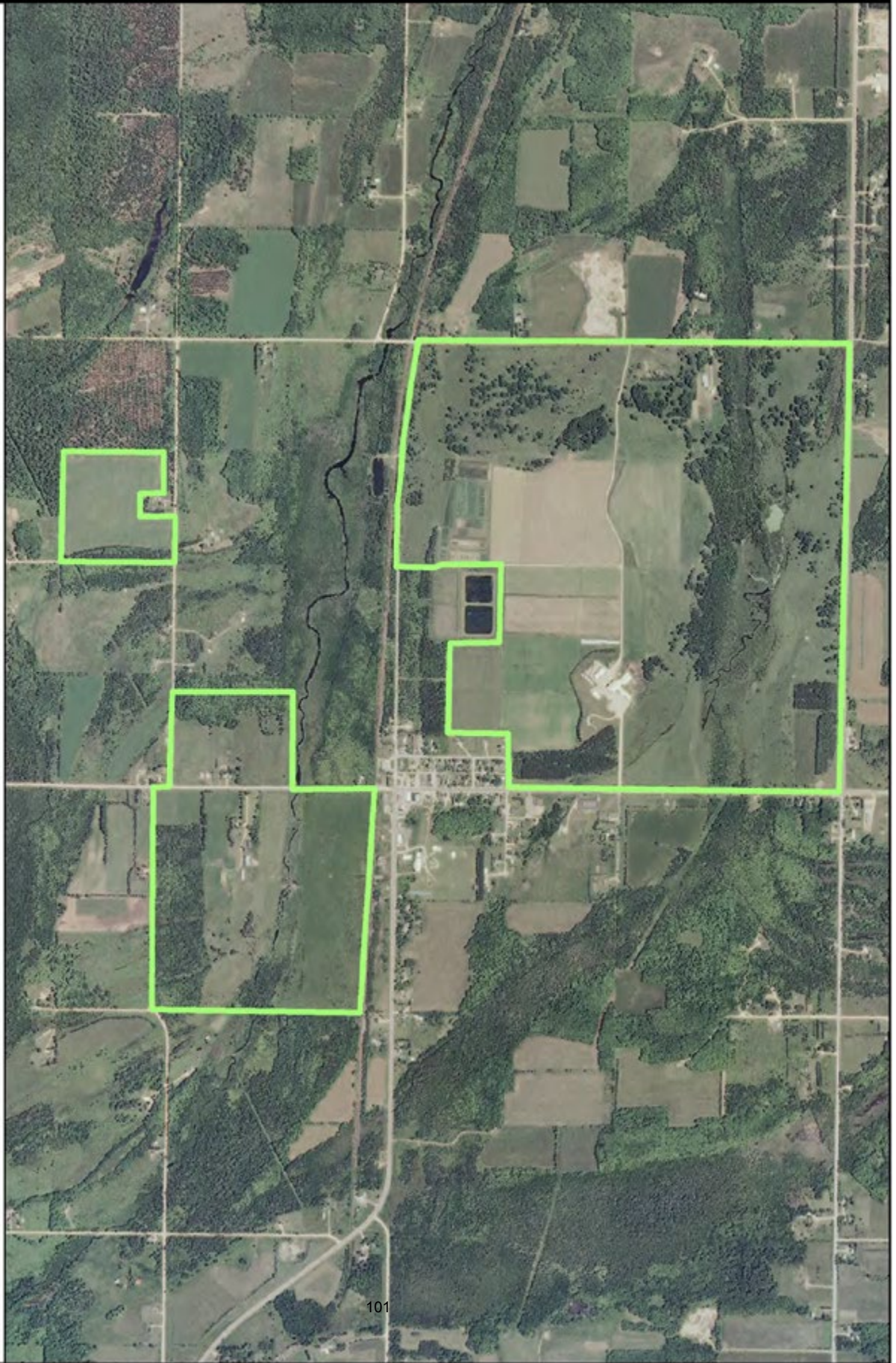
Image Year: 2010



Upper Peninsula Research Center

Alger County, City of Chatham and Rock River Township, Sections 24, 25, 27, 28, and 34

Image Year: 2010



Van Hoosen Property
Oakland County, Avon Township, Section 1

Image Year: 2009



MICHIGAN STATE
UNIVERSITY

Infrastructure
Planning and Facilities