Earlham College

Campus environmental sustainability plan

February 2023

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Executive summary

This is the latest revision of Earlham College's Sustainability Plan, prepared by the Sustainability Progress Committee, over the past two years. It is intended to guide action on campus to increase the understanding of sustainability concerns within the campus community, minimize our collective environmental impact and uphold our Principles and Practices. The SPC recommends that, moving forward, this plan be reviewed annually for progress and minor updates, with a more substantial revision every five years. Note that a Climate Action Plan (CAP) is also in preparation and will be merged with this document upon completion in 2022. The focus of the CAP will be on addressing our greenhouse gas emissions; thus, there is little related to energy use and/or transportation within this plan.

Statement on sustainability

Sustainability is the ability to meet present needs without compromising future needs. Work toward sustainability at Earlham is not fixed or static, but presents an ever-changing answer to the question, "How should we best live?" both on-campus and in our wider social and ecological communities. Guided by our Principles and Practices, Earlham's sustainability plan aims to fulfill basic organizational needs, but also to go beyond operational efficiency in order to sustain the natural and human systems that make up and intersect with our institution in a manner that is inclusive and led by our educational mission.

GOALS BY SECTION

Resource Conservation & Waste Management

- 1. Investigate options for a centralized approach to **purchasing** on campus that would include guidelines for environmental performance and/or ethical trade practices. Make a recommendation to college administration regarding possible approaches.
- 2. Investigate options for a more effective **surplus management** system and make a recommendation to college administration regarding possible approaches.
- 3. Conduct annual **waste** characterization studies to include data from waste and recycling haulers, composting information, along with regular waste audits. Based on results of waste characterization baseline, work towards a 50 percent reduction in divertible waste being sent to the landfill within 5 years. "Divertible waste" is recyclable or compostable.
- 4. Increase efforts to **educate** Earlhamites about sustainability by incorporating recycling at athletic events, Environmental Sustainability ESEM courses, NSO activities surrounding sustainability and videos focused on sustainable aspects of Earlham.
- 5. Identify cost-effective strategies for reducing Earlham's water use.

Academic/Curriculum

- 1. Support hiring and staffing of environmental sustainability courses and campus activities.
- 2. Investigate possible opportunities to increase the number of **sustainability-focused wellness courses**.
- 3. Develop sustainability-focused course modules for use in **Earlham Seminars** (ESEMs).
- 4. Track and promote **sustainability research** conducted by Earlham faculty and students.

Land

- 1. Investigate and, when deemed appropriate, pursue **certifications** under the following: Indiana Wildlife Federation's (IWF) Landscaping the Sustainable Campus, Tree Campus USA and Bee Campus USA. Center for Environmental Leadership staff can aim to focus on one of these per year, beginning in the year that this plan is adopted.
- 2. In an effort to both increase **carbon sequestration** capacity on campus and decrease landscaping maintenance needs, continue following through with the proposal for the establishment of **prairie plots** on campus that was developed by Environmental Sustainability seniors in 2019.
- 3. Investigate and recommend policies to encourage **landscaping practices** that minimize maintenance needs, the use of synthetic chemicals and the need for watering, while also beautifying and diversifying the campus landscape.
- 4. Integration of **Miller Farm** more fully into sustainability efforts on campus through campus engagement, academic coursework, & extending sustainable food projects to other parts of campus. In addition, ensure continued support for Miller Farm as a hub for practical, applied, experiential learning on campus.
- 5. Continued implementation of the college's **Stormwater** Pollution Prevention Plan (SWPPP) and associated monitoring. The SWPPP aims to reduce potential release of pollutants from college property into neighboring waterways.

Community

- 1. Strive for **sustainable awareness** through Earlham website, social media, NSO, flyers, HR welcome folder for new employees and green certificates for offices. Also, create and promote campus sustainability-related events to reach all of the campus community, incoming students, alumni and public organizations here and afar.
- 2. Develop sustainability guidelines and provide resources for all **campus events**, focused on food, resource and waste minimization. Promote and spread the word of green events by letting our community here and afar via email, campus monitors, the College website, social media and networking through departmental offices on campus.

- 3. Establish working relationships with **campus and off campus communities** in order to increase sustainable practices in our Earlham community and off campus communities, including governmental units such as the Richmond Environmental Sustainability Commission.
- 4. Network and work with Student Sustainability Corps (SSC), NSO leaders, Residence Life staff and house conveners to provide sustainable awareness in **campus housing** to reduce waste, electricity and water expenses. Help encourage resident students to engage in daily sustainable practices that are accessible, equitable and interactive.
- 5. Develop, promote and maintain **low-cost resources and activities** which help students and the entire community save money, reduce waste production and live sustainably: Outdoors Club, Bike Co-op, Repair Shop, Free Store, Free Food page on Facebook, Free Food Pantry, Sustainable Agriculture House (currently in Fry House), sustainable residence floor and SSC. Continue supporting student sustainability groups and these initiatives by providing tools, resources, increased coordination, faculty advising, staff and faculty assistance.
- 6. Explore ways that **environmental**, **diversity and social justice** efforts can take into account, support and strengthen one another in the curriculum, co-curriculum and Earlham community. Focus environmentally themed events on environmental justice or environmental racism and promote similar material in Environmental Sustainability courses. Connect the DPC Diversity Progress Committee with the Center for Social Justice and sustainability.

A draft timeline for the various activities needed to support these goals is provided in Figure 1. On-going activities include:

- Identify opportunities for raising sustainability awareness and utilize educational materials/displays/social media to address these.
- Ensure SPC representation on the City of Richmond Sustainability Commission.
- Regular meetings with the director of the Center for Environmental Leadership and college DEI professionals (AVP for strategic and diversity initiatives, Student Life) to determine opportunities for collaboration
- Collaboration with and support for existing groups/initiatives (SSC, Outdoors Club, Sustainable Ag House, etc.)

FIGURE 1. Sustainability Plan Timeline

Color coded by section: Resource Cons & Waste Management Academics/Curriculum

Land Community



Introduction

In the fall of 2011, then Earlham College President David Dawson charged the Environmental Responsibility Committee (now Sustainability Progress Committee) with developing a new comprehensive sustainability plan for the college. In the charge, President Dawson noted:

The newly charged committee will have the full weight and support of the College behind it as it follows its new charge. I will ask the committee to consult broadly, act transparently and develop a new plan for the community to consider by the end of the 2011-2012 academic year.

The committee fulfilled this duty, culminating in a plan that was approved in 2013. This plan also stated that it should be reviewed, updated and rewritten every three years. The second edition of the Earlham College Sustainability Plan was written by Environmental Studies seniors during the 2015-2016 school year and approved by senior staff. In 2018, the SPC decided to delay the scheduled every three-year revision of the Sustainability Plan. It was anticipated that key decisions would be made within that year related to addressing financial uncertainties and changes in leadership at the college-decisions that would affect priorities for the plan. In the fall of 2019, the SPC decided that the college would be best served by starting from scratch with a new plan, rather than simply making minor updates to the 2016 plan and began the work of developing this plan. While previous plans had been structured around the Association for the Advancement of Sustainability in Higher Education's STARS (Sustainability Tracking, Assessment and Rating System), it was decided that the new plan should be more customized to Earlham's situation as it is in this moment, rather than trying to fit our goals into a framework that might not be the best suited. After several months of work on the plan, the COVID-19 pandemic and the shutdown of the college in spring 2020 delayed the work. The SPC reconvened and refocused in 2020-21 to complete the draft of a new Sustainability Plan for the College.

In order to accomplish this task, the SPC divided into subcommittees to focus on different sections of the plan. Each subcommittee reviewed relevant sections of the 2016 plan and consulted key stakeholders and peer institutions to inform the development of goals.

The SPC recommends that, moving forward, this plan be reviewed annually for progress and minor updates, with a more substantial revision every five years.

President Anne Houtman signed the Presidents' Climate Leadership Commitment in October 2019. This commitment requires the college to develop a Climate Action Plan within three years of signing. Note that the development of this plan is in process and anticipated to be completed by May 2022. Thus, this Sustainability Plan does not include a focus on climate action or energy management. Once both the Climate Action Plan and Sustainability Plan are finalized, it is recommended that they be merged into a single document with the Climate Action Plan becoming its own section.

Statement on sustainability

Sustainability is the ability to meet present needs without compromising future needs. Work toward sustainability at Earlham is not fixed or static, but presents an ever-changing answer to the question, "How should we best live?" both on-campus and in our wider social and ecological communities. Many view sustainability planning as a necessary operational checklist including elements such as recycling, energy conservation and waste minimization. However, institutions must also consider the sustainability practices of other organizations before endorsing, promoting, or purchasing the services of those organizations. Earlham College highlights a commitment "to make only just and reasonable demands on the time and resources of others, to model a balanced life for those around us and to work toward a more just distribution of resources" under its Mission, Principles and Practices. Guided by these Principles and Practices, Earlham's sustainability plan aims to fulfill basic organizational needs, but also to go beyond operational efficiency in order to sustain the natural and human systems that make up and intersect with our institution in a manner that is inclusive and led by our educational mission. Each section of this plan highlights key queries intended to guide and inform work within that area.

ORGANIZATION OF THE PLAN

This plan consists of four main sections:

- Resource conservation and minimization
- Academics/curriculum
- Land
- Community

Each section of the plan includes an introduction providing overall historical context, along with a set of goals. Note that the ordering of the goals does not indicate priority. For each goal, you will find the following:

- Description
- Rationale
- Responsibility, including financial implications
- Annual benchmarks
- Potential roadblocks

Resource conservation and waste minimization

INTRODUCTION

While Earlham recognizes the need to conserve water on campus, this has not been seen as a high priority, primarily due to the low rates that we pay for water. Earlham's total water bill in 2019 was less than \$150,000, while payments for wastewater treatment (directly correlated to water usage) totaled approximately \$188,000. Meanwhile, our electricity bill totaled over \$1.1 million in the same year. In 2015-16, Earlham invested \$3.5 million in an energy-savings project that included measures to reduce water usage by three million gallons annually. It is unclear whether these savings have been realized. Water usage data is now **available online in a dashboard format** (via Tableau) and is also linked through the **Sustainability at Earlham page**. Opportunities exist to leverage this data to encourage additional conservation.

Minimizing waste has been a focus over the past several years. Besides recycling, the college also supports a composting operation, which collects compostable waste from our dining hall (pre- and post-consumer), campus housing and kitchenettes in most academic buildings. Compost is taken to Miller Farm, our campus farm, for processing and later use in the gardens. Additional waste minimization efforts include the Earlham Free Store, annual Move Out collections, waste centralization in academic buildings and a variety of source reduction efforts. Trends in the recycling industry, including increased costs, are driving the college to consider additional ways to refuse, reduce and reuse, in order to rely less on recycling.

The goals outlined in this chapter focus on purchasing, surplus management, waste minimization, educational efforts and water conservation.

Key queries from Earlham's Principles & Practices:

- Do we conduct College business in a way that guards and cares for our dedication to integrity? (Integrity)
- Do we work to minimize the gap between our actions and our convictions? (Integrity)
- In what ways do we as a community work for an environmentally responsible and sustainable future? (Simplicity)
- How could we be allocating our resources more justly? (Simplicity)
- How do we discern what constitutes simplicity? (Simplicity)

Investigate options for a centralized approach to **purchasing** on campus that would include guidelines for environmental performance and/or ethical trade practices. Make a recommendation to college administration regarding possible approaches.

Description

Purchasing on Earlham's campus is divided between departments. Departments and individuals can select an item to purchase from the vendor of their choice and have it shipped to campus. This leads to inefficiencies and added expense in many cases. Currently, there are several "unspoken" policies in place at Earlham regarding purchasing guidelines that should be integrated into a centralized purchasing policy to standardize the approach and ensure consistency.

Examples of guidelines to adopt

Electronics: All electronics purchased should meet Electronic Product Environmental Assessment Tool (EPEAT) Gold ratings when available. These purchases include servers, monitors and displays, mobile devices and imaging equipment (i.e. printers). If EPEAT Gold rated options are not available, purchases should hold the highest current EPEAT rating that is available. All faculty use college-provided monitors and computers, which are also available throughout different parts of campus for students and community members. Printers and other devices are also provided across campus, so it is important to have this policy in place when devices must be replaced or newly purchased. The responsibility for this policy is held primarily by Information Technology Services. This is an ongoing policy that will need to be upheld in every electronic purchase made at Earlham.

Paper: All paper purchasing should contain a minimum of 30 percent recycled paper, be acid-free and certified by the Sustainable Forest Initiative. This policy will apply to all future paper purchases made on campus and does not apply to paper that has already been purchased. Digital forms of documents should be made available whenever possible in order to reduce the amount of paper necessary to be purchased. The responsibility for this policy is held primarily by Information Technology Services and other offices on campus that purchase paper.

Appliances: All new appliances should be ENERGY STAR compliant. Such appliances include, but are not limited to, dishwashers, washing machines, dryers, refrigerators and televisions. These appliances are mainly in college housing, but are also in some academic buildings, the Athletics and Wellness Center and Facilities. Current appliances that have an ENERGY STAR alternative available should be replaced by 2030 in order to reduce overall energy consumption on campus. The responsibility for this policy is held primarily by Facilities.

Life cycle: There should be a preference for items that are part of company take-back programs wherein end-of-life is considered and planned for. If no such options exist, the preference should be for items that are recyclable at local facilities or home-compostable. For relevant items, various ethical and fair-trade certifications should be considered.

Rationale: There are potential cost savings to be gained through bulk ordering of commonly used items (like office supplies). Additionally, bulk ordering would result in less shipping and packaging waste. The Campus Store could potentially serve the role as the distributor of many goods and supplies.

Responsibility: The development of a centralized purchasing approach would require the involvement of the VP of Finance & Operations, along with staff from various departments on campus, including the Campus Store. While this shift would not require an outlay of funds, it would likely require additional hours of labor to develop and implement.

Annual benchmarks: Year 1: Convene a group to develop approach. Year 2: Work out details. Year 3: Launch.

Potential roadblocks: It is anticipated that there will be people on campus who simply don't want to change their practices. However, hopefully we would be able to quantify potential cost savings in a way that would convince them that it is worth it.

GOAL #2

Investigate options for a more effective **surplus management** system and make a recommendation to college administration regarding possible approaches.

Description

Partially due to the lack of a centralized purchasing policy, it is easy for departments and/or individuals to acquire a surplus of goods. With a centralized purchasing policy, there would be a record kept of which department purchased what, reducing the number of items that need to be purchased.

Specific Recommendations

Furniture: The college stores all furniture that is not currently being used in a maintenance barn on campus. Departments have the ability to visit this location and choose pieces to be placed in offices and other areas throughout campus. However, this option is underutilized, causing new furniture to be purchased when it is not actually necessary. In 2013, all of this furniture was barcoded and scanned, but unfortunately, these records have been lost. A new system should be created to scan, categorize and store information provided by these barcodes, as well as adding barcodes to pieces that do not already have them. The location of the items can then be tracked if it is removed from storage and if it returns to storage. Having one system where faculty and staff can easily view the items available in storage will

minimize the frequency with which new furniture is purchased. A part-time position, to be filled by a student or outside individual, will need to be created in order to catalog the items and put them into an accessible system. The responsibility for this policy is held primarily by Facilities and Residence Life.

Office supplies: It is likely that many faculty/staff and departments currently have a surplus of various office supplies. Instead of housing surplus office supplies within an individual's office, there should be one or several locations that act as a "library of things" where faculty and staff can place surplus supplies as well as search there for anything they need before purchasing something new.

Rationale: Currently, there is no inventory list of the surplus furniture on campus, thus when someone needs an item for an office or other room, they are likely to purchase something new, even though there might be a similar, perfectly usable item sitting in storage or in office/rooms that aren't being used. This contributes to excess spending along with excess waste.

Responsibility: These efforts would need to be coordinated with the centralized purchasing approach noted above to ensure that newly purchased items are added to the inventory and that the college begins to maintain records about what furniture is located where on campus. Campus Facilities, along with Residence Life and Center for Environmental Leadership staff, would be the responsible areas of campus. Funding might need to be to pursued via a grant to support this surplus management project.

Annual benchmarks: Year 1: Determine best system to manage surplus furniture inventory and decide upon approach. Year 2: Implement and/or pursue funding if needed.

Potential roadblocks: The primary challenge lies in needing to catch up with the lack of information about where different items are on campus. Choices would need to be made regarding whether to just begin with new items that are purchased or to attempt to inventory everything. Additionally, funding could be an obstacle.

GOAL #3

Conduct annual **waste** characterization studies to include data from waste and recycling haulers, composting information, along with regular waste audits. Based on results of waste characterization baseline, work towards a 50 percent reduction in divertible waste being sent to the landfill within 5 years. "Divertible waste" is recyclable or compostable.

Description

A comprehensive annual waste characterization study would provide valuable information, including

• Weights of waste generated at Earlham (available through waste haulers).

- Estimates of the percent of waste heading to the landfill that could have been diverted through composting or recycling.
- Estimates of the percent of waste currently diverted (composting/recycling/reusing).

Possible ways to achieve waste minimization goals:

- Expand composting on campus, which may require the purchase of a digester or other equipment to speed the process. Paper towel composting, additional food items (meats, dairy, etc.)
- Shift to purchasing items which are easily recycled/composted. Specifically, a shift away from current disposable coffee cups and towards ones which are actually recyclable. Coffee cups were a major waste found in previous audits which could have been diverted.
- Improve recycling education and buy-in, possibly through utilizing competitions.
- Collaboration with campus dining to continue to try to minimize use of disposables on campus.
- Work with Athletics to minimize use of disposables.

Rationale: Other college campuses have found (largely differing) sometimes around 60 percent of their waste could be reduced. About 2/3 of this is usually recycling and 1/3 usually compost.

Current waste audits being conducted per semester are insufficient in accounting for campus-wide waste production. They are helpful, though, by showing high levels of contamination in recycling and composting and the potential for trash items to be recycled in the areas they monitor.

Responsibility: The Center for Environmental Leadership's SSC will lead the waste characterization studies in collaboration with Facilities and Housekeeping. The SSC will also take the lead on educating the campus community about the data and information developed through these studies. Ultimately, however, it will take the buy-in of everyone on campus to help us achieve waste reduction goals. Funding for additional composting capacity could be acquired through grants.

Benchmarks: Begin waste characterization studies in Year 1 and repeat on an annual basis. Implement waste minimization efforts as appropriate beginning in Year 2.

Potential roadblocks: As noted, buy-in of everyone on campus will be necessary to achieve this goal, which will be challenging. Currently there's an insufficient amount of data to calculate the annual/monthly waste diversion that comes from composting. We will need to begin to track this. Waste diversion efforts depend on/are affected heavily by education efforts and purchasing.

Increase efforts to **educate** Earlhamites about sustainability by incorporating recycling at athletic events, Environmental Sustainability ESEM courses, NSO activities surrounding sustainability and videos focused on sustainable aspects of Earlham.

Description

Colleges such as Colorado College, Vanderbilt and Bowdoin have set high standards of what sustainable education should resemble: guest speakers, community projects, educational classes, etc. Although Earlham's attempt at sustainable education does include aspects from these colleges, there are multiple areas in which additional education can be implemented. In order to improve Earlham's sustainable education, Earlham should be pushing to achieve recycling at athletic events, ESEM courses centered around sustainability, NSO activities incorporating sustainability and videos focused on sustainable aspects of Earlham.

- Recycling at Athletic Events:
 - Currently, there are no recycling bins at athletic events. The addition of recycling bins and perhaps compost bins later in the future, would be a simple action to promote sustainability. Moreover, to incorporate education in the mix, a group of students could be organized around all disposal bins to educate people on proper disposal methods. This would decrease the waste produced at athletic events while simultaneously teaching fans about sustainability.
- NSO:
 - New Student Orientation is a helpful way to introduce first-years to the Earlham campus and get them acquainted with Earlham policies. The inclusion of sustainable lectures and activities during NSO would allow students to sense the cruciality sustainability has on campus. In addition, similar to the ESEM courses, this could encourage students to try out ENSU classes.
- Sustainable Videos:
 - Earlham already has sustainable concepts in place that some students have limited or no knowledge about. Let's show off these sustainable activities in order to bring awareness to Earlham's desire to be more sustainable and draw in more students interested in sustainability. For example, Miller Farm is an area that not a lot of students get involved in, but this could change with the help of educational videos about the Farm's process and production of food. This is only one of many areas that could be shown off to enlighten others about Earlham's current sustainability.

Rationale: Earlham is striving to make the campus more sustainable and the best way to do this is through education. It is important for students and faculty to understand concepts

and actions of being sustainable. Through these goals, Earlham may see an increase in students getting interested in sustainability and bring awareness to the worldly issue at hand.

Responsibility: The NSO and ESEM goals need to have the coordinators of these behind it to make any progress. The videos and athletic recycling can be attained through gathering people who are interested in being a part of these goals through emailing mailing lists and putting out these ideas on social media platforms. Once students/faculty are involved, they can proceed to have their own meetings and schedule video plans and recycling events.

Benchmarks Begin implementation in Year 1, with the goal of rolling out a new initiative each year, assuming adequate resources are available to support them.

Potential Roadblocks:Roadblocks would include buy-in from relevant parties. Additionally, there is no guarantee that increasing educational efforts will actually lead to changes in behavior.

GOAL #5

Identify cost-effective strategies for reducing Earlham's water use.

Description

The Student Sustainability Corps has seen success in their recent water-related initiatives. They will continue to work on this issue through outreach to the student body and will use their own funding. Earlham pays a monthly water bill which shows how much water was used by building. New data can be compared to a chosen "baseline" year. Past data has been compiled on Tableau. The addition of a water-use feedback system would provide more immediate data.

This larger goal of identifying practical, cost-effective methods for reducing Earlham's water consumption can be achieved by initiatives like the following:

- Infrastructure improvements
 - Retrofitting and replacement of less efficient fixtures
 - low-flush toilets, waterless urinals, low-flow shower heads, tap aerators
 - donating our still-functioning items in order to close the loop
 - adding water bottle filling stations to residential and academic buildings
- Educational initiatives
 - Inclusion of water-related educational programming in NSO activities
 - durable, reusable water bottles as the NSO gift

- Dorm competitions to promote conscious water consumption
- A Take Back the Tap initiative aimed at eliminating all one-time use plastic water bottles on campus and encouraging reusable water containers
- Landscaping
 - Improvements to landscaping where flooding is common (certain areas on campus flood with even the smallest amount of rain)
 - Capture and utilization of rainwater for landscaping (rain barrels)
 - Incorporation of more native plants
- Additional initiatives to consider
 - Utilization of a feedback system, like AquaCUE that shares real-time data (UC Merced saw a persistent 15 percent reduction in water use after the integration of AquaCUE into their Facebook page)
 - In-House water reclamation and recycling (dependent on Indiana's greywater laws)
 - Oberlin's Living Machine recycles 70 percent of the building's water use
 - Emory's WaterHub recycles up to 400,000 gallons per day, which is 40 percent of the campus' total water

Rationale: Water is not scarce in this area, but Earlham strives to provide a worldly perspective to its students and encourages us to think about ourselves as part of a global community. Therefore, our actions have the capacity to impact people elsewhere. For the administration, reducing water use will result in cost savings. Additionally, water-related landscaping changes will improve the health (and appearance) of the front campus ecosystem.

Responsibility: The Center for Environmental Leadership, in collaboration with Facilities, would take the lead on these initiatives.

Benchmarks: The College should work to identify the return on investment of the above improvements and aim to implement the most cost-effective approaches to reduce overall water consumption.

Potential roadblocks: Again, relies on buy-in from the larger campus community.

Academics/curriculum

INTRODUCTION

Earlham College offers several majors/minors that include significant sustainability and/ or environmental content, including environmental sustainability, earth and environmental science, biology and peace and global studies. In addition, the College also offers applied minors in the following areas: sustainability and management, outdoor education, sustainable agriculture, and art, nature and conservation. While these programs reach a significant number of students, there are opportunities to ensure that a greater number of students on campus engage with environmental and sustainability topics in the classroom.

Key queries from Earlham's Principles & Practices:

- Do I seek ways to be open to others' opinions while maintaining my commitment to critical thinking, intellectual rigor and truth-seeking? (Integrity)
- Do we, as an institution, examine power and privilege: who has it and how should it be used? (Peace & Justice)
- In what ways do we as a community work for an environmentally responsible and sustainable future? (Simplicity)
- Do we strive to promote a community life that will foster the intellectual, physical, moral and emotional wellbeing of all members? (Community)

GOAL #1

Support hiring and staffing of environmental sustainability courses and campus activities.

Description

While the transition of a visiting assistant professor (VAP) to a tenure-track line with 0.75 FTE committed to the environmental sustainability (ENSU) major has addressed a key identified need, there are still several faculty lines that are play supporting roles in the ENSU major that have been filled with VAPs. These include positions in earth & environmental science and biology.

Rationale: In the list of "Primary Academic Major" interest for applicants in the 2021 admission cycle, Environmental Sustainability ranked eighth among 37 majors for number of applications, seventh in admits and fourth in confirmed enrollments. Among interdisciplinary programs, it was second only to exercise science in total number of applicants and behind only biology, psychology and global management for confirmed enrollments. Beyond the obvious interest among prospective, admitted and confirmed

students, faculty in environmental programs often conduct research and oversee class projects that contribute to many of the other goals included in this sustainability plan. Added expertise and understanding of campus systems could ultimately save the College money by avoiding costs associated with hiring consultants to do some of this work and/or finding ways to increase efficiencies and decrease waste.

Responsibility: While the Sustainability Progress Committee and Environmental Sustainability faculty can advocate for tenure-track positions, it is ultimately the decision of the College President about which tenure-track positions to fill each year.

Benchmarks: Ongoing work with Environmental Sustainability faculty and faculty in affiliated departments to help to pursue positions.

Potential roadblocks: College finances that preclude hiring for tenure-track positions is a key concern.

GOAL #2

Investigate possible opportunities to increase the number of **sustainability-focused wellness courses**.

Description

At Earlham College, each student is required to complete wellness courses as a part of the general education curriculum. From the general education website:

Wellness at Earlham is defined as an active, lifelong process of becoming aware of and making choices toward a more healthy and fulfilling life. Goals of Earlham's wellness requirement include: 1) Promoting balance among academic, occupational and recreational aspects of life, 2) Providing opportunities to fulfill human needs such as belonging, achieving, competing, participating, socializing, exercising, relaxing and having fun and 3) Promoting positive health and wellness behaviors for individuals and the community. Wellness is an integral part of general education because understanding and caring for one's physical, psychological, spiritual and community selfhood is a fundamental prerequisite for all knowing. Further, the wellness requirement promotes a lifelong focus on both personal and community health in the broad sense and on skills applicable to maintaining bodily kinesthetic, intellectual and emotional effectiveness.

Courses that include aspects of sustainable living seem to be an obvious fit for this designation. There are a few options that could be considered. First, currently available courses could be modified to include additional sustainability content. Second, new courses could be developed. Third, a new designation for sustainability-focused wellness courses could be established. Currently, students have the option of completing "activity-based" or "analysis-based" wellness courses. "Sustainability-based" could be an additional category.

Rationale: The integration of sustainability into the wellness curriculum is a natural path to lifelong sustainability mindset, much like the lifelong focus on personal and community

health. Identifying currently offered courses would highlight the work Earlham is doing towards this goal and the skills students are learning. By increasing the number of courses and modifying current courses to include this focus, Earlham, in addition to its efforts to develop a lifelong learning interest in health and wellness, it is also training students to develop sustainability-focused activities.

Responsibility: The Sustainability Progress Committee should coordinate the initial investigation into the feasibility of the different possibilities. Responsibilities from there would depend upon the path selected.

Benchmarks: Year 1: Begin conversations with current instructors of wellness courses and with Curriculum Policy Committee to determine interest and feasibility of different options. Year 2: Initiate implementation of selected option.

Potential roadblocks: Current faculty not interested in modifying or developing new courses, CPC not interested in considering changes to the wellness requirement.

GOAL #3

Develop sustainability-focused course modules for use in **Earlham Seminars** (ESEMs).

Description

Well-designed course modules that could be delivered by ESEM instructor or by Center for Environmental Leadership staff would be an effective way to reach large numbers of first-year students. Topics could vary or be modified, depending on the focus of the particular ESEM course. If fall ESEMs return to their pre-COVID structure of having a Friday afternoon "lab" time, this block of time could be used to deliver content to multiple ESEM sections at once.

Rationale: ESEMs are designed to include content that orients first-year students to the Earlham community. Awareness of sustainability initiatives and expectations are a natural fit to also be discussed in these courses.

Responsibility: Given the many learning goals that ESEM instructors are asked to meet, inclusion of a sustainability module or session would (at least initially) be fully optional. Ideally if these are successful, there would be support for all ESEM to include them. Center for Environmental Leadership staff and students would coordinate the development of the modules, as well as outreach to ESEM instructors.

Benchmarks: Year 1: Development of 2-3 modules and outreach to limited pool of ESEM instructors to "pilot" these. Year 2: Refinement of modules and development of additional options, full outreach to ESEM instructors.

Potential roadblocks: Lack of interest among ESEM instructors, need for support (or directive) from College administration to state explicitly, loudly and repeatedly that sustainability is a strategic initiative will go a long way toward breaking through such intransigence.

Track and promote **sustainability research** conducted by Earlham faculty and students.

Description

There are already several faculty who do research that could be classified as "sustainability-focused". The College should aim to track these projects and highlight them on our sustainability website.

Rationale: Highlighting sustainability research on the College website would signal to prospective students that there are opportunities to engage with sustainability at Earlham, both in and out of the classroom.

Responsibility: The Sustainability Progress Committee would work with Center for Environmental Leadership staff and the director of Foundation Relations and Sponsored Programs to identify faculty researchers and with Marketing and Communications staff to determine the best means to highlight projects.

Benchmarks: Year 1: Collect information and locate stories that might have already been written to get on the website quickly. Ongoing: Update list of projects/faculty, prepare stories to highlight.

Potential roadblocks: Capacity of Marketing and Communications to develop new content.

Land

INTRODUCTION

Earlham's campus offers many opportunities for recreation, research and ecological benefits. There have been efforts through the years to enhance the college's landscapes for teaching purposes as well as environmental benefits, including the construction of a series of ponds and the establishment of prairie and carbon sequestration plots. There is now a need to reevaluate our land management practices to ensure that they are meeting economic, environmental, educational and aesthetic needs.

Key queries from Earlham's Principles & Practices:

- Do we conduct College business in a way that guards and cares for our dedication to integrity? (Integrity)
- Do we work to minimize the gap between our actions and our convictions? (Integrity)

- In what ways do we as a community work for an environmentally responsible and sustainable future? (Simplicity)
- Am I careful to consult, even if it may mean taking greater time in the process? (Community)

Investigate and, when deemed appropriate, pursue **certifications** under the following: Indiana Wildlife Federation's (IWF) Landscaping the Sustainable Campus, Tree Campus USA and Bee Campus USA. Center for Environmental Leadership staff can aim to focus on one of these per year, beginning in the year that this plan is adopted.

Description

There are a wide variety of certifications tied to landscaping and/or land use practices for college campuses. The three identified are likely the most relevant for Earlham's campus.

- IWF Landscaping the Sustainable Campus: Earlham faculty have been in conversation with representatives from IWF's program at various points in time, but we have yet to officially commit to pursuing certification. This program would likely be the most intensive of the three but is also likely to be the most beneficial as well, given that IWF could help us access funding for practices that might be identified during the evaluation process.
- Tree Campus USA: Earlham was previously certified under this program from 2013-15, so there is a foundation for meeting the requirements. We would need to update our Campus Tree Care Plan and also convene a committee focused on care of trees on campus.
- Bee Campus USA: This is a newer certification that would need to be reviewed more fully before committing to it. Requirements include the formation of a committee, submission of annual reports and annual fees.

Rationale: These certifications ensure that we are following best practices regarding land management while also gaining recognition for our efforts.

Responsibility: The Center for Environmental Leadership would take the lead in the application process, but the efforts required to earn and maintain certification would require collaboration with Facilities staff and with faculty who have expertise to assist with management.

Benchmarks: Beginning in the year the plan is adopted, focus on one certification each year.

Potential roadblocks: These certifications might not all be deemed feasible or appropriate for Earlham to follow through on.

In an effort to both increase **carbon sequestration** capacity on campus and decrease landscaping maintenance needs, continue following through with proposal for the establishment of **prairie plots** on campus that was developed by Environmental Sustainability seniors in 2019.

Description

See proposal in Appendix A for details. At this stage, funds have been secured for the establishment of a pilot prairie located near Beane Stadium. However, additional funding will need to be secured to expand beyond this pilot plot.

Rationale: Establishing prairies on campus would increase carbon sequestration capacity while also reducing the need for regular mowing, which would result in cost savings. See proposal in Appendix A for additional details.

Responsibility: ENSU/Biology faculty (Jaime Coon), Center for Environmental Leadership staff and students, Facilities staff and Institutional Advancement would all have roles to play.

Benchmarks: Year 1: Establish initial plot. Years 1-3: Grant-writing and/or fundraising. Years 3-5: Expand prairie areas. Ongoing: monitoring/maintenance.

Potential roadblocks: Securing funding would be the primary challenge.

GOAL #3

Investigate and recommend policies to encourage **landscaping practices** that minimize maintenance needs, the use of synthetic chemicals and the need for watering, while also beautifying and diversifying the campus landscape.

Description

While Earlham College generally operates under integrated pest management (IPM) principles when it comes to management of our grounds, there is currently no written policy in place to ensure this practice continues long-term. Additionally, there are many areas of campus that are currently maintained as lawns that could better serve campus needs if converted to other types of vegetation (see carbon sequestration goal above). Our current practice of using a tractor pulling a tank with a generator for water flower beds is also highly unsustainable due to the fuel usage and noise produced. Shifting to native, lower-maintenance plants, while also utilizing rain barrels to collect water for irrigation could serve to alleviate some of these problems. Additionally, reducing the number of beds overall could serve to reduce maintenance costs without compromising aesthetics.

Rationale: This goal seeks to institutionalize already existing practices and to implement additional practices that would minimize water and energy usage as well as maintenance

costs. Recent class projects have resulted in the successful establishment of perennial plants in multiple landscaping beds on campus and these can serve as examples moving forward.

Responsibility: Facilities, specifically the Grounds crew, would be the primary campus personnel responsible. However, the Center for Environmental Leadership would assist with researching alternatives, supplying extra labor as needed and seeking funding.

Benchmarks: Year 1: Review policies and opportunities, establish test plots. Year 2: adoption of policies, monitoring of test plots. Year 3: Expansion of practices. Ongoing: Monitoring.

Potential roadblocks: Staff time to develop policies and rethink options, funding, preferences of campus community around aesthetics

GOAL #4

Integration of **Miller Farm** more fully into sustainability efforts on campus through campus engagement, academic coursework, & extending sustainable food projects to other parts of campus. In addition, ensure continued support for Miller Farm as a hub for practical, applied, experiential learning on campus.

Description

After several seasons of operation in its new location, Miller Farm has developed expertise that can be drawn upon to contribute to a variety of efforts on campus. The Heart Market, a monthly on campus market, has increased the accessibility of Miller Farm products to the campus community while also providing opportunities for students to market art and other items. Continued efforts should be made to increase faculty involvement with Miller Farm through courses and/or research and to build additional volunteer opportunities for students and/or community members. Other identified needs include the development of a new manure management system in collaboration with the Equestrian program and the establishment and maintenance of small-scale food forests on the main part of campus.

Rationale: Miller Farm is a selling point for the college with prospective students. This goal seeks to ensure that it continues to gain momentum and begins to play a more integral role in the daily life of a larger portion of members of the Earlham community.

Responsibility: Primary responsibility would fall to Miller Farm staff and students with the support of the Center for Environmental Leadership and consultation with other stakeholders as appropriate.

Benchmarks: Ongoing: Outreach to faculty.

Potential roadblocks: Turnover and shifts in interests of students and/or faculty.

Continued implementation of the college's **Stormwater** Pollution Prevention Plan (SWPPP) and associated monitoring. The SWPPP aims to reduce potential release of pollutants from college property into neighboring waterways.

Description: The college worked with Patriot Engineering & Environmental to develop a SWPP, which was adopted in 2021. This plan calls for specific actions around inspections, training and reporting required for the college to be in compliance with Indiana Department of Environmental Management regulations. The final plan is included in Appendix B.

Rationale: Besides being the right thing to do to protect the water quality of nearby waterways, the adoption and implementation of a SWPPP fulfills college responsibilities associated with our ongoing partnership with the City of Richmond to comply with Municipal Separate Storm Sewer System (MS4) rules.

Responsibility: Facilities staff oversee the implementation of the SWPPP.

Benchmarks: Ongoing: Monitoring and reporting, quarterly inspections.

Potential roadblocks: Expenses associated with correcting any issues that might emerge

Community

INTRODUCTION

Sustainability is often said to have three pillars: environmental, social and economic. This section of the plan focuses on the social aspects of sustainability. For the Sustainability Plan, the "Community" section captures many areas of campus and community life. The co-curricular experience encompasses all aspects of campus life outside of the classroom, including but not limited to employment matters, residential living and student activities. It also involves the campus community's relationship with Richmond, Wayne County and the surrounding region.

Key queries from Earlham's Principles & Practices:

- Do we examine ourselves as a community for evidence of prejudice and bias and then work to overcome them? (Respect for Persons)
- Do we seek out the ways Earlham as an institution can act as a local and global force for peace and justice? (Peace & Justice)

- In what ways do we as a community work for an environmentally responsible and sustainable future? (Simplicity)
- Do we strive to promote a community life that will foster the intellectual, physical, moral and emotional wellbeing of all members? (Community)

Strive for **sustainable awareness** through Earlham website, social media, NSO, HR welcome folder for new employees, green certificates for offices, flyers and create and promote campus sustainability-related events to reach all of the campus community, incoming students, alumni and public organizations here and afar.

Description

Advocate for sustainable practices through different mediums (such as SSC) on Earlham's campus and in the broader local community.

Rationale: Using Earlham's platforms to encourage sustainability and ecological awareness is key to achieving sustainability goals and successful community outreach. Garnering community members' support on and off campus, along with establishing connections with Earlham alumni, remain crucial for making progress on various sustainability goals. A green certificate given to departmental offices with sustainable practices was a way to motivate our community members. It could be extended to cover other campus areas, including the student residence communities.

Responsibility: Office of Residence Life, house conveners, Sustainability Corps, the Earlhamite, The Earlham Word, Marketing and Communications, departmental offices, Alumni Facebook Group, Institutional Advancement, SPC, CCGE, HR, Employee Council.

Benchmarks: Ongoing: Social media support and participation in NSO. Year 1: Enhance presence on Earlham website (plan video and lay groundwork), update information for inclusion in the new employee welcome folder. Year 2: Work to implement green certificate program.

Potential roadblocks: Not everyone is connected to sustainability social media sites, limiting awareness of sustainability initiatives and participation at campus events. Identifying the most effective way to reach everyone might be challenging.

GOAL #2

Develop sustainability guidelines and provide resources for all **campus events**, focused on food, resource and waste minimization. Promote and spread the word of green events via email, campus monitors, the College website, social media and networking through departmental offices on campus.

Description

Substantial food and other waste is often produced when events occur on campus. There are currently no sustainable guidelines for groups organizing and hosting events on campus.

Rationale: There are potential cost savings to be gained by minimizing waste, disposing of recycling event items in recycling bins and using reusable materials for campus events.

Responsibility: Networking with Metz, Housekeeping, all who facilitate or participate in campus events, departmental offices, Residence Life staff, house conveners, NSO coordinator and leaders.

Benchmarks: Year 1: Reach out to Events office in coordination with Housekeeping and Metz to review the status and logistics of current events to identify any green practices and think of ways to promote greener events. Year 2: Implement green event practices.

Potential roadblocks: Sustainability practices and green events depend on the deliberate actions of hosts and attendees at the events in collaboration with Metz, Housekeeping and the Student Activities & Events Office. Lack of information or awareness of resources could stifle the efforts of organizers/hosts and attendees striving to hold green events.

GOAL #3

Establish working relationships with **campus and off campus communities** in order to increase sustainable practices in our Earlham community and off campus communities, including governmental units such as the Richmond Environmental Sustainability Commission in Richmond.

Description

In contact with members of Wayne County Sanitation Department, looking for ways to synergize sustainability efforts. Encourage CEL/SSC members to interact with and host small events for prospective students to encourage joining the sustainability communities on campus. Recent partnership with the City of Richmond Sanitary Department to perform waste water testing on campus, site utility work at D Street entrance has been completed. Continued partnership with Richmond Sanitary Department per Rule 13 Storm Water Quality Management Plan. A member of SPC Sustainability Planning Committee will act as a liaison between SPC and the Richmond Environmental Sustainability Commission by attending their monthly meetings in order to connect and be updated with all the relatable sustainable and environmental areas and activities in Richmond, IN.

Rationale: Sustainability practices in our residence halls, buildings and offices can be increased for waste minimization and savings. The Epic Grand Challenge and our Earlham Community Engagement Program are programs for students' initiatives to create ways to support Wayne County communities. Our Sustainability events and initiatives led by our

students are shared with our local campus community. We believe that the connection with the Richmond Environmental Sustainability Commission will increase opportunities for engagement for the Earlham Community and our local community. We believe that this might be an open and ongoing opportunity for our students to carry out their sustainable and environmental related initiatives, activities and internships in the local community.

Responsibility: City of Richmond Sanitary District, SPC, Sustainability Corps, Earlham President of Finance and Administration

Benchmarks: Ongoing: EC SPC liaison attends monthly Richmond Environmental Sustainability Commission meetings as of Spring 2021 and continues to share with SPC at the monthly meeting.

Potential roadblocks: There might not be enough incoming students interested in joining sustainability student groups and environmental clubs. Students choose their areas of interest when participating in the Epic Grand Challenge and when they are part of the Community Engagement Program. Students volunteer and participate in the areas, clubs, activities that they are interested in.

GOAL #4

Network and work with SSC, NSO leaders, Residence Life staff and house conveners to provide **sustainable awareness in campus housing** to reduce waste, electricity and water expenses. Help encourage resident students to engage in daily sustainable practices that are accessible, equitable and interactive.

Description

Sustainability practices and awareness to promote in residence halls, apartments and houses.

Rationale: Create awareness and promote sustainability as soon as students arrive and throughout their time at Earlham. There is no consistent track record of sustainability practices in houses and Campus Village. There is a need to promote sustainability and awareness throughout campus to increase sustainable practices in every residential area and minimize waste and expenses.

Responsibility: SSC members would have to work with Residence Life and NSO leadership for training and to spread sustainable practices and awareness throughout the student population. Residence Life can provide house and apartment groups with information about sustainable practices. The Center for Environmental Leadership coordinates a voluntary "Green Office Program" that includes a self-audit of current practices and suggestions to incentivize green practices in professional settings while promoting environmentally friendly practices. This program can provide Green Certificates to offices, residence halls, apartments and houses.

Benchmarks: Year 1: Draft informative sustainability signs/infographics. Year 2: Implement into housing spaces.

Potential roadblocks: Someone has to resource laminated signage to put up in residence halls and houses. Responsibility needs to be established for those charged with creating and maintaining consistent signage to promote sustainability practices. The SSC currently picks up the compost bins across campus and it could create an overload for SSC to add more pick-up locations on campus. Compost and posters might not be an option for apartments. Capacity for maintaining events and activities to inspire the residents to be more sustainable and minimize waste is limited. Sustaining interest involves a reliance on SSC members who want to work with NSO and Residence Life each semester. There might not be enough incoming students and interest to have a sustainability residence floor. There is no sustainability theme house in 2020-21, given that the 2020 student selection committee's review led to the theme falling in priority given its lack of campus outreach initiatives.

GOAL #5

Develop, promote and maintain **low-cost resources and activities** which help students and the entire community save money, reduce waste production and live sustainably: The Outdoors Club, Bike Co-op, Repair Shop, Free Store, Free Food page on Facebook, Free Food Pantry, Sustainable Agriculture House (currently in Fry House), sustainable residence floor and Student Sustainability Corps. Continue supporting student sustainability groups and these initiatives by providing tools, resources, increased coordination, faculty advising, staff and faculty assistance.

Rationale: Students have very little time to work around their academic schedules and some come from home situations with low means. International students are only allowed to work on campus which also might limit their source of income. Community members and students can dispose of no longer needed or wanted items and benefit from services and free items on campus to minimize waste and save money.

Responsibility: Departmental offices, faculty and staff throughout campus for networking and support, Residence Life for residential facilities, Student Life for all student-related activities on campus, SPC, Sustainability Corps and other student groups, Events Office for all activities on campus. Work with ESG to bolster student outreach.

Benchmarks: Continue to promote activities every year and ongoing and coordinate meetings with these clubs each semester to discuss ways to operate sustainably and promote sustainable practices

Potential roadblocks: Most of these initiatives are carried out by the Sustainability Corps, a limited number of students trying to promote sustainability and practices on a campuswide community scale. Having enough students to run these activities/initiatives can be a significant challenge. Some of the initiatives and activities are discontinued when students graduate and interest dissipates or other students do not have time. New students use their time to carry out new activities and initiatives that they are interested in and the former activities/initiatives diminish. There might not be enough incoming students interested in working in these areas and offering these services. Free Pantry items are based on donations by the community and inventory varies.

GOAL #6

Explore ways that **environmental**, **diversity and social justice** efforts can take into account, support and strengthen one another in the curriculum, co-curriculum and Earlham community. Focus environmentally themed events on environmental justice or environmental racism and promote similar material in Environmental Sustainability courses. Connect Diversity Progress Committee with the Center for Social Justice and sustainability.

Description: Organize and promote events related to environmental justice and inclusiveness through collaboration of multiple student groups and offices.

Rationale: We must recognize that climate change disproportionately impacts indigenous, low-income and developing communities. Many Earlham students come from such communities, directly impacted by widespread wastefulness and unsustainable practices. Our job is not only to prioritize sustainability for sustainability's sake, but for the pursuit of equity in our own local and global communities.

Benchmarks: Year 1: The director for the Center of Environmental Leadership and the director of Student Engagement & Diversity, Equity and Inclusion will meet to brainstorm potential collaborations to then be shared with SPC (Sustainability Progress Committee). Ongoing: Regular meetings (at least once each semester) between CEL staff and Student Life staff focused around DEI efforts.

Responsibility: The director of Student Engagement & DEI (Diversity, Equity and Inclusion) and the director of Center for Environmental Leadership convene at least once each semester to identify key intersections and action steps in their respective positions to amplify each other's work. Strive to interface the work of the Sustainability Office and the Diversity Progress Committee, SSC Student Sustainability Corps, student organizations, Religious Life, Residence Life, New Student Orientation leaders, Sustainability Office, DPC (Diversity Progress Committee), director of Student Engagement and DEI (Diversity, Equity and Inclusion), assistant director of Orientation; Interfaith Initiatives and Mediator, Multicultural Resource Center, Events Office, Earlham Student Government, and the Department of Languages and Cultures.

Potential roadblocks: Finding employee and student suitable times for multiple student groups and office directors and employees to meet.

Appendix 1

ENSU 488: Sustainability Senior Capstone Spring 2019

Earlham College Prairie Proposal Native Landscaping for Savings and Sustainability

Presented to the Earlham Board of Trustees, June 2019 Evelyn Barragan, Brenna Hellman, Lydia Evans

Advisor: Dr. Karen Mager, Assistant Professor of Environmental Sustainability Partner: Ian Smith, Director of Facilities

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Executive summary

This proposal recommends the conversion of 5 acres of Earlham Campus lawns into selfsustaining prairie habitats, or demonstration prairies.¹ Prairies are temperate grassland ecosystems high in plant, animal and pollinator diversity. The mission of this project is to decrease the high monetary and labor costs required for mowing turf grass while creating beautiful natural spaces that will bring ecological, educational and experiential benefits to the Earlham community.

We submit this proposal to request that the Board approve the addition of prairies in the locations specified at the June meeting so that this project can move forward in the summer and fall of 2019. We ask the Board to make an initial investment of \$10,000-\$20,000 to install these prairies, which will be paid back via reduced maintenance costs in 3-5 years. We also request that the Board approve entering into a 10-year cost share partnership with USFWS (US Fish and Wildlife Service) in order to reduce costs and ensure we have expert advice free of charge from USFWS biologists while the prairies are establishing. If the Board is unable to commit full funding for the project now, we request funding for Phase I (\$7,250-\$10,815) or at a minimum approval to move forward with the prairie installation if grant applications to support the project are successful.

BENEFITS

This project was proposed by Ian Smith in order to reduce the cost of maintaining turf grass and increase the sustainability, both financial and ecological, of Earlham's Grounds Department activities. The ecological benefits of a natural prairie habitat include increased wildlife and plant biodiversity, carbon sequestration, reduced water run-off and decreased energy expenditure. The prairie spaces offer many opportunities for educational and scholarly engagement and they will bring beauty and aesthetic diversity to Earlham campus.

PROPOSED LOCATION

Eight areas are proposed for conversion to prairies (see map, p. 0). Installation: Prairies will be installed during 3-4 site visits by a native restoration contractor. If approved by the Board in June, sowing could begin in late Fall 2019. The estimated installation cost, including interpretive signage, is \$8,650-\$20,073.

¹ Since most of Eastern Indiana, including Earlham Campus, was originally forest, rather than prairie (Western Indiana), we are using the term "demonstration prairie" rather than "restoration prairie." However, the goal of this project is to restore Earlham land to a self-sustaining natural habitat.

MAINTENANCE

Earlham Grounds Department will maintain the prairies with biannual burns and occasional mowing and weeding. The savings of having largely self-maintaining prairie versus labor-intensive turf grass will be approximately \$4,000 per year.

PROJECT CONTINUATION

The Capstone seniors have worked to ensure that this project will move forward if it receives Board approval. We have created significant documentation of our project and we have worked closely with Ian Smith and communicated with stakeholders and partners across campus. Finally, we have outlined a Prairie Assistant work-study or independent-study position for students to take initiative and provide support for the project. Supervision of the Prairie Assistant and grant-writing responsibilities will be supported by several faculty members across campus who are willing to carry this project forward.

ENSU 488 CAPSTONE

Each spring, Environmental Studies/Sustainability/Science majors work on a group project in partnership with Earlham College or the City of Richmond. Projects by previous Capstones include revitalization of the Middle Fork Reservoir (2018), creation of the Playground with a Purpose (2017), revision of the Earlham Sustainability Plan (2016) and creation of a Richmond Farmer's Market revitalization plan (2014). This year, Evelyn Barragan ('19 Environmental Sustainability), Brenna Hellman ('19 Environmental Science) and Lydia Evans ('19 Environmental Studies) along with faculty advisor Dr. Karen Mager have worked closely with Facilities Manager Ian Smith to create the following proposal.

Why prairies?

COST SAVINGS AND REDUCED MAINTENANCE

Prairies will significantly reduce the College's expenditure on grounds maintenance. While an established prairie only requires burnings and occasional invasive species removal, lawns require weekly mowing, irrigation and pest control. Lawns also contribute to rain runoff and campus flooding, while prairies can absorb rainfall. Due to the budget cuts for the next fiscal year, Facilities is facing reduced labor for maintaining the same campus area. This makes the reduction of mowed lawns a more pressing issue for our community. Prairies provide a much-needed alternative to traditional, cost-intensive lawn landscaping.

Estimated Budget and Cost Savings

The estimated initial installation cost of 5 acres of prairie is \$8,650-\$20,073 if all prairies are installed at the same time. If installed in two phases, the installation cost may be higher. Maintenance for the first seven years while the prairie is establishing is an estimated \$3,525, compared to \$31,500 for lawn maintenance. Once established, prairie maintenance for each 10-year cycle is an estimated \$4,950, compared to

\$45,000 in mowing costs for 10 years. Please see page 00 for a more detailed budget. If Earlham funds the prairie installation, it will pay for itself and save the College an estimated \$8,400 within the first seven years. After that, the prairie would save the college \$40,050 every ten years. Outside funding sources also exist to cover the costs of installation. Please see Potential Funding Sources (p. 00)

SUSTAINABILITY

Earlham College has a demonstrated commitment to sustainability. The creation of campus prairies would significantly contribute to the goals of the Comprehensive Sustainability Plan (2016), which states, "sustainability at Earlham will be visible, educational and effective."

In addition, the outcomes of the prairie align with the Principles and Practices of Simplicity, Community and Peace and Justice. Some of the ecological benefits of prairies include:

- **Carbon sequestration:** Prairies can sequester more carbon below ground than a forest does above ground²
- **Reduced runoff:** Due to prairie plants' deep root systems, they prevent runoff and erosion. They also help filter pollutants from contaminating the local watershed.
- **Increased biodiversity:** Prairies provide valuable habitat for birds, small mammals and insects. In particular, prairies provide important habitat for pollinator species, which are currently under great ecological stress. For example, the prairie plant milkweed is vital to the struggling populations of Monarch butterflies.
- **Campus certification:** Native landscaping habitats may make the college eligible for certifications such as the Indiana Wildlife Federation's "Landscaping the Sustainable Campus" initiative.

CAMPUS ENGAGEMENT

Prairies are beautiful habitats that present educational opportunities for courses, student projects, research and outdoor studying. Prairies also provide students a quiet space outdoors for relaxing or meditating. Included in our proposal is a bench for individuals to

^{2 &}quot;The Power of Prairies." (2011) Retrieved from

https://www.fws.gov/news/blog/index.cfm/2011/6/27/Iowa-The- Power-of-Prairies

enjoy the prairie and interpretive signage to help the community understand the benefits of prairies.

Course involvement: Biology courses regularly use natural areas on campus for research and education. The information and recommendations that come from monitoring the prairie habitats can then inform the work by Facilities and Maintenance. In particular, Assistant Professor of Sustainability Dan Atwater has several ideas for large research projects that would seek NSF support. Art classes can use the prairies for photography, painting, drawing and other class projects. Psychology classes can use these spaces for integrating the effects of natural spaces on mental health. Please see **Appendix B** for more details course involvement.

Community involvement: These spaces will also foster integration of the Earlham and Richmond communities. There are many possibilities for inclusion of the Richmond community. For example, Trueblood Preschool can use these areas for break times or for educating children about native plants, birds and insects. These prairies would be a valuable resource for the Joseph Moore Museum, which already uses the existing prairie in its programs, camps and ecotours.

Finally, many Richmond residents come to Earlham's Campus for walks and increasing the quality of the natural spaces would enhance their experience at Earlham.

Similar projects

EARLHAM PRAIRIE

The existing .75-acre prairie surrounding the Earlham Observatory back campus is an example of what the proposed prairies will bring to the Earlham campus. Installed in 1994 by a retired professor of plant ecology from Knox College, the prairie is now fully established. The prairie is burned every 2-6 years, but otherwise requires no maintenance.

Earlham Courses, research groups, JMM interpretive programs, Richmond and Earlham community members and a variety of wild birds, insects and mammals regularly use this prairie. Implementing more campus prairies would greatly expand the beauty and possibilities of engagement with Earlham's landscape.

The capstone project has used the successes of this prairie as a guide for our implementation proposal and has considered ways the new prairie sites can be improved. We have included recommendations in our maintenance plan to prevent certain invasive species present in the current prairie. We also intend to include a higher percentage of wildflowers in order to aesthetically enhance Earlham's campus.

NATIVE LANDSCAPING TRENDS IN INDIANA

Universities are increasingly turning to native plantings to decrease cost and increase the ecological value of campus spaces. Similar prairie landscaping restoration projects have found success at other institutions. Most notably, Butler University follows a comprehensive sustainable landscaping plan, including a 3-acre prairie, as part of the Indiana Wildlife Federation's "Landscaping the Sustainable Campus" initiative. Other successful prairie installation projects in Indiana include Kankakee Sands and Prairie Border Nature Preserve (Jasper County), the Baseline Barrens Nature Preserve (Washington County), Hoosier Prairie (Lake County).

Prairie Installation Process and Timeline

Installing Earlham Prairies would occur in four stages over seven years. After Board approval, next steps include seeking funding, finalizing and performing the installation and communicating with the campus about the landscape changes.

Early stages of prairie



Earlham back campus prairie



Pictures taken by Brent Smith

STAGE 1: PREPARATION AND SOWING

Pre-installation planning (summer and fall 2019)

- Secure funding.
- Confirm implementation schedule with a contracted native landscaping firm.
- Contractors will assess the sites for soil conditions, hydrology, erosion and other features. This information will inform the selection of an appropriate seed mix. The mix should have a variety of wildflowers and species that attract pollinators.
- August-September
 - Contractors will prepare the lawn for sowing by applying herbicide.
- September-October
 - Contractor will sow seeds with a no-till seed drill directly into prepared dead lawn.
 - Seeding should be completed in the fall as they will lie dormant over the winter and germinate during the spring rains.
- Throughout the year:
 - Prairie Assistant will reach out to the campus community about the landscape changes and will work to design interpretive signage.

STAGE 2: EARLY PRAIRIE MAINTENANCE

Season 1 (Spring and Fall 2020)

- May-October
 - The first two seasons after planting, the EC Grounds Dept. will mow the prairie 3- 5 times at a height of 6in to manage weed growth as the native plants begin to establish.

Season 2: (2020-2023)

- May-October
 - EC Grounds Dept. will mow the prairie 1-2 times at a height of 12in to manage any weeds.

Season 3-6: Burning (2023-2026)

- The third season after planting, EC Grounds Dept. will burn the prairie in April for three consecutive seasons. Burns can be coordinated in-house as they are for the existing back campus prairie.
- During the summer and fall, the EC Grounds Dept. and Prairie Assistants will manage invasive species as needed.

STAGE 3: COMPLETED PRAIRIE AND CONTINUED ANNUAL MAINTENANCE

After the seventh season, the prairie should be established and will require minimal care. The capstone seniors have prepared a detailed Prairie Maintenance Manual that the Facilities Department will use to care for the prairies

- April
 - Every 2-3 years the EC Grounds Dept. will burn the prairie.

- May-September
 - EC Grounds Dept. will maintain mown border strips and paths through the prairie.
- August-November
 - During the Fall semester, the Prairie Assistant, EC Grounds Dept., or AWPE trail maintenance courses will weed for invasive species. This may include bush hogging for woody growth.
- October-November
 - If prairie needs to be reseeded, late fall is optimal. Prairies only need to be reseeded every few decades and the current Earlham prairie has never been reseeded.

Potential native planting areas



FIGURE 1.

This map shows proposed prairie locations (olive green).

Orange polygons are potential prairie locations that may require more discussion with campus athletics or other stakeholders.

Potential forest areas are also included (purple) as possibilities for future sustainable landscaping improvements on Earlham's Campus.

The area with a star is marked a no mow zone in the 2014 Earlham Master Plan.

- Prairie area 1 (Stout)
- Prairie area 2 (Wellness)
- Prairie area 3 (pres. house)
- Prairie area 4
- Prairie area 5 (baseball field)
- Prairie area 6 (D Street)
- Polygon 7 (SW football field)
- Prairie area 8

Link to interactive map

Phasing of installation project

We recommend that the 5 acres (yellow areas) be approved for installation at the same time as the minimum area to achieve significant improvements in maintenance costs and ecological benefits. While these are the most obvious prairie locations, Ian Smith has encouraged us to include other areas that might require more discussion with campus stakeholders (orange areas). The yellow and orange areas total 7 acres. The current prairie by the Observatory serves as a demonstration of the success of prairie habitats on Earlham campus.

However, if it is necessary to phase the installation, it would be possible to start with a minimum of 3 acres (the minimum required by contractors). We recommend the areas behind the president's house, by the stadium, by the shot put and by Stout Meeting house. The cost of this area would be \$7,250-\$10,815. Please see Budget (p. 00) for more information.

PHASE 1

The following areas were recommended by Ian as easy to access yet not as centrally located on campus. We also recommend including Area 1, which is on the periphery of front campus and will enable educational opportunities and community engagement.

- Areas 7 & 8 SW of football field (throwing area) (1.69 acres and 0.10 acres respectively)
- Area 1 near Stout Meetinghouse (1.15 acres)

PHASE 2

These areas include spaces near front campus and areas that will be disturbed by electric cables if the solar installation project is approved.

- Area 2 continuation of the rain garden next to the Wellness Center (0.27 acres)
- Area 3 behind the president's house (1.17 acres)
- Area 4 near the tennis courts (0.21 acres)
- Area 6 by D Street entrance (0.74 acres)
- Area 5 between baseball field and the barn (1.67 acres)
- Note that areas 5 and 6 may need more consultation (2.4 acres total)

FUTURE PHASING

The purple areas already have established trees and therefore are more suited to a native forest restoration than a prairie. Brent Smith has encouraged future groups to undertake this project.

Campus stakeholder and expert consultation

EXPERT CONSULTATION

We have been in conversation with following individuals about best practices for prairie installation: Brent Smith (Biology Faculty, EC), Alyssa Nyberg (Kankakee Sands, Nature Conservancy), Ryan Hellmann (Field Operations Lead, Cardno Nursery), Brent Evans (Ground Manager, Cope Environmental Center), Natalie Marinova (Field Botanist, Eco Logic, LLC), Julia Kemnitz (U.S. Fish and Wildlife Service), Dr. Rebecca Dolan (Retired Director Friesner Herbarium, Butler University). Dr. Douglas Richmond (Associate Professor / Turfgrass Entomology & Applied Ecology at Purdue University).

U.S. FISH AND WILDLIFE SERVICE CONSULTATION (5/2/2019)

Julia Kemnitz from the U.S. Fish and Wildlife Service visited campus for an assessment of our proposed site locations. She confirmed the feasibility and likelihood of success in the sites we have identified. She shared her expertise on prairie installation and care and was able to confirm that our proposed maintenance plan was appropriate for the conditions of our campus. Julia has worked on several similar projects on university and private properties and was enthusiastic about the ecological benefits of Earlham developing a similar project. She also shared information about a potential cost-share agreement with the U.S. Fish and Wildlife Service, detailed below in Contracting Installation.

Contracting installation

Due to reduced staffing, the EC Grounds Department is no longer able to supply the labor for a prairie installation. However, they will be able to maintain the prairie once installed and Ian Smith has said that converting maintained lawn to prairie would greatly ease the workload on his staff.

U.S. FISH AND WILDLIFE SERVICE COST-SHARE AGREEMENT

The U.S. Fish and Wildlife Service offers a cost-share agreement for the creation of native prairie habitats. Julie Kemnitz visited Earlham for an initial consultation in May and is in support of our project. Typically, the cost share is up to 50/50 and requires the partnering institution to keep the land as habitat for ten years, at which point the agreement ends and the College has no further commitment to USFWS. USFWS provides a consultation, ongoing assessment and assistance and seed money, while Earlham would likely be responsible for

installing the seed and maintaining the prairie. However, different arrangements are possible according to the project needs.

CONTRACTING PRAIRIE INSTALLATION

Several landscaping companies in the region specialize in native landscape restoration.

While contracting a prairie installation requires an upfront investment, the specialized equipment and expertise of the firm will help guarantee the long-term success of this natural ecosystem. We have contacted the following two contractors to inquire about their process and receive initial budget estimates. These two firms come highly rated, but Julie Kemnitz from USFWS said there may be more and cheaper options in the area as well.

- Eco Logics LLC (Bloomington, IN): The installation would involve 4 total site visits: a site assessment, 2 preparatory sprays to kill the trufan finally installation with a Truax no-till drill seeder. All labor and equipment are included. Seed could be purchased from Spence Nursery or Cardno Nursery. Eco Logics requires a minimum of three acres to do a job.
- **Cardno Native Plant Nursery (Walkerton, IN):** The installation would also involve 4 total site visits: assessment, 2 spray treatments and a no-till drill installation. All labor and equipment are included. Seed would be selected from the Cardno Nursery.

Budget

The following tables present estimated values from several quotes provided by Cardno and Eco Logic. All estimates are based on a 5-acre prairie area installed at the same time. Taking the highest installation cost from our calculations (\$20,073), 5 acres of prairie would pay for itself and save the college \$8,427 over the first 7 years. After that, the prairie would save the college \$40,050 every ten years, or about \$4,000 a year.

NOTE ON PROJECT PHASING

If the 5 proposed acres were to be installed in different phases, the total installation cost would increase and the educational, ecological benefits would decrease. The seed costs, bench and interpretive costs would stay constant. Depending on the duration between multiple phases, a second consultation may be necessary. The installation cost is calculated assuming the efficiency of doing all 5 acres at once. It includes costs such as mileage that would have to be duplicated. For example, for the Cardno installation cost includes \$1,650 for gas and paid hours of driving.

Cardno's estimate for a 3-acre installation is \$10,815, including signage and a bench. A 3-acre installation with the USFWS cost-share would be \$7,250, including signage and a bench.

ESTIMATED INSTALLATION COSTS (5 ACRES)								
	Cardno	Eco Logic	USFWS Cost-Share					
Consultation	\$1,000	\$1,080	\$0					
Seed Costs	Estimated \$4,274*	\$6,400* (\$1,280/acre)	Paid for by USFWS					
Installation Cost	\$5,150	\$6,475	\$5,150**					
Total Installation	\$10,425	\$13,955	\$5,150					
Bench	\$500	\$500	\$500					
Interpretive Signage	\$3,000***	\$3,000	\$3,000					
Total	\$13,925	\$17,455	\$8,650					
Total + 15 percent hypothetical budget increase	\$16,013	\$20,073	\$9,947					
Simple Payback Period****	3.4 years	4.3 years	2.5 years					

 Price varies by the seed mix selected. Basic prairie mixes cost \$650-\$850/acre, while mixes with higher diversity or that are suited to higher moisture can range up to \$2,500/acre. Part of the consultation would be deciding on seed combinations suitable for EC Campus conditions and our budget restraints. The USFWS can create a seed mix for about \$500/acre.

** This is the installation cost of Cardno, but the USFWS may be able to connect us with a cheaper contractor

*** This is budgeting for three high quality and weather durable interpretive signs.

**** This is the installation cost total divided by \$4,050, the annual savings over the first seven years.

MAINTENANCE YEARS 1-7							
Pra	irie	Lav	Savings				
10 mowings*	\$1,800	Mowing labor* (7 years)	\$31,500				
4 burnings**	\$1,200	Irrigation costs	unknown				
Periodic Invasive Management	\$525						
Total	\$3,525	Total	\$31,500	\$28,500			

10 YEAR MAINTENANCE COSTS							
Pra	irie	Lav	Lawn				
3 burnings	\$900	Mowing labor (10 years)	\$45,000				
Periodic Invasive Management	\$750	Irrigation costs	unknown				
Reseeding***	\$2,100						
Total	\$4,950	Total	\$45,000	\$40,050			

* Mowing costs: Current mowing cost according to Ian Smith is \$900 an acre per year (\$900 x 5 acres x years). This includes labor and equipment but does not factor in irrigated areas. The \$1,800 for 10 mowings is a rough estimate (total mowed area of 50 acres, if \$900 includes ~25 mowed acres for a season).

- ** Estimated burning cost is based on \$15/hr. for overtime Facilities work and assuming it will take two people two hours per acre (\$300 per burning). It is also possible that other parties such as Brent Smith might be able to assist with the burning. Periodic invasive management (weeding, bush hogging, herbicide) is estimated at an hour/acre/year at \$15/hr. of overtime.
- *** This is an estimate assuming \$300 of seed and 8 hrs. at \$15/hr. per acre. Reseeding portions of a prairie once a decade, while optional, can help maintain its diversity. The current Earlham prairie has never been reseeded, but other projects at Butler and Cope have reseeded their prairies.

Potential funding resources

We have identified the following sources as options for funding the installation of the prairie.

USFWS PARTNERS FOR FISH AND WILDLIFE PROGRAM (COST SHARE AGREEMENT)

This is an excellent option for sustained financial support and expertise for the Earlham prairies. USFWS will provide a 50:50 cost share for prairie installation as well as credit for two years of maintenance mowing. Additionally, they can help us coordinate with contractors, conduct site visits to assess prairie health and are on-call for any additional consultation if issues arise. They have worked with other colleges (ex. Ball State) and local organizations (ex. Cope Environmental Center) on prairie installation and are enthusiastic to enter into an agreement with Earlham. Their cost share program requires a commitment that planted areas will remain in prairies for 10 years. However, it is possible to pull out of this agreement if different land uses for certain areas are needed, provided that the college pays back the USFWS investment in the given area at a pro-rated cost.

ADDITIONAL FUNDING SOURCES

- Indiana Native Plant Society Biodiversity Grant (\$400-\$1,500)
- US Fish and Wildlife Service (USFWS) Urban Program Grant
- Wayne County Foundation
- Has supported past ENSU Capstone projects
- Ball Venture Fund Grant
- Cliff Bar Family Foundation Grant
- National Fish and Wildlife Federation Monarch Habitat Grant
- National Science Foundation (NSF)-Division of Environmental Biology (research grant)
- NSF Research in Undergraduate Institutions (RUI) Grant/Award (research grant)
- NSF Research Experiences for Undergraduates (REU) Grant/Award (research grant)

The student(s) who participates in the Prairie Independent Study/Work Study position will help to apply for grants, as needed, in the 2019-2020 school year. The grant applications will be overseen by Karen Mager and Jamey Pavey, in consultation with Sara Paule. We will be passing down several documents with all of the resources and knowledge we have accumulated throughout this project which will contain any necessary information needed to complete grant applications.

Stakeholder and community outreach

ATHLETICS

- Rob Hewitt (track and field and cross country coach): We have met with Rob several times to discuss his requirements for the spaces that his athletes use. We have taken note to make sure we adjust our areas accordingly.
- Julie Kline (senior director of athletics): Julie brought up concerns about the track and field and cross country teams, which were resolved with a discussion with Rob Hewitt. We discussed the soccer teams, athletic training, parking and potential future land use.

MAINTENANCE

- We have been working closely with Ian Smith (director of Facilities).
- We created a Maintenance Plan that outlines care for the prairie. The Plan also includes people and resources to contact should any questions arise. We met with the Grounds Department in April to present the plan and answer their questions.

EPIC EXPO PRESENTATION

• We presented our project on April 17, 2019 to an audience of about 40 people, followed by an open discussion and a survey to gather community feedback (for results from this survey see p. 00).

STUDENTS

• We have reached out to several students who expressed interest in an independent study working closely with the prairie during the 2019-2020 school year.

GENERAL PUBLIC

- We are working with Brian Zimmerman in Marketing and Communications to create a story for the Earlham community and beyond to hear about our goals and vision for this project.
- We have gathered some materials and outlined goals of interpretive signage that will share the purpose, ecology and species of the Earlham prairies with the public. Signage, like the ones for the Wellness Center Rain Garden, will help communicate the ecological and educational value of the prairies and could be used to recognize donors. Additionally, we have received templates from the US Fish and Wildlife Service for small signs that can be used when prairie installation is in progress, to communicate to people that the disturbance they see will soon be a beautiful prairie. The Prairie Assistant will continue this work in the future.

Epic Expo survey responses

1. Adding prairies would beautify Earlham's campus 2. Adding prairies would bring educational opportunities to Strongly Agree Earlham Agree 3. Prairies are important to making Slightly Agree Earlham more sustainable Slightly Disagree 4. I would enjoy spending time in the proposed EC Prairies Disagree 5. Adding prairies would foster Strongly Disagree connection between the Richmond and Earlham communities 7.5 22.5 6. EC should implement the Ó 15 30 proposed prairies on campus Number of Respondents

Epic Expo Survey Responses

ADDITIONAL FEEDBACK FROM THE SURVEY:

- 1. Adding prairies would beautify Earlham's Campus
 - While most people agreed that prairies would beautify Earlham's Campus, several people also brought up that there will need to be a shift in the culture of aesthetics and landscaping expectations. We have consulted with different sources about best practices for communicating the purpose and aesthetic value of the prairies to the public, particularly during the initial installation phases. For example, the USFWS recommends a combination of mowed buffer strips around prairies (which show that the landscaping is intentional) with informational signs. We prioritized communication and outreach responsibilities in the Prairie Assistant job description for this reason.
- 2. Adding prairies would foster connection between the Richmond and Earlham communities
 - While many respondents were excited about possibilities for connection, they
 also commented that this will require specific partnerships with local schools and
 organizations in order to be effective. For example, planting a prairie between the
 meetinghouse and the library will provide easy access to Trueblood Preschool for
 educational purposes.
- 3. EC should implement the proposed prairies on campus
 - All of our respondents were very supportive and believe that this project should move forward/ Some people hope to see our project expand to more areas (larger areas, front campus) in the near future.

Project continuity

At the end of the 2019 spring semester, the ENSU seniors took steps to ensure that this project will move forward successfully if approved by the Board. We had conversations with different members across campus and we created a detailed and organized **EC Box Folder** to house all of our project documentation and instructions for future steps. We also drafted a detailed Maintenance Plan (located in Box) that would guide the EC Grounds Department in caring for the prairie during and after installation.

The table below summarizes the individuals with whom we have coordinated to support the different aspects of the project in the future.

EC GROUNDS

Please see the Prairie Maintenance section (p. 00) for a more detailed description of the labor required for maintenance and care for the prairie.

STUDENT INVOLVEMENT

We have developed a work study or independent study position for a Prairie Assistant to formalize continued student involvement in this project. For the first year, the work of the Prairie Assistant would focus on applying for grants, conducting community outreach and creating interpretive signage. Once the prairie is installed, their work would shift to activities like weeding and supporting prairie burns.

Currently, Grounds and Facilities does not have funding to support a work study position, so this position would be an independent study. In the future, it is possible that the EC Grounds Department and or the Biology Department could support a student worker to help with the removal of invasive species. We have so far identified six possible student who would like to do an independent study next year.

PROJECT CONTINUATION RESPONSIBILITIES						
	Person Respons	sible				
Task	EC Grounds and Facilities	Prairie Contractor	Prairie Assistant	Faculty Support	EC Courses	
Grant Writing*			Х	X Karen Mager, Jamey Pavey		
Community Outreach			Х			
Designing Interpretive Materials**			Х	X Ann Eliza Lewis	Х	
Supervision of Prairie Assistant***	X Ian Smith			X Dan Atwater		
Site Assessment and Seed Selection	X (hiring and coordinating with contractors)	Х	X (research support as needed)			
Installation of Prairie	X coordinating with contractors)	Х				
Burns	Х		X (support as needed)			
Trail and Border Maintenance	Х					
Invasive Species Removal	Х		Х		Х	
Signage and and Bench Installation	Х					
Biodiversity Monitoring and Assessment				X Biology Faculty	X (see p. 00)	

- * Karen Mager (assistant professor of environmental sustainability) and Jamey Pavey (director of Environmental Leadership Program) can support the Prairie Assistant in reviewing and submitting the grant proposals.
- ** Ann-Eliza Lewis (interim director of the Joseph Moore Museum and collections manager) has experience in educational interpretation. She has offered to lead one or two students in an independent study or summer research project to design quality interpretive materials for the prairie. She will also be teaching a course in Exhibit Design in the 2021-2022 SY and could include prairie signage as a class project.
- *** Dan Atwater (assistant professor of biology) has offered to supervise the Prairie Assistants as an independent study or work position and to provide direction on plant diversity monitoring and invasive species removal. Karen Mager, Jamey Pavey, Ann-Eliza Lewis and EC Ground Dept would also coordinate with and support this position on other tasks (ex. grant writing, interpretive signage, coordinating prairie burns, etc.).

Proposal summary

With this project, we hope to convert lawn monocultures into vibrant natural spaces that will enhance the educational opportunities, sustainability and beauty of Earlham's campus.

Colleges across the US are turning to native landscaping as a means to decrease costs and create more ecological and engaging campuses. We hope that Earlham College will also consider the benefits that prairie ecosystems would bring to our community, both for our students, faculty and staff, as well as the wider Richmond community. While prairies are natural ecosystems that require initial investment and patience to implement, they will quickly return their investment both in cost and in the benefits that they bring.

We thank the Earlham College Board of Trustees for taking the time to consider this proposal, and we are excited about the possibilities that prairies hold for Earlham's campus and community.



Pictures taken by Brent Smith

Appendix A: Prairie assistant

This position will be an independent study or student worker position, depending on the needs of the student and funding availability. The Prairie assistant will continue the project planning process as well as assist EC Grounds in maintaining the prairies. The assistant will also act as a liaison between Grounds, the Sustainability Office and biology courses involved with the prairie. Dan Atwater has offered to supervise this position. The responsibilities will change according to the stage of the prairie, outlined below.

POSITION RESPONSIBILITIES FALL 2019-SPRING 2020

- Assist in applying for grants and writing final/interim reports
- Update maintenance plan as needed
- Organize campus outreach about the prairie
- Communicate with Ground Crew and Contractors about installation schedule
- Design interpretive signage
- Keep Prairie EC Box folder updated and organized with relevant information

FALL 2020

- Assess prairie biodiversity
- Monitor and remove invasive species from August-November
- Research and troubleshoot potential problems
- Update maintenance plan as needed
- Maintain clear and organized records of projects and of prairie maintenance
- Assist with other grounds projects as needed
- Engage campus with prairie via social media, events, or other projects

SPRING 2021

- Assess prairie biodiversity
- Help Grounds Dept organize, advertise and conduct spring prairie burns (March-April)
- Research and troubleshoot potential problems
- Update maintenance plan as needed

- Maintain clear and organized records of projects and of prairie maintenance
- Assist with other grounds projects as needed
- Engage campus with prairie via social media, events, or other projects

ADDITIONAL PROJECTS

- Work with Jamey Pavey to pursue certification for Indiana Wildlife Federation's Landscaping the Sustainable Campus certification and other sustainability certifications
- Work with David Knight to create prairie information webpage

DESIRED QUALIFICATIONS

- Biology courses or field experience in plant identification and ecology preferred but not required
- Organized and detail-oriented
- Ability to take initiative on projects to enhance the prairie
- Enthusiastic about native habitat restoration
- 2nd year standing

Appendix B: Course Involvement

NATURAL SCIENCE CLASSES

- **Ecological Biology:** This course includes field projects conducted every September-October. Past research projects have used the existing prairieland increased prairie acreage would expand the opportunities for assessing plant biodiversity, edge effects, invasive species prevalence and soil nutrients.
- Environment, Science and Sustainability: The long-term monitoring projects the course conducts in late March could establish annual monitoring of the prairies. Possible assessments include the prevalence of invasive species before or after burning, soil quality monitoring, biodiversity counts, or amount of biomass.
- **Field Botany:** The course's spring field projects could use the prairie as a valuable resource in studying plant ecology and diversity.
- **Insect Biology:** Field projects conducted in fall focus on studies of insect biodiversity and could quantify insect biodiversity in the prairies.

- **Ornithology:** The prairies would provide valuable habitat for birds and space to assess bird biodiversity for class projects.
- **Population and Community Ecology:** Research projects conducted throughout each fall semester focus on the relationships within and between ecological populations and communities. Having multiple prairies would provide valuable space for comparison plots.
- **Biological Diversity:** The BioBlitz conducted at the end of each spring semester could include the prairie and provide and annual documentation of the prairie biodiversity.
- **Geology:** Having multiple plots of the same ecosystem across campus would provide a useful resource for soil quality collection and comparison.

ARTS CLASSES

- **Weaving and Fiber Arts:** Several prairie plants are a source of the natural dyes used by Earlham fiber arts students, for example, goldenrod and asters.
- **Photography and Drawing courses:** Prairies provide a rich and varied landscape as well as a variety of wildlife to provide natural inspiration for artwork.

HUMANITIES CLASSES

• American Literature and Ecology: A semester long activity in this course has students observe and write about a natural space on campus. These prairie habitats would provide an interesting source of reflections on human and more-than- human interactions and what "natural" means for restored ecosystems.

RESEARCH PROJECT WITH DAN ATWATER

Dan Atwater (Assistant Professor of Biology) conducts research on how individual-plant actions affect the function of prairie ecosystems. He explained that implementing multiple prairies on campus would provide enough space to conduct multiple long term, replicated and scientifically significant research projects. He already has several research ideas for semester-long student research, summer collaborative research, as well as his own research all of which can involve students. Increasing prairie plots on campus would contribute significantly to Earlham's research facilities and could be leverage for federally funded grant applications to the National Science Foundation (NSF), USFWS, or similar organizations. Dan also explained that implementing new prairies is a unique opportunity to establish a long-term experiment with far-reaching implications. For example, projects could manipulate the species composition of the genetic diversity of the plots, creating long-term, "living experiments" comparing different plots of prairies. These could easily be maintained and monitored using existing on-campus infrastructure.

Appendix 2

Stormwater Pollution Prevention Plan (SWPPP) February 13, 2020

Prepared for Earlham College

Prepared by Patriot Engineering and Environmental, Inc. 6150 East 75th Street Indianapolis, IN 46250 (317) 576-8058

Patriot Project Number: 19-1643-01E

Qualified Professional Certification Storm Water Pollution Prevention Plan Earlham College 801 National Road West Richmond, Indiana 47374-4095

This Storm Water Pollution Prevention Plan (SWPPP, SWP3 or Plan) has been reviewed and certified by the following qualified professional as defined in 327 IAC 15-13-5(57.)

Printed Name: David W. Services, CHMM, CPESC

Title: Environmental Compliance Manager, Patriot Engineering and Environmental, Inc.

Signature:

Date: _____

Management Approval Statement Storm Water Pollution Prevention Plan Earlham College 801 National Road West Richmond, Indiana 47374-4095

This plan has been reviewed and approved by management at a level with the authority to commit necessary resources for implementing the Plan. Management commits to the manpower, equipment and materials required to expeditiously control and remove the quantity of contaminants discharged in storm water that may be harmful. The program and procedures outlined in this Plan will be implemented and reviewed annually and updated in accordance with applicable state requirements. I certify under penalty of law that this Plan was prepared under direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information present. Based on my inquiry of the person(s) who manage the system or those persons directly responsible for gathering the information, the Plan developed is, to the best of my knowledge and belief, true, accurate and complete.

Printed Name:	 	
Title:		
Signature:		
Date:	 	

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For additional information or the most up-to-date version of Earlham College's Stormwater Pollution Prevention Plan, please contact the Director of Facilities.

1. Introduction

This Storm Water Pollution Prevention Plan (SWPPP, SWP3, or Plan) has been prepared for Earlham College located at 801 National Road West, Richmond, Indiana (Campus, Site or Property). The primary purpose of the Plan is to reduce the pollutants in storm water discharges associated with Campus activities and to ensure compliance with the requirements of Title 327 of the Indiana Administrative Code (IAC), Article 15, Rule 13, "Storm Water Run-Off Associated with Municipal Separate Storm Sewer System Conveyances" (Rule 13). A combined Rule 13 Notice of Intent (NOI) renewal letter was submitted for the City of Richmond and Earlham College Campus to the Indiana Department of Environmental Management (IDEM) on July 23, 2018. IDEM issued the Permit Number INR040044. A copy of the submission is found in Appendix A of this SWP3 Plan and maintained in the Facilities director's office.

In accordance with 327 IAC 15-13-3(6) and (7), the combined Rule 13 for the City of Richmond and Earlham College (Earlham) applies to:

- "A municipality with a population density, according to 2000 United States Census Bureau data, of five hundred (500) people per square mile or greater, United States Census Bureau population greater than seven thousand (7,000) and less than ten thousand (10,000)and having a university or college full-time equivalent enrollment, military base population, hospital bed count occupancy, or correctional Campus daily user population (based on the most recent enrollment, count, or population data) that places the total population greater than or equal to ten thousand (10,000)."
- "A university, college, military base, hospital, or correctional Campus with a full- time equivalent enrollment, daily user population, or bed count occupancy greater than or equal to one thousand (1,000), located within a designated municipality and having responsibility for a storm water conveyance."

1.1 PLAN IMPLEMENTATION, AVAILABILITY, REVIEW, AMENDMENTS AND CONSISTENCY WITH OTHER PLANS

This plan describes and ensures the implementation of practices, which are used to reduce the pollutants in storm water discharges associated with industrial activity at the Campus. This Plan has been certified by a qualified professional and approved by management at a level with the authority to commit necessary resources for implementing this Plan (Refer to pages i and ii prior to the Table of Contents).

A hardcopy version of the Plan will be maintained at the Campus in the Director of Facilities' office and an electronic version will be maintained on the Campus's network. In accordance with 327 IAC 15-13-13, the Plan can be made available for public review.

The Plan will be reviewed at least annually and amended as often as necessary to achieve the Plan's objectives. In accordance with 327 IAC 15-13-18, this Plan will be amended as changes in design, construction, operation, or maintenance at the Campus is implemented, which may have a significant effect on discharge of pollutants to the waters of the State. Each annual review and/or amendment will be documented on the form provided in Appendix N. The completed forms will be maintained in the Director of Facilities' Office.

In accordance with 327 IAC 15-4-1(e), Earlham College may be notified by IDEM at any time if the Plan does not meet the requirements of Rule 13. After such notification, the Plan will be amended and a written certification indicating the requested changes were made will be submitted to IDEM for review. Campus personnel will amend the Plan within 60 days after such notification.

The Campus also has a Spill Prevention, Control and Countermeasure (SPCC) Plan, with identifies oil storage at the Campus and associated spill prevention, control and countermeasures implemented at the Campus. The Campus's SPCC Plan is herein incorporated by reference. The SPCC Plan is maintained in the Director of Facilities' and the Assistant Director of Facilities' offices.

2. Site Background

2.1 SITE DESCRIPTION

The Site is located at 801 National Road West in Richmond, Indiana. The property is located on approximately 73.121 acres. The approximate coordinates of the center of the Campus are 39°49'23.51" North and 84°54'47.68" West. The site is accessed from National Road West. The Campus is bounded to the west by Earlham Cemetery, to the north by National Road West and residential properties beyond, to the south by agricultural and residential properties and to the east by residential and commercial properties.

As part of 327 IAC 15-13-6(2) for the list of all known receiving waters, a Site Location Map is provided as Figure 1 showing the proximity of these receiving waters corresponding to Earlham's geographical location. Based on a search on the Indiana Department of Natural Resources' (IDNR) website, there are no drinking water wells (i.e. unspecific or significant withdrawn well) within a 0.5-mile radius of the Site. There are two unconsolidated wells, on the eastern boundary of the Campus, see Figure 2 for the IDNR Well Map. In addition, a Soil Map of the Campus is provided as Figure 3. All Figures are located in Appendix D.

The Site is currently operated by Earlham College and is used for academic undergraduate and graduate education. The Campus typically operates twelve (12) hours per day, five (5)

days per week and fifty (50) weeks per year. The Campus's Standard Industrial Classification (SIC) code is 8221, Colleges, Universities and Professional Schools.

The site consists of sixty-five (65) various buildings that houses academic, administration, dormitories, athletics and facilities maintenance.

As part of 327 IAC 15-13-8(5), a Site Plan is provided as Figure4 and a Site Survey is provided in Appendix A, which contains at a minimum any of the following, if applicable:

- All on-Site storm water drainage and discharge conveyances, which may include pipes, ditches, swales and erosions channels, related to a storm water discharge.
- Known adjacent property drainage and discharge conveyances, if directly associated with run-off from the Campus.
- All on-Site and known adjacent property waterbodies, including wetlands and springs.
- An outline of the drainage area for each storm water outfall.
- An outline of the Campus property indicating directional flow via arrows, or surface drainage patterns.
- An outline of impervious surfaces, which includes pavement and buildings and an estimated of the impervious and pervious surface square footage for each drainage area placed in a map legend.
- On-Site wells used as potable water sources, as applicable.
- All existing structural control measures to reduce pollutants in storm water run-off.
- All existing and historical underground and aboveground storage tank locations, as applicable.
- All permanent designed plowed or dumped snow storage locations.
- All loading and unloading areas for solid and liquid bulk materials.
- All existing and historical outdoor storage areas for raw materials, intermediary products, final products and waste materials.
- Outdoor processing areas.
- Dust or particulate generating process areas.
- Outdoor waste storage or disposal areas.
- Pesticide or herbicide application areas.
- Vehicular access roads.

Currently, there are no on-Site water supply or injection wells.

2.2 SITE DRAINAGE

The topography of the majority of the Site is at an elevation of 991 feet above mean sea level (ft AMSL) with a gentle slope to the south southwest.

The locations and areas of the two storm water outfalls are as follows:

- Outfall 001 is a western outfall at approximately 39°49'30.25"N and 84°54'56.70"W. The total area is approximately 56.5 acres that consists of approximately 46,149 square feet (sf). or 29 percent of pervious surfaces and 114,919 sf. or 71 percent of impervious surfaces.
- Outfall 002 is a southern outfall into the storm water basin at approximately 39°49'9.92"N and 84°54'44.25"W. The total area is approximately 16.6 acres, that consists of approximately 5,076 sf. or 8 percent of pervious surfaces and 58,454 sf. or 92 percent of impervious surfaces. The outfall is a combined overland sheet flow from the southern college property, City of Richmond stormwater drains and other public rights-of-way.

2.3 RECEIVING WATERS

The Earlham College northern campus area stormwater inlets and conveyances drain into the Richmond Municipal Separate Storm Sewer System (MS4). The southern and western campus areas drain into a stormwater water ditch / riverine leading into Clear Creek and ultimately into the East Fork Whitewater River.

2.4 SITE FEATURES AND SENSITIVE AREAS TO PROTECT

The College property has a wooded area on the southwest border of the property. There is also one (1) wetland pond area within the woods and the woods have been defined as a Palustrine System that can be temporarily flooded (PFO1A) wetland. There are two large stormwater basins located on the western boundary of the Randal R. Sadler Baseball Stadium, a large basin that contains Outfall 002 on the southern boundary and a single stormwater basin on the northern boundary of the property that drains into Outfall 001.

3. Storm Water Pollution Prevention Team

As referenced in 327 IAC15-13-8(b)(1) to (3), Earlham has created a Storm Water Pollution Prevention Team for the Campus. The Storm Water Pollution Prevention Team is responsible for developing, implementing, improving and revising this Plan and stormwater quality discharged from campus. The individual team members' contact information and responsibilities are provided in Table 3.1 located in Appendix C.

4. Potential Pollutants and Sources

4.1 INVENTORY OF EXPOSED MATERIALS

An inventory of materials exposed to storm water that may reasonably be expected to affect the quality of storm water discharges from the Campus is provided in Tables 4.1, 4.2 and 4.3 in Section 4.2. As applicable, Safety Data Sheets (SDSs) for exposed materials are maintained at the Campus.

4.2 NARRATIVE DESCRIPTION

In accordance with 327 IAC 15-13-7(a)(4), this Plan provides a narrative description of areas that generate storm water discharges exposed to campus activities and have a reasonable potential for storm water exposure to pollutants. Any hazardous wastes, universal wastes and used oils are containerized and stored under roof cover until transported to an approved waste vendor.

4.2.1 Trash Stored in Outdoors Receptacles, Solid Waste Compactors, Recycling Container, Yard Waste Open Top container and Large Item Open Top Container

This area is used for the staging of solid waste (e.g. solid waste, food waste, green waste, etc.,) produced on Campus.

Staged/Stored Material Risk Identification Analysis

Information on the stored materials and potential exposures to storm water is summarized in the following table. Materials Staged in the Campus Areas.

Area	Purpose/ Activity	Potential Pollutants	Quantity	Staging Method	Potential Expsures	Likelihood of Exposure
Earlham Hall	General Waste Storage	Inert and and Nuisance Solids (food, plastic, rubber paper, etc.)	Varies	Covered Receiver Box	None	Unlikely
Facilities Maintenance	Recycling Matierals	Cardboard, plastics, paper, glass	Varies	Covered Container	None	Unlikely
	General Waste Storage	Inert and and Nuisance Solids (food, plastic, rubber paper, etc.)	Varies	Covered Receiver Box	None	Unlikely
Grounds Storage	General Waste	Green Organic Waste	Varies	Uncovered Open Top Container	Adequate Rain Event	Likely
Barns	Storage	Bulky Solid Waste	Varies	Uncovered Open Top Container	Adequate Rain Event	Likely

TABLE 4.1: Inventory of Materials with the Potential to be Exposed to Storm Water

Historical spills/releases/leaks

No historical evidence of or known reportable releases or spills of general Campus waste/ materials occurred in the general waste staging area.

4.2.2 Facilities and Grounds Maintenance and Fueling Area

Facilities Maintenance area is located off Central Drive on the Campus. This road is used as a main drive for trucks and vehicles entering and exiting the Campus. Fueling of vehicles and equipment is completed on-site at a Fueling Area by Facilities Maintenance; there are two bulk storage fuel tanks for unleaded gasoline and off-road diesel fuel. There is one 25,000-gallon double-walled Emergency Diesel Fuel tank used to provide fuel to the Campus Boilers in case of an interruption of natural gas. No re-fueling activity is associated with the 25,000-gallon Emergency Diesel Fuel Tank. Auto maintenance and Campus equipment are maintained in the Grounds Maintenance building. Inside the Grounds Maintenance building there are drums and buckets of lubricants (new and used,) greases and a 55-gallon drum of off-road diesel fuel.

Information on the stored materials and potential exposures to storm water is summarized in the following table.

TABLE 4.2: Materials Staged in Campus Maintenance and Fueling Area

Area	Purpose/ Activity	Potential Pollutants	Quantity	Staging Method	Potential Expsures	Likelihood of Exposure
Facilities Maintenance Fuel Area	Campus Vehicles	Bulk Unleaded Fuel	500 Gallons	N/A	Spills, Leaking Trucks and Vehicles	High
Facilities Maintenance Fuel Area	Campus Equipment Vehicles	Bulk Off-Road Diesel	300 Gallons	N/A	Spills, Leaking Trucks and Vehicles	High
Facilities Maintenance Building	Emergency Generator	Emergency Generator or Diesel Fuel Tank	25,000 Gallons	N/A	Spills and Leaking Piping	High

Historical spills/releases/leaks

No historical evidence of or known reportable releases or spills of Campus or Grounds Maintenance facilities.

4.2.3 Ground and Building Maintenance

Although a majority of the property consist of non-porous surfaces, lawn care and general maintenance is conducted on the entire campus, athletic areas and surrounding Campus properties.

Staged/Stored Material Risk Identification Analysis

Information on the stored materials and potential exposures to storm water is summarized in the following table.

Material	Purpose/ Activity	Potential Pollutants	Quantity	Staging Method	Potential Expsures	Likelihood of Exposure
Grounds Maintenance	Campus Equipment Maintenance	Off-Road Diesel, Lubrica (oils and greases), Used Oil	Three 55 Gallon Drums, 5 Gallon Buckets and Tubes	N/A	Spills, Leaking Trucks and Vehicles	Unlikely
Oily Wastes (used oil, rags, filters, adsorbent)	Maintenance of Vehicles and Equipment	Oils and Greases	Two 5 Gallon Buckets	N/A	Spills	Unlikely
Fertilizers, Herbicides and Pesticides	Significant Grounds Maintenance Including Application of Chemicals on Lawn and for Weed Control	Nitrogen, Phosphorus, Potassium and Organophos- phorus Compounds	Bulk Amounts (30# to 40# bags, 1 gallon and 5 gallon containers)	Application Services are Completed by the Grounds Crews	Spills	Moderate
Road and Ice Melt Salt	Significant Buildings Maintenance Including Application of Chemicals for Road Maintenance	Chlorides (salt) and Inert Solids	Two Covered Storage Bins (bulk amounts)	Stored Covered Shed Building Prior to Use (salt)	Adequate Rain Event	Unlikely

Historical spills/releases/leaks

No historical evidence of or known reportable releases or spills of fuels, lubricants, greases, used oil, fertilizers, herbicides, pesticides or ice melt/materials occurred on the Campus area.

5. Stormwater Management Practices and Measures

In reference to 327 IAC 15-13-17, the following storm water management practices and measures are implemented at the Campus to minimize storm water pollution.

5.1 GOOD HOUSEKEEPING AND BEST MANAGEMENT PRACTICES

The Storm Water Pollution Prevention Team will promote good housekeeping throughout the Campus. In reference to 327 IAC 15-13-17, the following good housekeeping and storm water management practices are currently implemented at the Campus to minimize potential storm water contamination:

- Weekly pickup of fifty-two (52) 33-gallon trash receptables across Campus.
- Trash and debris removal for stormwater basins on an as needed basis.
- Rip-rap in concentrated flow areas inside stormwater basins.
- Buffer strips of vegetation between parking areas and stormwater basins.
- Emptying of janitorial mop buckets into the sanitary sewer versus stormwater inlets.
- Immediate clean-up of spilled petroleum products on impervious and pervious surfaces.
- Quarterly stormwater inspections of entire Campus.
- Maintenance of grass swales.
- All storm drains will be marked with an adhesive medallion to identify storm drains and visual identifiers to not pour any material down the drain.
- Stormwater structure / conveyance inspections, cleaning and maintenance of all inlets, ditches on a bi-weekly basis.
- All spill kits will be maintained per the frequency identified in the SPCC plan.

The practices listed above will be inspected during the quarterly Campus inspections described in Section 5.3 and any corrective actions will be performed as soon as practicable.

5.2 PREVENTATIVE MAINTENANCE OF STORM WATER STRUCTURES AND CAMPUS EQUIPMENT

In reference to 327 IAC 15-13-7 and 327 IAC 15-13-8, preventative maintenance will be conducted on storm water structures and equipment at the Campus. Preventative maintenance includes regular inspections, testing, maintenance and/or repairs, of storm water structures, equipment and systems. Storm water structures at the Campus include stormwater basins and rip-rap lined outlets. Common equipment and systems include tanks, pipes, pumps, compressors, transformer, sumps and powered mobile equipment that could fail and result in discharge of pollutants in storm water. All such structures and equipment will be examined for leaks, support or foundation failure, or other signs of deterioration during the quarterly Campus inspections.

Preventive maintenance activities are conducted by Campus personnel to minimize potential pollutants in storm water runoff. All preventative maintenance will occur in general accordance with the various equipment manufactures' recommendations, if available. Upon discovering defects or damage to structures equipment, Campus personnel will repair or replace the defect or damaged equipment, as soon as practicable. Records of preventative maintenance and any corrective actions will be maintained at the Campus and in Appendix M of this Plan.

5.3 ANNUAL CAMPUS INSPECTION

In reference to 327 IAC 15-13-7 and 327 IAC 15-13-8, Campus personnel who are familiar with the activities performed on the Campus will conduct the annual Campus inspection. The purpose of the annual Campus inspections is to determine the effectiveness of the storm water management practices and measures. If feasible, the annual Campus inspection each calendar year will be conducted either during a storm event or shortly thereafter.

A blank Annual Campus Inspection Form is provided in Appendix B. Completed Annual Campus Inspection Forms will be maintained with the SWP3 at the Campus for a minimum of five (5) years after Rule 13 coverage expiration or renewal.

5.4 ANNUAL EMPLOYEE TRAINING PROGRAM

In reference to 327 IAC 15-13-7 and 327 IAC 15-13-8, Campus personnel with any level of responsibility of the components or goals of this Plan will receive annual training. The employee training will include at a minimum the following topics:

- Background, objectives and content of this Plan.
- Good housekeeping practices.
- Storm water structure maintenance.
- Spill response program, including reporting, location of spill cleanup materials and cleanup procedures.
- Sediment and erosion prevention.
- Other storm water best management practices.

An Annual Employee Training Program outline and roster form are provided in Appendix K. Completed roster forms will be maintained with the SWP3 at the Campus for a minimum of five (5) years after Rule 13 coverage expiration or renewal.

5.5 SPILL RESPONSE PROGRAM

The following general procedures will be initiated upon the discovery of a spill.

5.5.1 Reportable Spills

In the event of a reportable spill, the Campus Manager or Director of Facilities will report the spill to IDEM's Emergency Response Section at 888-233-7745 as soon as possible but within two hours of spill discovery. Upon IDEM's request, a written spill report will be submitted. A copy of the Indiana Spill Rule (327 IAC 2-6.1 or Rule 6.1) and IDEM's spill reporting guidance (including external emergency response entities) are provided in Appendix F. Additional spill response measures for oils are summarized in the Campus's Spill Prevention, Control and Countermeasure (SPCC) Plan, which is maintained by the Director and the Assistant Director of Facilities.

In accordance with 327 IAC 2-6.1-5, the following spills are reportable:

- Spills that damage waters of the state so as to cause death or acute injury or illness to humans or animals.
- Spills from the Campus that has been notified in writing by a water utility that it is located in a delineated public water supply wellhead protection area as approved by IDEM under 327 IAC 8-4.1 that are spills of any of the following:
 - Hazardous substances or extremely hazardous substances when the amount spilled exceeds one hundred (100) pounds or the reportable quantity, whichever is less.
 - Petroleum when the amount spilled exceeds fifty-five (55) gallons.
 - Objectionable substances as defined in section 4(11) of this rule.
- Spills that damage waters of the state and that are located:
 - Within 50 feet of a known private drinking water well located beyond the property boundary.
 - Within 100 yards of any high-quality water classified as an outstanding state resource water, any water designated as capable of supporting a salmonid fishery, or any water that is a fish hatchery, fish and wildlife area, nature preserve, or recreational water owned by the Indiana Department of Natural Resources or the federal government.
- For any spill that does not meet the above criteria, the following must be reported:
 - Spills to surface waters that include any of the following:
 - Hazardous substance or extremely hazardous substances when the amount spilled exceeds one hundred (100) pounds or the reportable quantity, whichever is less.
 - Petroleum of such quantity as to cause a sheen upon the waters.

- Objectionable substances as defined in 327 IAC 2-6.1-4(11).
- Spills to soil beyond the property that include any of the following:
 - Hazardous substances or extremely hazardous substances when the amount spilled exceeds one hundred (100) pounds or the reportable quantity, whichever is less.
 - Petroleum when the amount spilled exceeds fifty-five (55) gallons.
 - Objectionable substances as defined in 327 IAC 2-6.1-4(11.)
- Spills to soil within the property boundary that include any of the following:
 - Hazardous substances or extremely hazardous substances when the amount spilled exceeds one hundred (100) pounds or the reportable quantity, whichever is less.
 - Petroleum when spilled amount exceeds one thousand (1,000) gallons.
 - Objectionable substance as defined in 327 IAC 2-6.1-4(11.)
- Any spill for which a spill response has not been completed.

If applicable, the Director of Facilities will contact and document attempts to notify the following:

- For spills to surface water that causes damage, the nearest affected downstream water user located within ten (10) miles of the spill.
- For spills to soil outside the property boundary, the affected property owner(s), operator(s), or occupant(s.)

5.5.2 Response to a Small Spill

- Small spills are less than 5-gallons of materials. In case of small spills, Campus personnel will perform the necessary clean-up if the spill can be handled safely and hazards are known.
- The on-scene Campus personnel have adequate training to clean up the spill.
- Appropriate personal protective equipment (PPE) and spill response (e.g., spills kits) are available to the on-scene Campus personnel.

PPE and spill response equipment used to respond to small spills will be cleaned and restored to operating status prior to being put away. Any waste materials generated as a result of the clean-up efforts will be properly disposed in accordance with regulations. On-scene Campus personnel will contact the Director of Facilities, if assistance is needed for the disposal of waste materials.

5.5.3 Response to a Large Spill

Large spills can be defined as spills that:

- Involve more than 5-gallons of materials.
- Highly hazardous materials.
- Involve any amounts of chemicals with unknown hazards.

In the event of a large spill at the Campus, the first person discovering or witnessing the spill will contact the Director of Facilities.

Campus personnel in the vicinity of the spill will attempt to stop or control further spillage from the source by shutting off pumps, closing valves, plugging leaks, up-righting drums, or otherwise stopping the flow of material if it can be accomplished without endangering themselves or others. The initial response will be undertaken by on-scene Campus personnel only if:

- The spills can be handled safely and hazards are known.
- The on-scene Campus personnel have adequate training to control the spill safely.
- Appropriate PPE and spill response equipment are available to the on-scene Campus personnel.

The primary focus of emergency response activities is to protect human health and the environment. Emergency response activities will not be undertaken at the risk of injury to any person involved.

If the spill cannot be immediately stopped, controlled, or contained by merely closing a valve or shutting down a pump, the affected area will be evacuated of all Campus personnel and an emergency response contractor will be contacted.

If the situation warrants evacuation of the Campus, the emergency evacuation procedures outlined in the Campus's Emergency Action Plan (EAP) will be followed.

5.5.4 Spill Response Supplies

Campus personnel have the following spill response references on hand for response to emergency incidents. The list of Campus personnel can be found in Appendix C:

- Emergency Contact List (including external response entities.)
- SPCC Plan.
- Confined Space Program.
- Emergency Action Plan.

Spill response supplies will be stored in spill kits located at the Fueling Area, Facility Emergency Generator, Ground Maintenance building. Refer to Figure 2a for the location of all spill kits. The spill kits include various types of absorbents. The spill kits will be inspected monthly as part of the Campus's SPCC Plan and quarterly as part of the inspection identified in Section 5.3 of this Plan. An inventory of supplies for each spill kit will be maintained by the Director of Facilities or their designee.

5.6 ANNUAL NON-STORM WATER ASSESSMENT

In accordance with 327 IAC 15-6-7(c)(3), Campus personnel will conduct a non-storm water assessment. The assessment will be completed annually and will include a visual inspection of Outfall 001 and Outfall 002 during dry weather conditions to determine the presence of any non-allowable, non-storm water discharges. Allowable non-storm water discharges include the following:

- Firefighting activities.
- Fire hydrant flushing.
- Waters used to wash vehicles without the use of detergents and solvents.
- Water used to control dust.
- Potable water sources, including waterline flushing.
- Irrigation drainage.
- Lawn watering.
- Routing external building wash-down which does not use detergents.
- Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled materials have been removed) and where detergents are not used.
- Air conditioning condensate.
- Springs.
- Uncontaminated from refrigerant.
- Foundation or footing drains where flows are not contaminated with process materials such as solvents.

The assessments will result in a certification, which will identify the assessment date, area assessed, assessment method, assessment results and assessor's name and signature. A blank Non-Storm Water Discharge Certification Forms will be maintained with the SWP3,

Appendix G, at the Campus for a minimum of five (5) years after Rule 13 coverage expiration or renewal.

5.7 SEDIMENT AND EROSIONS PREVENTION

In accordance with 327 IAC 15-6-7(b)(7)(A), areas with a high potential for significant soil erosion will be identified and the measures to limit erosion will be identified and implemented, as necessary. The on-Site areas with the highest potential for significant soil erosion include the on-Site drainage ditches.

Measures currently in place include riprap in various locations of the on-Site drainage ditches and quarterly inspections of these drainage ditches. If significant erosion is observed in the on-Site drainage ditches, Campus management will place riprap in the ditches to minimize the erosion. In general, areas with demonstrated or potential for significant soil erosion will be addressed with soil stabilization through riprap or vegetative cover, contouring slopes, paving and/or installation of structural controls (e.g., basins/traps, check dams).

6. OPTIONAL ANNUAL STORM WATER SAMPLING

Annual grab samples of the storm water discharges from Outfall 001 and Outfall 002 could be collected and submitted for laboratory analyses of the parameters listed in Table 3. The purpose of the analytical tests is to evaluate the effectiveness of the best management practices (BMPs) installed on the Campus inference to the total maximum daily load (TMDL) established for Clear Creek. In addition, in the future if the US EPA requires analytical stormwater data, Earlham College will have a database of analytical parameters to determine the Campus' overall effectiveness of the BMPs.

In addition, Table 3 provides the sample type, sample frequency, typical sample hold times and typical laboratory analytical methods. The laboratory analytical methods identified in 40 CFR Part 136 will be used.

If the Campus decides to collect annual samples, Campus personnel will conduct the sampling as follows:

- Samples will be collected from Outfall 001 and Outfall 002 (See Figure 4 for outfall locations.)
- The Campus may sample and analyze the discharges from the outfalls. The monitoring data taken from the first-year event will be used to aid in developing and implementing this Plan. Subsequent annual sampling data will be used to verify the effectiveness of this Plan and will aid with revising the Plan and implementation of additional storm water management practices and measures, as necessary.
- Sampling is required to be within the first 30 minutes of discharge at Outfall 001 and Outfall 002 or as soon as practicable.
- The pH measurement will be taken at the time the grab samples are collected by using a pH meter that has been properly calibrated according to manufacturer's specification and provides results displayed in numeric units.
- Samples may be collected from a discharge resulting from a measurable storm event (i.e., rainfall equal to or greater than 0.1 inches) at least 72 hours from the previous measurable storm event.
- Run-off events resulting from snow or ice melt can be used for sampling stormwater.

7. RULE 13 ANNUAL REPORTING

In reference to 327 IAC 15-13-18, an Annual Report (IDEM State Form 51278) found in Appendix A, will be prepared and submitted to City of Richmond Sanitary District on an annual basis. For the first five (5)-year permit term, this completed form must be submitted by 1 year from the Storm Water Quality Management Plan (SWQMP) – Part C submittal date and, thereafter, 1 year from the previous report (i.e., in years two (2) through five (5) of permit coverage).

These reports are submitted as hardcopies.

The following information will be included in the annual report:

- Any changes to the original NOI letter from submission.
- Any changes to the Campus, the Campus operations, or the Campus's industrial activities.
- An annual summary of the program management activities performed during the reporting period, found in Section 16.
- Identification of the best management practices (BMPs) used for Campus personnel and student education and outreach included in your Storm Water Quality Management Plan (SWQMP), found in Section 17.
- Identification of the best management practices for Campus Personnel and Student participation and involvement included in your SWQMP, found in Section 18.
- Identification of the best management practices for Campus related illicit discharge detection and elimination (IDDE) included in your SWQMP, found in Section 19.
- If the Campus has construction activities, then:
 - List the best management practices for the construction site storm water run-off program identified in your SWQMP, found in Section 20.

- List the best management practices for post-construction storm water run- off control identified in your SWQMP, found in Section 21.
- List the best management practices for Campus operations used for pollution prevention and good housekeeping identified in your SWQMP, found in Section 22.

A blank Annual Report Form is provided in Appendix A. Completed forms will be maintained with the SWPPP at the Campus for a minimum of five (5) years after Rule 13 coverage expiration or renewal.

8. COMBINED NOI LETTER RENEWAL

As required by 327 IAC 15-13-9, a combined City of Richmond Sanitary District and Earlham College NOI letter renewal form will be submitted to IDEM at least 90 days prior to Rule 13 coverage expiration. The most recent NOI letter form will be obtained from IDEM's website for completion.