OAKLAND COUNTY SUSTAINABILITY PLAN

OAKLAND COUNTY MICHIGAN







A Message from David Coulter, Oakland County Executive

To the residents of Oakland County,

I am pleased to share the Oakland County Sustainability Plan prepared by AECOM with you. This comprehensive plan represents one of the first steps toward our goal of reducing greenhouse gas emissions on Oakland County's government campus, as well as implementing sustainable strategies for our buildings and operations.

It allows us to measure our progress to achieve net zero carbon emissions by 2050 with an interim benchmark of 50% carbon emission reduction by 2035.

With this plan's recommendations in hand, we can be more intentional about achieving more energy-efficient buildings on the county's campus and fewer gas-guzzling cars in the county's fleet, more environmentally friendly grounds, and foster a workforce culture that embodies the county's commitment to a more sustainable Oakland County.

The Sustainability Plan is key to the seven goals we've identified as top priorities for the county. And these goals are all linked. You can't have healthy residents without clean and safe water and air.

Livable neighborhoods can't be fully achieved without access to non-motorized trails, public transportation and open green spaces for recreation.

Equipped with the recommendations in this report, we can in All Ways, Move Forward in a proactive way to address the inequities that underserved communities experience on issues such as climate change and access to public transportation and green spaces.

I promise you, this is not a plan that will sit on a shelf. With the help of some federal funding, we have a real opportunity to make transformational, once-in-a-generation changes. And that's what I intend to do.

It's the right thing to do, it's the moral thing to do and it's the thing that we're going to do to ensure future generations have a safe and clean county where they can live, succeed and thrive.

With gratitude

David Coulter



Acknowledgments

Indigenous Land Acknowledgment

Oakland County resides on the ancestral, traditional, and contemporary lands of the Anishinaabe, known as the Three Fires Confederacy, comprised of the Ojibwe, Odawa, and Potawatomi. The land was ceded in the 1807 Treaty of Detroit and makes up southeast Michigan.

In recognizing the history and respecting the sovereignty of Michigan's Indian Nations, Oakland County honors the heritage of Indigenous communities and their significant role in shaping the course of this region. Further, the county recognizes the wrongs done to those forcibly removed from their homelands, separated from their families, deprived of their natural resources, prohibited their use of spiritual and traditional practices, and restricted from expressing their cultural identity. The county commits to fostering an environment of diversity, equity, and inclusion that is responsive to the needs of the First Peoples through our words, policies, and actions.

The acknowledgment, preservation, and perpetuation of customs and traditions of Indigenous nations are essential to our shared cultural heritage. A deep understanding of Native peoples' past and present informs the policy creation, partnerships, and community engagement of the county in its ongoing effort to elevate the dignity of all people and serve as shared stewards of the land.



Thank You

Thank you to all who have collaboratively developed the county's Sustainability Plan, including Steering Committee members, Focus Group and technical interview participants, and other staff. This Plan and its future implementation will advance the sustainability of the county's sites and operations, further enabling the county's government to serve the community now and into the future.

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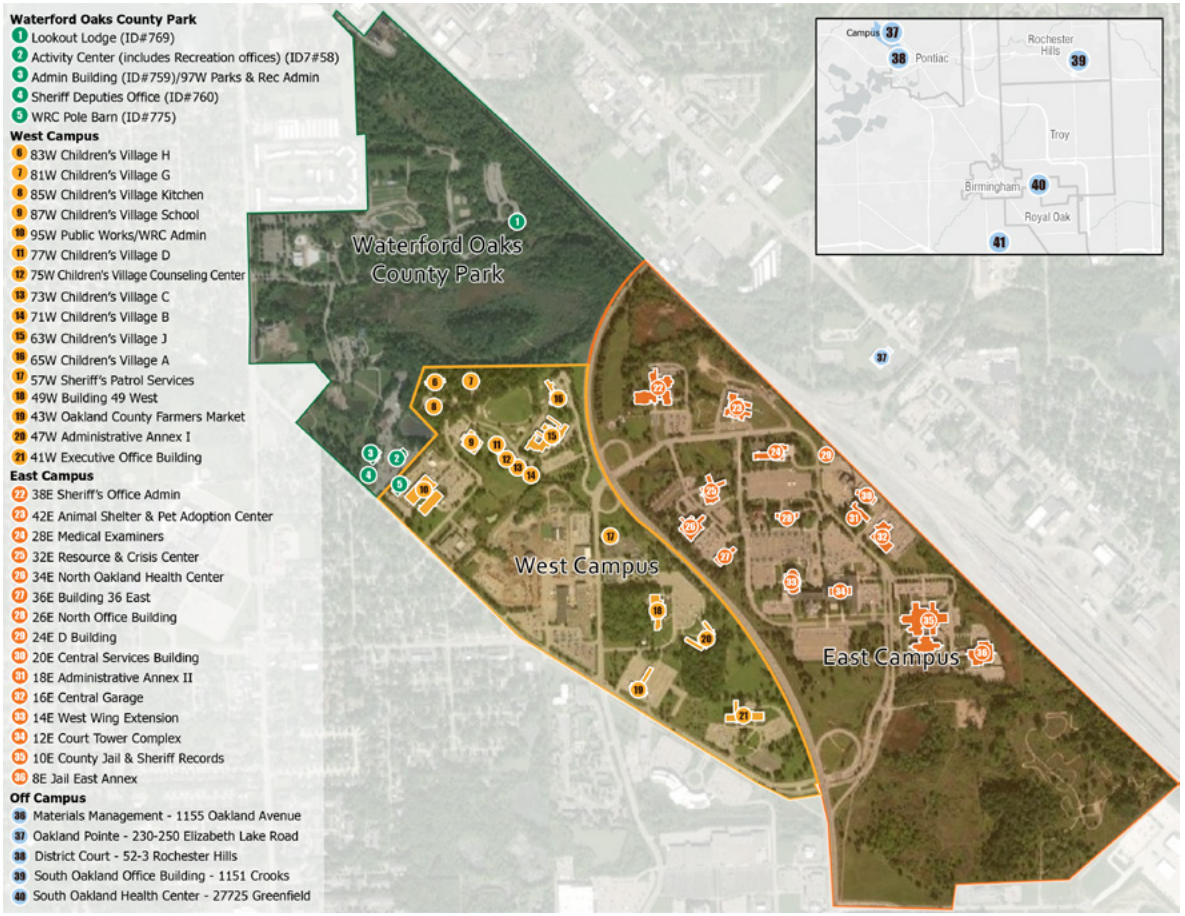
Introduction

Leading by Example

Oakland County is committed to fostering social equity, economic prosperity, and environmental sustainability. By modelling transparent, innovative, and achievable actions to improve sustainability within county sites and operations, the county aims to lead by example for the greater Oakland County community to advance social, economic, and environmental sustainability. Contained in this Sustainability Plan, there are recommended strategies that the county can implement to become more sustainable and an associated Framework to guide county decisions into the future.

The sustainability strategies focus on the Oakland County campus, select off-campus facilities, and Waterford Oaks County Park (see Figure 1). These strategies can also apply to specialty facilities and operations, like those at the county airport – however, these types of sites and operations will require more nuanced sustainability planning. The county's Greenhouse Gas Inventory includes all the county-owned sites and operations and will inform further decarbonization planning across the county's operational portfolio.

Figure 1. Sustainability Plan Sites and Facilities



A Framework was developed to guide this work. It includes the sustainability Vision, Guiding Principles, Focus Areas, Objectives, and Key Performance Indicators (KPIs). While Focus Areas are defined separately, they are all interconnected. The success of the county's sustainability efforts hinges on holistically advancing the Focus Areas together. The Framework is supported by a collective definition of sustainability and diversity, equity, and inclusion. The Sustainability Plan and Framework are complimented by a three phase Change Management Plan to support successful implementation of the sustainability strategies (See Appendix D: Change Management Plan).

What is Sustainability?

Sustainability is creating common good for all by protecting the environment and supporting the needs of the present without compromising the needs of the future. It considers the intersection of protecting the environment, protecting people, and supporting an equitable and inclusive economy. It is specifically defined through the three subjects below:

Environmental Sustainability

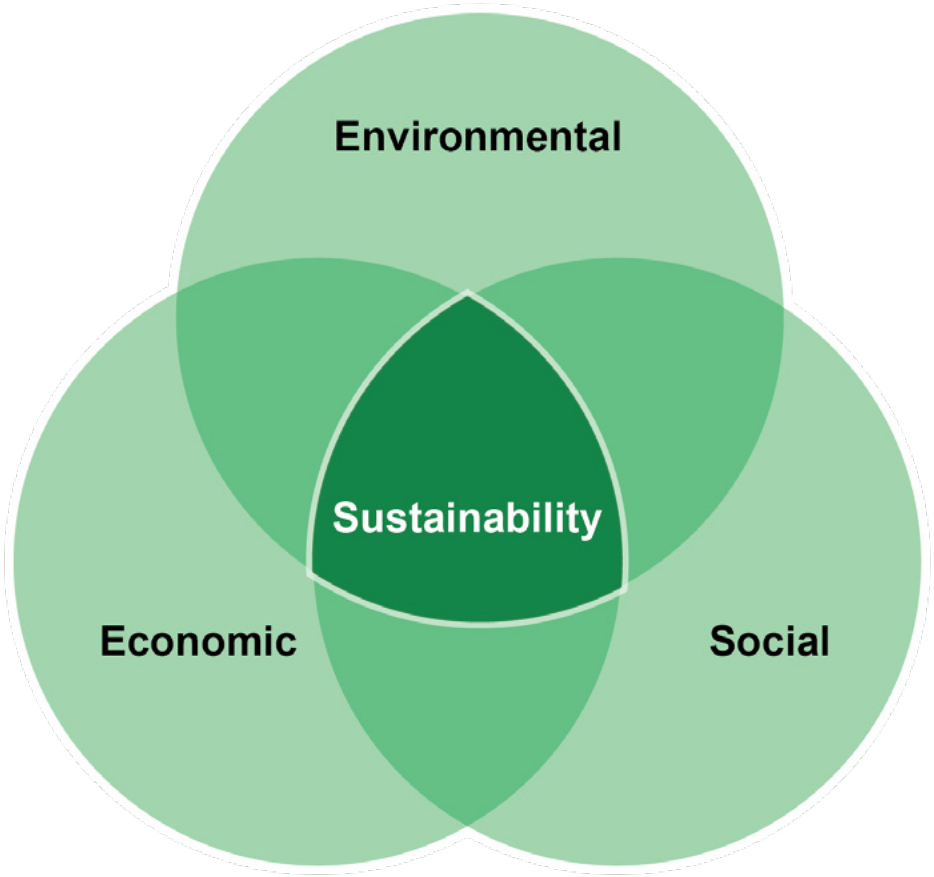
Environmental sustainability focuses on the natural environment and includes factors such as air and water quality, waste reduction and recycling, emission reduction, and ecosystem preservation and enhancement.

Social Sustainability

Social sustainability focuses on people and communities and includes factors such as diversity, equity and inclusion, access to education and training, and health and wellness resources.

Economic Sustainability

Economic sustainability focuses on finances and transactions of goods and services, and includes factors such as procurement, cost savings, revenue, and economic growth.



How does Diversity, Equity, and Inclusion relate to Sustainability?

Oakland County is a member of the Urban Sustainability Directors Network (USDN), an organization for sustainability practitioners in government. In 2019, USDN developed equity principles and commitments.[1] The county aligns with those principles and commitments, and specifically recognizes the following:

Equity is a professional competency. The skills associated with advancing equity make us better public servants, preparing us to deal with the complex nature of the social, economic, and environmental challenges Oakland County communities face.

The government has a fiscal and moral responsibility to address the long-term implications that inequity has on prosperity, health, and safety for residents, community members, and stakeholders. Governments can either create or eliminate barriers for better outcomes through their policies, programs, and relationships.

Increasing diversity, and promoting inclusion, within the sustainability field, and particularly in decision-making positions within government, will increase the long-term relevance of accountability of the county's work to communities who have been systematically denied influence. Diverse perspectives produce more sophisticated solutions. The sustainability field must consciously build a diverse and inclusive culture.

More information on the USDN Equity Principles and Commitments can be found in Appendix A.

What is Diversity, Equity, and Inclusion?

Equity means that everyone has access to resources and the support to reach each person's full potential. Creating a diverse, equitable, and inclusive county environment means that the county's workforce and visitors are valued, respected, included, and heard. Oakland County is committed to the goal of operationalizing equity by taking actions to integrate diversity, equity, and inclusion within all county operations. As a government organization with a commitment to public service and influence on public decision-making, Oakland County has a responsibility to identify, challenge, and change systems that perpetuate injustices and create disparate outcomes for marginalized and disadvantaged individuals and communities.



Action

Oakland County is continuously taking action to integrate diversity, equity, and inclusion into all county operations as well as setting measurements to identify progress or areas of opportunity.

Accountability

The county will hold all parties accountable to this commitment through continuous education around structural and systemic inequities and intentional incorporation of equity and inclusion in all policies, practices, and programs.

Strategies

Throughout this Sustainability Plan, look for sustainability strategies tagged with the county sustainability Guiding Principle of "Operationalize diversity, equity, and inclusion" for strategies that advance this value

1 Urban Sustainability Directors Network, https://www.usdn.org/about/usdn-equity-principles-and-commitments.html#/

Sustainability Framework

The Sustainability Framework includes the Vision, Guiding Principles, and Focus Areas to guide Oakland County's sustainability efforts and decision making. Each strategy is accompanied by objectives and KPIs to measure performance.

Guiding Principle: Value that is important to advance through sustainability strategies

Focus Area: Area for achievement that sustainability strategies are organized into

Objective: Indicator of progress toward advancing a Focus Area

Key Performance Indicator: Measure of performance toward an objective

Vision

Oakland County demonstrates leadership in social, environmental, and economic sustainability through modelling transparent, innovative, and achievable action. The county creates an accessible, safe, and welcoming campus that contributes to a positive service experience for all, through efficient, equitable, and low-carbon operations.

Guiding Principles



Operationalize diversity, equity, and inclusion

Integrate diversity, equity, and inclusion as core components of county operations, policies, and procedures.



Provide accessible services and campus environment

Create an accessible, safe, and welcoming county campus, and continue to enable county staff to better serve residents, businesses, and local governments.



Create education and engagement opportunities

Provide education, training, and engagement opportunities for staff as well as for campus visitors.



Advance the net zero carbon goal

Achieve net zero carbon emissions by 2050 with an interim benchmark of 50% carbon emission reduction by 2035 from a 2018 baseline.



Improve air and water quality

Mitigate the release of air and water pollutants and invest in technologies and infrastructure that improve air and water quality.



Maximize resource efficiency

Maintain quality while optimizing the use of financial, material, staff and other resources.

Focus Areas, Objectives and Key Performance Indicators

Sustainable Governance

Embed environmental, social, and fiscal sustainability into county operations.

- **Align the county's purchasing power with county sustainability values**, as measured by the percentage of county contracts awarded to vendors that scored highest against the sustainability- and equity- related bid evaluation criteria laid out in each request for proposal (RFP).[2]
- **Uphold the county's Asset Management Plan**, as measured by the percentage of critical assets that are tagged, integrated into the county's asset management databases, and undergo regular condition assessments and proactive maintenance.

Health and Wellness

Foster physiological, social, purposeful, ethical, mental, emotional, and intellectual wellness.

- **Improve staff mental health**, as measured by use of the Employee Assistance Program (EAP) program and percentage of staff diagnosed with mental health conditions documented in annual reports from the county's health consultant.
- **Improve staff physical health**, as measured by percentage of staff diagnosed with "lifestyle conditions" (i.e., diabetes, coronary artery disease, and hypertension) documented in annual reports from the county's health consultant.
- **Increase access to equitable and healthy workspaces**, as measured by percentage of workspaces and facilities that adhere to workplace standards.[3]
- **Increase employee connection with wellness initiatives at Oakland County**, as measured by participation rates in OakFit wellness programs annually.

Facility and Fleet Decarbonization

Expand the county's clean energy generation capabilities, convert the county's fleet to clean-energy vehicles, and advance decarbonization goals.

- **Expand carbon neutral energy generation and use**, as measured by the carbon emissions from energy consumption (CO_2e).
- **Decarbonize county vehicle fleet**, as measured by the percentage of internal-combustion engine (ICE) vehicles to non-combustion engine vehicles within the fleet.
- **Promote cleaner transportation alternatives**, as measured by the percentage of staff commuting to work by a transportation mode other than a single occupancy ICE vehicle.

2 Sustainability-related bid evaluation criteria may vary across RFPs. For a set of example criteria, please refer to strategy S4. Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities. This KPI is also inclusive of the county's strategic objective and KPI to increase opportunities in county procurement, as measured by the percentage of county contracts awarded to minority-, woman-, disabled-, veteran-owned businesses.

3 Workplace standards are to be determined through implementation of strategy W3. Enact Healthy Workplace Guidelines and Standards.

Focus Areas, Objectives and Key Performance Indicators

High Performance Buildings

Maximize efficient and low-carbon use of energy, water, and material resources within county facilities to the highest degree possible, while considering the design, facility operation and use, and maintenance requirements.

- **Reduce building energy use**, as measured by building energy use intensity (kWh or MMBtu/ square foot).
- **Increase building water efficiency**, as measured by gallons of potable water use per square foot.
- **Electrify county buildings**, as measured by the percentage of buildings fully electrified.
- **Increase construction waste diversion rate**, as measured by percent of construction waste diverted from landfills.

Waste Reduction and Diversion

Reduce the amount of waste generated and sent to landfills through increased material reuse, recycling and composting, and implementing other strategies to reduce overall material consumption.

- **Increase the non-construction waste diversion rate**, as measured by percent of waste generated on campus diverted from landfills; and percent of material recycled or composted.
- **Decrease non-construction waste generation**, as measured by the total tonnage of waste generated.

Open Space, Ecosystems, and Connectivity

Protect and enhance the natural and built environments of Oakland County Campus and Waterford Oaks County Park through ecological restoration, accessible design and connectivity, and restorative landscaping and planting areas.

- **Convert lawns to native meadows or forest**, as measured by acres of lawn converted to native meadows or forest.
- **Reduce run off**, as measured by gallons of stormwater captured.
- **Enhance the connectivity of campus through non-motorized paths**, as measured by linear feet of pathways.
- **Increase county tree canopy**, as measured by number of trees planted per year.
- **Reduce impermeable surfaces**, as measured by the square footage of impermeable surfaces removed.

Moving Sustainability Forward: Oakland County Sustainability Progress

Oakland County continues to demonstrate commitment to sustainability through strategic planning, resolutions, and actions. On Earth Day, April 22, 2021, the county announced the proposed resolution to achieve net zero emissions from county operations by 2050 with an interim goal of 50% carbon emission reduction by 2035. The County Board of Commissioners adopted this resolution on May 13, 2021. The Greenhouse Gas Inventory, created as part of this Sustainability Plan, sets a baseline of calendar year 2018 for the emissions target. The County Executive developed a Strategic Framework[4] to define the priorities, guide the work, and help measure the impact over the next five years.

In line with the Strategic Framework and one of the key priorities for County Executive David Coulter's administration, the county established the Office of Environmental Sustainability led by the county's first Chief Environmental Sustainability Officer to move sustainability forward. New initiatives led by the Office of Environmental Sustainability to date include drafting building standards that align with Leadership in Energy and Environmental Design (LEED), drafting and discussion of plans for vehicle electrification and required charging infrastructure, participating in various community-wide resilience and climate action planning efforts, and local partnerships for sustainability.

Also, in line with the Strategic Framework, the county continues to demonstrate commitment to enabling community members and staff to reach their full potential through establishing the Office of Diversity, Equity, and Inclusion led by the first Chief Diversity, Equity, and Inclusion Officer. Further, the county is implementing the recently developed community-wide roadmap for equitable programming, Strategies for Equitable Programs and Services, and conducted a Workplace Cultural Assessment, with both efforts led by the Office of Diversity, Equity, and Inclusion. Alignment and collaboration between county departments is critical to implementing sustainability initiatives with diversity, equity, and inclusion at the heart of all county priorities.



4 https://www.oakgov.com/StrategicFramework

Aligning the Sustainability Plan with the Strategic Framework

The County Executive Strategic Framework established community objectives and KPIs in the following eight goal areas: Thriving and Inclusive Economy, Healthy Residents, Skilled and Educated Workforce, Livable Neighborhoods, Environmental Sustainability, Public Safety and Fairness in the Criminal Justice System, Organizational Excellence, and Diversity, Equity, and Inclusion. These goal areas collectively touch on each component of sustainability – social, economic, and environmental – and the strategies within the Sustainability Plan can advance the strategic goal areas at the government site and operation level.

The Oakland County Sustainability Plan coincides with the County Executive Strategic Framework for the county.[5] The Strategic Framework guides the county's actions to accomplish its mission to serve through collaborative leadership and to help support communities where residents flourish and businesses thrive. The county's vision is to be a healthy, safe, and thriving place where everyone is valued, quality of life is high, and economic opportunity abounds.

Advancing equity through sustainability initiatives at county-owned sites and through county operations is key to advancing the strategic vision at the government scale. Advancing equity is core to making sure county-owned sites are healthy, safe, and accommodating to all users and abilities. When equity is advanced through government sustainability initiatives, the effect will extend through the services provided to community members. Therefore, a Guiding Principle of this Sustainability Plan is to operationalize diversity, equity, and inclusion.



VISION

To be a healthy, safe, and thriving place where everyone is valued, qualityof life is high and economic opportunity abounds.



MISSION

To serve through collaborative leadership and to help support communities where residents flourish and businesses thrive.

5 https://www.oakgov.com/StrategicFramework/Pages/default.aspx

Strategic Framework Goals



Thriving and Inclusive Economy

Oakland County cultivates entrepreneurs, attracts talent and investment, promotes cutting-edge technology, and strives for an economy that works for all people and businesses of all sizes.



Healthy Residents

Oakland County works to ensure access to quality affordable health care, including mental health services, to improve health outcomes for all residents.



Skilled and Educated Workforce

Oakland County provides residents the education, training, and support they need to get good paying jobs while assisting businesses in retention and recruitment efforts.



Diversity, Equity, and Inclusion

Oakland County celebrates and embraces its diversity and is committed to ensuring that all residents feel a sense of belonging, are valued, their voices uplifted, and are included in the efforts to close social, economic and well-being gaps that exist in our county.



Livable Neighborhoods

Oakland County offers residents quality, affordable housing in welcoming neighborhoods with access to parks and recreation, public transportation, and healthy food.



Environmental Sustainability

Oakland County seeks to protect the environment, reduce carbon pollution, keep our water and lakes safe, and conserve natural resources.



Public Safety and Fairness in the Criminal Justice System

Oakland County keeps residents safe from crime, ensures that all people are treated fairly by the criminal justice system, and helps put offenders on the path to productive lives.



Organizational Excellence

Oakland County government values its employees, responsibly manages taxpayer dollars, and delivers innovative and effective services to Oakland County residents.

Throughout this Sustainability Plan, look for sustainability strategies tagged with the Strategic Framework goal area icons for strategies that advance each goal.



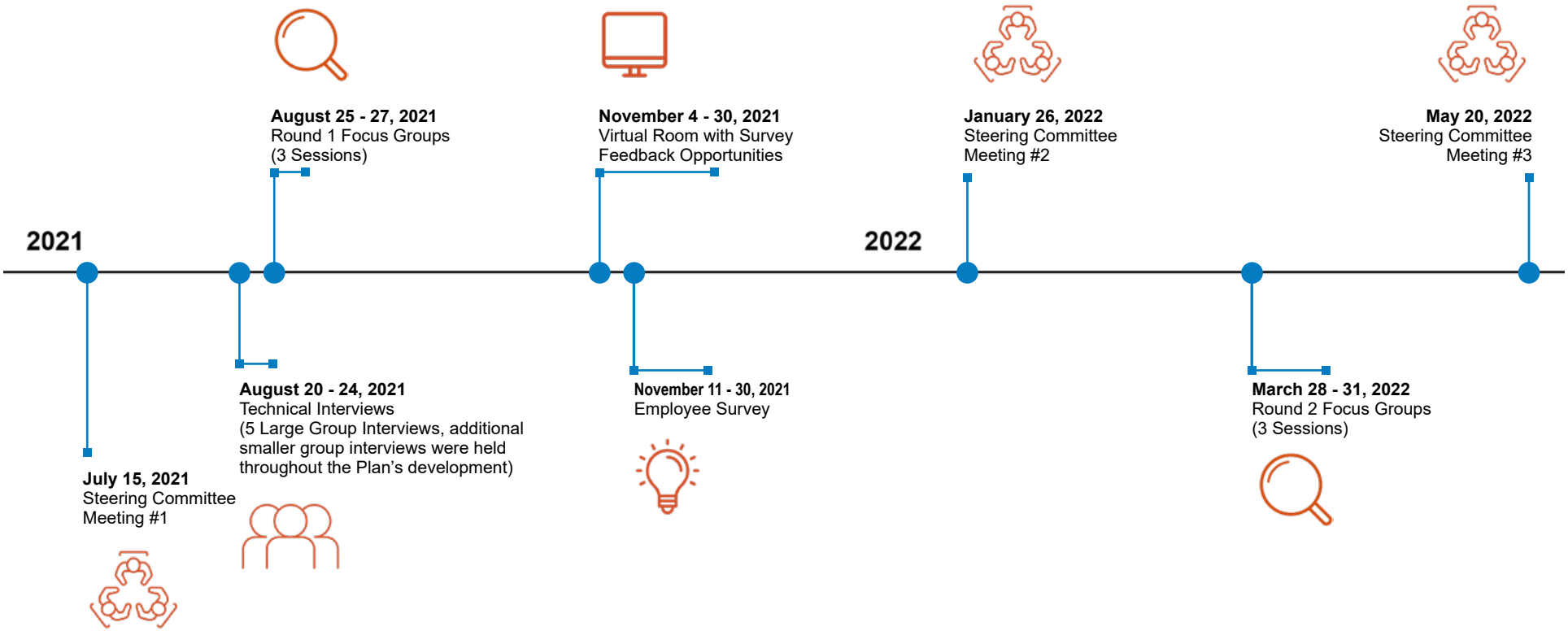
Stakeholder Engagement

The individuals and teams who work and run the county campus and facilities hold pivotal insights and are crucial to both the development and implementation of an impactful sustainability plan. Their input helped develop sustainability goals and provided technical information regarding operations. An employee Steering Committee made up of employees with a keen interest in sustainability provided overall guidance as the project moved forward.

Engagement allowed employees the opportunity to learn about and shape the Sustainability Plan in a meaningful way. Approximately 100 employees from 50 departments, programs, and service areas were engaged through virtual meetings. Employees were also provided additional opportunities to provide input on the Sustainability Plan development through a Virtual Engagement Room and survey, but participation through these mediums was limited.

A timeline of Engagement activities is here and are described in more detail in Appendix C: Stakeholder Engagement.

Timeline of Engagement Activities



Engagement activities provided a significant amount of technical information that was utilized to develop and refine potential strategies and inform approaches for successfully embedding sustainability into county operations. Qualitative information was also collected via employee engagement which provided background and personal views on sustainability in Oakland County. The transparent and honest communication received from county staff provided direction for implementation planning that acknowledges employees' views regarding sustainability. Several key insights gathered included:

Lead by Example

- Oakland County employees are proud of the work they do and the service they provide to county residents, both in the area of sustainability and elsewhere. They feel that leading by example is a priority for the success of the county's sustainability efforts.

Sustainability Priorities

- Employees feel that Health and Wellness is the most important sustainability Focus Area.
- Providing a healthy and safe work environment ranked as the top priority for sustainability efforts.
- The Focus Area of Open Space, Ecosystems, and Connectivity was also seen as a priority for the success of the county's sustainability efforts.

Barriers

- Resource constraints, including budget and staff capacity, are seen as the greatest barrier to sustainability.
- Focus group members were concerned that future administrations will not continue to move sustainability projects forward.

Equity and Access

- Those engaged generally stated that diversity, equity, and inclusion are important; however, this was not consistent among all engagement activities.
- There is a need for common definition and understanding of the impacts of accessibility and the connection of diversity, equity, and inclusion to sustainability.
- Employees do not feel that all employee groups have equal access to a healthy workplace in terms of OakFit Wellness Program activities and the availability of equipment, such as sit/stand desks, and facilities such as breakrooms and locker rooms.

Carbon Reduction

- Focus group members saw carbon reduction as less important to the success of the county's sustainability efforts compared to Steering Committee and county leadership.
- Focus group members generally felt that the county's actions in these areas would have limited impacts and/or that policies set outside of the county's control would address these needs.
- The net zero carbon goal was seen as less achievable and less tangible than other Guiding Principles. Greater understanding of the net zero carbon goal is needed among employees.

Acceptance of Sustainability

- Employees want acknowledgment of their sustainability efforts and achievements made to date.
- Focus Group members were excited about sustainability from a visionary perspective, but at times appeared resistant to change in areas related to their jobs.
- Engagement participants were eager to provide feedback on sustainability matters and want to have input on planning and implementation.

Greenhouse Gas Inventory



Net Zero

The county set a goal to achieve net zero emissions for county government operations by 2050 with an interim goal of 50% emissions reduction by 2035 compared to 2018 emissions. The 2018 baseline year was selected as it corresponds with other local government targets and GHG inventories. As there are different pathways for meeting a net zero carbon goal, the definition of net zero in the context of Oakland County's operations and Sustainability Plan is as follows:

Net zero is achieved when the net GHG emissions associated with county government operations are zero. This is achieved through ambitious local climate action that reduces GHG emissions to the extent feasible combined with implementation of local and regional carbon dioxide removal (CDR) opportunities to remove any remaining emissions estimated to occur in the target years. CDR opportunities can include natural strategies, such as forest restoration and agricultural soil management, or high-tech strategies, such as direct air capture.

The county conducted a greenhouse gas (GHG) inventory to understand the sources of county operational GHG emissions and to identify priority actions that can advance its net zero carbon goal. The GHG inventory results presented in this section highlight the sectors in which the county will need to focus GHG reduction efforts to achieve the net zero carbon goal. While the sustainability strategies in this Plan focus on the county campus, select off site facilities, and Waterford Oaks County Park, the inventory accounts for emissions across all sites, facilities, and operations to represent the full spectrum of county operational emissions. Strategies set forth in the Sustainability Plan will support the county in pursuing the goal of net zero carbon. However, a decarbonization strategy is needed to chart the path for achieving that target. The Decarbonization Framework serves as a base roadmap to develop a full decarbonization strategy.

This government operations GHG inventory follows the guidance outlined in the Local Government Operations Protocol (LGOP), developed by ICLEI – Local Governments for Sustainability, the California Air Resources Board, and the California Climate Action Registry. As an ICLEI member, the county selected ICLEI's ClearPath tool as the primary GHG inventory tracking tool. ClearPath is an online application for the calculation, tracking, and management of GHG emissions inventories at the government operations and community scales. ClearPath allows users to create government operations inventories that are in line with the Local Government Operations Protocol (LGOP). The tool accounts for the GHGs recognized under the Kyoto Protocol, including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). These GHGs have varying levels of climate impact and are represented as carbon dioxide equivalents (CO_2e) in the GHG inventory to allow for comparison. Each GHG has a global warming potential (GWP) that represents its heat-trapping ability relative to that of CO_2. Quantities of different GHGs are converted to CO_2e using their 100-year GWP values from the Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment Report.[6]

What is CO_2e?

CO_2e is a metric used to represent CO_2 emissions along with other harmful greenhouse gas emissions all in one number.

6 https://www.ipcc.ch/assessment-report/ar5/

Table 1. IPCC Fifth Assessment Report GWP Values

GHG*	GWP
CO_2	1
CH_4	28
N_2O	265

* Due to Oakland County's inventory boundary and reporting protocol requirements, only CO_2, CH_4, and N_2O emissions were relevant to the county's operations and are included in this table.

The LGOP recommends GHG inventories be developed based on calendar year data. The county's base year inventory represents calendar year 2018 as it is the most recent year that reflects normal, pre-COVID-19 operating conditions. The inventory is organized into five sectors: Buildings and Facilities, Vehicle Fleet, Solid Waste Facilities, Wastewater Facilities, and Fugitive Emissions.

Generally, the inventory includes emissions from sources over which the county has operational control, except for solid waste disposal. The county has operational control in instances where there is full authority to introduce and implement operating policies at the operation. If services are contracted to other organizations who maintain operational control, any emissions resulting from the service are considered "outside" of the county's control and can be optionally reported. Even though solid waste disposal operations would be considered an optional emissions source, these emissions have been included in the 2018 inventory to better represent total GHG emissions due to county operations.

To reach the net zero carbon goal, sector-specific strategies and targets can be identified to ensure sector reductions are progressing in line with the net zero carbon goal. However, there may be technological or political barriers to meeting these sector targets or reducing remaining emissions.

GHG Inventory Summary

In calendar year 2018, government operations generated 56,411 metric tons (MT) of CO_2e. Approximately 75% of these emissions are from building and facility electricity and natural gas use. The remaining emissions are primarily from on-road fleet vehicles followed by wastewater treatment processes, solid waste disposal, and off-road vehicles and equipment. The following sections detail municipal emissions in each of the five sectors (see Figure 2 and Table 2).

Figure 2. 2018 GHG Inventory: Municipal CO_2e Emissions by Sector

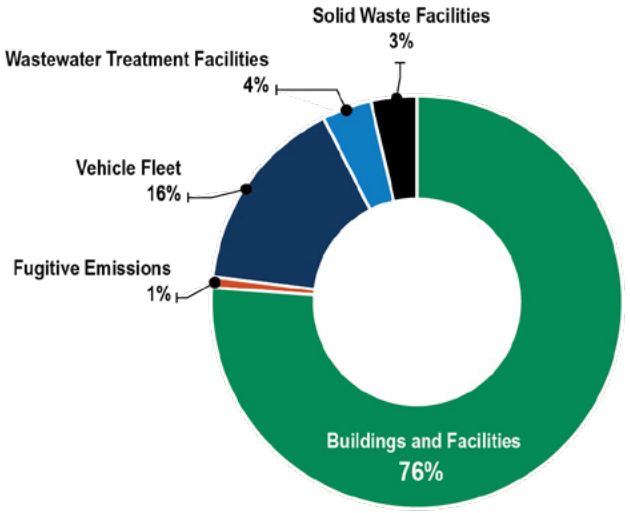


Table 2. 2018 Municipal Activity Data and Emissions

CLEARPATH CATEGORY	CY2018	ACTIVITY DATA	UNIT	CLEARPATH EMISSIONS ($MTCO_2E$)	% TOTAL
BUILDINGS AND FACILITIES	Natural Gas	2,460,769	therms	13,088	23%
	Generator Fuel Oil	1,587	gallons	16	<1%
	Electricity	49,829,981	kWh	29,857	53%
VEHICLE FLEET	On-road Vehicles – Diesel	39,163	gallons	400	<1%
	On-road Vehicles – Gasoline	891,677	gallons	7,864	14%
	Off-road Vehicles – Diesel	31,144	gallons	321	<1%
	Off-road Vehicles – Biodiesel	451	gallons	4	<1%
	Off-road Vehicles – Gasoline	28,292	gallons	250	<1%
SOLID WASTE FACILITIES	Campus Solid Waste	5,014	short tons	1,627	3%
	Park Waste – Landfill	1,129	short tons	366	<1%
	Park Waste – Compost	49	short tons	3	<1%
WASTEWATER TREATMENT FACILITIES	Conventional WWTP Process Emissions	221,112	people	513	<1%
	Conventional Aerobic WWTP Effluent Discharge	96,112	people	589	1%
	Conventional Anaerobic WWTP Effluent Discharge	125,000	people	910	2%
	Conventional Anaerobic WWTP Digester Gas Combustion	125,000	people	8	<1%
	Septic Systems	1,379	people	168	<1%
PROCESS AND FUGITIVE EMISSIONS	Fugitive Emissions from Natural Gas Distribution	2,460,769	therms	427	<1%
TOTAL				**56,411**	

Buildings and Facilities

Buildings and facilities generate GHG emissions from on-site energy use. Electricity consumption is the single largest contributor to county GHG emissions, generating roughly 53% of total local government operations emissions. The county uses a third-party choice purchaser, Executive Energy, to purchase electricity, but does not currently participate in any green power purchasing, which could serve to reduce the county's electricity emissions in the future. Natural gas consumption generates approximately 23% of total GHG emissions, while fuel oil used in generators contributes less than one percent.

The Central Steam Plant uses natural gas to generate steam. The steam is distributed to the main campus buildings to provide space heating/cooling and water heating. Though the Central Steam Plant occasionally uses fuel oil, none was consumed in calendar year 2018. In addition, three campus buildings do not use central steam and are served directly by utility-provided natural gas. The county also operates three airports and multiple wastewater treatment facilities, septic systems, and retention treatment basins that use natural gas and electricity. Streetlight electricity consumption was excluded from this inventory as direct electricity consumption data was not available and GHG emissions are likely negligible based on the small number of streetlights within county control.

The county operates 35 emergency generators that use #2 dyed ultra-low sulfur diesel. The county's wastewater treatment facilities also use separate generators, but the fuel consumption information for these systems is not currently tracked and has not been included in the 2018 inventory.

Fugitive Emissions

Fugitive emissions include the intentional or unintentional releases of GHGs commonly arising from the production, processing, transmission, storage, and use of fuels and other substances. This includes refrigerant leakage from air conditioners or natural gas leakage from distribution pipelines.

Municipal operations fugitive emissions include those from natural gas distribution and represent less than 1% of the county's total GHG emissions. Calculating refrigerant leakage emissions depends on knowing the timing and quantity of refrigerant recharge. The county hires contractors to re-charge refrigerants in chiller systems but the amount of added refrigerant is not tracked. The county is currently working to create a refrigerant tracking system for large chillers, which could help inform future GHG inventories.

Vehicle Fleet

The county's vehicle fleet includes on-road and off-road vehicles and equipment. The on-road vehicle fleet generates nearly 15% of total GHG emissions while off-road vehicles and equipment contribute approximately 1%.

On-road and off-road vehicles and equipment both use gasoline and diesel fuels while some off-road equipment also uses biodiesel. While on-road vehicle fleet fuel use could not be disaggregated by county department, off-road emissions included in the inventory were from Parks and Recreation and Airport Administration equipment, such as lawnmowers, all-terrain vehicles, snowblowers, plows, runway brooms, fire trucks, and tractors. The Water Resources Commissioner's (WRC) Office also uses gasoline, diesel, and liquified petroleum gas (LPG) powered off-road vehicles and equipment, such as forklifts, pumps, rough terrain vehicles (RTV), telehandlers, snow blowers, and pressure washers. However, WRC does not specifically track off-road fuel consumption, so emissions from their off-road vehicles and equipment were excluded from the 2018 inventory.

The Sheriff's Office helicopters are the only source of aviation fuel consumption in county municipal operations. During inventory development, county staff considered this fuel use to be negligible and this activity was excluded from the inventory.

What are Fugitive Emissions?

Fugitive emissions are unintended or unmonitored greenhouse gases or other emissions that escape into the atmosphere. These emissions are not a result of an intentional or necessary function of the system, they are instead the result of leaking valves, seals, or fittings, evaporation losses, or other weaknesses in the system.

Wastewater Treatment Facilities

Wastewater generates GHG emissions during its treatment and discharge. The county operates multiple wastewater treatment facilities, septic systems, and retention treatment basins. These systems serve residents, businesses, parks, and golf courses. Wastewater treatment and discharge from these systems generates nearly 4% of total county emissions.

This category represents process emissions that occur from wastewater treatment and discharge. Any electricity and natural gas use from county-operated wastewater facilities is reflected in the Buildings and Facilities sector. Wastewater produced by municipal operations, such as in bathrooms, is primarily sent to wastewater facilities outside of the county's operational control (e.g., Clinton River Water Resource Recovery Facility). Therefore, these emissions are considered optional sources for reporting purposes and are not included in the 2018 inventory.

Solid Waste Facilities

Solid waste disposal generates GHG emissions based on its treatment process, such as through the decomposition of organic matter. This typically occurs in landfills where fugitive methane emissions are released. Composting organic waste can drastically reduce these emissions, while recycling waste typically produces no GHG emissions that are reflected in the GHG inventory. Using estimated waste quantities, landfilled waste from the campus and parks generates almost 4% of total government operations emissions. Composting green waste from county parks generates less than 1%. Around 13% of total waste is estimated to be diverted to recycling or compost.

The county does not own or operate any landfills and therefore does not report any direct landfill fugitive GHG emissions. The county does generate solid waste though and contracts waste disposal services. Even though contracted solid waste disposal operations are considered optional emissions sources, they are included in the 2018 inventory to better represent total GHG emissions from municipal operations.

Empirical data on solid waste disposal in 2018 was not available. However, a campus operations diversion rate analysis was conducted as part of the sustainability planning process with 2020 data that showed estimated campus and park waste quantities and destinations. These estimates were developed based on information gathered from department interviews, dumpster sizes, and pick-up schedules. The 2020 estimated waste quantities were used as a proxy for calendar year 2018. Notably, these waste values reflect pandemic-related operational impacts while the rest of the 2018 GHG inventory data does not. In addition, the specific receiving landfills and composting sites for the campus and park waste are unknown, so default assumptions were made to support the GHG emissions calculations.

To improve future solid waste tracking and emissions reporting, the county should require waste quantity and disposal destination reporting from its waste contractors (see the strategy D1. Review and Renegotiate Waste Hauling Contracts for more detail).

Decarbonization Framework

To ultimately reach the net zero carbon goal, a series of actions will need to be undertaken over the short-, medium-, and long-term to electrify fleets and facilities, pursue carbon neutral energy sources, and drive energy efficiency to reduce overall energy need. The following framework outlines how the county may tackle each of the main emissions sectors. The framework is divided between high priority actions and ongoing actions.

High priority actions are needed in the near-term to guide long term planning and the most significant capital investments and operational changes needed for net zero carbon operations. Ongoing actions can be adopted incrementally and as needed to drive down remaining emissions. This framework is intended as a starting point for future strategic planning and to guide near-term decision-making to support the interim and long-term net zero goals.

What is Decarbonization?

Decarbonization is any process that aims to reduce the carbon dioxide and other greenhouse gases produced or released into the atmosphere by an energy process. This can mean shifting energy systems that produce carbon dioxide to systems that do not or using carbon capture strategies to prevent the carbon produced from entering the atmosphere.

High Priority Actions

- Identify Pathways to Facility Fuel Decarbonization
- Pursue Fleet and Equipment Electrification

Ongoing Actions

- Invest in Efficient Operations
- Decarbonize Electric Supply
- Pursue Offsets or Partnerships for Remaining Emissions Sources

High Priority Actions



Identify Pathways to Facility Fuel Decarbonization

Decarbonization of the Central Steam Plant is a high priority action, as potential alternative fuels or systems will require significant capital investment and planning. Further, the decarbonization strategy selected will inform prioritization of other actions the county will undertake around energy efficiency and adoption of renewable energy. The alternative system will also need to align with future new developments, either through ability to scale capacity or through expanded use of decentralized systems. This high priority action aligns with the strategy F1. Conduct a Decarbonization Feasibility Study for Central Steam Plant.

Following identification of a Steam Plant decarbonization pathway, options for electrification or fuel alternatives for other equipment may be reviewed, including ground or air source heat pumps for distributed heating and cooling systems and efficient electric appliances such as heat pump dryers and induction cooktops.



Pursue Fleet and Equipment Decarbonization

Decarbonization of fleet and off-road equipment may occur concurrently to facilities decarbonization and efficiency measures. Ongoing review of new alternative vehicles and equipment will be needed in order to ensure the county is maximizing opportunities to continue to reduce carbon emissions in this sector.

A first step in electrification will be development of an electric vehicle (EV) plan which identifies a clear pathway for fleet conversion and infrastructure investment needs to ensure sufficient charging capacity, as discussed in the strategy F3. Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus. Off-road equipment will be harder to electrify than on-road vehicles, but are associated with a small (1%) of total GHG emissions. Therefore, the initial study focus should be electrifying on-road vehicles (15% of total emissions) while monitoring emerging zero emission vehicle off-road technology solutions.

Ongoing Actions



Invest in Efficient Operations

Energy efficiency is a core strategy for reducing overall energy and carbon needs and can be applied to achieve short term energy and cost savings in pursuit of net zero carbon operations. Consideration should be given to long term plans for use of fossil fuels and the Central Steam Plant when selecting capital efficiency projects to avoid investment in technologies not compatible with the county's broader decarbonization strategy.

To ensure persistence of efficiency measures and to maintain high performance, energy audits are advised on a 5-year cycle for all county campus facilities. Additionally, the county may seek to invest in high return measures across all facilities to quickly scale impact, such as completion of the campus's light-emitting diode (LED) lighting conversion. Efficiency measures will reduce overall renewable energy needed, either through on-site generation or off-site purchasing arrangements. This ongoing action aligns with multiple strategies, including: H1. Perform Energy Audits at Target Facilities, H2. Complete Campus-Wide LED Lighting Conversion, H3. Continue Investment In Energy Efficiency Measures, H4. Perform a Campus-Wide Water Audit, H5. Continue Investment in Water Efficiency and Conservation Measures, and H6. Develop Sustainable New Construction and Major Renovation Standards.



Decarbonize Electric Supply

Electric power may be decarbonized through adoption of on-site renewable or off-site renewable supply. In addition to providing routine operational power, on-site renewable generation can be paired with battery or other onsite storage to decarbonize back-up generators. This will ultimately be a core element of the decarbonization strategy as electricity currently generates about half of the total emissions, a fraction that will likely increase as electrification is pursued. On-site solar opportunities on the campus are discussed more in strategy F2. Pursue On-Site Solar Generation at Key Campus Locations.

The county may seek to develop long term electric supply outlooks, considering decarbonization of its current fleet and facilities to properly plan for renewable procurement volumes.



Pursue Offsets or Partnerships for Remaining Emissions Sources

While the main decarbonization focus will be on addressing fleet and facility emissions, some smaller sources will need to be addressed over the long term to achieve net zero carbon operations. Smaller emissions sources, such as wastewater treatment and effluent, may be addressed through forming partnerships with providers to support reduced carbon emissions in these external processes or by securing carbon offsets for these smaller, difficult to decarbonize processes.

Local carbon sequestration measures such as tree planting should be prioritized for such emissions to address any residual emissions in 2050 (see strategies O3. Strategically Convert Lawns to Forest or Meadow and O4. Implement Ecological Restoration Projects for more). As a next-best strategy, industrial carbon capture technology is still in its infancy but is showing promise for efficiently removing large volumes of CO_2 from the atmosphere. The county can continue to assess these technologies. Finally, purchasing carbon offsets should be considered as a last resort for meeting the net zero carbon goal.



Keep Moving Sustainability Forward

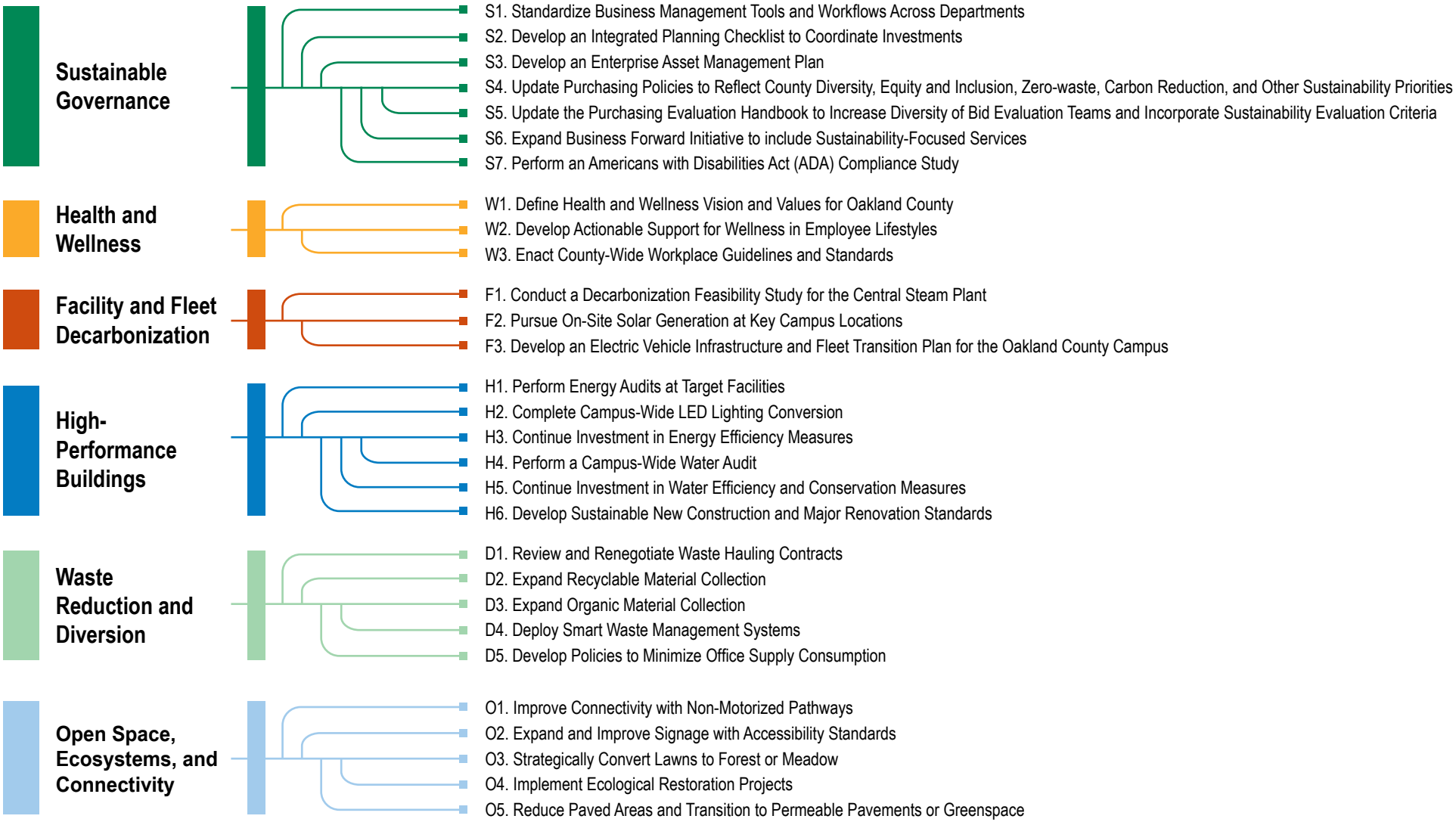
To develop this Plan, the county reviewed sustainability progress to date, identified opportunities for improvement, and engaged with county staff. After the county reviewed the current state of sustainability for energy, fleet, operations, health and wellness, nature, and ecosystems, the county identified areas for improvement aligned with the county's social, economic, and environmental priorities. Throughout the Plan development process, collaborative conversations were held with staff to gather insights to inform the Plan (see the Stakeholder Engagement section). The county identified 29 strategies to advance over the six Focus Areas.

Oakland County's Sustainability Vision

Oakland County demonstrates leadership in social, environmental, and economic sustainability through modelling transparent, innovative, and achievable action. The county creates an accessible, safe, and welcoming campus that contributes to a positive service experience for all, through efficient, equitable, and low-carbon operations.



Sustainability Strategies



Strategy Implementation Sequence

Due to staff capacity and funding availability, the county cannot implement all strategies at once – instead, the county must sequence the implementation of strategies. Figure 3 serves as a guiding roadmap for how the county can sequence strategy implementation according to sustainability priorities and potential equity and decarbonization impacts. The "immediate," "next," and "future" priority zones serve as guideposts for implementation sequencing. The county can review and alter strategy sequencing as new priorities, resources, or KPI performance trends emerge.

Three of the sustainability strategies are foundational strategies, in that they will increase the county's ability to efficiently coordinate efforts, make decisions guided by county priorities, and track performance towards the Objectives. These strategies should be prioritized for implementation, as they will enable more effective implementation of other strategies identified in this Plan. Five additional strategies are informative strategies, in that they will uncover additional sustainability opportunities for consideration. These five strategies include studies, plans, or audits and will collectively help target and plan for high impact investments in energy, mobility, water, and waste systems. Implementation of informative strategies should start in the "immediate" priority zone.

The remaining strategies are targeted policies and initiatives that the county can implement directly. Most policies should be developed in the "immediate" priority zone as they establish guidelines and processes that will set the county up for success in aligning future actions with sustainability priorities. Similarly, initiatives that prioritize equity, diversity, inclusion, and employee wellness should be prioritized for implementation. Initiatives that can have decarbonization impact in the county's largest emitting sectors – Buildings and Facilities and Vehicle Fleet – should be prioritized and start implementation in the "immediate" and "next" priority zones (see the Greenhouse Gas Inventory section for more information). Namely, high priority actions identified in the Decarbonization Framework section should start implementation in the "immediate" priority zone. Remaining strategies, though important, should be prioritized for a future date as more resources become available or as implementation of other actives are completed.

Foundational Strategies

- **S1** Standardize Business Management Tools and Workflows Across Departments
- **W1** Define Health and Wellness Vision and Values for Oakland County
- **H6** Develop Sustainable New Construction and Major Renovation Standards

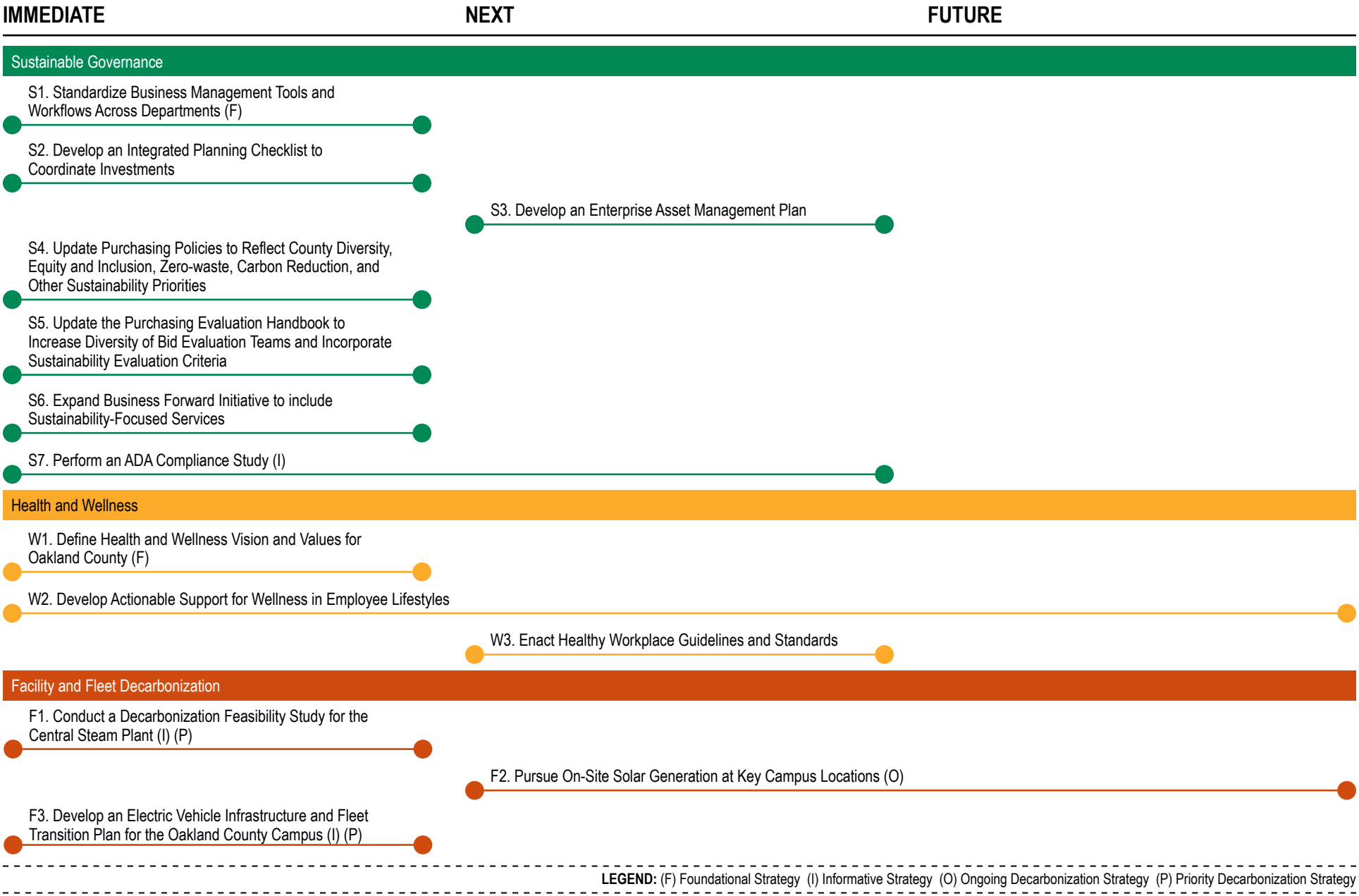
Informative Strategies

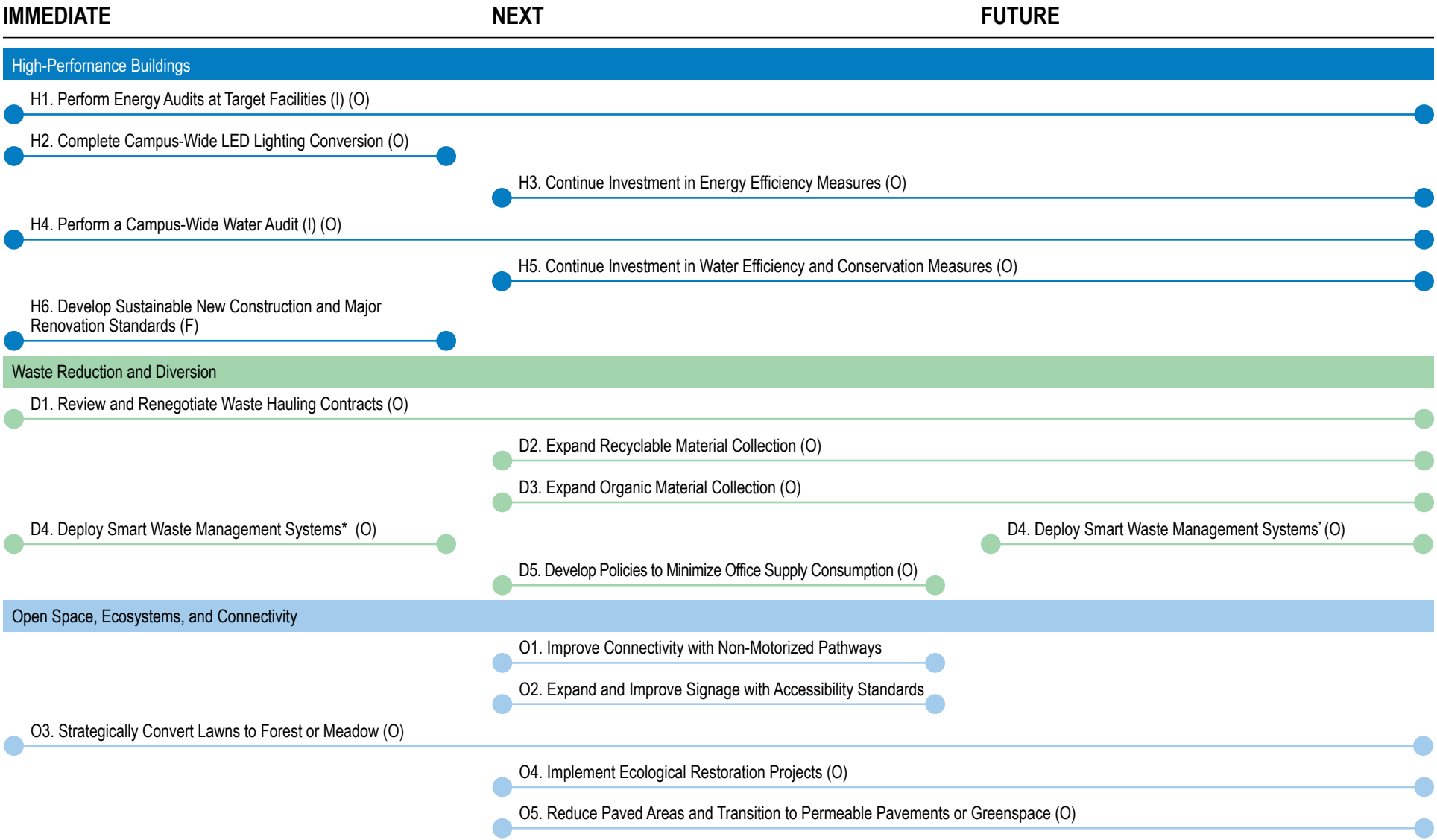
- **S7** Perform an Americans with Disabilities Act (ADA) Compliance Study
- **F1** Conduct a Decarbonization Feasibility Study for the Central Steam Plant
- **F3** Develop an Electric Vehicle Infrastructure and Fleet Transition Plan for the Oakland County Campus
- **H1** Perform Energy Audits at Target Facilities
- **H4** Perform a Campus-Wide Water Audit

Priority Decarbonization Strategies

- **F1** Conduct a Decarbonization Feasibility Study for the Central Steam Plant
- **F3** Develop an Electric Vehicle Infrastructure and Fleet Transition Plan for the Oakland County Campus

Figure 3. Strategy Implementation Sequence





*The county has approved installing solar-power trash compactor bins and, at the time of this writing, is negotiating a contract with BigBelly. The county can install solar-power trash compactor bins in the "immediate" prioritization zone as a quick win. The county can consider installing dumpster monitoring systems in the "future" priority zone as the next iteration of its strategy to deploy smart waste management systems (see strategy D4. Deploy Smart Waste Management Systems for more detail).

LEGEND: (F) Foundational Strategy (I) Informative Strategy (O) Ongoing Decarbonization Strategy (P) Priority Decarbonization Strategy

How to Read the Strategies

Each Focus Area section includes an introduction that explains the Strategic Framework goals and sustainability Guiding Principles advanced through strategies within the Focus Area. Objectives and KPIs to track performance within each Focus Area are also included.

Each strategy is presented in the following format. Along with each strategy approach, development stage, strategy type, internal teams, external partners, the county Strategic goals, and Guiding Principles advanced by the strategy are identified.



FOCUS AREA

STRATEGY ID AND NAME

GUIDING PRINCIPLES
Guiding Principle advanced through the strategy

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities
- Advance the net zero carbon goal
- Improve air and water quality
- Maximize resource efficiency

COUNTY STRATEGIC GOALS
County strategic goal advanced through strategy

- Thriving and Inclusive Economy
- Healthy Residents
- Skilled and Educated Workforce
- Livable Neighborhoods
- Environmental Sustainability
- Public Safety and Fairness in the Criminal Justice System
- Organizational Excellence
- Diversity, Equity, and Inclusion

DEVELOPMENT STAGE
Current development stage for the strategy

In Progress: The county is currently planning or implementing this strategy

Future: The county is not yet planning or implementing this strategy

STRATEGY TYPE

Foundational: Increases the ability to efficiently coordinate, make decisions guided by priorities, and track performance towards Objectives

Informative: Helps target and plan for high impact investments

PARTNERS
External organizations contributing to strategy planning or implementation

TEAMS
County teams involved in strategy planning and implementation

Lead: Lead county team responsible for strategy planning and implementation

Support: Supporting county team contributing to strategy planning and/or implementation

FINANCIAL ANALYSIS
To explore the financial viability of select strategies, Oakland County's consultants, Eminence Partners and AECOM, conducted preliminary financial analyses using rough order of magnitude costs and reasonable assumptions for six strategies. These six strategies are:

F2. Pursue On-Site Solar Generation at Key Campus Locations

F3. Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

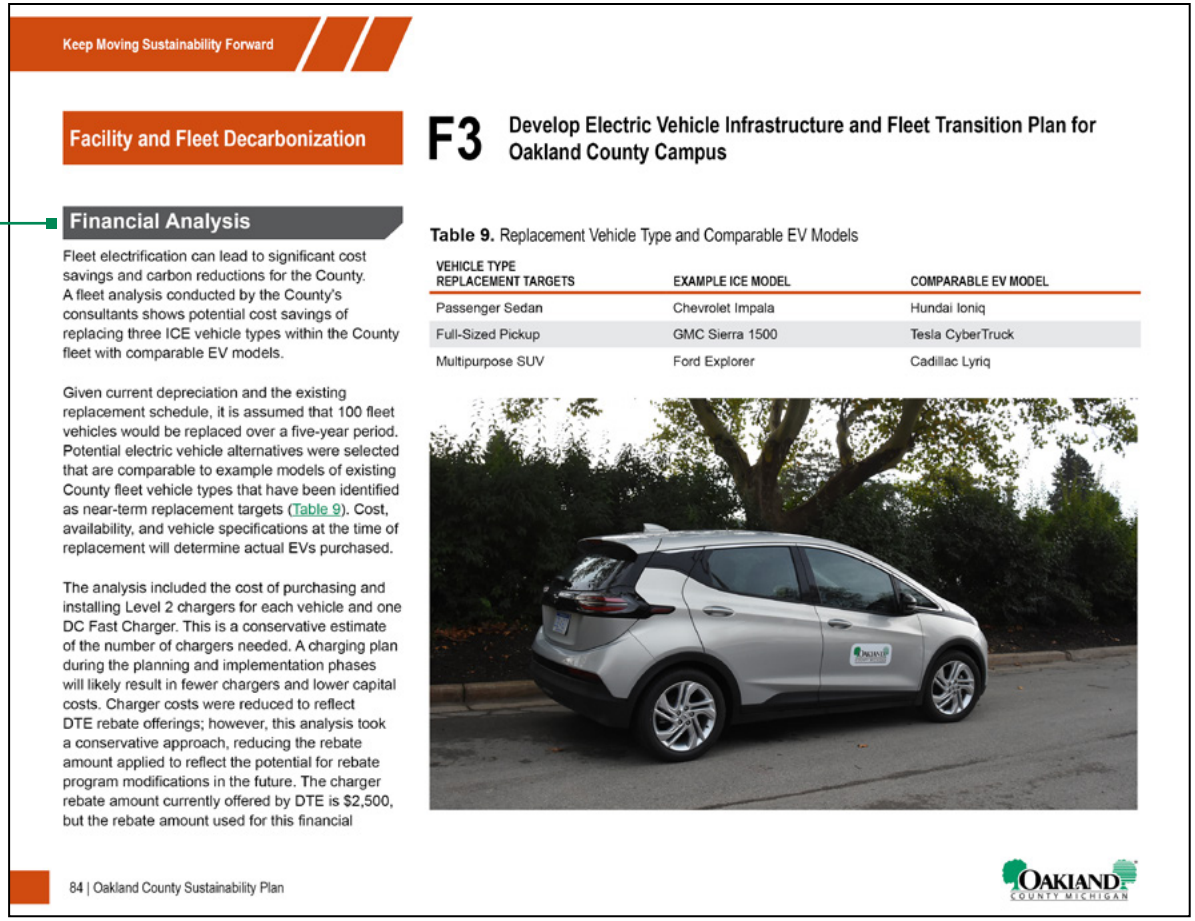
H2. Complete Campus-Wide LED Lighting Conversion

D2. Expand Recyclable Material Collection

D3. Expand Organic Material Collection

O1. Improve Connectivity with Non-Motorized Pathways

The analyses illustrate potential upfront costs, return on investment (ROI), and payback periods and were used to identify potentially applicable funding and financing mechanisms. Examples of the identified funding and financing mechanisms are described on the next page. The county should continue to explore investing in sustainability and potential funding mechanisms as they implement sustainability strategies.



Funding and Financing Mechanisms

Examples of types of funding and financing mechanisms available to implement sustainability-related initiatives are described on this page. Where applicable, these are expanded upon within the six strategies for which preliminary financial analysis was conducted.

Capital and Operating Budgets

When planning for future fiscal year budgets, the county can build funds into the capital and operating budgets to cover the cost of sustainability strategies. Capital Budgets are used for the acquisition, installation, and, at times, major repair of assets such as land, buildings, and equipment or installations. Operating Budgets include funds allocated to the ongoing maintenance and operation of assets, programs, and services. These budgets may contain a variety of funds, such as Sustainability Revolving Funds, which are dedicated for specified purposes.

Tax Exempt Bond Financing

The county could fund many sustainability improvements through the proceeds of a tax-exempt bond issuance. The bonds would be sold to investors to raise funds for the project. It may also be possible to fund multiple smaller projects through one bond issuance, which could make the transaction more cost effective. When bonds are sold, the county agrees to repay the investors principal plus interest, which is generally exempt from federal, state, and local taxes. These bonds may qualify as green bonds to attract additional types of investors and potentially lower interest rates.

There are two types of bonds distinguished by the source of repayment. General obligation bonds are secured by the county's pledge to repay from their taxing authority. Repayment of revenue bonds is from a specified revenue, often associated with the project being financed. Revenue bonds can be issued with the savings, such as energy savings, generated by the project pledged to repay the debt. The county will work with its financial advisor and other professionals to determine the appropriate structure and type of bonds for each project or group of projects if bonds are issued to fund strategies.

Federal, State, and Regional Funding Programs

At the Federal, State, and regional levels, there are a variety of grants and programs available to governmental entities, including the county, to help advance sustainability-related strategies. Specifically, with the passing of the Infrastructure Investment and Jobs Act (IIJA), several existing programs have received renewed funding and many new programs have been created

Collective Buying Power

To reduce the capital or operating costs of strategies, the county can explore the ability to form coalitions with other counties or cities, villages, and townships to increase buying power and negotiate lower rates and costs for strategy the implementation. For example, bulk procurement of electric vehicles for several jurisdictions could help reduce per-unit costs or coordinating with other entities for waste and recycling collections could reduce hauling rates.

Public Private Partnerships (P3)

Through a P3, the county would partner with private investors, developers, and/or operators who would shoulder a portion of the development, capital, or operating costs in exchange for (a portion of) operating revenues (including advertising rights), valuable biproducts (e.g., renewable natural gas or fertilizer), and/or tax benefits. The agreement could also be structured to allow us to repay a partner through operational savings such as through a Guaranteed Energy Savings Performance Contracting arrangement.

Sustainable Governance



Embed environmental, social, and fiscal sustainability into county operations.

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities
- Advance the net zero carbon goal
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Thriving and Inclusive Economy
- Skilled and Educated Workforce
- Environmental Sustainability
- Organizational Excellence
- Diversity, Equity, and Inclusion

Objectives and KPIs

Align the county's purchasing power with county sustainability values, as measured by the percentage of county contracts awarded to vendors that scored highest against the sustainability- and equity- related bid evaluation criteria laid out in each request for proposal (RFP).[7]

Uphold the county's Asset Management Plan, as measured by the percentage of critical assets that are tagged, integrated into the county's asset management databases, and undergo regular condition assessments and proactive maintenance.

County policies and procedures impact all county services, projects, and programs, as well as the experience of county staff and visitors. As demonstrated in the County Strategic Framework, the county is focused on advancing a Thriving and Inclusive Economy and Organizational Excellence. The county can leverage its purchasing power to support the local economy by developing sustainability- and equity- focused purchasing policies and supporting local businesses in building skills and services within these areas. Every strategy within the Sustainable Governance Focus Area can advance the Organizational Excellence goal through increasing opportunities in county procurement, improving service delivery, and responsibly and efficiently managing assets and taxpayer dollars.

7 Sustainability-related bid evaluation criteria may vary across RFPs. For a set of example criteria, please refer to strategy S4. Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities. This KPI is also inclusive of the county's strategic Objective and KPI to increase opportunities in county procurement, as measured by the percentage of county contracts awarded to minority-, woman-, disabled-, veteran-owned businesses.

Table 3. Sustainable Governance Strategies

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
S1	Standardize Business Management Tools and Workflows Across Departments							X			X	X			X	County Executive	Information Technology, Management and Budget, Office of Sustainability, Purchasing, Departmental Leadership	
S2	Develop an Integrated Planning Checklist to Coordinate Investments							X							X	Facilities Management, Parks and Recreation	Office of Sustainability, WRC, Information Technology, Management and Budget, Planning Division	DTE Energy, Consumers Energy, City of Pontiac, Waterford Township, Plante Moran, Oakland County Road Commission
S3	Develop an Enterprise Asset Management Plan							X	X	X	X	X	X	X	X	Facilities, Operations, and Maintenance	Office of Sustainability, Information Technology, Parks and Recreation, Water Resources Commissioner	Cityworks
S4	Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities	X				X		X	X	X			X		X	Purchasing	Office of Sustainability, Office of Diversity, Equity, and Inclusion	

LEGEND: (*) In Progress

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
S5	Update the Purchasing Evaluation Handbook to Increase Diversity of Bid Evaluation Teams and Incorporate Sustainability Evaluation Criteria							X	X	X						Purchasing	Office of Diversity, Equity, and Inclusion, Office of Sustainability	
S6	Expand Business Forward Initiative to include Sustainability-Focused Services	X		X				X	X	X	X					Economic Development	Office of Diversity, Equity, and Inclusion, Purchasing	
S7	Perform an ADA Compliance Study*							X	X	X	X					Facilities Management	Office of Sustainability, Office of Diversity, Equity, and Inclusion, Parks and Recreation, Risk Management Department	

LEGEND: (*) In Progress

Sustainable Governance

S1 Standardize Business Management Tools and Workflows Across Departments

Guiding Principles

- Provide accessible services and campus environment
- Create education and engagement opportunities
- Maximize resource efficiency

County Strategic Goals

- Organizational Excellence

Development Stage: Future

Strategy Type: Foundational

Partners: N/A

Teams

Lead: County Executive

Support: Information Technology, Management and Budget, Office of Sustainability, Purchasing, Departmental Leadership

County departments and teams currently utilize different tools and workflows to perform the same functions and, within individual departments, not all teams have established consistent workflows and centralized documentation for implementing and tracking projects. Where feasible, using the same tools enterprise-wide and establishing uniform workflows and data standards for these tools can help to streamline the county's operations and improve the services provided to county residents. As it applies to the Sustainability Plan's Guiding Principles, standardizing business management tools and workflows across departments can:

- **Provide accessible services and campus environment and create education and engagement opportunities** by setting one standard for management and workflow so that information is more accessible and useful to employees at all levels.
- **Maximize resource efficiency** by streamlining management and operational practices to save employee time and money and prevent unnecessary losses.

One area with significant opportunity for standardization is asset management. For example, while many county departments and teams that maintain critical county assets have adopted Cityworks to manage asset maintenance, not all departments and teams use the platform—or use it to its full extent. Additionally, assets are assigned different identifiers (IDs) across software platforms (e.g., Cityworks and the county's financial information software) and departments use different taxonomies to generate asset identifiers (i.e., asset identifiers have different composition of numbers/letters and a varying number of characters).

A more comprehensive list of strategies for improving asset management practices can be found in S3. Develop an Enterprise Asset Management Plan, but other opportunities for standardization include:

- Developing an asset management charter to tie departmental roles to specific workflows and responsibilities.
- Defining common assumptions for calculating asset deterioration curves and lifecycle value, with consideration to enterprise departments such as Parks and Recreation or the Water Resources Department for specific guidelines.
- Determining recurring condition assessment cycles based on asset criticality and the level of risk associated with asset depreciation and deterioration.

Sustainable Governance

S1 Standardize Business Management Tools and Workflows Across Departments

- Providing structured templates for condition assessments that clearly dictate how assets should be evaluated (e.g., documents that should be consulted to support the assessment, guidance to distinguish between "good," "average," and "poor" condition).

Opportunities to standardize business practices expand past asset management. More broadly, facility improvements—such as implementation of energy efficiency measures and workstation improvements—have historically been completed in an ad hoc manner. There is a need to standardize and centralize communication or documentation of past efforts, including what and where improvements have been made and who was involved in implementing these improvements. Building a clear record of progress and centralized database of resources (e.g., vendor contacts and lessons learned) as projects are completed will increase transparency and enable county organizations to move through workflows more efficiently and effectively.

To kick-off implementation of this strategy, the county should identify a multi-disciplinary group of departmental representatives to sit on a workgroup charged with identifying the business processes that would most benefit from standardization, developing resources to support adoption of new tools and workflows, and advocating for change within their department. A cross-departmental approach will promote broader consideration of lessons learned from a more diverse set of tools and processes and lead to solutions that can be adapted to departments and teams' different needs. In other words, all solutions and resources should balance standardization with flexibility to ensure departments can right size the use of tools and workflows to fit their mission, critical functions, and organizational capacity.

In establishing the workgroup, the county can look to the interdepartmental Property Acquisition and Management Work Group (staffed by Oakland County Parks and Recreation, Facilities Maintenance and Operations, Corporation Counsel staff) for best practices on identifying participants and defining their individual roles and responsibilities. As the county begins to approach potential participants, the county should clearly articulate the expected level of commitment to ensure active participation.

Finally, implementation can expand past internal organizations to include cities, villages, and townships (CVTs) and peer counties. The U.S. General Service Agreement's (GSA) Cooperative Purchasing Programs[8] enables local governments to jointly-purchase IT products and services, and the county's own G2G Marketplace[9] (an online procurement center for government agencies) supports collective purchase of software systems. The county should consider leveraging these programs to coordinate a joint purchase of business management tools that would benefit its network. Standardization across the county and its CVTs could streamline transfer of non-proprietary data and create a more cohesive service experience for residents.

8 https://www.gsa.gov/buying-selling/purchasing-programs/gsa-multiple-award-schedule/schedule-buyers/state-and-local-governments/cooperative-purchasing

9 https://www.oakgov.com/purchasing/G2GMarket/Pages/default.aspx

Sustainable Governance

S2 Develop an Integrated Planning Checklist to Coordinate Investments

Guiding Principles

Maximize resource efficiency

County Strategic Goals

Organizational Excellence

Development Stage: Future

Partners: DTE Energy, Consumers Energy, City of Pontiac, Waterford Township, Plante Moran, Oakland County Road Commission

Teams

Lead: Facilities Management, Parks and Recreation

Support: Office of Sustainability, Water Resources Commissioner, Information Technology, Management and Budget, Planning Division

The county has identified and begun to plan for millions of dollars of capital improvement and maintenance projects but are often met with funding and other resource limitations when translating ideas into action. Coordinating implementation of multiple improvement projects can consolidate costs, breakdown siloed workstreams, encourage cross-departmental communication, and accelerate progress towards multiple sustainability objectives. For example, installing EV-ready utility infrastructure concurrently with new fiberoptics and transitioning pavement construction to the use of porous materials to reduce maintenance (thereby reducing costs and visitor frustration at the lack of parking during construction maintenance). In addition, identifying opportunities to coordinate implementation of a single measure (e.g., LED lighting conversion) across multiple locations at once—rather than on a location-by-location basis—can enable the county to leverage economies of scale more effectively. As it applies to the Sustainability Plan's Guiding Principles, developing an integrated planning checklist to coordinate investments can:

- **Maximize resource efficiency** because a standardized checklist ensures that investments are being made strategically and working together to prevent excess costs or time wasted.

To support identification of synergistic capital projects or maintenance initiatives, the county should develop an integrated planning checklist that requires project sponsors to evaluate the viability of implementing multiple sustainability improvements simultaneously or expand implementation past an initially identified location. In completing the checklist, the project sponsor should seek support from stakeholders that may become involved in the design, financing, implementation, and maintenance phases of the project lifecycle to ensure the form fully reflects the project's needs and opportunities. This collaborative process can be integrated into the existing capital and maintenance planning workflow and will not only ensure decision makers continue to have access to a consolidated list of wants and needs, but also enable long-term sustainability benefits to remain a priority as decision makers come and go.

The checklist can start with a list of Guiding Principles (like those at the foundation of this Plan) that should be reflected in all future investments, at both the capital planning and maintenance budget scales, and may also integrate requirements from new construction buildings that may be established in the future (see strategy H6. Develop Sustainable New Construction and Major Renovation Standards). Principles may include a commitment to improving accessibility, increasing efficiency, and decreasing carbon impact. In practice, this would ensure that all streetscape and building renovation projects include Americans with Disabilities Act (ADA) accessibility and mobility improvements, for example, and that critical equipment are replaced with more efficient models as they reach the end of their service life.

Sustainable Governance

S2 Develop an Integrated Planning Checklist to Coordinate Investments

The county can also work towards developing a "menu" of sustainable infrastructure improvements that must be incorporated into larger capital projects. The Boston Smart Utilities Program[10] can serve as a model: The Program identified five smart utility technologies (SUTs)—district energy microgrid, green infrastructure, traffic signal enhancements, smart streetlights, and telecom utilidors—and criteria for when and what SUTs must be considered for a project. For example, any development project greater than 100,000 square feet must conduct a feasibility study to consider including green infrastructure that can retain 1.25 inches of rainfall. Applying this concept to the county's predominant spending categories and sustainability priorities, the county could require that, for a parking lot with a critical number of spaces, repaving projects would also include installation of an EV-ready utility infrastructure.

For more urgent projects or projects that are already in the planning phase, the county can create an abbreviated checklist with foundational sustainability practices such as:

- Upgrading equipment to more efficient models (with respect to both energy and water use)
- Electrifying equipment that combusts fossil fuels
- Modernizing infrastructure to be ADA code compliant and integrating universal design principles
- Transitioning paved areas to permeable pavements and lawns to native plantings

The abbreviated checklist would first prompt project sponsors to provide justification for its use (e.g., to explain the need for urgency) and should still require sponsors to indicate project alignment with integrated planning Guiding Principles. However, more extensive review of alignment with other planned projects and the menu of sustainable infrastructure improvements would not be required.

10 http://www.bostonplans.org/planning/planning-initiatives/boston-smart-utilities-program

Sustainable Governance

S3 Develop an Enterprise Asset Management Plan

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities
- Advance the net zero carbon goal
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Organizational Excellence
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: Cityworks

Teams

Lead: Facilities, Operations, and Maintenance

Support: Office of Sustainability, Information Technology, Parks and Recreation, Water Resources Commissioner

An enterprise-wide Asset Management Plan would provide county organizations with uniform and structured guidance for operation and maintenance (O&M) of assets, capital planning for new and existing assets, and evaluating asset performance in line with the sustainability Vision. As it relates to the Sustainability Plan's Guiding Principles, an Asset Management Plan can:

- **Operationalize diversity, equity, and inclusion** through rooting decision-making processes in data and organizational values to remove potential bias in asset planning and enable equitable distribution of O&M resources.
- **Create education and engagement opportunities** through creating opportunities for increased exposure to content relating to asset performance and the county's asset management practices—for asset managers and asset users alike.
- **Provide accessible services and campus environment, advance the net zero carbon goal, and improve air and water quality** through proactively identifying opportunities to improve asset efficiency, emissions, and accessibility throughout their lifecycle, not just at end of life.
- **Maximize resource efficiency** through not only optimizing county assets' performance over their entire lifecycle, but also optimizing the use of county personnel and financial resources for asset management.

The Asset Management Plan should build upon the Four Pillars of asset management (organization, data, workflows, and technology) and actions already described in S1. Standardize Business Management Tools and Workflows Across Departments.

The Asset Management Plan can be used to train new staff and refresh existing staff on the county's asset management organizational structures, data

Sustainable Governance

S3 Develop an Enterprise Asset Management Plan

streams, workflows, and tools. For example, as Cityworks is updated, the Asset Management Plan can provide guides for system configuration and customization, user administration, field staff setup, asset data entry and data updates, asset hierarchy management, map and graphical features, analytical features, report generation, and mobile applications. User guides should also dictate how often systems and information should be updated, how data should be entered (i.e., define data standards), and designate staff administrators to field questions from users.

Increasing staff familiarity and comfort with asset management data, workflow, and tools and clear delineation of roles and responsibilities through an Asset Management Plan can result in operational efficiencies, uniformity across departments, and automated workflows. Federal infrastructure funding often requires asset management plans. Establishing an Asset Management Plan may position the county to become more competitive for future federal funding opportunities.

A Sustainability Asset Management Framework is provided in Appendix E: Sustainability Asset Management Framework to guide the development of Oakland County's comprehensive Asset Management Plan. The county should identify a group of internal departmental partners that operate and maintain the county's critical assets to sit on a workgroup to develop this plan. The workgroup should meet regularly to incorporate lessons learned from its implementation, connect to the budget cycle, and audit performance and implantation of the plan to ensure the plan remains a living document. To further inspire regular updates, a member of the working group can apply to join the Michigan Infrastructure Council's Asset Management Champion Program.[11] The Program was established to share best practices to strengthen asset management programs across the state.

11 https://www.michigan.gov/mic/am-champions

Sustainable Governance

S4 Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Thriving and Inclusive Economy
- Environmental Sustainability
- Organizational Excellence
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: N/A

Teams

Lead: Purchasing

Support: Office of Sustainability, Office of Diversity, Equity, and Inclusion

The county's purchasing policy was last updated in 2004 and, in summary, guides personnel to contract vendors that would provide the best overall value to the county. The definition of "best overall value" is flexible depending on the product purchased or contracted service, and bid evaluators are encouraged to consider the entire lifecycle cost of a bid and other metrics, which may—but do not have to—include environmental and social considerations.

Release of this Sustainability Plan and transitioning to a new financial information system presents the Purchasing Department with an opportunity to comprehensively update its procedures, including county purchasing policies. As it relates to the Sustainability Plan's Guiding Principles, updating purchasing policies could:

- **Operationalize diversity, equity, and inclusion** by setting standards and metrics to award more contracts to minority-, woman-, or disabled veteran-owned businesses.
- **Advance the net zero carbon goal** by incorporating sustainability considerations into all purchasing policies or developing an overarching sustainable purchasing guide.
- **Maximize resource efficiency** by addressing how county assets are disposed of and developing policies to promote reuse, sharing between departments, and other strategies to minimize excess purchasing.

Further, the county's strategic goal area of Organizational Excellence includes the KPI to increase opportunities in county procurement, as measured by the percentage of county contracts awarded to minority-, woman-, or disabled veteran-owned businesses.

The county may either amend existing sections of its purchasing policy to incorporate specific sustainability considerations unique to each section, or draft new Special Considerations or Other section(s) that broadly apply sustainability principles to all sections within the county policy. Updates may include but should not be limited to:

- Reviewing existing eligibility criteria that may be prohibitive to small or micro businesses, such as the county's insurance requirements (Section 2300.4).

Sustainable Governance

S4 Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities

- Specifying baseline eligibility standards, preferential criteria, or guidelines for vendors that reflect the county's sustainability goals. Guidelines could include vendor pledges to mitigate carbon emissions, actions to reduce or eliminate packaging (or only accept 100% recyclable packaging), B-corporation certification or other similar certifications, regular release of environmental, social, and governance (ESG) reports, active support of social justice initiatives, investment in historically disadvantaged communities, and/or other demonstrations of environmental and social care. These types of "sustainability guidelines" could be added as considerations for development of bid specifications (Section 2300.3). In cases where a primary vendor might have subcontractors, the county should consider extending these guidelines to both the primary vendor and its subcontractors.
- Adding a "Made in Michigan" or "Made in Oakland County" consideration for products manufactured locally when they are offered at a competitive price and quality, and similar "Based in Michigan" or "Based in Oakland County" considerations for rendered services. The county's existing policy gives similar preference to products made in the United States for purchases valued greater than $10,000 (Section 2400.1). Narrowing the focus to local products will reduce GHG emissions associated with the county supply chain and expand economic development opportunities for local businesses.
- Strengthening the county's policies informing proper disposal of county assets (Section 3000.3) to encourage material reuse, either through identifying opportunities to trade equipment between county organizations or auctioning to the public. For goods that cannot be reused, consider specifying preferences for durable goods, certified sustainably produced paper and wood products, products with recycling content and made of recyclable materials, used, refurbished, and/or remanufactured goods, non-toxic or organic materials, and any additional products that result in minimal/zero waste production throughout their life cycle (e.g., packaging, services). The latter may be accomplished through expanding the county's Policy to Promote Recycling (Section 3000.7).
- Expanding authorization for cooperative purchasing (Section 3000.11). Buying products in larger quantities can enable the county to leverage economies of scale and reduce supply chain emissions.

The county may seek other ideas through joining the Sustainable Purchasing Leadership Council.[12] The Council provides support toward developing sustainable purchasing practices to government, higher education, corporate, and non-profit organizations. Regional government members include Dakota County (MN), Fairfax County (VA), Hennepin County (MN), King County (WA), and Multnomah County (OR).

Ultimately, all updates to the county's purchasing policies should remain in compliance with Article I § 26 of the State Constitution, which prevents public organizations from using affirmative action in procurement (i.e., giving preference to vendors on the basis of race, sex, color, ethnicity, or national origin). Intentional marketing efforts or service provision that target small, micro, sustainable, or minority-, women-, disabled- or veteran-owned businesses is permitted by Article I § 26 and can support this strategy by increasing and strengthening the pipeline of these businesses. For example, the county established the Business Forward initiative to support small businesses and expanding this program to provide sustainability-focused services could further align with this recommendation (see strategy S6. Expand Business Forward Initiative to include Sustainability-Focused Services).

12 https://www.sustainablepurchasing.org/

Sustainable Governance

S4 Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities

While enforcing updated policies, the county should add a database or catalog of products or vendors that are well-aligned with the county's sustainability priorities to its G2G Marketplace and institute a tracking system to evaluate the sustainability impact of updated procurement policies and processes. To start, the county could track the number of contracts that are awarded to local bidders and bidders that, for their given Request for Proposal (RFP), performed best against the county's sustainability-oriented bid evaluation criteria (in addition to tracking the number of county contracts that are awarded to disadvantaged business owners).

Sustainable Governance

S5 Update the Purchasing Evaluation Handbook to Increase Diversity of Bid Evaluation Teams and Incorporate Sustainability Evaluation Criteria

Guiding Principles

- Operationalize diversity, equity, and inclusion

County Strategic Goals

- Organizational Excellence
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: N/A

Teams

Lead: Purchasing

Support: Office of Diversity, Equity, and Inclusion, Office of Sustainability

A core component of the county's purchasing policy is its bid evaluation process. Each bid submitted in response to a county Request for Proposal (RFP) is evaluated by a team of three to five subject matter experts. The bid evaluation team is provided with a Handbook that defines the expectations for team members (e.g., to maintain impartiality) and the process through which bids are scored.

Once the county's broader purchasing policy is updated (see strategy S4. Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities), the Handbook should similarly be revised to reflect the sustainability priorities. As it relates to the Sustainability Plan's Guiding Principles, updating the Purchasing Evaluation Handbook could:

- **Operationalize diversity, equity, and inclusion** by standardizing the process with which the county evaluates bids to prioritize partnerships with minority-, woman-, disabled veteran-owned businesses.

The Handbook should establish clear guidelines to center diversity, equity, and inclusion through all stages of the procurement process, including formation of bid review teams to mitigate explicit or implicit bias towards potential bidders. Potential bias could be resolved through appointing a member of the Purchasing Department to serve as a team "foreman" (like a jury foreman) and moderate discussions, as Purchasing Department staff are less likely to be familiar with the subject of each proposal and thus more likely to remain impartial. Increasing diversity of the evaluation team—such as through requiring, instead of recommending, that teams include representatives from different county organizations—can also mitigate potential biases.

In addition, the scoring process should be revised to explicitly require that sustainability metrics be used to evaluate bids. The existing Handbook states that cost should only be considered after other qualitative criteria are evaluated but does not provide examples of such qualitative criteria, nor does the Handbook define lifecycle cost analysis as the standard financial assessment. The Handbook can establish a baseline set of sustainability criteria that is used to evaluate every bid—such as lifecycle cost, anticipated carbon impact, and strength of the company's diversity, equity, and inclusion policy—as well as more aggressive criteria reserved for larger contract values. All proposed criteria should be reviewed for compliance with Article I § 26 of the State Constitution, which prohibits the county from establishing preference on the basis of race, sex, color, ethnicity, or national origin (e.g., the county cannot establish a quota for contracts held by disadvantaged business owners).

Sustainable Governance

S6 Expand Business Forward Initiative to include Sustainability-Focused Services

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment

County Strategic Goals

- Thriving and Inclusive Economy
- Skilled and Educated Workforce
- Organizational Excellence
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: N/A

Teams

Lead: Economic Development

Support: Office of Diversity, Equity, and Inclusion, Purchasing

In March 2022, the county's Economic Development Department established "Business Forward," an initiative to provide resources and services to local small businesses, with a focus on minority-, women-, and veteran-owned businesses. Business Forward Consultants embedded in county communities will provide entrepreneurial services through individual consultations, workshops, training sessions, and other engagements. Support services cover, but are not limited to, accounting, legal support, digital marketing and advertising, eCommerce, government contracting, language translation services, food services, and market analysis. Through this initiative, the county hopes to expand support to 4,000 small businesses per year, which is 10 times more small businesses served than in the past.

As it relates to the Sustainability Plan's Guiding Principles, expanding the Business Forward Initiative to include sustainability-focused services could:

- **Operationalize diversity, equity, and inclusion** by providing education and outreach services to small businesses that can then increase the number of small businesses enterprises in the county's procurement pipeline. As a result, the number of contracts the county holds with underrepresented small business owners could be increased.
- **Provide accessible services and campus environment** by connecting small businesses to the resources and business opportunities provided by the county.

More broadly, support for small businesses increases equity in both county procurement and community economic development. Notably, these efforts can directly impact the following County Strategic Framework KPIs: increase business investment, improve minority business development, increase opportunities in county procurement, and demand the highest customer service.

The county could expand the Business Forward program to further align with county strategic priorities and Sustainability Plan strategies and Guiding Principles. To start, the county can expand outreach to a wider audience, and tailor existing services to disabled business owners, micro-businesses, and others that could benefit from targeted support.

Then, once the program is established for a broad audience, the county could expand the types of services rendered by the program. One area

Sustainable Governance

S6 Expand Business Forward Initiative to include Sustainability-Focused Services

of focus could be to advance businesses' focus on and capabilities to promote environmental sustainability, such as through providing guidance related to reducing supply chain emissions and material waste, utility efficiency incentives, etc. In addition, once the county's broader purchasing policy is updated (see strategy S4. Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities), the county can focus new Business Forward services on educating and preparing entrepreneurs to be able to fulfill these requirements and thus become more competitive in the county's procurement process. For example, Business Forward consultants could provide guidance on various business sustainability certifications (such as B-corps certified), environmental, social, and government (ESG) impact report development, and best practices for incorporating sustainability standards into work products and obtaining related professional credentials (e.g., Leadership in Energy and Environmental Design (LEED), Envision, WELL, ParkSmart) for businesses in the development and infrastructure sectors.



Sustainable Governance

S7 Perform an ADA Compliance Study

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment

County Strategic Goals

- Organizational Excellence
- Diversity, Equity, and Inclusion

Development Stage: Future

Strategy Type: Informational

Partners: N/A

Teams

Lead: Facilities Management

Support: Office of Sustainability, Office of Diversity, Equity, and Inclusion, Parks and Recreation, Risk Management Department

Despite ongoing efforts to improve Americans with Disabilities Act (ADA) accessibility, the county campus has many ADA compliance challenges. A likely cause for non-compliance is the age of the campus's physical infrastructure. Most campus facilities were built before the original ADA Standards for Accessible Design were codified in 1990 and altering older buildings not originally designed with the ADA standards is costly and rigorous; however, despite these barriers, the county remains committed to improving compliance and includes accessibility measures in all construction projects.

Other examples of non-compliance at the campus include narrow passageways and cramped spaces within county facilities, a lack of accessible connections between non-motorized pathways and the street, and instances of bollards or large planters limiting accessibility of non-motorized pathways.[13] Furthermore, ADA compliance is not limited to physical infrastructure. All forms of county communications, including websites and emergency communications services, are also subject to ADA regulations.

The county should perform an ADA compliance study to, at a minimum, understand non-compliance issues, and develop a plan to adequately update campus facilities and operations. As it relates to the Sustainability Plan's Guiding Principles, performing an ADA Compliance Study could:

- **Operationalize diversity, equity, and inclusion and provide accessible services and campus environment** by understanding where existing barriers are on campus and what options are available to make the campus facilities and resources more accessible.

The study would involve a thorough survey of campus facilities, grounds, supporting physical infrastructure (e.g., wayfinding signage), and digital and phone services to develop a comprehensive list of deficiencies. These deficiencies should not only relate to physical accessibility, but also audio-visual and language accessibility. In addition, the survey should identify opportunities to exceed legally required ADA standards and implement universal design principles, which recognize a wider spectrum of abilities to create an environment that accommodates and welcomes everyone. The survey should be performed with support from a specialized contractor to increase county staff's skill with ADA standards and universal design principles.

13 Some bollards and large planters on campus were deployed to deter vehicles from driving into restricted areas or to otherwise improve safety. Bollards and large planters should be replaced or adjusted to comply with ADA requirements without compromising safety.

Sustainable Governance

S7 Perform an ADA Compliance Study

In addition to a physical walkthrough, the study can be informed by a review of county data and industry best practice resources such as:

- ADA enhancement projects identified through the capital improvement program[14]
- Complaints filed with the county's Risk Management Department through its ADA Grievance Procedure
- ADA Best Practice Tool Kits for State and Local Governments[15]
- Design Resources developed by the Center for Inclusive Design and Environmental Access at the University at Buffalo (topics include wayfinding, clearances for wheeled mobility users, and pedestrian winter accessibility)[16]

The results of the survey and literature review should be summarized in an Accessibility Master Plan that identifies and prioritizes strategies for overcoming identified deficiencies, describes any necessary follow-on studies, establishes reliable funding sources for incrementally improving compliance, and stipulates comprehensive universal design practices for all new construction projects (and major renovations, where feasible). This process should consider that not all building types must demonstrate compliance with the same rigor (e.g., in spaces in which staff jobs, tasks and activities require able bodied people, ADA requirements would fall second to local building codes, Occupational Safety and Health Administration (OHSA), and other safety standards). Still, buildings should be renovated to be adaptable to future building use and strive for full compliance wherever possible.

This process may emulate the Oakland County Parks and Recreation Department's (OCPR's) approach to improving county parks accessibility. OCPR first completed an ADA Assessment and Master Plan in 2006 and has since developed individualized ADA Transition Plans for its parks. To support completion and implementation of transition plans, OCPR designates $50,000 in annual capital improvement program funds and $50,000 in annual maintenance program funds[17] towards its ADA Transition Program.

Once the county's plan is approved and begins to be implemented, the resources it provides to local businesses and cities, villages, and townships (CVTs) through the Advantage Oakland Accessibility Initiative[18] should be updated to reflect key themes and lessons learned, such as best practices for adapting older buildings to ADA Design Standards and strategies for resolving the most common causes of non-compliance.

14 County capital improvement program documents identified $16.2 million in unfunded ADA enhancements.

15 https://www.ada.gov/pcatoolkit/toolkitmain.htm

16 http://idea.ap.buffalo.edu/resources/

17 These figures should be evaluated to determine if the recurring funds are sufficient to achieve short-term compliance, and if not, the sum that would be required.

18 https://www.oakgov.com/advantageoakland/planning/historicpreservation/Pages/Accessibility-Initiative.aspx



Health and Wellness

Foster physiological, social, purposeful, ethical, mental, emotional, and intellectual wellness.

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Thriving and Inclusive Economy
- Healthy Residents
- Livable Neighborhoods
- Environmental Sustainability
- Organizational Excellence
- Diversity, Equity, and Inclusion

WHO Definition of Wellness

"Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."[19]

Oakland County Health and Wellness is centered around the employee and evaluated through an approach based on the World Health Organization (WHO) definition of wellness. This wellness approach focuses on six comprehensive wellness components: Physiological, Social, Purposeful, Mental, Ethical, and Intellectual. Wellness is interconnected with all the sustainability Focus Areas. Wellness strategies can result in benefits such as improved employee mental and physical wellness, increased employee productivity, and decreased employee stress.

Objectives and KPIs

Improve staff mental health, as measured by use of the Employee Assistance Program (EAP) program and percentage of staff diagnosed with mental health conditions documented in annual reports from the county's health consultant.

Improve staff physical health, as measured by percentage of staff diagnosed with "lifestyle conditions" (i.e., diabetes, coronary artery disease, and hypertension) documented in annual reports from the county's health consultant.

Increase access to equitable and healthy workspaces, as measured by percentage of workspaces and facilities that adhere to workplace standards.[20]

Increase employee connection with wellness initiatives at Oakland County, as measured by participation rates in OakFit wellness programs annually.

19 https://www.who.int/data/gho/data/major-themes/health-and-well-being#:~:text=The%20WHO%20constitution%20states%3A%20%22Health,of%20mental%20disorders%20or%20disabilities

20 Workplace standards are to be determined through implementation of strategy W3. Enact Healthy Workplace Guidelines and Standards.

Health and Wellness



Foster physiological, social, purposeful, ethical, mental, emotional, and intellectual wellness.

Oakland County Health and Wellness strategies require application across various scales for the employee experience: at a campus scale, at a facilities scale, and in immediate workplace environment scale. The three Health and Wellness strategies build upon each other. The first is to develop an all-encompassing Health and Wellness Vision and Values for Oakland County, expanding on the existing mission of the OakFit Wellness Program. The next two strategies focus on actionable support to promote Health and Wellness through measurable outcomes and county-wide workplace standards and guidelines to streamline the Oakland County workplace.

Table 4. Health and Wellness Strategies

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
W1	Define Health and Wellness Vision and Values for Oakland County*		X						X	X	X	X			X	Human Resources	Office of Sustainability, County Executive	Marsh & McLennan Agency
W2	Develop Actionable Support for Wellness in Employee Lifestyles	X	X		X			X	X	X	X	X				Human Resources	County Executive	External vendors
W3	Enact County-Wide Workplace Guidelines and Standards		X		X	X			X	X	X			X	X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Human Resources, Purchasing, Environmental Health Services Unit of the Health Division	Marsh & McLennan Agency, Vendor partnerships

LEGEND: (*) In Progress

Health and Wellness

W1 Define Health and Wellness Vision and Values for Oakland County

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities
- Maximize resource efficiency

County Strategic Goals

- Healthy Residents
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: Marsh & McLennan Agency

Teams

Lead: Human Resources

Support: Office of Sustainability, County Executive

Oakland County has a robust OakFit Wellness Program with a multitude of offerings to employees. This strategy further strengthens this program by building upon its existing mission statement and goals. The first step is to review the existing OakFit mission and goals to assess if they are representative of all Oakland County employees, and if the mission and goals remain progressive toward the future vision. Include Health and Wellness success factors to provide a framework that Oakland County can apply to further enhance and strengthen the OakFit Wellness Program. During an interview for the sustainability planning process, OakFit Wellness Program Human Resource leaders shared the need to develop a specific vision for Oakland County employees based on Health and Wellness. Defining and confirming the Vision, Mission, and Values will provide guiding direction and reference

OakFit Mission Statement

The mission of OakFit is to assist Oakland County employees, retirees and dependents in taking ownership of their health and wellness in order to improve quality of life, enhance productivity, and stabilize long-term employee/employer health care costs.

OakFit Program Goals

- Build countywide awareness
- Encourage participation from all employees
- Engage employees in improving overall health
- Track and measure improvement efforts in order to reduce long term health care costs

Health and Wellness

W1 Define Health and Wellness Vision and Values for Oakland County

materials during implementation of strategies to ensure alignment with and progress towards goals. As it relates to the Sustainability Plan's Guiding Principles, defining Health and Wellness Vision and Values for Oakland County could:

- **Operationalize diversity, equity, and inclusion and provide accessible services and campus environment** by identifying health and wellness stakeholders and decision makers that are representative of all county employees.
- **Provide accessible services and campus environment** by administering a Vision that prioritizes equitable access to Health and Wellness resources and considerations for the diverse needs of employees and other stakeholders.
- **Create education and engagement opportunities** by establishing a concrete universal mission with a specific and digestible set of goals from which all other educational and outreach materials could be built.
- **Maximize resource efficiency** by developing an overarching Vision and Values for Health and Wellness the county can better prioritize resources to meet specific wellness goals and track metrics to ensure that resources are being maximized.

The following three steps provide a path toward developing the Health and Wellness Vision and Values. This strategy should also align with the *2022 Mental Wellbeing Strategy* Oakland County developed.

A common understanding and definition of what Wellness means to Oakland County will be critical to understanding the desired outcomes from Wellness strategies. The definition that Oakland County creates should be used in all employee communications referring to Health and Wellness. This will confirm employee understanding of Oakland County's Health and Wellness goals, and better align personal interests and investments.

Identify Health and Wellness Stakeholders: Human Resources would lead development of the Health and Wellness Vision and Values. Human Resources can engage the wellness committee, county decision makers, and end users in the process of defining the vision and values in order to ensure this framework aligns with staff needs.

Define Vision and Values: Conduct a series of engagements with the purpose of confirming the mission and defining the corresponding vision and values. This may include first convening with the identified leadership stakeholders and understanding alignment with employee perspective. This recommended series of engagements would be active and participatory workshops with pre-read communication materials, as well as post workshop findings reports. Workshops would be led by Human Resources with support from the County Executive and Office of Sustainability. The activities from these workshops would yield draft versions of the Health and Wellness Vision, Mission, and Values created by direct input of key stakeholders. From these draft materials, Human Resources should send follow-up communications for feedback and input, to ultimately yield the final version.

Measure and Track Success Factors: Human Resources can then define success factors to track progress towards achieving the mission, vision, and values. By comparing health consultant (e.g., Segal Consulting, Marsh & McLennan Agency) employee health reports year-over-year, health outcome changes and improvements can be measured and tracked over time.

Health and Wellness

W2 Develop Actionable Support for Wellness in Employee Lifestyles

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities

County Strategic Goals

- Thriving and Inclusive Economy
- Healthy Residents
- Livable Neighborhoods
- Organizational Excellence
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: External vendors

Teams

Lead: Human Resources

Support: County Executive

This strategy builds on W1. Define Health and Wellness Vision and Values for Oakland County by outlining actionable steps towards offering resources aligned with the county's health and wellness vision, mission, and values. Through implementing these steps, the county can support all aspects of Health and Wellness in employee lifestyles, at all scales, from campus-wide to individual. As it relates to the Sustainability Plan's Guiding Principles, developing actionable support for wellness in employees' lifestyles could:

- **Operationalize diversity, equity, and inclusion** by taking into account employee feedback and developing actionable support that applies to the needs and interests of a diverse campus population.
- **Provide accessible services and campus environment** by building wellness programing and tools into the built environment and conducting specific initiatives to understand and improve program and campus accessibility.
- **Create education and engagement opportunities** by using employee feedback and dedicated research to expand the channels with which wellness messaging is conveyed.

Consider the following action steps when defining wellness support initiatives:

Step 1: Define Success Factors. Define success factors for each health and wellness value. To clearly identify how wellness initiatives advance success factors, create a matrix that includes each success factor across the top row and each wellness initiative down the first column. For each wellness initiative, mark the success factor(s) with which it aligns.

Connect OakFit Wellness Program to the Built Environment. Develop actionable support to strengthen the connection between OakFit Wellness Program offerings and the built environment. Consider the opportunity to leverage

Health and Wellness

W2 Develop Actionable Support for Wellness in Employee Lifestyles

the campus as a living lab and pilot for OakFit Wellness Program offerings. For example, consider signage on future and existing non-motorized paths to encourage and motivate employees. Signage could include distance travelled and campus walking routes.[21] The county may also explore opportunities to connect the Farmer's Market to employee nutrition. Today the OakFit Wellness Program conducts Employee Market Day[22] at the Farmer's Market. Consider how this offering can be built upon to connect further to nutrition (such as displaying nutrition facts, recipes, or hosting cooking classes in partnership with the market to tie ingredients to a satisfying meal).

Connect Messaging and Physical Environmental Cues. Consider reconciliation between the current OakFit messaging, county policies related to wellness, and physical environmental cues. For example, removing ash pot locations from main facility entrances to reflect the OakFit smoking cessation program and Oakland County Smoking Policy. Currently, there are several ash pots located at entrance sidewalks. In addition, the Segal Annual SHAPE Health reports demonstrate the need for focusing on diet due to negative health conditions being higher than the norm, yet access to healthy foods on campus is limited.

The Segal SHAPE Report, based on the Oakland County Health Plan from 2017, states "The number of plan participants diagnosed with Coronary Artery Disease (CAD) is more than double the norm. The annual per participant per year (PMPY) cost for these participants is $19,004 which is 3.96 times higher than the PMPY cost for the average plan participant. Since this disease can be prevented and reversed with dietary modification, this should be an area of focus for plan management." These statistics matched with the lack of resources on campus to improve diet and exercise demonstrates the importance of connecting the OakFit Wellness Program to the surrounding environment.

Also, consider external partners to support and encourage participation and habit building through verifying and rewarding engagement in everyday positive actions. For example, the county could consider adopting applications (apps) and programs that encourage sustainable behavior through rewards points. Actions could include walking, biking, exercising, recycling, or any other actions that Oakland County sees fit to promote. Allowing staff to earn rewards points through sustainable behaviors also furthers the next step, providing employee incentives.

Provide Employee Incentives. Provide employees incentives to participate in wellness programs and initiatives. The county should offer incentives that go beyond monetary and competition-driven rewards by considering the impact of positive health outcomes on the individual. Consider cost and benefit to further tie incentives and programs for wellness programs to positive health outcomes. Based on feedback from focus groups and interviews with county employees, the prevailing incentive for participation in OakFit is monetary. For example, the Health Screening is documented as the most popular initiative, as it provides monetary incentive for participation. Currently, it has been reported that messaging to employees about participation in Health and Wellness programs provides benefit to the county through cost savings. Shifting the focus to how Health and Wellness programs benefit the individual provides incentive for participation.

The county should consider the following when developing actionable support toward employee wellness: accessibility of programming, inclusion of arts and cultural initiatives, creation and promotion of non-motorized paths, and understanding effectiveness of EAP resources in supporting mental and emotional health of employees. Each is described in further detail below.

21 https://wellness.oakgov.com/resources/Pages/Maps-Trails.aspx

22 https://wellness.oakgov.com/programs/Pages/Employee-Market-Day.aspx

Health and Wellness

W2 Develop Actionable Support for Wellness in Employee Lifestyles

Consideration 1: Accessibility of Programming. This consideration pertains to equitable access to Health and Wellness resources, programs, and amenities for all worker profiles, including staff, managers, 24 hours a day, 7 days a week (24/7) employees, and essential employees, as well as for employees that work off the main campus.

Employee feedback on the accessibility of programming through the OakFit Wellness Program included perceptions that the lunch and learn programs were historically inaccessible to all employees, specifically 24/7 employees, off-campus employees, employees that do not have technology within their workplace, and staff that work in buildings that are open to the public during lunch time. However, beginning in early 2022 all lunch and learn sessions are now recorded with closed captioning and directly embedded into the OakFit website for current and previous employees to access.

Employees also provided feedback on the lack of access to healthy food options on campus, and constraints to visiting the only café located in the Courthouse. Employees expressed perceived disadvantages to having to pass through security check points before accessing the café, and inability to access the café due to work-hour constraints. Additional feedback included frustration from 24/7 employees that the only food options available are vending machines which do not include healthy options. Consider partnering with local food trucks and utilize the Farmer's Market location throughout the year.

In addition, feedback included general lack of access or knowledge of access to the current OakFit Wellness Program offerings. Consider increasing and targeting communications to both new and current employees to increase employee awareness and participation. Consider removing the requirement to subscribe to OakFit wellness emails and instead provide an opt-out option. Include OakFit communication in all general staff-wide communications such as the Telegraph or other frequent communications.

Consideration 2: Campus Inclusion of Arts and Cultural Initiatives. Define the county approach to inclusion of arts and cultural initiatives through physical representation on campus. This recommended approach is focused on the exterior campus level but could be extended to the interior built environment as the program gains support. Examples of this approach are sculpture parks, murals, and rotating installations. Consider partnering with local artists throughout Oakland County to showcase and promote their work.

Consideration 3: Creation and Promotion of Non-motorized Paths. Creating and promoting the use of non-motorized paths on Oakland County Campus is another strategy for improving employee Health and Wellness. Oakland County should consider beautifying existing non-motorized paths by planting trees, improving the pathways, and providing other amenities and enhancements, such as rest areas or mile markers, to encourage employees to access and use. The county should also consider amenities for post-use of the pathways such as bicycle parking, lockers, showers, and other amenities to support employee ease of use. Additional recreational amenities could include permanent outdoor bodyweight training structures. Wayfinding and signage is critical to this consideration. Please reference the O1. Improve Connectivity with Non-Motorized Pathways strategy and O2. Expand and Improve Signage with Accessibility strategy within the Open Space, Ecosystems, and Connectivity Focus Area for detailed information.

Health and Wellness

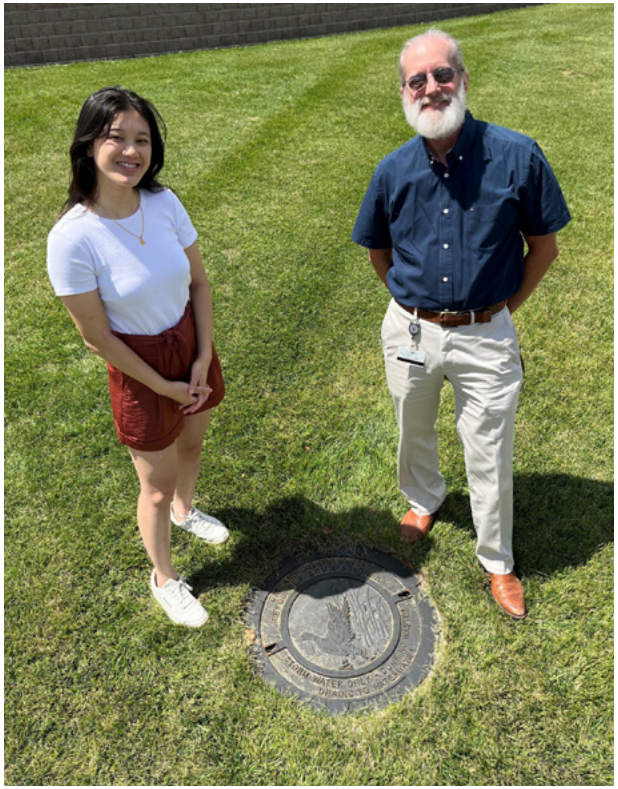
W2 Develop Actionable Support for Wellness in Employee Lifestyles

Consideration 4: Mental and Emotional Support Through EAP Resources. Focus group participants shared that currently the EAP is viewed as a disciplinary measure, not an asset for employees. Messaging around this program should shift from a disciplinary measure to a mental and emotional health resource. Due to recent county events, the EAP program has been promoted and utilized by staff and was supported by the OakFit Stamp Out the Stigma program promoting mental health awareness and wellness.

The county should consider continuous analysis to ensure that the current EAP resource is meeting the mental health needs of Oakland county employees. Information included in the county's health consultant's annual reports should be used to support this analysis.

Art and Health and Wellness

Research by the World Health Organization (WHO) demonstrates the inclusion of arts and cultural initiatives is beneficial to Health and Wellness. The WHO found that "within prevention and promotion, findings showed how the arts can affect the social determinants of heath, support child development, encourage health-promoting behaviors, help to prevent ill health, and support caregiving. Within management and treatment, findings showed how the arts can help people experiencing mental illness, support care for people with acute conditions, help support people with neurodevelopmental and neurological disorders, assist with the management of noncommunicable diseases and support end of life care."[23] Further, Harvard Health stated in an article, "Studies have shown that expressing themselves through art can help people with depression, anxiety, or cancer, too. And doing so has been linked to improved memory, reasoning, and resilience in healthy older people."[24]



Stormwater Manhole Cover Design Contest

The Water Resources Commissioner (WRC) lead a competition for high school students in the area to design artistic covers for stormwater manholes. The winner of the contest had their art included on all stormwater manholes throughout the city. The project served as an educational campaign to bring awareness to students and their families about the importance of managing storm water and keeping pollution out of storm drains. This project also had a distinct artistic component integrating art and culture into sustainability planning for the community.

23 "What is the evidence on the role of the arts in improving health and well-being? A scoping review." World Health Organization (Health Evidence Network (HEN), Fancourt D, Finn S, 1 2019, https://apps.who.int/iris/bitstream/handle/10665/329834/9789289054553-eng.pdf

24 "The Healing Power of Art." Harvard Health, Harvard Health, 1 July 2017, https://www.health.harvard.edu/mental-health/the-healing-power-of-art#

Health and Wellness

W3 Enact Healthy Workplace Guidelines and Standards

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Healthy Residents
- Livable Neighborhoods
- Environmental Sustainability
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: Marsh & McLennan Agency, Vendor partnerships

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division

Support: Human Resources, Purchasing, Environmental Health Services Unit of the Health Division

This strategy focuses on office-based workspaces in Oakland County facilities. It does not include specialized work environments, such as courtrooms, the Law Enforcement Complex, Children's Village, the Animal Shelter, Sheriff's Office Administration, and Farmer's Market. Due to the nature of the work in those specialized spaces, further investigation and modifications for workplace standardization is needed. However, administrative spaces within specialty spaces and buildings may apply to this strategy. Guidelines for nutrition apply to all facilities unless superseded by other programmatic and facility requirements. Guidelines for janitorial chemicals also apply to all facilities unless superseded by other programmatic and facility requirements.

county-wide workplace guidelines are important for office-based employees because they provide a standard approach to the workplace and resources. These guidelines strive to create transparency in the workplace and provide consistency across departments. This approach may allow for case-by-case considerations for individual employee accommodations. However, these standards should consider all users and abilities, and should be adaptable and universally designed. As it relates to the Sustainability Plan's Guiding Principles, enacting healthy workplace guidelines and standards could:

- **Operationalize diversity equity and inclusion and provide accessible services and campus environment** by creating a universal standard for offices that ensures all employees have equitable access to comfortable and healthy work environments.
- **Maximize resource efficiency** by standardizing buildings to eliminate the need for additional appliances, such as space heaters or personal microwaves and refrigerators, in buildings. By providing employees with the appliances and environmental conditions they need the county has more control over energy usage and resource management.
- **Improve air and water quality** by bringing buildings up to current industry standards for air quality and drinkable water access.

Health and Wellness

W3 Enact Healthy Workplace Guidelines and Standards

A standardized approach to the workplace, whether with furniture or janitorial operations, provides ease of maintenance, operations, and asset management across all facilities. Uniform offerings can be transferred where needed throughout county facilities through various cycles of employee growth and attrition. The following considerations are steps towards creating county-wide workplace standards and guidelines: nutritional support and access to healthy food, access to clean drinking water, task lighting, outdoor seating, ergonomic and other flexible desk configurations (e.g., standing desk, hoteling areas), and reducing and replacing janitorial chemicals with environmentally, non-toxic alternatives.

Workplace Guidelines and Standards Documents: Create Workplace Guidelines and Standards documents that outline and detail requirements across county workplaces. These documents provide a standardized approach to workspace environment types that could span from high-level approaches (guidelines) to room data sheets with specifications (standards). These documents typically include individual workstation set up, workplace space types (spaces to support every work type, from focus heads-down work to collaborative teaming and social environments), hybrid work policies, amenities, and space use etiquette. A standardized allocation of square foot per employee in the workplace provides the opportunity for rightsizing space based on departmental requirements, both today and with future growth projections. Additionally, the county's most valuable asset are its workers, who are material to its operations and success – as such, it is paramount that workplace guidelines and standards support a healthy and safe work environment. Workplace guidelines and standards should align with the Occupational Safety and Health Administration (OSHA) standards. Creating a healthy and safe work environment can involve physical measures, like those outlined in this section, as well as processes for ensuring engagement, transparency, and accountability.

Developing workplace standards and guidelines provides an opportunity for county-wide policies around supplies (e.g., office, pantry, female hygiene products, sharps containers, recycling bins, etc.) and employee wellness spaces (e.g. breakrooms, lactation rooms, respite and prayer rooms, gender neutral bathroom options etc.) (Please reference the strategies S4. Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities and S5. Update the Purchasing Evaluation Handbook to Increase Diversity of Bid Evaluation Teams and Incorporate Sustainability Evaluation Criteria in the Sustainable Governance Focus Area section for more detail).

Focus group participants mentioned inconsistency across departments for approach to coffee or snacks. Participants stated that coffee and snacks may be provided by managers out of their own interest, and many departments didn't have basic storage or amenities for access to food during the workday (e.g., microwaves, refrigerators, utensils). Some employees address such deficiencies by bringing in personal appliances. When employees use personal appliances, it can make it difficult for the county to manage energy consumption at the building level. Equitable distribution of these appliances should be accompanied by

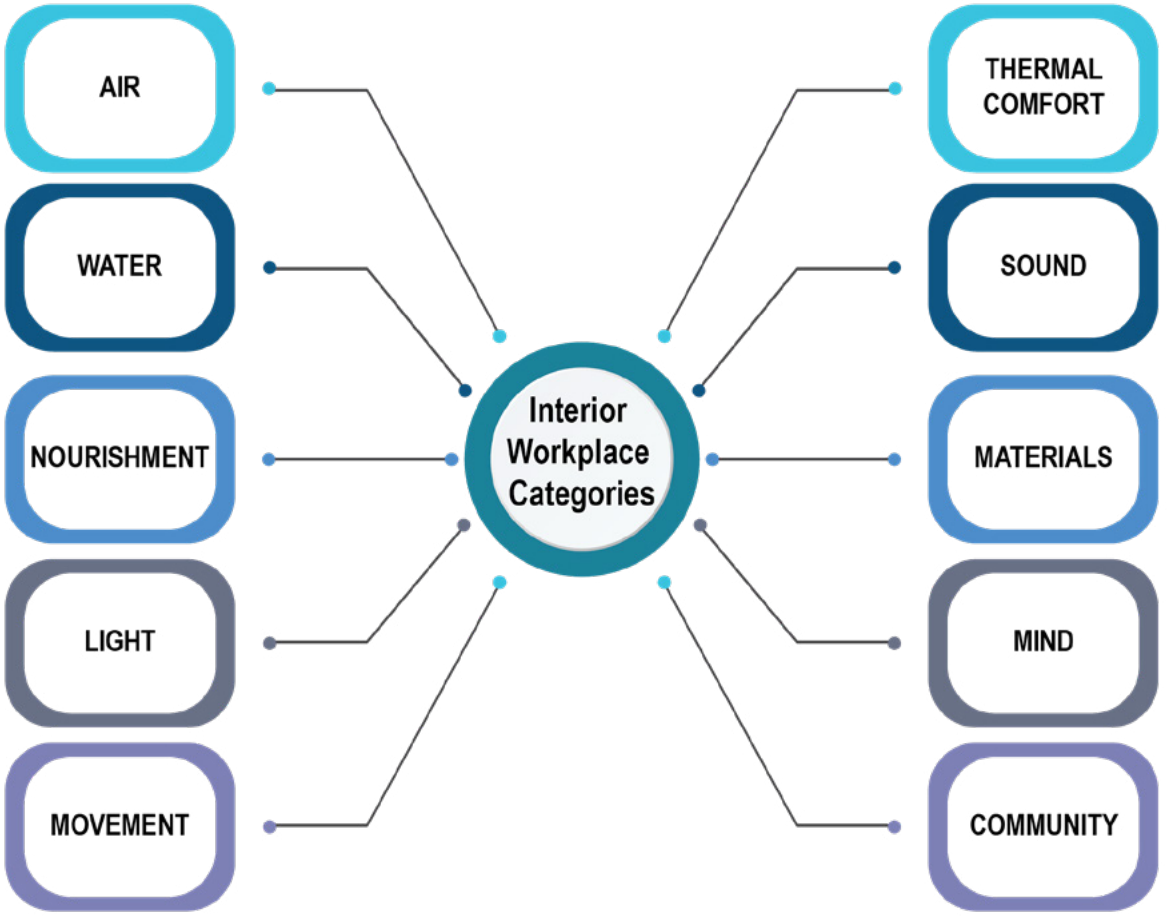
Health and Wellness

W3 Enact Healthy Workplace Guidelines and Standards

prohibiting personal devices such as dorm fridges, coffee makers, and space heaters. In addition, focus group participants discussed some departments had standing desks and others were not familiar with how to gain access to such resources. Workplace guidelines and standards can streamline the approach and policy to these resources across all departments and workplaces.

Workplace guidelines may also include recommendations for lifespan of and the intended use of furnishings. Replacement of furnishings in specialty spaces (Sheriff Administration Building, Children's Village, Law Enforcement Complex) occupied 24 hours a day requires a focus on durability or further considerations for end of useful life than other spaces that are used 8 hours a day. For example, focus group participants reported that office furniture in 24/7 workspaces may be beyond its useful life and in need of replacement. In addition to spatial, finishes, and furniture guidelines, the county may consider referencing and applying best practices of a wellbeing standard. The International WELL Building Institute's (IWBI) WELL Building Standard is the most robust wellbeing standard in the industry based on market research. Applying best practice solutions is a way to provide employee wellness benefits based on measurable outcomes and evidence-based recommendations. Categories

Figure 4. WELL Building Standard Interior Workplace Categories



Source: https://resources.wellcertified.com/articles/well-tip-understanding-the-comparison-between-well-v1-and-well-v2-pilot/

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W3 Enact Healthy Workplace Guidelines and Standards

for interior workplace wellness strategies include air quality, access to daylight, light levels, thermal comfort, acoustics, and finish materials. Several of these categories affect facility-wide systems and are to be considered at a systematic level prior to adaptation.

To complement these workplace standards, the county could also consider engineering standards that include targets for mechanical systems that support healthy indoor air quality. The WELL Building Standard includes goals for indoor air quality as a benchmark for indoor air quality basis of design. These have corresponding effects to the High-Performance Buildings Focus Area strategies, reference those strategies for more information. The EPA Environmental Benefits Mapping and Analysis Program[25] is a free tool that analyzes the effect of air quality on health impacts and their economic value. This tool can be a resource to understand how air pollution in the geographical area impacts county employee health.

Consideration 1: Nutritional Support and Access to Healthy Food. The main issues described in focus groups by employees were around the lack of access to food on campus. There is a security checkpoint in the Courthouse before gaining access to the only existing on-campus café and security prevents food delivery. The county could consider developing a program for employee pick up, delivery, and office event catering from the existing courthouse café. Employees who participated in focus groups stated that they often turned to fast food off-campus because there is no access to healthy food on-campus. All worker profiles should be considered, including 24/7 workers that work double shifts and essential employees, when developing on-campus food offerings. Also consider enabling equitable access to nutritional options for on-campus and off-campus facilities. Oakland County Human Resources and Purchasing should lead this portion of the strategy with support from a partner healthy food vendor.

Consideration 2: Nutrition Options. Provide access across many scales ranging from a full-service hot food café (staffed café) to grab-and-go markets (ready-made packaged with an automated point of sale) and healthy vending (vending machines). Providing employees with a broad range of nutritional food and ensuring it is accessible will give employees nutritious options on Oakland County's campus. The Human Resource department should examine courthouse café menus and current partner vending contracts for nutritional value and also examine the percentage of vending machine products that include soda and high trans-fat food. The county can consider exploring vendors that have high nutritional value options. Finally, working with a local vendor with nutritious food options could be one way to provide not only nutritious food, but also community and local business support. This action will have an impact on facility and operational costs; however, accessible healthy food offerings are a necessary action to lead by example, and could lead to cost savings on health expenses over time due to improved health outcomes.

25 https://www.epa.gov/benmap

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W3 Enact Healthy Workplace Guidelines and Standards

This nutritional approach builds upon employee access for all locations, all shifts, and raising standards for nutritional value for meals across campus. The Segal SHAPE Reports on the Oakland County Health Plan provide information on the Oakland County employee base that show how employees would directly benefit from a nutritional strategy.

The Segal SHAPE report on the Oakland County Health Plan from 2018 stated, “The number of plan participants diagnosed with CAD is more than double the norm. The annual PMPY cost for these participants is $21K which is four times higher than the PMPY cost for the average plan participant. Since this disease can be prevented and reversed with dietary modification, this should be an area of focus for plan management.”

The Segal SHAPE report on the Oakland County Health Plan from 2018 states, “The number of plan participants exceeds the norm for each of the “lifestyle conditions” (i.e., Diabetes, CAD, and Hypertension). Strategies aimed at altering diet and increasing exercise should be prioritized.”

The Segal SHAPE report on the Oakland County Health Plan from 2019 stated, “Compliance with all diabetes measures is low. In particular, the number of diabetics monitoring their A1C values typically raises a red flag. However, the risk scores of those non-compliant diabetics are very low and may be an indication that these are type II diabetics who have their condition under control with diet and exercise.” The 2018 report highlighted a similar finding.

Consideration 3: Clean Drinking Water Access. Develop policies around access to palatable drinking water in workspaces. Employees who participated in focus groups reported the lack of access to palatable drinking water, noting issues with the drinking water taste and smell. In fact, one participant even mentioned inquiring with colleagues about interest in setting up a water delivery system in the office at their own cost, because the drinking water was unpleasant in the workplace. Facility standards may include filtered water bottle filling stations across buildings and accessible to workplaces. Installing water bottle filling stations is an example of best practice in the WELL Building Standard and Leadership in Energy and Environmental Design (LEED) rating system. Environmental Health and Safety should lead this portion of the strategy with support from Facilities Management.

Health and Wellness

W3 Enact Healthy Workplace Guidelines and Standards



Consideration 4: Outdoor Seating. Provide smoke-free outdoor seating spaces at all facilities. Facilities Management and Purchasing should lead this portion of the strategy. Currently, the only observed outdoor seating outside of facilities doubles as smoking spaces. In focus groups, employees reported they desire to have smoke-free outdoor seating spaces where they can eat lunch or take a break. This consideration aligns with the county's Tobacco Cessation program by providing smoke-free seating options for staff and visitors. Further, research shows that smoking is the leading cause of chronic obstructive pulmonary disease (COPD).[26] According to Segal SHAPE Reports based on the Oakland County Health Plan from 2017-2020, Oakland County Healthcare spends about $1 million a year on COPD claims (about $1,650 per patient per year). While COPD is not the highest healthcare cost for Oakland County attributed in the SHAPE Reports, this is a significant expense that could be directly reduced by improved air quality including reduced direct smoke inhalation and second-hand smoke exposure. Providing smoke-free outdoor seating options can support those trying to limit smoking and prevent from second-hand smoke exposure.

Consideration 5: Reduce and Replace Janitorial Chemicals with Environmentally, Non-toxic Alternatives. The Oakland County Chief of Custodial Services has studied and worked to start implementing International Facility Management Association (IFMA) recommended sustainability initiatives. The Chief of Custodial Services' goal is to improve the work environment without impacting health standards or creating financial strain on operations. As of June 2021, Oakland County was ranked "Excellent" or "Satisfactory" in 9 of IFMA Benchmarks and "Needs Improvement" in 1 IFMA Benchmark. Current accomplishments include:

- A total of 99% of janitorial paper products are "Green Seal" certified or "ECO" approved
- Approximately 98% of chemicals are ready-to-use or ready-to dispense products
- All FMO vacuums have 97% or higher filtration systems
- Employees have been trained on the proper use of chemicals when treating services.

The IFMA Benchmark that was ranked as "Needs Improvement" in Oakland County facilities is "Use cleaning chemicals that meet Green Seal or similar standards." Oakland County should do an analysis of existing janitorial chemicals with industrial

26 "Smoking and COPD." Edited by David Dugdale, Mount Sinai Health System, Mount Sinai Health System, 2019, https://www.mountsinai.org/health-library/special-topic/smoking-and-copd#:~:text=Smoking%20is%20the%20leading%20cause,so%20it's%20hard%20to%20breathe.

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W3 Enact Healthy Workplace Guidelines and Standards

hygienists focused on environmental health and safety in the workplace and compare against other health standards, recognizing that some facilities (e.g., the County Jail) may require hospital grade cleaners/disinfectants because of the higher risk of viral and bacterial exposure. Choosing best practice janitorial chemicals and defining proper protocols for use of these chemicals will prevent employees from being exposed to toxic and harmful chemicals that can negatively impact human health. In doing so, consider referencing the WELL Building Standards, which provides a consolidated list of best practice certifications for each class of cleaning products (including Green Seal, in some cases).

According to WELL standard cleaning, all disinfection and sanitization products must meet one of the following three requirements to be less hazardous:

1. Products are labelled as 'low-hazard' or 'safer' by an ISO 14024-compliant or by a third-party certification recognized by the local government where the project is located.[27] Hazard criteria must be specific for the product classes within the scope of this feature.
2. The Safety Data Sheet (SDS) of each product as sold discloses ingredients per EU Regulation 2015/830 (CLP) or California State Bill No. 258 and no ingredients listed in Section 3 of the SDS are classified as the following Globally Harmonized System codes and corresponding hazard statements:
    - H311: toxic in contact with skin
    - H312: harmful in contact with skin
    - H317: may cause allergic skin reaction. Individual terpenes may be present up to a concentration of 0.5% in undiluted products.
    - H334: may cause allergy or asthma symptoms or breathing difficulties if inhaled
    - H340: may cause genetic defects
    - H350: may cause cancer
    - H360: may cause damage to fertility or the unborn child
    - H372: may cause damage to organs through prolonged or repeated exposure
3. Products meet Feature X08 Materials Optimization.

Implementation of this strategy may be in conjunction with the Waste Reduction and Diversion Focus Area strategies if janitorial services and waste diversion and removal services are combined (see the Waste Reduction and Diversion section for more information). The Environmental Health Services Unit of the Health Division and Facilities Management, Chief of Custodial Services, should lead this portion of the strategy.

27 Green Seal's certification procedures follow ISO 14020/14024.

Facility and Fleet Decarbonization



The county's net zero carbon goal for government operations is to reach net zero carbon emissions by 2050, with an interim goal of 50% carbon emission reduction by 2035 from a 2018 baseline.

Expand the county's clean energy generation capabilities, convert the county's fleet to clean-energy vehicles, and advance decarbonization goals.

Guiding Principles

- Provide accessible services and campus environment
- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Objectives and KPIs

Expand carbon neutral energy generation and use, as measured by the carbon emissions from energy consumption (CO_2e).

Decarbonize county vehicle fleet, as measured by the percentage of internal-combustion engine (ICE) vehicles to non-combustion engine vehicles within the fleet.

Promote cleaner transportation alternatives, as measured by the percentage of staff commuting to work by a transportation mode other than a single occupancy internal-combustion engine (ICE) vehicle.

To support the county's target to reach net zero carbon emissions by 2050, with an interim goal of 50% carbon emission reduction by 2035 from a 2018 baseline, the following section outlines specific targeted actions for development of onsite renewable energy generation capabilities, reduction of energy use and emissions from facilities, and advancement of zero emission vehicles (ZEV) across the county fleet.

Currently, 76% of the county's emissions are from energy use and 16% of the county's emissions are from their fleet. Decarbonizing energy and transportation-sector emissions is critical to achieving carbon neutrality by 2050. Electricity consumption generates 53% of total emissions and natural gas, which supplies the Central Steam Plant, represents 23% of all emissions. As such, conversion or decommissioning of the Central Steam Plant and of other natural gas equipment and appliances on campus must be the primary focus of the county's decarbonization strategy. Replacing energy sources with renewable energy generated on-site is also key to reaching the net zero carbon goal and can increase the county's energy-resilience. Off-site renewable energy sources, including power purchase agreements, can also contribute to advancing the net zero carbon goal.

Table 5. Facility and Fleet Decarbonization Strategies

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
F1	Conduct a Decarbonization Feasibility Study for the Central Steam Plant					X		X					X		X	Facilities Planning and Engineering Division	Facilities Management: Facilities, Maintenance, and Operations Division, Engineering	
F2	Pursue On-Site Solar Generation at Key Campus Locations					X		X					X		X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing, Parks and Recreation	
F3	Develop an Electric Vehicle Infrastructure and Fleet Transition Plan for the Oakland County Campus					X		X			X		X			Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing, Parks and Recreation	

LEGEND: (*) In Progress

Facility and Fleet Decarbonization

F1 Conduct a Decarbonization Feasibility Study for Central Steam Plant

Guiding Principles

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: Future

Strategy Type: Informative

Partners: N/A

Teams

Lead: Facilities Planning and Engineering Division

Support: Facilities Management: Facilities, Maintenance, and Operations Division, Engineering

The central steam plant currently operates predominantly on natural gas and serves several of the largest facilities on the Oakland County campus, producing 18% of overall county operations greenhouse gas (GHG) emissions.

The county's Steam Plant Decommissioning Study was conducted in 2021. The research in this study found that decommissioning the Steam Plant and replacing it with a local, more efficient, natural gas boilers could result in $18,890,316 in savings in the next 10 years. Study findings also showed that the localized high efficiency boilers would result in 30% less annual carbon emissions than the current steam plant and are expected to have a longer lifecycle and fewer necessary repairs. While this solution would reduce carbon emissions to meet short term carbon reduction goals, installing a natural gas system is still a long-term investment in fossil fuels that will not help the county meet its long-term net zero carbon goal. A new boiler system is an expensive replacement that would lock the county in to a long-term dependence on fossil fuels that would delay reaching the net zero carbon target.

The goal of this additional study would be to identify the feasibility of alternatives for a decarbonized heating system, either distributed or central. This is necessary to both meet the county's long-term net zero carbon goal as well as ensuring other energy investments. For example, energy efficiency upgrades to steam-serviced facilities. All upgrades and capital investments should be performed in alignment with the capital improvement plan and decarbonization efforts. Thus, this strategy is aligned with the county's Strategic Framework goal areas of Environmental Sustainability and Organizational Excellence. Conducting a decarbonization feasibility study of the central steam plant could:

- **Advance the net zero carbon goal** by exploring steam plant alternatives that eliminate the county's long-term dependence on fossil fuels.
- **Maximize resource efficiency** by exploring alternatives that are lower in maintenance costs and increase overall water and energy efficiency.

This proposed study would evaluate all available and emerging decarbonization alternatives for the central steam plant, including those that could separate the county from fossil fuels entirely in order to work towards the net zero carbon goal. The study should investigate different alternatives whether Oakland County decides to decentralize or maintain the steam plant. Preservation of the steam plant can include looking into renewable fuel alternatives, such as biofuels. Decentralization of the steam plant can include applying carbon neutral energy sources to buildings on campus, such as heat pumps. Options for evaluation include:

Facility and Fleet Decarbonization

F1 Conduct a Decarbonization Feasibility Study for Central Steam Plant

- **Distributed, Decarbonized Systems:** Transition from a central steam plant to individual systems at each county location which operate on newer, efficient electrified technologies. This would complement the 2021 study recommending the transition to natural gas boilers, but would include the exploration of non-fossil fuel alternatives and the technical and cost analysis of each option specific to the impacted county facilities and long-term net zero goal.
- **Centralized Ground Source Heat Pump (GSHP) System:** A connected GSHP system would provide heating and cooling from stable underground temperatures and would supply heating and cooling to each facility.
- **Alternative Fuels:** Renewable natural gas, biofuels, or green hydrogen may be considered. Feasibility is based on local availability of the alternative fuel.
- **Carbon Capture and Sequestration:** Capture of on-site carbon emissions for long term underground storage may allow for continued operation of the natural gas plant. This would require evaluation of ongoing cost and local sequestration site availability.

The feasibility study should include the following relative to each technology:

- **Current and projected technological maturity:** Availability or projected availability of the technology in the market will be critical for assessment of feasibility and implementation.
- **Timelines:** Each decarbonization technology and scenario should have an identified timeline which considers technological feasibility and design, engineering, construction timeframes, relation to the GHG targets, and current remaining steam plant lifespan.
- **Alignment with county net zero carbon targets:** Projected timeline and carbon intensity of each technology should align with the county's net zero goal and interim GHG reduction targets.
- **Cost estimates:** Capital investments required for each technology, as well as required ongoing annual operations and maintenance costs will be critical to this assessment and feasibility study.
- **Funding opportunities:** Where applicable, identification of funding and financing mechanisms which may be available to support each technology.
- **Options for new developments:** Provide guidance for new developments on either connecting to the alternative system or options for decarbonized distributed systems. Phase out connections to natural gas systems in new developments.

Looking into alternatives now will allow Oakland County to integrate the selected strategy into future capital plans, facility upgrades, and electric procurement processes. It will also provide updated timelines and phasing of current efficiency measures for facilities currently served by the plant. It is important to continue monitoring state and federal legislation that may impact the economics of decarbonization, including fuel switching or electrification incentives, and carbon pricing schemes.

Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

Guiding Principles

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division

Support: Purchasing, Parks and Recreation

Oakland County campus presents ample opportunity for development of onsite renewable energy, which will support decarbonization goals. Additionally, increased energy efficiency paired with use of on-site renewable energy and battery storage solutions will enhance county resilience by limiting its critical energy load and reducing its reliance on the broader electrical grid. As it relates to the Sustainability Plan's Guiding Principles, pursuing on-site solar generation at key campus locations:

- **Advance the net zero carbon goal** by developing localized renewable energy sources on campus to reduce and eventually eliminate the county's dependence on fossil fuels for energy.
- **Maximize resource efficiency** by taking advantage of existing roofs that would be eligible sites for onsite solar and increasing resilience and self-sufficiency of the campus energy system.

Primary sites of development are open spaces and parking areas on campus. Due to the decreasing cost of solar energy, on-site solar resources would provide economic benefits by reducing purchased energy from the grid, thus promoting efficient use of county funding.

Considerations for development of these sites include:

Key Site Locations: Oakland County campus has several parking lots, rooftop locations, and open space that would be a good fit for solar installations. Three key site locations , as seen in Figures 5-7, were identified through the Sustainability Plan development process: the Farmers Market parking lot, the public parking lot, and open space west of the Sheriff's Administration Building. Installing ground-mount solar in the open space west of the Sheriff's Administration Building has the potential capacity to generate approximately 3 million kWh in electricity per year.

Installing a carport solar system in the Farmers Market parking lot has the potential capacity to generate approximately 1 million kWh in electricity per year. Last, installing a carport solar system in the public parking lot has the potential capacity to generate approximately 2.5 million kWh in electricity per year. The analysis prepared in informing this Plan identified that approximately 21 million kWh of electricity was used by the Oakland County campus in 2020. Investment in on-site solar generation at selected sites identified here would produce enough electricity to offset approximately 30% of this annual consumption

Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

Funding and Financing Models: There are a range of models for development of solar including those that may allow for cash-flow neutral loan and energy savings. Leases, power purchase agreements, and any future state or utility programs should be evaluated to ensure maximized financial benefits of solar installations, including the federal investment tax credit (ITC).

Streamlined Planning and Development: Where possible, coordinate solar installation with other planned projects. New developments, including facilities and parking areas, can include solar ready design to support continued growth in campus renewables in the future. For example, installation of the Farmer's Market parking lot solar canopy or inclusion of solar ready design to support future installation could be considered in the county's planned improvements to the facility and parking lot during the timeframe of FY23 through FY25.[28]

Identification of Co-Benefits: There are several co-benefits to installing solar on campus. Installing solar canopies over parking areas provides covered parking which protects vehicles and people from the weather, resulting in reduced cooling needs for vehicles and comfort for visitors and employees. Ground-mounted solar on greenspaces can be designed to include native plantings which promote stormwater infiltration and benefits to pollinators and birds. Additional evaluation is needed to consider any potential local environmental or wetland impacts, particularly for solar development of green space. Last, installing battery storage opportunities in addition to solar can provide a resiliency measure to reduce reliance on the electrical grid and reduce overall carbon emissions.

Operations and Maintenance (O&M): The National Renewable Energy Laboratory has resources to understand and minimize O&M costs as well as a tool to determine O&M costs based on system size, roof type, and environmental conditions.[29] Snow is rarely removed from solar photovoltaic (PV) systems because it is not cost effective and the reduction in productivity is 3% on average and 15% in very snowy environments. However, snow is sometimes removed when a dangerous amount of weight is on the system or snow is removed from the front of the array to provide clearance for snow to slide off. The cost for snow removal on average is about $50 to $75 per hour for labor and about $0.50/sf of array area. Ice dams should be removed to ensure that water drains off the roof properly, the cost is $70 on average for labor per ice-dam location and materials include a $50 rake and ice-melting supplies.[30]

28 https://www.oakgov.com/parks/getinvolved/Pages/cip.aspx

29 https://www.nrel.gov/docs/fy20osti/74840.pdf

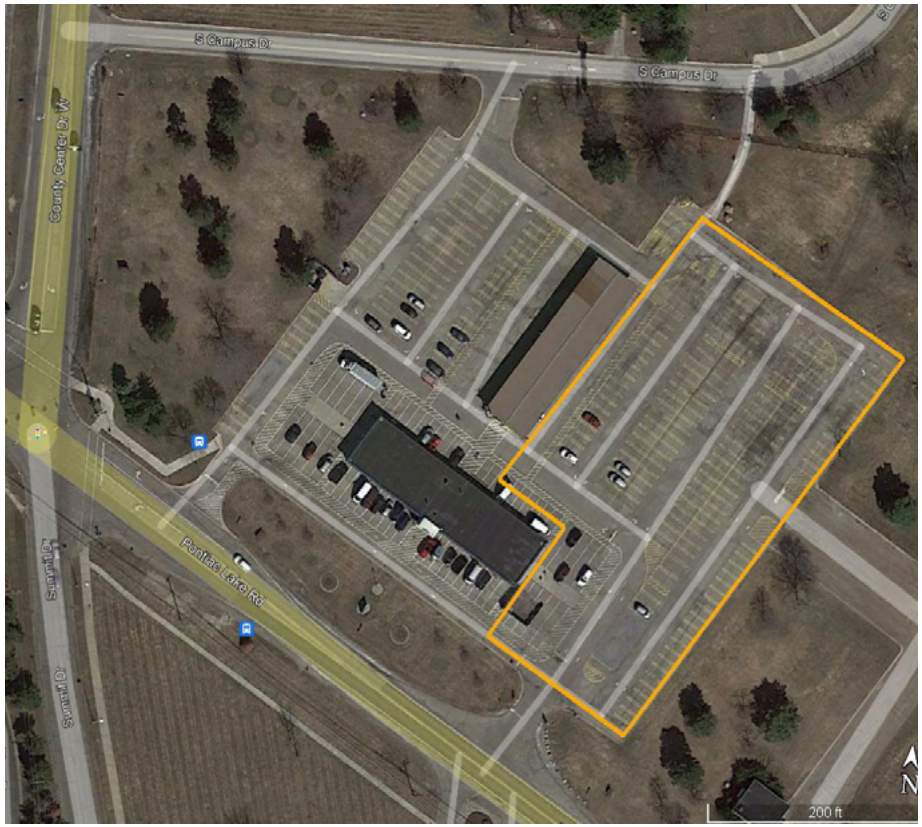
30 https://www.nrel.gov/docs/fy19osti/73822.pdf

Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

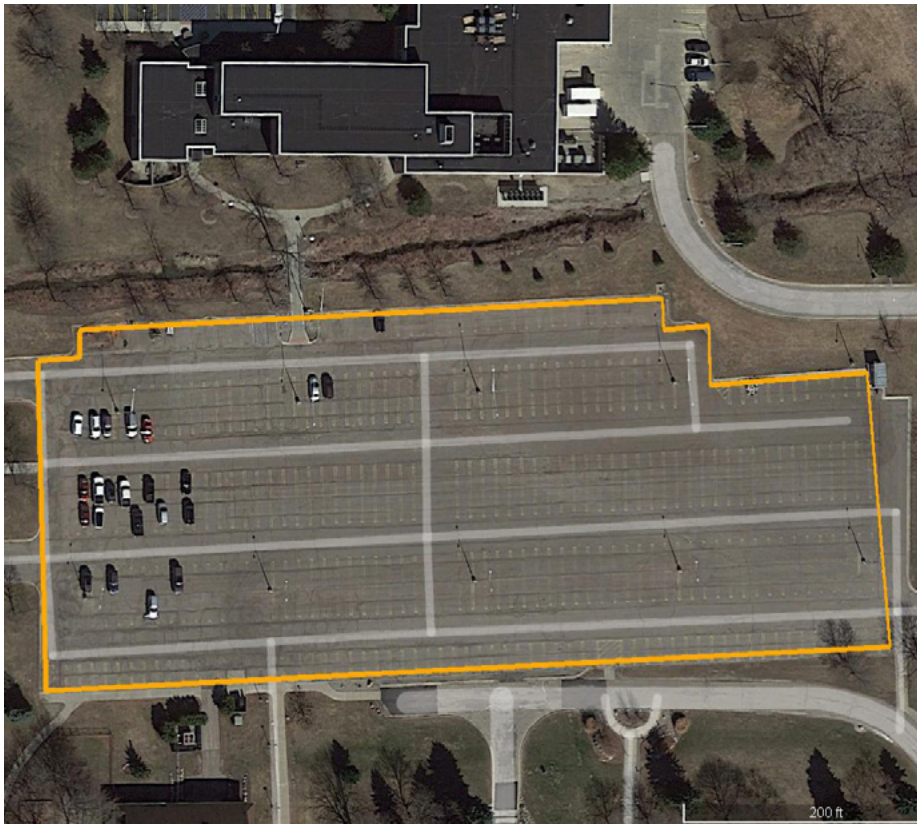
The Farmers Market parking lot could host an approximately 800 kW carport system, generating approximately 1 million kWh of electricity per year. With up front capital, ongoing O&M costs, and annual electric cost savings, it is estimated that this site would yield 4.1% ROI and have a 24.5-year payback period.

Figure 5. Potential Solar Canopy Site at Farmer's Market



The public parking lot could host an approximately 1900 kW carport system, generating about 2.5 million kWh per year. With up front capital, ongoing O&M costs, and annual electric cost savings, it is estimated that this site would yield 4.3% ROI and have a 23.3-year payback period.

Figure 6. Public Parking Lot Proposed Solar Area

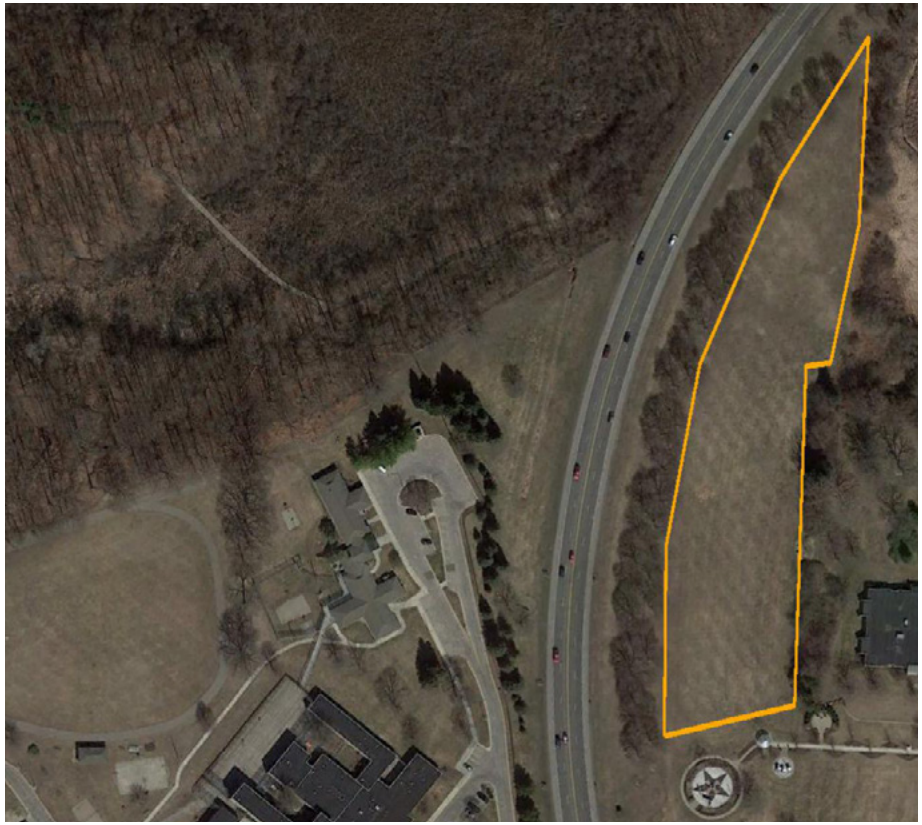


Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

The open space west of the Sheriff's Administration Building could host an approximately 2,000 kW ground-mount system, generating about 3 million kWh per year. With up front capital, ongoing O&M costs, and annual electric cost savings, it is estimated that this site would yield 9.0% ROI and have a 11.2-year payback period.

Figure 7. Possible Solar PV Site, West of Sheriff's Administration Building, Open Lot



Installation of the three preliminarily identified solar sites would result in 13% reduction in electricity emissions and 7% reduction in total emissions, from a 2018 baseline (Table 6).

Table 6. Potential GHG Emission Reduction from Solar Installation at Key Sites

	FARMERS MARKET PARKING LOT	PUBLIC PARKING LOT	OPEN SPACE WEST OF THE SHERIFF'S ADMINISTRATION BUILDING	THREE SYSTEMS COMBINED
Production (Year 1) (kWh)	1,000,000	2,500,000	3,000,000	**6,500,000**
% reduction in total 2018 electricity consumption (kWh)	2%	5%	6%	**13%**
% reduction in total 2018 electricity emissions ($MTCO_2e$)	2%	5%	6%	**13%**
Reduction in total 2018 municipal emissions	1%	3%	3%	**7%**

Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

Financial Analysis

The Farmers Market parking lot, the public parking lot, and open space west of the Sheriff's Administration Building went through initial evaluation and analysis to estimate cost, payback, and funding considerations for implementation. Based on preliminary analysis, the proposed solar installations have the following generation capacity: the Farmers Market parking lot could host an approximately 800 kW carport system, generating approximately 1 million kWh of electricity per year. The public parking lot could host an approximately 1900 kW carport system, generating about 2.5 million kWh per year. Last, the space west of the Sheriff's Administration Building could host an approximately 2,000 kW ground-mount system, generating about 3 million kWh per year.

The capital outlay, payback period, and return on investment (ROI) calculated by the county's consultants, were based on the total costs and electric savings for each of the three systems. A price per kW of $3,900 for the carport system and $1,900 for the ground-mount system respectively, including a 5% contingency, was applied to calculate the capital outlay for the carport and ground-mounted systems. By using a Tax Equity Partnership funding mechanism, bonus depreciation and the ITC was applied to the initial capital outlay (see the Partnership with Tax Equity Investor funding mechanism description for more information).

Additional costs for these systems include ongoing annual O&M costs ($5/kW) and a one-time inverter replacement cost ($10/kW) at year 15. Ongoing annual O&M costs would increase slightly each year due to inflation. Potential savings were calculated based electric cost savings. Even though solar degradation is 3% after year 1 and 1% annually thereafter, electric cost savings will increase over time due to utility rate escalation.

Capital outlay, ongoing O&M costs, inverter replacement costs, annual electric savings, payback period, and ROI for each system and the three systems combined are shown in Table 7. Figure 8 shows cumulative cashflows and breakeven points for each installation and the installations bundled.

The solar PV market is quickly evolving. As the market advances and technology improves, the costs of equipment and maintenance will decrease, and new incentives or alternative financing methods may become available. Such factors could dramatically increase the ROI and lower the payback period. Further, ground-mount systems have a higher ROI and lower payback period than the carport systems. This could be one consideration as the county prioritizes solar installations. It should also be noted that the analysis below does not place a value on the carbon reduced from the switch to solar power.

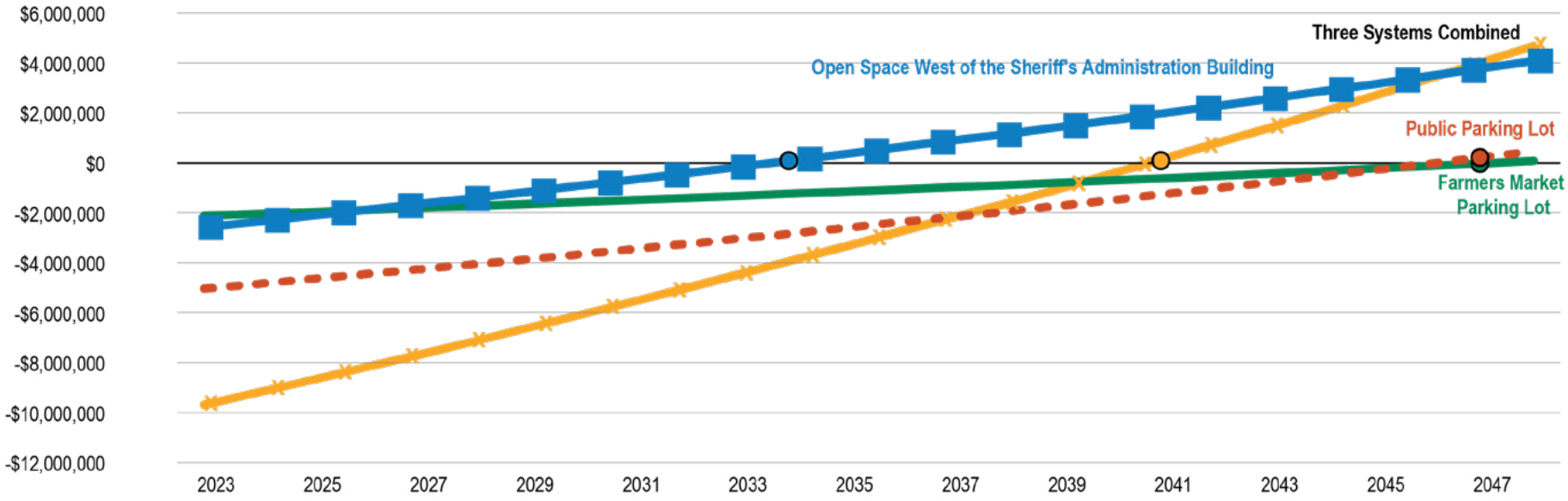
Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

Table 7. Key Solar Installation Financial Analysis Outputs

ITEM	FARMERS MARKET PARKING LOT	PUBLIC PARKING LOT	OPEN SPACE WEST OF THE SHERIFF'S ADMINISTRATION BUILDING	THREE SYSTEMS COMBINED
Capital Outlay	$2,100,000	$5,000,000	$2,600,000	$9,700,000
Ongoing Costs: Annual O&M (Year 1)	$4,000	$9,500	$10,000	$23,500
Ongoing Costs: Inverter Replacement (Year 15)	$8,000	$19,000	$20,000	$47,000
Annual Electric Savings (Year 1)	$80,000	$200,000	$240,000	$520,000
Payback Period (Years)	24.5	23.3	11.2	17.9
ROI	4.1%	4.3%	9.0%	5.6%

Figure 8. Solar Installations: Cumulative Cashflow



Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

Funding Mechanisms

Potential funding mechanisms for solar installations include:

Capital Budget: The solar PV systems costs should be included in a capital budget.

Operating Budget: Related ongoing maintenance and expenses for solar PV panels and inverters would be a part of the operating budget.

Partnership with Tax Equity Investor: Given that the ITC plays an important role in solar economics and helps lower the payback, the county should consider partnering with a tax equity investor.[31] As such, this funding mechanism was included in this financial analysis model for this strategy. The tax equity partner(s) could invest a certain percent of capital costs and claim all ITC (usually 99%) and bonus depreciation in year 1 or when the system is placed in service (per the Operating Agreement between project partners). The tax equity partner(s) would co-own the system for five to seven years to secure claimed tax benefits. After seven years, depending on the financial arrangement, the county can buy out the solar PV systems at an agreed price or Fair Market Value or transfer the ownership within the partnership.

Power Purchase Agreement (PPA): A PPA is a great option for entities that are not able to monetize tax credits or that cannot purchase solar PV systems outright. Through a PPA, a third-party solar developer would install, own, and operate an energy system on county property. The county would purchase the electricity for a predetermined period, usually 20 years. This option does not require a capital outlay from the county. The savings would be realized through the difference between the utility and PPA rates. To determine the PPA rates to calculate actual savings, the county would need to produce the RFP and collect quotes from solar developers.

Tax Exempt Bond Financing: The county could finance the solar installations through the proceeds of a tax-exempt bond issuance. The bonds would be sold to investors to raise funds for the solar installations. In return, the county would agree to repay the investors principal plus interest, which is generally exempt from federal, state, and local taxes. These bonds could qualify as green bonds to attract additional types of investors. There are two types of bonds distinguished by the source of repayment. General obligation bonds are secured by the county's pledge to repay from its taxing authority. Repayment of revenue bonds is from a specified revenue, often associated with the project being financed. When bonds are issued for solar projects, they are typically general obligation bonds; however, bonds have been issued with the savings generated by solar projects being pledged to repay the debt.

Guaranteed Energy Savings Performance Contracting (GESPC): The county can contract with an Energy Service Company (ESCO) to design, install and maintain the solar PV systems. The ESCO will guarantee that the energy savings generated from the project will be sufficient to offset the project costs, including financing. If the project does not meet the guaranteed savings, the ESCO is required to make up the shortfall to the customer. ESCOs are generally paid a negotiated fee or share in the energy savings. GESPC projects can be financed through a variety of mechanisms including bond financing or, more frequently, municipal leases. Michigan allows tax exempt lease purchases for energy conservation improvements. The lender holds title to the conservation title and

31 Tax information contained in this communication was not intended or written to be used by any person for the purpose of avoiding penalties, nor should such information be construed as an opinion upon which any person may rely. AECOM is not providing a formal opinion regarding the ITC and Depreciation. The ITC and depreciation estimate is preliminary and subject to adjustment based on actual costs.

Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

leases it for the term of the financing. At the end of the term, the lender transfers ownership to the county. This form of financing is not considered debt under Michigan law and therefore does not count toward the county's authorized debt limit.

Sustainability Revolving Fund: The county can establish a Sustainability Revolving Fund (Revolving Fund) to pay for the solar projects, or other projects that generate energy cost savings (e.g., H2. Complete Campus-Wide LED Lighting Conversion). Initial capitalization of the fund can come from grants, rebates, or appropriations from the county's General Fund. As projects are completed and ongoing, an amount equal to the energy savings would be paid back to the fund over time.[32] This would replenish the Revolving Fund which could be used for additional solar projects in facilities without additional General Fund appropriations.

Funds will be repaid and available for additional projects that will generate savings that are repaid to the Revolving Fund. For example, based on the payback period model for the open space west of the Sheriff's Administration Building, $230,000 in energy savings would be repaid to the fund after the first year and the capital outlay fully replenished by energy savings in about 11 years.

Federal, State, or Regional Programs: The Infrastructure Investment and Jobs Act (IIJA) appropriated $550 million to the **Energy Efficiency and Conservation Block Grant (EECBG) Program** to assist eligible local, county, tribal, and state governments in implementing strategies to reduce fossil fuel emissions, reduce total energy use, and improve energy efficiency for transportation and buildings. This program was previously funded back in 2009 through the American Recovery and Reinvestment Act and it is anticipated that solar projects will be eligible under this refunded program.[33]

32 Some Revolving Funds only receive a portion of the energy savings. The remaining savings accrue to the general fund. By sharing the savings, leadership may be more willing to undertake future energy projects; however, the fund will be replenished more slowly.

33 https://www.energy.gov/eere/wipo/energy-efficiency-and-conservation-block-grant-program-bipartisan-infrastructure-law-2021

Facility and Fleet Decarbonization

F3 Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

Guiding Principles

- Provide accessible services and campus environment
- Advance the net zero carbon goal

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: Future

Strategy Type: Informative

Partners: N/A

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division

Support: Purchasing, Parks and Recreation

Oakland County taking the initiative to decarbonize its fleet will result in significant progress on reaching net zero carbon emissions. Installing EV charging infrastructure on Oakland County's campus would demonstrate the county's commitment to climate action and provide amenities to employees, residents, and visitors of the campus. Oakland County could then provide real-world accounts and education of the function, success, and opportunities electrifying large fleets and installing EV infrastructure has for a government entity. Community members may also be inspired to integrate electrification into their personal lives. As it relates to the Sustainability Plan's Guiding Principles, developing an electric vehicle infrastructure and fleet transition plan for Oakland County campus could:

- **Provide accessible services and campus environment** by providing EV charging infrastructure on campus adopting EVs becomes more accessible for campus employees. Switching to EVs for the campus fleet improves air quality and health outcomes for people on campus.
- **Advancing the net zero carbon goal** by eliminating the greenhouse gas emissions caused by gas and diesel vehicles and increasing awareness of EVs to promote widespread adoptions.

Oakland County operates a fleet of 853 vehicles across multiple departments, with the majority operated by the Sheriff's Office (233 vehicles) and the Water Resources Commission (195 vehicles). Two fleet vehicles are currently electric. There are several currently available EV alternative options for Oakland County's fleet. County fleet vehicle types vary widely from standard pool vehicles and transport vans to specialized airport maintenance, snow removal, and emergency services vehicles. These vehicles were categorized into vehicle types based on their size and function. Table 8 details the specific models identified through the sustainability planning process as potential electrified county fleet vehicle options for each vehicle type. These are intended as representative options for Oakland County. The technology and industry are ever changing to include additional model types with ranges comparable to internal combustion engine (ICE) vehicles.

Facility and Fleet Decarbonization

F3 Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

Table 8. Electric Vehicle Alternative Options

VEHICLE	EXAMPLE MODELS
Truck - Class 6	BYD, CityFreighter CF-1, Endera Motors L, Freightliner eM2, SEA Electric MD Cutaway
Pick-Up Truck	Tesla Cybertruck, Ford F-150 Lightning
Work Van	Ford E-Transit, Envirotech Logistics Van, Maxwell Vehicles ePro
Passenger Vehicle - Hatchback	Hyundai Ioniq, Chevrolet Bolt, Audi e-tron, BMW i3, Ford Mustang Mach-E, Tesla Models
Motorcycle	Harley Davidson Live Wire, Zero SR/F, Lightning LS-218,
Passenger Vehicle - SUV	Cadillac Lyriq, Kia Niro EV, Volvo XC40 AWD BEV
Truck - Class 7 and 8	BYD 8TT, Freightliner eCascadia, Lion Electric Lion8
Multi-Purpose Delivery Vehicle (MPDV)	Canoo MPDV, Bollinger Deliver-E, Lightning System F-59 Cargo Van
Super Duty	Phoenix Zeus 500, Roush Cleantech F-650, Lion Electric Lion6, Nordresa T6, Lightning System Ford E-450,

Facility and Fleet Decarbonization

F3 Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

In undertaking this electric vehicle infrastructure and fleet transition study, the county can develop opportunities to achieve operational savings and critical electrification investments for the fleet. To develop a fleet electrification pathway, consider identifying the following:

- Future assessment of electric fleet vehicles, including duty-cycles and charging needs, charging and electric utility infrastructure, and impacts to existing vehicle procurement and maintenance needs.
- EV fleet data management approaches, to ensure mileage, performance data, and preventative maintenance schedules can be maintained.
- EV charging policy for staff and visitors to determine campus charging needs, optimized infrastructure, and usage or fee policies. The policy may also suggest operating hours for charging user types.
- Lifecycle carbon assessment for fleet vehicle types to allow for prioritization of fleet conversion based on near-term and long-term targets, as informed by the GHG inventory.
- Campus-wide charging infrastructure plan, which includes siting and timeframes to support fleet electrification and workplace electrification. DC fast charging may be considered in some locations to support rapid charge of fleet or visitor vehicles.
- Develop vehicle procurement policy which emphasizes EVs and lifecycle savings. The county will be leading by example in demonstrating the potential for EVs to serve a range of their services while providing operational savings. Likewise, more EVs would be out on road, reducing overall fuel costs. Emerging business models may be considered, including battery swap outs, alternative battery leasing frameworks, and charging-as-a-service solutions.
- Identify applicability of emerging micromobility solutions for on-campus transportation including e-scooters and bicycles.
- Consider inclusion of off-road vehicles (e.g., lawn mowers, golf carts), which make up1% of the county's total GHG emissions, for inclusion in the transition plan for zero carbon alternatives. Electrification of on-road vehicles, which make up 15% of the county's total GHG emissions, should be prioritized.

Dual-port Level 2 chargers can be placed in public parking lots and equipped to accept the

Facility and Fleet Decarbonization

F3 Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

Financial Analysis

Fleet electrification can lead to significant cost savings and carbon reductions for the county. A fleet analysis conducted by the county's consultants shows potential cost savings of replacing three ICE vehicle types within the county fleet with comparable EV models.

Given current depreciation and the existing replacement schedule, it is assumed that 100 fleet vehicles would be replaced over a five-year period. Potential electric vehicle alternatives were selected that are comparable to example models of existing county fleet vehicle types that have been identified as near-term replacement targets (Table 9). Cost, availability, and vehicle specifications at the time of replacement will determine actual EVs purchased.

The analysis included the cost of purchasing and installing Level 2 chargers for each vehicle and one DC Fast Charger. This is a conservative estimate of the number of chargers needed. A charging plan during the planning and implementation phases will likely result in fewer chargers and lower capital costs. Charger costs were reduced to reflect DTE rebate offerings; however, this analysis took a conservative approach, reducing the rebate amount applied to reflect the potential for rebate program modifications in the future. The charger rebate amount currently offered by DTE is $2,500, but the rebate amount used for this financial

Table 9. Replacement Vehicle Type and Comparable EV Models

VEHICLE TYPE REPLACEMENT TARGETS	EXAMPLE ICE MODEL	COMPARABLE EV MODEL
Passenger Sedan	Chevrolet Impala	Hundai Ioniq
Full-Sized Pickup	GMC Sierra 1500	Tesla CyberTruck
Multipurpose SUV	Ford Explorer	Cadillac Lyriq



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F3 Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

analysis is $1,500 to reflect the potential for rebate modifications in the future.[34]

The capital outlay of $1,170,000 (present value) reflects the current price differential of the EV models over ICE vehicles and the purchase and installation price of EV chargers. Cost savings were calculated based upon a comparison of EV versus ICE vehicle models' fuel costs. For purposes of this analysis, no future year escalation rate was applied to electricity prices. This provides a more conservative approach to comparing costs given recent increases and volatility of gasoline prices. Results are listed below and shown in Figure 9 and Figure 10. Although not included in the analysis, it should be noted that revenues could be produced by offering charging services to the public utilizing the charging infrastructure installed for county vehicles. A feasibility study is needed to quantify the revenue potential.

- Capital Outlay: $1,170,000
- Annual Fuel Savings for Electric Vehicle Models Versus Comparable ICE Models:
  - Ioniq: $3,790
  - CyberTruck: $4,730
  - Lyriq: $4,000
- Payback Period: 7 years
- ROI: 21.6% over ten years

Figure 9. EV Fleet and EV Chargers: Cumulative Cash Flow

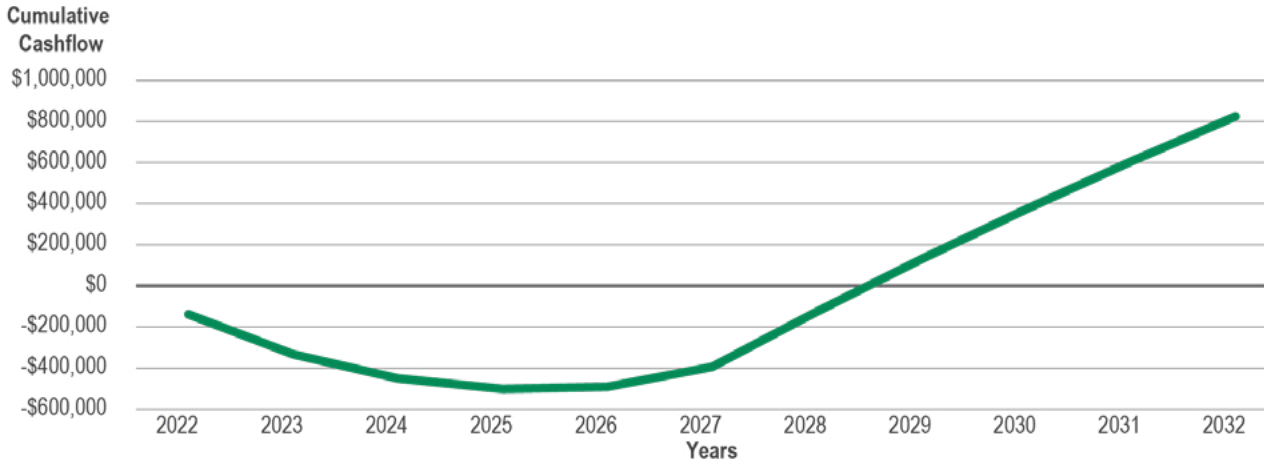
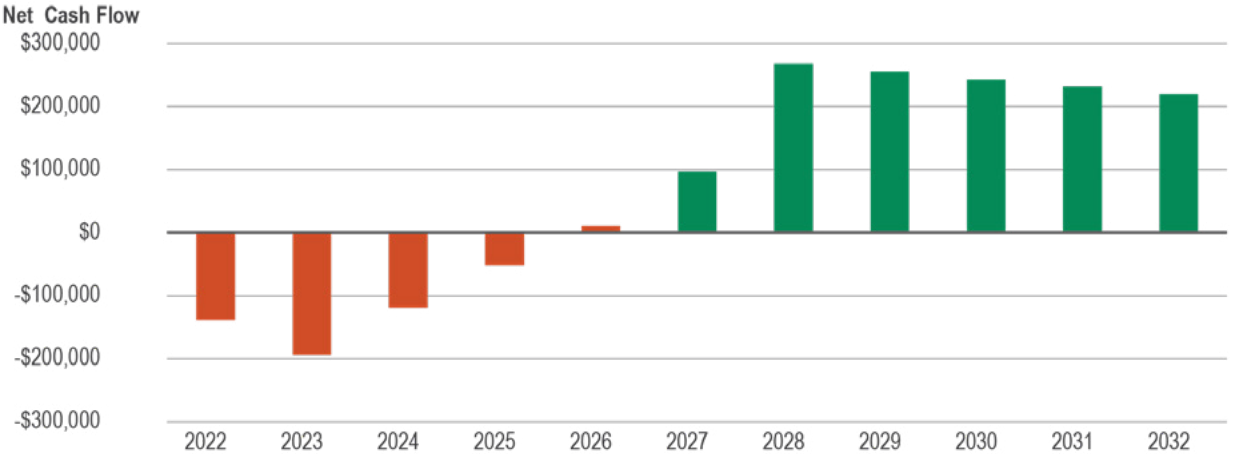


Figure 10. EV Fleet and EV Chargers: Annual Cash Flow



34 https://newlook.dteenergy.com/wps/wcm/connect/dte-web/home/service-request/business/electric/electric-vehicles/pev-biz-fleet

Facility and Fleet Decarbonization

F3 Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

Funding Mechanisms

Potential funding mechanisms for EV replacements and associated costs could include:

Capital Budget: The scheduled replacement of existing vehicle and charger purchase costs should be included in a capital budget.

Operating Budget: Charger-related ongoing maintenance and expenses would be a part of the operating budget.

Rebates: Utility rebates are available through **DTE Energy's Charging Forward program** which offers a commercial fleet rebate of up to $2,500 per port for Level 2 chargers and up to $70,000 for DC fast chargers. These rebates are available on a first come serve basis on an installation site of up to 100 chargers and cover 30% to 50% of the cost of EV charging infrastructure.[35]

Federal, State, or Regional Programs:

The recently passed IIJA included the investment of $7.5 billion to build a national network of electric vehicle chargers in the United States with an initial goal of 500,000 EV chargers to accelerate the adoption of EVs, reduce emissions, improve air quality, and increase green jobs. Priority in funding is to be given to "rural areas; low- and moderate-income neighborhoods;" and "communities with a high ratio of multiunit dwellings to single family homes" with grant sizes up to $15 million per project.

The IIJA specifically introduced **Charging and Fueling Infrastructure Grants** which support the deployment of EV charging and other low-carbon fueling infrastructure with a set-aside for charging stations in publicly accessible locations such as public buildings and parks.

The IIJA appropriated $550 million to the **EECBG Program** to assist eligible local, county, tribal, and state governments in implementing strategies to reduce fossil fuel emissions, reduce total energy use, and improve energy efficiency for transportation and facilities. This program was previously funded back in 2009 through the American Recovery and Reinvestment Act and it is anticipated that clean transportation projects will be eligible under this refunded program.[36]

Southeast Michigan Council of Governments' (SEMCOG) Planning Assistance Program: SEMCOG has provided funding for local planning in a variety of areas since 2019. The FY2023 offering included grants of up to $50,000 for planning in six areas of regional significance, including Electric Vehicle Infrastructure Planning which could be used for feasibility studies or other EV planning efforts. These grants required an 18.5% local match. The FY2023 application window closed in May 2022; however, this program should be monitored for future opportunities.

Tax Exempt Bond Financing: The county could finance the conversion of ICE vehicles to EVs with the proceeds of a tax-exempt general obligation bond issuance. Given the relatively small size of capital outlay, the county will first determine that bond financing would be cost effective for the project.

35 https://newlook.dteenergy.com/wps/wcm/connect/dte-web/home/service-request/business/electric/electric-vehicles/pev-biz-fleet

36 https://www.energy.gov/eere/wipo/energy-efficiency-and-conservation-block-grant-program-bipartisan-infrastructure-law-2021

Facility and Fleet Decarbonization

F3 Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

Public Charging Fees: In certain locations, EV chargers can be used for county vehicles and be available for public charging for a fee. Public charging fees could be used to offset additional vehicle electrification expenses or placed in the county's General Fund.

Dual-port Level 2 chargers can be placed in public parking lots and equipped to accept the county's Voyager Card, or similar purchase card, for fleet charging and other forms of payment for the public. A feasibility study should be conducted to determine appropriate locations and revenue potential. Considerations for placement would include, among others, public access, security for fleet vehicles, and proximity and convenience for fleet vehicle users. With dual-port chargers, one port can be available on a first come, first served basis, and the other restricted to county use always or during certain hours as need to ensure fleet vehicles are adequately charged.

Two business models are possible for this opportunity. The county can administer the program, or partner with an established charging company which could be responsible for various business functions such as billing in exchange for a set fee or portion of the revenues.



High-Performance Buildings



Maximize efficient and low-carbon use of energy, water, and material resources within county facilities to the highest degree possible, while considering the design, facility operation and use, and maintenance requirements.

Guiding Principles

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Objectives and KPIs

Reduce building energy use, as measured by building energy use intensity (kWh or MMBtu/square foot).

Increase building water efficiency, as measured by gallons of potable water use per square foot.

Electrify county buildings, as measured by the percentage of buildings fully electrified.

Increase construction waste diversion rate, as measured by percent of construction waste diverted from landfills.

Buildings generate GHG emissions through their on-site energy use, making up 76% the county's GHG emissions. The majority of these emissions come from using natural gas (23%) and electricity (50% to 55%) for heating, cooling, lighting, appliances, and water heating and delivery. By increasing county building performance, the county can more efficiently use energy and water, resulting in decreased emissions, improved air quality and comfort, and reduced operational costs. Increasing energy and water efficiency is critical to reaching the county's net zero carbon goal.

The Oakland County International Airport achieved the U.S. Green Building Council's LEED Gold Certification in 2012. To obtain this certification, the building was designed to fulfill prerequisites and credits included in the LEED Green Building Rating System™ that address carbon, energy, water, waste, transportation, materials, health, and indoor air quality.[37]



37 https://www.usgbc.org

Table 10. High-Performance Building Strategies

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
H1	Perform Energy Audits at Target Facilities					X		X					X			Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing	
H2	Complete Campus-Wide LED Lighting Conversion*					X		X					X		X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation	Purchasing, Human Resources	
H3	Continue Investment In Energy Efficiency Measures*					X		X					X		X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation	Purchasing, Human Resources	
H4	Perform a Campus-Wide Water Audit					X		X							X	Facilities Management	WRC	
H5	Continue Investment in Water Efficiency and Conservation Measures*					X		X							X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation	Purchasing, Human Resources	
H6	Develop Sustainable New Construction and Major Renovation Standards					X							X	X	X	Office of Sustainability, Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing, WRC, Parks and Recreation	

LEGEND: (*) In Progress

High-Performance Buildings

H1 Perform Energy Audits at Target Facilities

Guiding Principles

Advance the net zero carbon goal

County Strategic Goals

Environmental Sustainability

Organizational Excellence

Development Stage: In Progress

Strategy Type: Informative

Partners: N/A

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division

Support: Purchasing

Through a previous facility energy efficiency assessment in 2010, the county began to evaluate on-site energy usage and strategies to improve energy efficiency. The assessment identified behavioral changes, retrofits, and energy management systems that would improve efficiency on campus. The implementation of these changes resulted in a 15% decrease in energy usage across campus. However, the energy needs and opportunities for efficiency improvements have changed since 2010 with aging buildings and advancements in available technology.

Campus-wide energy audits completed every five years would fill persisting information gaps, keep data up to date and relevant, and identify opportunities to improve system-wide infrastructure condition and enable efficiencies. As it relates to the Sustainability Plan's Guiding Principles, performing energy audits on campus facilities could Advance the net zero carbon goal by identifying short term energy efficiency improvements to reduce emissions from on-site energy use.

This strategy is aligned with the county's Strategic Framework goal areas of Environmental Sustainability and Organizational Excellence by providing energy saving investments that also have associated cost savings and carbon reduction potential.

The first step for conducting audits is to gather data, both regarding energy consumption and the equipment or facilities that consume energy. Data on facilities that consume energy would include an examination of building envelope, lighting, HVAC, domestic hot water, plug loads, and compressed air for all buildings. Energy usage data can be used to determine base loads, seasonal variation, and efficient energy costs. Further assessment can include building air quality, temperature, ventilation, humidity, and other conditions that affect energy performance. This data can then be used to model the impacts of potential energy efficiency changes and produce reports of energy efficiency recommendations. Completing energy audits every five years can ensure that building energy data remains up to date and allows for new improvements in efficiency to be implemented. Major, non-steam plant connected facilities, such as the IT Data Center, should be prioritized for auditing and implementing energy efficiency mechanisms. Energy audit identified upgrades for facilities connected to the steam plant should align with outcomes of the county's steam plant decarbonization study efforts. In addition, the current county lifecycle plan for heating and cooling system upgrades and replacements involves an opportunity for revision every five years. Completing energy audits on a five-year cycle as well can help inform these heating and cooling revisions.

High-Performance Buildings

H1 Perform Energy Audits at Target Facilities

Energy audits should be performed in line with industry standard approaches, such as American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Level II. The county may also leverage utility or other funding opportunities to help offset the cost of energy audit studies, such as programs offered by DTE. Energy audits can also be expanded in scope to include consideration of opportunities for beneficial electrification, such as use of newer efficient, electric appliances.

Table 11. Facilities Connected to the Central Steam Plant

Administrative Annex II
Central Garage
Central Services Building
Courthouse Complex 12E/
Day Care Center
Health Center – Pontiac
Information Technology
L Building (attached to Heat Plant)
Law Enforcement Complex
MCF – Lab Only
North Oakland Health Center
North Office Building
Sheriff's Administration Building

Table 12. Campus Facilities Not Served by Central Steam Plant

Administrative Annex I
Animal Shelter and Pet Adoption Center
Children's Village "A" Bldg.
Children's Village "C" Bldg.
Children's Village "D" Bldg.
Children's Village "G" Bldg.
Children's Village "H" Bldg.
Children's Village "J" Bldg.
Children's Village "K" Bldg.
Children's Village School
D Building
East Annex
Executive Office Building
Health Center – Southfield
Medical Examiner's Facility
Oakland Pointe – East
Oakland Pointe – West
Paint Shop (Near RR Tracks)
Patrol Services
Public Works Building
Rochester District Court
Service Center – Pontiac
South Oakland Office Building

High-Performance Buildings

H2 Complete Campus-Wide LED Lighting Conversion

Guiding Principles

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation

Support: Purchasing, Human Resources

LED lighting is an industry standard energy efficient technology which can support major energy savings on short time scales. The county has already begun the process of replacing incandescent, fluorescent, high-pressure sodium, and other energy-intensive lighting technologies with newer, highly efficient LED bulbs and fixtures. However, many opportunities for LED retrofit remain, and there is limited current tracking of retrofitted and non-retrofitted areas. A comprehensive, one-time assessment and investment in conversion is recommended to complete this transition. As it relates to the Sustainability Plan's Guiding Principles, completing campus-wide LED lighting conversion could:

- **Advance the net zero carbon goal and maximize resource efficiency** by switching to a lighting system that uses less energy, increasing energy efficiency, and reducing campus dependence on greenhouse gases.

This strategy also aligned with the county's Strategic Framework goal areas of Environmental Sustainability and Organizational Excellence as LED lighting conversion and lighting controls can result in both energy and cost savings.

The strategy also supports standardization of workplace guidelines by promoting consistent lighting technologies and controls.

A campus-wide lighting inventory, including indoor and outdoor lighting, can establish the current extent of LED upgrades and inform gaps in the current transition. The inventory should include a count of non-LED bulbs, identify the lighting control (switches, schedule, motion sensor, 24/7 operation), identify the current bulb and fixture specifications, and any current lighting issues or deficiencies. The inventory should also identify any barriers to implementation, including the need to replace fixtures where a drop in LED is not feasible.

In addition to more efficient lighting, control types and levels may be assessed. This can allow for either automated operation, such as motion sensors or schedules, or increased manual controls to enable staff to selectively turn on lights when present outside of normal operating hours. Day-light harvesting may be an additional solution, where lights near windows are controlled based on sunlight levels and dim up or down to maintain proper illumination throughout the day.

Following the inventory, the campus should include all new LED fixtures in its procurement plans and policies to ensure persistence of savings and continued availability of replacement bulbs as needed (see strategy S4. Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities).

High-Performance Buildings

H2 Complete Campus-Wide LED Lighting Conversion

Financial Analysis

Completing the lighting inventory detailed in this strategy would allow the county to determine remaining LED lighting conversion and lighting control opportunities as well as other information, such as bulb and fixture specification needs. For the purpose of this preliminary financial analysis, it is assumed that 80% of the county's building square footage has not yet had lighting converted to LED. Similarly, while there are various lighting control opportunities that should be assessed for applicability on a site-by-site basis, only installation of motion sensors for the purpose of this analysis were included.

These high-level assumptions were used by the county's consultants to determine the capital outlay, payback period, and ROI for the remaining LED lighting conversion and motion sensor installation based on estimated equipment costs, labor costs, and energy savings. Based on the market value of lamps, fixtures, controls, and associated installation labor, an initial capital outlay of approximately $3,4000,000 was calculated. Given that state and utility rebates and incentives are available for energy efficiency upgrades, a 10% rebate was applied to determine the upfront cost. The actual value of rebates would depend on the specifics of the final conversion which would be determined through the inventory. Potential savings were calculated by estimating electricity cost savings due to more energy efficient fixtures, and less overall energy use through the utilization of motion sensor lighting controls. Additional savings were calculated via avoided maintenance and materials given that LED lighting fixtures have a 1% failure rate compared to 20% and 10% failure rates for existing fluorescent bulbs and ballasts respectively. Electric and maintenance cost savings would increase slightly each year due to escalation of electric rates and inflation rates for lighting and control equipment and labor. Results are listed below and shown in Figure 11 and Figure 12.

- Capital Outlay: $3,400,000
- Annual Savings (Year 1):
  - Electric: $500,000
  - Maintenance: $166,000
- Payback Period: 4.8 years
- ROI: 20.6%

High-Performance Buildings

H2 Complete Campus-Wide LED Lighting Conversion

Figure 11. LED Lighting Conversion and Motion Sensor Upgrade: Annual Cash Flow

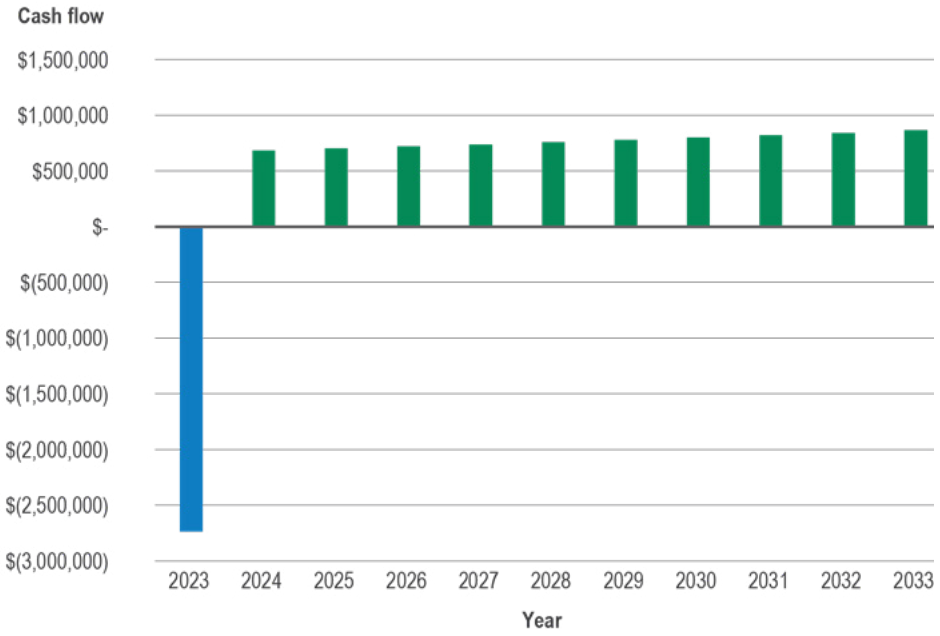
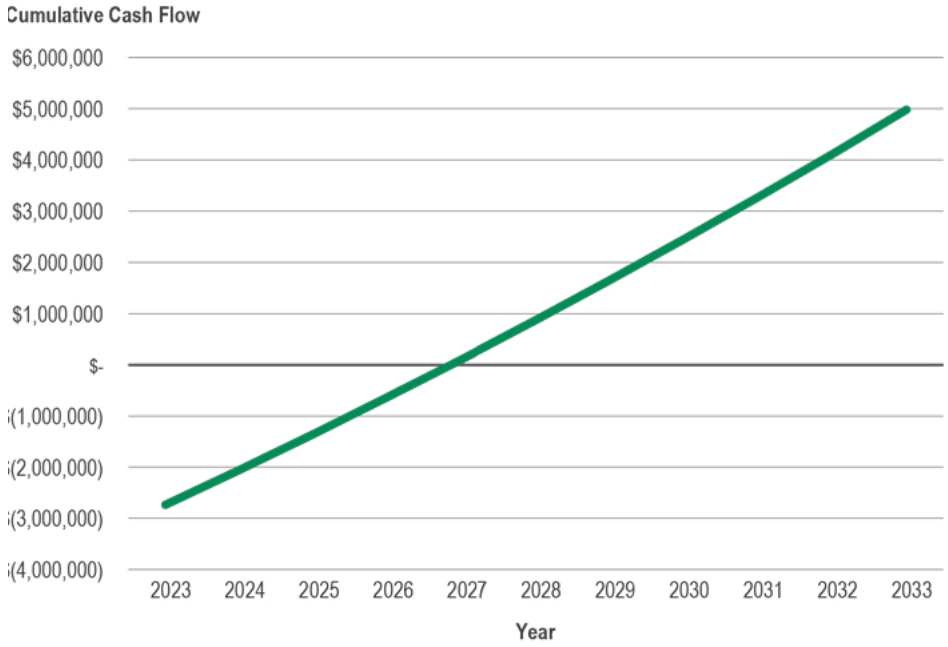


Figure 12. LED Lighting Conversion and Motion Sensor Upgrade: Cumulative Cash Flow



High-Performance Buildings

H2 Complete Campus-Wide LED Lighting Conversion

Funding Mechanisms

Potential funding mechanisms for LED light conversion and lighting controls installation include:

Capital Budget: The modest, upfront LED lighting conversion costs should be included in a capital budget.

Operating Budget: If there are increased ongoing maintenance and expenses, they would be a part of the operating budget.

Rebates: DTE offers the following programs:

- **Lighting Instant Discount Program:** DTE has partnered with participating distributors to make it easy to purchase qualifying LED lamps (usually bulbs only). Products are discounted instantly, with no additional rebate forms or applications to fill out.[38]
- **Prescriptive Incentives:** These incentives are paid based on the quantity, size and efficiency of the equipment.[39]
- **Michigan Saves Energy Efficiency Program for Business:** DTE Energy, in partnership with Michigan Saves, is offering 0% financing up to $150,000 for an energy efficiency project that receives prescriptive measure incentives through their Energy Efficiency Program for Business.[40]

Sustainability Revolving Fund: The county can establish a Sustainability Revolving Fund (Revolving Fund) to pay for the LED lighting conversion, or other projects that generate energy cost savings (e.g., F2. Pursue On-Site Solar Generation at Key Campus Locations). Initial capitalization of the fund can come from grants, utility rebates, or appropriations from the county General Fund. As projects are completed and ongoing, an amount equal to the energy savings would be paid back to the fund over time.[41] This would replenish the Revolving Fund which could be used for additional energy efficiency projects in Oakland County facilities without additional General Fund appropriations.

The LED lighting conversion is an ideal initial project to establish the Revolving Fund given the short payback period. Funds will quickly be repaid and available for additional projects that will generate savings that are repaid to the Revolving Fund. Based on the payback period model for this strategy, more than $250,000 in energy savings would be repaid to the fund after the first year and the capital outlay fully replenished by energy savings in less than seven years.

Tax Exempt Bond Financing: The county could finance the LED lighting conversion through the proceeds of a tax-exempt bond issuance. The bonds would be sold to investors to raise funds for the LED lighting conversion. In return, the county would agree to repay the investors principal plus interest, which is generally exempt from federal, state, and local taxes. These bonds could qualify as green bonds to attract additional types of investors. When bonds are issued for energy efficiency projects, they are typically general obligation bonds; however, bonds have been issued with the savings generated by the project being pledged to repay the debt.

38 https://www.newlook.dteenergy.com/wps/wcm/connect/dte-web/home/save-energy/business/programs+and+offers/lighting+discounts

39 https://www.newlook.dteenergy.com/wps/wcm/connect/dte-web/home/save-energy/business/incentives/presctiptive+incentives

40 https://www.newlook.dteenergy.com/wps/wcm/connect/dte-web/home/save-energy/business/incentives/michigan+saves

41 Some Revolving Funds only receive a portion of the energy savings. The remaining savings accrue to the general fund. By sharing the savings, leadership may be more willing to undertake future energy projects; however, the fund will be replenished more slowly.

High-Performance Buildings

H2 Complete Campus-Wide LED Lighting Conversion

Guaranteed Energy Savings Performance Contracting (GESPC): The county can contract with an Energy Service Company (ESCO) to design, install and maintain LED lighting conversions, or other energy efficiency projects. The ESCO will guarantee that the energy savings generated from the project will be sufficient to offset the project costs, including financing. If the project does not meet the guaranteed savings, the ESCO is required to make up the shortfall to the customer. ESCOs are generally paid a negotiated fee or share in the energy savings. GESPC projects can be financed through a variety of mechanisms including bond financing or, more frequently, municipal leases. Michigan allows tax exempt lease purchases for energy conservation improvements. The lender holds title to the conservation title and leases it for the term of the financing. At the end of the term, the lender transfers ownership to the county. This form of financing is not considered debt under Michigan law and therefore does not count toward the county's authorized debt limit.

Federal, State, or Regional Programs:

The Infrastructure Investment and Jobs Act (IIJA) appropriated $550 million to the **Energy Efficiency and Conservation Block Grant (EECBG) Program** to assist eligible local, county, tribal, and state governments in implementing strategies to reduce fossil fuel emissions, reduce total energy use, and improve energy efficiency in the transportation, building, and other appropriate sectors. This program was previously funded back in 2009 through the American Recovery and Reinvestment Act and it is anticipated that energy efficiency projects will be eligible under this refunded program.[42]

The IIJA introduced a new program, **Energy Efficiency Revolving Loan Fund Capitalization Grant Program**. This program is still being defined but will result in additional funds to States to support revolving loan funds. The program should be monitored as the county may have access to expanded or new revolving funds from the State for energy efficiency projects.[43]

42 https://www.energy.gov/eere/wipo/energy-efficiency-and-conservation-block-grant-program-bipartisan-infrastructure-law-2021

43 https://www.energy.gov/bil/energy-efficiency-revolving-loan-fund-capitalization-grant-program

High-Performance Buildings

H3 Continue Investment In Energy Efficiency Measures

Guiding Principles

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation

Support: Purchasing, Human Resources

Energy efficiency is a core component of any net zero strategy and often produces the most immediate and low-cost opportunities for carbon emissions reductions. Demonstration of the technologies and practices that lead to increased energy efficiency at key campus facilities and communication of associated savings and technologies deployed may serve as a model for the broader community. As discussed in strategy H1. Perform Energy Audits at Target Facilities, the county performed a successful energy audit in 2010 that identified opportunities for energy efficiency improvements that upon implementation resulted in a 15% reduction in energy usage campus wide.

The county has made energy efficiency investments at various campus locations, including use of variable speed drives in the HVAC systems and use of efficient technologies in newer facilities. These efficient technologies included the installation LED lighting discussed the previous strategy, replacement of single paned windows with double paned windows in campus buildings to improve insulation, and installation of smart meters in campus buildings to track energy usage. Other improvements were behavioral such as shifting custodial schedules to work in the same parts of the building at the same time so lighting could be turned off in other areas, adjusting the heating and cooling set points, establishing no-mow zones on campus to reduce mower emissions, and removing all personal appliances from offices.

This strategy aims to work with the momentum of these existing energy efficiency measures by continuing to invest in energy efficiency improvements as they arise. As it relates to the Sustainability Plan's Guiding Principles, continuing investment in energy efficiency measures could:

- **Maximize resource efficiency and advance the net zero carbon goal** by continuing to seek out technologies, behaviors, and management systems that reduce the amount of energy used to conduct campus operations, reducing energy needs of the county, dependence on fossil fuels, and energy cost.

Every five years when energy audits are completed, the county will identify new opportunities for improvements and can continue to make energy efficiency changes. Technical interviews with stakeholders for this report highlighted more efficient roofing and updating HVAC systems as additional energy efficiency improvements the county could consider. Also, as available technology advances the county can stay vigilant about taking advantage of opportunities to install new technology, perform retrofits, or implement new behavioral best practices for energy efficiency.

High-Performance Buildings

H4 Perform a Campus-Wide Water Audit

Guiding Principles

Maximize resource efficiency

County Strategic Goals

Environmental Sustainability

Organizational Excellence

Development Stage: In Progress

Strategy Type: Informative

Partners: N/A

Teams

Lead: Facilities Management

Support: Water Resources Commissioner's Office

Through past facility condition assessments, the county has begun to evaluate the condition of on-site water infrastructure. However, the condition of several water mains serving campus facilities is still unknown, and there may be irregularities in other data used to assess facility water performance. For example, in 2019, some facilities consumed several times (up to about 11.5 times) more water in July than in other summer months.

A campus-wide water audit would fill persisting information gaps, uncover potential reasons for data inconsistencies, and identify opportunities to improve system-wide infrastructure condition and enable efficiencies. As it relates to the Sustainability Plan's Guiding Principles, completing a campus-wide water audit could:

- **Maximize resource efficiency** by taking a data driven approach to understanding the campus water system and water waste in order to better manage and implement water efficiency measures.

A campus-wide water audit can identify:

- Water leaks in water mains or facility-level equipment and solutions to minimize losses and rebalance water consumption.
- Facilities with service lines that are incompatible with low-flow plumbing fixtures (if service lines are too large, water-efficient fixtures may provide insufficient flow to completely flush solids through the system) and potential resolutions.
- Opportunities to install flow meters to increase the accuracy and reliability of collected data.

The first step for conducting a water audit is to gather data, both regarding water consumption and the equipment or facilities that consume water (e.g., building occupancy, equipment specification sheets). A preliminary review of existing asset condition and water usage data can be used to identify areas of focus during the audit and develop a clear schedule of events to ensure all assets are evaluated in a streamlined manner. Next, auditors perform a thorough site survey to validate or identify inconsistencies and gaps in existing data. Together, these resources will enable auditors to develop a water balance and identify water losses and conservation opportunities. The American Water Works Association's (AWWA) manual for Water Audits and Loss Control Programs could be a useful tool to facilitate the audit process.[44] The Public Building Water Auditing Best Practices guide developed by the Nevada Governor's Office of Energy is a less technical resource that could also provide initial direction.[45]

44 The full manual must be purchased and can be done so here. The table of contents and first chapter are freely available.

45 Nevada Governor's Office of Energy (2017). Public Building Water Auditing Best Practices. https://energy.nv.gov/uploadedFiles/energynvgov/content/Programs/Public%20Building%20Water%20Auditing%20Best%20Practices.pdf

High-Performance Buildings

H4 Perform a Campus-Wide Water Audit

Analysis of and investment in water infrastructure not owned by the county will require coordination between the City of Pontiac and Waterford Township. Each community serves half of the campus. To streamline the audit process, the county should request the utility share any available data that is not provided on bills and be present at site surveys.

The audit can be paired with implementation of other strategies, such as an energy audit, to maximize resource efficiency by identifying efficiency solutions across the energy-water nexus. In addition, the scope of the audit could be expanded past domestic water systems to also consider irrigation and stormwater systems, and thus potentially identify solutions to optimize the county's irrigation system.



What is the energy-water nexus?

Energy is used to extract, transport, purify, and heat or cool water – this relationship is the water-energy nexus.

High-Performance Buildings

H5 Continue Investment in Water Efficiency and Conservation Measures

Guiding Principles

Maximize resource efficiency

County Strategic Goals

Environmental Sustainability

Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management, Parks and Recreation

Support: Water Resources Commissioner's Office

In addition to campus-scale water efficiency opportunities uncovered by the campus water audit, the county can expand implementation of low-flow plumbing fixtures as existing fixtures require replacement, existing facilities undergo renovation, and new facilities are constructed. Low-flow plumbing fixtures include low-flow sink faucets (e.g., faucets with aerators, which have already been installed in service center buildings), low-flow shower heads, dual flush toilets, and waterless urinals. Implementing water conservation measures are a relatively low-cost avenue for improving water efficiency and result in long-term cost savings.

Furthermore, water conservation measures limit energy required to transport, heat, or cool water, resulting in improved facility energy efficiency and mitigated carbon emissions. As it relates to the Sustainability Plan's Guiding Principles, continuing investment in water efficiency and conservation measures could maximize resource efficiency by implementing new technology and management strategies to reduce water waste and reduce inefficiencies in the water system. Improving the water system can also improve energy efficiency and further maximize resource efficiency on campus.

In addition, the county may consider opportunities to reduce potable water consumption through utilizing graywater or collected rainwater for non-potable applications (e.g., to flush toilets, for lawn irrigation, as process water in cooling or other industrial applications). To start, the county could conduct a study to assess feasibility of supplying graywater to facilities from one of its treatment plants, or if annual rainfall would provide sufficient capacity to offset irrigation demand and generate a return on the investment. Any strategies that result from this study should be designed in compliance with Appendix A of the 2015 Michigan Plumbing Code.[46]

Adoption of low-flow and graywater or rainwater collection systems will require the county to provide education and training opportunities on proper use and maintenance of these systems (particularly to abate any negative perspective of graywater recycling systems, even when use is limited to non-potable functions). Proper use and maintenance of low-flow fixtures will sustain the lifespan of the new, water conservation measures, providing usage and cost savings over time.

46 https://up.codes/viewer/michigan/mi-plumbing-code-2015/chapter/A/nonpotable-water-systems#A

High-Performance Buildings

H6 Develop Sustainable New Construction and Major Renovation Standards

Guiding Principles

- Advance the net zero carbon goal
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability

Development Stage: In Progress

Strategy Type: Foundational

Partners: N/A

Teams

Lead: Office of Sustainability, Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division

Support: Purchasing, WRC, Parks and Recreation

Establishing a sustainable building standard for new construction and major renovation aligned with the county's sustainability Focus Areas and Guiding Principles can result in reduced greenhouse gas emissions, increased resilience to climate change and extreme weather events, healthier buildings, and reduced energy costs. Establishing and implementing a sustainable building standard is critical to achieving the county's net zero emissions goal as the buildings and facilities sector accounts for 76% of total county operational emissions. These emissions result from on-site use of electricity (53%), natural gas (23%), and fuel oil (1%). Sustainable buildings can support enhanced energy resilience by limiting critical energy load and increase climate resilience by helping to normalize indoor temperatures during extreme heat and cold events. Further, sustainable building features can create healthier building environments for county staff and visitors.

This strategy can advance the following sustainability Guiding Principles:

- **Advance the net zero carbon goal** by Implementing building standards that require measures to decrease energy use and reliance on fossil fuels. Also, require construction waste diversion requirements to limit emissions from solid waste disposal processes. When appropriate, adopt enabling infrastructure standards for county fleet electrification that will lead to reduced vehicle fleet emissions.
- **Improve air quality** through healthy building measures, like sealing and ventilation. In addition, reduce greenhouse gas emissions and harmful air pollutants from energy use, improving air quality. Reduce impact on the environment and contribute to diversity of the biosphere.
- **Maximize resource efficiency** by reducing utility costs through implementation of energy and water efficiency measures and energy demand management.

The county does not have an existing sustainable building standard. However, Michigan commercial buildings must comply with the International Energy Conservation Code (IECC) 2015 model energy code and ASHRAE 90.1-2013 energy efficiency standard. Michigan is in the process of updating their commercial building model energy code to IECC 2021. The Michigan Healthy Climate Plan also includes a strategy to include provisions to the IECC 2021 model energy code to support electric vehicle charging and other climate mitigation solutions (e.g., energy storage, renewable energy, and building decarbonization). Along with other

High-Performance Buildings

H6 Develop Sustainable New Construction and Major Renovation Standards

local governments, the county joined the U.S. Green Building Council's 2022 Leadership in Energy and Environmental Design (LEED) for Cities and Local Government Leadership Program to receive support for attaining LEED certification.

Sustainable building standards can cover various subject areas in addition to energy, such as planning and design, water, material management, environmental quality, governance, and socio-economic impact. Various funding mechanisms can be considered to reduce costs of sustainable building measures, such as utility incentives and rebates, state or federal funding opportunities, energy savings performance contracting (ESPC), or tax-exempt bond financing.[47] To integrate sustainability Guiding Principles and advancement of sustainability objectives into building new construction and renovation projects, it is recommended that the county establish a holistic sustainable building standard.

The county can follow the phases outlined below to develop its sustainable building standard:

Develop a goal framework. Review both existing and aspirational priorities and requirements to identify goals for the sustainable building standard. Existing priorities and requirements that the sustainable building standard should align with can include, but may not be limited to, the county's net zero carbon goal, sustainability objectives and key performance indicators (KPIs), OSHA standards, and Americans with Disabilities Act (ADA) compliance standards. Aspirational priorities might include specific targets that the county would set through decarbonization planning based on its greenhouse gas (GHG) inventory. The county can conduct a benchmark review of buildings standards adopted by peer municipalities or organizations with campus style sites to further understand current best practices.

Phase 2: Define the scope for the building standard. The county can determine what facility specifications (e.g., size, function, occupancy type) are included and not included under the sustainable building standard. Further, the county can specify what level of renovation is included and not included under the sustainable building standard. The county could consider requiring tiered levels of standard depending on scope. For example, the county could require new buildings to achieve net zero carbon energy use or net zero carbon energy-ready design while requiring majorly renovated facilities to attain a lower tiered level of energy performance. In addition to net zero carbon requirements, the county can create a product database that declares the product contents, where it's coming from, and where it goes at the end of its life. This could help contractors match materials to indoor air quality standards, understand the safety of certain chemicals, and, where possible, source materials closer to the building site.

Phase 3: Develop sustainable building standards to achieve the established goals for in-scope buildings. Ensure that standards align with building and engineering solutions presented in existing sustainability and resilience planning efforts (e.g., sustainability plan strategies, future vehicle fleet decarbonization planning, future decarbonization planning, transparency platform for materials and products).

Phase 4: Establish a process to integrate the sustainable building standard into decision making processes, like budget planning and bid processes.

Phase 5: Establish a process to check compliance and goal performance. Measure compliance and goal performance by tracking each building's energy consumption data, water usage data, material removal and installation quantities, and other relevant building information aligned with the goal framework for 12 consecutive months.

47 All listed potential funding mechanisms do not apply to all sustainable building measures. At the same time, any listed funding mechanism can apply to multiple types of sustainable building measures.

High-Performance Buildings

H6 Develop Sustainable New Construction and Major Renovation Standards

Use tracking outputs to understand building performance compared to similar buildings and understand how performance changes over time. The county could also consider requiring a certain level of goal performance at key events (e.g., building refinancing, building certifications, and inspections) or at the time of safety upgrades.

Phase 6: Determine a cadence (e.g., every 5 years) for updating the sustainable building standard.





Waste Reduction and Diversion

Reduce the amount of waste generated and sent to landfills through increased material reuse, recycling and composting, and implementing other strategies to reduce overall material consumption.

Guiding Principals

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Objectives and KPIs

Increase the non-construction waste diversion rate, as measured by percent of waste generated on campus diverted from landfills; and percent of material recycled or composted.

Waste also contributes to the county's overall GHG emissions. Waste that goes to landfills from the campus and parks generates almost 4% of total government operations emissions and composting green waste from county parks generates less than 1% of total government operations emissions. Waste diversion strategies, the process of diverting waste from landfills (such as reduced material use, composting, and recycling), can help reduce emissions linked to waste generation and processing. Waste diversion strategies are measured by the total weight of diverted material compared to total waste generated and reported as an overall percentage. This metric is important to keep track of the successes and opportunities for sustainable waste management. Education along with supportive waste collection processes, purchasing practices, and policies are foundational to increasing the county's waste diversion rate. By reducing waste, the county would utilize resources more efficiently and protect natural resources, such as water quality, air quality, and natural habitat.

Table 13. Waste Reduction and Diversion Strategies

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
D1	Review and Renegotiate Waste Hauling Contracts*							X							X	Facilities Management, Parks and Recreation	Office of Sustainability, Purchasing	
D2	Expand Recyclable Material Collection					X		X					X		X	Facilities Management, Parks and Recreation	Office of Sustainability	
D3	Expand Organic Material Collection					X		X					X		X	Facilities Management, Parks and Recreation	Office of Sustainability	
D4	Deploy Smart Waste Management Systems							X							X	Facilities Management	Office of Sustainability, Parks and Recreation	
D5	Develop Policies to Minimize Office Supply Consumption							X							X	Purchasing	Office of Sustainability	

LEGEND: (*) In Progress

Waste Reduction and Diversion

D1 Review and Renegotiate Waste Hauling Contracts

Guiding Principles

Maximize resource efficiency

County Strategic Goals

Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management, Parks and Recreation

Support: Office of Sustainability, Purchasing

The county contracts with a third-party vendor, Priority Waste, for solid waste pickup and disposal. The contract is structured so costs are fixed based on container size and number of weekly pickups. The county incurs the same cost if a container is half or completely full, and because Priority Waste does not report waste collection or disposal data, the county cannot quantitatively validate whether pickup schedules are optimized.

The COVID-19 pandemic has illuminated county employees' capability and interest in teleworking and renewed the value of public open spaces like Waterford Oaks County Park. As the county continues to respond and adapt to these trends—and also divert additional solid waste to recycling or compost (see the strategies D2. Expand Recyclable Material Collection and D3. Expand Organic Material Collection) —waste disposal volumes are likely to become more variable. The county should regularly evaluate the filled volume of collection containers and level of necessary service and remove, resize, and/or adjust pick-up schedules for under- or over-utilized bins. As it relates to the Sustainability Plan's Guiding Principles reviewing and renegotiation waste hauling contracts could:

- **Maximize resource efficiency** by developing contracts that allow the county to document the quantity of waste being produced on campus in order to develop strategies to reduce waste and maximize efficiency. New contracts could also work to reduce greenhouse gas emissions produced from transporting waste from campus to waste facilities.

The county should also consider renegotiating its waste hauling contracts so pricing is based on the volume or weight of waste collected, rather than a fixed rate per bin. Doing so would mitigate sunk costs from receiving service for relatively empty dumpsters and enable the county to more accurately track and report progress towards waste diversion goals but may require a change in vendor. Some vendors may not be able to provide precise measurements if the county's waste is picked up by trucks that service other customers. When the county reissues a Request For Proposal (RFP) for waste collection services, ability to measure volume or weight of collected waste should be a metric for bid evaluation.

Waste Reduction and Diversion

D2 Expand Recyclable Material Collection

Guiding Principles

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management, Parks and Recreation

Support: Office of Sustainability

The county collects some, but not all, recyclable materials. Paper and cardboard are collected at county facilities and parks, but plastics, glass, and metals are not. Expanding the county's recycling program to include collection of these materials would support the county's sustainability priorities. As it relates to the Sustainability Plan's Guiding Principles, expanding recycling materials collection could:

- **Advance the net carbon goal** by mitigating county Scope 3 GHG emissions from waste disposal at landfills and creating opportunities to preserve natural resources that might otherwise be converted into landfills. Scope 3 emissions are any emissions produced not from the county's facilities or operations but from external processes necessary for the operations of the county. So, emissions from a local landfill or incinerator where county waste is sent are an example of Scope 3 emissions.
- **Maximize resource efficiency** by expanding the number of materials that can be recycled and converted into new products, maximizing the productive lifespan of raw materials.

To best support the county's emissions reduction goals and enable profitability, it is recommended that the county collect plastics, glass, and metals separately from paper and cardboard using dual-stream recycling. Although dual-stream recycling is less convenient for building occupants and parkgoers (as well as janitorial staff and park managers), dual-stream programs can result in less contamination than single-stream programs. For example, the University of Colorado-Boulder's transition to single-stream recycling collection at its residential halls in hopes of increasing recycling participation was short-lived: the university reverted to its original dual-stream program after a single school year due to significantly higher contamination rates (which, in turn, limited the university's ability to sell collected paper at a good price).[48] In applying these lessons learned and considering both county staff's strong interest in waste reduction and recycling and their statements that janitorial staff often find contamination in existing paper/cardboard recycling streams, dual-stream recycling appears to be the more appropriate solution than single-stream.

Still, to overcome any trepidation that dual-stream recycling may be burdensome for building occupants and parkgoers, the county can implement the following best practices:

- Robust education and communication around recycling as new plastics, glass, and metals collection bins are deployed.

48 A full case study on this pilot is available to Association for the Advancement of Sustainability in Higher Education members at https://hub.aashe.org/browse/casestudy/14309/testing-single-stream-versus-dual-stream-recycling-at-cu. A summary of the pilot—and discussion on how it impacted design of other universities' recycling programs—is publicly available and can be found at https://operations.tufts.edu/recycle/news/2014/10/06/single-stream-vs-dual-stream/.

Waste Reduction and Diversion

D2 Expand Recyclable Material Collection

- Centralized waste and recycling station should have three color-coded bins (one for non-recyclable waste, one for paper products, and one for plastic, glass, and metal products). Office environments should also have small under-the-desk or deskside paper bins.
- All bins should have clear labels and be accompanied by graphic signage depicting what can and cannot be disposed in each bin and other rules for proper material disposal.
- To further build recycling competency, the county can also develop signage and/or digital newsletters spotlighting materials that are most often disposed improperly, and even sponsor competitions between facilities/departments to increase recycling rates and “accuracy”.
- The county can leverage resources from the University of Michigan (including a publicly accessible Dropbox of printable materials[49]) and State of Michigan “Recycling Raccoon” Program[50] to develop signage and other education and communications materials.



49 https://www.dropbox.com/sh/g4ckx1n7jin3pwk/AAAxUXOaXfCSbe7A0FxIFOUea?dl=0

50 https://recyclingraccoons.org/

Waste Reduction and Diversion

D3 Expand Organic Material Collection

Guiding Principles

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management, Parks and Recreation

Support: Office of Sustainability

As with recycling, the county collects some, but not all, organic materials generated at the campus and parks. Green waste (e.g., landscape clippings, leaves, raw wood) is composted and reused, but for the most part, food scraps and other organic waste (e.g., compostable utensils) is not composted.[51] Through diverting additional solid waste streams, composting can further advance county sustainability goals. As it relates to the Sustainability Plan's Guiding Principles, expanding organic material collection could:

- **Advance the net zero carbon goal** by mitigating the Scope 3 GHG emissions from waste disposal at landfills.
- **Maximize resource efficiency** by creating opportunities to preserve natural resources that might otherwise be converted into landfills.

These impacts can be realized quickly: the volume of solid waste collected from 50 tenant organizations housed in three commercial buildings in Montreal nearly halved within less than a year of when the development started its compost program.[52]

To start, the county should identify a hauling vendor to pick up organic materials, as the county does not have the physical infrastructure or resources to compost on-site. Alternatively, the county could explore selling collected materials to local farms or other organizations that manage organic waste. Selling organic waste could serve as a source of revenue. Organics collection bins (typically brown or yellow) should be placed at all commercial kitchens, break rooms, office lounges and other locations where organics are generated. Bins should have a closed lid and clear signage. Building occupants and janitorial staff should be trained on proper sorting and collection practices (education and communications materials generated for the expanded recycling program can also address composting). Consider having designated staff members for each facility be trained and responsible for organic waste management to assist the greater facilitations team with education, sanitation, and collection.

Once the composting program is more firmly established, the county could consider transitioning to on-site composting. This would require the county to identify the proper method for composting onsite, and which is most appropriate based on

51 Potential food waste from the Farmer's Market is diverted through means other than composting. Make Food Not Waste and Food Rescue USA to pick up excess food from Market vendors and share it amongst the community.

52 https://plus.lapresse.ca/screens/1c83f1a6-f96c-4405-8422-164c5301f260__7C___0.html

Waste Reduction and Diversion

D3 Expand Organic Material Collection

facility generation. For example, windrow composting, vermicomposting, or in-vessel units. Windrow composting is a process in which compostable materials are layered in long rows and turned periodically, this process is used in agricultural settings to produce large quantities of compost. Vermicomposting uses worms to convert organic material into compost. In-vessel composting is a process where organic materials are kept in a small, contained vessel with controlled environmental characteristics to facilitate composting in a compact space. The campus and parks grounds crews could then utilize the material in landscaping throughout county properties. This would also result in improved soil and plant health and cost savings on fertilizers.



Waste Reduction and Diversion

D3 Expand Organic Material Collection

Financial Analysis

The collective goal of the strategies to expand recycling and organic materials collection is to protect the environment and create new economic opportunities. Diverting waste from landfills will reduce GHG emissions while supporting the transition to a circular economy and development of recyclable materials and compost commodities markets.

The financial model developed for Strategies D2 Expand Recyclable Collection and D3 Expand Organic Material Collection by the county's consultants reflects the progressive changes in tonnages and hauling costs between trash, recycling, and composting categories, assuming a goal to reduce total waste generation by 20% and divert 75% of generated waste by 2030. This benchmark was established through referencing the State of Michigan's recycling goal,[53] peer county waste diversion goals, and public and private real estate owners and operators' corporate sustainability and/or ESG reports.

Assuming the county achieves the 2030 goals, the county's anticipated waste breakdown is:

- Trash (Landfill): 25%
- Recyclables: 60%
- Organic materials: 15%[54]

The capital budget includes:

- Recycling (dual-stream) and composting equipment, including BigBelly solar-powered compactor bins
- Resources to develop waste reduction and diversion education, awareness, performance monitoring, and auditing programs

Increasing diversion rates results in less waste sent to landfills. Figure 13 shows the progressive changes in weight across trash, recycling, and organic materials waste categories. So, while waste hauling costs will decrease, operational expenses from hauling recyclables and organic materials will increase as is shown in Figure 14. The greatest opportunity to offset increasing operational expenses from recycling and composting is to deploy smart waste management systems, such as BigBelly compactor bins. The bins' built-in compaction technology can yield up to a 5-to-1 compaction ratio, resulting in fewer pickups. Reducing collection frequency decreases labor, transportation, and material expenses (i.e., decreases the person-hours, transportation fuels, and plastic bags required to collect and dispose waste), as well as the emissions associated with transportation. This analysis assumes that compacting waste could decrease collection frequency, on average, from twice a day to once a day. In addition, the county can offset costs through new revenue streams, including sale of recycling commodities and processed compost.

- Capital Outlay: $1,200,000
- Payback Period: 21.9 years
- ROI: 4.6%

Annual and cumulative cashflows are shown in Figure 15. Foundational assumptions in the financial analysis are relatively conservative, considering that the recycling and composting markets in southeast Michigan are nascent but have potential for significant growth. As these markets mature, the estimated recycling and organic material hauling costs are likely to decrease, while revenues from commodities sales would increase—resulting in a lower payback period. This analysis does not yet consider funding mechanisms that would both reduce the upfront capital cost owed by the county and accelerate market growth, nor policies that place financial costs on environmental or social externalities (e.g., a social cost of carbon).

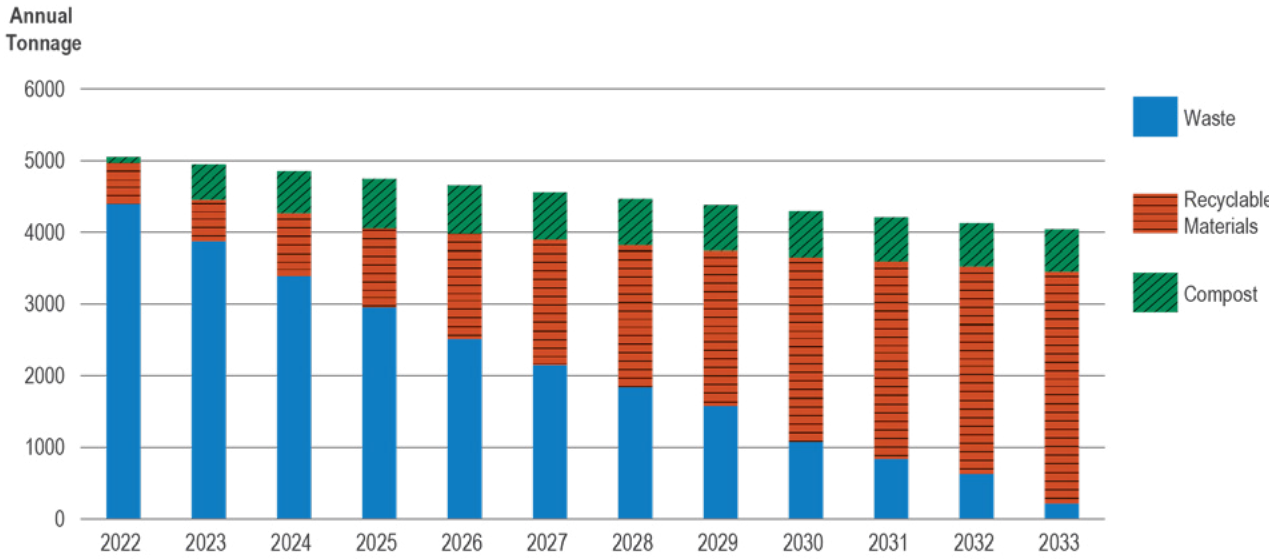
53 https://www.michigan.gov/egle/about/groups/solid-waste-and-recycling-advisors

54 U.S. Environmental Protection Agency data suggests 14.6% of municipal solid waste is food waste and yard trimmings accounted for about 2% of the county's collected waste in 2020 (https://archive.epa.gov/epawaste/nonhaz/municipal/web/html/). To achieve a 75% diversion rate, the remaining 60% of diverted waste will be recycled materials.

Waste Reduction and Diversion

D3 Expand Organic Material Collection

Figure 13. Projected Weight of Generated Waste by Category



Waste Reduction and Diversion

D3 Expand Organic Material Collection

Figure 14. Projected Operating Costs by Category

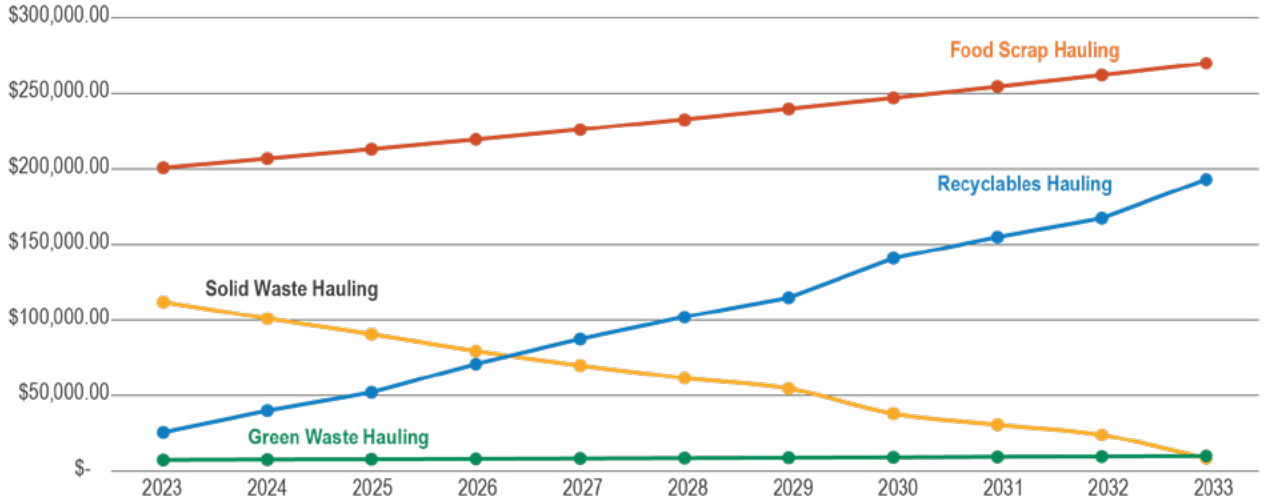
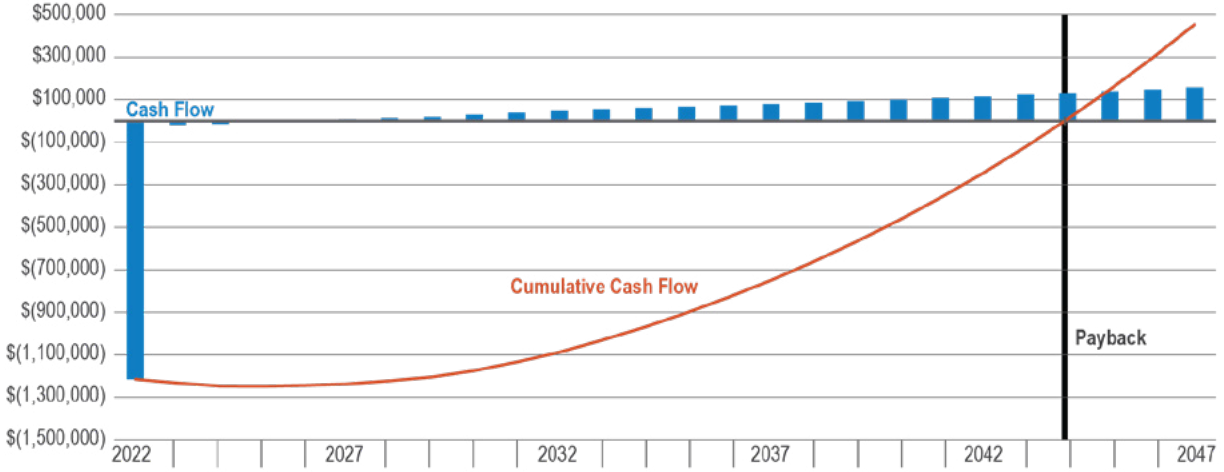


Figure 15. Expand Recyclable and Organic Material Collection: Annual and Cumulative Cash Flows



Waste Reduction and Diversion

D3 Expand Organic Material Collection

Funding Mechanisms

Potential funding mechanisms for the recycling and composting program include:

Capital Budget: The recycling and composting programs' initial costs should be included in a capital budget.

Operating Budget: Ongoing maintenance and waste hauling expenses would be a part of the county's operating budget.

Federal, State, or Regional Programs:

The Infrastructure Investment and Jobs Act (IIJA) funded a new grant program aimed at improving post-consumer materials management and infrastructure locally called the Solid Waste Infrastructure for Recycling Grant program. The program is still under development, but has funding allocated at $275 million.[55]

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) provides grants to support state-wide recycling goals. In 2022, EGLE will provide matching grants to support Governor Gretchen Whitmer's climate priorities by supplementing efforts to increase the state-wide recycling rate, ensure diversity, equity, and inclusion, and grow recycling markets and recycling supply chains through the NextCycle Michigan Initiative (NextCycle). A total of $15 million was made available for NextCycle Michigan Recycling Grant projects in FY 2022, and some funding categories are still accepting applications.

The NextCycle Michigan Recycling Grants have the following categories:

- **Michigan Recycling Infrastructure Grants:** Eligible projects increase collection and processing capacity of recyclable materials or food waste, access to recycling or food waste composting infrastructure, and participation rates in recycling or food waste composting programs. Applications are closed for the FY 2022 cycle, so the county should monitor the program site for notice of new funding opportunities.
- **Michigan Recycling Market Development Grants:** Eligible projects create new markets or expand existing markets and supply chains for recycled materials; stimulate demand for recycled materials and recycled content products; assist businesses that manufacture, market, and use recycled-content products; commercialize technologies to replace materials with recycled content; or research and develop new uses for recycled materials. Applications are closed for the FY 2022 cycle, so the county should monitor the program site for notice of new funding opportunities.
- **Michigan Small Community Education Grants:** Eligible projects provide access to recycling education resources for communities with fewer than 10,000 households. The county could qualify by targeting education towards one of its CVTs of this size. Applications are rolling until all funds are distributed.

For additional information on Michigan Recycling Grants, please reference the program RFP.[56]

55 https://www.epa.gov/rcra/solid-waste-infrastructure-recycling-grant-program

56 https://www.michigan.gov/egle/-/media/Project/Websites/egle/Documents/Programs/MMD/Recycling/2022-RFP.pdf?rev=bf089736d4f34a14880b8c21f7ba8964&hash=AF2E9087322515BF3C70E7A448766A89#:~:text=The%20NextCycle%

Waste Reduction and Diversion

D3 Expand Organic Material Collection

Partnerships:

- Partnerships with other public entities and/or residential and commercial buildings to achieve economies of scale for waste and recycling collections (e.g., collectively negotiate reduced hauling rates).
- Partnerships with non-profit organizations such as The Recycling Partnership, which provides grants for public education and outreach as well as other helpful resources and programs to improve recycling rates and reduce the bin contamination. If the county chooses to pursue an expanded waste and recycling public outreach program through **Advantage Oakland**[57], these partnerships could be especially beneficial.

Tax Exempt Bond Financing:

The county could finance the recycling and organic materials collection program through the proceeds of a tax-exempt bond issuance. The bonds would be sold to investors to raise funds for the program. In return, the county would agree to repay the investors principal plus interest, which is generally exempt from federal, state, and local taxes. These bonds could qualify as green bonds to attract additional types of investors. The county could generate revenue through the recycling and compost program through selling processed recyclables and compost. When bonds are issued for recycling and compost programs, they are typically general obligation bonds; however, bonds could be issued with the savings generated by the project being pledged to repay the debt.

57 https://www.oakgov.com/advantageoakland/planning/wasteandrecycling/Pages/default.aspx

Waste Reduction and Diversion

D4 Deploy Smart Waste Management Systems

Guiding Principles

Maximize resource efficiency

County Strategic Goals

Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management

Support: Office of Sustainability Parks and Recreation

Smart refuse systems can be deployed throughout the county campus and Waterford Oaks County Park to optimize trash pickup schedules, increase diversion rates, and improve site aesthetics. As it relates to the Sustainability Plan's Guiding Principles, deploying a smart waste management system could:

- **Maximize resource efficiency** by minimizing unnecessary trips to transport waste from campus to recycling facilities and landfills. Also, monitor recycling to reduce contamination and make recycling more efficient.

The county can consider two types of smart refuse systems: solar-powered trash compactor bins and dumpster monitoring systems.

Solar-powered Trash Compactor Bins: Municipalities and major development sites have increasingly begun to deploy solar-powered trash compactor bins in areas with significant non-vehicular traffic (e.g., retail/entertainment districts). When a bin becomes full, it will use energy produced by its embedded solar panels to compact collected trash or recyclables and allow room for more trash to be thrown away. Bins may go through this cycle several times before they are nearly full of compacted waste, at which point they use integrated "smart" systems to signal that collection is needed. As opposed to standard sidewalk bins, which either may only be half-full or overflowing onto the sidewalk when haulers come to collect trash, solar-powered trash compactor bins are only serviced when necessary—and before overflowing trash can cause clutter and unpleasant odors in the public way.

County leadership has already approved installing solar-powered trash compactor bins and, as of this writing, is negotiating a contract with BigBelly. Once the contract is finalized, the county should identify areas with significant non-vehicular traffic as priority locations for bin installation. Locations may include the Courthouse complex, Farmer's Market, Waterford Oaks County Waterpark, and at trailheads throughout the park.

Dumpster Monitoring Systems: Sensors and cameras can be placed inside standard dumpsters to monitor and analyze the volume and type of disposed materials, as well as vendor pick-up schedules. These systems can record instances of dumpsters being serviced when relatively empty or when a pick-up is missed, and for recycling bins, detect non-recyclable materials that contaminate the load. Collected datapoints across the service campus (or across county parks) can be integrated into reporting software and used to optimize hauler service schedules and routes, introducing cost savings, and if necessary, renegotiate hauler contracts (refer to the strategy D1. Review and Renegotiate Waste Hauling Contracts).

Dumpster monitoring systems have demonstrated significant returns on investments. A pilot of dumpster monitoring systems across several

Waste Reduction and Diversion

D4 Deploy Smart Waste Management Systems

developments in Texas yielded $1,000 in savings per container, the result of instituting corrective actions for dumpsters being serviced when they were as little as 31% full and haulers missing, on average, 2.5 pickups per month.[58] By comparison, the cost of dumpster monitoring is $10 to $20 per month.[59]

Given the potential benefit, the county should consider expanding the Smart Waste Program to include dumpster monitoring. A first step is to solicit quotes from potential vendors to better understand suitability for the county's campus and the associated costs and benefits.



58 https://www.forbes.com/sites/jeffkart/2020/09/14/trash-tech-from-realpage-and-compology-reduces-collection-costs-improves-recycling/?sh=255f2acb5453

59 https://www.cnn.com/2020/12/18/tech/compology-artificial-intelligence/index.html

Waste Reduction and Diversity

D5 Develop Policies to Minimize Office Supply Consumption

Guiding Principles

Maximize resource efficiency

County Strategic Goals

Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Purchasing

Support: Office of Sustainability

The county's waste strategy should not only include opportunities to expand waste diversion, but also reduce material consumption upfront. To start, the county should develop an enterprise-wide policy to reduce consumption of office supplies. As it relates to the Sustainability Plan's Guiding Principles, developing policies to minimize office supply consumption could:

- **Maximize resource efficiency** by adopting strategies that minimize supplies needed for office operations and implementing strategies to manage, reuse, and recycle necessary supplies to maximize efficiency.

The policies could include, but should not be limited to, the following strategies:

- Establishing a paperless office standard (e.g., only circulate digital copies of documents and scan existing hard copies rather than creating new copies). In cases where this is infeasible, limit paper purchases to recycled paper and establish default preferences for word processing software so files have reduced margins, use single spacing, and print double-sided.
- Eliminating provision of Styrofoam and single-use plastic dishware, drinkware, and utensils. Instead, the county can provide adaptive recyclable metal straws and compostable—or at least biodegradable—dishware, drinkware, and utensils, encourage use of personal dishware, drinkware, and utensils, and require that all beverages sold in vending machines and at the campus cafeteria be provided in recycled aluminum containers.[60] In addition, the county could offer branded reusable water bottles, utensils, etc. as an incentive for significant and/or consistent participation in sustainability-related programming.
- Similarly limiting purchases of pens and pencils to biodegradable options.
- Establishing centralized office supply stations for supplies that can be easily shared (e.g., staplers, tape holders) and encourage supply reuse as much as possible (e.g., for paper and binder clips).
- Centralizing purchase of office supplies to mitigate excess orders and alleviating inconsistent supply availability/quality. As the lead implementer, the Purchasing Department would be best suited for coordinating centralized purchases with support from individual department "champions". Department "champions" would not only coordinate purchases, but also encourage changes in their facility and educate staff.
- Requiring county staff that continue to regularly work from home to purchase personal supplies for their home offices through a county

60 Ball Arena (home to the Denver Nuggets and Colorado Avalanche) has transitioned to infinitely recyclable aluminium cans, bottles, and cups for all beverage concessions and, per a February 17, 2022 press release: "…is on pace to eliminate more than 1 million single-use plastic cups and bottles in 2022." (information sourced from https://www.ball.com/newswire/article/124110).

Waste Reduction and Diversion

D5 Develop Policies to Minimize Office Supply Consumption

portal, from a list of pre-approved sustainable alternatives. This list would be developed through implementation of S4. Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities, which includes a recommendation to develop a catalog of products that are well-aligned with the county's sustainability priorities.

These policies could be established through similar means as the county's policy and procedure for establishing and implementing its Copier Fund (Section 3000.2 of its purchasing policy), which centrally governs enterprise-use of copier resources. The Fund appoints a single organization, the Oakland County Support Services Division, to review all departmental requests to lease copiers and monitor a centralized inventory of copier machines. A broader policy to minimize office supply consumption would apply these principles to other common office equipment and materials.

Alternatively, the policy could be free-standing from the county's main purchasing policy to provide individual organizations with more flexibility to adapt specific provisions to best meet their needs.





Open Space, Ecosystems, and Connectivity

Protect and enhance the natural and built environments of Oakland County Campus and Waterford Oaks County Park through ecological restoration, accessible design and connectivity, and restorative landscaping and planting areas.

Guiding Principals

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities
- Advance the net zero carbon goal
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Healthy Residents
- Skilled and Educated Workforce
- Livable Neighborhoods
- Environmental Sustainability
- Organizational Excellence
- Diversity, Equity, and Inclusion

Objectives and KPIs

Convert lawns to native meadows or forest, as measured by acres of lawn converted to native meadows or forest.

Reduce run off, as measured by gallons of stormwater captured.

Enhance the connectivity of campus through non-motorized paths, as measured by linear feet of pathways.

Increase county tree canopy, as measured by number of trees planted per year.

Reduce impermeable surfaces, as measured by the square footage of impermeable surfaces removed.

In addition to reducing the county's carbon emissions from energy, transportation, and building sectors, carbon sequestration can help us meet the county's net zero carbon goal. Through carbon sequestration, carbon dioxide is captured and stored through nature-based systems such as forests, meadows, trees, and wetlands. The county can maximize carbon sequestration by expanding and enhancing the natural environment. Nature-based solutions, ecosystem restoration, reducing impervious surfaces, and other efforts can increase the resiliency of county properties and surrounding environments by improving storm water management, protecting waterways, and supporting native plants and animal species.

Whether people come to county sites for work, services, or recreation, the open space and pathways impact staff and visitors alike. County open space, recreation spaces, and pathways are critical infrastructure assets. Ensuring equitable outdoor amenities, such as accessible pathways and open spaces, contribute to positive employee and visitor mental and physical wellness. Adequate, accessible wayfinding increases connectivity and access to the county's properties and improves visitor interaction.

Table 14. Open Space, Nature, and Ecosystems Strategies

		County Strategic Goal								Sustainability Guiding Principle							Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
O1	Improve Connectivity with Non-Motorized Pathways*		X		X	X			X	X	X		X			Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Parks and Recreation	Oakland County Road Commission, MDOT, SMART, SEMCOG
O2	Expand and Improve Signage with Accessibility in Mind			X	X			X	X	X	X	X				Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division; Parks and Recreation: Wayfinding Group and Sign Standards Work Group	Office of Diversity, Equity, and Inclusion; Media and Communications; Office of Sustainability	Oakland County Road Commission, MDOT
O3	Convert Lawns to Forest or Meadow					X		X					X	X	X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division; Parks and Recreation	Office of Sustainability, WRC	
O4	Implement Ecological Restoration Projects				X	X							X	X	X	Office of Sustainability	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division; Parks and Recreation; WRC	City of Pontiac, Waterford Township, Plant Wise
O5	Reduce Paved Areas and Transition to Permeable Pavements or Greenspace*					X		X						X	X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation	Office of Sustainability, WRC	City of Pontiac, Waterford Township, Oakland County Road Commission, MDOT

LEGEND: (*) In Progress

Open Space, Ecosystems, and Connectivity

O1 Improve Connectivity with Non-Motorized Pathways

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Advance the net zero carbon goal

County Strategic Goals

- Healthy Residents
- Livable Neighborhoods
- Environmental Sustainability
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: Oakland County Road Commission, MDOT, SMART, SEMCOG

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division

Support: Parks and Recreation

This strategy supports the county's Livable Neighborhoods Strategic Framework community objective of ensuring access to parks and recreation, transportation, and healthy food. The strategy also supports the county's Environmental Sustainability community objective of ensuring access to transportation by supporting infrastructure for alternative modes of transportation. In addition, this strategy supports the county's Healthy Residents Strategic Framework community objective of improving community mental health and connects to the Health and Wellness Focus Area (see the strategy W2. Develop Actionable Support for Wellness in Employee Lifestyles) by providing paths and spaces that promote employee interaction and provide mental refreshment to reduce stress and increase physical fitness. As it relates to the Sustainability Plan's Guiding Principles, improving connectivity with non-motorized pathways could:

- **Operationalize diversity, equity, and inclusion** and provide an accessible campus environment by making it safer and more accessible to travel to and from campus by modes of transportation besides the car. This expands access to the outdoor spaces and resources offered on campus.
- **Advance net zero carbon goal** by reducing the necessity of cars that emit greenhouse gases.

Non-motorized connections are incomplete in most areas of the county and prevents people from walking, biking, and using mobility devices safely throughout campus. Access around the county campus has largely favored vehicular traffic, and east campus is much more connected by non-motorized pathways than west campus. Expanding the non-motorized pathway network would increase access to and around the county campus and create a more equitable distribution of pathways between different parts of campus. Figure 16 shows potential non-motorized pathways, including sidewalks, trails, pathways, active transportation connections, and potential crossings.

A design goal would be to identify loop paths offering a 15- or 30-minute walk, preferably in naturalized areas, to promote employee walking during lunch or breaks. All the above result in a financial return to the county in the form of increased employee productivity and reduced health care costs. The county should also

Open Space, Ecosystems, and Connectivity

implement planned non-motorized pathways as identified by SEMCOG's 2020 Bicycle and Mobility Plan for Southeast Michigan.[61] The county should identify opportunities for infrastructure installation, such as bike lanes, and/or intersection reconfiguration, such as pathway connectivity and safe street crossings, to support a safe and comfortable experience for all users and all abilities, specifically focusing on the crossings at the existing bus stops and across Telegraph Road (see Figure 16). Consider installing supporting amenities such as bike parking, e-bike charging, lockers, showers, and bike repair stations. SEMCOG provides a compilation of bicycle, pedestrian, and supporting infrastructure design guidelines that should be referenced when implementing various non-motorized pathway types. These guidelines are included in the SEMCOG's 2020 Bicycle and Mobility Plan for Southeast Michigan and are based on design guidance provided by the American Association of State Highway and Transportation Officials (AASHTO), the National Association for City Transportation Officials (NACTO), the Federal Highway Administration (FHWA), and the Michigan Department of Transportation (MDOT).[62]

61 https://semcog.org/desktopmodules/SEMCOG.Publications/GetFile.ashx?filename=BicycleAndPedestrianMobilityPlanForSoutheastMichiganMarch2020.pdf

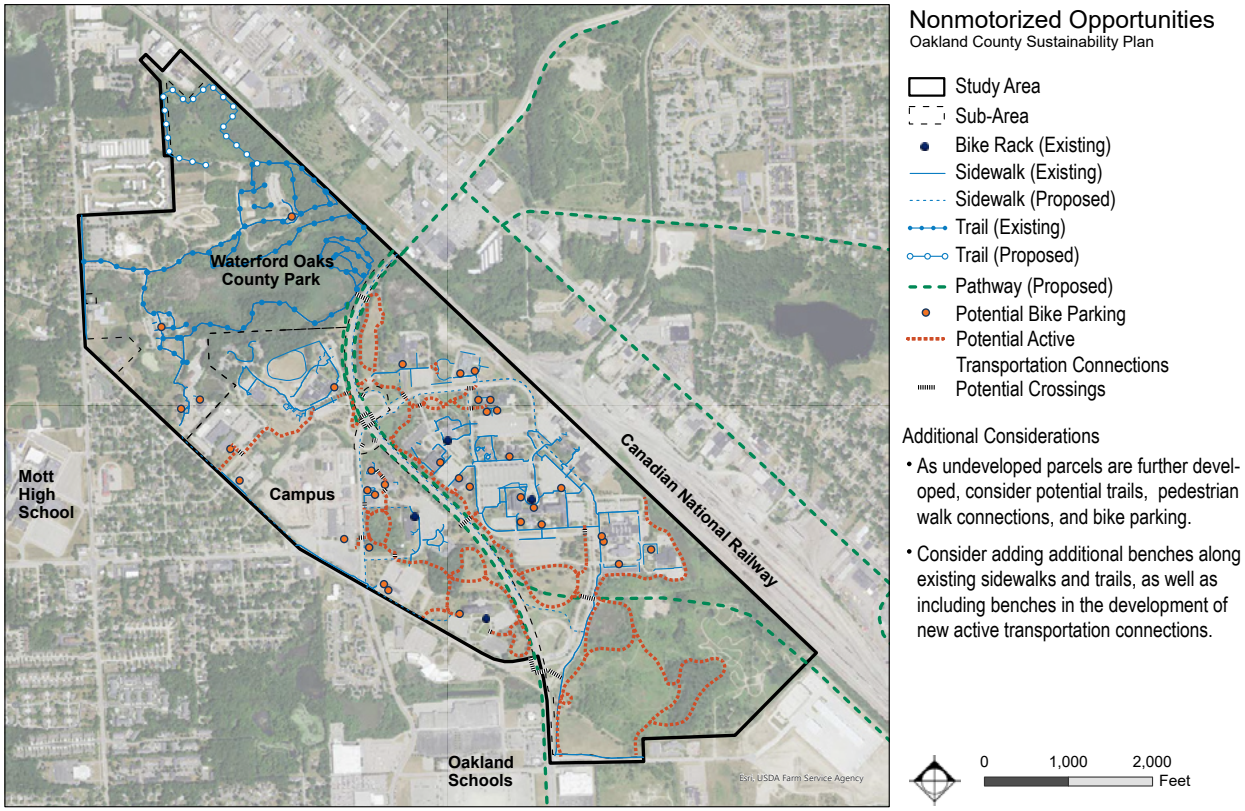
62 https://semcog.org/desktopmodules/SEMCOG.Publications/GetFile.ashx?filename=BicycleAndPedestrianMobilityPlanForSoutheastMichiganMarch2020.pdf

63 https://semcog.org/desktopmodules/SEMCOG.Publications/GetFile.ashx?filename=BicycleAndPedestrianMobilityPlanForSoutheastMichiganMarch2020.pdf

O1 Improve Connectivity with Non-Motorized Pathways

Trails are non-motorized pathways through natural areas that are usually unpaved. Pathways are regional non-motorized pathways identified by SEMCOG's 2020 Bicycle and Mobility Plan for Southeast Michigan[63] that include both trails and paved walking and biking pathways. Active Transportation Connections are county campus-specific pathways identified by the Oakland County Sustainability Plan development process that could be either trails or paved walking and biking pathways.

Figure 16. Potential Non-Motorized Pathways



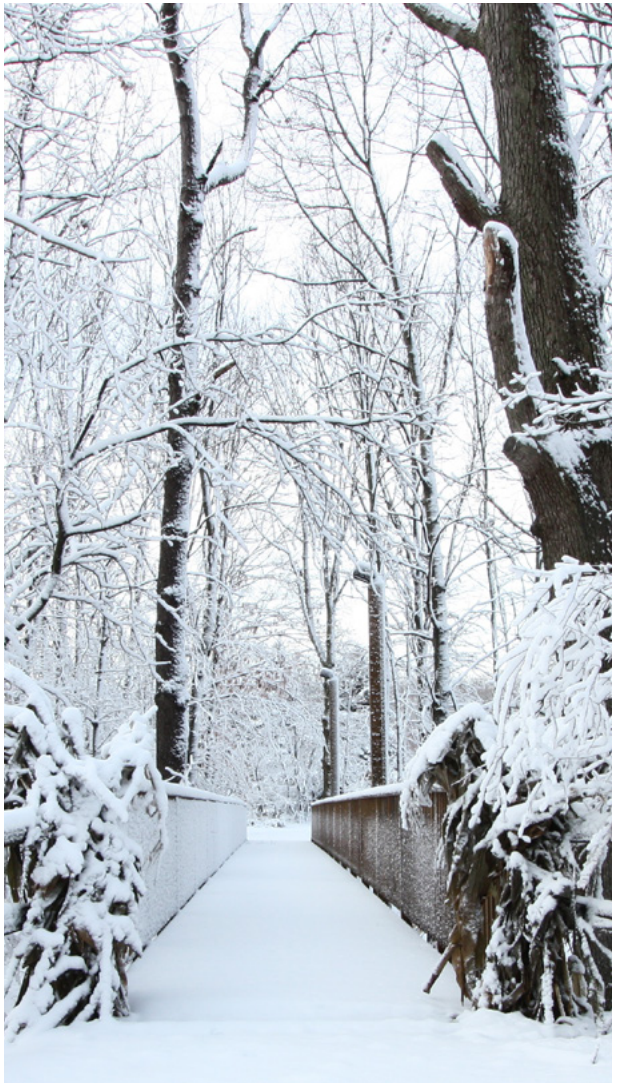
Open Space, Ecosystems, and Connectivity

01 Improve Connectivity with Non-Motorized Pathways

A bike or e-bike rental program is another consideration that may appeal to those who come to campus via vehicle or bus but want to get around campus during the day and should be coordinated with Facility and Fleet Decarbonization strategies.

Partnership with external agencies will be crucial for implementing new crossings and non-motorized pathways. The county owns most of the roadways on campus, and their maintenance falls under the Oakland County Road Commission's jurisdiction. Therefore, updates to existing facilities and their upkeep will need to be coordinated with the Road Commission. Telegraph Road is a state road, so any changes to this corridor will need to be coordinated with MDOT. Access to bus stops should be considered by coordinating with Suburban Mobility Authority for Regional Transportation (SMART). Finally, SEMCOG has identified future non-motorized pathways and can help the county access funding for their design and construction.

Maintenance is another crucial consideration for implementing non-motorized pathways on campus. If non-motorized paths are to provide equitable access, be part of a fitness strategy, and provide year-round health benefits, there should also be a program to keep these paths snow- and ice-free in the winter. Under current procedures, snow removal is prioritized at 24/7 facilities, then 7-day facilities, then facilities only open during business hours (within this last tier, buildings with the most public traffic are given most attention). Non-motorized paths should be factored into the county's snow removal procedures and location prioritization.



Open Space, Ecosystems, and Connectivity

01 Improve Connectivity with Non-Motorized Pathways

Financial Analysis

The financial analysis developed by the county's consultants for this strategy demonstrates the potential financial benefit realized through increased employee walking following the creation of additional campus non-motorized paths. Physical activity can play a significant role in employees' health, wellness, quality of life, and productivity. The analysis focuses on benefits associated with walking including increased productivity[64] and decreased healthcare costs.[65]

Capital outlay, payback period, and ROI was determined based on the construction of 15,000 linear feet of pathways, assuming that 500 employees on campus would utilize the new paths. The initial capital outlay of $1.4 million to construct non-motorized pathways is based on market prices for labor, goods, and pathway development. Operation and maintenance costs were not included in the analysis as it was impossible to determine at this stage which areas of trail would be cheaper to maintain than the current surfaces or landscapes and which would be more expensive.

The ongoing positive impacts, however, are more difficult to measure. It was conservatively assumed that the full health and productivity impacts would be realized incrementally over a five-year period. Increased walking, physical activity, and breaks improve cognitive processes and attention,[66] ability to focus,[67] enthusiasm, and relaxation,[68] all of which are associated with increased productivity. While it is established that walking improves employees' ability to be productive, no studies were identified that provided a link to the actual economic output or value to the increased productivity. With that, the analysis utilized a modest assumption of positive economic benefit of 1% of salaries for affected employees. This economic benefit represents increased productivity and ability to provide additional services to Oakland County taxpayers and residents. Reductions in healthcare costs were based on a study authored by Masayuki Kato in 2013 and calculated at 2.6% per year.[69] In today's dollars, this assumed increase in productivity and savings in health care costs would be $1.26 million greater than the initial upfront investment (net present value) which over the 10-year time frame would be the equivalent to a 17.4% return.

- Capital Outlay: $1,400,000
- Annual Savings (year 6 and thereafter):
  - Healthcare Costs: $183,500
  - Productivity: $288,700
- Payback Period: 6.4 years
- ROI: 17.4%

64 https://redbooth.com/blog/walking-productivity-scientific-links
65 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4020264
66 https://doi.org/10.1080/01443410.2012.723612
67 https://doi.org/10.1016/j.cognition.2010.12.007
68 https://doi.org/10.1111/sms.12398
69 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4020264.

Open Space, Ecosystems, and Connectivity

01 Improve Connectivity with Non-Motorized Pathways

Figure 17. Pathways Development: Annual Cash Flow

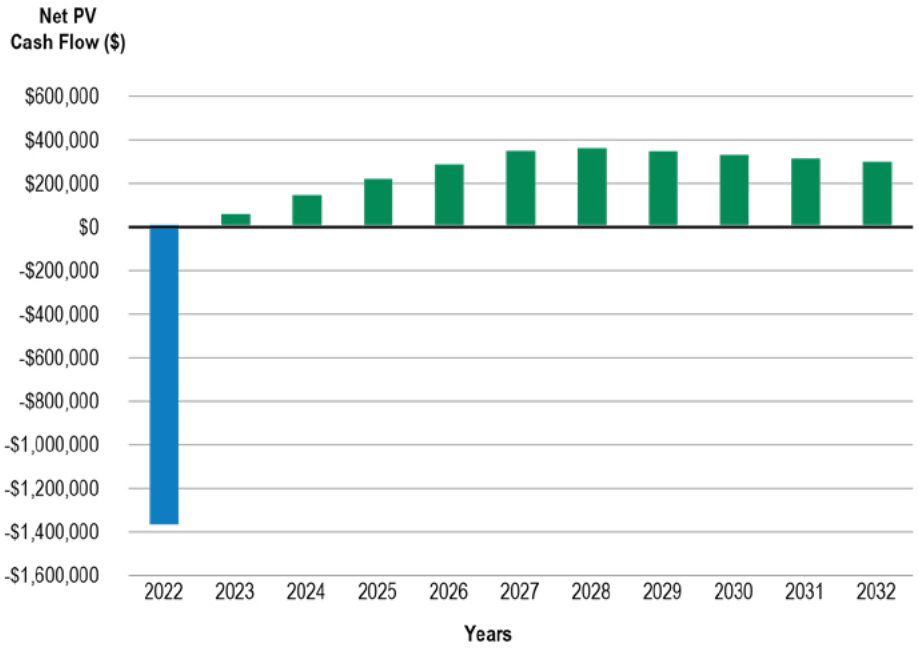
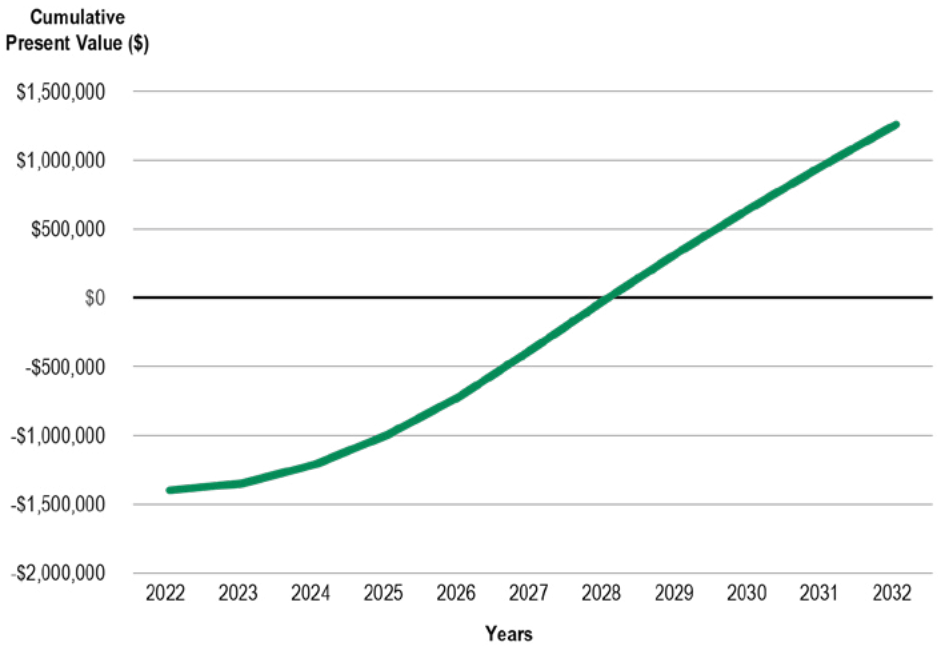


Figure 18. Pathways Development: Cumulative Cash Flow



Open Space, Ecosystems, and Connectivity

01 Improve Connectivity with Non-Motorized Pathways

Funding Mechanisms

Potential funding mechanisms for non-motorized pathways include:

Capital Budget: The non-motorized pathways program's initial costs should be included in a capital budget.

Operating Budget: Ongoing maintenance and expenses would be a part of the operating budget.

Federal, State, or Regional Programs:

The Infrastructure Investment and Jobs Act (IIJA) appropriated $550 million to the EECBG Program to assist eligible local, county, tribal, and state governments in implementing strategies to reduce fossil fuel emissions, reduce total energy use, and improve energy efficiency for transportation and facilities. This program was previously funded back in 2009 through the American Recovery and Reinvestment Act and at that time projects that reduced energy use for transportation, including new pathways and connections, were eligible.[70]

The **Michigan Department of Transportation's Transportation Alternatives Program** (TAP) is administered in Southeast Michigan through SEMOCOG. Typical projects funded by the program seek to improve mobility through bicycle and pedestrian infrastructure such as pathways, sidewalks, pedestrian crossings, and bike lanes. While counties are not eligible to apply, the county could partner with other eligible applicants such as the City of Pontiac or the Oakland County Public Transportation Authority for funding.[71] Grants require local match of at least 20%. In 2021, the Southeast Michigan Council of Governments awarded $2.8 million in TAP funds.[72]

The **Michigan Department of Natural Resources** (DNR), has recreation grant programs which could provide funding for non-motorized pathways:

- DNR makes recommendations to the National Park Service for outdoor recreation grants through the **Land and Water Conservation Fund**. Governmental entities with DNR approved community five-year recreation plans are eligible to apply for grants of up to $500,000 which require a 50% local match.
- **The Michigan Natural Resources Trust Fund** provides grants to local units of government for public outdoor recreation including trails. Applicants must have an approved five-year recreation plan to be eligible for grants up to $300,000. A 25% local match is required.[73]
- **The Recreation Passport Program** provides approximately $2 million per year for indoor and outdoor public recreation projects. Preference is given to rehabilitation of existing facilities. Grants require a 25% match and cannot exceed $150,000.[74]
- **The Michigan Trails Fund** provides grant opportunities to governmental organizations for regional non-motorized trail projects. Eligible uses include planning, design, engineering, and construction.[75]

Tax Exempt Bond Financing: The county could finance the additional campus non-motorized paths through the proceeds of a general obligation tax-exempt bond issuance. Given the relatively small size of capital outlay, the county will first determine that bond financing would be cost effective for the project or package with other projects.

70 https://www.energy.gov/eere/wipo/energy-efficiency-and-conservation-block-grant-program-bipartisan-infrastructure-law-2021, https://www.nlc.org/article/2021/12/03/what-you-need-to-know-the-energy-efficiency-and-conservation-block-grant/

71 https://www.michigan.gov/mdot/programs/grant-programs/transportation-alternatives.

72 https://eu.detroitnews.com/story/business/autos/2021/12/12/mobility-project-grants-millions-awarded-southeast-michigan-council/49517195/.

73 https://www.michigan.gov/dnr/buy-and-apply/grants/rec/mnrtf.

74 https://www.michigan.gov/dnr/buy-and-apply/grants/rec/rec-pp.

75 https://www.michigantrailsfund.org/new-page#

Open Space, Ecosystems, and Connectivity

O2 Expand and Improve Signage with Accessibility Standards

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities

County Strategic Goals

- Skilled and Educated Workforce
- Livable Neighborhoods
- Organizational Excellence
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: Oakland County Road Commission, MDOT

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation: Wayfinding Group and Sign Standards Work Group

Support: : Media and Communications, Office of Sustainability, and Office of Diversity, Equity, and Inclusion

It is critical to coordinate with the Office of Diversity, Equity, and Inclusion and Communications to ensure all signage is accessible for all visitors. county branding and cohesion should be integrated into any signage or wayfinding displays on and off campus, at all county-owned property. As it relates to the Sustainability Plan's Guiding Principles, expanding and improving signage with accessibility standards could:

- **Operationalize diversity, equity, and inclusion and provide accessible services and campus environments** by setting a standard to ensure that the signage on campus is informative and useful for all employees and visitors on campus without the need for additional support. Improving accessibility of signage also improves accessibility of spaces by making it so everyone who visits campus can find their way around and take advantage of the green spaces and resources offered on campus.
- **Create education and engagement opportunities** by providing interpretive signage to learn about sustainability through the campus environment.

The county has already installed a drive-up information map with paper maps that visitors can take (see Figure 19), extensive operational and wayfinding signage across county park facilities, as well as interpretive signage. However, the drive-up information map is only accessible by car and some signage is located where it cannot be viewed at all (see Figure 20). There is an opportunity to make the same kind of information available along routes accessible by people walking and biking.

Strategy components for both wayfinding and interpretive signage follow. Both digital (e.g., Wi-Fi Kiosks) and non-digital modalities can be considered for signage.

Open Space, Ecosystems, and Connectivity

O2 Expand and Improve Signage with Accessibility Standards

Wayfinding Signage

As a 600-acre campus with 28 different departments, the county campus can be disorienting for visitors. Some wayfinding signage is currently provided, but more is needed to clearly orient visitors to the various departments, parking, and accessible entrances and routes for users of all abilities. A professionally designed wayfinding signage system is also an effective way to "brand" the county campus by using consistent colors and materials as well as defining the extents of the campus to visitors. The county may also consider developing a wayfinding app for the campus that connects to the Access Oakland data portal.[76]

By improving accessibility of county sites and services, this strategy for wayfinding signage supports the county's Livable Neighborhoods Strategic Framework community objective of ensuring access to parks and recreation and transportation as well as the Organizational Excellence Strategic Framework community objective of demanding the highest customer service.

Interpretive Signage

The county should also design and install interpretive signs located along non-motorized pathways to explain and illustrate sustainability topics to employees and visitors. Interpretive signage can also be placed in other locations, such as parking lots, under solar carports, or within facilities to share information. Interpretive signs are envisioned as separate from wayfinding signs but using consistent design themes. Interpretive sign content could include health benefits of walking, wetland restoration benefits, carbon sequestration effects of trees, clean energy benefits, or sustainable infrastructure (e.g., solar carport, greenhouse) information. Signage could include QR codes or website links for people to learn more.

Interpretive signage expansion also advances the county's Skilled and Educated Workforce Strategy Framework community objective of ensuring children get a great start in early learning and by more broadly providing an education opportunity.

76 https://accessoakland.oakgov.com/datasets/oakgov::oc-government/explore?location=42.659169%2C-83.384309%2C10.00

Open Space, Ecosystems, and Connectivity

O2 Expand and Improve Signage with Accessibility Standards

Figure 19. Existing Information Map





Figure 20. Existing Interpretive Signage





Open Space, Ecosystems, and Connectivity

O3 Strategically Convert Lawns to Forest or Meadow

Guiding Principles

- Advance the net zero carbon goal
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation

Support: Office of Sustainability, Water Resources Commissioner

This strategy supports the county's Environmental Sustainability Strategic Framework community objectives of protecting drinking water and lakes and reducing county government energy use due to reduced lawn maintenance. It also supports the county's Organizational Excellence objective of maintaining the highest fiscal stewardship. Converting lawn to meadows would also contribute to enhancing pollinator habitats and visual diversity. As it applies to the Sustainability Plan's Guiding Principles, strategically converting lawns to forest or meadows could:

- **Advance the net zero carbon goal** by increasing carbon sequestration and reducing emissions from mowing. It is estimated that 50 acres of lawn conversion to forest would result in 40 tons of carbon reduction or sequestration per year.
- **Improve air and water quality** by reducing fertilizer and pesticide use, reducing the presence of greenhouse gases in the atmosphere, and capturing run off water.
- **Maximize resource efficiency** by reducing grounds maintenance costs and water used in lawn maintenance.

The county Facilities Department should collaborate with the Parks and Recreation Department to determine best conversion sites, as well as optimal plant selection, installation, and maintenance best suited for Oakland County properties. Prioritization should include areas that experience flooding, as buffers along natural resources, such as stream banks or drains, and areas that do not negatively impact visibility such as open fields or areas that can be integrated into existing landscaping areas. It is also important to consider land use and future land use. For example, not planting trees over critical underground infrastructure or in areas slotted for future development.[77]

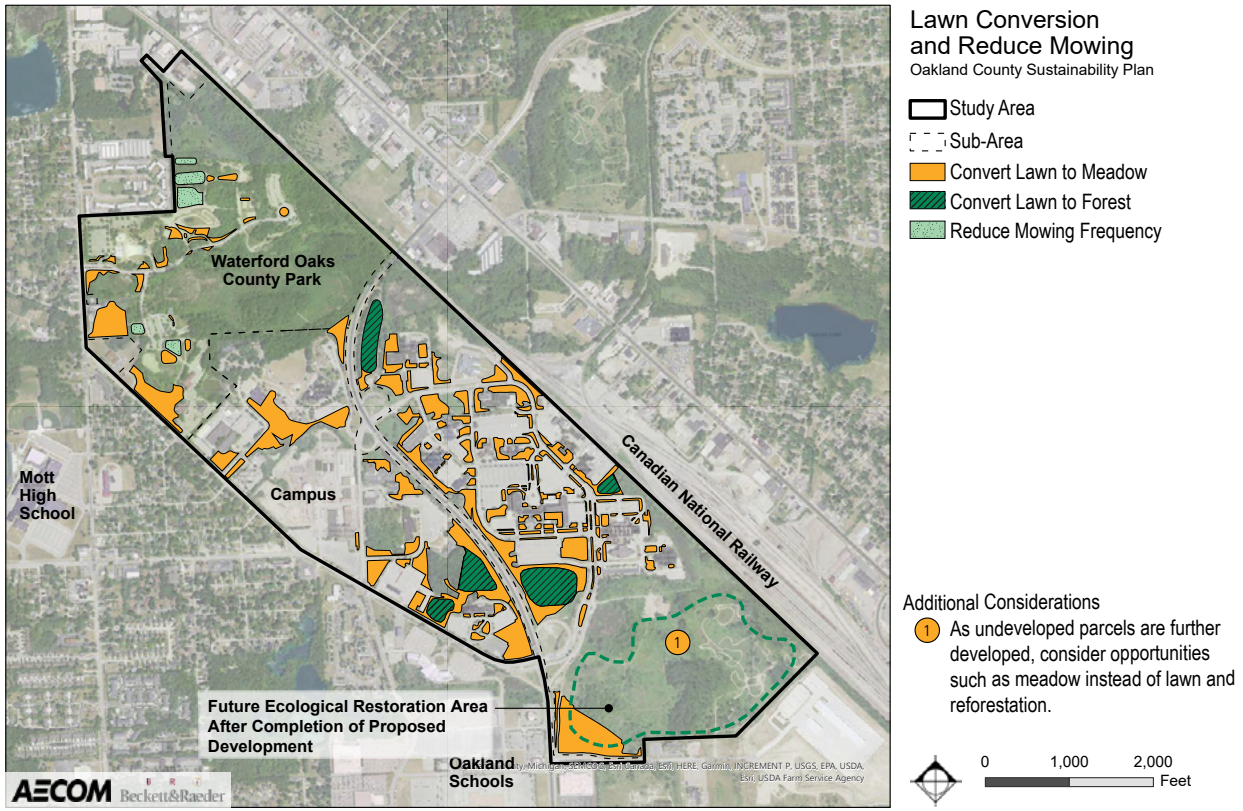
77 The campus landscape plan should also include tree planting locations (see the O4. Implement Ecological Restoration Projects strategy).

Open Space, Ecosystems, and Connectivity

O3 Strategically Convert Lawns to Forest or Meadow

It is estimated that there is potential for approximately 50 acres of lawn conversion on the county campus. Figure 21 shows opportunities for lawn conversion to meadow or forest. The figure also shows areas that could remain as lawns but be mowed less frequently. Opportunities to convert lawn to forest primarily occur west of the Sheriff's Administration building, north of the County Executive building, and south of the Circuit Court building. The open space west of the Sheriff's Administrative Building was also identified as a potential site for groundmount solar. If the county installs solar at this site, this space can be designed to include meadow with native plantings which promote stormwater infiltration and benefits to pollinators and birds. Forests should be planned with solar installations in mind, avoiding trees in locations that would block light from rooftop solar.

Figure 21. Potential Lawn Conversion Areas



Open Space, Ecosystems, and Connectivity

O3 Strategically Convert Lawns to Forest or Meadow

Converting lawn to native meadow plantings requires several steps and considerations. First, all turf grass needs to be removed and tilled to prep the area. Consider selecting drought tolerant native grasses and wildflowers in most areas. For areas that experience flooding, consider drought tolerant species and planting diagram recommendations. There are several community organizations that have resources supporting these types of installations, such as the SEMCOG Green Infrastructure Plan and the Clinton River Watershed Council. Meadows can take two to three years to fully establish and require regular maintenance to reduce noxious weed introduction and ensure optimal plant health. Adequate training and resources should be developed and provided to ensure county staff are trained properly.



Open Space, Ecosystems, and Connectivity

04 Implement Ecological Restoration Projects

Guiding Principles

- Advance the net zero carbon goal
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Livable Neighborhoods
- Environmental Sustainability

Development Stage: In Progress

Partners: City of Pontiac, Waterford Township, Plant Wise

Teams

Lead: Office of Sustainability

Support: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation, Water Resources Commissioner

Wetland restoration and tree plantings support the county's Livable Neighborhoods Strategic Framework community objective of ensuring access to parks and recreation by adding green space to the county campus. This strategy also supports the Environmental Sustainability community objective of protecting drinking water and lakes. Furthermore, these recommendations would enhance habitat and the campus aesthetic. As it applies to the Sustainability Plan's Guiding Principles, implementing ecological restoration projects could:

- **Advance the net zero carbon goal** by sequestering carbon and reducing heat island effects.
- **Improve air and water quality** and **maximize resource efficiency** by relieving flooding, filtering runoff pollutants, and taking up nutrients.

Wetland Restoration

Streambank and wetland restoration projects are critical in improving water quality, providing flood relief, and maintaining natural habitat. Oakland County, by implementing critical restoration projects, will align with the new stormwater requirements developed by the Water Resources Commission, demonstrate commitment to preserving natural environments, and participate as stewards of the watershed.

Mainland Drain North is a 4,000-foot-long drainage corridor centrally located in the county campus, conveying runoff from more than 200 acres of the campus as well as large areas off campus (see Figure 22). It is reported that this area floods frequently. The county Facilities group in cooperation with WRC should sponsor creation of a stream restoration plan to restore and enlarge existing wetlands and restore the channelized ditch to a naturalized stream channel. Wetland enlargement would serve multiple purposes including increased stormwater flood storage volume, increased wetland vegetation to filter pollutants and uptake nutrients, enhance wildlife habitat, and improve campus aesthetic.

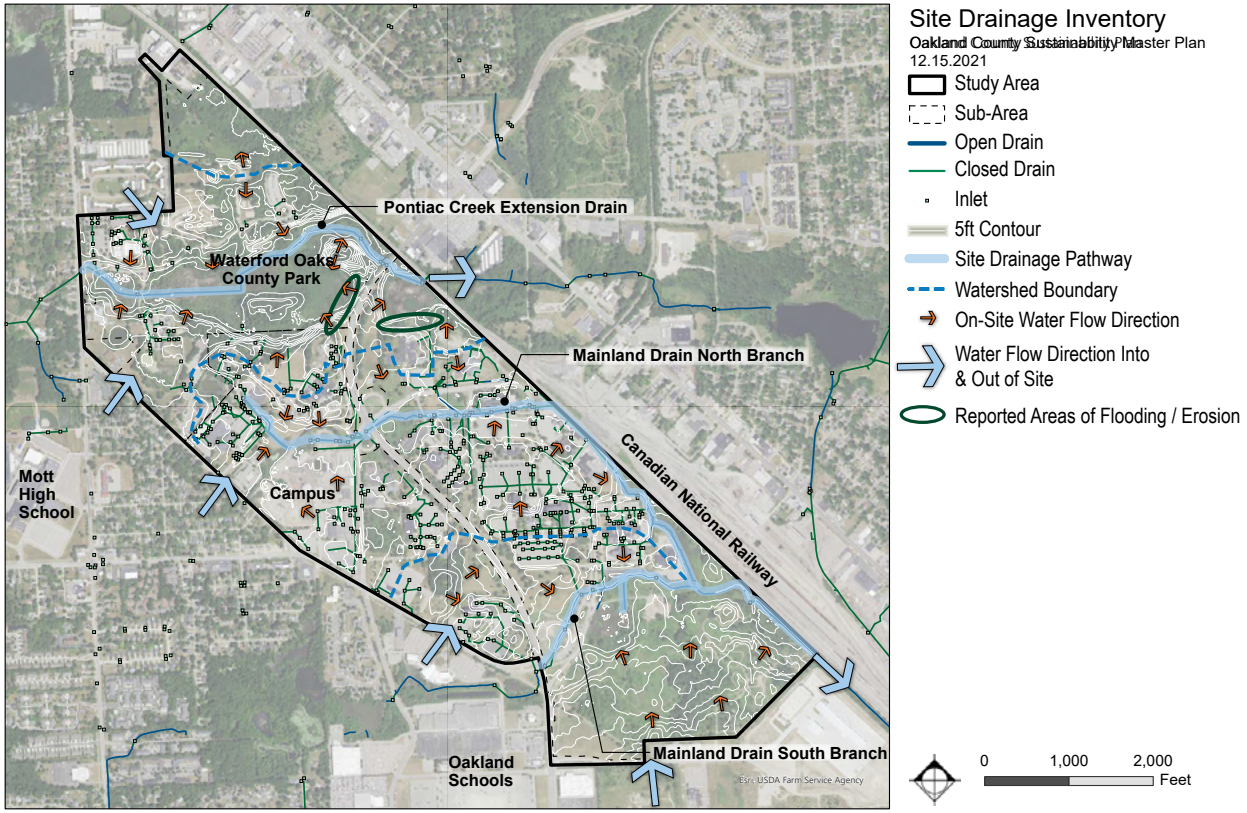
Open Space, Ecosystems, and Connectivity

O4 Implement Ecological Restoration Projects

Reforestation

The county should develop a campus landscape plan to identify feasible tree planting locations along streets, in parking lots, and near buildings.[78] There is an estimated potential for up to 1,000 trees to be planted on campus. The carbon absorption and runoff reduction benefits are significant. One published rule of thumb is that one tree can absorb 48 pounds of carbon per year;[79] therefore 1,000 trees could absorb 24 tons of carbon per year. Another published rule of thumb is that one tree can intercept an average of 1,700 gallons of rainfall per year; therefore, 1,000 trees could reduce runoff by over 1.5 million gallons per year. The tree planting plan should focus on utilization of a diverse mix of native species arranged in informal groupings.

Figure 22. County Campus Drainage



78 The campus landscape plan should also lawn maintenance and conversion areas (see the Strategically O3. Strategically Convert Lawns to Forest or Meadow strategy).

79 Various factors determine the amount carbon a tree can sequester, such as tree size, species, and health. Online calculators, such as the North Carolina State University Carbon Calculator, can be used to estimate carbon sequestration from trees. North Carolina State University Carbon Calculator: http://www.carboncalculator.ncsu.edu/

Open Space, Ecosystems, and Connectivity

O5 Reduce Paved Areas and Transition to Permeable Pavements or Greenspace

Guiding Principles

- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: In Progress

Partners: City of Pontiac, Waterford Township, Oakland County Road Commission, MDOT

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation

Support: Office of Sustainability, Water Resources Commissioner

The county should evaluate additional opportunities to install green stormwater installations, such as permeable pavements or bio-infiltration areas, in new parking lot installations and assess parking lot pavement rehabilitation projects. The county Facilities Management Department integrated bioswales into the Administrative Complex parking area and paved one of the campus parking lots with porous asphalt. Learning from the successes and challenges of these existing installations, the county has an opportunity to implement similar infrastructure in other locations throughout campus. Green stormwater infrastructure implementation in parking areas should be coordinated with electric vehicle infrastructure installation (see strategy F3. Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus), as well as efforts to reduce overall parking space requirements wherever feasible. As it applies to the Sustainability Plan's Guiding Principles, reducing paved areas and transitioning to permeable pavements or greenspace could:

- **Improve air and water quality** by reducing and filtering stormwater runoff.
- **Maximize resource efficiency** by relieving local flooding, reducing roadway maintenance costs, and preventing the high costs and resources required to respond to serious flooding events.

The Executive Office Building parking lot at the northwest corner of Telegraph Road and Pontiac Lake Road should be considered as a high priority for pavement reduction or elimination due to very minimal use. The county should perform soil testing for infiltration rates as part of permeable pavement project planning and consider how the pavement will be maintained over time. Resources include the US EPA's Toolkit on Permeable Pavement[80] and the Minnesota Department of Transportation's Guidance on Permeable Pavements in Cold Climates report.[81]

The county does not use any coal-tar-based products. However, a formal policy should be adopted to ensure that the practice continues, and that products containing other harmful chemicals such as other polycyclic aromatic hydrocarbon (PAH) are not used. Furthermore, the county may consider placing a ban on PAH sealants, as many communities in Michigan and around the Great Lakes region have implemented. have implemented. For example, the Minnesota

80 https://www.epa.gov/soakuptherain/soak-rain-permeable-pavement

81 http://www.dot.state.mn.us/research/TS/2015/201530TS.pdf

Open Space, Ecosystems, and Connectivity

O5 Reduce Paved Areas and Transition to Permeable Pavements or Greenspace

Legislature banned the sale and use of coal tar-based sealants in 2014. The coal tar-based sealants contributed to 67% of PAHs in 15 Minnesota metro-area stormwater ponds.[82]

These recommendations support the county's Environmental Sustainability Strategic Framework community objective of protecting drinking water and lakes.

In the longer term, the county should evaluate the elimination of the two left-turn cloverleaf intersections on Telegraph Road at Pontiac Center Road and County Center Road which would reduce the surface area of impermeable pavement in the area. In partnership with the Road Commission and MDOT the traffic patterns at these locations should be evaluated under current traffic conditions for conversion to traditional perpendicular intersections consistent with the Telegraph Road corridor to the north and south of the county campus. This recommendation also aligns with strategy O1. Improve Connectivity with Non-Motorized Pathways This recommendation supports the county's Environmental Sustainability Strategic Framework community objective of protecting drinking water and lakes as well as the Organizational Excellence objective of maintaining the highest fiscal stewardship. In addition, this recommendation would free up land for the county's use.

The Huron River Watershed Council

The Huron River Watershed Council is an advocacy group that has worked with the Michigan Environmental Council, the League of Conservation Voters, and other interested groups to monitor the presence of PFAS in drinking water and lakes in the Michigan area. PFAS are a family of thousands of chemicals associated with many health problems, the pollution of which is widespread in the United States. The state of Michigan has established drinking water standards for seven PFAS chemicals and state rules are in place for cleanups regarding the seven chemicals. The Huron Rivers Watershed Council continues to monitor PFAS rates in drinking water and other bodies of water and has seen very low rates in the Michigan area due to successful legislation. This case study is an example of the impact the county could have on protecting drinking water by implementation a formal policy to ensure that coal tar and PAH based products are not used. The Huron River Watershed Council was able to reduce harmful chemicals in drinking water through strategic legislation and advocacy. Along with banning these chemicals from the source, the county can implement permeable pavements to reduce runoff and prevent chemicals in the environment from entering the water supply.

82 https://www.pca.state.mn.us/business-with-us/coal-tar-based-sealants



Next Steps

AECOM developed this Sustainability Plan on behalf of Oakland County to achieve their Sustainability Vision and advance their sustainability Guiding Principles through strategic action in the Focus Areas of Sustainable Governance, Health and Wellness, Facility and Fleet Decarbonization, High-Performance Buildings, Waste Reduction and Diversion, and Open Space, Ecosystems, and Connectivity. Through implementation of sustainability initiatives set forth in this Plan, Oakland County can advance the broader Strategic Framework. Most importantly, by advancing sustainability within county sites and operations, the county can further provide positive service experience for all, through efficient, equitable, and low-carbon operations – extending sustainability impact and resources throughout the greater community and continuing to lead by example.

This Sustainability Plan identified 29 strategies. The next step is to implement these strategies, supported by the guidance provided in the Change Management Plan. Progress will be monitored throughout the process through critical KPIs and metrics associated with each strategy. The Plan will be reassessed and evaluated periodically to ensure that it continues to align with county priorities and policies, as well as regional and state priorities.

Implementing Sustainability Strategies

Successful implementation of the sustainability strategies presented in this Plan hinges on the collaboration of county staff to keep moving sustainability forward. As such, purposeful communication of the county's Sustainability Framework and staff roles for strategy implementation is key. Effective communication can result in:

- Mainstreaming sustainability concepts and priorities amongst staff
- Reinforcing that all county decisions must be aligned with its sustainability priorities
- Empowering staff to take ownership of the county's current and future sustainability actions
- Increasing transparency and accountability for organizational processes

Achieving these objectives will require consistent messaging to encourage continued enthusiasm for pursuing and operationalizing sustainability. The steps below provide a roadmap for providing this messaging:

Step 1 Communicate the Sustainability Framework

Step 2 Define Roles

Step 3 Develop Sustainability Framework Brand Identity

Step 4 Connect Employees to the Brand

Step 5 Provide a Platform for Safe and Open Feedback Loop

Additionally, a supporting communications strategy and Change Management Plan will provide guiderails so the county can easily identify *who* needs to be engaged, *how* they are expected to contribute to the county's Sustainability Framework, *when* they are expected to achieve certain milestones, and *what* additional resources or measures, if any, need to be identified to overcome barriers in reaching these milestones.

STEP 1: Communicate the Sustainability Framework

When sharing the Sustainability Plan with Oakland County employees, the Sustainability Framework should be clearly communicated so all employees have unified understanding of the county's goals and how they should inform future decision-making. Consistent messaging will ensure the material resonates with staff.

STEP 2: Define Roles

Provide all individuals within county organizations with a clear definition of their role in progressing next steps. Defining roles immediately when projects are kicked off will help employees envision how they can contribute to a project's success and the county's broader sustainability Vision, ultimately ensuring efficient project delivery. Each strategy within this Plan identifies the lead, supporting, and external teams that are expected to contribute to project implementation. Building off this foundation, project leadership can create a responsible, accountable, consulted, and informed (RACI) matrix to align roles and responsibilities for each team member and concisely communicate them to the entire team.[83] A RACI matrix will support role clarity by ensuring all team members share a common understanding of their respective contributions, as well as how to coordinate amongst each other to achieve cohesive success

STEP 3: Develop Sustainability Framework Brand Identity

Develop a content calendar to ensure consistency and integration with other county-wide communications. A strong brand identity for sustainability within Oakland County will ensure that any communication distributed about sustainability has the same look, feel, and is instantly recognizable as on-topic. The Sustainability Framework should be at the foundation of the county's sustainability brand, and the triple bottom line should be visible in all messaging.

The Michigan Department of Environment, Great Lakes, and Energy's Recycling Racoons[84] campaign is an example of a sustainability brand. The Recycling Raccoons educate, engage, and mobilize Michigan residents on how to recycle correctly. Each member of the Recycling Raccoon Squad personifies a recyclable material (Gladys Glass, Paper Mackay, Nyla P. Lastic, Carlos Cardboard, and Precious Metale), who articulate important rules for recycling common household materials.

Branding also involves curating distribution channels so stakeholder groups (e.g., county staff, elected officials, and visitors) will have an individualized sustainability experience. Distribution channels may include digital platforms, printed materials, and permanent signage[85] solutions. A content calendar can be developed to identify an appropriate mix of digital and traditional mediums to make content accessible to a variety of patrons and reduce redundancies in planned communication.

83 Reference Appendix D: Change Management Plan for detailed information about stakeholder preparation and alignment towards role definition, among other Change Management strategies.

84 https://recyclingraccoons.org/

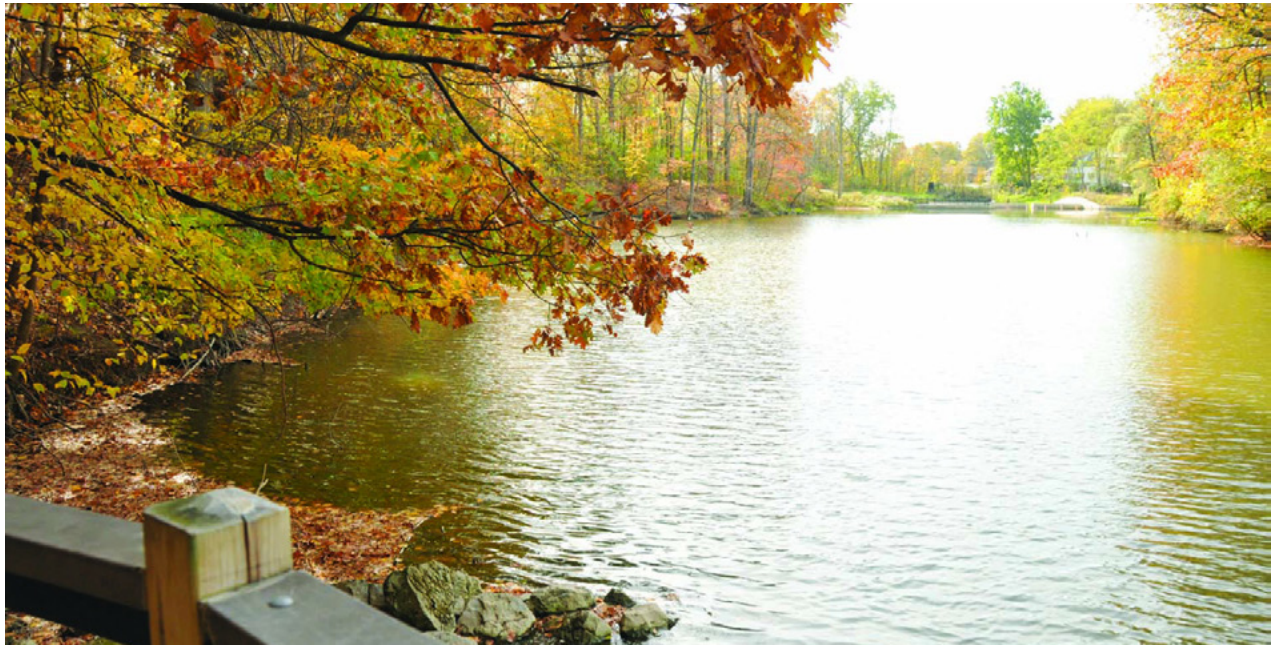
85 Please see O2. Expand and Improve Signage with Accessibility Standards for more detail.

STEP 4: Connect Employees to the Brand

The next step is to connect employees with the importance of the brand message—for their own work, the entire county organization, the environment, and the community at large. Simply put, the county needs buy-in from its employees to progress its sustainability agenda. Reiterating to employees the critical role they play in measuring and promoting, and providing them with the tools to do so, is foundational and ultimately achieving progress. As Oakland County's policies and programs evolve to reflect the Sustainability Framework, it is critical that sustainability leadership explain the reason for these changes.[86] As much as possible, leadership should point to the Guiding Principle(s) that justify the change and the objectives that will be advanced by this change. In addition, establishing county employee education and outreach programs will bring sustainability to the forefront and mainstream sustainability for staff and day-to-day operations. To incentivize collective sustainability action, the county can also consider connecting sustainability metrics to annual employee work plans and performance evaluations, leverage behavioral change applications to develop individualized sustainability coaching and training plans, and reward county departments and teams that achieve desired performance and seek partnerships with vendors that articulate the same values.

STEP 5: Provide a Platform for Safe and Open Feedback Loop

Provide a safe two-way communication channel for employees to provide feedback, including opportunities for anonymous comments. County and staff leadership are best positioned to receive and respond to employee feedback. Responses, particularly an explanation of how the sustainability program will be strengthened in response to comments, should be communicated to staff in a timely manner.



86 In focus groups facilitated as part of the Plan's development process, county employees reported that they often did not know the reason behind recent changes and expressed interest in county and staff leadership communication around why the change is happening.

Tracking Sustainability Progress

The Sustainability Framework defined in this Plan provides a set of Objectives and KPIs to monitor and review progress. The county can continuously monitor progress by tracking and analyzing performance according to the sustainability Objectives and KPIs. Progress towards achieving stated sustainability goals should be tracked on an internal or public dashboard to increase transparency and accountability for organizational processes.

The following steps can be taken to streamline progress reporting processes:

- Catalo ging and standardizing data streams required for tracking KPIs
- Hosting trainings to ensure consistent use of KPI evaluation methodologies (including quality control procedures) and reporting templates across departments and teams
- Identifying opportunities to integrate performance reporting procedures into existing workstreams
- Including strict reporting requirements in Request for Proposals (RFPs) (e.g., require waste haulers to regularly report the volume or weight of collected materials)

Monitoring performance can serve as a feedback mechanism that enables the county to identify areas for improvement and areas of success. The county can then use performance results to review its Sustainability Framework, strategies, and implementation practices to improve performance or better align with county priorities and policies.



A Message from Erin Quetell, Environmental Sustainability Officer

"Whenever you are asked if you can do a job, tell 'em, 'Certainly I can!' Then get busy and find out how to do it." – Theodore Roosevelt

To the residents and community members of Oakland County,

Thank you for your time and consideration in reviewing this plan. There is no blueprint for sustainability. It is a complex idea, and difficult to define. Politicians, scholars, and subject matter experts have tried to define sustainability with ever changing jargon and ideas as new technologies or thought processes emerge.

Acknowledging that, this inaugural Sustainability Plan attempts to define and establish strategies around sustainability to support advancement and efficiencies in Oakland County-owned facilities and operations. It aligns with the County Executive Strategic Framework and links to the overall goal of net zero carbon emission by 2050 for the county, and interim reduction of 50% carbon emissions for county operations by 2035. We have a lot of work ahead of us.

It is my pleasure to conclude this planning document and welcome feedback, critical and supportive, to continue to discover ways to implement sustainable practices into Oakland County. Together, we can work towards an equitable social infrastructure, preserve and enhance our natural environmental infrastructure, and continue to prosper as an economic driver for the State of Michigan.

Sincerely,

Erin Quetell
Chief Environmental Sustainability Officer





Appendix A

Urban Sustainability Directors Network Equity Principles and Commitments

This appendix includes the Urban Sustainability Directors Network's Equity Principles and Commitments.[87]

In the summer of 2019, the Planning and Advisory Committee (PAC) tasked the Equity Advisory Committee (EAC) with creating a strategy to prioritize equity network-wide. In response, the EAC collaborated to draft Equity Principles and Commitments, which outline USDN's foundational equity values and the resulting commitments the organization is making. In August of 2020, the EAC presented its work to the PAC, and the PAC unanimously endorsed the Equity Principles and Commitments (see below), which will help guide USDN's staffing, programming, and budget decisions.

Equity Principles

USDN recognizes that:

1. **The root causes of climate change, environmental injustice, and racial inequity are the same.** Climate change, environmental injustice, and racial inequity are systemic outcomes of colonization: the exploitative extraction of natural and human resources to generate profit for the few. Solutions that do not directly address these common causes will not succeed.
2. **Successful solutions prioritize the most marginalized.** We believe that to design better solutions, we must practice targeted universalism, prioritizing those who experience the most vulnerability to climate change, disproportionate exposure to environmental injustice, and the biggest barriers to benefiting from climate solutions. By doing so, we will produce solutions that meet the needs of everyone. By not doing so, we are upholding current disparities.
3. **Prioritizing marginalized communities means leading with race.** Race is the leading predictor of outcomes across the United States and Canada, yet governments have not systemically acknowledged or addressed disparities by race or their role in creating them. Because of this, racial analysis must be a priority. "Leading with race" does not mean "only race." It is a practice of starting with a racial equity analysis to understand how race impacts outcomes, recognizing how the intersectionality of identities and groups also impacts outcomes.
4. **Equity is a professional competency.** The skills associated with advancing equity make us better public servants, preparing us to deal with the complex nature of the social, economic, and environmental challenges our communities face. Equity is responsible governance. The government has a fiscal and moral responsibility to address the long-term implications that inequity has on prosperity, health, and safety for residents and stakeholders. Governments can either create or eliminate barriers for better outcomes through their policies, programs, and relationships.
5. **Diversity is an asset.** Increasing diversity within the sustainability field, and particularly in decision-making positions within government, will increase the long-term relevance and accountability of our work to communities who have been systematically denied influence. Diverse perspectives produce more sophisticated solutions. To diversify successfully, the sustainability field must consciously build an inclusive culture.

87 https://www.usdn.org/about/usdn-equity-principles-and-commitments.html#/

Equity Commitments

USDN commits to:

6. **Creating a learning community.** Developing equitable solutions that will produce the change needed in our communities will be hard, complicated work. USDN is a space for us to be authentic and make mistakes, but it will also push us to do better and be better.
7. **Supporting our members' individual racial equity work.** To build our professional competency and confidence in racial equity work, we must honor the vulnerability, courage, and humanity required. Although systemic racism negatively impacts us all, Black, Indigenous, and People of Color bodies and white bodies will have different needs, from healing to humility. We will support each member's individual anti-racism practice.
8. **Building the pipeline of diverse sustainability professionals and developing leaders.** We are committed to using our positional power and influence to attract, train, and retain members from communities underrepresented in the sustainability field, particularly Black, Indigenous, and People of Color practitioners. We also commit to creating growth and leadership opportunities for these individuals.
9. **Structuring USDN funding and resources to support our equity principles.** USDN will use our equity principles to inform staffing, programming, and budget decisions for both our organization and the funds we make available to members.
10. **Accelerating adoption of equity values and commitments in our field of practice.** USDN will work with partners that share our values, and we will use our organizational influence to set an example of racial equity work for our community of practice.
11. **Creating an inclusive culture.** USDN will create spaces where members, staff, and partners feel welcome to participate fully with their identities, experiences, and positions.
12. **Being accountable to our principles.** USDN will evaluate and publicly report on how we are living up to our explicitly stated equity principles and our opportunities to do better.



Appendix B

Summary of Strategies

Table 15. Summary of Strategies

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
S1	Standardize Business Management Tools and Workflows Across Departments							X			X	X			X	County Executive	Information Technology, Management and Budget, Office of Sustainability, Purchasing, Departmental Leadership	
S2	Develop an Integrated Planning Checklist to Coordinate Investments							X							X	Facilities Management, Parks and Recreation	Office of Sustainability, WRC, Information Technology, Management and Budget, Planning Division	DTE Energy, Consumers Energy, City of Pontiac, Waterford Township, Plante Moran, Oakland County Road Commission
S3	Develop an Enterprise Asset Management Plan							X	X	X	X	X	X	X	X	Facilities, Operations, and Maintenance	Office of Sustainability, Information Technology, Parks and Recreation, Water Resources Commissioner	Cityworks
S4	Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities	X				X		X	X	X			X		X	Purchasing	Office of Sustainability, Office of Diversity, Equity, and Inclusion	

LEGEND: (*) In Progress

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
S5	Update the Purchasing Evaluation Handbook to Increase Diversity of Bid Evaluation Teams and Incorporate Sustainability Evaluation Criteria							X	X	X						Purchasing	Office of Diversity, Equity, and Inclusion, Office of Sustainability	
S6	Expand Business Forward Initiative to include Sustainability-Focused Services	X		X				X	X	X	X					Economic Development	Office of Diversity, Equity, and Inclusion, Purchasing	
S7	Perform an ADA Compliance Study*							X	X	X	X					Facilities Management	Office of Sustainability, Office of Diversity, Equity, and Inclusion, Parks and Recreation, Risk Management Department	
W1	Define Health and Wellness Vision and Values for Oakland County*		X						X	X	X	X			X	Human Resources	Office of Sustainability, County Executive	Marsh & McLennan Agency
W2	Develop Actionable Support for Wellness in Employee Lifestyles	X	X		X			X	X	X	X	X				Human Resources	County Executive	External vendors
W3	Enact County-Wide Workplace Guidelines and Standards		X		X	X			X	X	X			X	X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Human Resources, Purchasing, Environmental Health Services Unit of the Health Division	Marsh & McLennan Agency, Vendor partnerships

LEGEND: (*) In Progress

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
F1	Conduct a Decarbonization Feasibility Study for the Central Steam Plant					X		X					X		X	Facilities Planning and Engineering Division	Facilities Management: Facilities, Maintenance, and Operations Division, Engineering	
F2	Pursue On-Site Solar Generation at Key Campus Locations					X		X					X		X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing	
F3	Develop an Electric Vehicle Infrastructure and Fleet Transition Plan for the Oakland County Campus					X		X			X		X			Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing, Parks and Recreation	
H1	Perform Energy Audits at Target Facilities					X		X					X			Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing	

LEGEND: (*) In Progress

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
H2	Complete Campus-Wide LED Lighting Conversion*					X		X					X		X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation	Purchasing, Human Resources	
H3	Continue Investment in Energy Efficiency Measures*					X		X					X		X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation	Purchasing, Human Resources	
H4	Perform a Campus-Wide Water Audit					X		X							X	Facilities Management	WRC	
H5	Continue Investment in Water Efficiency and Conservation Measures*					X		X							X	Facilities Management, Parks and Recreation	WRC	

LEGEND: (*) In Progress

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
H6	Develop Sustainable New Construction and Major Renovation Standards					X							X	X	X	Office of Sustainability, Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing, WRC, Parks and Recreation	
D1	Review and Renegotiate Waste Hauling Contracts*							X							X	Facilities Management, Parks and Recreation	Office of Sustainability, Purchasing	
D2	Expand Recyclable Material Collection					X		X					X		X	Facilities Management, Parks and Recreation	Office of Sustainability	
D3	Expand Organic Material Collection					X		X					X		X	Facilities Management, Parks and Recreation	Office of Sustainability	
D4	Deploy Smart Waste Management Systems							X							X	Facilities Management	Office of Sustainability, Parks and Recreation	
D5	Develop Policies to Minimize Office Supply Consumption							X							X	Purchasing	Office of Sustainability	

LEGEND: (*) In Progress

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
O1	Improve Connectivity with Non-Motorized Pathways*		X		X	X			X	X	X		X			Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Parks and Recreation	Oakland County Road Commission, MDOT, SMART, SEMCOG
O2	Expand and Improve Signage with Accessibility in Mind			X	X			X	X	X	X	X				Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division; Parks and Recreation: Wayfinding Group and Sign Standards Work Group	Office of Diversity, Equity, and Inclusion; Media and Communications; Office of Sustainability	Oakland County Road Commission, MDOT
O3	Strategically Convert Lawns to Forest or Meadow					X		X					X	X	X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division; Parks and Recreation	Office of Sustainability, WRC	

LEGEND: (*) In Progress

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
O4	Implement Ecological Restoration Projects				X	X							X	X	X	Office of Sustainability	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division; Parks and Recreation; WRC	City of Pontiac, Waterford Township, Plant Wise
O5	Reduce Paved Areas and Transition to Permeable Pavements or Greenspace*					X		X						X	X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation	Office of Sustainability, WRC	City of Pontiac, Waterford Township, Oakland County Road Commission, MDOT

LEGEND: (*) In Progress



Appendix C

Stakeholder Engagement

This appendix describes the various engagement activities and the departments, programs, or organizations engaged.

Engagement Activities

Steering Committee Meetings:

The Steering Committee included members of the county's Environmental Committee and select county employees with a keen interest in sustainability. Three Steering Committee meetings were held throughout the Sustainability Plan development process. This Committee provided general guidance, direction, and feedback.

Each Steering Committee meeting included information on the Sustainability Plan overall, development progress, and a discussion activity to gather participant input. The initial Steering Committee meeting was designed to gather input needed to inform the project vision. The second meeting focused on testing vision concepts and receiving feedback on Focus Areas and Guiding Principles. The third meeting focused on reviewing components of the draft Sustainability Plan.

Technical Interviews:

Five large group interviews were held to confirm or clarify technical information gathered through a Request for Information process. Interviewees were selected by the county based upon the employees' knowledge of specified subject matters. Each group interview had a topic of focus. These topics were:

- Campus Grounds
- Campus Facilities
- Parks Grounds
- Parks Facilities
- Health and Wellness

In addition to large group interviews, multiple smaller group and individual interviews with county staff relating to waste, procurement, health and wellness, asset management, and finance were held. These interviews were conducted to gather information from staff not available during the larger group interviews or to discuss topics in more detail than was possible in the large group interviews.

Focus Groups

Focus Groups were held in two rounds. The first round was held as analysis of Oakland County's operations was beginning. The second round of Focus Groups was held as potential sustainability strategies were being developed.

Round One:

During the first round, two Focus Groups were utilized to gather information, opinions, and insights relating to employee health and wellness. The members of these Focus Groups were selected based upon the organization in which they worked and the building in which they were located. A third Focus Group was used to test the visioning results from the first Steering Committee meeting.

Focus Group participants were selected based on a set of criteria to reflect a variety of job types, work locations, ethnicity and length of service with the county.

Round Two:

During this round of Focus Groups, two groups were used to gather feedback on potential sustainability strategies regarding ease of implementation and impact on employees. These groups consisted of employees randomly selected as well as employees that could have a role in strategy implementation. The third Round Two Focus Group was primarily designed to gather input about employees' readiness and resistance to change, knowledge about the Sustainability Plan project, and methods of communication. The Round Two Focus Group members were chosen randomly using criteria to approximate the racial and gender make up of Oakland County Employees.

The Focus Groups were held virtually and included an overview of project information followed by interactive activities to gather participant insights with introductory and project information provided through a slide presentation.

Virtual Room and Surveys

An online Virtual Engagement Room was created to provide the opportunity for employees to learn about the development of the Sustainability Plan and various topics relating to sustainability. Survey questions embedded in the Virtual Engagement Room sought information regarding how employees view sustainability, their vision of success for the county's sustainability efforts, and obstacles to success. Virtual Room engagement levels were low.

A separate online survey with questions like those in the Virtual Room was prepared to solicit information regarding employees' views regarding sustainability, their vision of success for the county's Sustainability efforts, and obstacles to success. Survey response rate was low.

Public Review

It is important that the county be transparent about its activities. A summary of the Plan and information about sustainability was provided via a Story Map on the county's website.

Engagement Participants

Almost 100 individual county employees took part in virtual engagement events, with some participating in multiple meetings. In total, employees provided input through meetings, the Virtual Room, and surveys in approximately 185 instances. Fifty different county divisions, programs, or organizations participated in engagement meetings.

County Department, Program, or Organization Participating in Engagement Meetings:

County Executive Administration
Corporation Counsel
Risk Management
Management & Budget Administration
Purchasing
Equalization Administration
Fiscal Services Administration
Fiscal Services Reimbursement
Facilities Management Administration
Facilities Management/Support Services Division
Facilities Maintenance & Operations Administration
Facilities Maintenance & Operations Building Custodial
Facilities Maintenance & Operations Building Maintenance
Facilities Planning & Engineering
Human Resources Administration
Human Resources Recruitment
Human Resources Benefits Administration
Human Resources Retirement
Human Resources Employee Benefits
Health Administration
Neighborhood & Housing Development
Public Services Administration
Children's Village Administration
Animal Control Administration
IT Administration
IT CLEMIS
Economic Development Administration
Planning & Local Business Development Division
Planning & Local Business Development/Trails Transportation & Environment
National & International Business Attraction
Emergency Management and Homeland Security
Department of Public Communications Community Engagement Unit
Circuit Court Civil/Criminal
Circuit Court Family Friend of the Court
Probate Estates & Mental Health
Prosecuting Attorney/Litigation
Sheriff/Sheriff s Staff
Sheriff/ERP/Administration
Sheriff/Patrol Service/Traffic
Emergency Communications Operations
Board of Commissioners/Administration
Library Board/Administration
Parks & Recreation Administrative Services
Parks & Recreation Programs & Services
Parks & Recreation Red Oaks Waterpark
Parks & Recreation Parks Facilities Maintenance & Development
Water Resources Commission Administration
Water Resources Commission Financial Services
Water Resources Commission Plan Review and Permit Services
Treasurer/Administration



Appendix D

Change Management Plan

This Change Management Plan is founded on the Prosci Change Management approach. Prosci is a global leader in Change Management. Training and certification as a Certified Change Practitioner is provided by Prosci.

Introduction

The Office of Environmental Sustainability will utilize this Change Management Plan when implementing strategies provided in this Sustainability Plan. This Change Management Plan includes an approach to identify the cause of any internal resistance to sustainability initiatives and is developed from practices defined by Prosci. Prosci's Change Management methodology is founded on scientific principles and applied research that is results-oriented to manage organization-wide change, one person at a time.

The Change Management Attachment is an Excel file to use in conjunction with this **Change Management Plan** as part of the Oakland County Sustainability Plan. The tabs in the Excel file correlate to the phases in the written Change Management Plan.

The change management team identified by the county to deliver this plan will utilize the following tools at these specified phases: 1) complete the Change Impact Assessment and Stakeholder Matrix tabs during Phase 1 of the Change Management Plan, and 2) complete the Communications Plan, Leadership Sponsor Roadmap, and Resistance Management Plan during Phase 2 of the Change Management Plan.

Defining Change Management

Change Management is an applied process and set of tools to help lead the people side of change, in parallel to the technical side of change, and reach organization desired outcomes. Change Management aids in mobilizing teams to understand why change is happening and provides transition allowing employees to be successful through times of change. Change Management has both a technical side and a people side. The technical side focuses on designing, developing, and delivering technical solutions, while the people side has a focus on employees to embrace, adopt, and use the change. The sustainability strategies outlined in the first half of this document represent the technical side of change. Change occurs one person at a time in an organization - going from current, to transition, to future state - and can occur at an individual, project team, or organizational level. It is important that change is viewed as a process, and the actions and activities are customized to the needs the county's organization. For Change Management to be successful, it is important to have a network of stakeholders across the organization that support the vision and key behaviors. Critical actions to ensure the success of any change include transparent and honest communication, leadership role-modeling behaviors, developing tools to help employees through change, building trust in leadership and the program, and ensuring measures are in place to sustain changes.

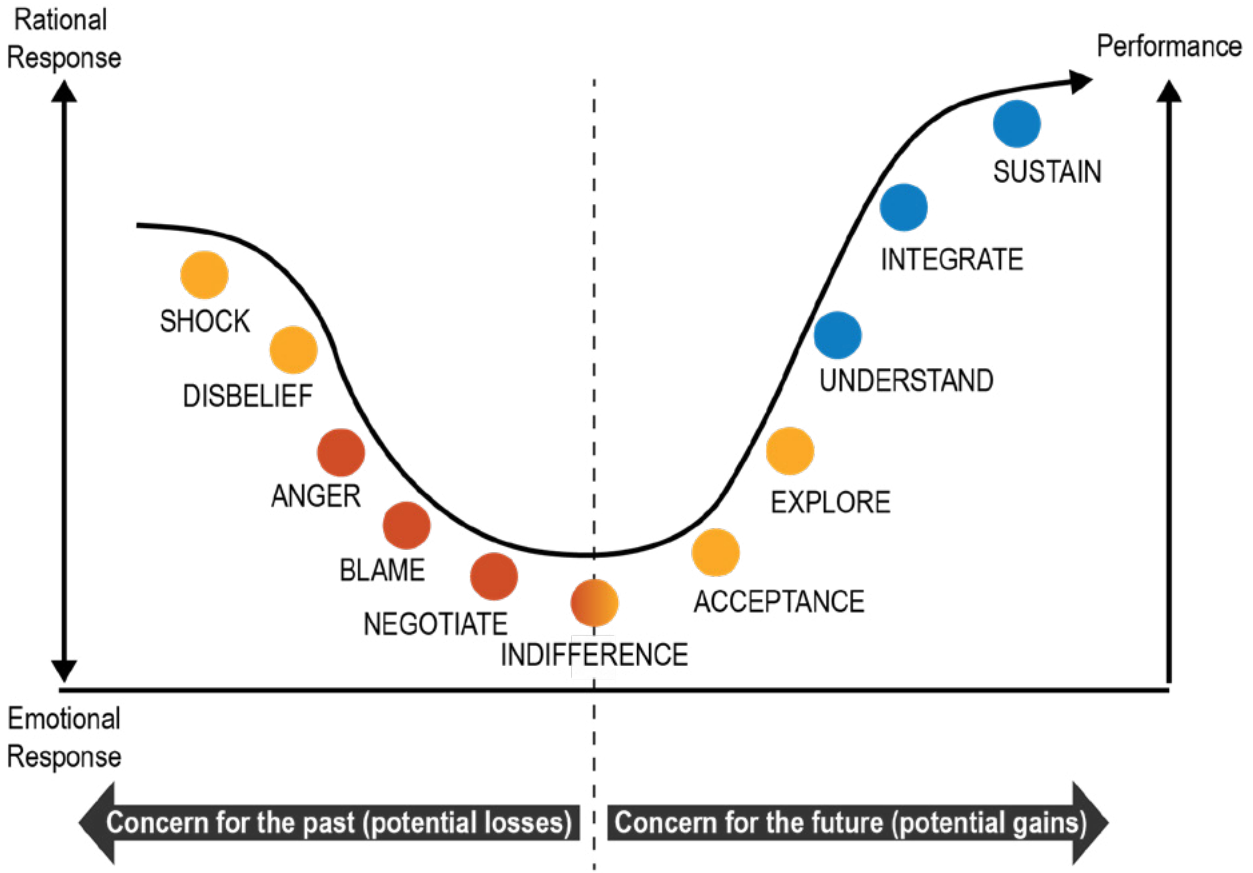
The Value of Change Management

When Change Management initiatives have good performance, they are six times more likely to meet project goals and objectives than initiatives with poor Change Management.[88] This success demonstrates the connection between employees realizing expected benefits and that change is a strategic capability that helps organizations become more resilient.

Models for Change Management – Individual Level

There are several approaches to setting a Change Management framework to develop a common and shared vocabulary around change and how individuals respond and react. The Kubler-Ross[89] change curve is a diagrammatic tool used today by many organizations to show how people respond to and experience change over time.

Figure 23. Kubler-Ross Change Curve



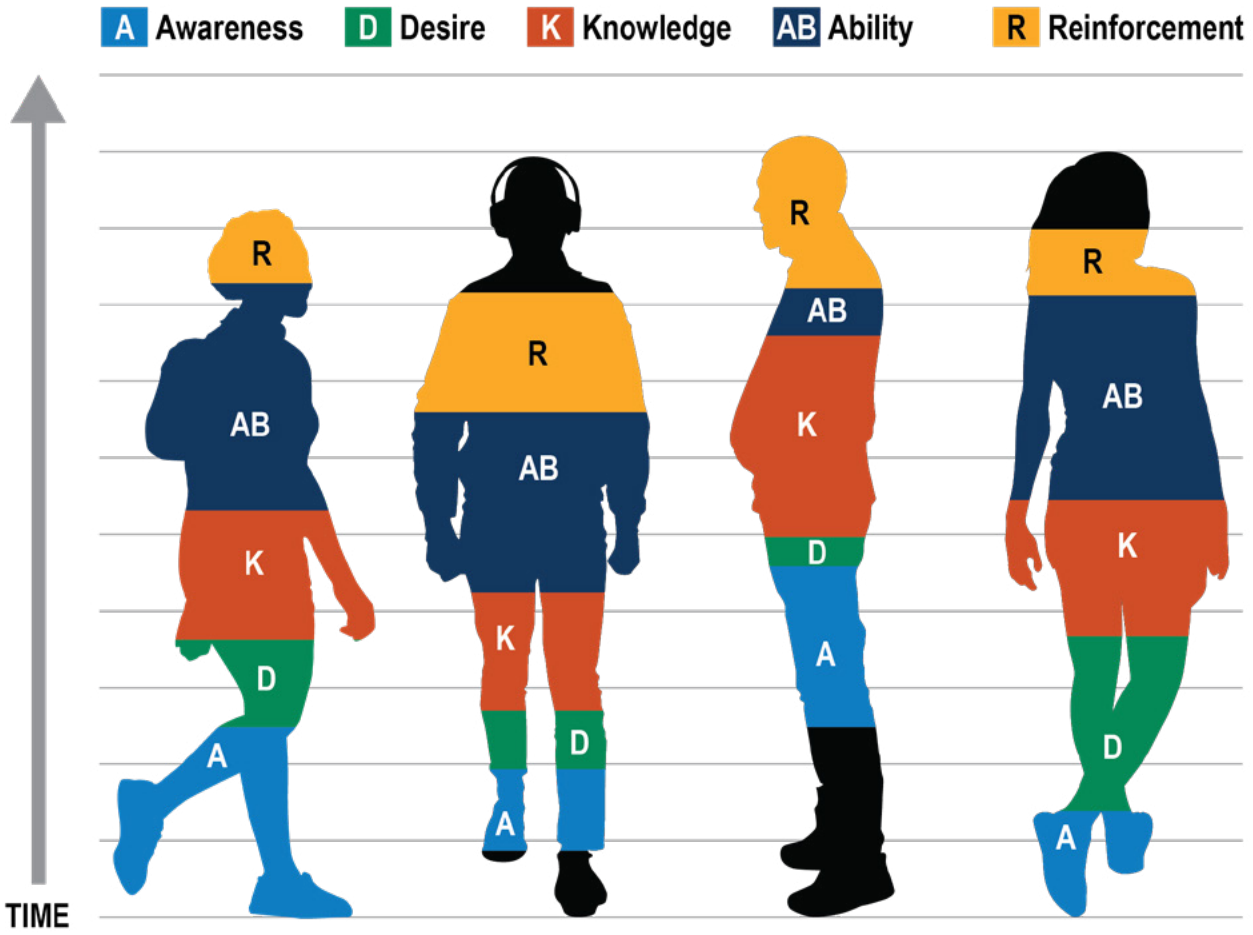
88 Prosci Benchmarking data 2007-2019

89 https://www.ekrfoundation.org/5-stages-of-grief/change-curve/

Procsi's change model, ADKAR[90], shares recognizable traits with the Kubler-Ross Change Curve, as the ADKAR steps could hypothetically be mapped across time. ADKAR is an acronym for: awareness, desire, knowledge, ability, and reinforcement. Procsi's ADKAR model is a framework to understand where people are in the change process when they are going through a change, and at which stage each individual is currently in – whether that is being aware of, desiring, knowledgeable of, able to adopt, or reinforcing a change.

Another Change Management model, the SCARF model[91], consists of five motivators, including: Status, Certainty, Autonomy, Relatedness, and Fairness. When people feel intimidated, it leads to a decrease in performance at work. On the contrary, when people feel recognized or rewarded, their performance increases. The SCARF model focuses on recognizing and addressing fears and maximizing the recognition from team members. Using the SCARF model can improve team performance and encourage constructive feedback from team members.

Figure 24. ADKAR Model Over Time per Person: Change Occurs at Different Times for Different People



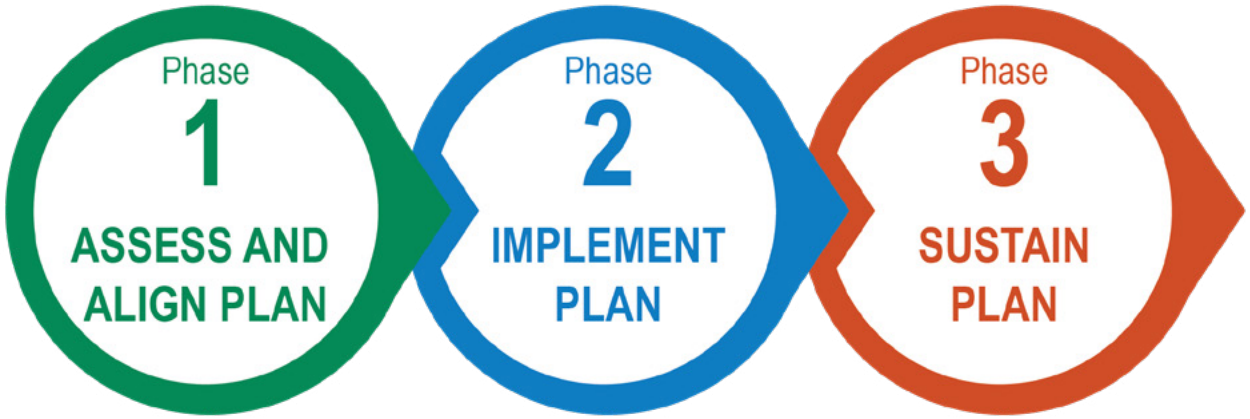
Source: https://pminb.ca/images/downloads/SelfGrowth_Professional_Development_Days_2021/pminb_change_management_presentation_may_13_2021.pdf

90 https://www.prosci.com/methodology/adkar?utm_term=prosci%20adkar&utm_campaign=ADKAR&utm_source=adwords&utm_medium=ppc&hsa_acc=5529787200&hsa_cam=10286811822&hsa_grp=100632746377&hsa_ad=497488228964&hsa_src=g&hsa_tgt=aud-1241589768885:kwd-302580028780&hsa_kw=prosci%20adkar&hsa_mt=e&hsa_net=adwords&hsa_ver=3&gclid=Cj0KCQjwjN-SBhCkARIsACsrBz4VrstbxkyIM8fUlW12ic6vWeriwMf3tK5Rk545LuJ7LWIaaSEY1SQaAsSaEALw_wcB

91 http://web.archive.org/web/20100705024057/http://www.your-brain-at-work.com/files/NLJ_SCARFUS.pdf

How to Use This Plan

This Change Management Plan includes three phases: **Phase 1 | Assess and Align Plan**, **Phase 2 | Implement Plan**, and **Phase 3 | Sustain Plan**. Throughout all three phases of this Change Management Plan thorough, consistent, and clear communication with all relevant stakeholders across Oakland County is critical to success. Throughout this Change Management Plan, there are references to 'projects' or a 'project.' This plan assumes that strategies in this Sustainability Plan will ultimately manifest in individual and specific projects implemented towards achieving the county's strategy. Additionally, this plan references 'project management' teams, assuming that individual projects are managed and delivered through this specific team, which is distinct from 'Change Management' teams.



Stakeholder Engagement for Change Management

Throughout the development of the Sustainability Plan, Oakland County employees have been engaged from a cross-section of the organization. Please reference Appendix C: Stakeholder Engagement to see all Stakeholder Engagement conducted towards the county's Sustainability Plan, and the outcomes and takeaways from that engagement. Engagement throughout Change Management at the employee level is crucial for employee buy-in when the time comes to implement sustainability strategies. This summary provides the stakeholder engagement key takeaways thus far that have informed the Change Management Plan and approach. While stakeholder engagement key takeaways are fully defined in the Stakeholder Engagement section of this plan, a high level summary of engagements is provided here through the change management lens. This summary provides the highest level of sentiment from employees engaged that should be considered when delivering change management.

Throughout all engagement activities, employees raised a consistent concern that resource constraints are a barrier to sustainability initiatives. Employees expressed that leadership needs to improve two-way communication and implement employee feedback. Employees engaged seemed to be interested in sustainability initiatives if they had the budget to implement them.

From technical interviews, the takeaway is that facilities maintenance and operations teams understand the value of sustainability improvements and are eager for resources to deliver them. Additionally, organization-wide baseline use of specific software to collect and dispatch maintenance work orders and monitor asset condition (i.e., Cityworks) is a step Oakland County is taking to streamline efforts and track progress towards O&M goals. Currently the county is not utilizing all Cityworks functions. Having specific software that tracks progress towards project goals allows the county to see what areas of a change are successful and what areas may need additional attention.

Nature, ecosystem, and trails related technical interviews provided the insight that Parks and Recreation has two existing committees dedicated to sustainability initiatives, which can be a resource for implementing successful Change Management.

Employees in Parks and Recreation understand the value of sustainability initiatives and are eager for the resources to deliver them.

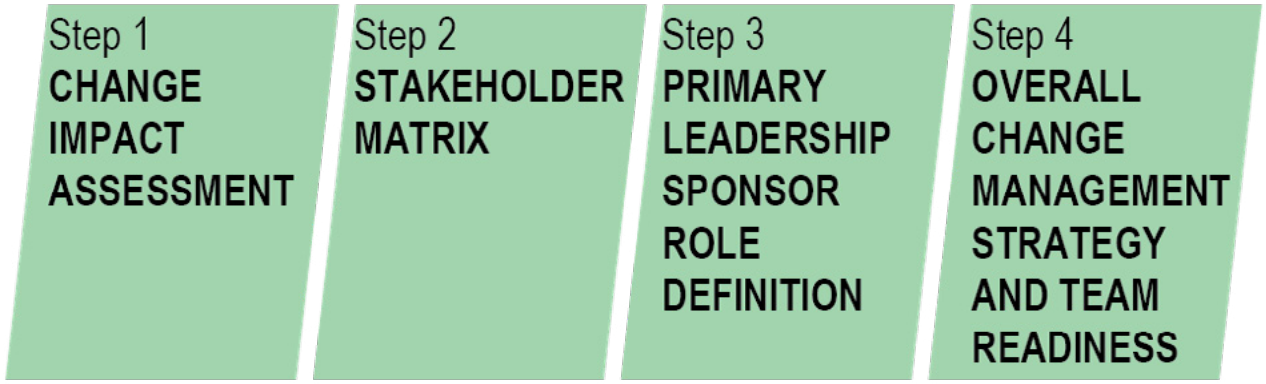
Technical interview outcomes on the topic of energy centered on the need for more clarity around energy goals and how this affects current roles and responsibilities of building engineers. Employees have implemented some forms of energy efficiency, like retrofitting LEDs, and have yet to tackle more complex efficiency issues. There currently is no database to track energy efficiency building updates.

Technical interviews and focus groups provided insights on Health and Wellness on the county's campus. These insights led to the takeaway that there is not a consistent approach to resources or offerings for employee wellness. Examples include: the standing desk approach being different per department, and wellness offerings are not universally available for different work schedules and locations. Additionally, findings demonstrated that the OakFit Wellness Program currently bases messaging on ROI to the county rather than the benefit directly to the individual.

Phase 1 | Assess and Align Plan

Phase 1 prepares teams for conducting the Change Management Plan itself. There are two goals of this phase of the Change Management Plan. One goal is to define why Oakland County has developed the Sustainability Plan, and why changes are occurring as related to its implementation. The other goal is to define who relevant stakeholders are, including those impacted by Sustainability Plan implementation changes and those critical to successful and lasting change and operations.

The specific steps to be complete during Phase 1 include: 1) conduct Change Impact Assessment, 2) prepare the Stakeholder Matrix, 3) prepare the Primary Leadership Sponsor Role, and 4) coalesce the overall Change Management strategy based on these developed items 1-3 in partnership with specific project management teams. Find a Change Impact Assessment Template and Stakeholder Matrix Template in the **Change Management Attachment**. This section will also explain how to use these templates in the appropriate steps.



Step 1 | Change Impact Assessment

Impact assessments are critical engagement activities meant to highlight the size and breadth of the change and gather information to ensure resources are allocated to implementing the change effectively.

The purpose of this Change Impact Assessment is to provide an understanding of the size of the change and the gap between the current situation and the desired future state, and finally to identify areas that need to be supported through the transition. Change impacts can include people, technology, behavior, processes, systems, workplace, and services. Conduct a Change Impact Assessment for every major Sustainability Plan Focus Area, Strategy, and project as applicable. The change impact may be the same for an entire Focus Area, so it isn't always necessary to complete a change impact assessment for every project. Additionally, it may be beneficial to revisit the impact assessment at key milestones throughout the project. It is important to continue to capture the impacts as the project progresses and outcomes gain increasing clarity.

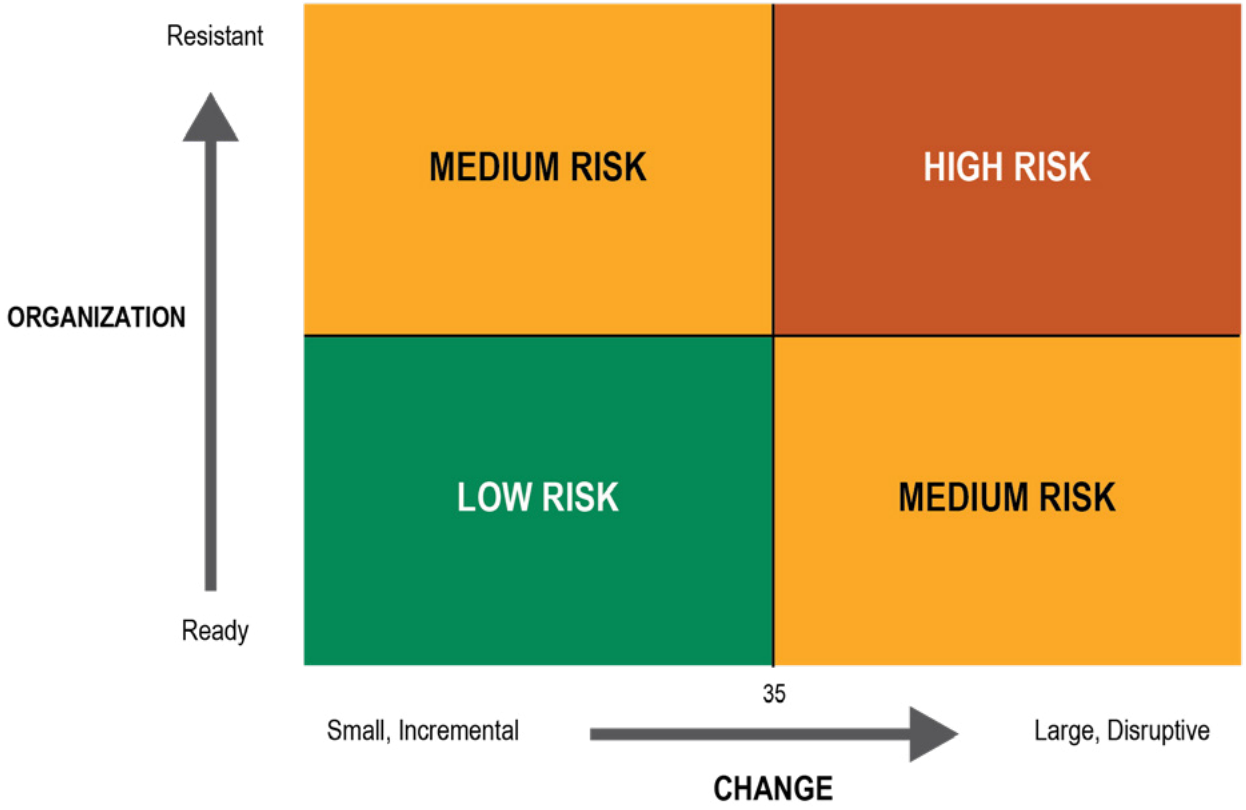
The steps that follow are to complete an impact assessment, through hosting and facilitating an interactive workshop. The goal of the workshop is to define details of sustainability implementation and changes. The workshop participants will be completing the Impact Assessment Matrix, using the template provided in **Change Management Attachment**, by defining the type and level of impact associated with the change. Completing this matrix includes identifying who will have an active role in completing the change and who will be impacted by the change. The outcome of completing the Change Impact Assessment is that areas of drastic change will be identified, and the project and change team can understand where resources are needed to mitigate and lead successful change.

Change impacts assessments may be completed in collaboration with a Change Leader Group and other key project team members. A Change Leader Group consists of a key group of individuals who form an important part of the change network. The role of the Change Leader Group is to support and engage employees through the change journey by being the conduit between the business units they represent and the project implementation team. Each Change Leader is nominated by business unit leaders based on desired attributes towards group makeup. The Change Leader Group role includes providing support to the change team by collecting feedback, cascading messages, and role-modelling behaviors. The Change Leader Group is a tool towards sustaining and embedding changes long term. The recommended size of this group is approximately 15 to 25 people and dependent on the number of departments that need representation. The Change Leader Group will be aware of what is changing, what is not changing, who is impacted, the timelines of the impact, the source of the change, the scope of change, and the risks of not changing.

Considerations while completing the Change Impact Assessment include identifying impacts and what motivators at an individual level are affected. This will help the county develop actions to respond to these impacts and motivators of change. A helpful tip is to remember is – do not just focus on negative impacts of change. Make sure that the positive impacts of the change are also discussed. These will help create positive messages, to bring users through a successful change journey. Once the impact assessment is complete, speak to department leads across the organizations to confirm alignment on impacts and that no major themes have been overlooked.

Defining change impact includes defining risk associated to any given project. A project's risk depends on organizational attributes and change characteristics. If the organization is supportive of the change, the project will have a lower amount of risk. When changes are small and incremental, they have less risk than large and disruptive changes. The diagram shown in Figure 25 depicts different levels of risk based on where a project falls within a change matrix. The matrix shows change characteristics (x-axis) and organizational attributes (y-axis). Information from your analysis of the change impact will inform a project's location on the change matrix. Once determined, communication of the project risk to the Primary Leadership Sponsor (this role is defined below in Phase 1, Step 3) is key because additional Change Management tactics and resources may be required to mitigate risk on a project. The risk level is not good or bad. The risk level informs the Change Management strategies needed to achieve success.

Figure 25. Organizational Attributes and Change Characteristics Risk Mapping



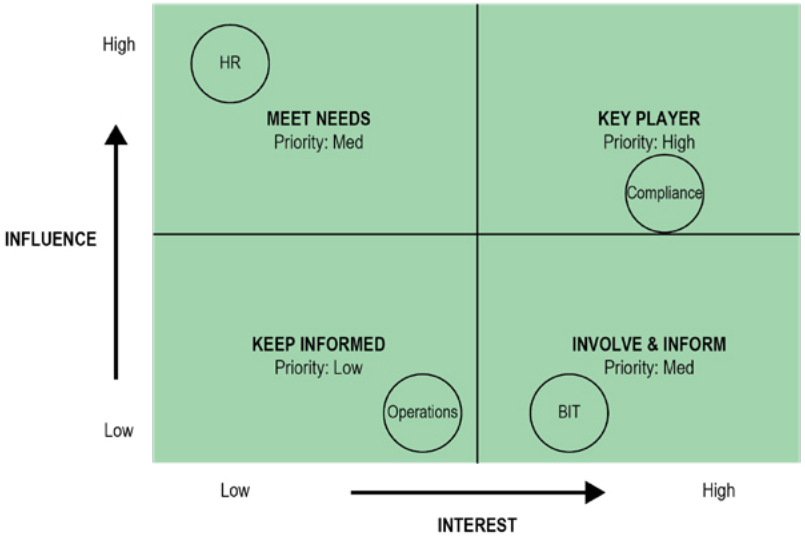
Source: https://blog.prosci.com/keys-to-prepare-for-change

Step 2 | Stakeholder Matrix

Development of the Stakeholder Matrix provides identification of all relevant stakeholders impacted through the county's Sustainability Plan. Due to the current parameters of the county's Sustainability Plan, the Stakeholder Matrix defined here is focused on Oakland County employees. Oakland County employees that are included in the Stakeholder Matrix may include: leadership, managers, change leaders, project and Change Management teams, communications teams, operations, human resources, information technology, and all other staff. Stakeholders will not necessarily know what is expected of them or understand the future vision at the onset of implementing the Change Management Plan or a specific project. Therefore, managing stakeholders and clearly defining roles and outcomes is necessary for project success. This Stakeholder Matrix tool in the **Change Management Attachment** will provide clarity in understanding stakeholder perspectives, in order to track and monitor progress with them throughout the change journey. Additionally, this tool can help identify both advocates and blockers of change. Identifying and understanding stakeholders, and if they will advocate or block the changes, will be essential in tailoring the communications and engagement approach (defined in Phase 2 | Implement Plan). All impacted stakeholders within an organization should be included on the matrix to confirm the best groups are engaged.

Stakeholder management is an ongoing process and needs to be reviewed frequently throughout the project. Consider applying the identified stakeholder attributes from the matrix to a stakeholder mapping exercise to visually map out the elements. The example stakeholder map provided in Figure 26 can help identify where to designate Change Management resources to help ensure that the change is successful. Stakeholders who have a high level of interest in the change occurring and a high level of influence within the organization will be crucial in the success of the change. Stakeholders who have a high level of interest, but a low level of influence should be informed throughout the change.

Figure 26. Stakeholder Matrix



Key Player

- When stakeholders have a high level of interest in the change and a high level of influence, work closely with them to achieve results.

Meet Needs

- Keep stakeholders who have a strong influence but a low interest in the change satisfied and confident throughout the program.

Involve and Inform

- Stakeholders who have high interest in the change but have limited influence need to be kept informed throughout the program. Involve them in low-risk areas to maintain interest.

Keep Informed

- Stakeholders with limited influence and low interest in the change should receive general communications and responses to questions asked. Aim to engage and increase interest in these stakeholders.

Step 3 | Primary Leadership Sponsor Role Definition

The Primary Leadership Sponsor role needs to be defined at the onset of Sustainability Plan implementation and builds upon the defined change characteristics and organizational attributes of the change impact assessment. The Primary Leadership Sponsor role is crucial for successful change initiatives and is an essential deliverer of key messages about change with employees. It is best practice to have active and visible executive sponsorship as projects with strong, effective sponsorship demonstrate strong successful outcomes.[92] The Primary Leadership Sponsor will also inform direction on influential employees within the organization, usually managers or leaders, who in turn advocate for and approve of any changes.

The Primary Leadership Sponsor for the county's Sustainability Plan will take one of the following forms: 1) someone on the project and Change Management team, 2) a mid-level manager, 3) both an executive leader and a mid-level manager, or 4) a steering committee member and an executive leader. Progressively each of these four models requires more resources and power regarding project sponsorship. The higher organizational attributes (change-resistant) and change characteristics (large and disruptive) the project is, the greater the need for strong project sponsorship. The higher the impact and risk identified during the Change Impact Assessment, the more critical support and sponsorship from leaders in the organization is for project success.

The Primary Leadership Sponsor participates actively and visibly throughout the project and must build a needed coalition of sponsorship with peers and other managers. The Primary Leadership Sponsor will set expectations and establish clear objectives for the project while holding the project team accountable for results. The Primary Leadership Sponsor will attend frequent project review meetings and actively review progress. Employees will look to senior leaders, such as the Primary Leadership Sponsor, for messages (both spoken and unspoken) about the project's importance and the organization's commitment to the change. The Primary Leadership Sponsor has been identified as the number one contribution to change success when there is active and visible sponsorship across benchmarking case studies. Finally, the Primary Leadership Sponsor, in a senior leadership role, is one of the two preferred senders of messages about change, especially when the topic is about business drivers for change (the other being directly from an employee's manager, on topics of day-to-day impacts).

An additional effective tool around Change Management leadership is establishing an Executive Leadership Team for sustainability at the county, which would include the Primary Leadership Sponsor. All impacted groups/departments should be represented in the Executive Leadership Team. An example makeup of an Executive Leadership Team may have approximately five members, all executive peers who convene to receive progress updates and provide guidance, input, and leadership at a regular cadence. This is made possible with the collaboration and action of the Executive Leadership Team as a whole. Convening a team with decision-making authority all in one place to document decisions to move a project forward is an effective way to ensure schedules, scopes, and budgets can be maintained.

The support system for the change includes the Executive Leadership Team and the Primary Leadership Sponsor. Together they make the change possible. It is important that endorsement of change be given and that expectations are clear at the beginning of the project to ensure leaders can commit the appropriate amount of time and resources to the Change Management process. It can often be helpful to discuss with the Executive Leadership Team what they perceive to be the traits of effective (and ineffective) leadership, and how this relates to the change process. Examples of engagements with the Executive Leadership Teams include: setting a vision for the future, defining reason and context for change, discussing ways of promoting change, and defining challenges to understand where the barriers lie. A helpful tip for the Executive Leadership Team is to not assume everyone is advocating for the change at the onset, not everyone will be on board with change – each Executive Leadership Team member is somewhere on the change curve too. Work with the Executive Leadership Team and share the importance of their role in supporting other people through their journey.

92 https://www.prosci.com/resources/articles/change-management-best-practices

Step 4 | Overall Change Management Strategy and Team Readiness

Defining an overall, actionable Change Management strategy per project will require collaboration with the project management team, to understand project parameters that feed into the strategy. There are four actions that are required to define an overall Change Management strategy per project, including: scope definition, identifying stakeholders impacted, defining change type, and defining change magnitude.

The first action, defining the scope, needs to be considered for each specific project within the overall Sustainability Plan to scope the change. The scope of change will be informed by the specific project scope, which will be coordinated through the project management team. Similar projects may align to the same change management needs and can be combined in one change management approach to streamline processes. One example of projects with similar change management needs is a compost program strategy and a recycling program strategy. These have similar impacts on end users, so one change management approach to ensure end user buy-in, and therefore, strategy success, can be utilized. The second action is to determine the number of individuals impacted by the change. For example, any specific project may impact a single workgroup, department, division, or the entire county employee base. The third action is to define what type of change is occurring per project and implementation initiative. Change types that apply to the county's Sustainability Plan include policy, process, system, operations, organization, job roles, staffing level, and strategy. Additionally, defining what type of change is occurring can be informed by the six Focus Areas (Sustainable Governance, Facility and Fleet Decarbonization, High-Performance Buildings, Waste Reduction and Diversion, Open Space, Ecosystems, and Connectivity, and Health and Wellness). The final step in defining the Change Management strategy is to determine the amount of change that is occurring. Determine if the change is an incremental improvement, a dramatic change, or if the change falls somewhere in the middle.

Defining the future state will help to gain insight into crafting a Change Management strategy for a sustainability project. Specifically, knowing the ideal future state will help articulate the "why" behind the need for a change and build support from other stakeholders. Additionally, defining the future state will inform if the change has been a success during project delivery, tracking outcomes against progress. Identifying the future state will also identify gaps before the project commencement, align stakeholders so that everyone knows what change is occurring, and assist with prioritizing actions and resource allocation.

Finally, setting up the Oakland County team delivering Change Management is part of an effective leadership sponsor structure necessary for successful change. The Change Management team makeup can be one of the following: 1) project team members assigned Change Management tasks, 2) team external to the project team dedicated to the project to perform Change Management, 3) a combination of the previous two (with Change Management team on the project team, and also supported with a team outside to perform Change Management tasks). The third team makeup example may best support the county based on how it is structured today: with specific teams at the county who lead communications, trainings, and other necessary activities being specialized and supporting a Change Management team that is embedded within a project team.

The key is to have the Change Management team cohesively integrated with both the project team and the Primary Leadership Sponsor. The identified Change Management team will execute the Change Management Strategy through the specific plans detailed in Phase 2 | Implement Plan. The Change Management team members must have proven leadership qualities and be able to successfully manage multiple priorities and stakeholders in a fast-paced environment. Change Management team members must have excellent communication skills, high emotional intelligence and empathy, and be passionate about contributing to the successful implementation of the Sustainability Plan. Necessary key attributes of Change Management team members include the ability to inspire others, a strong understanding of Oakland County practices, forward-thinking, forward-looking, solution-oriented, confidence, and integrity.

Phase 2 | Implement Plan

Phase 2 actively engages project and Change Management teams through implementation of Change Management, using these planning tools that can be found in the **Change Management Attachment**: Communications Plan Template, Leadership Sponsor Roadmap Template, and Resistance Management Plan Template. These planning tools are integrated across overall implementation and specific project schedules to drive towards change buy-in and adoption. Once implementation is in motion, progress towards change and milestones are tracked to ensure Change Management plan alignment, and these findings are synthesized to report out to teams and leadership at regular check-ins.

The Communications Plan is a detailed matrix developed and tailored to topics specific to the Sustainability Plan strategies and Focus Areas. The items identified in the Communications Plan include the following for specific communications: targeted audiences, key messages, timeframe and frequency for issuance, and delivery methods and channels. Depending on the Change Management team structure, the Communications Plan may also include who is responsible and accountable to prepare and deliver specific communications. Additionally, when preparing the Communications Plan, it will be critical to have a current project schedule related to the Sustainability Plan strategies implementation. Knowing key project milestone dates and deadlines will directly relate to when communications are issued to staff and stakeholders. Once the Communications Plan is prepared, it should be discussed and issued with the project and Change Management team, the Primary Leadership Sponsor, and any department leaders who are needed to support changes in the Oakland County Sustainability Plan.

The Communications Plan template in the **Change Management Attachment** is to be used to complete this step in the process. Based on the Prosci ADKAR model referenced at the beginning of this Change Management Plan, the ADKAR steps the Communications Plan helps clarify on an individual bases are Awareness and Reinforcement. The following are critical details to consider and include when developing the Communications Plan:

- **WHO** is going to communicate the message to employees? Employees receive messages about change best from senior leaders or executives in the organization. Once the sender is identified, who will communicate the message to employees, consider the platform for presentation (e.g., live, recorded, text, and other platforms)
- **WHAT** behind-the-scenes information do employees need to know, or what is the reason for the project? For example, if a certain change could produce a positive result towards Oakland County's desire to lead by example, the important message is that Oakland County leads by example for sustainability.
- **WHEN** is it necessary to communicate information to employees? Communication is crucial for employees to buy-into the project, so delivering the message before the design or development has started is helpful. The best timing to introduce a project is at the project start-up. Reference the project timeline and pick the appropriate date and time for this message.
- **HOW** is the message going to be delivered? This message can be communicated via email, newsletter, meetings, etc. For example, Oakland County may determine a newsletter or a post on the Intranet site is the best fit to deliver the message.

The Leadership Sponsor Roadmap clearly outlines roles and responsibilities by project phase for the Primary Leadership Sponsor and Executive Leadership Team necessary to support the change project. Not only is this expressed in terms of roles of the Primary Leadership Sponsor by project phase, but also by stakeholder group in each phase. Creating identifiable actions that the Primary Leadership Sponsor and/or the Executive Leadership Team will complete to sponsor the change is a key activity of the Change Management team, outlined on the Leadership Sponsor Roadmap. The Primary Leadership Sponsor typically has a role in project management and Change Management. The Primary Leadership Sponsor will make project management decisions regarding resources, scope, strategy, and schedule for the project. The Primary Leadership Sponsor will also act to support change management through actively participating in the project, directly communicating with employees, and building buy-in with managers and employees.[93]

93 https://pminb.ca/images/downloads/SelfGrowth_Professional_Development_Days_2021/pminb_change_management_presentation_may_13_2021.pdf

All of these roles, responsibilities and expectations of the Primary Leadership Sponsor are included and detailed in the Roadmap. The Leadership Sponsor Roadmap will directly affect the Prosci ADKAR model steps of Awareness, Desire, and Reinforcement. The Primary Leadership Sponsor has less of a direct and active role in impacting Oakland County employees development of knowledge and ability, which is more likely to be developed through managers and peers through training. The Leadership Sponsor Roadmap template in the **Change Management Attachment** is to be used to complete this step in the process. The process for the Change Management team to follow in development and delivery of the Leadership Sponsor Model is as follows:

- **Prepare** the Leadership Sponsor Roadmap for the Primary Leadership Sponsor using the template provided in the attachment.
- **Provide** the Primary Leadership Sponsor with this Roadmap through review and discussion to confirm understanding and commitment from leaders of the change.
- **Facilitate** and assist the Primary Leadership Sponsor in completing the Roadmap throughout the project process. The Change Management team will be an ongoing aide to the primary sponsor to support the project team, align any other critical sponsors of the change, and provide direction and create awareness with employees.

The Resistance Management Plan is a proactive approach to managing resistance, and entails preparing for areas of resistance at all levels of the organization. The Resistance Management Plan can be built with the foundation of the Change Impact Assessment results from Phase 1 | Assess and Align Plan, that forecasted areas where issues may need to be confronted. The Resistance Management Plan provides guidelines for handling resistance before encountering actual resistance. This will help find the source of resistance during project delivery and increase the success of the Change Management Plan.



Once the Resistance Management Plan is prepared, one of the key aspects of executing the plan will be to have conversations with individuals identified as resistant to the change. Preferably, these discussions would be led by the individual's direct supervisor and conducted face-to-face. In order to prepare for these conversations, to generate dialogue and response, consider these question prompts:



Prosci's top ten tips for leading these conversations:



For changes being implemented that are radical changes with medium to high risk, one key tool to proactively manage resistance is to offer opportunities for employees of Oakland County to engage at the on-set of projects and throughout the project delivery process. An early focus on reinforcement helps create employee buy-in through co-creation and ultimately increase the likelihood of sustaining the changes being implemented. It is also recommended to ensure alignment and tracking against the remainder of the other elements of the Change Management Plan if areas of resistance to the project implementation are identified within Oakland County. For example, if the Communications Plan as detailed is not following and meeting plan, this could be a source of resistance, because adequate communications are not reaching employees. If everything is tracking as planned, the Resistance Management Plan can then be relied upon as the most important area of focus.

Based on the outcomes of the Resistance Management Plan, individual coaching and training plans can be developed to bring each person along with the change – meeting them where they are, with what they need, in response to changes that impact them. It is recommended that coaching and training development align with Oakland County employee training means and methods for content development and delivery. Based on the Prosci ADKAR model referenced in this plan, the step of that model the Resistance Management Plan helps effect on an individual basis is Desire. The Resistance Management Plan template in the attachment of this document is to be used to complete this step in the process. Below are critical details to consider and include when developing the Resistance Management Plan:

- **WHAT** might resistance look like when implementing the Oakland County Sustainability Plan? How will the Change Management team identify resistance? What strategy will you use for managing resistance for employees of all levels? Direct supervisors or high-level managers are typically the best way to manage resistance to change coming from an individual.
- **WHEN** implementing the Oakland County Sustainability Plan, where are different levels of employees within the organization anticipated to become resistant?
- **HOW** has the prepared approach to managing resistance been reviewed and discussed with the Primary Leadership Sponsor?
- **HOW** has the Resistance Management Plan been communicated to managers and coaches, so they use it during employee sessions? Sessions include all-staff meetings, coaching, training, and individual development planning.

Finally, while change implementation is ongoing, ensure that you are tracking project and change milestones through the use of the Change Management Plan and tools. These findings are to be shared at regular project and Change Management check-ins to either redirect course or celebrate alignment.

Phase 3 | Sustain Plan

Phase 3 focuses on sustaining change adoption and integration long-term. This entails measuring performance, celebrating success, identifying and addressing areas of resistance, and integrating the project and changes into day-to-day operations within Oakland County. When focusing on sustaining the Change Management Plan, gather feedback across all levels of the organization. Create corrective action strategies based on feedback received from the organization. Use resistance management to understand and identify where resistance may exist and strategize how to manage that resistance.

Within 30 to 60 days after project completion, a reflective session is encouraged to be held with leaders (including both project and Change Management leaders, and overall Sustainability Primary Leadership Sponsor as required) to document lessons learned throughout the project. This will be the first line of feedback about the Change Management Plan delivery across the Sustainability Plan implementation. These sessions can be held per project or per Focus Area. They can be repeated when a major delivery milestone is reached for other areas of implementation.

The primary focus of this session will be to identify what worked well and what needs improvement during project implementation, and where gaps are that impacted the success of the change. This session should focus on Change Management application of communication, stakeholder, and leadership strategies in relation to project delivery. The project team can be included to debrief on lessons learned for the technical project delivery as well.

The next step to gathering feedback is to conduct employee end user feedback sessions about Sustainability Plan implementation and project delivery. Employee and end user feedback sessions will include prompts aimed at learning where the responder is on the change curve, utilizing the ADKAR model, to know how to interpret the feedback. From this feedback, it can be determined if there are any corrective actions required because of identified resistance or issues to realign and maintain progress toward sustaining implemented changes. Additionally, another area of focus in feedback sessions can be to understand areas that are cause for celebration because of successful change adoption. This can be done throughout the project as a vital tool to build momentum and positive buzz around an atmosphere of rewarding success.

Feedback can occur formally or informally and can be proactive or reactive. Planned and organized feedback, considered formal feedback, may include online forms, team meetings, and question and answer sessions. Examples of informal feedback include conversations in passing, general emails, and casual discussions with colleagues. Managers and supervisors are key sources of feedback. Employees are more likely to discuss change honestly and openly on a daily basis with their peers and in many cases their supervisors. This candid feedback is helpful in diagnosing gaps and developing approaches to managing resistance. The lessons that emerge from this informal feedback may not be fully disclosed in your organized, formal feedback channels.

Employee and end user feedback can be gathered across various channels and methods including surveys, comment boxes at live events, focus groups, outreach within business units and direct supervisors inquiry to teams, and finally, a resource through which employees can reach out with questions and input (such as a generic email where all feedback can be received throughout the project process).

Finally, to reiterate the significance of their role, leaders and sponsors are critical influencers to sustaining lasting change over time. It is important to have a discussion with leadership to determine how they feel they can support the change going forward. Leadership and sponsor visibility is critical throughout and after change.

To reiterate and support resistance management (Resistance Management Plan developed in Phase 2 | Implement Plan, to be utilized here) leaders across Change Management should continue to be role models and listen to the feedback from team members. More key actions include celebrating milestones and rewarding behaviors that are in line with the change, calling out behaviors that do not align with the change, and continuing to monitor impacted teams and individuals through the change curve and ADKAR model. Remember that some colleagues will take longer to accept the change than others.

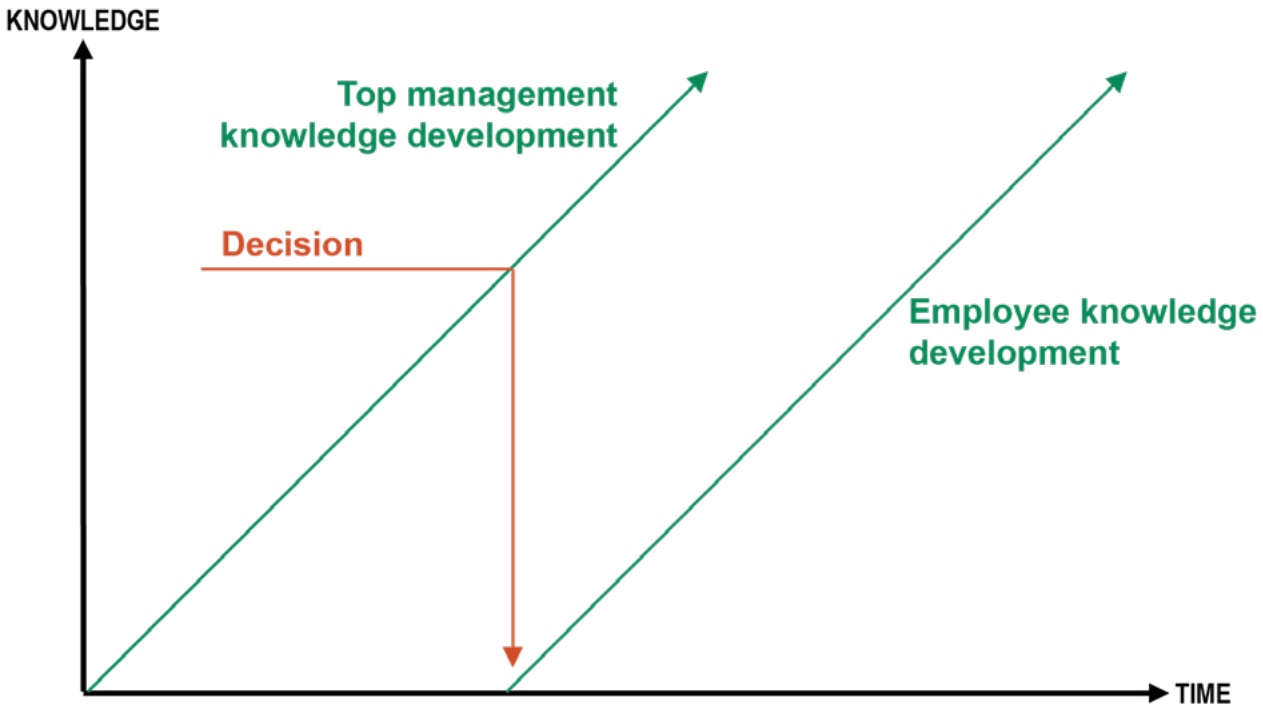
Change Management Plan | Conclusion

Two final tools are provided here to both provide empathy for those in Change Management roles, and to assist with mitigating resistance, in parallel to the Resistance Management Plan. Diagnosing gaps and managing resistance is an ongoing process. Although depicted in the Change Management process at the conclusion, the Change Management team can view these and other tools as ongoing activities through the project. These two models conclude planning and action of the Change Management Plan; however, these phases, tools, and teams can be applied cyclically throughout any given change or project as needed, to ensure successful change adoption.

The motivation gap shown in the diagram in Figure 27 demonstrates that knowledge about a specific topic or change is different per stakeholder group over time. Knowledge about the importance of the change can lead to motivation gaps between stakeholder groups. This tool can be used in workshop sessions with leaders, managers, and staff to empathize with colleagues. When used with leaders to empathize with colleagues, it can help reframe challenges their colleagues may experience when attempting to assimilate new information, behaviors, or protocols. When the motivation gap model is applied to Change Management, it highlights two things: the lag in time that exists between the development of a strategy, vision, or decision, and how to be successful with communications to inform employees about it.

When using the motivation gap model, consider the following engagement activity: Visualize a time they heard about a change in their life, and what other stakeholders were involved. Ask them to discuss what helped them during the change process, and how they can use their experiences to apply to the Sustainability Plan.

Figure 27. Motivation Gap



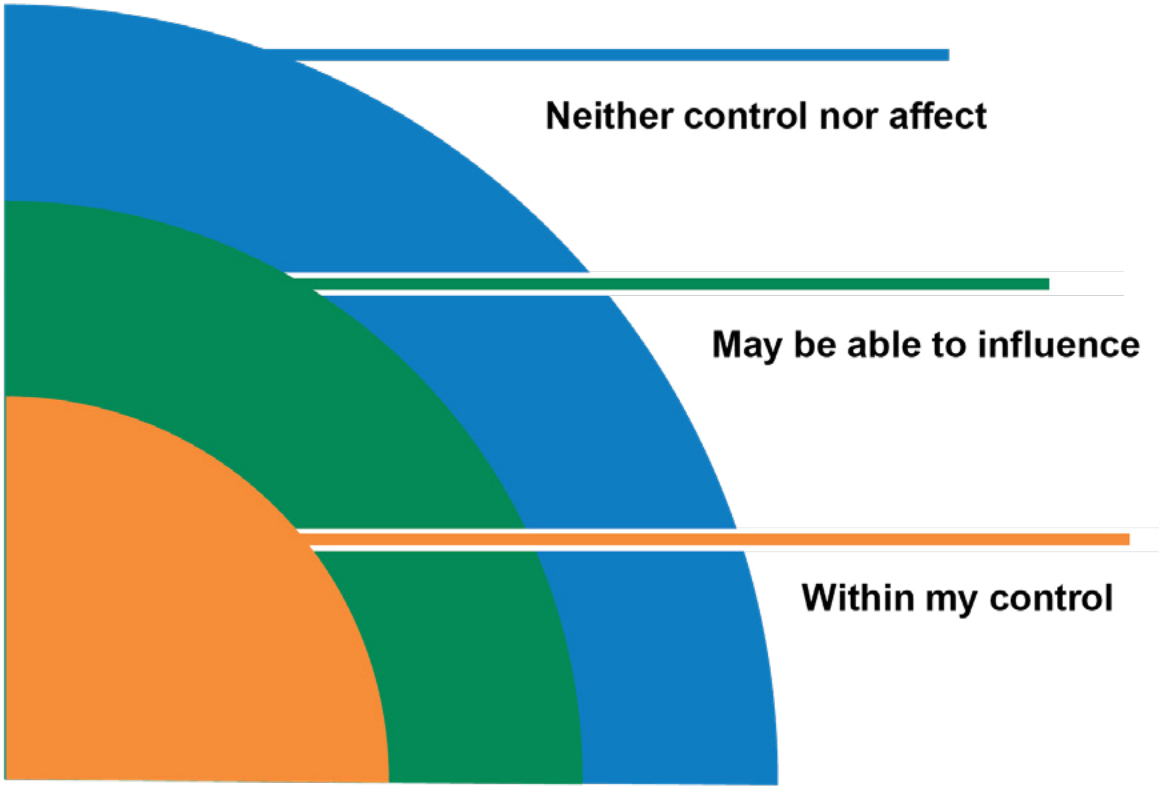
Finally, the influence model aims to assist employees in identifying areas of change that they can influence or control.

When a change process begins, use the influence model to reflect upon the following prompts with various stakeholders: *can you challenge this decision, can you influence the implementation of the decision, and what actions can you take to help embed and embrace the change?*

These prompts can be asked for each aspect of the change, whether it be a policy, work process, or team-based change, and each aspect could be mapped onto the model diagram in Figure 28 in a workshop setting with participants. Visually mapping and documenting specifically where their span of control is per aspect of the change could aid in change acceptance, and therefore progress towards success.

This Change Management Plan, tailored for the county's Sustainability Plan implementation, is a tool to establish end user adoption to provide successful and lasting change. This plan defines a process running in parallel for the 'people' side of change, alongside technical solutions implementation. In turn, the success of specific sustainability strategy implementation will help advance the county's Strategic Framework community objectives and goals.

Figure 28. Influence Model





Appendix E

Sustainability Plan Vision and the Asset Management Framework

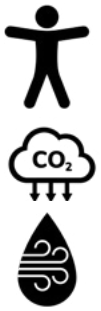
A key component of the county's sustainability Vision is to create an accessible, safe, and welcoming campus that contributes to a positive service experience for all and demonstrates efficient, equitable, and low-carbon operations. Establishing an asset management framework grounded in sustainability is a foundational step towards transparent and achievable action in this regard. As it relates to the county's Sustainability Plan's Guiding Principles, an asset management framework can:



Operationalize diversity, equity, and inclusion through rooting decision-making processes in data and organizational values to remove potential bias in asset planning and enable equitable distribution of O&M resources.



Create education and engagement opportunities through increasing exposure to content relating to asset performance and the county's asset management practices—for asset managers and asset users alike.



Provide accessible services and campus environment, **advance the net zero carbon goal**, and **improve air and water quality** through proactively identifying opportunities to improve asset efficiency, emissions, and accessibility throughout their lifecycle, not just at end of life.



Maximize resource efficiency through not only optimizing county assets' performance over their entire lifecycle, but also optimizing the use of county personnel and financial resources for asset management.

This framework is meant to serve as a foundation from which the county can develop a comprehensive Asset Management Plan, like that described in the strategy S3. Develop an Enterprise Asset Management Plan in the Sustainable Governance Focus Area section. The framework reflects the county's Sustainability Framework through integrating examples of how implementation of asset management best practices can enable environmental, social, and economic sustainability.

Asset Management Overview

Asset management is an integrated process that involves interdisciplinary and interdepartmental collaboration to manage existing and planned assets. When developed and applied correctly, asset management programs streamline organizational and data processes, reduce operational costs, and increase resource and operational efficiencies. An enterprise-wide Sustainability Asset Management Framework would help county government realize these benefits and, more specifically, provide departments with uniform and structured guidance for O&M of assets, capital planning for new and existing assets, and evaluating asset performance in line with the county's sustainability Vision. In turn, county residents, businesses, and CVTs experience benefits as well.

Benefits to County Staff and Operations:

- Lower long-term maintenance, operations, and preservation costs through streamlining existing procedures to improve operational efficiency
  - Introducing uniformity across departments to increase staff familiarity and comfort with asset management data, workflow, tools and clearly defined roles and responsibilities
  - Consolidating and automating workflows
- Access to new state and/or federal infrastructure funding streams that require applicants to demonstrate an established asset management program
- More effective utilization of available resources (including taxpayer dollars) and pursuit of funding opportunities available to priority projects

Benefits to County Residents, Businesses, and Local Governments:

- Improved performance of shared or publicly used assets and mitigated risk from reducing maintenance backlog
- Improved credibility and accountability for decision-making through clear demonstration that investments are aligned with the county's goals and resources, and as a result, improved communication between staff, elected officials, and the public
- More equitable distribution of Country resources

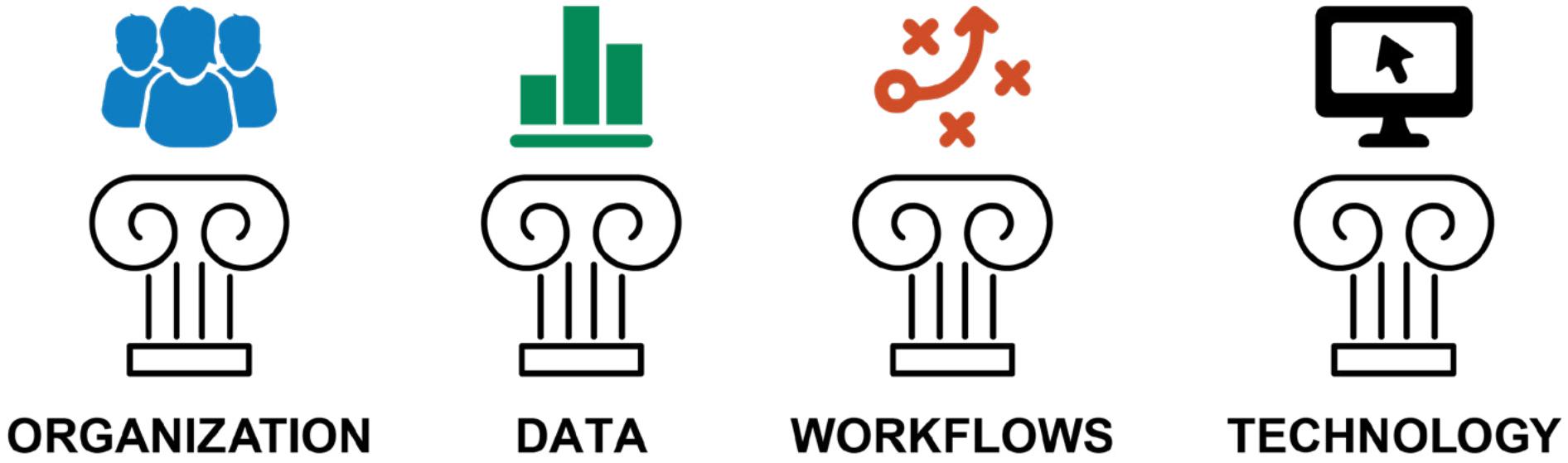
To capture these and additional benefits, the Sustainability Asset Management Framework builds upon the Four Pillars of Asset Management (organization, data, workflows, and technology), the Sustainability Framework, S1. Standardize Business Management Tools and Workflows Across Departments, and Tracking Sustainability Progress. The Framework is organized according to the Four Pillars, with Sustainability Plan ideals woven throughout.

Asset Management Framework Pillars

AECOM's Four Pillars of Asset Management—organization, data, workflows, and technology—collectively provide a structured framework for evaluating current asset management practices and identifying opportunities to incrementally improve performance.

As with sustainability planning, a key tenet of asset management is that beginning to make some improvements is better than making none. This Framework was designed recognizing that the county, the county's departments and divisions, and even the CVTs the county serve will progress along a maturity continuum of improving asset management capabilities. As such, the Four Pillars can be adapted and "right-sized" to reflect any organization's vision, resources, and experience, so that it can be applied at the county level, within specific departments and divisions, and by other peer municipal and regional governments.

The following principles, organized by Pillar, represent best practices for establishing an asset management strategy that empowers sustainable procurement and O&M of assets at any scale. The connection between each Pillar and the triple bottom line of sustainability is also exemplified in the following sections.



Organization



People and leadership are vital to successful implementation and sustainable operation of asset management programs. To establish cross-departmental accountability and an ongoing collaborative approach to asset management, the Sustainability Asset Management Framework was developed from the county's overarching sustainability Vision and goals that should resonate equally with county subject matter experts in finance, decision-making, and planning and operations within different service areas.

The following organizational best practices help establish standards, assign roles and responsibilities, and systematizes hierarchies for decision making.

1. Develop a standardized and coordinated approach to asset management across organizations while recognizing that operating units may have differing levels of maturity, have varying capabilities or capacity to track data, operate under different missions, and leverage different funding sources that may carry specific requirements.
    - 1.1. Adopting a standardized the asset management approach can position the county to leverage economies of scale for maintenance activities and support more accurate budget forecasting and capital planning.
        - 1.1.1 Coordinating bulk shipments of materials can not only save costs, but also reduce the county's supply chain emissions.
    - 1.2. Increased cross-departmental coordination from standardization can facilitate knowledge sharing and build collective capacity.
2. Establish indicators for evaluating asset performance that reflect sustainability principles, such as lifecycle cost, environmental impact, and asset criticality to continued operations.
    - 2.1. Regularly monitor and use indicators to re-evaluate asset management priorities and strategies.
    - 2.2. Include Sustainability Framework objectives and KPIs in asset management performance frameworks.
3. Explicitly map roles to asset management workflows for the most active participants (both at the enterprise and departmental or divisional levels) and establish expertise redundancy.
    - 3.1. Establish an asset management charter to formalize stakeholder (e.g., county staff, contracted vendor) roles and maintain accountability for accomplishing responsibilities according to defined workplans and schedules.
        - 3.1.1 Be alert to unconscious biases when forming stakeholder teams and assigning responsibilities.
        - 3.1.2 Plainly state the team's sustainability values and how they are reflected in the Asset Management Plan.
        - 3.1.3 Include budget, grant awards, or other funding requirements as an on/off ramp for critical workflows.
    - 3.2. Develop organizational maps that associate both individual staff members and generalized roles with fundamental workflows.
        - 3.2.1 Consider workflows at the enterprise, department, and division levels, and link to asset data and performance reporting (including that for sustainability) so it can also be rolled up through this hierarchy.
        - 3.2.2 Identify feedback channels between stakeholders and opportunities for succession and expertise redundancy.
            - 3.2.2.1 Establishing expertise redundancy can improve organizational resilience to natural hazards.
        - 3.2.3 Indicate generalized roles alongside specific contacts at multiple levels of the hierarchy to support more efficient information transfer as staff transition into new roles.

Example of an Existing Best Practice

The Parks and Recreation Department manages a dashboard to track implementation of Strategic Plan actions (including actions related to asset management), asset usage and user satisfaction, and asset financial value. Additionally, the Department established a "Priority Investment Rating" to direct funding towards assets that are highly valued by the community but may be underperforming (i.e., assets are unable to completely fulfill community needs in their current condition).

Data



Data collection, analysis, and management is where much of the effort to implement an asset management framework and plan is expended. Understanding best practices for data management related to existing asset inventories, recorded characteristics, and projected performance can help inform more effective planning, purchasing, and implementation of future assets.

1. Assign assets unique but standardized numerical IDs that are tied into an asset hierarchy.
    - 1.1. Continue to assign IDs at the time of purchase.
        - 1.1.1 Assign entirely numerical or alphanumeric IDs for improved data processing.
        - 1.1.2 Provide indication of the asset owner, location, and type within asset ID taxonomies and hierarchy.
        - 1.1.3 Structure IDs so they are easily interpretable to staff with varying levels of experience in asset management.
        - 1.1.4 Retain an up-to-date record of asset IDs. If IDs are changed to conform with a new naming convention, show a history of old and new IDs.
    - 1.2. Tag assets with scannable barcodes or QR codes (generated from their IDs) that map to their asset inventory profile.
        - 1.2.1 Ideally, tag all assets greater than $5,000 in value and interrelate tag numbers and asset IDs.
        - 1.2.2 Using RFID and GPS-enabled tags saves staff time and resources to locate assets.
2. Prioritize thorough data collection and maintenance for the division's most critical assets; right-size the appropriate level of effort at the divisional level.
    - 2.1. Remain vigilant against potential biases when prioritizing asset criticality.
    - 2.2. Involve the teams or individual staff performing O&M to define a "right-sized" data collection approach, both with respect to the number of assets for which data is collected and the amount of data collected for each asset.
        - 2.2.1 Involving the teams that perform O&M in data collection will mitigate potential resistance toward accepting new data collection workflows and tools.
    - 2.3. Where possible, consider implementing remote data collection and monitoring tools for critical assets to support early identification of potential failures.
        - 2.3.1 Remote data collection and monitoring for critical assets can improve organizational resilience to natural hazards.

3. Fill gaps in existing asset inventories so each asset profile includes a comprehensive maintenance history (e.g., link work orders to an asset profile to track historical asset condition data).
   - 3.1. Confirm lifecycle data (e.g., depreciation, level of deferred maintenance, replacement/demolition value) is gathered and regularly updated for each asset.
     - 3.1.1 Automated computation and updates to asset deterioration curves from lifecycle data can mitigate risk of asset failure.
     - 3.1.2 Maintaining up-to-date asset data can help teams more accurately forecast maintenance budgets.
   - 3.2. If not already included, consider updating lifecycle cost methodologies to reflect environmental and social costs (e.g., potential carbon pricing schemes)
   - 3.3. Expand inventories to include indicators of asset criticality to continued operation to support maintenance prioritization, especially when funding is constrained.
     - 3.3.1 Consider equity in prioritizing near-term levels of service.
4. Within data standards, specify who is responsible for completing each field, rules for completing each field (e.g., character types and limitations, and consistent nomenclature), and how often each field should be updated.
   - 4.1. Develop data standards so they can be clearly interpreted by staff with varying levels of experience in asset management.
   - 4.2. Review definitions of asset criticality or condition (i.e., language as being in "poor" versus "average" or "good" condition) for potential implicit biases.
   - 4.3. Align data collection cycles with internal budgeting and external funding application cycles and emissions reporting cycles.

Example of an Existing Best Practice

The Parks and Recreation Department inventories assets at the system, facility, and equipment level. At the equipment level, completed asset profiles include a numerical asset ID, type, location, manufacturer, model number, serial number, installer, utility requirements, start/end/length of life cycle, and cost. The profile also indicates when it was last updated and by whom.

Workflows



Workflows, or processes, help asset managers align budgetary and O&M decisions, recognize and respond to risk, and receive and address feedback from asset users. Workflow best practices involve designing, implementing, and clearly communicating processes to provide streamlined and effective services.

1. Perform condition assessments at least once every five years to maintain accurate asset deterioration forecasts.
   - 1.1. Define assessment cycles based on an asset's criticality and the level of risk associated with asset deterioration (i.e., assets critical to county operation/that carry higher risk of failure when deteriorated should be assessed more frequently).
     - 1.1.1 Where feasible, perform energy, water, and waste audits as part of broader condition assessments to improve operational efficiencies (see strategies H1. Perform Energy Audits at Target Facilities and H4. Perform a Campus-Wide Water Audit for more information).
     - 1.1.2 Collect data related to safety, ADA compliance, and other accessibility considerations to support implementation of strategy S7. Perform an ADA Compliance Study and the study's resulting recommendations.

1.2. Integrate assessment templates into software tools to allow more automated data entry and comparison across assets.

1.2.1 For teams that use Cityworks, leverage field applications that will become available through the latest software upgrade; for teams that do not, leverage digital forms that integrate into databases or output information into spreadsheets (e.g., Microsoft Forms).

1.2.2 Use compatible data standards to increase interpretability and effectiveness of assessment data.

1.3. Structure assessment templates to translate observations into a prioritized list of O&M tasks and/or new capital investments.

1.3.1 Use sustainability criteria (e.g., carbon reduction potential normalized by dollar value) to prioritize O&M tasks and capital investments.

2. Prioritize proactive maintenance to enable long-term savings and improved performance across the triple bottom line (e.g., prolonged equipment efficiency, increased reliability of budget forecasts, and reduced risk of sudden failure and associated safety hazards and expenses).

2.1. Build organizational capacity to conduct proactive maintenance through upfront investment in work order systems

2.1.1 When new assets are purchased, establish recurring work order tickets for preventative maintenance tasks

2.2. Leverage asset maintenance history to proactively schedule and prioritize maintenance.

2.2.1 Develop a library of formalized workflows specific to the most common maintenance requests or work orders and other asset management tasks.

3. Provide asset users with instructions of how to submit a work order for routine maintenance requests and notify staff of emergency maintenance needs.

3.1. Streamlined communications procedures can provide shorter repair and replacement turn-around times and more efficient use of funding sources.

3.2. Establish separate processes, contacts, response time expectations, etc. for addressing emergency maintenance requests.

3.2.1 Provide additional instruction regarding the types of failures that warrant emergency maintenance (to both users and maintenance teams).

3.2.2 When the county is facing increased risk of a natural hazard, remind users of emergency maintenance procedures to increase site resilience.

3.3. Work order and emergency notification systems should be accessible to customers with disabilities. Provide accessible alternatives if primary systems are not accessible (e.g., a telecommunications relay service or text service for deaf and hard of hearing staff).

Example of an Existing Best Practice

Use of a work order system provides the necessary foundation for the county's Facilities Maintenance and Operations Division (FMO) to efficiently track asset maintenance history and manage maintenance resources. Additionally, in their using of recurring work orders for preventative maintenance and creation of templates for recurring maintenance requests, FMO has begun to automate/streamline maintenance workflows. Cityworks can also autogenerate cyclically recurring work orders following customer submission of a reactive maintenance request so staff can further improve proactive maintenance in the future. Finally, FMO has established a separate workflow to elevate emergency maintenance requests: county staff are directed to call directly rather than go through Cityworks.

Technology



Technology is the means of delivering the Asset Management Framework and subsequent Plan. By using technology to collect, store, and interpret data, asset managers can better articulate data trends, reconcile outlier data points, and use data to make decisions about how to most effectively prioritize resources. Transitioning to a standardized system across all county departments would allow for increased operational efficiencies, but the system should provide flexibility so county departments can customize how it best serves them.

Technology best practices help distill objective information and thus better allow staff to apply subjective judgment for critical decisions, allowing for greater data transparency, justification in decision-making, and clearer understanding of processes, data limitations, and risk management.

1. Integrate asset, labor, material, equipment, and other financial data in one enterprise-wide system, or link asset management and mapping tools (e.g., Cityworks, GIS Indoors) and financial information systems so data streams are automatically shared between platforms.
    - 1.1. Establish enterprise-wide, platform-agnostic data standards and implement data governance gateways to enforce standards within data processing workflows.
        - 1.1.1 Leverage or map to a common asset ID system (i.e., translate between Cityworks, Workday, and GIS/CAD asset IDs).
    - 1.2. Incorporate asset condition data into system-scale drawings/maps to more easily identify hotspot areas of poor/good performance.
    - 1.3. Leverage user acceptance testing and sign-off to confirm software meets scoped requirements.
2. Compliment detailed step-by-step user guides for software systems with one-pagers (often provided by the software vendor).
    - 2.1. To ensure guides are user friendly, include a table-of-contents, version control table, annotated screenshots, and information on who to contact for additional information.
        - 2.1.1 Only distribute guides electronically to conserve paper resources.
        - 2.1.2 Guides should be accessible to staff with disabilities (e.g., annotated graphics should include alternative text).
    - 2.2. Structure guides so different teams can easily distinguish between foundational, capacity building, and more innovative modules and determine the optimal level of investment for their needs.
    - 2.3. Update the guides after major software upgrades or every three years (whichever is more frequent) to reflect new features and gained efficiencies from becoming more comfortable with the software over time.
3. Establish clear communication channels between software administrators from the vendor, IT, and individual user organizations.
    - 3.1. Ask software account managers to share best practices for how users can best leverage systems to advance environmental sustainability goals.
    - 3.2. Establishing strong technology support teams can facilitate expedited knowledge sharing and build collective capacity, enabling teams to more efficiently maximize the value of software systems.

Example of an Existing Best Practice

Cityworks is a well-regarded asset management tool. Most county facilities have been integrated into the tool, and it has been implemented at an appropriate scale for the county's operations. The county's pursuit of additional upgrades to the system will further enable efficient and sustainable asset management.

Additionally, the county has developed two step-by-step guides to educate county employees on how to complete the following tasks in Cityworks: submit and process work orders, add or delete a task associated with the work order, add internal labor and/or contracted estimates to a work order, and add materials from the stock room to a work order. The guide is searchable and includes annotated screenshots and, where applicable, a clear definition of different dropdown menu choices.

Appendix F



Financial Analysis Methodology

Oakland County's consultants conducted a financial analysis for the strategies listed below. This appendix includes the analysis methodology for each of these strategies.

F2. Pursue On-Site Solar Generation at Key Campus Locations

F3. Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

H2. Complete Campus-Wide LED Lighting Conversion

D2. Expand Recyclable Material Collection and D3. Expand Organic Material Collection

O1. Improve Connectivity with Non-Motorized Pathways

F2. Pursue On-Site Solar Generation at Key Campus Locations

Following industry practice and taking into account the nuance of the solar purchase investment, a market standard solar analysis template for cash purchase was utilized. It accounts for the capital costs of the carport and ground-mounted systems along with electric savings from energy production.

The Farmers Market parking lot, the public parking lot, and open space west of the Sheriff's Administration Building were used as indicative investment locations for the purpose of this analysis. Based on preliminary desktop analysis, the Farmers Market parking lot could host an approximately 800 kW carport system, generating approximately 1 million kWh of electricity per year. The public parking lot could host an approximately 1900 kW carport system, generating about 2.5 million kWh per year. Last, the space west of the Sheriff's Administration Building could host an approximately 2,000 kW ground-mount system, generating about 3 million kWh per year.

To calculate the upfront capital costs, a turn-key price per kW for carport and solar PV systems was used and a 5% contingency was added.

To calculate the payback period, the values of ITC and depreciation were subtracted from the total cost of installing the solar PV systems. The ITC for 2024 is assumed to be 22%. By using a Tax Equity Partnership funding mechanism, the net capital outlay after application of bonus depreciation and the ITC was calculated. For this analysis, as the county does not have tax liability to apply tax credit against, so it was assumed that only 80% of tax benefits would be received back through tax equity partnership. In other words, the county would buy a $1 tax credit for 80 cents. This calculation also assumes a 26% tax rate.

Table 16. Solar Installation Type, Size, Production, and Cost

ITEM	FARMERS MARKET PARKING LOT	PUBLIC PARKING LOT	OPEN SPACE WEST OF THE SHERIFF'S ADMINISTRATION BUILDING	THREE SYSTEMS COMBINED
System Type	Carport	Carport	Ground-mount	Carport, Ground-mount
System Size (kW-DC)	800	1,900	2,000	4,700
Production (Year 1) (kWh)	1,000,000	2,500,000	3,000,000	6,500,000
Production Ratio (kWh/kW)	1,250	1,316	1,500	
Turn-Key Price per KW[95, 96]	$3,900	$3,900	$1,900	
System Price	$3,120,000	$7,410,000	$3,800,000	$14,330,000
System Price after 5% Contingency	$3,276,000	$7,780,500	$3,990,000	$15,046,500
Net System Price after ITC and Bonus Depreciation	$2,121,850	$5,039,393	$2,584,304	$9,745,546

Additional costs after system installation include ongoing annual O&M costs ($5/kW) and one time inverter replacement cost ($10/kW) at year 15.[97] Ongoing annual O&M costs would increase slightly each year due to a 3% inflation rate.

On the revenue side, the electricity savings were calculated based on the estimated electricity production. The National Renewable Energy Laboratory's (NREL) PVWatts calculator was used to determine estimated electricity production for each system type.[98] Production would then decrease slightly over time due to a 3% solar degradation in year one and 1% annual solar degradation thereafter.[99] An electric rate of $0.08/kWh with a 2.25% annual escalation factor was assumed to calculate electric cost savings.[100]

95 The average market price is $3,000-4,500/kW depending on the design and features, such as built-in lighting, stormwater management system, columns configuration, steel pricing etc.

96 The average market price is between $1,700-$2,000/kW.

97 The typical warranty for inverters is 12 to 15 years.

98 https://pvwatts.nrel.gov/

99 The exact degradation rate would be based on the solar panels specifications. Solar panel performance warranties generally allow for 2-3% degradation in their first year and 0.5%- 1% each year after.

100 The base utility rate is derived from actual 2020 utility bills and escalated to the year of 2022.

Given the initial capital outlay, ongoing costs, and potential savings, the market standard solar analysis model yielded results in Table 17.

Table 17. Key Solar Installation Financial Analysis Outputs

ITEM	FARMERS MARKET PARKING LOT	PUBLIC PARKING LOT	OPEN SPACE WEST OF THE SHERIFF'S ADMINISTRATION BUILDING	THREE SYSTEMS COMBINED
Capital Outlay	$2,100,000	$5,000,000	$2,600,000	$9,700,000
Ongoing Costs: Annual O&M (Year 1)	$4,000	$9,500	$10,000	$23,500
Ongoing Costs: Inverter Replacement (Year 15)	$8,000	$19,000	$20,000	$47,000
Annual Electric Savings (Year 1)	$80,000	$200,000	$240,000	$520,000
Payback Period (Years)	24.5	23.3	11.2	17.9
ROI	4.1%	4.3%	9.0%	5.6%

F3. Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

Given a five-year depreciation schedule, the consultant calculated a regular replacement schedule that evenly replaced 100 existing vehicles over a five-year time frame. They have identified three vehicle types within the county fleet for near-term replacement. These vehicle types, along with example models in the county's fleet, comparable EV models, and the number of each replaced in the analysis are shown in Table 18. Cost, availability, and vehicle specifications at the time of replacement will determine actual EVs purchased.

Table 18. Fleet Vehicles Replaced

REPLACEMENT TARGETS	EXAMPLE ICE MODEL	COMPARABLE EV MODEL	NUMBER OF VEHICLES REPLACED
Passenger Sedan	Chevrolet Impala	Hundai Ioniq	25
Full-Sized Pickup	GMC Sierra 1500	Tesla CyberTruck	50
Multipurpose SUV	Ford Explorer	Cadillac Lyyriq	25

The cost to the county is shown as the difference between the higher priced EV versus the comparable ICE model in the Detroit market. The annual fuel costs for ICE vehicles and EVs were calculated and compared to determine the relative annual savings offered by EVs. ICE vehicle costs included the average price of regular fuel in Michigan on May 22nd, 2022. EV costs were calculated using the average electricity rate paid by the county in 2021 and accounted for battery capacity when determining annual electricity consumption. Assumptions relating to vehicles can be seen in Table 19.

Table 19. EV Assumptions

ITEM	ASSUMPTION
Miles driven per year[101]	20,000
Average Electric Rate[102]	$0.08/kWh
Unused Electric Battery Capacity[103]	10%
Gasoline Price[104]	$4.56/gal
Chevy Impalas Replaced	25
Chevy Impala Cost[105]	$37,662
Chevy Impala Fuel Economy[106]	4.5 gal/100 miles
Hyundai Ioniq Cost[107]	$38,829
Ioniq Battery Capacity[108]	38.3 kWh/170 miles
GMC Sierras Replaced	50
GMC Sierra Cost[109]	$35,655
GMC Sierra Fuel Economy[110]	5.9 gal/100 miles
Tesla CyberTruck Cost[111]	$40,000
CyberTruck Battery Capacity[112]	200 kWh/476 miles
Ford Explorers Replaced	20
Ford Explorer Cost[113]	$39,991
Ford Explorer Fuel Economy[114]	5 gal/100 miles
Cadillac Lyriq Cost[115]	$60,000
Cadillac Lyriq Battery Capacity[116]	100.4 kWh/300 miles

101 Based on the county's normal replacement of target of a vehicle of 60 months and/or 100,000 miles.

102 Based on Oakland County historical electricity bills. For purposes of this financial analysis, no escalation rate was applied for future years. This provides a more conservative approach given recent increases in and volatility of gas prices which impact the cost differential between ICE vehicles and EVs.

103 https://www.drivingelectric.com/your-questions-answered/96/electric-car-battery-life-how-preserve-your-battery

104 Average price per gallon of regular gasoline in Michigan on May 22, 2022 (https://fuelinsights.gasbuddy.com/home).

105 https://www.edmunds.com/chevrolet/impala/2020/vin/1G1105S37LU105021/?radius=6000

106 https://www.fueleconomy.gov/feg/bymodel/2016_Chevrolet_Impala.shtml

107 https://www.edmunds.com/hyundai/ioniq-electric/2021

108 https://www.hyundaiusa.com/us/en/vehicles/ioniq-electric/compare-specs

109 https://www.cargurus.com/Cars/new/nl-New-GMC-Sierra-1500-Detroit-d116_L16090

110 https://www.fueleconomy.gov/feg/bymodel/2016_GMC_Sierra.shtml

111 https://www.carwow.co.uk/tesla/news/4408/tesla-cybertruck-price-specs-release-date#gref

112 https://ev-database.uk/car/1248/Tesla-Cybertruck-Single-Motor

113 https://www.patmillikenford.com/ford-explorer-detroit-mi

114 https://www.fueleconomy.gov/feg/bymodel/2016_Ford_Explorer.shtml

115 https://www.edmunds.com/cadillac/lyriq/

116 https://www.autoblog.com/2021/04/21/2023-cadillac-lyriq-luxury-ev-crossover-reveal/

Although an optimization study should be conducted to determine the number of chargers needed, the consultant assumed the purchase and installation of a dual-port Level 2 charger in conjunction with each vehicle purchase. Dual-port chargers can be used for the county fleet and, potentially, to provide additional revenues from public charging. Without a feasibility study, these additional revenues are unknown but would have a net positive impact on the financial analysis. Given this uncertainty, they have not been included in the analysis. Public charging would not be appropriate in all fleet vehicle locations due to security needs or inconvenience to the public. Assuming that dual-port chargers would be purchased for each vehicle is a conservative approach and the charger investment is likely to be lower than the amount assumed. In addition to Level 2 chargers, a single DC Fast charger unit is purchased and installed at the beginning of the investment process. With each charger installed there is an associated operation and maintenance cost that is accrued on an annual basis which was factored into the analysis. Cost assumptions relating to chargers can be found in Table 20. Charger related costs were obtained from interviews with Dunamis Energy Partners.

Table 20. EV Charger Assumptions

ITEM	ASSUMPTION
Level 2 Charger and Software Cost per Charger	$3,650
Level 2 Charger Installation per Charger	$2,350
Level 2 Charger Annual O&M	$800
DC Fast Charger and Software	$45,000
DC Fast Charger Installation	$55,000
DC Fast Annual O&M	$1,750
Rebate Amount per Level 2 Charger	$1,500

The cost of each charger purchase is offset by a $1,500 purchase rebate. This number is lower than current charger rebates of up to $2,500 being offered by DTE.[117] The rebate amount was reduced below DTE's current offering to reflect the potential for rebate modifications in the future.

Given the initial capital outlay and potential savings, the payback period model yielded the below results.

- Capital Outlay: $1,170,000
- Annual Fuel Savings for Electric Vehicle Models Versus Comparable ICE Models:
  - Ioniq: $3,790
  - CyberTruck: $4,730
  - Lyriq: $4,000
- Payback Period: 7 years
- ROI: 21.6% over ten years

117 https://newlook.dteenergy.com/wps/wcm/connect/dte-web/home/service-request/business/electric/electric-vehicles/pev-biz-fleet

H2. Complete Campus-Wide LED Lighting Conversion

While the level of savings of each replaced fixture in terms of energy consumption and decreased maintenance can be calculated at a reasonable level of confidence, the range in magnitude of its application due to uncertainty in the amount of remaining LED lighting conversion needs creates material uncertainty. As such, given reasonable assumptions, the utilization of a payback period model indicates a worthwhile investment.

While only motion sensors were included in the payback period model, other lighting control solutions should be assessed for each site based on applicability during the lighting inventory. Examples of additional lighting control strategies include daylight harvesting sensors, bi-level fixtures, and network 'smart' controls. These controls should be implemented during major renovations as renovations present the best opportunity to improve lighting layouts and incorporate more advanced control strategies. The lighting contractors should refer to the most recent energy codes and base their design on these standards.[118]

Lighting control best practices include:

- Dimmable LED fixtures for all lighting (e.g., overhead, sconce, accent, desk lamps)
- Occupancy or vacancy sensors in all spaces that timeout 10 to 20 minutes after occupants have left
- Daylight sensors that dim or turn off lights when daylight is available
- Daylight sensors in open-plan offices (>500 sq. ft.) within daylight zones (e.g., near windows or skylights)
- Dimmers or switches with bottoms that provide continuous dimming or different levels of lighting (e.g., 0%, 50%, 100%)
- Bi-level fixtures for stairwells and parking areas that have 10% to 30% brightness when not occupied and100% brightness during occupancy. The percentage should be specified in Foot Candles in accordance with the building code.
- LED exit signs that are no more than five watts per side

Based on technical interviews and site visit initial observations, the consultant assumes that 80% of the available building square footage had yet to have lighting converted to LED (Table 21). They assume that this same portion of building stock would require motion sensor installation. An accurate amount of remaining building square footage for LED lighting conversion and lighting control upgrades would be determined through an LED lighting and controls inventory.

Table 21. Buildings Data

ITEM	ASSUMPTION
Total Building Sq. Ft.	1,922,091
LED and Controls Upgrade Sq. Ft. as a Percent of Total Building Sq. Ft.	80%
LED and Controls Upgrade Sq. Ft.	1,537,673

The number of fixtures for replacement was estimated based on the assumption that the Lighting Power Density (LPD) for the existing lighting is 1.30 W/sq. ft.[119, 120] (i.e., 1,537,673 sq. ft. x 1.30 W/sq. ft. = 1,998,974.64 W). Assuming the average common fixture is 64 W,[121] the total number of fixtures for replacement would be 31,234 fixtures (Table 22).

Table 22. Office Lighting Power Density

ITEM	ASSUMPTION
Baseline LPD	1.30 W/sq. ft.
Average Wattage per Fixture	64 W
Retrofitted LPD	0.64 W/sq. ft.[122]

118 ASHRAE 90.1-2019 Energy Standard (Table 9.6.1) or International Energy Conservation Code (IECC) 2021.

119 2010 Energy Code level (https://lightingcontrolsassociation.org/2011/04/18/ashrae-releases-90-1-2010-part-1-design-scope-administrative-requirements/).

120 2001 ASHRAE Energy Standard for offices.

121 Typical T8 fluorescent lamps wattage is 32 Watts (https://www.lrc.rpi.edu/programs/nlpip/lightinganswers/t8/03-t8-power.asp). 2x4 troffers can have 1-4 lamps per fixture. In this case, they assume a typical fixture has two lamps (tubes) and have a 64 W power load (2 x 32 Watts).

122 2021 IECC International Energy Conservation Code.

The total capital budget was estimated assuming that the county can retrofit 70% of the existing 31,234 fixtures with new LED lamps (bulbs only). The remaining 30% of the existing fixtures would be replaced with new LED fixtures. Additionally, costs for one wall switch motion sensor[123] per every 500 sq. ft. and one ceiling motion sensor per every 2,500 sq. ft. were factored in. Market value cost for lamps, fixtures, controls, and associated installation labor was used. Lastly, a 25% contingency factor and 10% in rebates was applied to total LED lighting and motion sensor upgrade costs. The resulting capital outlay was $3,403,543 (Table 23).

Cost savings were then calculated based on reduction in energy consumption due to reduced wattage from LED lighting replacements and reduced lighting operating time from the motion sensors. A baseline wattage per square foot for the existing lighting was assumed as 1.30 and the new retrofitted wattage per square foot was assumed as 0.64. Daily light operating time was assumed as 16 hours before motion sensor installation and 8 hours after motion sensor installation for each of the 260 business days.[124] Based on these factors, an annual electric savings of 6,268,784 kWh resulted. To calculate electric cost savings, the consultant used an electric rate of $0.08/kWh with a 2.25% annual escalation factor.[125] Electric savings in the first year would be $501,503.

Table 23. Equipment and Installation Costs

FIXTURE TYPE	MIXED	FIXTURE QUANTITY	BULBS/ FIXTURE	PRICE PER UNIT (INCLUDING INSTALLATION)	TOTAL COSTS
Lamps (bulbs)	70%	21,864	2	$20	$874,551
New Fixtures	30%	9,370		$200	$1,874,039
Motion Sensors (Wall Switches)	1/every 500 sq. ft.	308		$100	$30,753
Motion Sensors (Ceiling)	1/ every 2500 sq. ft.	615		$400	$246,028
				Total Costs	$3,025,371
				Contingency 25%	$3,781,714
				Cost after 10% Rebate	$3,403,543

123 Ceiling motion sensors mostly in restrooms.

124 Average across facilities.

125 The base utility rate is derived from actual 2020 utility bills and escalated to the year of 2022.

Along with the assumptions noted in Table 24, they used three main assumptions to calculate annual maintenance cost savings. Given the 20% failure rate of fluorescent lamps, it was estimated that the county would expect to replace 6,247 of the existing 31,234 fluorescent bulbs, resulting in a total annual associated material and labor costs of $81,208. Given the 10% failure rate of the electronic/magnetic ballasts, it was estimated that the county would expect to replace 3,123 of the existing 31,234 electronic/magnetic ballasts, resulting in a total annual associated material and labor cost of $124,936. Comparatively, given the 1% failure rate of LED fixtures, the county would expect to replace 312 of existing 31,234 fixtures if a lighting conversion was conducted, resulting in a total annual associated material and labor cost of $40,604. Considering the difference between costs of existing bulb and ballast replacements ($206,144) and costs of new LED fixture replacements ($40,604), the potential annual maintenance savings after LED lighting conversion is $165,540 in the first year. The financial model applies a 3% annual inflation rate after the first year, increasing savings gradually over time.

Table 24. Maintenance Savings Assumptions

ITEM	ASSUMPTION
Maintenance Staff Labor Rate[126]	$30.00
Time for Spot Lamp Replacement	0.10 hr. (6 min.)
Time for Spot Ballast Replacement	0.5 hr. (30 min.)
Time for Spot LED Fixture Replacement	1 hr. (60 min.)
LED Lamp Failure Rate	1%
Motion Sensors Failure Rate	1%
Existing Fluorescent Lamp Failure Rate	20%
Existing Fluorescent Ballast Failure Rate	10%
Costs per Lamp	$10.00
Costs per Ballast	$25.00
Costs per LED Fixture	$100.00
Inflation Rate	3%

Given the initial capital outlay and potential savings, the payback period model yielded the below results.

- Capital Outlay: $3,400,000
- Annual Savings (Year 1):
  - Electric: $500,000
  - Maintenance: $166,000
- Payback Period: 4.8 years
- ROI: 20.6%

126 Maintenance staff labor rates are based on the average of base rates for Building Maintenance Technician and Lighting Technician positions (https://www.indeed.com/career/building-maintenance/salaries/MI?from=top_sb, https://www.indeed.com/career/lighting-technician/salaries/MI?from=top_sb#common-benefits). 38% of the average base salary was then added to the maintenance staff labor rate to account for overhead and benefits (https://www.bls.gov/news.release/ecec.nr0.htm). Assumed avoided maintenance labor time resulting from this lighting upgrade scenario can be reallocated to time needed for other maintenance projects.

D2. Expand Recyclable Material Collection and D3. Expand Organic Material Collection

Methodology:

The volume of generated waste (by category) was projected using the 2020 waste schedules and proposed reduction and diversion goals. The county's waste schedule data included the number of containers, container size, and pickup frequency for each container, but not the actual volume of waste collected. The containers' "fullness" at the time of pickup and composition of disposed waste (i.e., volume-to-weight conversion factors) were assumed to estimate the weight of collected waste.[127, 128]

For example, two 6-yard containers located at Waterford Oaks County Park are serviced seasonally (four months per year). During the season, they are serviced twice a week (Tuesday and Friday).

Total Cubic Yardage = 6 yards x 2 containers x 2 times week x 4.33 weeks/month x 4 months x 75% full container = 312 cubic yards

To convert from cubic yards to tons, the following EPA Volume-to-Weight Waste Conversion Factors[129] were applied for each waste type:

- Commercial (all waste, uncompacted): 138 lbs per cubic yard
- Mixed Waste (compacted): 650 lbs per cubic yard
- Recycling paper (loose): 200 lbs per cubic yard
- Commercial Organics: 135 lbs per cubic yard
- Mixed Yard (uncompacted): 250 lbs per cubic yard

Returning to the example calculation, the waste collected from these Waterford Oaks County Park bins would be: 312 cubic yards x 138 lbs per cubic yard = 43,023 lbs = 19.36 tons (1 lb = 0.00045 metric tons).

This logic was used to estimate the total weight and cost of collected waste at each county park and service center pickup location.

Table 25. Waste and Cost Projections

ITEM	TONS	%	COSTS	BLENDED RATE
Trash	4,400	87%	$123,494	$28.07
Recyclables (paper/ cardboard)	570	11%	$24,576	$43.13
Organic Materials (including yard trimming[130])	82	2%	$7,200	$88.18
Total	5,052	100%	$155,270	

The projection assumes overall waste generation (tonnage) will be reduced by 2% every year through new procurement policies and applying the 5R Principles (Refuse, Reduce, Reuse, Repurpose, Recycle).

127 The county also provided monthly reports from its recycling vendor, Green for Life (GFL), with the volume and weight of paper collected from the service campus. Because 2020 data is not representative of a "typical year" (i.e., because county facilities were not fully occupied during the height of the COVID-19 pandemic), it is believed to underestimate the volume of paper generated in and cannot be used as a "true" baseline. Thus, the recycling baseline was determined using the same methodology for estimating the volume and weight of disposed trash: based on the container size, volume-to-weight conversion factors, pickup frequency of containers listed in the waste schedule.

128 The county should continually monitor collection container "fullness" relative to contracted service levels and contractually require vendors to weigh collected materials (refer to strategy D1. Review and Renegotiate Waste Hauling Contracts for more information). If vendors cannot collect reliable weight data (e.g., if a vendor's truck services multiple sites per trip), the county should adopt a similar methodology to measure and compare tonnages year over year.

129 https://www.epa.gov/sites/default/files/2016-04/documents/volume_to_weight_conversion_factors_memorandum_04192016_508fnl.pdf

130 All references to yard trimmings only encompass green waste produced at county parks. It is assumed that FMO will continue to manage green waste produced on the service campus; yard trimmings produced on campus will not be collected by a third party and the county will not incur additional third-party hauling costs.

The volume of waste generated per category was estimated based on the following assumptions:

- **Organic Materials:** starts at 10% during the first year of program implementation, and then progressively increases to 15% of total waste generated by Year 3 and then plateaus.[131]
- **Recyclables:** progressively increases from 11% to 60% of total waste generated by 2030. Assuming 15% of generated waste is organic materials, 60% of generated waste will need to be recycled in order to achieve a 75% diversion rate. The county will continue to expand recyclables collection past 2030, eventually reaching an 80% recycling rate by 2033.
- **Solid Waste:** progressively scales down from 87% to 25% of the waste stream by 2030, and only 5% of the waste stream by 2033.

After estimating the tonnage for each waste stream, the annual costs were calculated for the following scenarios. The difference between these scenarios represents incremental savings/ expenses in hauling and operational costs.

- Business as usual
- After the recycling and composting program is implemented

To calculate the total hauling costs, the average rate for trash, recycling, and yard trimming collection across county pickup locations was applied. The rates were averaged by dividing the estimated total annual costs by the estimated total annual tonnage. The collection rate for other organic materials (e.g., food scraps) was estimated from market data.

- Trash: $28.07 per ton
- Recycling: $43.13 per ton[132]
- Yard Trimming: $88.18 per ton[133]
- Composting: $5 per bin pickup (pickup 5 days per week) based on market data. Midtown Composting offers weekly pickups starting for $16 per month ($4 per pickup on average).[134]
- Escalation factor: 3% per year

While waste hauling costs decrease, operational expenses for hauling recyclables and organic materials will increase. Additional operating expenses will include ongoing education, performance monitoring, and auditing activities to encourage anti-contamination behavior.

The composting program will likely be the most cost-intensive program given the spread of bins throughout facilities. Program costs will depend on vendor rates (local vendors include My Green Michigan,[135] Midtown Composting,[136] and Unlimited Recycling[137]) and collection logistics, including proximity and capacity of local composting sites. Important considerations that may impact cost include:

- The number of collection points. The vendor could collect from multiple locations throughout the service campus and county parks or a central location to reduce logistical costs.
- If collected from a central location, the means for getting food waste to the pickup site. Janitorial staff could collect compost daily and bring it to the designated location, or facility occupants could store compost in break room freezers and deliver to a publicly accessible drop off location (e.g., the County Farmers Market) when needed. In the latter case, the county should prioritize compost pickup at the Farmers Market.

On the other hand, BigBelly compactors carry the greatest savings potential through reducing the number of pickups and associated labor, transportation, and material expenses.

131 EPA data suggests 14.6% of municipal solid waste is food waste and yard trimmings accounted for 2% of the county's collected waste in 2020 (https://archive.epa.gov/epawaste/nonhaz/municipal/web/html/).

132 The county's vendors charge a monthly rate for each pickup location based on service frequency and container volume.

133 The county pays a flat fee per service call ($235) and an additional charge per ton of waste collected ($30 per ton). The blended rate per ton was estimated assuming a container is serviced twice a month when they are nearly full (collecting about 2 tons of waste), so each service call carries an average charge of $300.

134 https://midtowncomposting.com/product/weekly-residential-food-waste-composting/

135 https://www.mygreenmi.com/?utm_source=CompostNow&utm_campaign=Friends&utm_medium=web#home

136 https://midtowncomposting.com/

137 https://unlimitedrecycling.com/food-waste-composting/?utm_source=CompostNow&utm_campaign=Friends&utm_medium=web

Assumptions:

2020 Baseline

- Trash: 4,400 tons
- Recycling (Paper): 570 tons
- Yard Trimming: 82 tons

TOTAL: 5,052 tons

2020 Diversion Rate: (570 tons + 82 tons) / 5,052 tons = 13%

2030 Goals (Suggested)

Total generated waste: 2% annual reduction

2030 Diversion Rate: 75%

2030 Waste Breakdown (Suggested):

- Trash (Landfill): 25%
- Recyclables: 60%
- Composting: 15%

Hauling Rates

- Trash/Landfill: $28 per ton
- Recycling: $43 per ton
- Yard Trimming: $88 per ton
- Composting: $5 per pickup per bin, estimating pickup 5 times per week (150 pickup locations/ bins). Facilities may have multiple pickup locations per building or centralized curb side pickup areas.

Equipment Quantity and Pricing

- Recycling Stations: every 2,500 square feet.
- Under-desk paper bins: every 500 square feet (3,460 desks)
- Composting bins: every 10,000-13,000 square feet, or one to two per floor (primarily located in kitchens, lounges, breakroom, etc.). For some facilities, totters or rollout containers with capacity of up to 50 gallons can be used in addition to or instead of small buckets with lids.

Extra bins can be placed in facilities with greater demand for composting and recycling collections than anticipated. In some locations where both recycling and composting are needed (e.g., cafeterias), the county should provide a four-stream bin instead of separate trash, dual-stream recycling, and composting bins. Four stream bins include:

- Trash
- Paper
- Glass, plastic, metal
- Composting

Estimated costs are based on average market prices (standard design).

Table 26. Equipment Quantity and Pricing

ITEM	QUANTITY	AVERAGE MARKET PRICE
Recycling Station (Triple-stream Bins with Trash, Paper/ Cardboard, Glass/ Plastic/Metal)	769	$501 per unit
Under Desk Paper Bins	3,460	$14 per unit
Outdoor Dual-stream BigBelly Units	75	$8,000 per unit
Small Composting Bins	150	$40 per unit
Extra Tumblers or Bins	100	$155 per unit
Container Sensors[138]		$10,000 (one time)
Additional Signage and Education Program		$35,000 (one time)

Total estimated costs also account for 10% contingency on all the categories above.

138 The county can place sensors in large collection containers to monitor container "fullness" at the time of service and identify missed pick-ups. Data can be used to reevaluate service schedules.

BigBelly Assumptions

The following (conservative) assumptions are based on the case study from the University of Houston.[139] These metrics should be reviewed with BigBelly during the contract negotiation process and updated once the contract is final.

- Number of Triple Station Kiosks (Trash and Dual-stream Recycling): 75[140]
- Collection Frequency for Standard Sidewalk Bins (times per week): 14
- Collection Frequency with BigBelly (times per week): 7
- Time to Empty a Bin: 20 minutes including logistics
- Labor Rate ($ per hour): $20
- Fuel Savings per Bin (from reduced travel): $100
- Reduced Number of Plastic Bags per Bin: $50
- Total Savings from per BigBelly Bin: $2,577

Recyclables Sales

The prices for recycled paper, plastics, glass, and scrap metals are very volatile and future regulations, tariffs, international trade policies or other initiatives may cause supply and demand of materials and resulting commodity prices to continue to fluctuate.

An online commodity pricing index for post-consumer recovered materials illustrates the wide range of recycling commodity prices between different grades of materials.[141] As of May 2022, the average market price for recyclables is:

- **Plastic:** between $1 and $1,000 per ton, depending on the plastic quality and chemical composition. For example:
  - Mixed, unsorted plastic materials (e.g., soda bottles, milk jugs, shampoo bottles, and yogurt cups): $1 to $2 per ton
  - Mixed, sorted Polyethylene Terephthalate (PET) and HDPE (High Density Polyethylene) plastic bottles, jars, and containers: $60 to $140 per ton
  - PET bottles only: $840 to $1,000 per ton
- Sorted office paper: $125 per ton
- Mixed glass: $10 to $30 per ton
- Mixed steel cans: $12.50 to $210 per ton

The county's net revenues would depend not only on the market (foreign and domestic), but also on the local MRF's processing costs, fuel costs, brokerage fees, collected material quality, recycling stream breakdown, etc. The following per ton commodities costs are based on low-end market prices, deduct processing costs, and assume the county would share profits with the recycling hauler/broker.[142]

- Recyclables: $20 per ton
- Compost: $10 per ton
- Escalation Rate: 5% per year

Additionally, contamination rates impact the county's potential revenues. Recycling contamination occurs when materials are sorted into the wrong recycling bin (e.g., placing a glass bottle into a mixed paper recycling bin). Incorrect disposal can cause a whole bag of recyclables to be rejected and sent to the landfill, resulting in a reduced revenue from recycling or composting materials. For example, if 50% of collected recyclables are contaminated, the county will only capture 50% of its revenue potential. This analysis assumes a gradual improvement in contamination rates:

- Years 1-2: 50% contamination rate
- Years 3-5: 25% contamination rate
- Years 6-7: 20% contamination rate
- Year 8: 15% contamination rate
- Years 9-onwards: 10% contamination rate

To achieve higher yield in recyclable material sales, the county needs to minimize contamination in the recycling stream.

139 https://uh.edu/facilities-services/programs/sustainability/Use_of_Solar_Powered_Recycling_and_Trash_Units_on_Campus.pdf

140 The first kiosks should be strategically placed near building entrances (on average, two stations per building (e.g., at a front and back entrance) with additional stations at high-traffic facilities (e.g., the Courthouse)), gathering areas, and along high-traffic non-motorized pathways and trails. Additional kiosks can be installed as needed, based on the success of the program's first phase.

141 www.recyclingmarkets.net

142 As recycling commodities markets mature, the profit share for recyclables sales should be outlined in the RFP process for the county's recycling vendor and/or recycling broker. For reference, Waste Management (WM), a publicly traded waste and recycling company, offers a fee-for-service profit share model to their customers. With this model, the price of recyclable materials is structured as a charge or "tip fee" when the commodities' price does not cover WM's cost to process the recyclable materials or as a "rebate" when the commodities' price is higher than WM's processing costs. In the latter case, WM and their customer share the benefit. WM's pricing schematic is either based on fixed contractual rates or on defined minimum per-ton rates. For more information on WM's practices, refer to: https://investors.wm.com/static-files/6f36d219-fd4c-43ce-93f6-35f5928eb2eb

O1. Improve Connectivity with Non-Motorized Pathways

To meet sustainability goals, such as improving campus connectivity and creating nature and fitness walks, it is estimated that 15,000 linear feet (LF) of trails would be needed. For purposes of this analysis, it is assumed that each trail would be eight feet wide with a two-foot shoulder each side leading to (12' x 15,000 LF) 4.2 acres of lawn displacement. Capital costs for pathway construction is estimated at $1.4 million assuming that construction, signage, engineering, and landscaping could be accomplished at the cost of $65.33 per linear foot. Thirty percent was added for contingency (Table 27). It is assumed all of the cost of this construction will be expended in year one.

Table 27. Pathway Construction Assumptions

ITEM	ASSUMPTION
Linear Feet of Trails Constructed	15,000
Cost per Linear Foot	$65.33
Contingency	30%
Total Cost of Construction, Signage, Engineering and 30% Contingency	$1,400,000[143]

To determine the positive productivity and healthcare impacts, it was assumed that 500 employees would take advantage of the new pathways on a regular basis. It was assumed that the economic output of increased productivity of those taking advantage of the new pathways be 1% of each employee's salary calculated using the average Oakland County employee salary of $57,740.[144] It was assumed that the full benefit of walking, productivity increases and healthcare cost reductions, would not be realized immediately. As such, these benefits were scaled up incrementally over five years, with the full cost savings benefit being realized in year six and each year thereafter. Healthcare savings were calculated using 2.6%[145] of the county's average annual healthcare costs of $14,112 per year over the five year scale up period.

Table 28. Economic Benefit Assumptions

ITEM	ASSUMPTION
Number of Affected Employees[146]	500
Increased Productivity	1%
Average Annual Salary of Employees	$57,740[147]
Scale Up Period to Realize Full Cost Savings	5 Years
Average Annual Healthcare Costs	$14,112[148]
Health Care Cost Savings Over Scale Up Period	2.60%[149]

Given the initial capital outlay and potential savings, the payback period model yielded the below results.

- Capital Outlay: $1,400,000
- Annual Savings (year 6 and thereafter):
  - Healthcare Costs: $183,500
  - Productivity: $288,700
- Payback Period: 6.4 years
- ROI: 17.4%

143 AECOM estimate

144 Human Resources, Oakland County

145 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4020264

146 Approximately one-tenth of the county's workforce.

147 Human Resources, Oakland County

148 Human Resources, Oakland County

149 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4020264



Appendix G

List of Acronyms

24/7 24 hours a day, 7 days a week

AASHTO American Association of State Highway and Transportation Officials

ADA Americans with Disabilities Act

ADKAR Awareness, desire, knowledge, ability, and reinforcement

ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers

CAD Coronary artery disease

CH_4 Methane

CO_2 Carbon dioxide

CO_2e Carbon dioxide equivalents

COPD Chronic obstructive pulmonary disease

County Oakland County, Michigan Government

CVT Cities, villages, and townships

DNR Department of Natural Resources

EAP Employee Assistance Program

EGLE Environment, Great Lakes, and Energy

ESCO Energy service company

ESG Environmental, social, and governance

EV Electric vehicle

FHA Federal Highway Administration

GHG Greenhouse gas

GESPC Guaranteed energy savings performance contracting

GSA General Service Agreement

GSHP Ground source heat pump

GWP Global warming potential

HDPE High density polyethylene

HFC Hydrofluorocarbon

ICE Internal-combustion engine

ID Identifier

IFMA International Facility Management Association

IIJA Infrastructure Investment and Jobs Act

ITC Investment tax credit

IWBI International WELL Building Institute

KPI Key performance indicator

LED Light-emitting diode

LEED Leadership in Energy and Environmental Design

LF Linear feet

LGOP Local Government Operations Protocol

LPD Lighting power density

LPG Liquified petroleum gas

MDOT Michigan Department of Transportation

MRF Material recovery facility

MT Metric tonnes

N_2O Nitrous oxide

NACTO National Association for City Transportation Officials

NREL National Renewable Energy Laboratory

O&M Operation and maintenance

OCPR Oakland County Parks and Recreation Department

OHSA Occupational Safety and Health Administration

P3 Public-private partnership

PAH Polycyclic aromatic hydrocarbon

PET Polyethylene terephthalate

PFC Perfluorocarbon

PMPM Per patient per month

PMPY Per participant per year

PPA Power purchase agreement

RACI Responsible, accountable, consulted, and informed

RFP Request for proposal

ROI Return on investment

RTV Rough terrain vehicles

SCARF Status, Certainty, Autonomy, Relatedness, and Fairness

SDS Safety Data Sheet

SEMCOG Southeast Michigan Council of Governments

SF_6 Sulfur hexafluoride

SMART Suburban Mobility Authority for Regional Transportation

Strategic Framework Oakland County Strategic Framework

SUT Smart utility technology

TAP Transportation Alternatives Program

USDN Urban Sustainability Directors Network

VMT Vehicle miles traveled

WHO World Health Organization

WRC Water Resources Commissioner

ZEV Zero emission vehicle



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