



Environmental Sustainability Plan

2023

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Introduction



What is Environmental Sustainability?

Environmental sustainability is the ability to achieve and maintain a balance with the natural world to create access to a safe and healthy life now and in the future. That includes clean air, potable and adequate water, healthy soils for growing food, and biodiversity capable of sustaining ecosystems. It is incumbent on the present generation to ensure these ecosystems are healthy and sustainable for future generations.

Purpose of the Environmental Sustainability Plan

The City of Sisters' Environmental Sustainability Plan (ESP) serves as the foundation that the City will use to better adapt to an ever-changing environment and plan for a more sustainable future.

This plan identifies the goals and policies in existing City Plans that address needs relating to environmental sustainability, climate change, and conservation. Those referenced Plans include: Wastewater Capital Facilities Plan, Water Capital Facilities Plan, Urban Forest Management Plan, Transportation System Plan, Wildfire Risk Assessment and Mitigation Plan, Parks Master Plan, and Comprehensive Plan.

Climate Change Impacts on Sisters

Climate change is affecting Sisters Country and Central Oregon and is projected to become more severe in the future. Many of those effects are visible to the community of Sisters – increased wildfires and wildfire intensity, decreased snowpack on the very mountains from which the city derives its name, and water level variability in the region's waterways and aquifers.

Increased temperatures impact snowpack in the Cascade Range. Since 1915, snowpack in the western US has decreased by 21% with anthropogenic changes to climate having been shown to contribute to around half of the reduction of snowpack in the Oregon Cascades.^{1,2} Groundwater near the Cascade Range shows changes in water table level fluctuations that correlate to precipitation in the mountains. Though not expected to influence the local aquifer thanks to highly permeable bedrock, a decline in snowpack is predicted while general precipitation is predicted to stay the same or even increase slightly.⁴ Fortunately, the Deschutes aquifer of the Upper Deschutes Basin is quite robust. At 1000 feet of saturation in a single geologic formation the aquifer receives over 4,000 cubic feet per second of recharge annually, about 50 times faster than groundwater currently being pumped out.⁴

Given the current trend, future changes to global climate will increase the risk and severity of wildfires as the result of drought, increased temperatures, and extreme thunderstorms.^{5,6} As wildfire frequency increases so does the number of days in which air quality reaches unhealthy levels. Figure 1 shows an upward trend in the acreage burned by wildfires in the Pacific Northwest region and Figure 2 shows a dramatic increase in the number of days cities across Oregon have experienced air quality rated “unhealthy for sensitive groups” (USG) or worse because of wildfire smoke.⁶ Between 2012 and 2021 Sisters alone had on average 8.7 days per year experiencing an air quality index of USG or worse.⁶

With Sisters’ identity and economy rooted in the surrounding natural resources— mountain views, trees, creeks, plants, wildlife, trails and recreation – drought, wildfire, and climatic changes pose a loss of ecosystem stability, habitat reduction, harm to the local economy by reducing tourism and outdoor recreation, and loss of local livability and quality of life.



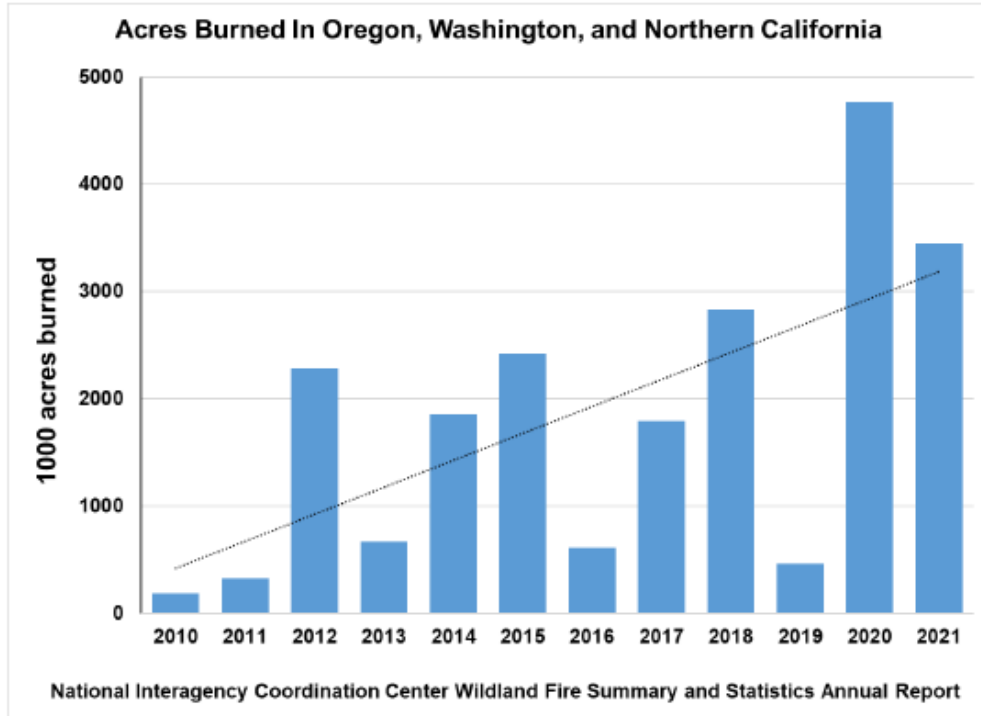


Figure 1: acreage burned by wildfire in the Pacific Northwest⁶

AQI days \geq USG caused by wildfire smoke

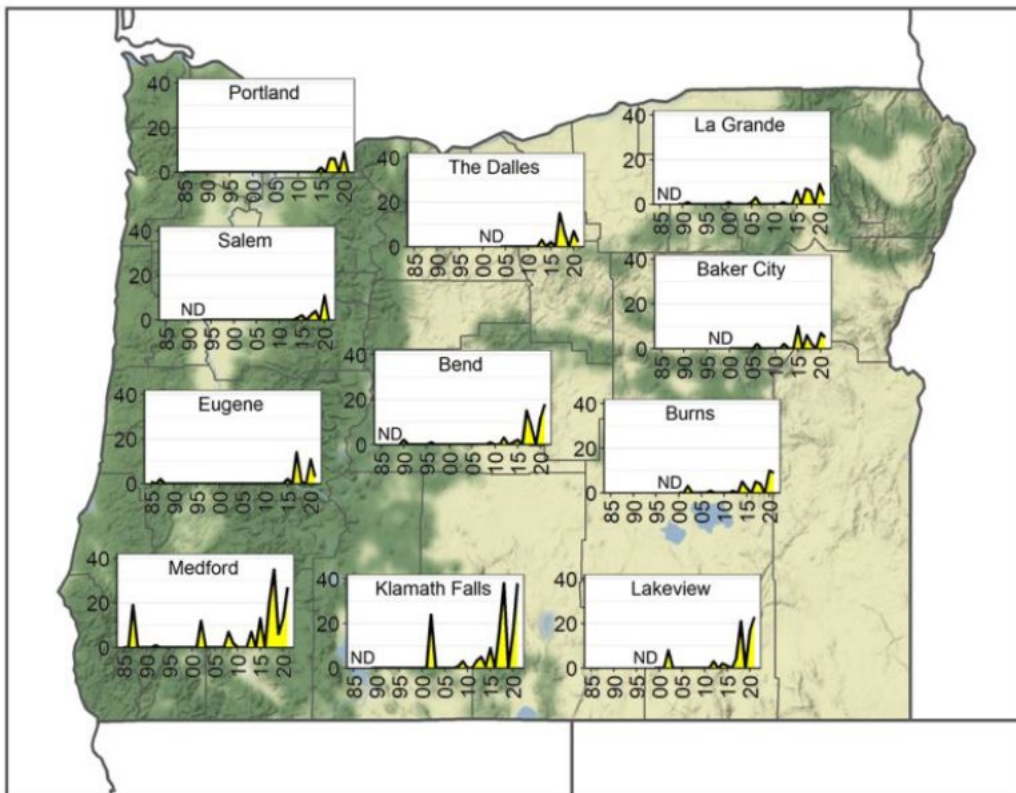


Figure 2: wildfire AQI trends in Oregon⁶

Vision

Reduce Sisters Contribution to Global Carbon Pollution by Reducing Greenhouse Gas Emissions

The City of Sisters receives its electricity from Central Electric Cooperative, which purchases electricity from the Bonneville Power Administration. The generation source results in relatively low carbon-emission electricity. Figure 3 shows an approximation of the different sources of electricity as sources can change from year to year. The largest source of electricity is hydroelectric accounting for 85%, followed by 10.6% from nuclear power from the Columbia Generating Station in south-central Washington, 2.74% from various sources which includes some emission-free renewable sources, and the remaining 1.57% comes from wind and other non-specified renewable sources.

Using tools provided by the Oregon Department of Environmental Quality and Central Electric Cooperative the City of Sisters recently began monitoring its energy use at its facilities, street lighting, as well as vehicle fuel use. Using this information as an approximate representation of its carbon footprint, the City can identify the amount of greenhouse gas emissions (GHG) associated with its operations and identify areas to reduce energy use.

In 2022, the City of Sisters was responsible for 161.24 metric tons of CO₂ equivalent (MT CO₂e) emissions. As a reference the average American household is responsible for anywhere between 6 and 20 MT CO₂e emissions per year.^{7,8} Figure 4 shows the CO₂ equivalent emissions by source category using data from table 1. Fuel use from City fleet vehicles accounts for 56% of the total approximate CO₂ equivalent emissions during the year 2022.

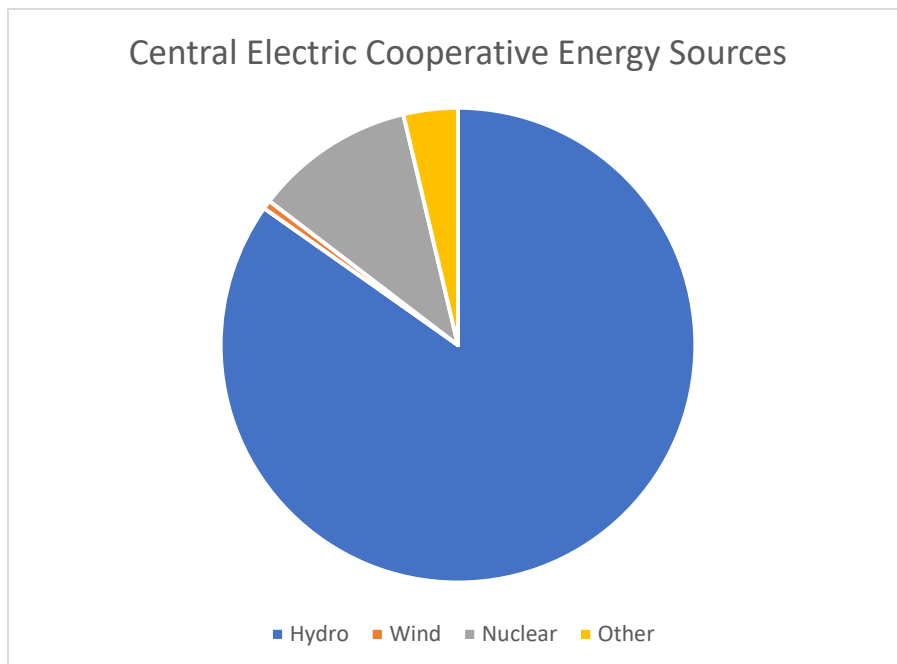


Figure 3

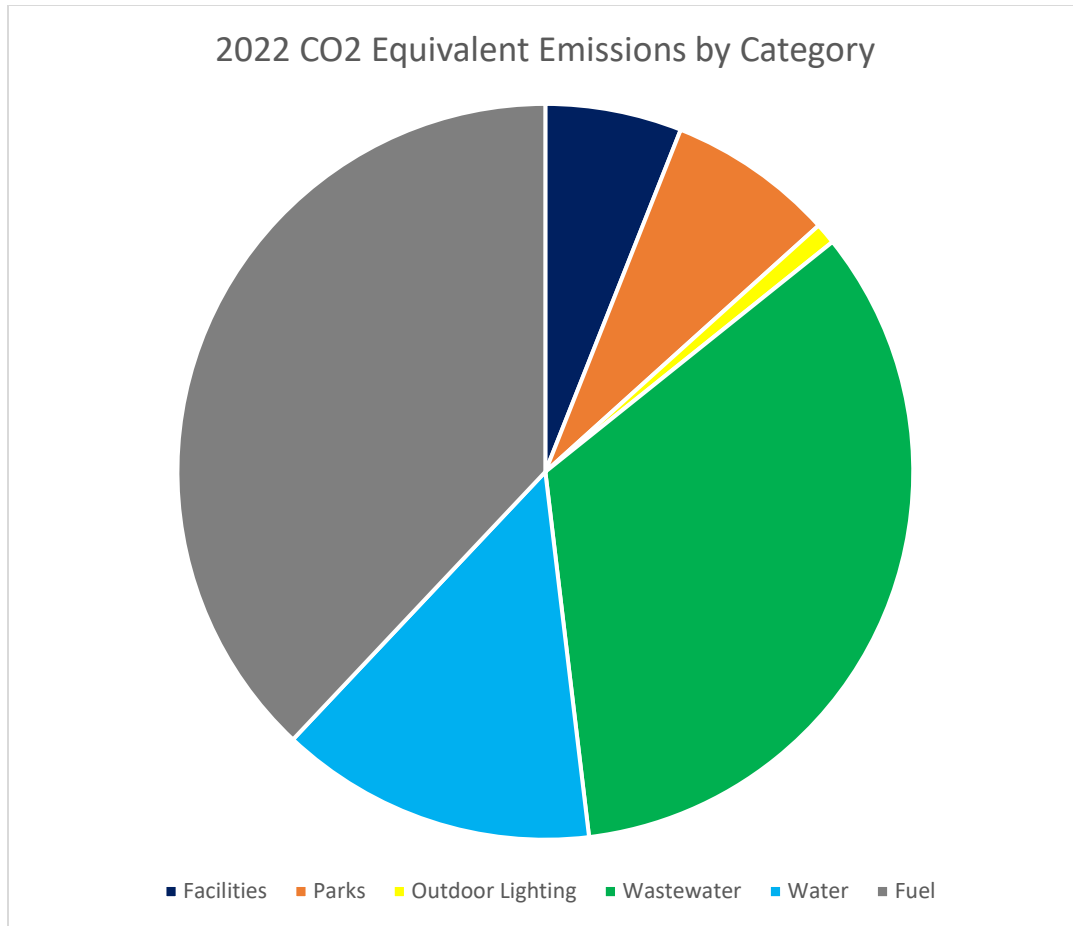


Figure 4

BY CATEGORY	Metric tons CO2 equivalent	Percentage
Facilities	9.67	6%
Parks	11.81	7%
Outdoor Lighting	1.50	1%
Wastewater	54.57	34%
Water	22.46	14%
Fuel	61.22	38%

Table 1

As more data and resources become available for tracking greenhouse gas emissions related to City operations, they will be incorporated into the analysis for use in progress reporting and future updates to the Plan.

Reduce Emissions by 20% by 2030, Achieve Carbon Neutrality by 2050

The United Nations states that in order to “keep global warming to no more than 1.5°C – as called for in the Paris Agreement – emissions need to be reduced by 45% by 2030 and reach net zero by 2050.”⁹ By using the available data generated from the City’s greenhouse gas emissions analysis, the City of Sisters can track its progress towards achieving and maintaining carbon neutrality with aspects outlined in this plan as the groundwork.

Embrace Equity, Protect Healthy Ecosystems, and Create Opportunities for Future Generations

“Climate equity is the goal of recognizing and addressing the unequal burdens made worse by climate change, while ensuring that all people share the benefits of climate protection efforts.”

-United States Environmental Protection Agency¹⁰

Climate change affects all people equally, however not all communities will be impacted in the same way. Elderly, low-income, disabled, and minority populations are more likely to face disproportionate impacts because of economic disparities, historical patterns of inequity, and/or systemic environmental injustice. Those communities are more vulnerable to conditions caused by a changing climate with the most common adverse exposure in the region being severe heat and wildfire smoke. Actions such as maintaining and growing a robust urban forest to reduce urban heat islands and diligent disaster preparedness will help ensure at-risk local populations are equitably considered.

The City of Sisters will engage with the community including those from diverse backgrounds, connect citizens with resources on how to better prepare for and adapt to climate impacts, foster priorities and practices for climate resiliency, and work with local agency partners and experts, and prepare to address ways the City can meet the needs of citizens during an emergency. Equity will be considered and incorporated throughout the development and implementation of this plan. Together we can ensure a safe and healthy future for all members of the Sisters community, and for the surrounding natural world we call home.



Focus Areas

Outlined in each focus area are goals, existing conditions, progress on current projects, future actions that can be taken by the City of Sisters and strategies on how the community can help contribute to a more sustainable Sisters Country.

- **Energy & Buildings**
 - **Energy Conservation and the Clean Energy Transition**
 - **Solar Infrastructure**

- **Transportation**
 - **Public**
 - **City Fleet**

- **Water Conservation**

- **Waste**
 - **Solid Waste**
 - **Wastewater**
 - **Stormwater**

- **Wildfire Mitigation**

- **Parks, Open Space, and Our Urban Forest**



Energy & Buildings

Goals

- Minimize greenhouse gas emissions associated with City-owned facilities
- Improve energy efficiency in City-owned facilities
- Expand renewable energy production in City-owned facilities
- Promote energy efficiency and renewable energy production on private developments

Energy Conservation/Clean Energy Transition

Existing Conditions

- **Current Facility Greenhouse Gas Emissions**

As mentioned in the introduction, the City of Sisters has begun monitoring its greenhouse gas emissions and compiling the data for continued analysis. This analysis includes facility electrical use and vehicle fuel consumption. The City measures emissions based on a commonly used metric, CO₂ equivalent (CO₂e). The use of CO₂e as a metric allows for simplification and use as a comparative tool for understanding the impact of operations through time.

- **Facility Energy Consumption/Equipment Status**

During the 2022 calendar year, electricity use at structures such as facilities, restrooms, and other buildings related to City operations accounted for about 40% of City GHG emissions which equated to around 47 MT CO₂e emissions. Many rooms in major facilities currently use occupancy detectors that will turn lights on and off as staff enter and leave.

- **Complete Lighting and HVAC Audit**

Recently the City of Sisters completed an audit of its lighting and heating ventilation and air conditioning (HVAC) at three of the highest consumption facilities: City Hall, Wastewater Treatment Plant, and Public Works Headquarters. The audit allowed the City to identify less efficient lighting fixtures that could be replaced and explore more efficient alternatives such as LED fixtures. Completion of the lighting upgrades is expected by the end of 2023. Energy efficient HVAC upgrades are expected to be made to the Public Works Headquarters in fiscal year 23/24.

Future Actions

- **Internal Actions**

- **Reduce Consumption & Maximize Energy Efficiency**

In an effort to reduce electricity and fossil fuel consumption and maximize energy efficiency the City will explore strategies such as expanded use of occupancy detectors in major facilities, purchase of electric vehicles, implementing alternatives to motor vehicle use such as bicycles available for staff use, and more efficient electrical equipment. A staff educational campaign would be an easy way to communicate new ways City operations can become more sustainable with simple reminders like turning off lights and dressing appropriately for the weather to reduce

energy use associated with heating and cooling. Initial investments in these and other energy saving methods will result in long-term savings and responsible use of tax dollars.

- **Shift Grid Consumption to Renewable Energy Generation**

Evaluating potential sites where the installation of photovoltaic (PV) solar panels can be implemented will be important for the City to decrease reliance on the grid and less sustainable sources of electricity.

- **External Actions**

- **Transition Propane Gas Use to Electricity**

Most common household appliances are available that use electricity as opposed to propane gas. Propane, though often referred to as the “cleanest” of the fossil fuels, is, nonetheless, a fossil fuel and its use contributes GHG in the form of CO₂. The average US household uses 600 gallons of propane during the winter months alone (October through March) which equates to almost 3.5 MT CO₂e per household.^{11,12} As a byproduct of petroleum and natural gas propane has an overall impact beyond consumer usage.

There have been discussions of gas appliance bans in many states including Oregon and at the federal level. The City will continue to monitor legislation at the state and federal level surrounding these appliances and will explore options to encourage the electrification of homes and businesses.

- **Establish Minimum Energy Efficiency Standards for New Development**

In terms of cost-effective and near-term methods, energy efficiency is an easy way for individuals to become more sustainable and reduce their carbon footprint. An initial investment in high-efficiency electronic equipment and appliances can save residents money over time. Energy-Star rated appliances will be encouraged.

Solar Infrastructure

Existing Conditions

- **Public Works HQ Solar System**

In June of 2022 the City of Sisters brought online its first photovoltaic (PV) solar system. Located on the rooftop of the Public Works Headquarters building, the system consists of 104 individual panels and three inverters creating a 50-kW system providing power to not only the building itself but the neighboring Wastewater Treatment Facility. As of March 2023, the system has generated nearly 50 megawatt hours (MWh) of electricity and avoided over 36 MT CO₂e in emissions, the equivalent of planting roughly over 600 trees.

Future Actions

- **Internal Actions**

- **Develop City Facility Solar Installations**

There are many structures owned by the City that have the potential to support small to medium sized PV systems to generate power for nearby amenities and facilities while reducing reliance on the grid and setting an example for the community. For the City to achieve carbon neutrality and net zero emissions, generating renewable energy and storing it for low solar output periods will be crucial.

- **Solar Battery Opportunities**

The existing PV solar system owned by the City, especially during the summer months, will often produce excess energy. Constructing battery backup and storage systems for facilities with solar infrastructure will help to fully take advantage of the energy generated by the solar panels and further reduce reliance on the grid, reduce GHG emissions, and reduce costs. The addition of an energy storage system would allow for facilities such as City Public Works to continue operations with minimal interruptions in the event of a power outage keeping critical systems working such as the Wastewater Treatment Facility without having to rely on generators that use fossil fuels.

- **External Actions**

- **Facilitate and Encourage Solar Energy Production in New Development**

Some homeowners in Sisters already have installed solar panels on the roofs of their homes. Home and business owners and public facilities can benefit from installing PV systems to become more resilient to disruptions in service and reduce emissions associated with grid electricity. The City will make efforts to facilitate and encourage new developments to include solar panels on structures including working with CEC to promote incentives.



Transportation

Goals

- Improve availability and access to alternative transportation
- Improve vehicle efficiency of City fleet
- Promote public electric vehicle use

Public

Existing Conditions

- **Current Multi-Modal Infrastructure**

The City's Comprehensive Plan and Transportation System Plan (TSP) identified goals to increase access and availability of alternative modes of transportation such as walking, biking, and public transit in addition to encouraging energy efficient transportation. The City is fortunate to currently have over 12 miles of multi-use paths within the city limits. With low speed limits throughout the majority of the city, marked bicycle lanes on busier streets, and a local geography that is relatively flat, people can easily get around town using alternatives to motor vehicles. Those conditions also increase accessibility for those experiencing reduced mobility.

- **Transit**

Cascade East Transit (CET), among other transit providers, operate in the city with CET having multiple marked transit stops throughout town at key locations that offer services or shopping opportunities.

- **Motor Vehicle System Performance**

Most vehicles on the road in Sisters today are internal combustion engine (ICE) vehicles. Though hybrid and electric vehicles are a popular option, they make up a small portion of those vehicles in use. Older vehicles especially experience poorer fuel economy than newer ICE vehicles and as those reach their end-of-life individuals frequently consider EV options. However, a lack of publicly accessible EV infrastructure is a major barrier to those considering an EV.

Future Actions

- **Internal Actions**

- **Energy Efficient Lighting**

Technological advancements may continue to allow for more efficient lighting on roads and paths. The City will continue to monitor new technologies and consider how and where they can be implemented as current technology in use reaches its end of life.

- **East Portal**

In mid-2023, the City of Sisters finished the master plan for a multi-modal transportation hub to be located at the former USFS East Portal property, which the City now owns. The site has the potential to support EV charging for passenger vehicles and transit vehicles. Additionally, the site

will support parking for visitors, park-and-ride, carpooling, and bicycle use encouraging reductions in single-occupancy vehicle trips.

- **Multi-Modal Infrastructure**

As of early 2023 nearly 2.5 miles of multi-use paths are planned with the aim of connecting existing paths as well as popular locations both within and outside of the city limits. Additionally, the City's Transportation System Plan identifies Washington Avenue as being a potential candidate for a bicycle boulevard. This would create a major east-west bike-friendly connection in the southern portion of the city. Facilitating the public's transition away from vehicle use in favor of alternative forms of transportation is critical for reducing air and noise pollution.

- **Electric Transportation**

As the City, regional stakeholders, and individuals begin switching to more sustainable transportation there will be a need for infrastructure to be in place to support the transition from internal combustion engine vehicles to electric passenger and transit vehicles. City parks are excellent candidates for EV charging locations in addition to the future multi-modal transportation hub.

As with electric vehicles, electric bicycles are becoming increasingly popular. Key sites such as the future multi-modal transportation hub would be ideal candidates for hosting e-bike infrastructure.

- **Develop Employee Incentive Program**

Encouraging City staff to use ridesharing, carpooling, alternative fuel vehicle use, as well as walking or biking will set an example for others in the city and show the commitment staff have towards sustainable lifestyles.

- **External Actions**

- **Require EV Charging Infrastructure in New Development**

A common barrier to EV use is a lack of charging infrastructure. By requiring EV charging infrastructure to be utilized in new developments, particularly multifamily and commercial developments, Sisters can make EV use more equitable and accessible.

- **Revise Development Code to Favor Walkable/Rideable Neighborhoods**

One of the easiest and most impactful ways for residents to decrease their GHG emission contributions is to utilize non-motorized modes of transportation. Sisters has an ample sidewalk and multi-use path network; better utilization and additional investments of the infrastructure would allow residents to access services more easily on foot or by bike.

- **Events**

Sisters hosts a multitude of public events from markets to festivals and these events attract thousands of people every year. Public event organizers will be encouraged to incorporate sustainable transportation into their events such as bike valets and shuttles.

City Fleet

Existing Conditions

- **Fleet Electrification Analysis Report**

The City of Sisters and Evergreen Consulting Group have completed a fleet electrification study to determine how City-owned internal combustion engine (ICE) vehicles can be phased out and replaced by electric vehicles. The passenger vehicles in the City fleet will be the easiest to switch to EV as alternatives currently exist on the market. However, the larger utility vehicles used by the Public Works Department will take the longest as they need to meet certain requirements for the staff to perform their duties and there are currently few viable alternatives on the market that meet those requirements. The City is able to easily calculate and track fuel consumption rates to better inform decisions regarding phasing out ICE vehicles for alternatives.

Future Actions

- **Internal Actions**

- **Fleet Study Recommendations for Transitioning to More Efficient Vehicles**

The recently completed Fleet Electrification Analysis Report identified EV alternatives to ICE vehicles currently in the City fleet. The analysis considered each proposed alternative vehicle from both a cost-per-mile (CPM) and total cost of ownership (TCO) perspective. Though multiple options currently exist on the market as viable alternatives for passenger vehicles, there are few cost-effective alternatives for larger vehicles such as the utility vehicles used by the Public Works staff that require mounted utility boxes and snowplows. For example, the Ford Lightning is unable to swap out the bed for utility boxes and Ford has not yet confirmed whether a snowplow could be mounted on the vehicle. Also, though the Ford e-Transit has the potential to support various bed options, an appropriate snowplow is not able to be mounted. The City will continue to monitor EV models on the market as technology progresses to determine what can meet the needs of the department staff. Fleet electrification is another crucial component to reaching carbon neutrality and net zero emissions for City operations.

Electric Vehicle Type	ICE Equivalent	EV Average CPM
2022 Chevrolet Bolt EV BEV*	\$0.46	\$0.35
2022 Ford F-150 Lightning 4WD BEV	\$1.65	\$0.81
2022 Ford e-Transit – Cargo Van BEV	\$1.66	\$1.12
2022 Ford Mustang Mach-E AWD BEV	\$0.63	\$0.78
2022 Freightliner eM2 BEV	\$1.98	\$2.84
2022 Phoenix Motorcars Z500 – Work Truck BEV	\$1.25	\$2.27
2022 Freightliner e-Cascadia BEV	\$2.00	\$5.58
2022 Lion Electric Lion8 Refuse BEV	\$0.58	\$5.58

*On April 25, Chevrolet announced that it will no longer produce the Chevy Bolt EV, or Bolt EUV, after the 2023 model year. It will be replaced by the Equinox EV beginning with the 2024 model year.

Table 2

- **Develop Charging Infrastructure**

There are several locations in the city that have the potential to support EV infrastructure for fleet use. However, a major barrier is the high cost of the chargers themselves and installation of upgraded electrical service. The City will explore EV charging locations at key facilities such as the Public Works Headquarters and City Hall to support fleet EVs while monitoring for funding opportunities.

Other Actions

- **Develop Information on Electric/Hybrid Vehicles on City Website**

Information is readily available to the public regarding EVs. Providing information to residents about the benefits and other useful information about EVs will be important to further encourage those considering switching to EVs.

- **Implement Transportation Demand Management Strategies**

The City's TSP identifies multiple strategies for reducing single-occupancy vehicle trips including ridesharing, bike programs, and incentives to employees. Such strategies may require coordination between the City of Sisters and businesses.

- ❖ The future multi-modal transportation hub is being planned to support ride-sharing options and the city will be well-positioned for similar strategies to become a more viable option.
- ❖ Community multi-modal sharing has become a common and popular option in many cities across the country and should be explored locally.
- ❖ Concepts such as electric bike-sharing programs may be well suited for the future multi-modal transportation hub.
- ❖ Expand the availability of bike parking racks in high-traffic areas to promote bicycle use.

- **Electric Transit**

The future multi-modal transportation hub will be constructed in a way that allows for electric transit charging and the City will continue to coordinate with local transit providers to stay informed on their plans regarding fleet electrification to support the charging of transit vehicles.

- **Lighting Infrastructure**

All City-owned streetlights and path lighting within the city currently use energy-efficient light-emitting diodes (LED) and shrouded in such a way to be dark-sky compliant and lessen deleterious effects on wildlife.

- **Noise Pollution**

Noise pollution has been identified by the United States Environmental Protection Agency as detrimental to humans and can even result in noise-related illnesses and a major contributor to noise pollution is vehicular traffic.¹³ The improvement of Barclay Drive to better facilitate an alternate route through Sisters will help to divert through-traffic away from the pedestrian heavy downtown core and nearby residences. The City will explore additional ways to reduce noise pollution in the downtown area.



Water Conservation

Goals

- Promote water efficient irrigation and landscaping
- Minimize water consumption
- Maintain sustainable water supply

Existing conditions

• Conservation Plan

The City of Sisters' most recent Water Management and Conservation Plan (WMCP) from 2021 outlines current conservation measures and projections about future water demands. Water conservation will not only help better prepare the community in drought but will help maintain a healthy aquifer for the future. The City will encourage water-wise actions in the community through education, policy, and incentives for residents and businesses. The City currently has information for residents and businesses regarding water conservation both in the home and outside for irrigation. Conserving water has multiple benefits. Besides reducing water use it also reduces costs associated with pump operations and maintenance and reduces emissions related to energy use.

• Curtailment Plan

Since 2007, the City of Sisters has not experienced a lack of sufficient potable water supply. However, the City does have a plan should such a scenario occur (table 3). The Plan also outlines measures that should be taken at each stage including public outreach and restrictions on non-essential use.

Shortage Stage	Initiating Conditions
Stage 1: Water Shortage Alert	<ul style="list-style-type: none"> ▪ Demand reaches 80% of authorized production capacity for three or more consecutive days; or ▪ Reservoir level drops below 17 feet (1.2 MG) with wells pumping at authorized production capacity.
Stage 2: Serious Water Shortage	<ul style="list-style-type: none"> ▪ Well #3 failure during peak season with Wells #1 and #2 still operational; ▪ Demand reaches 90% of authorized production capacity for three or more consecutive days; ▪ Reservoir level drops below 11 feet (0.8 MG) with wells pumping at authorized production capacity; or ▪ A major break in one of the two secondary transmission lines that would limit the City's ability to fill and use the reservoir to full capacity.
Stage 3: Critical Water Shortage	<ul style="list-style-type: none"> ▪ Well #3 failure and either Well #1 or Well #2 also inoperable (only one city well operational); ▪ Demand is 100% or more of authorized production capacity; or ▪ A major break in the main transmission line from the reservoir to the secondary transmission lines that would take the reservoir off-line resulting in a potential loss of system pressure and fire-flow capacity.
Stage 4: Emergency Water Shortage	<ul style="list-style-type: none"> ▪ Sabotage involving the loss of one or more wells, reservoir, transmission lines, or similar loss of water supply elements; or ▪ Water supply or system contamination.

Table 3: City of Sisters Curtailment Stages

Future Actions

• Internal Actions

○ Implementation Phasing of WMCP

Actions to better conserve water were identified in the WMCP which include routine maintenance, repair, and checks such as annual audits and commercial meter testing. Actions that need to be implemented include:

- ❖ Develop and implement a schedule for testing residential meters.
- ❖ Provide detailed conservation messages in monthly billings during warmer months (May-September)
- ❖ Strive for less than 10% non-revenue water.
- ❖ Work with high-consumption users on improving water conservation.

○ Curtailment Action During Drought Declaration

“In drought conditions, we all need to make an effort to use our water wisely. Water conservation is key to reducing pressure on our groundwater sources, and our biggest opportunity for water savings is from more efficient irrigation practices.”

-Public Works Director Paul Bertagna

During the most recent drought conditions the City of Sisters released information to the public on water-saving methods around their homes. The City will continue to monitor conditions and advise the public during drought conditions as declared by the governor.

○ Water Efficient Technologies on City-Owned Irrigation Systems and Parks

Sisters is fortunate to have a network of parks throughout the City as well as beautifully landscaped streets in the downtown area and surrounding many businesses. Recently the City converted nearly all landscaped areas from above-ground sprinkler irrigation to underground drip lines. This has allowed drastic reductions in water use and avoided waste due to run-off or overspray. Grassed areas in parks are irrigated mindfully and are monitored so that more precise applications of water can be administered. Some grassed areas are not used by the public and are being evaluated for water-wise landscapes to keep Sisters a green and inviting place for all while conserving water. The City will also retrofit the splash pad at Fir Street Park to recycle the water after being disinfected.

• External Actions

○ Development Code and Landscaping Standards

Though many new developments implement water-wise landscaping and irrigation, the City can update development codes to require water efficient irrigation technologies and water-wise gardening techniques in new developments such as rain barrels and subsurface drip irrigation.

○ Incentive Programs

Incentive programs have the potential to influence many residents to switch to more water-efficient irrigation practices and technologies outside of the home and inside the home with low-flow fixtures and faucet aerators which will allow residents to save money on their water bill.



Waste

Goals

- Expand means by which wastewater disposal can benefit environment and community
- Improve energy efficiency of wastewater facilities
- Promote stormwater collection via bioswales to facilitate groundwater recharge
- Reduce consumption of carbon intensive products and services
- Increase waste diversion from landfills

Existing Conditions

- **Recycle Center**

Owned by the City but operated by Republic Services, the Recycle Center offers expanded recycling opportunities for anyone in Deschutes County. Oversized cardboard boxes, glass containers, and even used motor oil can be brought there to be disposed of appropriately or recycled.

- **Wastewater Treatment, Collection, and Disposal**

Wastewater in the City isn't as wasteful as some may think. After being treated at the City's Wastewater Treatment Facility, wastewater is disposed of during the warmer months as irrigation so that the water can infiltrate back into the earth and be used by the vegetation, primarily around 80 acres of forested land surrounding the Wastewater Treatment Facility. This supports sustaining a robust forest frequented by local wildlife including chipmunks, ground-squirrels, tree squirrels, mule deer, elk, coyotes, wild turkeys, and various birds of prey including bald eagles.

- **Lazy Z**

One unique way the City disposes of treated wastewater is on a City-owned portion of the Lazy Z Ranch. Here Public Works staff utilize agricultural irrigation techniques to grow hay. The site has been identified in the Wastewater Facilities Plan for expansion in the future for increased disposal of treated wastewater.

- **City Stormwater System**

The City uses several techniques for capturing stormwater from collectors in roadways with gutters, rock swales, and bioswales all of which allow stormwater to infiltrate back into the earth. Information about stormwater and how the community can help the City manage stormwater is available on the City's website.

Future Actions

- **Solid Waste**

- **Internal Actions**

- **Prioritize Purchasing of Less Carbon-Intensive and More Sustainable Products and Services**

Many products on the market have alternatives made with sustainability in mind often at a comparable price. Products purchased by the City for operations will be evaluated and more sustainable alternatives can be used.

- **Increase Waste Diversion from Landfills**

Though City operations include a great deal of recycling, including paper, glass, plastic, and metal products, some City facilities require increased efforts to reduce sent to landfills. Waste audits will help in determining what types of waste are produced and better inform where the City can improve facility waste diversion efforts. The City will also explore the feasibility of implementing public recycling containers.

- **External Actions**

- **Implement Education and Outreach Concerning Waste Reduction and Recycling**

Consumption of goods and food is a large source of greenhouse gas emissions both in residential homes and at businesses. The City will explore public information that encourages reducing consumption and waste, how to properly dispose of certain waste items, composting, and other sustainable waste practices.

- **Events**

Events inevitably produce waste from ready-to-eat food containers or disposable cups. The City will encourage sustainable waste practices such as compostable or plastic-free food and drink containers in public events.

- **Wastewater**

- **Internal Actions**

- **Wetland Construction Phasing**

A creative solution to wastewater disposal has been identified involving the creation of a 16-acre constructed wetlands, 4 wet acres of forested ponds, and 2 miles of streams on the City-owned Lazy Z property. Identified as part of phase 1 of the Lazy Z Ranch Master Plan this project would include amenities for the community such as vehicle parking, a viewpoint, connections to neighboring trail systems, and a trail system through the wetlands and forested area. As with other constructed wetlands in the state it is anticipated that there would be an increase in waterfowl and raptors as well as other regional wildlife offering a local and easily accessible location for bird watching, a popular hobby in the region.

- **Pumping Energy-Use Reduction**

Wastewater facilities are the second largest source of GHG emissions from City operations. The future Westside Pump Station offers an opportunity to employ energy-efficient pumps. Energy efficient pumps will be installed at existing locations when existing pumps reach the end of their useful life.

- **Stormwater**

- **Internal Actions**

- **Continue Implementing COSM Strategies for Treating Stormwater**

The Central Oregon Stormwater Manual (COSM) provides guidance on stormwater management system designs that meet state requirements to reduce pollutants entering bodies of surface water. Whychus Creek is a beautiful yet fragile aspect of life in Sisters and diverting stormwater away from entering the waterway will help to maintain the health of the creek and the wildlife that depend on it.

- **External Actions**

- **Use Bioswales and Permeable Pavement for Stormwater Disposal and to Reduce Flood Risk**

Bioswales offer ways to dispose of stormwater while supporting vegetation. Bioswales are visually attractive when maintained properly and have many benefits from filtering out pollutants to creating habitats for pollinators.¹⁴

Permeable pavement is another clever way of capturing and disposing stormwater and often include open-pore surfaces of paver, concrete or asphalt allowing water to flow through the surface and storing it while allowing it to infiltrate into the earth.¹⁵

Rainbarrels on private developments for use in landscape irrigation can also help to reduce runoff entering City right of way, further reducing the amount of stormwater entering a swale in a storm event.



Wildfire Mitigation

Goals

- Create and maintain defensible spaces around critical infrastructure
- Promote mitigation and preparedness efforts

Existing conditions

- **Wildfire Mitigation Plan**

Completed in 2022, the City of Sisters Wildfire Risk Assessment and Mitigation Plan (WRAMP) identified and prioritized City-owned and managed properties for treatment allowing the City to strategically manage sites. Additionally, there is the Greater Sisters Country Community Wildfire Protection Plan (CWPP), a joint effort between local fire districts, city, county, state organizations, and Project Wildfire, which outlines goals to protect lives, create and maintain fire-adapted communities, and better manage forests.

- **Hazardous Fuels Reduction Project**

The City of Sisters began work on its Hazardous Fuels Reduction Project which aims to administer treatments recommended in the WRAMP. The two sites included in the project are the “high priority” City-owned Edgington Road Parcel (future site of a municipal drinking water well) and the forested area surrounding the City’s Wastewater Treatment Facility.

Future Actions

- **Internal Actions**

- **Implement Mitigation Action Items**

Regular and routine maintenance throughout the year by Public Works staff to address many of the concerns highlighted in the WRAMP such as clearing of pine needles and managing other ground-level fuels.

- **Continue Agency Coordination for Wildfire Preparedness**

Future emergencies that Sisters may face will likely be linked in some way to the changing climate. By continuing to coordinate with other governmental organizations and local and regional emergency responders the City can better protect the lives of residents and visitors. The City will also explore how best to connect residents with organizations and the resources and assistance they need to better prepare and harden their homes against wildfire.

- **External Actions**

- **Strengthen Code Language for Private Property Fire Resiliency**

Buildings could see an increase in the potential for wildfire exposure as frequency and intensity increases. Wildfire preparedness and resiliency should be considered in new developments regarding more resilient construction techniques and landscaping.



“The forest ecosystems of the east Cascades of Central Oregon are complex. All of them are forests that are historically adapted to fire.”

-Deschutes Collaborative Forest Project ¹⁶

○ **Private Property Fuel Reduction and Preparedness**

Much of Sisters’ city limits are in a wildland-urban interface (WUI) zone, which are at high-risk of a fire hazard. Creating a defensible space is an easy and effective way to create a more fire-resilient property. Embers from a wildfire can travel several miles downwind where they may land on flammable material such as yard debris, uncleaned gutters, or wood piles and ignite the material. Embers can even enter a home through vents or other openings.^{17,18} Proper management of defensible space can give a structure an 85% chance of surviving a wildfire situation! Republic Services, the waste management company that serves Sisters, offers two separate yard debris cleanups, one in the spring and another in autumn. This is a commonly utilized service by residents in Sisters.

A prepared Sisters is a sustainable Sisters. A single burning home and all the synthetic materials within can release large amounts of toxic substances into the air, soil and water impacting not only the most vulnerable citizens of Sisters but can even impact municipal water ^{19,20}. The City of Sisters will continue to make educational materials and other resources accessible to the public on how to create effective defensible spaces to be a more fire-adapted community.

○ **Manage Urban Forest for Wildfire Resilience**

The City of Sisters Urban Forest Management Plan (UFMP) helps guide the City in maintaining and growing the urban forest. This document outlines wildfire mitigation and fuel treatments as they relate to the urban forest and includes the following recommendations:

Issue	Recommendation	Expected outcome
Defensible Space	Update defensible space requirements in the Sisters Development/Municipal Code.	Fuel reduction adjacent to all structures in city limits.
Wildfire Zoning	Adopt a wildfire hazard zone using criteria established by Oregon Department of Forestry.	Allows city to apply wildfire mitigation building codes to lots.
Wildfire Resilient Building Codes	Adopt a WUI code with wildfire hazard mitigation provisions for residential structures.	Gives city a new tool for improving wildfire resiliency with new development.
Defensible Space	Update Defensible Space requirements to align with current science and best practices, expand the requirements to include the entire WUI area.	Helps address wildfire risk to developed land within and adjacent to the city.
Fuel Reduction	Work with private and public landowners to reduce fuels within the WUI.	Provides fuel breaks that will help protect the existing stand
Tree Selection	Develop a list of acceptable trees that are ecologically fire resistant.	Prevents the spread of wildfire within the city.

Table 4: Wildfire Mitigation

Parks, Open Space, and our Urban Forest

Goals

- Improve access to green spaces and parks by community
- Maintain urban forest
- Reduce heat island effects
- Protect local ecosystems

Existing conditions

- **Tree City USA**

Tree preservation is important to the community in Sisters. The City of Sisters is proud to be an Arbor Day Foundation Tree City USA participant since 2007. Sisters is the only city in Oregon to have an Urban Forestry Board, Urban Forestry Management Plan, a contracted Urban Forester, and a Tree Ordinance!

- **Tree Inventory**

With the help of the City's Urban Forester an inventory of the trees in City right of way and on City property was created, allowing us to track existing tree species and health.

- **Whychus Creek Restoration**

Whychus Creek, a tributary of the Deschutes River, flows through the city and bisects Creekside Park. With a large open area to the north and the City's campground to the south, Whychus Creek at Creekside Park is a popular attraction to those seeking nature in the city. In 2023 Sisters completed a riparian restoration in the area where the creek flows through Creekside Park, mitigating bank degradation, planting native flora to improve habitat for native fauna, and increase accessibility to the creek.

Future Actions

- **Internal Actions**

- **Green Space Acquisition**

The City's 2023 Parks Master Plan identified several areas for potential open and natural spaces primarily recommending that the City work with the Oregon State Parks and Recreation Department to acquire State property on the eastern border of the city. The property is adjacent to Whychus Creek and would provide open space and natural areas for creek access and passive recreation. Recommendations have also been made to acquire public access easements to undeveloped property adjacent to Whychus Creek for increased access in the city.

- **Park Development**

Other recommendations in the Parks Master Plan include additional playground equipment at existing playgrounds in City parks, constructing a "Future Northwest Park", new trails at the Lazy Z Ranch site, and other potential uses for undeveloped property.

- **Convert Gasoline-Powered Lawn Equipment to Electric**

Many alternatives to traditional gas-powered landscaping equipment are currently on the market including lawnmowers. The City will monitor the market for potential alternatives to gasoline-powered lawn and landscaping equipment.

- **Expansion of Tree Canopy in Urban Heat Islands**

The urban forest is an aspect of life in Sisters that is very important to members of the community. Currently, the City plants trees every year during our annual Arbor Day Celebration. A major barrier to planting trees in the region is the need to irrigate the trees for years until they are able to survive on their own. The City will continue to consider areas suited for tree planting in addition to the Arbor Day plantings.

- **Wastewater Wetlands Trail Development**

The Lazy Z Ranch Master Plan identified areas of the Lazy Z Ranch to be used as a 16-acre constructed wetlands including a forested area with 4 acres of ponds and 2 miles of streams. Throughout this area would be several trails allowing users to view wildlife, especially birds such as waterfowl and raptors.

- **Stream Restoration & Protection**

Whychus Creek is a key feature of life in Sisters for those who enjoy the natural environment of the City. It is paramount to monitor the Creek where it flows through the City to preserve its health and ability to sustain wildlife and not negatively impact life downstream.

Other Actions

- **Reduce Light Pollution through Dark Skies Ordinance**

Light pollution has many impacts on wildlife from disrupting the migration patterns of birds and predation patterns of animals who rely on insects attracted to lights at night, causing delicate ecosystems to become unbalanced.²¹ Though these effects are often unseen by people who spend nights sleeping, light pollution can also disrupt human sleeping patterns.²² Central Oregon is fortunate to have access to amazing night-sky views of the stars and by following Dark Sky practices all can benefit; human, animal and plant. The City will work towards updating its Dark Skies Standards, achieving minimal light pollution, and explore certification in the International Dark-Sky Association.



Next Steps

Implementation Plan

Year 1 Implementation Summary

- Complete LED lighting retrofit for City Hall
- Complete energy efficient HVAC upgrades for Public Works Headquarters
- Update to City's Darks Skies Ordinance
- Design Phase I of East Portal Mobility Hub with EV infrastructure
- Begin work on Barclay Dr improvements
- Complete water conservation streetscape irrigation projects
- Continue park irrigation water conservation projects
- Complete splash pad water recycling retrofit
- Continue wildfire resiliency work on Public Buildings

1-5 yr

- Begin initial stages of fleet electrification
- Install solar batteries at existing solar facilities
- Implement phases of WMCP
- Expand City Fleet to include alternative modes of transportation
- Expand recycling opportunities at campground and Public Works HQ
- Expand public recycling opportunities throughout the city.
- Construct Lazy Z Ranch Phase 1
- Implement Wildfire Mitigation Action Items
- Construct Future Northwest Park
- Convert gas powered lawn equipment to electric
- Develop East Portal site to serve as a multi-modal transportation hub

5-10 yr

- Construct Lazy Z Ranch Phase 2

To Be Determined

- Transition propane gas to electrical appliances
- Code Updates
 - Private property fire resiliency
 - Minimum energy efficiency standards
 - EV charging at multifamily and commercial developments
 - Favoring walkable/rideable neighborhoods
 - Solar energy production in new development
- Back up batteries for City-owned solar systems
- Evaluate potential sites and install e-bike infrastructure
- Evaluate potential sites and install EV infrastructure

Accountability and Enforcement

By adopting this plan, the City of Sisters will demonstrate a commitment to creating a more sustainable Sisters Country and mitigating climate change.

Progress Reporting

Progress reporting will be done on an ongoing basis with reports provided to oversight boards and committees as well as the city council. Reports will largely consist of action progress, planned and completed projects, and regular updates to GHG emissions and renewable energy analyses. The goal will be for annual progress reporting and updates to boards/committees/council and for the plan to be updated at least every 5 years. During those update periods the plan will be reevaluated to determine if new actions must be made and if current actions are sufficient to meet the plan’s goals.

Oversight

Oversight for specific topics such as Focus Areas, actions or goals will be provided by the applicable Board or Committee: City Council, Parks Advisory Board, Planning Commission, Public Works Advisory Board, and Urban Forestry Board.

Funding

Various funding sources in the City budget currently fund projects described in this plan and will continue into the future. State and Federal grants have also been instrumental in supplementing funding for some of the larger projects in Sisters. Both City budgeted funding and grants will be crucial sources of funding for implementing this plan.

Equity Considerations

Actions outlined in this plan should be implemented in a manner that addresses equity concerns unique to Sisters. Ensuring that equity is considered and addressed will help to create a more sustainable future and livelihood for the community as a whole. When actions are implemented, it will be important to assess if historically disadvantaged groups are being equitably considered in the following topics:

Disproportionate Impacts	Are burdens generated to historically disadvantaged groups? Can the burdens be mitigated?
Accessibility	Is this action accessible to households and businesses throughout the community, particularly historically disadvantaged groups?
Engagement	Are historically disadvantaged groups engaged and empowered in a meaningful and appropriate manner?
Alignment and Partnership	Does the action support and align with historically disadvantaged groups in the community? Is there an opportunity for collaborative partnership?
Relationship Building	Does the action facilitate building effective relationships with diverse communities?
Economic Opportunities and Staff Diversity	Does the action create workforce development, contracting opportunities and increased diversity of city staff for historically disadvantaged groups?
Accountability	Are there appropriate accountability mechanisms to ensure historically disadvantaged groups will equitably benefit?

Table 5

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Acknowledgments

City Council
Mayor Michael Preedin
Council President Andrea Blum
Gary Ross
Jennifer Letz
Susan Cobb

Public Works Advisory Board
Billy Kelly
Rachel Ruppel
Dane Zehrung

City Staff
Paul Bertagna
Jackson Dumanch
Emelia Shoup
Jordan Wheeler