M

Sustainability Planning Principles

SUSTAINABILITY PLANNING PRINCIPLES

Greater Cincinnati's past development convention of utilizing combined sewers has led us to our current, untenable condition of 14 billion gallons of annual combined sewer overflow, which now, in response to the federal consent decree requires a major rebuilding and reconfiguration of the sewer system.

The Lick Run Alternative Project proposes solutions that address the triple bottom line goals of Project Groundwork. With this innovative approach, the proposed infrastructure investments could be leveraged to achieve a higher level of community enhancements and, potentially, a reduced financial burden on the citizens it serves.

This investment should also be supported by a set of robust planning principles. The Sustainability Planning Principles on the following pages provide suggestions for watershed stakeholders to consider when collaborating on creating sustainable, energy-efficient and revitalized urban communities. The Sustainability Planning Principles are categorized into seven categories:

- Water,
- Energy/ CO_2 Reduction,
- Habitats,
- Transportation,
- Planning,
- Resources
- Miscellaneous

These Categories are further separated into Subgroups, each with their own section, for example, Water has the Subgroups of Storm Water, Potable Water and Black Water Management, while Habitat is broken down into Fauna, Flora and Human. Each descriptive section of the Subgroups has an attached narrative and an associated icon for ease of reference. Within these Subgroups, there is a listing of sustainability tactics. Many of these tactics have been the topics of favorable conversations at one or more of the Lick Run Design Workshops. Other tactics are notable sustainability practices and tactics that could help leverage the investments that MSD will be making to create a more sustainable community.

All the Sections have listed at the bottom of each section numbers for Potential Implementation Partners (which are identified on this page). The Sustainability Planning Principles, with accompanying potential tactics, offer suggestions for future multi-stakeholder sustainability initiatives for the Lick Run Watershed and also other watersheds.

The Sustainability Planning Principles are intended to support the Urban Waterway Base Plan and the Long-Term Vision Plan in the Lick Run Watershed. They can also apply to other watershed-based planning efforts in the region.

Potential Implementation Partners:

1. Area Farmers Network
2. Building Owners
3. Business Owners
4. Cincinnati Department of Transportation & Engineering
5. Cincinnati City Council
6. Cincinnati Park Board
7. City of Cincinnati Planning
8. Duke Energy
9. Energy Service Company (ESCo)
10. Greater Cincinnati Energy Alliance
11. Greater Cincinnati Water Works
12. Higher Education (for research opportunities)
13. Homeowners
14. Metro
15. Metropolitan Sewer District of Greater Cincinnati
16. Non-profit Organizations
17. Power Purchase Agreement Agent
18. Private Developers
19. Private Sector Architect/Engineer
20. Private Sector Landscape Architect
21. Property Owners

Water

Stormwater Management

Our antiquated storm sewer system mixes storm water with black water from the sanitary sewer system. This mixture must then be cleaned and filtered before being released back into the Mill Creek. In Natural Systems thinking, rainwater is a critical resource for the watershed in which it is falling, not a detriment. The tactics below indicate ways in which the rain water can bypass the sewer system, recharge aquifers, and enter directly into the natural water systems of creeks, streams and the Ohio River. These strategies save energy and money by stopping storm water from entering the current treat and pump sewer system, as well as mitigating the problematic combined sewer overflows.

Potential Tactics

- Bioswales, Rain Gardens, and Storm Water Planters
- Capture for Irrigation and/or Conveyance
- Stream Irrigate Crops and Landscape
- Vegetated Roofs and Living Walls
- Create a Neighborhood Rainfall Budget
- Pervious Pavers and Gravel
- Pervious Concrete and Asphalt
- Reinforced Turf
- Contour planting
- Conservation easements

Implementation Partners:

4 6 7 11 12 13 15 16 18 19 20 21

Potable Water Management

Potable Water is clean, drinkable water which has been filtered by the Greater Cincinnati Water Works from the Ohio River and the Great Miami Aquifer in Southern Butler County. The GCWW provides 136 million gallons per day which takes energy to filter and pump. Our human waste is conveyed by this clean, filtered water. We irrigate our lawns and crops with the same filtered water, and many of our industrial processes use potable water. Below are tactics to lower our potable water consumption, which will save energy, money and natural resources.

Potential Tactics

- Capture Storm Water, Gray (used) Water, Condensate, Dehumidification Water for Human Waste Conveyance
- Capture Storm Water, Gray (used) Water, Condensate, Dehumidification Water for Irrigation
- Gallon Per Flush Thresholds
- Xeriscape/ Natural and Adaptive Plant Species
- Zero Irrigation Strategies
- Create a Neighborhood Water Budget
- Waterless Urinals
- Dual Flush Toilets - new or conversion kit

Implementation Partners:

3 6 7 11 12 13 15 18 21

Black Water Management

Black Water is the waste water which contains human or animal waste and is in the direct purview of the Metropolitan Sewer District. Since this water includes pathogens, great care must be taken and has direct impact on public health. Lowering the amount of black water lowers the amount of water that needs to be treated and pumped. In Natural Systems thinking, there is no waste. What is waste to one species is a resource to another. As such, there are potential tactics that turn human waste into an environmental benefit.

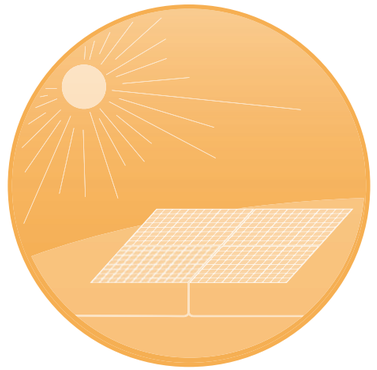
Potential Tactics

- Waterless Urinals
- Dual Flush Toilets
- Compost Toilets
- Living Machine

Implementation Partners:

2 3 6 11 12 13 15 18

Energy



Usage

Buildings use over 40% of the domestic energy in the United States. There are many inexpensive tactics listed below that can be utilized to save energy and money. By simply designing with the Natural Systems of solar access, natural ventilation and daylight, a building owner can drastically reduce the utility bills. Of course, it helps to meter or measure the use and subsequent improvements to help understand the effectiveness of the improvement.

Potential Tactics

- Energy Use Monitoring
- Adopt Efficiency Standards
- Reduce Demand
- Passive Energy Strategies
- Daylighting
- Conifers Planted as Windbreak
- Deciduous Trees Planted on South of Building
- Create a Neighborhood Energy Budget
- Community Based Energy Use Reporting
- Solar Access Guidelines
- Natural Ventilation Strategies
- Utilize ASHRAE DESIGN GUIDES

Implementation Partners:

3 6 7 8 9 10 12 13 16 18 19 20 21

Production

Once the efficiency has been maximized, then the source of power should be a consideration. Simply having a district heat loop will reduce significantly the energy wasted in delivery to the site. There are multiple methods of producing energy that can be utilized effectively in our region. While wind power is not reliable in Southwest Ohio, the tactics listed below have opportunity. In some cases, like geoexchange loops and solar thermal, high rates of return can be found. There are also tactics which harvest the energy already created and often times wasted, such as small hydro generators and heat transfer systems.

Potential Tactics

- Solar Panels
- Heat Transfer form Sanitary Sewer
- Micro Scale Hydro
- Biomass Gasification
- Solar Thermal
- Data Center Energy Harvest
- Create a Neighborhood Solar Budget
- District Heat Loop
- Geoexchange co-op
- Solar Access on South Facing Slope

Implementation Partners:

3 6 7 8 11 12 13 15 16 17 21

CO_2 Reduction

As municipalities across the country are lessening their impact on the environment through their Climate Action Plans, carbon emissions are being targeted for reduction. Along with the energy efficiency and energy production, below are a few tactics that communities can consider to help in their carbon reduction strategy. Measuring is a key component which allows others to witness success. This master plan also considers the energy related to moving and processing water, which can be very energy intensive. There are also carbon sequestration examples, such as planting a forest or vegetated roofs.

Potential Tactics

- Community Scale Carbon Reporting
- Create a Neighborhood Carbon Budget
- Watergy (Water and Energy Efficiency)
- Plant a Forest for Carbon Sequestration
- Vegetated Roofs
- Living Walls
- Buy Local Products

Implementation Partners:

3 6 7 11 12 13 15 16 18 19 20 21

Habitat

Fauna

Before this area was settled by humans, it was home to various species of fauna which no longer exist today or exist in diminished numbers. While this project will not take a complete restorative approach, it can begin to enhance some habitat zones and considerations while providing opportunity for dense human development. Below are tactics which have and can be implemented into the planning process for the Lick Run Watershed. Most fauna species are helpful and assist the Natural Systems approach to create a sustainable community. As an example, bats can eat 600 to 1,000 insects, including mosquitoes, per hour, and bees help pollinate flowers, give us honey, and some are predators to wasps.

Potential Tactics

- Create a Habitat Corridor
- Reduce Light Pollution
- Create Species Habitat such as Bat Houses, Bee Hives and Monarch Wayfinding Stations
- Create Habitat for Aquatic Animals
- Create Habitat for Amphibians
- Create Habitat for Reptiles
- Create Habitat for Aviary
- Create Habitat for Insects
- Conservation easements

Implementation Partners:

3 4 6 7 12 13 15 16 18 19 20 21

Flora

Before this area was developed, paved and hardscaped, it was home to various species of flora which no longer exist today or exist in diminished numbers. While this project will not take a complete restorative approach, it can begin to enhance some habitat zones and considerations while providing opportunity for dense human development. Below are tactics which have and can be implemented into the planning process for the Lick Run Watershed. Aside from their inherent beauty, plants provide many benefits that can save infrastructure costs and embodied energy. For example, plants can remove contaminants from the soil through phytoremediation, mitigate landslides with their root structure and filter runoff water.

Potential Tactics

- Plant Native/ Adaptive Vegetation and Remove Invasive Species
- Create Habitats for Aquatic, Terrestrial, and Avian Species
- Create a Hillside Overlay
- Rebuild Soil Capacity
- Create Restorative Landscapes
- Create a Hardscape Management Plan
- Use an Integrated Pest Management Plan
- Create an Eco-fertilizer Policy
- Phytoremediation
- Conservation easements

Implementation Partners:

3 6 7 12 13 15 16 18 19 20 21

Human

The master plan has been designed to create a high quality human habitat with a strong sense of place. To be sustainable, Nature and humans must successfully coexist within the same community. The tactics below help create an enhanced quality of life for a wide range of people, including people of different ages and abilities. Creating beautiful, universally designed, publically accessible spaces with event programming will help enhance a sense of community. The buildings should also support the health, safety, and welfare of people using sustainable practices and technologies.

Potential Tactics

- Create Beautiful Spaces
- Create Vista Corridors and Views from Interior Spaces
- Design for Physical Fitness
- Walkability and Trail Access
- Design for Accessibility and Visitability
- Universal Design
- Public Art and Biophilic Design
- Plan for Events and Program Public Spaces
- Recognize Cultural History and Tradition
- Create a Non Profit to Stewardship Vision
- Adequate Temperature, Humidity and Acoustic Controls
- Daylight Interior Spaces
- Utilize a Green Cleaning Policy
- Utilize a Indoor Environmental Quality Plan

Implementation Partners:

3 4 6 7 12 13 15 16 18 19 20 21

Transportation

Automobile / Infrastructure

As the master plan begins to be implemented, there will be opportunity to renovate the streets and other transportation infrastructure within the project boundary. At that time, it is advised to take the tactics listed below into consideration for a more sustainable neighborhood. LED street lights will lower energy consumption and maintenance costs. If appropriate locations can be found, roundabouts will keep a constant traffic flow, reduce idling times and exhaust and lower tragic and severe accident rates. Other examples will lower carbon emissions, save upfront costs and increase development opportunity.

Potential Tactics

- LED Streetlights
- Roundabouts in Lieu of Traffic Signals
- Use Recycled and Regional Materials in Infrastructure
- Allow for Shared Parking
- Zip Car Station
- PV Powered Electric Car Charging Stations
- Ride Share/ Carpool Programs
- Right Turn on Red Policy
- Hybrid/ EV Auto Incentives

Implementation Partners:

3 4 5 7 13 16 17 18 21

Alternative

While the majority of residents and through traffic rely on the automobile for transportation, there are other modes that can be enhanced in the short term. A complete streets design will accommodate the auto, mass transit, bicycles and walkers within the same right of way. Many residents walk, but have expressed a concern with crossing traffic. It is imperative that a walkable urban design be created for a strong sense of community, and hike/ bike trails can increase physical fitness options. Metro plays a critical role in the transportation to, in and through this corridor. One consideration is to ask Metro to provide free bicycle transportation up the hillside. As the population increases then the neighborhood can support more the long term, more robust transportation examples.

Potential Tactics

- Complete Streets
- Metro Pass Incentives
- Metro Policy: Free Bicycle Transport Up Hillsides
- Priority Green Light for Buses
- Robust Sidewalk Network
- Walking Trails
- Hike/ Bike Trails
- Light Rail Station
- Rent a Bike Program
- Travel Demand Management System

Implementation Partners:

3 4 6 7 13 14 15 16 20 21

Planning

Guidelines

As the master plan proceeds, there are several opportunities to provide additional guidance to the developers, property owners and public agencies. Some provide environmental benefits , such as heat island reduction considerations, while other provide development incentives, such as brownfield redevelopment programs and density bonus zones. Community design charrettes make certain that the local residents, businesses and property owners has a chance to influence the development in their neighborhood.

Potential Tactics

- Brownfield Assessment/ Redevelopment
- Steep Slope Protection
- Tree Lined Streets
- Heat Island Reduction
- Community Design Charrettes
- Design Guidelines
- Hillside Overlay District
- Form Based Codes
- Density Bonus Zone
- Green Enterprise Zone
- LEED-Neighborhood Development

Implementation Partners:

3 7 13 15 16 18 21

Social Equity

As we move toward a more sustainable future, the economic and environmental concerns have been and will continue to be addressed. There is another aspect that should receive equal weight in the decision making process, and that is social equity or quality of life issues. Below are a series of tactics which will help ensure that the human factor is taken into consideration. The Social Impact of Building program looks at the human condition during the construction process and has multiple references for the creation of projects.

Potential tactics

- Workforce Development Programs
- Workforce Standard During Construction
- Universal Design
- Pictorial Directional Signage
- Educational Environmental Graphics/ Signage
- Visitability
- Plan for Mixed Income Housing
- Mixed Use Planning
- Increase Residential Opportunities
- Open Access to Community Space
- Neighborhood Based Non Profit
- Crime Prevention Through Environmental Design
- Waterway/ Watershed Stewardship Organization

Implementation Partners:

3 7 10 12 13 15 16 18 19 20 21

Food

The current neighborhood greatly lacks food options, particularly healthy choices. Below are a few tactics that can be utilized as the demand increases. It is possible that large landscape interventions could incorporate edible landscapes, and the master plan allows for the use of parking lots for a farmers market or similar event. There are opportunities for communal or individual gardening or other food production, such as beekeeping.

Potential Tactics

- Farmers' Market
- Local Food Co-op
- Edible Landscape
- Underground Irrigation for Crops
- Integrated Greenhouses
- Urban Community Gardens
- Local Grocery
- Bee Hives

Implementation Partners:

1 3 6 7 13 15 16 18 20 21

Resources

Materials

As the master plan comes to fruition, it is imperative that the material selection is made wisely. products need to be durable and perform well, but they should also come from our region when able. This will help the local economy and reduce transportation costs and energy. Materials high in recycled content should also be heavily considered. This will increase demand for recycled products, save embodied energy and reduce the waste going to the land fill. One of the best resource saving tactics is to reuse existing structures.

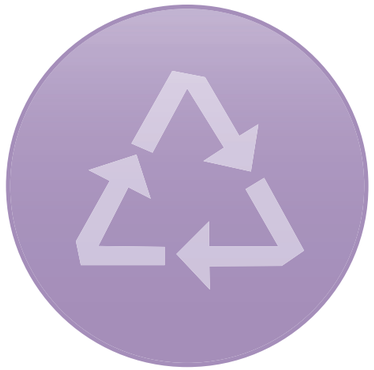
Potential Tactics

- Existing Building Reuse
- Use Foundations as Ruins/ Park Amenities
- Set Recycled Content Goals for Constructed Improvements
- Set Regional Material Goals for Constructed Improvements
- Set Reclaimed Material Goals for Constructed Improvements
- Life Cycle Assessment for Constructed Improvements
- Set Embodied Energy Goals for Constructed Improvements

Implementation Partners:

3 4 6 7 11 12 13 14 15 16 18 19 20 21

Broad Scale



Waste

The majority of our waste from daily activity can be utilized a s a resource, very similar to the Natural Systems approach. According to the EPA, over 62% of our common waste is organic in nature and can be composted. This compost would aide in restoring the soil's nutrients and create jobs. Almost a quarter of all our waste is recyclable - another resource that would save energy and the environment through the decreased need of mining. Below are listed tactics that can be utilized in the watershed to divert resources away from the landfill.

Potential Tactics

- Set Construction Waste Management Goals for Constructed Improvements
- Use Demolished Material as Aggregate
- Create a Commercial EPA Class 2 Compost Faculty
- Collect Neighborhood Organic Waste
- Install Recycling Bins in Streetscape
- Solar Powered Trash Compactors

Implementation Partners:

1 3 4 6 7 12 13 15 16 18 21

Metrics and Miscellaneous

As the master plan implementation moves forward, there are several resources and metrics to consider. Below are some examples that will help the project(s) make certain sustainable considerations in the realm of economic, environment and social equity. many of these can be utilized as guidelines, such as LEED for Neighborhood Development and the Sustainable Sites Initiative. Others can be used as project goals, such as Net Zero Energy or LEED Platinum. Still other help to measure the project overtime, such as Energy Star's Portfolio Manager.

Potential Tactics

- Public Landscape/ Buildings/ Infrastructure To Lead by Example
- Integrative Systems Design Process
- Integrative Systems Maintenance Process
- Energy Star
- LEED Platinum
- LEED for Neighborhood Development
- Living Building Challenge
- Sustainable Site Initiative
- ICLEI
- Cradle to Cradle
- Social Impact of Building
- Architecture 2030
- Net Zero or Regenerative Energy, Water, and Waste

Implementation Partners:

1 3 4 6 7 8 9 10 11 12 13 14
15 16 17 18 19 20 21