

4.4 GREEN INFRASTRUCTURE

Findings

The Comprehensive Plan Update: 2006-2026: An Area-Wide Vision for Kenton County defines green infrastructure as an “interconnected network of protected land and water that supports native species, maintains natural ecological processes, sustains air and water resources and contributes to the health and quality of life for our citizens.” Green infrastructure is a concept that elevates the importance of the natural environment to the level of the built infrastructure, requiring careful consideration and planning. The concept can broadly be defined as an interconnected system of parks, stream corridors, preserved hillsides, and large undeveloped spaces forming greenways. Green infrastructure has also been defined more narrowly to include on-site stormwater management practices including rain gardens, bio-retention systems and green roofs.

Systems comprising green infrastructure perform many valuable functions that typically cost less in the long run than other alternatives such as pipes and sewage treatment facilities. These functions include: cleaning the air and water of pollution, cooling the environment, providing habitat for native species, providing space for recreation activities, and increasing the value of the built environment. One of the most important contributions green infrastructure provides in the context of Latonia may be on-site stormwater management.

The Existing Conditions Report, compiled in April 2010, delivers an analysis of key natural and man made features of the study area. This analysis, available at www.nkpc.org, can be used to provide indicators of the green infrastructure conditions of the area as well as gauge where problems may be found. The existing conditions report also calls out three primary areas of focus for future green

infrastructure implementation techniques within the study area. These focus areas include:

- Efforts to increase stormwater management
- Expansion and restoration of the tree canopy
- Reduction of impervious surfaces in the area.

A complete description of these focus areas can be found in the Existing Conditions Report. However, details will be included in this section as necessary to describe areas where the community should focus to solve existing green infrastructure problems, prevent new problems from occurring, and improve the overall health and quality of the community through new efforts.

Green infrastructure practices can often be easily implemented with only minor modifications to existing areas. The strategic action committee discussed in section 4.9 Strategic Action Committee and Neighborhood Associations should encourage green infrastructure by working with the community to find avenues for implementation. Beginning with efforts such as removing a few parking spaces in a large parking lot for conversion to rain gardens, installing curb extensions with planters, or adding rain barrels can begin to positively impact an area in a short timeframe. An approach that may be enacted in the early phases of implementation that would include the coordinated effort of the City and volunteers includes the reforestation of the ravines located in the north - northwestern portion of the study area.

Sanitation District No. 1 Church Street CSO Reduction Project - Through discussions with SD1 staff identified a major project located immediately outside the study area between Church Street and Winston Avenue, just north



Figure 4.4.1: Banklick Creek Watershed

of Banklick Creek, in the City of Taylor Mill. The study area and the proposed project location are both within the Banklick Creek watershed. SD1 has several objectives for implementing green and gray infrastructure controls within this area, some of which include improving health, improving existing infrastructure, and improving Banklick Creek. The goal of this community green infrastructure project is to improve and restore natural habitats, reduce the combined sewage entering the Banklick Creek, and improve the quality of storm water flowing to the stream. It is expected that the project will also provide educational opportunities, as well as opportunities for passive recreation.

SD1 has developed numerous innovative approaches to reducing overflow events that not only provides a CSO reduction and water quality improvement, but also enhances the neighborhood and provides community

amenities. Ideas within the proposed plan, which include both traditional gray components and green elements, will provide both a public health and water quality improvement. These ideas are anticipated to result in cost savings to SD1 as compared to the gray-only solution. This project is anticipated to begin in early 2012 with completion expected in mid-year 2013. It should be noted this time line is tentative and only applies to construction of Phase I of the project. Phase II is still listed as a potential project by SD1. Additional details of the project can be found in Appendix A.

It is important to keep in mind that timeframes mentioned throughout the entirety of this section are general parameters of when projects and/or implementation measures may likely be started, but completion of these projects may reach beyond the end of the timeframe. Commencement dates of these recommendations should be considered approximate and flexible based on many factors including the formation of the strategic action committee charged with oversight of the implementation of this plan.

Implementation Techniques

Impervious Surface Reduction - The study area consists of approximately 18 percent impervious surfaces which prevent water from entering the ground. Preventing infiltration prohibits natural cleansing and rapidly releases stormwater into the surface drainage system. Many techniques are available that can help to reduce the impervious surface of the study area. Some of these techniques include green roofs, rain barrels, rain gardens/bioretention areas, stormwater planter boxes, grassed swales, and pervious pavement.

During the redevelopment process as many of these techniques as possible should be evaluated for potential use. The greatest potential to remove a significant amount of impervious surface within the study area may be found within the Latonia Plaza shopping center area. The inclusion of green practices into

redevelopment scenarios will also help set the tone for the rest of the neighborhood. Pairing these techniques with redevelopment rather than attempting to implement as a standalone process will help the community in utilizing potential funding more efficiently as these facilities can be provided during development. However, there will likely be many parts of the study area which will not undergo redevelopment within this planning period and individual site-specific implementation efforts may be warranted. Examples of green infrastructure practices such as vegetated medians, pervious parking lots, natural plazas, and increases in street trees can be found in section 4.8 Latonia Plaza Redevelopment on page 83.

Short Term 0-5 Years

Rain Barrels and Cisterns - Rain barrels and cisterns are an effective way to reduce stormwater runoff volume in developments with limited open space, including existing residential properties. Often, the most important factor to



Figure 4.4.2: Rain Barrel

consider when using rain barrels/cisterns is the use of the captured water. This water can be used for typical landscaping purposes such as plant watering in residential settings or toilet flushing in commercial buildings.



Figure 4.4.3: Stormwater Planter Box

Stormwater Planter Boxes - Stormwater planter boxes are a specific type of bioretention feature that are typically used in projects with space constraints. In the redevelopment of the shopping center area, planter boxes could be used near buildings and along local roadways and access drives. Planter boxes can also act as a buffer between the sidewalk and the roadway making pedestrians feel safer in busy transportation corridors, or even along residential streets. Another ideal location for the use of planter boxes may be in an area such as Ritte's Corner. This is an area that is already developed and is not likely to see massive redevelopment and therefore presents an opportunity to implement this type of green infrastructure technique. The use of planter boxes within the Ritte's Corner area could provide some stormwater management abilities without the need for complete removal of sidewalks or streets.

Curb extensions and green medians - Curb extensions are generally found at the corner of smaller streets and provide opportunity for plantings to occur that help facilitate stormwater management in areas where these practices are usually lacking. Extensions can provide the additional benefit of added safety to pedestrians as it further buffers them from vehicular traffic and reduces the distance required to cross travel lanes on a street. Green medians can also be used to provide opportunity for plantings to occur to help facilitate stormwater management

in areas where these practices are usually lacking. An ideal location for a green median may be between 40th Street and 38th Street on Winston Avenue.



Figure 4.4.4: Curb Extensions

MID TERM 5 - 12 YEARS

Green Roofs - Green roofs are an example of green infrastructure that can be a desirable addition to a building design that provides storm water management benefits. Green roofs are most frequently used for multi-story buildings in areas with limited open space. In addition to managing storm water runoff, green roofs can reduce energy demand for cooling and can be designed to serve as a green space amenity for building users. Green roofs may be appropriate in the redevelopment of the Latonia Plaza shopping center area (section 4.8 Latonia Plaza Redevelopment, page 83). This area currently



Figure 4.4.5: Green Roof in Use at SD1

consists of mostly impervious surfaces in the form of rooftops and parking lots. The green roof technique may provide for a significant improvement in stormwater more naturally filtrate into the ground.

Rain gardens/bioretention areas - These features are based on the concept of directing stormwater runoff into green space areas of a development that are designed to store, infiltrate, and slow the flow rate of runoff. Effective rain garden/bioretention area designs require a consideration of existing soil conditions, need for engineered soil, plant selection, and overflow structure design. Potential locations for rain gardens/bioretention areas include landscaping areas around parking lots and buildings, especially in redevelopment efforts in the Latonia Plaza area.

Another area for improved stormwater management and reduction of impervious surfaces is through the construction of a partial vegetated median along Winston Avenue. Such a median could have the potential to treat stormwater runoffs without forcing water into the sewer system. Portions of the median could potentially be used for the installation of rain gardens and bioretention areas, which will more readily store and infiltrate stormwater runoff from the roadway. Special care and consideration should be given to ensure vegetation chosen for the median does not negatively interfere with traffic sight lines along the corridor.



Figure 4.4.6: Rain Garden in a Parking Area

Vegetated swales - Vegetated or grassed swales located in public roadway medians and along roadsides offer an alternative to traditional piped storm drainage systems. The proposed median on Winston Avenue has potential for providing stormwater management benefits. Use of swales in road rights-of-way can be very beneficial given the relatively large size of these areas combined with the fact that standard, raised medians provide minimal stormwater management benefits.

ONGOING

Pervious Pavement - By allowing stormwater to seep through the surface and into a natural purification process, pervious pavement can be a useful implementation technique in the management and reduction of stormwater runoff. Soil type is key to the effectiveness of pervious pavement and working with SD1 may help to implement a program that best matches the attributes of the area. There are a few places within the study area which may be appropriate locations for pervious pavement pilot projects. These areas include the parking lot of the Bill Cappel Youth Sports Complex or the parking lot of Rosedale Manor. Additional use of pervious pavement should be explored if trial efforts prove successful.

Tree canopy restoration - The study area consists of approximately 8 percent of tree canopy cover. This is extremely low compared to the recommended 25 percent for urban residential neighborhoods by American Forests. Water conservation and reduction of soil erosion are two major factors which can be addressed through attention to the percentage of tree canopy in an area. Trees and other vegetation aid in the slowing of water moving across the ground surface and help to reduce soil erosion.

There are benefits to restoring the tree canopy of an area that go beyond aiding in stormwater management. These benefits include a reduction

in air pollution due to an increased ability to remove CO₂ from the air, energy savings associated with shade in the summer and wind breaks during the winter months, an increase in economic stability attributed to the attraction of business and people by the more aesthetically pleasing neighborhood, reduction in noise pollution due to the ability of trees to absorb and block noise, and an increase of wildlife and plant diversity by creating mini-climates for plants and wildlife that would otherwise not be able to survive.

One of the most effective and easily accomplished techniques to aid in the restoration of the tree canopy for the area may include planting within tree lawns along the street, curb extensions and green medians. Trees might also be reintroduced into floodplain areas where development should be otherwise discouraged. These techniques provide opportunity for vegetation to be added to the study area throughout the redevelopment process.

Street Trees and Treelawns - This study recommends adding street trees as the study progresses. Tree canopies can help to lessen stormwater impacts, help to cool urban areas, and have potential to make an area more walkable by increasing pedestrian safety. Map 4.4.1 provides details on where street trees and treelawns currently exist within the area. Areas lacking street trees that also contain treelawns, such as along Caroline Avenue or East 43rd Street, should be considered primary locations for street tree additions. These areas already contain treelawn facilities that should be appropriate to sustain newly planted trees. Addition and modification to treelawns, and/or creation of tree wells should also be pursued as trees are added to streets without sufficient planting space. This study also recommends the use of appropriate street tree species as defined by the City of Covington's arborist to mitigate potential negative impacts such as sidewalk cracking or lifting.

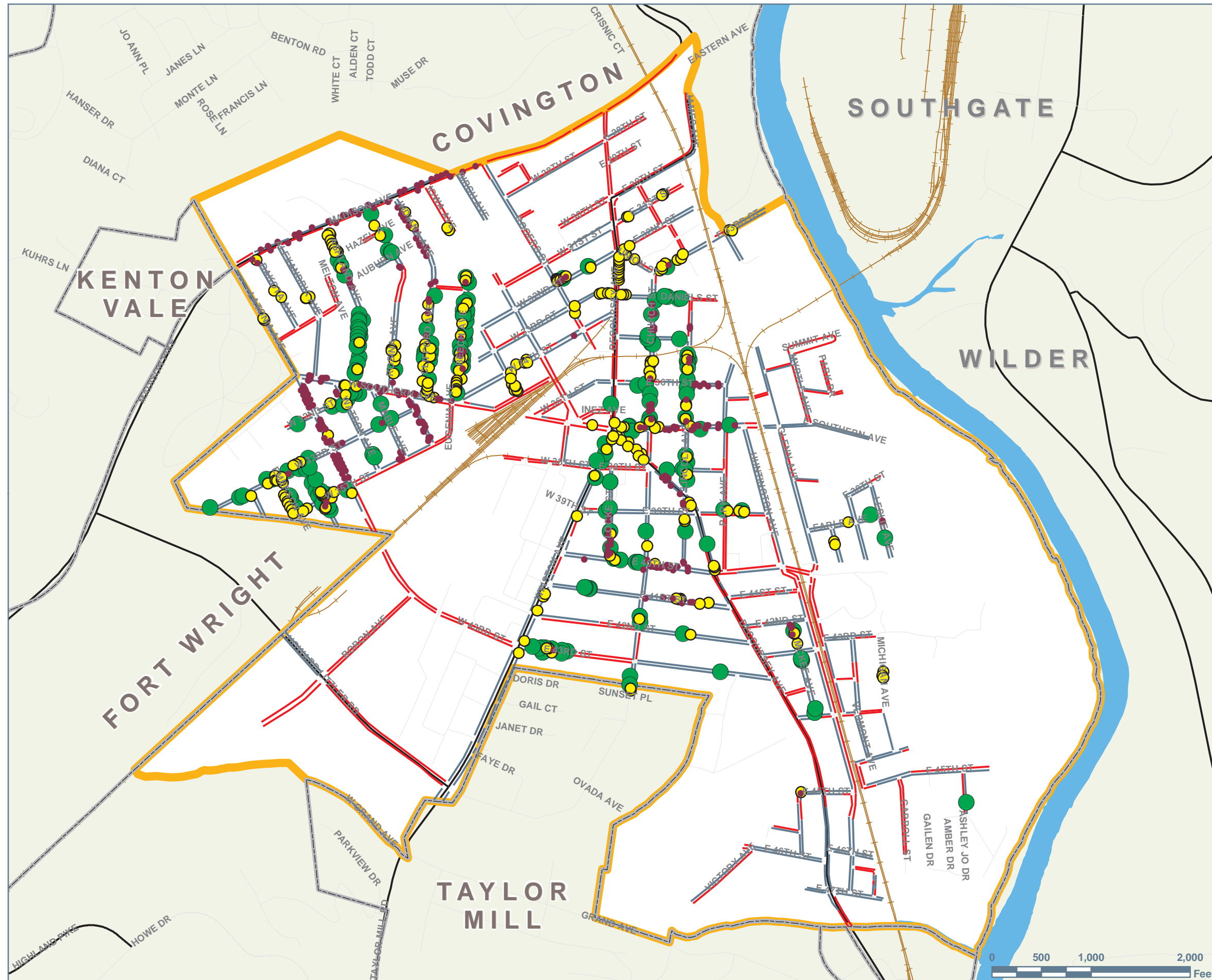
Vegetated Medians - Vegetated medians are planting areas that lie between the travel lanes of a roadway. While medians currently exist along Clifford Avenue, West 31st Street, and Summit Drive within the study area, new medians should be implemented on an ongoing basis as redevelopment allows. This study specifically recommends adding vegetated medians along Winston Avenue between 40th and 38th Streets as redevelopment occurs. Some of the benefits these medians provide include additional safety to pedestrians crossing the roadway, space for stormwater infiltration, and general beautification of the neighborhood. These medians should also be incorporated on major internal streets of the redevelopment area as displayed in Figure 4.8.6 on page 95. Additional details on vegetated medians can be found in section 4.8 Latonia Plaza Redevelopment on page 83.

Collaboration with Local Experts

Sanitation District No. 1 - A primary overall green infrastructure goal of the Latonia Small Area Study is to help the community in reducing incidents of stormwater and wastewater issues within the area. Working with Sanitation District No. 1 will be critical in finding effective ways to reduce impervious surface and increase the tree canopy of the study area; thereby helping manage the overall stormwater issue within the area. The techniques described above provide the basis for an ongoing program that addresses green infrastructure improvements in the Latonia study area.

City Arborist - This City Arborist could aid the Strategic Action Committee in the appropriate selection of trees and plantings during the implementation of this project. This could also be a source of valuable information to assist in identifying appropriate locations for street trees and plantings to most benefit the community.

Map 4.4.1 Street Trees and Treelawns



- Legend**
- Small Tree
 - Medium Tree
 - Large Tree
 - Treelawn Available
 - No Treelawn
 - + City boundary
 - + Study Area
 - Railroad
 - US and State Hwy
 - County and Local Roadways

Source: LINK GIS Date: October, 2010



