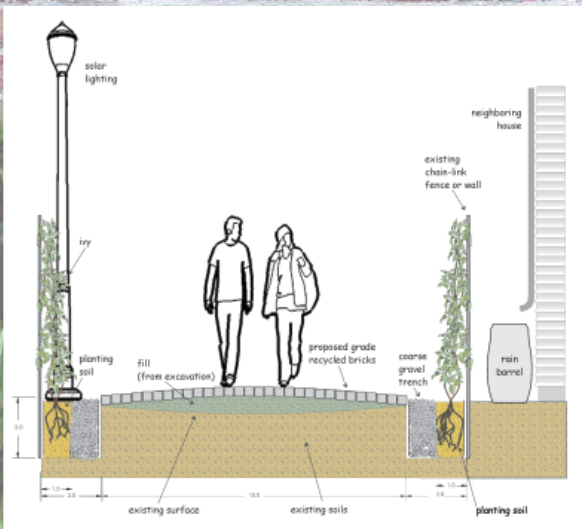


North Common Alleyways Project

Using low impact development to improve Lawrence alleyways

June 2008





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This document was produced by the Horsley Witten Group, Inc. for
Groundwork Lawrence.

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Groundwork Lawrence is pleased to present the **North Common Alleyways Project: Using Low Impact Development to Improve Lawrence Alleyways**. This project highlights the potential for the reclamation of Lawrence’s alleyways utilizing low impact development (LID) methods to create safe, healthy and environmentally sound pedestrian, bike and vehicle passageways. We would like to thank the Massachusetts Environmental Trust for its financial support and our partners the Horsley Whitten Group and Lawrence CommunityWorks for making this project possible. Most importantly, we would like to thank the residents, business owners, and city employees that provided their input and feedback ensuring the identified solutions meet the neighborhood’s interests and needs. This report represents a culmination of our efforts to understand the conditions of the North Common Alleyways, to reach out to the surrounding community members affected by the alleyways’ current conditions, and to develop a plan to guide future improvements of the alleyways.

North Common Alleyway Project - an Introduction

Created in spring of 2008, with funding through MET’s “Water’s Role in Ecosystem Health” program, the North Common Alleyways Project allowed Groundwork Lawrence to explore redevelopment possibilities for the North Common Neighborhood Alleyways through the lens of low-impact development (LID), highlight potential redevelopment scenarios for the alleyways using a variety of LID techniques, and educate the public (residents, business owners, City officials, developers) about these possibilities with the guidance of a qualified LID/engineering firm. By holding a series of focus groups with interested residents living adjacent to the alleyways, Groundwork Lawrence confirmed the host of current alleyway uses, as well as overall concerns about their current condition. Armed with that information, we hired engineers from the Horsley Witten Group (HW) to create a palette of LID design/enhancement scenarios for four of fourteen alleyways. (The four alleyways in question were chosen because together they represent the array of current and desired alleyway uses in the North Common Neighborhood.) Along with each LID scenario, HW presented details about each feature’s stormwater management function, an estimated cost analysis, and a description of maintenance requirements that helped further inform our evolving discussion surrounding reclaiming Lawrence’s alleyways. As an additional component of our Alleyway Project team, Lawrence CommunityWorks’ (LCW) Organizing Department provided community outreach support by publicizing our endeavor, especially the alleyway focus groups, among residents in the neighborhood. LCW helped us gather detailed input—most especially among those residents who were unable to attend our focus group, but whose feedback was extremely valuable.

History of Groundwork Lawrence’s Alleyway Focus in Lawrence

Since 2004, under the leadership of Groundwork Lawrence and in addition to broad volunteer-driven cleanups, two alleyway improvement initiatives in the North Common neighborhood have featured the use of LID techniques. Thanks to funding provided by the Massachusetts Office of Coastal Zone Management (CZM), Groundwork Lawrence was able to design and construct the following two alleyway projects:

- *The Orchard Street “Green Alleyway” Project* – With a \$12,000 grant from CZM, we worked to create a passive green habitat and pedestrian conduit. Our Green Alleyway project was the very first iteration of low-impact development techniques applied in the alleyways; in addition to the use of reclaimed cobblestone for planter beds and terracing to slow the flow of stormwater, the project featured the use of native drought-tolerant plantings that were attractive to birds, butterflies, and bees. Despite some ongoing maintenance challenges this alleyway is currently wholly cared for by nearby residents who helped design and implement the improvements.



- *The Union & Mechanic LID Alleyway Community Garden Project* – With \$30,000 in funding from CZM, Groundwork Lawrence retained the landscape design services of David Buchanan, principal at Stillman Restoration & Design, to design volunteer-built raised community garden beds, an LID patio, and a series of rain gardens that help manage stormwater runoff from an adjacent site that had been creating erosion further downhill. Still high-functioning as an LID Demonstration Site, Groundwork Lawrence owns the alleyway in trust and oversees a network of eight active community gardeners who cultivate food and flowers there.

Additional funds and these improvements have enabled us to leverage funding and ongoing civic engagement in the form of volunteer labor from nearby residents, local youth in our Green Team program, along with The Timberland Company and New Balance Athletic Shoe, who have supplied hundreds of their employees to help complete the build-out and ongoing maintenance of these projects. This funding also leveraged additional momentum necessary to build a campaign to reclaim all the alleyways in the city—an ongoing Groundwork Lawrence initiative. For instance, in 2007 the Merrimack Valley Planning Commission received an EPA Brownfield Assessment Grant, with which they conducted a Phase I Environmental Site Assessment for twelve alleyways in the North Common neighborhood. With this Phase I information, we have been able to continue creating a knowledge base documenting the alleyways' prior uses, potential contamination concerns, and overall site constraints that could potentially impact future build-out scenarios.

Next Steps for Alleyway Improvements

In regards to the overall solutions proposed in this guide for the alleyways, City officials and citizens at the presentation of these solutions were excited about the redevelopment possibilities presented, but citizens carefully tempered their excitement by explaining that improvements alone cannot remedy dumping and other illegal activity in the alleyways, and reiterating the need for more frequent oversight and accountability from the city, particularly in response to the illegal dumping that occurs in the alleyways. Mostly importantly, attendees felt that the proposed improvement scenarios could alleviate most safety concerns by improving accessibility and installing lights, thereby making law enforcement of all types that much easier. To continue evolving this discussion, and in response to desires expressed for a comprehensive plan going forward that includes not only the residents living adjacent to alleyways but also the City of Lawrence, and owners of the alleyways, Groundwork Lawrence hopes to create an ongoing Sustainability Campaign that could feature (among other strategies) coalition-building via subsequent LID Alleyway presentations to city administrators and commissioners, developers, apparent alleyway owners, residents, and other interested community groups as a means for broadening the support for the use of LID in any redevelopment project. Our next step is to nurture ongoing collaborations with the City of Lawrence and our growing group of interested residents and stakeholders, with whom we hope to define and implement a comprehensive plan for a more sustainable Lawrence with the city itself a major stakeholder.

Our hope is that this report will serve as a guide to further sustainable development in the City of Lawrence as we address similar issues in vacant lots, brownfield properties, residential development and commercial redevelopment.



Purpose of this Booklet

The purpose of this booklet is to provide ideas to improve the conditions of the alleyways of the North Common neighborhood in Lawrence, Massachusetts, through the use of Low Impact Development (LID) techniques and other “green” approaches. These alleyways serve as pedestrian walkways and provide vehicle access to garages for neighboring residences and businesses. Unfortunately, they are also commonly used as dumping grounds for unwanted trash and debris, often have poor drainage resulting in standing water, and are in generally poor condition from a lack of maintenance.

This booklet is designed to demonstrate potential improvements to the function of the alleyways that enhances the aesthetics as well as improves their environmental footprint. This guide also provides ideas that could be imitated, expanded on, and implemented by various developments or projects in the entire city and beyond. As with any improvement project, there are costs associated with materials and labor, but we have tried to select materials that are readily available, relatively inexpensive, easy to install, functional, and durable.



Introduction to Low Impact Development

Low Impact Development (LID) is a site design technique and landscaping that aims to preserve the natural hydrology of a site and manage stormwater in an ecologically sensitive manner. To estimate the natural hydrology of a site, one should picture a site in a natural undeveloped condition, with trees, understory vegetation, leaf litter, organic soils, and a natural ability to capture and retain rainwater from most rainstorms. When the town constructs buildings, driveways, roads, or alleyways, we typically add impervious areas where water can no longer infiltrate into the ground. Instead, it collects and runs off the land surface into low points, sometimes causing erosion and/or flooding and carrying with it pollutants that it collects along the way. The goal of LID is to use elements based on natural features, such as vegetation, soils, and infiltration, to improve the hydrology and aesthetics in these long developed and essentially impervious alleyways.

In This Booklet.....

This booklet contains three proposed alleyway design concepts that incorporate LID techniques. They are based upon observations made during field visits on March 25, 2008. These are contrasted by photographs of the existing conditions in four pilot alleyways in the North Common neighborhood. Each of the elements presented in the alleyways designs is described in more detail to help the reader understand the purpose, installation requirements and benefits of the element. A host of suitable plantings are also identified.

Existing Conditions of North Common Alleyways

This project has focused on four pilot alleyways as inspiration for the conceptual designs. These alleyways were selected based on the variety of uses they represent, including pedestrian traffic, vehicle traffic and gardening. These alleyways are:



#4. From Garden Street to Orchard Streets (between Newbury and Union Streets)

#12. From Haverhill Street to Elm Street (between Newbury and East Haverhill Streets)

#13. North of Elm Street (between Newbury and East Haverhill Streets)

#14. From Jackson Street to Elm Street (east of Jackson Street)

The Alleyway numbers refer to the North Common Alleyway Inventory, which includes 14 alleyways, prepared by Groundwork Lawrence.



Alleyway #4. Garden Street to Orchard Street

This alleyway is closed to vehicular traffic and has been the subject of previous improvements, including granite entry posts, a stone bench and pergola, and flower garden plantings along each side of the alleyway. The alleyway slopes downhill from west to east, and there is a single, heavily clogged catch basin at the base of the alleyway. It is lined with houses on either side. The edge of the alleyway is defined primarily by chain link fence, along with some recently painted bright murals.

Alleyway #12. Haverhill Street to Elm Street

This alleyway is located in a residential neighborhood. It is used for some vehicular traffic as well as access to garages and parking areas in the rear of adjacent residences. The alleyway will serve as access to parking for a housing complex in development at the southern end of the alleyway. Pedestrian use is limited due to trash, debris and safety concerns. The alleyway is lined by a combination of chain link fence, picket fence, garages and murals, as well as several large mature trees. The grade is flat, and the ground surface is a combination of pavement in poor condition and compacted dirt.



Alleyway #13. North of Elm Street

This alleyway is used primarily for vehicular access to residential garages and parking. Pedestrian use is limited due to trash and debris and safety concerns. The alleyway is lined by a combination of chain link fence and garages. The grade is flat, and the ground surface is a combination of pavement in poor condition and compacted dirt. There are several large trees lining the edge of this alleyway, which provide shade and improve the aesthetics of the alleyway.

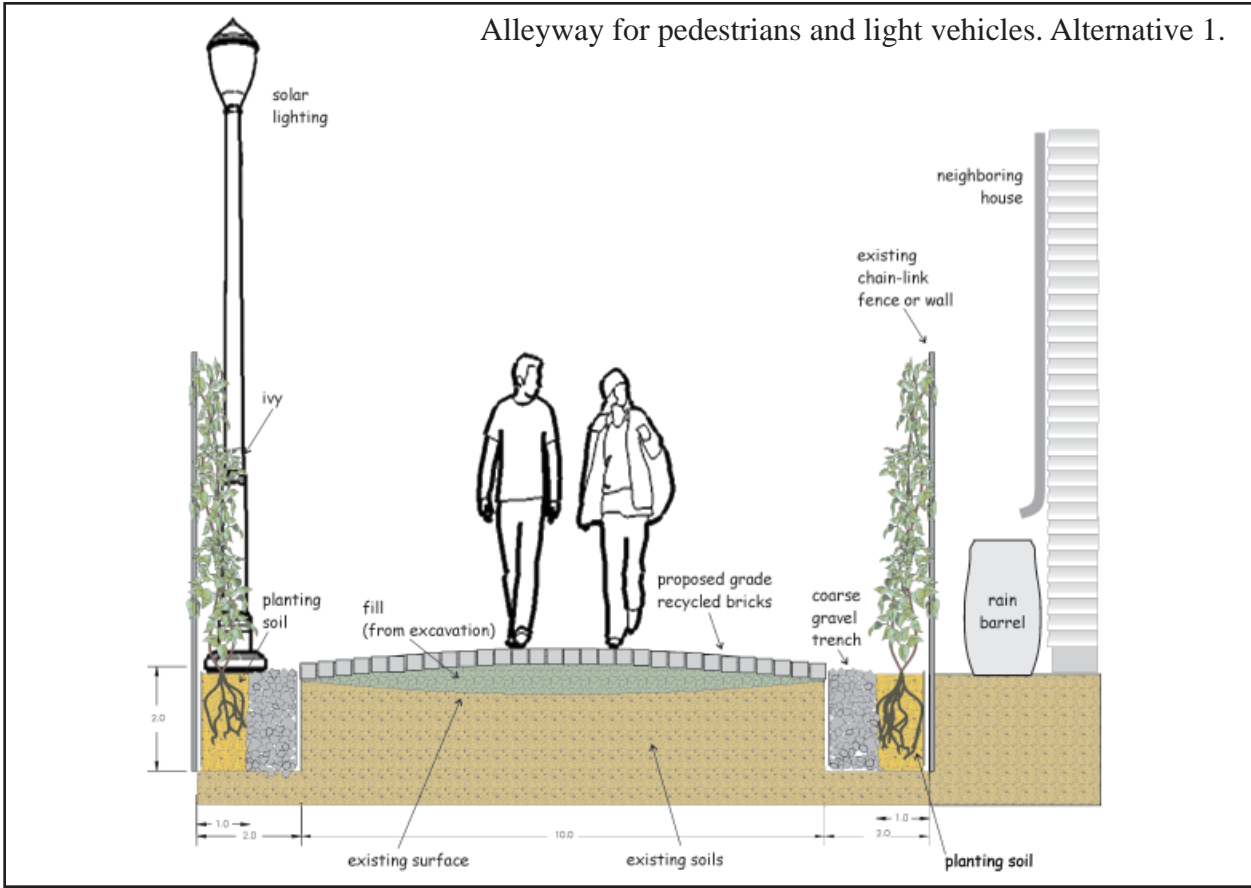


Alleyway #14. Jackson Street to Elm Street

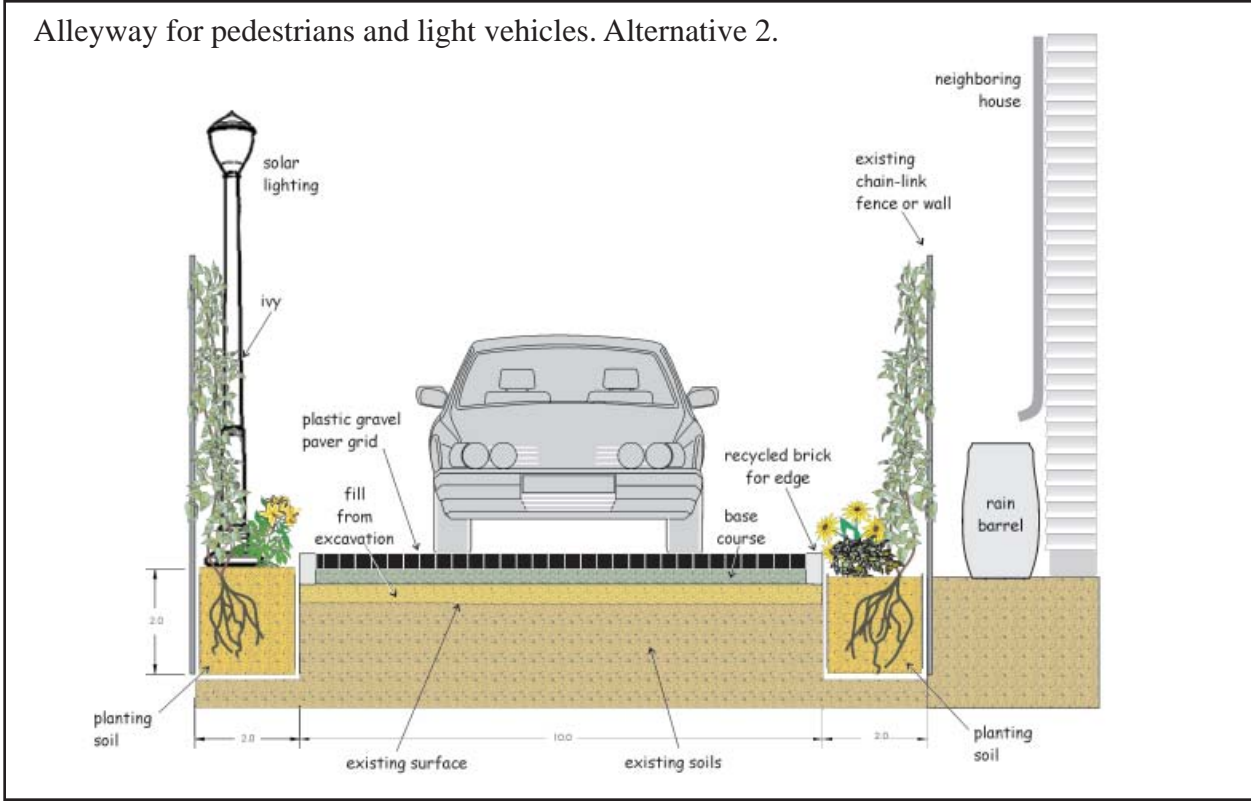
This L-shaped alleyway is used primarily for pedestrian travel, as granite columns at the Elm Street end prohibit vehicles from entering the alleyway. Recent improvements have been made, including the installation of raised planting boxes used by neighbors for flowers and vegetables. The alleyway is lined by a combination of chain link fences, picket fence, houses and a large brick commercial building. The grade is flat on the eastern end and slopes downhill to the west toward Jackson Street. The ground surface is a combination of pavement in poor condition and compacted dirt. There are several large trees lining the edge of this alleyway.



Alleyway for pedestrians and light vehicles. Alternative 1.



Alleyway for pedestrians and light vehicles. Alternative 2.



Alleyway for pedestrian travel only.

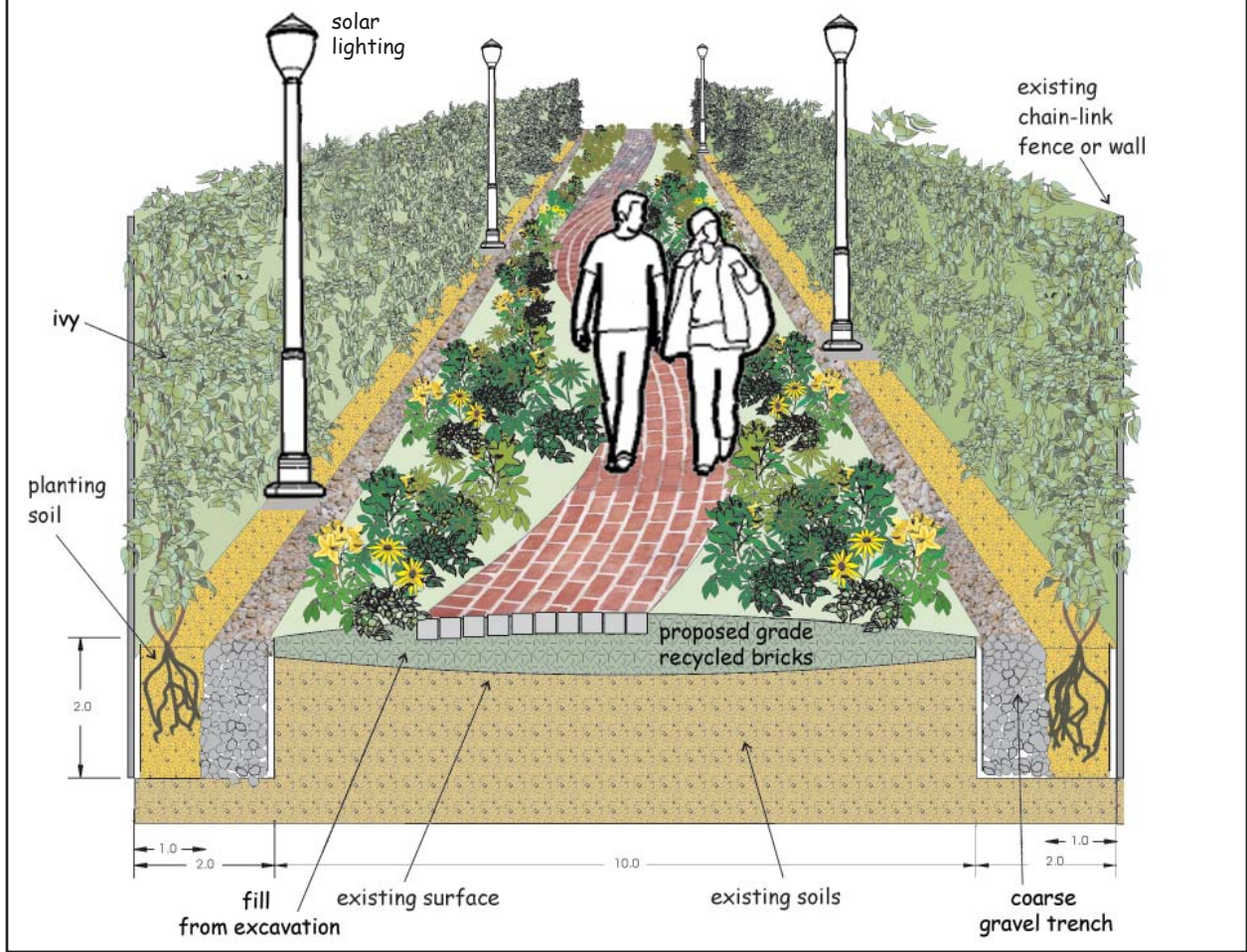


Photo enhancement of proposed design.



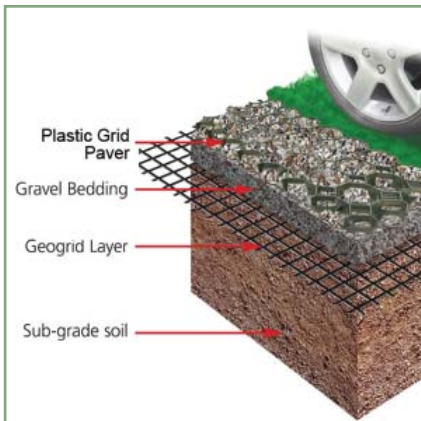
Recommended Alleyway Design Elements

Design Approach

An integrated approach was designed that includes alleyway surfaces, stormwater infiltration, bioretention plantings and lighting elements. The recommended geometry provides for the infiltration and treatment of one-inch of stormwater runoff from the alleyway surface, consistent with the Massachusetts Stormwater Standards.



Recycled Bricks: In a traditional mill area such as Lawrence, bricks may be readily available for reuse from the City DPW or building restoration sites. Bricks are highly suited to heavy traffic, and can be used to create a stable surface for a walking path or vehicle driveway. Installation can be somewhat intensive and should be performed or guided by an experienced installer. It generally requires a 4 to 8" dense aggregate subbase and a 1-inch bedding of high strength sand.



Plastic Gravel Paver Grid: This plastic grid system provides an alternative road support for heavy load bearing while also allowing rainwater to be stored and infiltrated into the ground. This grid system will reduce runoff during the more common smaller storms, and will slow peak flows during larger events. They also reduce the formation of ice on the road surface. This system can be plowed, though gravel may need to be replaced over time.



Gravel Trench: A trench filled with gravel is a simple way to provide storage for runoff during rain events, and can help water to infiltrate into the ground rather than overwhelming downstream catch basins and adjacent streets. It will also provide for the development of a root-zone and its associated microorganisms that provide significant water quality treatment. This trench is approximately 1 to 2' wide.



Fill from Excavation: Materials excavated out of the trenches along the edges of the alleyways can be used to create the desired elevation and grading along the surface of the alleyway. Given the history of these alleyways, the excavated material will likely include significant fill material, and some materials such as concrete asphalt may need to be removed before reusing the excavated materials.



Planting Soil: Planting soil along the edge of the alleyways can provide an environment for beneficial plants and ivy. It can also absorb water that would otherwise run off the land surface. This planting soil should be a mixture of about 40% sand, 30 - 40% compost and 20 - 30% topsoil.



Plantings (Modified Green Walls): Based upon the unique geometry of the narrow alleyways and the limited available planting areas, a modified green wall concept was developed. Evergreen climbing vines (including Boston Ivy, English Ivy and Virginia Creeper) are recommended as they will adapt well to the limited horizontal spaces and more plentiful vertical planting areas (building walls and chain-link fences).



Rain Barrels: Rain barrels can be used to capture rain water from rooftops for irrigation and other non-potable uses. Direct the downspout from the rooftop into the top of the rain barrel, which should be outfitted with a screen to prevent leaf litter from entering the barrel. Attach a faucet and hose to the bottom of the barrel and an overflow hose from a hole near the top of the barrel. Raise the barrel up on some blocks to use gravity to drain the water out. Paint the rain barrels with creative designs to brighten up your backyard area with some “green” artwork.



Solar Lighting: These lights contribute to improved safety and ambience in the alleyways, while requiring no electricity from the City or the neighboring residents. There are many styles of solar lighting available for landscape lighting, ranging from tall street lights, to smaller lantern-style lights that can be mounted on posts, to even smaller lights installed along the ground to line a pathway.

Ground Plantings: Plantings can help to absorb some of the moisture from rainfall events through their roots as well as through interception. Plants also remove a certain level of pollutants from the runoff since they use nutrients to grow. It is best to use a variety of plants and to select hearty, non-invasive perennials that are suited to the northeast climate, can withstand somewhat harsh conditions and will continue to grow year after year. In some cases, limited low-growing plantings can be added to supplement the climbing vine plantings. Plant examples include Creeping Juniper, Switch Grass, Common Periwinkle and Moonbeam Tickseed.



Creeping Juniper
(*Juniperus horizontalis*)



Switch Grass
(*Panicum virgatum*)



Common Periwinkle
(*Vinca minor*)



Moonbeam Tickseed
(*Coreopsis verticillata*)

Estimated Costs

Costs will depend on the specific design of the alleyway improvements, the amount of volunteer versus professional labor available or required, the amount of donated or readily available materials, and the combination of plants selected. Material and greenery selections for these sustainable alleyway enhancements were chosen based on their feasibility and ease of implementation.

Below is a summary of estimated planning level costs to help develop a basic budget. Based on these estimates, the estimated cost of materials outright for a 500' long alleyway with bricks or gravel pavers may range from \$35,000 to \$70,000. However, with donated recycled bricks, economic solar lighting, and discounted soils, the cost can be significantly reduced. Additional costs may include permit fees, bonds or insurance for this work. Permitting, engineering, and contingency costs can be estimated as an additional 10-20% of the total cost.

ESTIMATED PLANT COSTS

Plant*	Spacing	Estimated Wholesale/Retail Cost
Creeping Juniper	5 - 7' on center	\$6.25/\$10.15 per 1 gallon pot
Switch Grass	3- 4' on center	\$6.25/\$12.15 per 1 gallon pot
Common Periwinkle	12 - 18" on center	26.25/\$42.55 per flat (24 plants), or \$2.60 per 3" pot
Moonbeam Tickseed	1' - 2' on center	\$5.60/\$9.50 – 1 gallon pot
Boston Ivy	6-12" on center	\$10.50/17.00 per 1 gallon pot
English Ivy	12" on center	\$25.75/\$45.00 per flat (100 plants)
Virginia Creeper	3 - 4' on center	\$14.50/23.50 per 1 gallon pot

* Labor and other materials (soil amendments, additional compost, mulch) usually cost approximately 2 to 3 times the wholesale cost of the plants.

ESTIMATED MATERIALS COSTS[#]

Description	Material	Professional Labor ^{##}
Brick walkway with base course	\$50/square yard	\$100/square yard
Gravel Paver Plastic Grid	\$30/square yard	\$50/square yard
Gravel Backfill for Paver Grid (3/8" stone)	\$20/ton	\$8/ton
Washed stone gravel for gravel trench (3/4" stone)	\$17/ton	\$8/ton
Gravel/planting soil trench excavation	\$0	\$6/cubic yard
Planting Soil	\$30/ton	\$10/ton
Solar lighting	\$20 - \$5,000 each	Up to \$500 each
Rain Barrel	\$50-100	\$0

[#] For cost estimating purposes, the average alleyway dimensions are assumed to be 14' wide by 500' long. Costs for gravel trenches and planting soil are based on 1' wide by 2' deep trenches along each side of the alleyway.

^{##} Labor rates are estimated contractor costs, not prevailing wage rates for city contracting. Professional labor costs have been provided here for reference, but can be significantly offset by volunteer labor.



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Groundwork Lawrence, Inc. (GWL) is a locally-based 501(c)3 non-profit organization working to create sustainable environmental change through community-based partnerships. Groundwork is committed to “changing places and changing lives” through on-the-ground projects, education, and volunteer programs that help to transform local communities. To accomplish this, GWL leads and supports a variety of partnership-driven efforts that bring together the public, private, and non-profit sectors to solve complex environmental problems and sustain a long-term vision for neighborhood change and renewal. Groundwork Lawrence is an affiliate of Groundwork USA.

To download a copy of this booklet, please visit www.groundworklawrence.org

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Project Partners



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