

Creekside Best Management Retrofitting Taskforce: Final Report



Prepared by the City of League City
& The Texas Sea Grant of Texas A&M University

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Clear Creek is considered impaired by the Texas Commission on Environmental Quality for high levels of fecal bacteria and low levels of dissolved oxygen. This contamination is the cumulative result of our everyday actions, often called non-point source pollution. Everything we do on the land from what we put on our yards, fluids that leak from our cars and wastewater leaks in our towns flow into our creeks and bayous when it rains and all combine to have a negative impact on water quality.

Most of us give little thought to how we manage runoff from rain storms, but it has a significant impact on the world around us. Using Best Management Practices (BMPs) like rain gardens, pervious pavement and bio-swales can treat water where it falls and reduce the negative effects of runoff. BMPs can also help to mitigate flooding by encouraging infiltration and retaining water during the peak of the rain storm, allowing it to be filtered before it travels through the storm drain system, keeping it from overwhelming the system and therefore reducing flooding.

BMPs can easily be incorporated into most any yard or landscaped area, and if each of us were to make a small change, Clear Creek would see big results.

In suburban areas like League City much of the land is covered by impervious surfaces including buildings, pavement and compacted landscapes. All of these impact drainage systems and increase runoff volume and velocity from rain storms. This runoff often carries pollutants including:

- Sediment
- Oil, grease and toxic chemicals from motor vehicles
- Pesticides and nutrients from lawns and gardens
- Viruses, bacteria and nutrients from pet waste and failing septic systems
- Heavy metals from roof shingles, motor vehicles and other sources

These pollutants, often referred to as Nonpoint source pollution, can harm fish and wildlife, kill native vegetation, and make recreational areas unsafe and unpleasant. In February 2011, the City of League City was awarded a Clean Water Act, Section 319(h) grant from the Texas Commission on Environmental Quality (TCEQ) through the Nonpoint Source Program for the purposes of constructing a WaterSmart Park to showcase and study different stormwater Best Management Practices (BMPs) and investigate financial incentives to encourage people to implement BMPs on their own property. BMPs can be used in new development, re-development or retrofitted into existing areas. This makes them ideal for any project in League City. Approximately half of League City is already developed, therefore retrofit projects will be essential for the City to improve water quality. The Creekside District and taskforce are a pilot project to help better understand what efforts home and business owners are willing to undertake and what incentives could motivate them to take action and install BMPs in their neighborhoods.

Overview of Taskforce

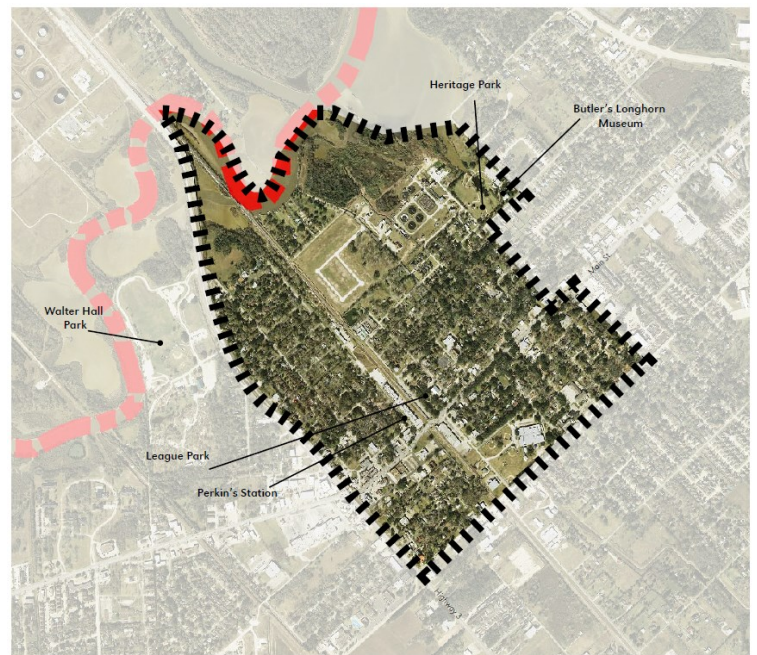
In February 2011, the City of League City was awarded a Clean Water Act, Section 319(h) grant from the Texas Commission on Environmental Quality (TCEQ) through the Nonpoint Source Program for the purposes of constructing a WaterSmart Park and to investigate different Best Management Practices (BMPs) and financial incentives to encourage people to implement BMPs on their own property. As part of the grant, a taskforce was created to identify areas of the district which would benefit from the implementation of green infrastructure and Stormwater Best Management Practices. The Creekside Best Management Retrofitting Taskforce convened once a month to discuss ways that the City and private homeowners can join forces to retrofit the Creekside Neighborhood to better control stormwater runoff. Ultimately, the City will use the information gathered through this process to implement policies and practices that will help manage stormwater runoff and flooding in the Creekside Neighborhood and throughout League City.

The Creekside Neighborhood sits on the bank of Clear Creek in the historic heart of League City. The area, which was originally developed in the late 1890's by J.C. League of Galveston, is characterized by the majestic live oak trees which line the streets and by the historic and cultural resources located throughout the neighborhood. By 1914, League City was a bustling commercial center with a population of over 500 residents. The area which now encompasses the Historic District was established as an urban center for a thriving community of early settlers.

The Creekside Neighborhood was chosen as a model for the Best Management Retrofitting Taskforce for several reasons. First, it was determined that retrofitting an established urban area like the

Historic District would provide the most information about which BMPs will work best in League City. The area was developed with large, open, road-side ditches to manage stormwater, but this existing infrastructure has become outdated and is inadequate. Next, this area is located on Clear Creek and is prone to stormwater runoff issues and flooding, which makes it the ideal place to study the benefits of Best Management Practices. Finally, this particular neighborhood has an active and involved network of residents who were willing to invest their time and energy into being a part of the taskforce.

This report summarizes the findings of the Creekside Best Management Retrofitting Taskforce. It outlines the Best Management Practices that were looked at throughout the process and details the ways in which those BMPs can and should be used within the Creekside Neighborhood. It also includes a comprehensive list of long term goals for incorporating Best Management Practices in League City, including a variety of possible financial incentives and ordinance revisions which may be used to encourage property owners and developers to implement green infrastructure solutions on their property.



Creekside Neighborhood

Non-structural post construction stormwater best management practices (BMPs) can be retrofitted into existing parks, businesses and homes. These practices improve infiltration rates for rain water, reducing runoff volumes and allowing naturally occurring microbes in the soil to break down pollutants, removing them from the stormwater before it reaches our creeks, bayous and ultimately Galveston Bay.

Clear Creek is considered to be impaired by the Texas Commission on Environmental Quality for high levels of bacteria and low levels of dissolved oxygen. These impairments are caused in part by polluted stormwater runoff from developed areas in League City and other communities in the watershed. Stormwater pollution is rarely intentional but rather is the cumulative result of our everyday actions. BMPs are a way to capture and treat polluted stormwater before it is released into our waterways. Stormwater BMPs that are appropriate for the Clear Creek watershed are discussed on the following pages.



WaterSmart Landscapes:

WaterSmart is an approach to natural landscaping based on three principles: water conservation, water quality improvement and habitat for wildlife. A number of practices can be incorporated into new or existing flower beds and lawns to build healthier landscapes that have a positive impact on water quality. These principles can be applied to both home and commercial landscapes.

- ◆ **Build Healthy Soil:** Healthy soil is the basis for a healthy garden or lawn. A sample of the soil should be tested for nutrient content before fertilizer is applied to ensure the proper ratios of nitrogen and phosphorus are added. This practice can save property owners money by only applying what is needed. Healthy soil helps build healthy root systems and heartier plants.
- ◆ **Use Fewer Chemicals:** Applying compost is an easy way to make sure soil has beneficial microorganisms that break down pollutants in runoff, turning potentially harmful substances into usable building blocks for plants. Chemical fertilizer provides nutrients but has no impact on microorganisms. Other chemicals, including pesticides, can destroy beneficial organism, such as lady bugs, as well as harmful pests. Homeowners typically over apply chemical products; the excess can run off during the next rain fall and pollute our creeks and bayous.
- ◆ **Use Native Plants:** Native plants are adapted to living in the unique climate of coastal Texas and thrive in our growing conditions. After establishment they require less maintenance and use less water. These vibrant and varied plants also provide habitat for song birds, butterflies and hummingbirds that live in the area.
- ◆ **Use Less Turf:** Bermuda and St. Augustine grasses are typically used in yards and are not native to Texas. These grasses take a great deal of care, water and fertilizer to create the lush green carpet of yard that most people expect at their home. Reducing the amount of grass in a home or commercial landscape will decrease both chemical and water usage. Instead, extend flower beds, plant more trees and shrubs or try a native ground cover in lower use areas.

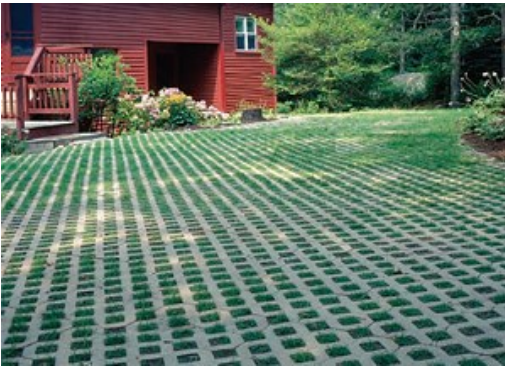
Best Management Practices



Swales: These open drainage courses, when properly designed, have gently sloping sides and are typically vegetated but can also have a rock lined bottom or can mimic a dry stream bed. The rocks and plants help to slow the flow of stormwater after each rainfall so sediments and pollutants can be filtered from the water. However, these design features should not hamper the flow enough to back up water and cause flooding.



Tree Box Filters: This BMP is typically a pre-manufactured in-ground container used to control and detain runoff along roadways. Runoff from the street is directed into a concrete box that contains a tree or vegetation and soil that filters runoff before it enters the storm drain. These box systems can be included in new roadway projects or existing areas with curb and gutter systems. These systems are not designed to be used with swales.



Pervious Pavement: This alternative to asphalt or concrete allows rain water to drain through the porous surface to a reservoir underneath for temporary storage. Many variations exist from very basic rock or gravel parking areas that allow water to soak through, to pervious concrete and pervious paver systems. This variety allows for pervious pavement to be used in many different situations. Soil in League City typically has very high clay content so water does not absorb quickly or easily into the ground. Because of this, an underdrain system is required to help move water through the pervious system and into the storm drain.



Green Roofs: These roof top gardens are an extension of a roof which adds water proofing, a drainage system, a lightweight growing medium and plants. These extensions allow a typically impervious surface to become a pervious one, absorbing rainwater instead of allowing it to runoff. The components of a green roof add extra weight to the structure, making them difficult to retrofit on existing buildings; however a green roof can easily be designed for new construction and work well on large buildings with flat roofs.



Rain Gardens: Rain gardens are a shallow depression planted with native and adapted plants that collect rainwater runoff from roofs, parking lots and other surfaces. These gardens vary in size and design based on the amount of water they are designed to capture and treat. Commercial rain gardens are typically larger in size and designed to capture more runoff. They also contain an underdrain system and an overflow to prevent water from backing up and flooding parking lots, streets or other areas. Homeowner rain gardens are typically smaller in size and designed

to capture runoff from a smaller area. They are typically situated in a low area of the property away from buildings and water sheet flows into the garden. They are typically designed without an underdrain or an overflow, water is simply allowed to pool and filter at its own pace. Rain gardens have all of the maintenance requirements of a typical flower garden including weeding, periodic mulching and irrigation during times of drought.



Rainwater Harvesting: The concept of collecting and storing rain water is not new and water tanks can be seen in historic photos of League City. Water that drains from an impervious surface (roof, driveway or parking lot) can easily be captured and stored for later non-potable usage. This provides several benefits. First, water that is collected is not immediately funneled into ditches and swales, thus reducing the amount of runoff from the property and the amount of water traveling through the storm drain system, reducing flow volumes and rates and decreasing

the likelihood of flooding. Second, stored water can be used in place of costly potable water for irrigating flowers and lawns and for washing vehicles. Harvesting systems can be small scale such as rain barrels which are typically less than 100 gallons, large above ground tanks that range from 500-5,000 gallons in size or underground systems that can exceed 10,000 gallon capacity. While a large system will have a greater impact, rain barrels are an easy, low cost practice for home owners to adopt and are a simple way to introduce stormwater BMPs to the community.

All of the BMPs described previously could be used in the Creekside District. However, several are easier to implement than others. Open swales are found throughout the Creekside Neighborhood and offer the biggest opportunity to improve on already existing infrastructure. WaterSmart landscapes, rain gardens and rain water harvesting tanks are excellent choices for both home and commercial areas. Rain gardens can be incorporated into parking lot islands and any business with a landscaping can use WaterSmart principles and native plants. Cisterns are very easy to add to any down spout on a home or business and with a small pump run an irrigation system. Small scale rain barrels are great for home use and large scale underground tanks can be installed under pervious pavement parking areas for additional collection.

Green roofs, pervious pavement and tree filter boxes are all suitable but take more engineering and planning to be properly installed and integrated into the neighborhood (Table 1). Green roofs should be considered for new all construction, especially buildings with a large foot print. Any street projects that are installing curb and gutter would be a good fit for tree box filters. Many opportunities exist for adding pervious pavement when hard surfaces are replaced; driveways, parking lots, sidewalks and roads could be re-designed to be at least partly pervious. The table below indicates the BMPs that are best suited to private property vs. public buildings and infrastructure.

Table 1. Suggested BMPs best suited for public and privately owned lands.

BMP	Public	Private
Swale	X	X
Tree Box Filter	X	
WaterSmart Landscape	X	X
Rain Garden	X	X
Pervious Pavement	X	X
Rainwater Harvesting	X	X
Green Roof	X	

Some of these Best Management Practices are best suited to particular locations within the Creekside Neighborhood. The following pages outline the specific places within the district that were identified as problem areas in need of retrofitting, and explain which BMPs are most appropriate for each.

Implementation of BMPs



Fire Station No. 1: Fire Station No. 1 presents an opportunity for the City to retrofit an existing concrete drainage swale that was poorly done and is not working properly. This concrete drain is not only unsightly, but it is also harming the tree adjacent to it. The drain should be retrofitted to incorporate either a bioswales or small rain garden. There is also an opportunity here to add a cistern and collect water from the roof, which could then be used to wash fire trucks and equipment.



League Park: League Park is an important focal point for the neighborhood and offers many opportunities to implement Best Management Practices, especially pervious pavement. There is a great deal of concrete paving in the park in addition to many of the City's largest historic Butler Oak trees. Implementing pervious pavers in League Park would not only help to address the water runoff problems in the area, but also allow the trees to get more water.



Parking Lot at League Park: The parking lot at League Park would be an ideal place to implement several Best Management Practices, especially pervious pavers. It also presents an excellent opportunity to include landscaped islands with rain gardens between some of the parking spaces. This would introduce more pervious surface to the parking lot and help break up the large expanse of pavement. Another opportunity here would be to include underground cisterns to retain stormwater.



Butler Longhorn Museum: The Butler Longhorn Museum has already incorporated several BMPs, including pervious pavement and a rain garden. The museum is in the process of expanding the parking area to accommodate more visitors, which would be an ideal place to continue utilizing the pervious pavement that is already in use elsewhere on the site. Improving drainage swales on the property and adding additional WaterSmart landscapes would also help improve stormwater runoff at the museum.

Implementation of BMPs



Fire Training Center: Because of the nature of the training center, there is a need for a source of water on site to put out fires. Currently, the Fire Department collects the water used to extinguish fires and recycles it to be used again. The fire training center is an excellent example of how Best Management Practices are already being implemented within the Creekside neighborhood.



Helen's Garden: Helen's Garden is already a well established garden and is not in need of any significant changes. However, many of the paved gathering spaces or walking paths could at some point be replaced with pervious pavers. There is also an existing low-lying area of the garden that is currently covered in grass which would be a good location for a rain garden. These BMPs can be incorporated in the future as improvements are made to the garden over time.



League City Skate Park: The new skate park presents a perfect opportunity to install a rain garden at the end of the swale near the existing storm drain. There is an existing ditch which tends to collect water, so planting native vegetation in this area would help to control the storm-water runoff and would help to beautify the park.



Existing Swales & Culverts: The existing drainage swales and culverts present the most significant opportunity to improve drainage and control water runoff in the Creekside Neighborhood. There are multiple culverts that are either collapsed or clogged and many of the swales are in need of maintenance. Restoring the existing drainage swales and culverts would have the most substantial impact on stormwater runoff and flooding in the area.

Implementation of BMPs

Table 2. Load reductions for proposed BMPs by site.

BMP	Nitrate/Nitrite Reduction (lbs/year)	Phosphorus Reduction (lbs/year)	Bacteria Reduction (million colonies/year)	Total Suspended Solids (lbs/year)
Fire Station #1				
Rain Garden	1.35	0.312	8,683	19,987
League Park				
Pervious Pavement Plaza	4.71	1.09	30,389	62,954
Pervious Pavement Sidewalks	1.68	0.39	10,853	22,483
Pervious Paving Spaces	12.62	2.92	81,390	168,608
Parking Lot Rain Gardens	6.31	1.46	40,693	84,300
Butler Longhorn Museum				
WaterSmart Landscaping	0.192	0.046	1,240	2,570
Helen's Garden				
Pervious Pavement Plazas	0.937	0.336	9,932	26,540
Pervious Pavement Sidewalks	3.51	0.815	22,699	47,023
Rain Gardens	2.40	0.557	15,505	32,119
Skate Park				
Vegetated Swale	2.94	0.682	18,993	39,346
Rain Garden	4.81	1.11	31,009	64,238
TOTAL REDUCTION	41.46	9.72	2.71 x 10 ⁵	570,168

The taskforce explored different financial incentives that would encourage property owners to implement Best Management Practices on their property. Incentives that are being considered include the following:

Property Tax Credits:

The City is exploring the possibility of establishing a tax credit program for property owners who incorporate green infrastructure techniques on their property. One option for this type of tax incentive would be to offer a reduction in property taxes by 25% - 50% for a period of five years for new development that utilizes BMPs on a substantial portion of the property (i.e. more than 25%).

Another possible tax incentive would apply to property owners that substantially retrofit an existing site with BMPs. In this case, property taxes would be frozen at the value assessed prior to retrofitting the property for a period of up to ten years. Alternatively, property taxes could be waived entirely for a time period of 3 to 5 years.



Existing drainage swale on private property



Kansas Avenue in the Creekside Neighborhood

Reduction of Drainage Impact Fees & Permit Fees:

It is anticipated that, at some point, the City will implement a drainage impact fee. Once adopted, there would be an opportunity to reduce or waive those fees for developments that incorporate BMPs.

Another financial incentive would be to waive building permit fees for development that includes BMPs. This fee reduction would apply to new developments that incorporate BMPs on a substantial portion of a new site and could relate to a variety of different building permits, including flat work permits, irrigation permits, or Capital Impact Fees.

There are a number of incentives aside from tax and fee reductions that can be implemented by the City or by other organizations in support of the City's goals. A number of communities throughout the US have successfully implemented the programs outlined on the following page. These programs could serve as examples for League City.

◆ Offering Rain Barrels at a Reduced Cost:

Programs could be established which focus on a specific BMP such as a rain barrel program. The City of Houston was able to purchase a tractor trailer load of rain barrels at wholesale prices and sell these to residents at cost. This required some up front funding from the City but they were able to recover the entire cost of the rain barrels. Staff and volunteer time was required to organize the program and sell the rain barrels. A similar program could be established in League City or civic groups could sell rain barrels as a fundraiser selling slightly above wholesale costs but still less than purchasing a barrel at retail prices.



◆ Design Assistance for WaterSmart Landscapes:

Larger efforts could focus on landscaping in general and include WaterSmart or rain garden design planning and native plant sales. Initial seed money would be needed for both of these efforts. A local landscape designer could be hired to create 2-5 designs for rain gardens and WaterSmart gardens in various situations such as full sun, part shade and full shade areas. These could be made available to residents free of charge and help reduce the out of pocket costs for install a new garden.



◆ Offering Native Plants at a Reduced Price:

Native plants are an integral part of BMPs and a good source is sometimes difficult to find. Twice a year plant sales, within the community are one way to make these resource directly available to residents. Groups like Urban Harvest and Master Gardener clubs regularly hold one day plant sales and typically sell out of all species. A dedicated volunteer force supervised by a paid staff member (City or other organization) could easily manage this project.



◆ Establishing a Volunteer Crew:

A trained volunteer crew could be established to help with projects in the District and throughout the City. A short training course covering general garden maintenance as well specific training related to native plants, rain gardens and runoff could easily be offered several times a year. A small amount of funding would be required to establish and manage the program and provide tools for volunteers. A group like this provides a unique way for residents to give back to the community and help their fellow citizens.



Larger scale, more expensive BMP projects such as pervious pavement lend themselves to cost share options. Grant funding could be obtained from a number of sources both private and public for this cause. Depending on the size, scope and impact of a project a portion of the design or installation costs could be covered by the program. A committee of city staff and residents would need to be created and judging criteria determined to develop a process for funds to be fairly distributed.



During the Green Infrastructure Community Open House on October 19, 2013, residents and stakeholders were asked to rate several incentives according to whether or not such an incentive would make them more likely to implement a particular Best Management Practice on their property. There are other possibilities to provide funding and cost share opportunities and new programs are likely to grow out of any programs that are implemented. Below are the different incentives that were voted on and the results of the poll.

Table 2. Response from League City Residents to incentive questions at the Green Infrastructure Open House, October 2013.

Would the following incentives make you more likely to install a stormwater best management practice at your home or business?	Yes	No
Making rain barrels available for residents to purchase at reduced costs.	100%	0%
Free options for WaterSmart landscape and rain garden design plans for shaded, part shade and full sun locations.	100%	0%
A volunteer crew to help homeowners with rain garden or WaterSmart garden installation and maintenance.	100%	0%
A program where citizens could purchase native plants at whole sale prices a few times each year	100%	0%
A cost share program to pay for a portion of the cost to install pervious pavement driveway or walkway.	83%	17%

The goal of the Creekside Best management Retrofitting Taskforce is to ultimately implement Best Management Practices in the Creekside Neighborhood that will help to reduce stormwater runoff, mitigate flooding, and improve air quality. The first step in this process was to identify the areas which could benefit most from particular BMPs. The next step is to move forward with putting those BMPs into practice by installing the rain gardens, bios-wales, and pervious pavement that were discussed on the previous pages. By creating financial incentives like tax credits and cost share programs, the City hopes to encourage people to retrofit their own property with BMPs as well.

◆ Code Revisions & Policy Changes

The City is researching plans to move forward with some of the financial incentives outlined in the previous pages, including tax credits and cost share programs, by drafting policies and presenting them to City Council for approval. The Planning Department will also be working with City Council in the coming months to revise the City's Zoning Ordinance and create requirements and incentives for developers to include Best Management Practices in new projects.

◆ Identify & Secure Additional Funding Sources

The Creekside Neighborhood is located within the City's Community Development Block Grant (CDBG) target area. This means that there may be federal funding that can be used to address drainage and infrastructure. The City also plans to examine the Capital Improvement Program for additional sources of funding and to seek out and obtain additional private grant funding to help with the cost of implementing BMPs.

◆ Education & Outreach

Educating residents and business owners about the importance of installing BMPs on their property will be a key component to ensure that the goals of this taskforce come to fruition. Creating educational materials and holding community outreach events is critical to ensure that residents learn about and understand the benefits of retrofitting their property with green infrastructure solutions and Best Management Practices. Word of mouth is one of the best ways to spread the message about BMPs.

The City currently has multiple information streams that can be tapped into, short videos on Channel 16, Twitter, Instagram, Facebook, and the City website all offer opportunities to cross promote projects and share information. Also, local print media including the Galveston County Daily News and Change Magazine routinely include information about League City and will likely include stories about a stormwater program. Citizens, City Staff and project partners will all need to work together to spread the word about the importance and ease of improving water quality through better stormwater management.



In the spring of 2013, the City reached out to various community representatives, development professionals, neighborhood activists, and horticulturists from the area to begin forming a taskforce that would assist in identifying stormwater Best Management Practices (BMPs) that would be best suited for existing neighborhoods. That taskforce made the decision to focus on an existing neighborhood in the historic part of League City, known as Creekside. Thus, the taskforce was named the “Creekside Best Management Retrofitting Taskforce.” This area was chosen primarily because it is an established neighborhood with a history of flooding issues and because of its proximity to Clear Creek, a well-known body of water that is a focal point of League City.

Over a seven month period, the Creekside Best Management Retrofitting Taskforce broadened their knowledge of stormwater Best Management Practices and examined ways to incorporate those practices into their neighborhood. The Creekside area is comprised of single-family and multi-family residential, commercial, and public uses, and it is the oldest neighborhood within League City. The district was developed with large, open ditches to handle stormwater and is known for its natural landscape, native plantings, and significant oaks trees. In addition, this area has already incorporated several best Management Practices including rain gardens and bioswales.



League Park

Residents of the Creekside neighborhood take great pride in their community and strive to be a model for other portions of the League City, making the Creekside neighborhood an excellent case study for the City.

The Taskforce focused their early meetings on expanding their knowledge of the various BMPs. Then, utilizing maps of the area, they identified locations within the neighborhood that were best suited to specific BMPs. Next, they toured the neighborhood, further discussed specific sites and decided upon a list of recommendations. The Taskforce then held a Community Open House in the neighborhood to inform residents about green infrastructure and how Best Management Practices can be incorporated on private property. Also at this open house, participants were surveyed regarding the various types of incentives that might attract more people to incorporate Best Management Practices on their property.

The Taskforce envisions that their next step will be to work with City staff and elected officials to ensure that stormwater BMPs are incorporated in more City projects and policies, and that new codes are drafted that will highly encourage, or in some instances require, that these tools are implemented in future development and redevelopment projects in League City. In addition, the Taskforce hopes to create an incentive program that will encourage private property owners to incorporate appropriate BMPs on their own property. Ultimately, the goal of the Taskforce is to ensure that residents, developers, and public officials all work together to better manage stormwater runoff and help to improve the water quality in Clear Creek.

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Planning & Development Department
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April 1, 2013

Dear Stakeholder,

In February, 2011, the City of League City was awarded a Clean Water Act Section 319(h) grant from the Texas Commission on Environmental Quality through the Nonpoint Source Program, for the purpose of construction of the WaterSmarmk Park and implementation of water management tools. As part of this grant, the City will develop a program designed to promote incorporation of stormwater quality and water conservation measures on commercial and residential sites in League City. The City proposes to utilize the Historic District, as a model to address best management practice (BMP) standards for new development, by developing a retrofit program that encourages these measures.

To help facilitate this process, the City will establish a taskforce of residents, property owners, and other stakeholders within the Historic District to delineate the boundaries, model area and the initial program goals. You are receiving this letter because you have been identified as someone who might be interested in serving on the taskforce; if you are interested in participating in this program, we will have an introductory meeting for taskforce members and staff to learn more about the program and role of the taskforce. We will meet at 6:00pm on April 25, 2013 at the Civic Center.

If you have any questions, please do not hesitate to call me at (281)554-1084.

Sincerely,

Wes Morrison
City Planner

Creekside Taskforce Meeting Notes July 18, 2013

Attendees: Kathy Edwards, Beth Schroeder, Peter Guglielmo, Fay Dudley, DA Hake, Chantell Hypolite, Wallis McCillin, Dick Collins (spelling?), Dennis Ruhl, Wes Morrison, Charriss York

Attendees looked at large aerial photos of the Creekside District and discussed their ideas of how to LID practices could be added to the area.

- Oak tree at the wine bar
 - o Is there a way to replace crumbling pavement with pervious pavement
- League Park
 - o Was historically a swale around the park – possibly recreate
 - o Concerns that basketball courts are killing trees
 - o Possibly replace existing pavers around the court with an impervious surface (pavers or crushed granite)
- Fire station – are they removing the swale during construction?
 - o Could we install a cistern to collect water to use to wash the trucks
 - o Charriss will find an example where this is being done
- Are there regulations for concrete setbacks around trees (for instance when building a driveway) to protect the root zone? If not, could they be instated?
- Could the plan review process for home improvements encourage LID practices? Or provide information to homeowners about LID options?
- Flood sturdy and water that needs to flow toward Kansas Street
- Need to find a way to address Iowa Street flooding
- Home at 920 4th Street
- Would love to see rain gardens at each individual property
- Could we allow more yards to “flood” (water to temporary pond in yards when it rains) – install swales, native vegetation or something to encourage that in an appropriate way that would not threaten structures
- Look at land and yards that flood, these folks would probably be open to ideas to help resolve that problem
- Park Street – Interfaith Caring Ministries has an existing detention pond, could we retrofit a wetland or something there
- Kansas Street – Look at areas where existing swales could be filled in or redesigned to meander and slow water flow in that area – some areas have enough space for a retrofit like this
- Would like to see a rain barrel program for homeowners – similar to what happened in Houston, the City could purchase a large quantity to get reduced prices and sell them at cost to homeowners – could be in conjunction with a workshop or other educational activities
- Could we create a cost share program for cisterns – grant funding for this? Other options?
- Township Development – many new homes being built; need to look for a way to work with the developer. Would need to show cost savings for including LID

- Ideas to encourage rain gardens
 - o Install a rain garden and get a reduction in city taxes
 - o Designs for gardens provided to homeowners for free
 - o Cost share plant costs if using an approved rain garden design plan
 - o Volunteer force to help with installation and/or maintenance

Name	Affiliation	Email	Phone
Kathy Edwards			
Demi Huff			
MICHAEL HENDERSON			
VALERIE HENDERSON			
Beth Schroeder			
Heather McKnight			
Wallis McMillin			
DAVE HAKE			
Vaness Hamilton			
Katie Benoit			
Dave Hake			
Jay Sedney			

Date: Aug 24, 2013

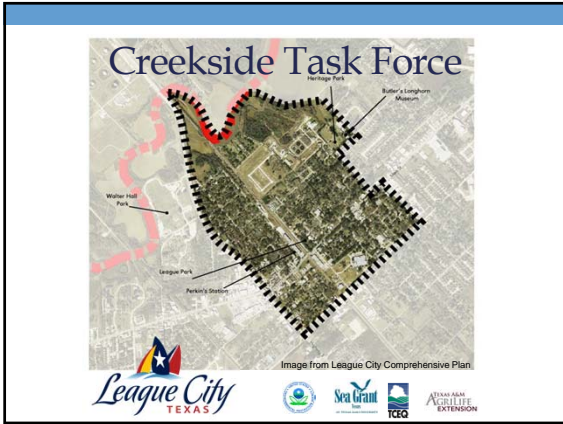
Meeting Title: Creek side Task Force
Walking tour

Location: Historic District

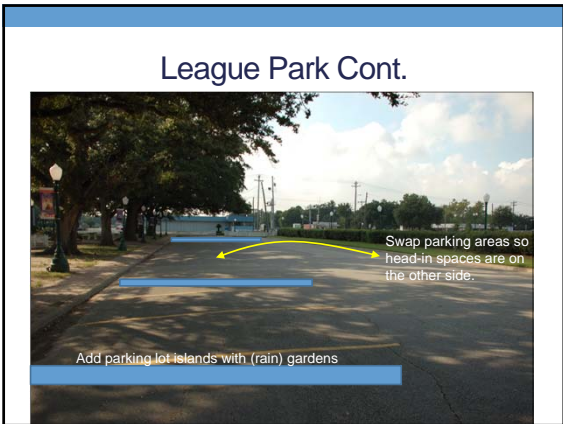
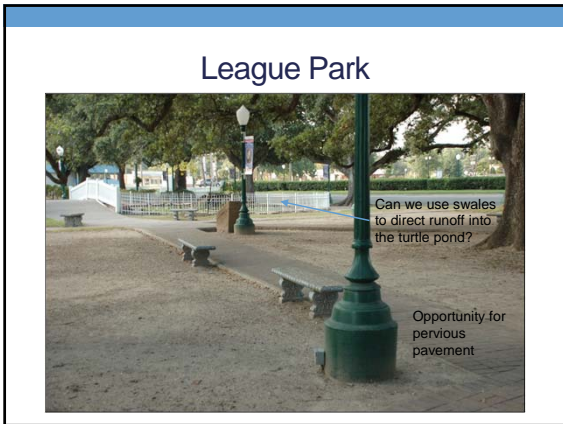
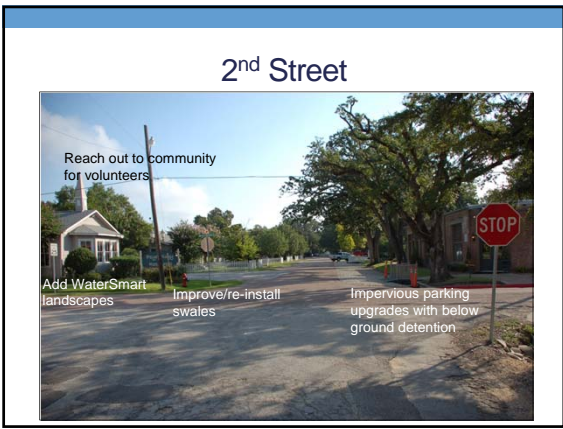
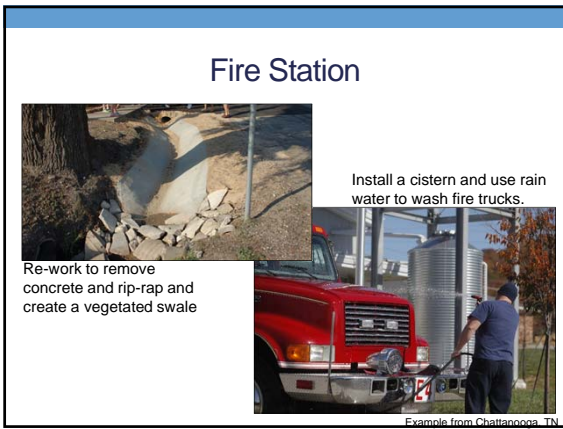
Storm Water Best Management Practices: Walking Tour Notes: August 24, 2013

- Implement standards for property owners
 - Require Best Management Practices in Ordinance
 - Encourage things like
 - Pervious pavement
 - Underground storm water retention below parking
 - Offer incentives

- Opportunities for Best Management Practices:
 - Fire station
 - Retrofit concrete drainage ditch
 - Use as an example of what not to do
 - League Park
 - Incorporate Swales
 - Have water from League Park flow into the koi pond
 - Pervious pavement in parking lot
 - Put landscape islands in parking lot to absorb water
 - Hellen's Garden
 - Rain garden around the man holes in grass area
 - Skate Park
 - Put a rain garden in the existing ditch near the skate park where water already collects
 - Swales and Drainage ditches
 - Plant native plants in swales
 - Repair and maintain collapsed or clogged culverts
 - Use Kathy Edwards' house as an example of swales that are working well



- ### Types of BMP's
- Swales
 - Tree Planter Boxes
 - WaterSmart landscapes
 - Rain Gardens (bioretention)
 - Pervious Pavement
 - Rainwater Harvesting
 - Green Roofs



Water Tower



Redevelop swales



Helen's Garden

- Opportunity for rain gardens around storm drains
- Add WaterSmart gardens during future park improvement projects



Skate Park (League Elementary)



Swales Throughout the District

- Plant native plantings in swales
- Use Kathy Edwards' house as an example of swales that are working well
- Design standards



Maintenance Issues



Repair and maintain collapsed or clogged culverts



Detention Areas



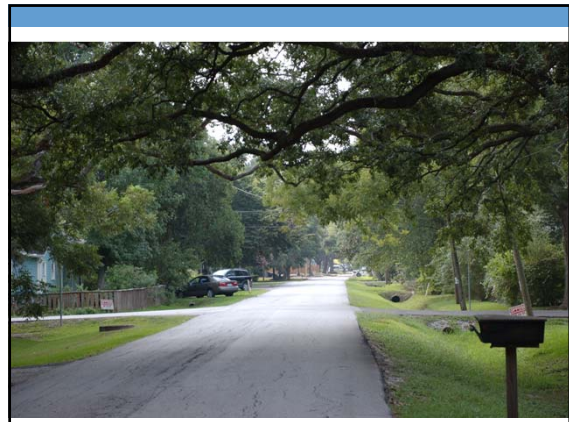
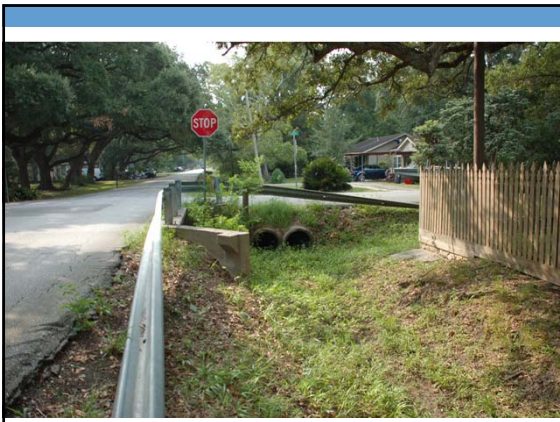
Other Suggestions

- Implement standards for property owners
 - Size and design for swales and culverts
 - Foot bridges over swales
- Require best management practices in ordinance
 - Home owner rain gardens, rain water harvesting, native plants in landscapes
- Improve water flow across the District



Other Suggestions

- Encourage practices like:
 - Pervious pavement
 - Underground storm water retention below parking
 - Rain gardens
- Provide Incentives
 - Rain barrel program, free garden designs, reduced cost native plants





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Cynthia Clevenger	CBEP		
Bette Specion			
Darrell & Mary McNatt			
Jay Sedney			

Date: 10/19/2013

Meeting Title: Green Infrastructure
Community Open House

Location: Butler Longhorn
Museum
1220 Carvell St
League City TX 77573

Green Infrastructure Community Open House
October 19, 2013
Written Comments

- To educate other city departments concerning BMP's and begin implementation NOW.
- Which improvement provides the largest impact for the least amount of money?
- Are installing BMP's on my property tax deductible?? –Brent Meshier
- Explain that green infrastructure does not increase water demand to ???
- I would like to compare these concepts to HD drainage study.
 1. Are there synergies to address flooding?
 2. Can swales & detention slow water draining from South of Main Street?
- Is there a swale opportunity behind the Friends Church parsonage at Iowa & 2nd(or 3rd?) This could help with flooding at McNatt's. –DAHAKÉ
- Pervious pavement for friends church →Additional parking on Illinois between 2nd & 3rd
- Is the city staff aligned? Permitting department with planning department?

Green Infrastructure Community Open House

You're invited!

The City of League City and the Texas Costal Watershed Program are hosting a Community Open House to gather public input and inform residents about the possibilities for green infrastructure solutions and stormwater Best Management Practices in the Creekside Neighborhood. Come learn about the benefits of different eco-friendly ways to reduce storm water runoff on your property!

When:

Saturday, October 19th

10:30 am

Where:

Butler Longhorn Museum

1220 Coryell Street, League City

What is green infrastructure?

Green infrastructure is an eco-friendly approach to storm water management that can be utilized on private property. Unlike conventional stormwater infrastructure which uses pipes to dispose of rainwater, green infrastructure uses vegetation and soil to manage rainwater where it falls. Practices including rain gardens, bioswales, permeable pavement, and rain barrels weave natural processes into the built environment, providing stormwater management, flood mitigation, air quality management, and much more!

For more information, please contact Wallis McMillin at **(281) 554-1079** or wallis.mcmillin@leaguecity.com.




Open House sponsored by:



T1-Rural Preserve	T-2 Rural Preserve	T-3 Suburban	T-4 General Urban	T-5 Urban Center	T-6 Urban Core
WaterSmart Landscaping					
Good Housekeeping					
Pervious Pavement					
Bioretention & Swales					
Detention/Retention basins/ponds		(basins located outside of immediate urban areas)			
		Tree-boxes/Sand Filters			
		Green Roofs			
		WQ Inlet separators			



WaterSmart Landscapes

- Building healthy soil
- Using native plants
- Using less chemicals
- Using less turf
- Using less water

Swales


- Drainage courses with gently sloping sides, typically vegetated by can have rock

Rain Gardens

- A shallow depression planted with native and adapted plants that collects rainwater runoff from roofs, parking lots and other surfaces









Tree Box Filters

- In-ground containers used to control and detain runoff
- Typically pre-manufactured
- Contain a tree or vegetation and soil to filter runoff before it enters the storm drain

Pervious Pavement & Pavers

- An alternative to asphalt or concrete
- Allows stormwater to drain through the porous surface to a reservoir underneath for temporary storage









Rainwater Harvesting

- Collecting and storing runoff from an impervious surface for later non-potable usage




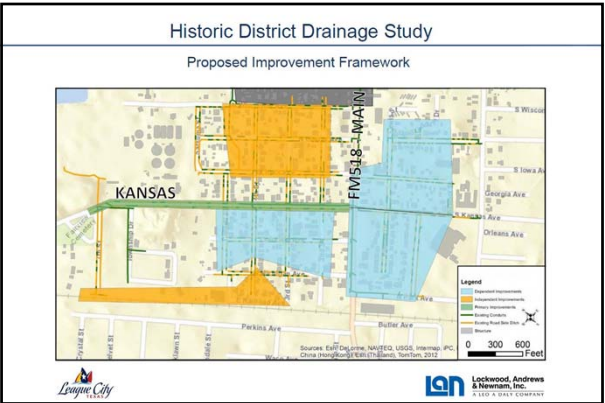
Stormwater Runoff

- What is stormwater runoff?**
 - When it rains, water that does not soak into the ground but instead runs across the land and impervious surfaces (such as roofs, road and parking lots) is called stormwater.
- How does it get polluted?**
 - There are many sources of pollution including fecal waste from humans and animals, over fertilization, sediment from construction sites, trash and debris
- What can I do about it?**
 - Many things including picking up after your pets, reducing the amount of chemicals you use around your home and installing stormwater BMPs



Green Roofs

- An extension of a roof which adds water proofing, a drainage system, a lightweight growing medium and plants.

Ghirardi WaterSmart Park

What is a WaterSmart Park?

WaterSmart is an approach to landscaping focused on three main principles:

1. Water conservation
2. Water quality
3. Habitat for wildlife (birds, butterflies, pollinators)



Park design plan by TBG

The Park was designed with water cleaning features but is still first and foremost a park with a pavilion, play ground and walking trails.

The park is located on Louisiana Ave near FM 518



Would the following incentives make you more likely to install a stormwater best management practice at your home or business?	Yes	No
Making rain barrels available for residents to purchase at reduced cost.		
Free options for WaterSmart landscape and rain garden design plans for shaded, part shade and full sun locations.		
A volunteer crew to help homeowners with rain garden or WaterSmart garden installation and maintenance.		
A program where citizens could purchase native plants at wholesale prices a few times each year.		
A cost share program to pay for a portion of the cost to install pervious pavement driveway or walkway.		

Load Reduction Calculations

Simple Method

This method for estimating pollutant loads for urban areas was developed by the Center for Watershed Protection.

For chemical constituents:

$$L = 0.226 * R * C * A$$

Where: L = Annual load (lbs)
R = Annual runoff (inches)
C = Pollutant concentration (mg/l)
A = area (acres)
0.266 = unit conversion factor

For bacteria:

$$L = 103 * R * C * A$$

Where: L = Annual load (billion colonies)
R = Annual runoff (inches)
C = bacteria concentration (1,000/ml)
A = area (acres)
103 = unit conversion factor

Annual Runoff:

$$R = P * Pj * Rv$$

Where: R = Annual runoff (inches)
P = Annual rainfall (inches)
Pj = Fraction of annual rainfall events that produce runoff (usually 0.9)
Rv = Runoff coefficient (calculated as $0.05 + 0.9 * Ia$)
Ia = Impervious Cover 69% for medium density development, 13% for low density, 0% for open space)

Locally derived Event Mean Concentrations (EMC) are used for C in the above equation. A 1992 publication from the Galveston Bay Estuary Program¹ estimated EMCs for eight different cover classes in the Galveston Bay drainage area. These take into account local conditions and are the best estimates for Galveston County Texas and were used for this project.

Area for each BMP was estimated using Google Earth or on the ground measurements.

BMP effectiveness is based on median values. For the rain garden, bio-swale, green roof and permeable pavement, values were taken from the Center for Watershed Protection National Pollutant Removal Database² and used as the expected percent reduction; median values for BMP effectiveness for WaterSmart landscaping were taken from the Pennsylvania Stormwater Best Management Practices Manual³ and used as the expected percent reduction.

¹ Galveston Bay National Estuary Program. 1992. Characterization of Non-Point Sources and Loadings to Galveston Bay. GBNEP-15.

² Center for Watershed Protection. 2007. National Pollutant Removal Performance Database Version 3. Retrieved from <http://www.stormwaterok.net/CWP%20Documents/CWP-07%20Nat%20Pollutant%20Removal%20Perform%20Database.pdf>

³ Pennsylvania Department of Environmental Protection. Pennsylvania Stormwater Best Management Practices Manual. 2008. Retrieved from <http://www.elibrary.dep.state.pa.us/dsweb/View/Collection-8305>