THE BOTTOM RAIN GARDEN HOW TO GUIDE

North Central Texas Council of Governments
Blue-Green-Grey Grant Program

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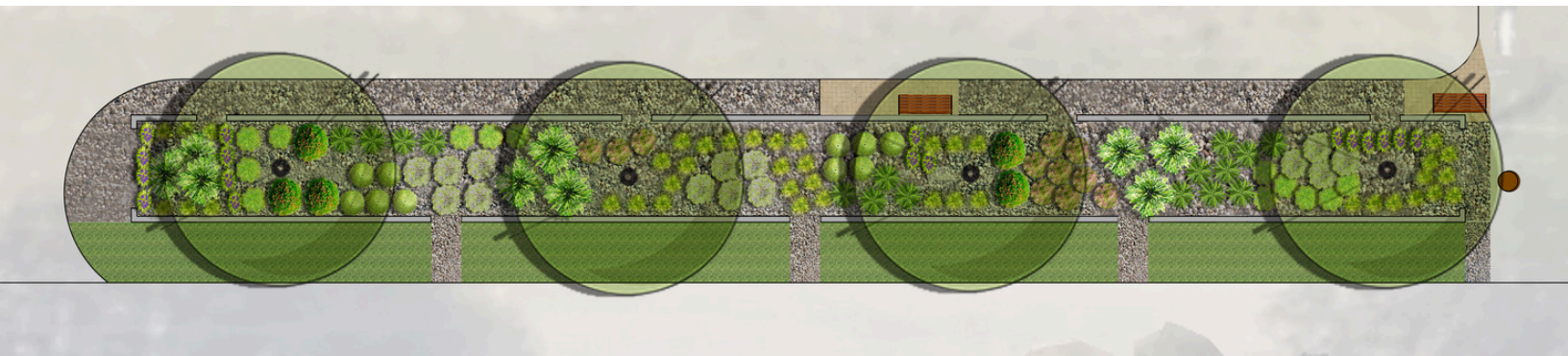
Project Partners:

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Introduction

The North Central Texas Council of Governments (NCTCOG) has committed to promoting innovative green infrastructure solutions through its Blue-Green-Grey Funding Program. This program "focuses on breaking the silos between water infrastructure, the environment, and transportation infrastructure to help create and fund innovative spaces and solutions that combine these components. The goal of the Blue-Green-Grey program is to support innovative pilot projects that provide resources for cities and organizations to use to replicate these ideas throughout the metroplex."

A Portion of the completed Bottom District Rain Garden

Funding for the Rain Garden pilot project derived from a North Central Texas Council of Government 2021-2022 Blue-Green-Grey application for New Ideas Funding Opportunity. This resource outlines the lessons learned by The Bottom District Rain Garden grantee team to successfully plan, design, construct,

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1. North Central Texas Council of Governments. "Green Infrastructure". Retrieved from https://www.nctcog.org/trans/plan/land-use/green-infrastructure on December 3, 2024.

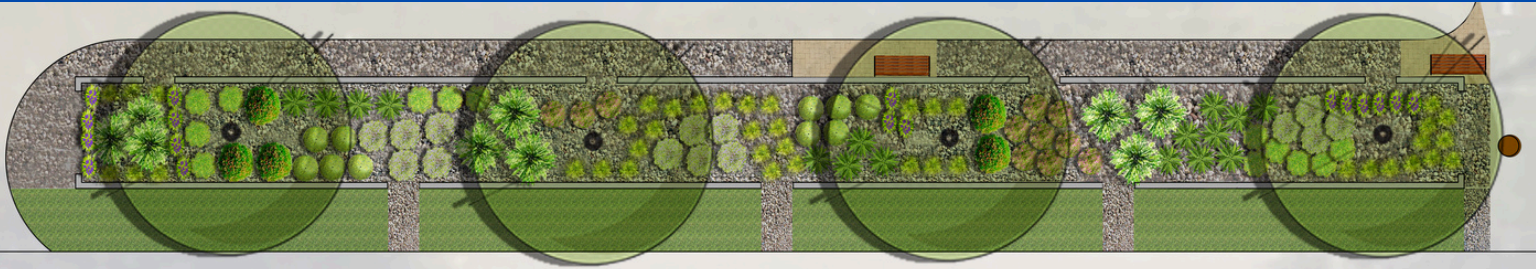and reveal a rain garden as a community development and beautification project through this initiative.

A rain garden is a sustainable, green landscaping solution designed to absorb and filter stormwater runoff. These spaces reduce flooding, erosion, and water pollution, while enhancing community green spaces. Rain gardens also help to decrease urban heat island effect, by increasing the green and ground cover available to absorb sunlight into other efficient uses.

Just as a rain garden has many components that work together to achieve its desired goal, the project team echoed that sentiment. The North Central Texas Council of Governments provided project funding; the City of Dallas granted access to the public green space and support navigating the design and permitting processes, The Golden S.E.E.D.S. Foundation was the steward of the grant and assembled the project team; the University of Texas at Arlington College of Architecture, Planning, and Public Affairs Landscape Architecture program conducted initial community engagement and created original plan concepts; DesignJones created the final design and all construction documents. AquaGreen Global constructed the rain garden; and C-Suite Equity Consulting managed the design, construction, engagement, and administrative phases of the project - including authoring this concise DFW Rain Garden How To Guide.

The following sections are written with implementation in mind and highlight key factors for success, but are not prescriptive. They are reflective of best practices discovered throughout the process, and are meant to inform and streamline your implementation.

Phase I: Plan

This preliminary stage of the project should explore various options for implementation based on project budget, site location, community input, and unique area conditions. This is the time to be creative, consider new approaches and technologies, and think outside the box to find innovative and layered solutions to existing water, environmental, and transportation challenges.

Each of the sections below highlight key areas of considerations with examples for this project phase.

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A. Define Project Goals

- **Environmental:** Examples include improve water quality, reduce runoff, mitigate urban heat island effect, and support local biodiversity.
- **Social:** Examples include create educational opportunities, engage the community, and enhance public spaces.
- **Economic:** Examples include reducing public infrastructure costs, increase property values, and attract funding for community-focused improvement.

B. Assemble a Project Team

- **Key Stakeholders:** Engage residents, leaders, area governments, businesses, organizations, places of worship, and other relevant constituencies.
- **Partners:** Collaborate with consulting firms, educational institutions, landscape architects, urban planners, and engineers for technical expertise.

C. Site Selection

- **Criteria:** Assess proximity to water runoff sources, soil type, sun exposure tolerance, community accessibility, and potential for visibility.
- **Assessment:** Determine ownership of proposed project location (private/public), plot dimensions, water flow analysis, proximity to Waters of the US (i.e. federally regulated rivers), and utilities. This will help you to select a location that meets all local and grant requirements comfortably.

D. Understanding Permits and Approvals

- **Land Designation:** Determine if the project must reside on land designated for "public use". If so, it is crucial to obtain permits, clearances, and legal agreements from local government authorities *prior to* construction.
- **Departmental Coordination:** Request permitting requirements from public works, planning and urban design, stormwater, arts and culture, and legal departments, as appropriate or necessary, to ensure compliance with city requirements and the project does not impede existing stormwater systems.
- **Timeline Management:** Plan for a project timeline that is at least twice as long as your internal team timeline to account for delays, questions, internal city processes, grant funder processes and administration, and coordination between governmental entities. This approach helps you underpromise and overdeliver on the project completion date.

E. Community Engagement

- **Awareness Campaign:** Host informational meetings, workshops, surveys, etc. to gather input on design elements and location, and to build local support.
- **Volunteer Recruitment:** Engage community members, schools, local organizations, businesses, places of worship, civic groups, trade groups, and others for hands-on participation that will help to offset maintenance costs.
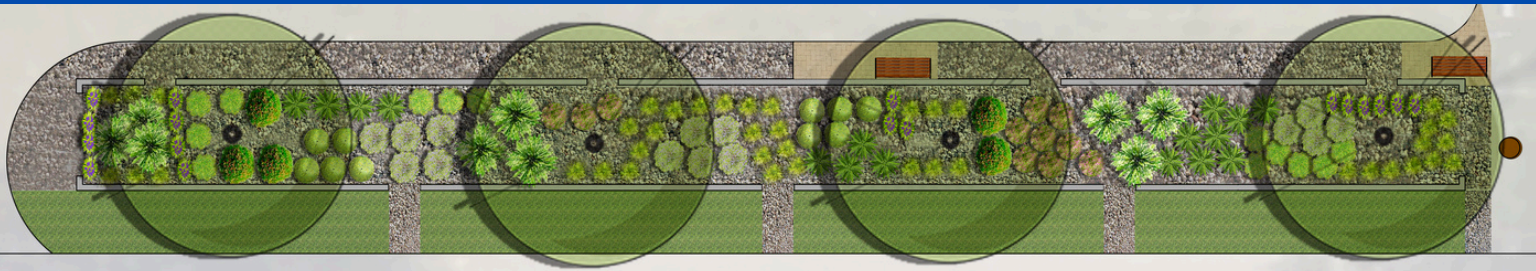
Phase II: Design

The design phase was split into two parts for this project. The first phase was initial community engagement sessions and design concept creation. The following phase selected the project location and drafted concept, rendering, and final construction design documents.

Each of the sections below highlight key areas of considerations with examples for this project phase. Additional technical guidance is provided by DesignJones.

A. Definitions

- **Evergreen:** Plants that retain their foliage throughout the year. These plants typically remain green, but sometimes are another color if the foliage is variegated (presence of streaks, splotches, or patches of alternative colored foliage) or prone to changing color due to temperature changes. (Examples: yaupon, juniper, boxwood, sedge grass)
- **Perennial or Herbaceous Perennial:** Plants that typically survive from the roots for more than two years in the landscape with the above ground portions of the plant dying back to the ground each year. (Examples: Iris, Salvia, Black Eyed-Susans, etc.)
- **Annual:** Plants that complete their life cycles in less than one year, in many cases in one season or less. (Examples: violets, coleus, impatiens, mums, zinnia, etc.)

- **Hardiness:** Refers to a plant's ability to grow and survive over its useful landscape life in a given region.
- **Hardiness Zone:** Refers to the geographic zones designated by the United States Department of Agriculture (USDA) that indicates the average annual minimum low temperatures for the USA, Canada, and Mexico.
- **Permeable/Permeability:** Refers to ability for liquids to pass through.

B. Conceptual Design

- **Site Layout:** Start by mapping the rain garden's size, shape, and location relative to existing infrastructure. When mapping the location, include any existing utilities and/or property easements (for reference to City guidelines and ordinances for construction) and consider maintenance requirements.
- **Plant Selection:** Choose native plants that thrive in local conditions, considering water tolerance and ecological benefits.
  - Native plantings reduce both irrigation and maintenance, and are better suited to survive the severe weather extremes in Texas.
  - We also recommend referring to the USDA Hardiness Zone to determine which hardiness zone in which the garden is located. Plants that are well adapted to your zone designation, while not native, will also be able to thrive in similar conditions when water and sun requirements are met.
  - Additional resources are available online through the AgriLife extension, City planting lists, and university extensions which provide lists or search engines to help you in your plant search.
- **Aesthetic Considerations:** Design for year-round visual appeal, to spark local community interest, and to support integration of the garden with the surrounding environment through complementary colors, styles, and textures.
  - Plants also have a life cycle that must be considered when making the plant selection. A successful design will offer interest throughout every

season of the year by incorporating plants that bloom at different times. Understanding life cycles can help with managing maintenance costs.

- Evergreen plants maintain green leaves throughout the year.
- Perennials offer the opportunity for interest in off seasons, and will come back the next growth season.
- Annual plants live for one life cycle and must be replaced annually.
  - Use colors in your surroundings to find stone or materials that are a good fit for the area, while achieving the level of permeability that is required for a successful rain garden.

C. Detailed Design

- **Hydrological Design:** Calculate water flow, infiltration rates, and overflow management.
- **Planting Plan:** Develop a detailed planting scheme, including species, planting density, and seasonal variations to ensure year-round blooms. When developing your planting plan, make sure to consider plant spacing and sun requirements.
- **Infrastructure Integration:** Design pathways, informational signage, seating options, and educational features that support interaction with the garden. These can be incorporated relative to garden size and project budget.
  - Pathways and seating options provide opportunities for access by people of all ages and abilities, and should consider the user's safety in design. Varying heights, proximity to vehicular traffic, or other nearby physical programming of the space should be considered.
  - Signs can display educational information regarding the rain garden, planting material, and organization's work. Signs must be pre-approved by the City if they are to be placed on city property.

- **Technology Integration:** Explore new and innovative stormwater management technologies, such as GreenBlue Urban liners and container boxes, that can increase water storage capacity within a small footprint, while also increasing sustainability through the use of recycled plastics in manufacturing.
  - The product must be evaluated by the designer and vendor for the site to determine appropriateness for the application. Examples include Silva Cells Products and GreenBlue Urban Hydroflex Planters.

D. Partner Collaboration

- **Consultation:** Assemble a team with diverse expertise to complete all required components of the project and refine the design. This can include landscape architects, engagement specialists, engineers, ecologists, management specialists, and urban planners in the public, private, educational, and nonprofit sectors.
  - These partnerships will often be phased based on project needs. It is important to select partners that are collaborative and willing to incorporate information from previous phases into their work.
  - Identifying a manager for project logistics and management will help to streamline communication, ensure deadlines are met, and transitions are seamless between project phases, consultants, contractors, and vendors.
- **Educational Input:** Engage local schools and universities to incorporate learning opportunities with the design. This contributes to student learning experiences and maximizes the learning institution and the project budgets.

PROJECT SITE

Design Overview

Bee Balm (*Monarda didyma*)

Zexmenia (*Wedelia acapulcensis var. hispida*)

River Rock Mix

Mexican Mint Marigold (*Tagetes lucida*)

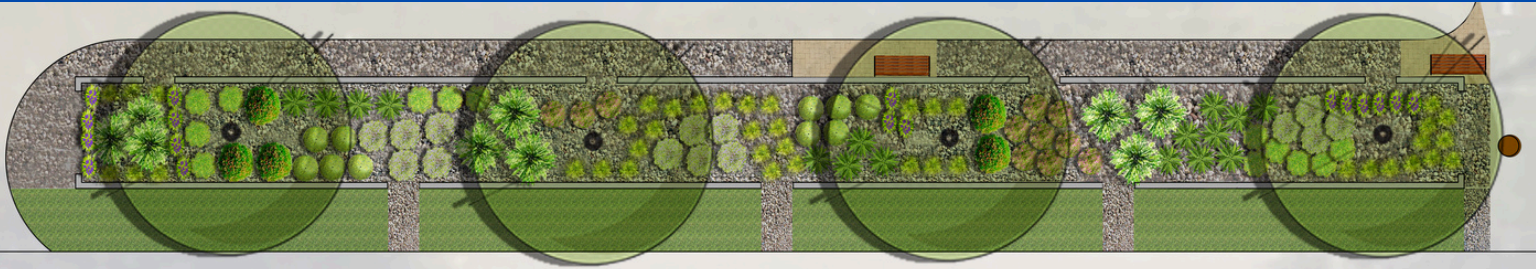

Red Yucca (*Hesperalo paviflora*)

Brown Mulch

Yaupon Holly (*Ilex vomitoria*)

Louisiana Iris (*Iris ser. Hecagonae*)

Phase III: Permit

The permitting and approval stage is a critical juncture in the project, moving from design to construction related activities. During this phase community stakeholders are reengaged, local and regional authorities provide final approval, and construction preparation begins.

Each of the sections below highlight key areas of considerations with examples for this project phase.


A. Regulatory Approvals

- **Community Approval:** Present the design to the community, city staff, and regional governmental personnel for final approval. This should be an update to the community from the initial engagement and design process.
- **Local Permits:** Work with city staff to secure all necessary zoning, environmental, right of way, street, and construction permits, as well as legal clearances. This also includes stormwater permits if the garden will connect to a stormwater line.
  - Construction permits are issued when a 100% design is approved by the city. Allow a minimum of 2-3 weeks for this application process.
- **Regional Approvals:** Obtain approval from water management districts, conservation authorities, and other relevant agencies at the local, regional, and national levels as required.

B. Compliance Check

- **Environmental Regulations:** Ensure compliance with local, state, and federal environmental laws governing construction preparation and activities. This will vary by location and will need to be confirmed prior to the start of construction.
- **Safety Standards:** Adhere to local construction and public safety codes, including submitting timely (renewed as necessary) requests to 311 and 811 before construction begins.
    - 811 - Requests to mark utility - water, electric, gas, etc. - lines
    - 311 - Requests to mark water/wastewater lines

C. Budget Management

- **Budget Considerations:** Establish a budget at the inception of the project, that includes firm quotes from all consultants and your administrative costs.
    - Keep track of expenses monthly and update grantor at least bimonthly on budget progress and expenditures to date.
    - Leverage existing partnerships and collaborations to bridge the gap between the project budget and needs. This will allow you to maximize a smaller project budget ($75k) for greater impact.
    - You can also explore agreements with local trade organizations or existing partners that are willing to donate or volunteer time/services or accept a smaller professional fee than usual as a social impact, corporate responsibility, or in-kind donation to your organization to create a win-win opportunity.
- **Contractor Selection:** Ensure the contractor has the necessary experience, licenses, and bonding to complete city projects. This will eliminate delays and allow them to anticipate obstacles beforehand in the implementation process. It will also eliminate preventable delays with construction.
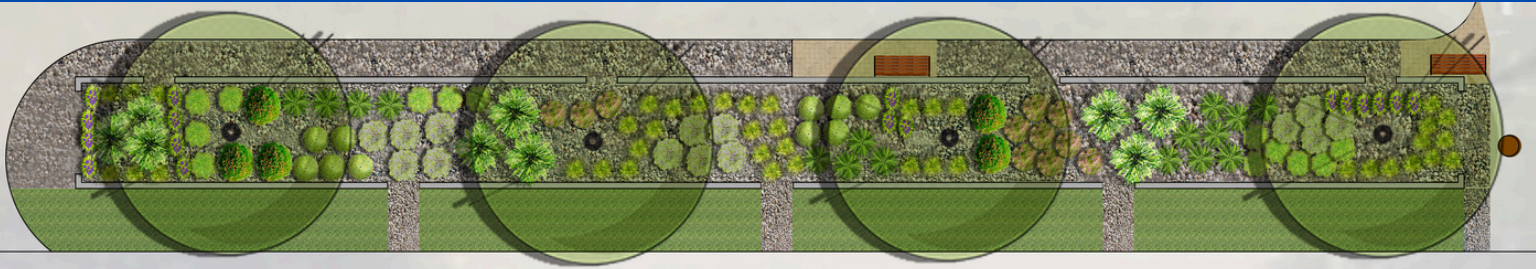
Phase IV: Construct

The construction phase of the project brings together input from engagement, design specifications, and governmental approvals to bring the physical design to life. This phase requires extensive coordination to ensure the project remains on time and any installation questions and obstacles can be resolved quickly.

Each of the sections below highlight key areas of considerations with examples for this project phase.

A. Site Preparation

- **Clearing and Grading:** Remove debris, level the site, and prepare for excavation.
- **Excavation:** Dig the rain garden basin, ensuring proper depth and slope for water retention according to design documents.
- **Soil Amendment:** Add compost, fertilizer, and/or amendments as recommended to improve soil nutrient levels and water absorption.

B. Installation

- **Drainage Features:** Install in/outlet cuts and other drainage and slope features to direct water into the garden and encourage downward drainage and retention.
- **Planting:** Implement the planting plan, ensuring proper spacing and soil coverage.

- **Preventative Measures:** Apply geotechnical liners to retain moisture, suppress weeds, and protect plant roots.

C. Quality Control

- **Inspection:** Regularly inspect the site for construction quality and adherence to design specifications. If items are missed or out of compliance, address them with the contractor as soon as possible to maintain integrity of the design and reduce delays.
- **Adjustments:** Make necessary adjustments based on site conditions and unforeseen challenges. This can include installing alternative plant types, as approved by the landscape architect, if the originally designed species is out of stock.
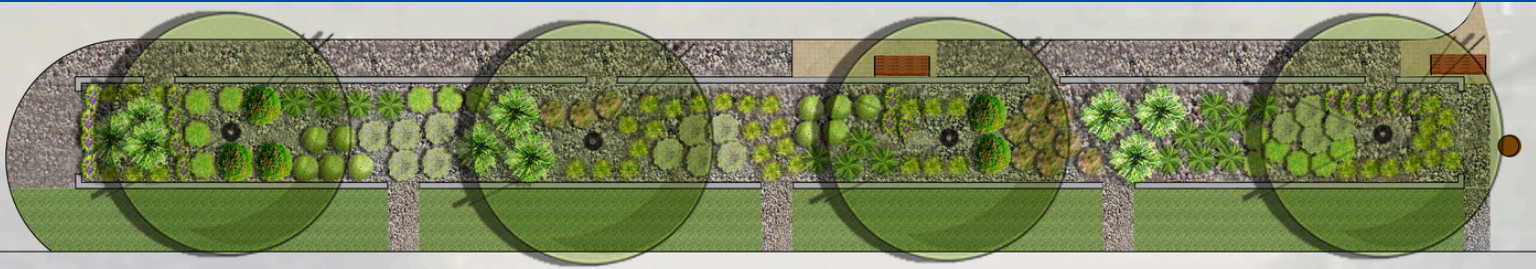
Phase V: Reveal

Now it is time to share the result of engagement, planning, design, collaboration, and construction. This stage of the project invites all community members, funders, partners, and collaborators to celebrate the completion of the rain garden. The process will be shared, educational opportunities provided, project partners highlighted, and volunteer opportunities presented.

Each of the sections below highlight key areas of considerations with examples for this project phase.

A. Rain Garden Reveal & Ribbon Cutting

- **Community Event:** Host a rain garden reveal and ribbon-cutting ceremony, inviting stakeholders, funders, partners, volunteers, and local media.
- **Educational Tours:** Provide guided tours explaining the rain garden's function, design, and benefits. This is a great opportunity to share more about the various plant types, filter elements, and technology innovations.
- **Recognition:** Acknowledge the contributions of partners, volunteers, and sponsors from every phase of the project.

B. Long-term Maintenance

- **Maintenance Plan:** Develop a schedule for weeding, mulching, watering, and plant replacement.
- **Volunteer Involvement:** Engage the community in ongoing maintenance

through volunteer days and schedules.

- **Monitoring:** Track the rain garden's performance in managing stormwater and improving biodiversity.

C. Educational Programs

- **Workshops:** Offer workshops on rain garden creation, native plant gardening, and water conservation. This can also include recorded tours and educational sessions that are uploaded to the website.
- **School Programs:** Collaborate with local schools to incorporate the rain garden into science and environmental curricula.
- **Volunteer Programs:** Offer ways for the local community to get involved through new volunteer programs for homeroom classes/grades, clubs, and organizations as a way to increase environmental stewardship.
- **Public Signage:** Install educational signage explaining the rain garden's role in the community and ecosystem.

Rain Garden

The Bottom Neighborhood Demonstration Garden

| Yaupon Holly | Lindheimer's Muhly | Louisiana Iris | Switch Grass | Zexmenia |
| *Ilex vomitoria* | *Muhlenbergia lindheimeri* | *Iris ser. Hexagonae* | *Panicum vigatum* | *Wedelia acapulcensis var. hispida* |

| Mexican Mint Marigold | Gregg's Blue Mistflower | Turk's Cap | Bee Balm | Cherokee Sedge |
| *Tagetes lucida* | *Conoclinicum coelestinum* | *Malvaviscus arboreus var. hispida* | *Monarda didyma* | *Carex cherokeensis* |

Phase VI: Evaluate

Once the rain garden is operational it is critical to continue to monitor how it functions and to document all that was learned throughout the process. .

Each of the sections below highlight key areas of considerations with examples for this project phase.


A. Project Evaluation

- **Performance Review:** Assess the rain garden's effectiveness in stormwater management, plant health and biodiversity, and community engagement.
- **Feedback Collection:** Gather feedback from the community, partners, and participants for continuous improvement.

B. Replication Strategy

- **Documentation:** Create a project report or summary that includes lessons learned, challenges, best practices, and successes (like this one).
- **Model for Future Projects:** Use the rain garden as a model for other community development projects in the region.
- **Funding Opportunities:** Identify potential funding sources (local, regional, national, private, public, philanthropic, etc.) for replicating or expanding the pilot project in other locations within your neighborhood or externally to other communities.

○ The evidence of successful project completion and rain garden operations could also be used to apply for additional funding to install pathways, seating, and information and education signage, if the original project budget did not allow for them.
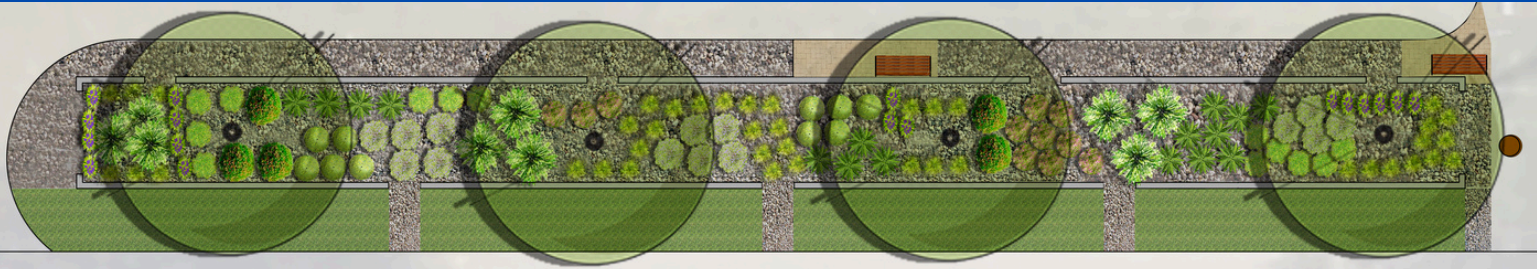
Lessons Learned

Throughout this process we noted several important items learned that had a tremendous impact on project processes, approvals, construction, and completion. That list is compiled here for easy reference and review.

Each of the sections below highlight key areas of considerations with examples for this project phase.

A. Understanding Permits and Approvals

- Securing permits, clearance, and agreement from local government, especially when working on land designated for public use, is critical to the project's success.
- Early engagement with Public Works, Planning and Urban Design, Construction, Stormwater, and Arts and Culture departments is necessary to align the project with city requirements, avoiding conflicts with existing infrastructure.
- Establish a clear and consistent staff/personnel point of contact in the local government.
    - This champion will help you navigate the maze of regulations, pinpoint and connect you with other key staff members critical to project approval and success, highlight guidelines you need to consider in your design, and answer your questions (or find someone that can), which streamlines your process and increases chances of success.

- Maintain contact with this person, invite them to community meetings, and establish key design and construction benchmarks to ensure you maintain their approval throughout all phases of project development.

B. Timeline and Budget Considerations

- Doubling the internal timeline accounts for potential delays and ensures a realistic project schedule. This approach also helps build credibility by allowing you to underpromise and overdeliver on the completion date.
- With a $75K budget, additional funding and/or partners willing to contribute through donations (monetary and in-kind) or reduced fees is essential. Leveraging social capital and existing partnerships can bridge budget gaps.

C. Community Engagement

- Early and consistent engagement with residents and stakeholders is vital for project success. Providing opportunities for participation in decision-making, maintaining clear communication, and creating programs that involve nonprofit, governmental, and private partners fosters community buy-in.
- Hosting 60 to 90 minute meetings allows for a thorough overview, Q&A sessions, and opportunities for involvement in the project's maintenance - without losing your audience's interest.

D. Promoting Early Adoption

- Distributing plants representative of the garden's species at community meeting updates can generate interest and encourage local adoption of rain gardens and native species for flood mitigation.
- This creates additional educational opportunities personalized to recipients and the area. A hands-on experience to hold and ask questions about

possible plant types can also create excitement around adding these elements to their home gardens and landscaping before the rain garden is completed.

E. Inclusive Communication

- Writing plans in clear, accessible language (with minimal jargon) and using diagrams increases the likelihood that community members and stakeholders can understand and apply the information. This approach fosters inclusivity and broader participation.

- Provide language access resources appropriate to the meeting to make sure that all attendees (virtual and in person) are able to actively and meaningfully engage.

- Utilize technology to support continuous community education. This could include incorporating a QR code or your organization's website on the signage where visitors can go for more information about each of the plant types. This structure also helps to reduce costs, as the website can be more easily updated than a sign.

F. Design Progress and Completion

- Work with your designated local government representative to establish clear design completion benchmarks for the project. This keeps the grant team accountable and lets the government representative know when they can expect updates.

- Your design partner will lead the completion of the concept, rendering, and construction drawings. Selecting a quality partner is key.

- As you near the 75% completion mark, engage with your contractor to get updated estimates on construction timelines. If you have not identified a contractor, send out request for estimates/bids on project construction.

Once the 100% design is complete finalize construction contractor and set a tentative timeline to begin work as soon as possible.

G. Construction

- Start with a walkthrough of the site with the design, management, and construction teams.
- Finalize the project timeline and include buffers for weather, holidays, and existing workloads with contractor.
- Use the construction plan to schedule reveal and ribbon cutting date with buffers.

H. Reveal + Ribbon Cutting

- Create a program that highlights your commitment to thoughtful community development and the contributions of grantees, project funders, local government, partners, and contractors.
- Invite those that participated in engagement sessions and outreach.
- Highlight and provide high-level education around the rain garden and its purpose in the neighborhood.

I. How To Guide

- Begin taking notes at the start of the project to document best practices, lessons learned, improvements, and innovations you discover along the way.
- Revisit and update at least each month to make sure information is retained and documented accurately.

J. Project Management

- Create systems at the start of the project. This includes project management, collateral management, regular meetings, and reporting

standards. Share the combination of systems with all partners and the grantee to ensure everyone understands where information will be housed and shared.

- Determine the best way to coordinate the exchange of information and preferred methods of communication for the project team. Adjust as necessary.
- Set a regular cadence for project reporting and updates. Utilize percentages to document progress and create visual updates to the team and funders.

Reveal & Ribbon Cutting Celebration

CONCLUSION

A community rain garden project is a collaborative effort that provides environmental, social, and economic benefits. By following this guide, you can ensure that your rain garden is effectively planned, designed, constructed, and maintained, creating a lasting positive impact on both the community and the environment.

Completed Bottom Rain Garden

About CSEC

C-Suite Equity Consulting is an award-winning consulting firm that partners with mission-focused organizations, businesses, and governments to improve social, environmental, and economic outcomes. We use the principles of equitable development and social determinants of health to *Make Urban Spaces Equitable Places* to live, work, and play.

Where Innovation Meets Impact

We specialize in strategy, research, training, and speaking solutions that yield a triple bottom line for clients – fulfilling project goals, forging deeper connections, and leaving a positive, lasting, and tangible legacy in communities, workplaces, and individual lives.

Primary Areas of Impact

Racial Equity

We work to ensure that race is no longer a primary indicator of access, opportunity, or quality of life, and that all residents have equitable access to resources and spaces.

Social Equity

We work to ensure communities and individuals, especially those of color, are included in decision-making, equipped for self-advocacy, and empowered to own their political and social power.

Economic Equity

We work to ensure economic mobility is a reality for all, especially communities and individuals of color that have experienced pervasive historic disinvestment, neglect, and racist financial practices.

Environmental Equity

We work to ensure equitable access to green and park spaces and the enjoyment of healthy environmental conditions such as clean air, water, and land.

The Bottom Rain Garden
How To Guide

THE GOLDEN
S.E.E.D.S.
FOUNDATION
Sowing, Encouragement,
Empowerment and
Development for the
Spirit of our Community
A Community Development Corporation (CDC)

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