Official Agenda

RALEIGH CITY COUNCIL

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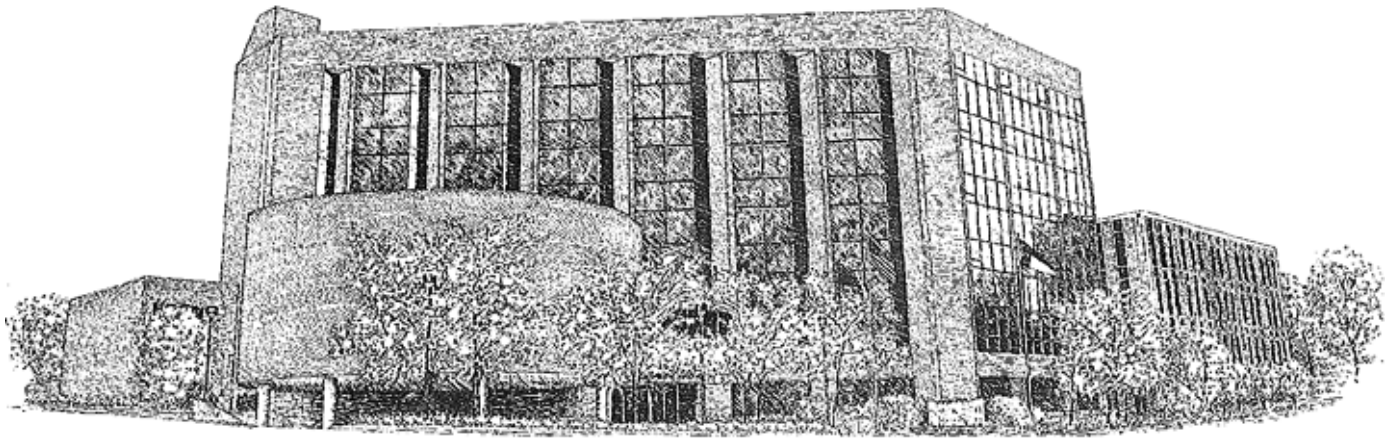
Kay C. Crowder, Mayor Pro Tem
Mary-Ann Baldwin
Corey D. Branch
David N. Cox
Bonner Gaylord
Russ Stephenson
Dickie Thompson

TUESDAY, MAY 10, 2016
4:00 P.M. WORK SESSION
CONFERENCE ROOM 305

Avery C. Upchurch Government Complex



222 West Hargett Street, Raleigh, North Carolina 27602

A. MEETING CALLED TO ORDER BY THE MAYOR

B. AGENDA

1. Southeast Raleigh Tennis Complex

Shawsheen Baker, Parks, Recreations & Cultural Resources

Staff will provide an update on development of a Southeast Raleigh Tennis Center.

2. Green Infrastructure and Low Impact Development (GI/LID) Policies

Blair Hinkle, Public Works

Staff will provide an update on implementation of the GI/LID Work Plan. Since approval of the plan by City Council in March 2015, staff has been coordinating two parallel stakeholder work groups and various other focus groups to address the priority items contained therein. These work groups completed their efforts in March 2016, and staff will provide a summary of recommendations. The results of this work can be found in the form of the Implementation Work Group report, the Code Review Work Group report, and the staff summary memo, all of which are included with the agenda packet. Also included in the backup materials are the approved Work Plan and GI/LID Fact Sheets demonstrating the use of these techniques as applied to various development types.

Staff and the City's consultant, Tetra Tech, will provide a presentation outlining progress made to date and will highlight specific recommendations for Council action. Following the work session specific recommendations will be placed on a future City Council agenda for formal consideration.

3. Moore Square Park Design Update

Grayson Maughan, Parks, Recreation & Cultural Resources

Sasaki Associates will provide a brief update on the design status of Moore Square, including architecture, fountain and play design. Updates will also include the incorporation of public art, as approved on April 26 by the Public Art and Design Board as well as incorporation of elements of the South Park Heritage Walk vision plan. The project has received preliminary approval from the Raleigh Historic District Commission for a Certificate of Appropriateness, with final review and approval anticipated to occur this summer.

Staff will provide a brief presentation during the work session.

City Of Raleigh

NORTH CAROLINA

TO: Ruffin L. Hall, City Manager

FROM: Shawsheen Baker, Senior Park Planner, Parks, Recreation and Cultural Resources

CC: Diane Sauer, Parks, Recreation and Cultural Resources Department Director

SUBJECT: Council Work Session Agenda Item – Southeast Raleigh Tennis Center update

DATE: May 3, 2016

Background Information:

Initiated by local tennis activists advocating for increased tennis programming for the communities in southeast Raleigh, this project is intended to provide a staffed tennis facility and offer opportunities for a destination location for city league, inter-collegiate match and tournament play in addition to drop-in play and instructional court space for the residents of the community. The facility was proposed to consist of a center building of approximately 4,000 square feet, 20+ outdoor tennis courts with associated parking and site amenities.

After studying a number of city-owned properties in the southeast area, a 9-acre undeveloped site at Barwell Road Park was selected as the most viable location, considering and balancing the site contraints and development impact on neighborhood, environment transportation and accessibility. Local tennis advocates presented a construction cost estimate of $3.8 million for a tennis facility at Barwell Road Park based on a design concept prepared by US Tennis Association, and proposed public and private partnership.

In 2012, City approved the two-thirds General Obligation Bond including $2.3 million for Southeast Raleigh Tennis Center. The total project budget was targeted at $5 million:

2007 Parks Bond	$1,700,000
2012 2/3 Bond	$2,300,000
Private Contribution	$1,000,000
Total Project Budget	$5,000,000

In 2013, a consultant team was hired through a RFQ process. The consultants conducted site investigation, developed schematic design and prepared construction cost estimate of $6.2 million. Project total including design and construction became approximately $7 million.

In 2014, PRCR staff attempted a few grant applications including $2 million from the Wake County Major Facilities Capital Project Fund and $500,000 from LWCF Outdoor Recreation Legacy Partnership Program. No grant funding was received.

PRCR assessed available budget and existing resources in southeast Raleigh, and recommends relocating the tennis center to Biltmore Hills Park and expanding the current tennis facility at the park. The objective is to implement 2 major projects in southeast Raleigh with the current available funds:

1. Barwell Road Park Master Plan
2. Southeast Raleigh Tennis Center at Biltmore Hills Park

Attachments

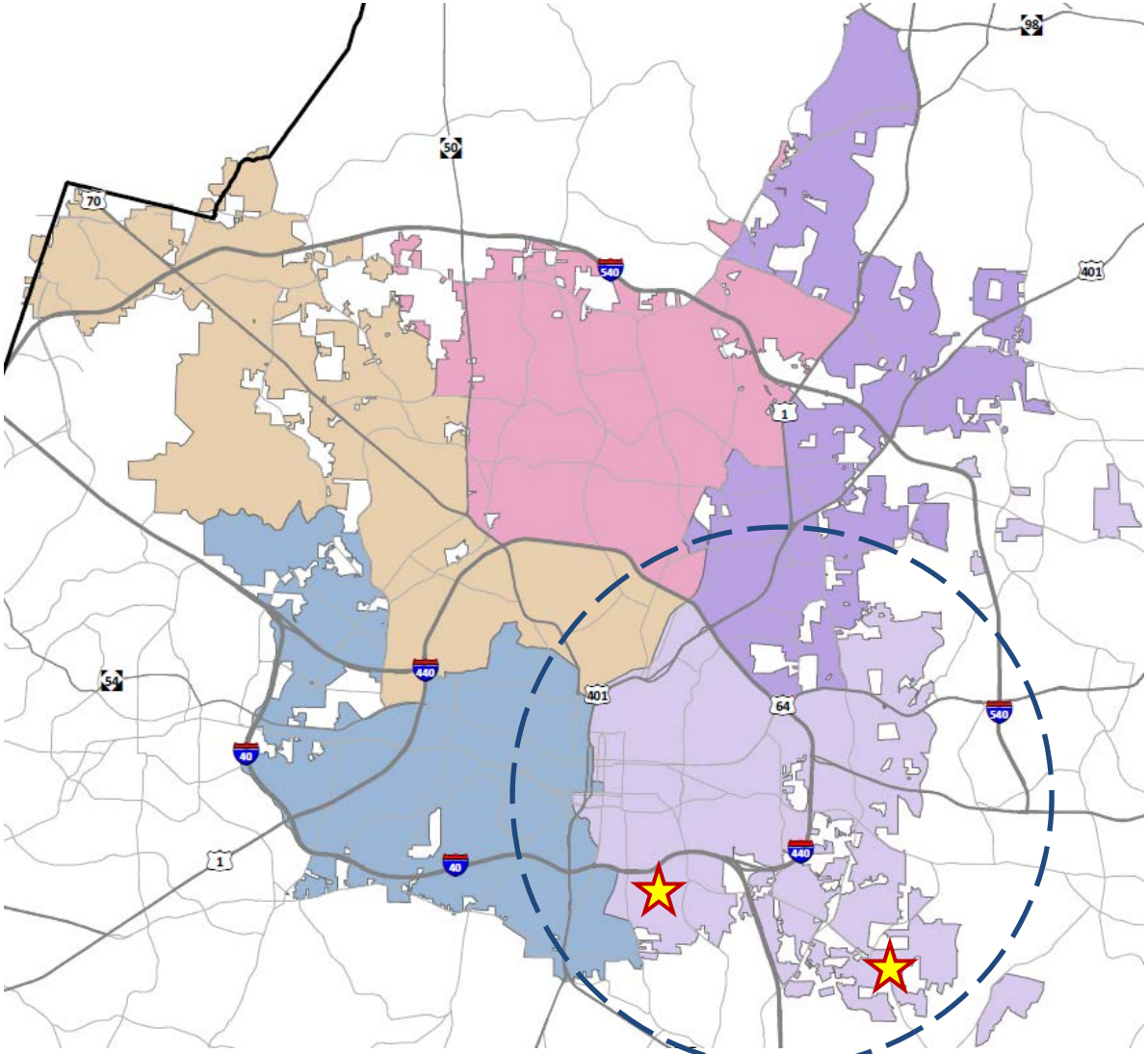
Southeast Raleigh Tennis Center Presentation at May 10, 2016 Council Work Session.

Agenda Item:

Parks, Recreation and Cultural Resources staff will provide a brief update on the development of Southeast Raleigh Tennis Center.

Southeast Raleigh Tennis Center Update

May 2016



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Southeast Raleigh Tennis Center

2008 Initiated Project - Tennis advocates approached the city to explore the opportunity of establishing a tennis center in southeast Raleigh. Working with USTA and local tennis advocates, staff studied 6 city-owned sites in southeast Raleigh including Worthdale Park, Walnut Creek South and North, Peterson Street property and Biltmore Hills Park and Barwell Road Park. Barwell Road Park was the recommended site.

- Why southeast Raleigh? economics, demographics, universities.

2009 Developed Concept - Advocates worked with USTA on a design concept for a tennis facility at Barwell Road Park and proposed private and public partnership with interest in private contribution.

2012 Approved Funding - City approved the 2/3 General Obligation bond including funds for Southeast Raleigh Tennis Center based on USTA's concept.

2013 Hired Design Consultant - The consultant conducted site investigation, schematic design and prepared construction cost estimate which suggested the project was over budget.

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Southeast Raleigh Tennis Center

Proposal:

- **Fund Tennis Expansion at Biltmore Hills Park** with 2/3 Bond adding 8 courts for a total of 16 courts and adding office space at Biltmore Hills Community Center to accommodate tennis program operations
- **Fund Barwell Road Park Master Plan** with Parks Bond in preparation for implementation with future bond funding

Objectives:

- **Barwell Road Park public participation**
- **Keep the tennis center in southeast Raleigh**
- **Share resources**
- **Minimize construction cost impact**
- **Work within the original budget**

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Southeast Raleigh Tennis Center

Biltmore Hills Park

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Southeast Raleigh Tennis Center

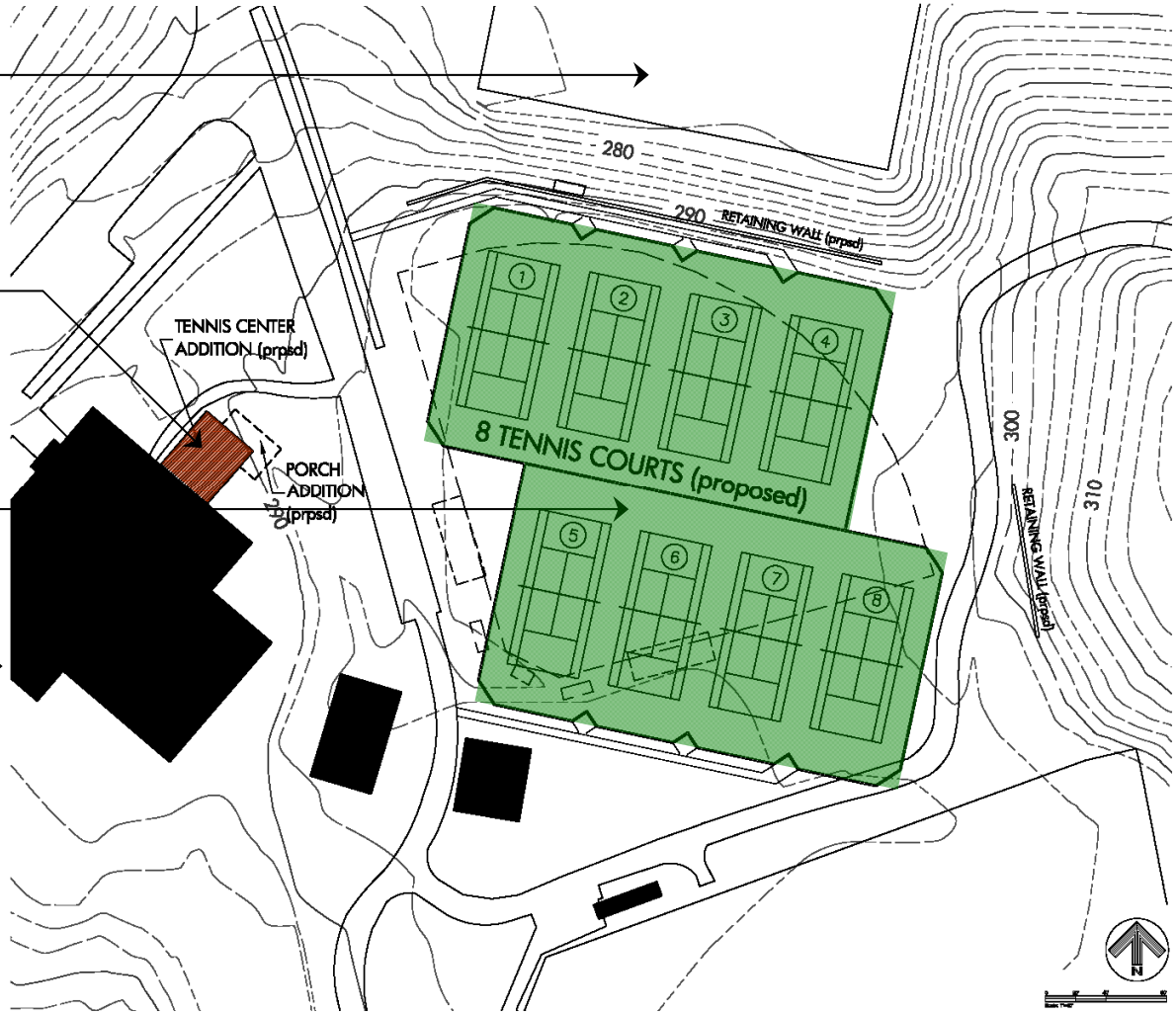
Biltmore Hills Park

Existing Eight Tennis Courts

Building Addition for Tennis Center Operation

Additional Eight Tennis Courts

Existing Community Center



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Southeast Raleigh Tennis Center

Construction Cost Estimate Comparison

	2009 Funding Partner's Estimate for Barwell Road (conceptual)	2014 Consultant's Estimate for Barwell Road (60% design)	2015 Consultant's Estimate for Biltmore Hills (conceptual)
Tennis Courts	$736,853	$1,470,692	$354,542
Site Work	$1,031,986	$1,554,059	$198,796
Lighting & Amenities	$526,340	$671,460	$250,050
Stormwater & Utilities	$125,000	$384,527	$43,640
Building	$830,880	$700,435	$272,530
Gen. Conditions, Contingency, OH/P	$552,680	$1,805,652	$640,116
Total	$3,803,739	$6,586,825	$1,759,674

Currently Available PRCR Funds for Construction: $3.68 million

(not including potential private contribution)

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Southeast Raleigh Tennis Center

Benefits of Relocating from Barwell Road to Biltmore Hills:

- **Much lower capital construction costs** due to resource sharing and taking advantage of existing tennis facility
- **Barwell Road Park Master Plan** giving the community the opportunity to offer input for its use at Barwell Road Park
- **Two major projects in southeast Raleigh** – Barwell Road Park Master Plan and Southeast Raleigh Tennis Center at Biltmore Hills Park with the available budget plus private contribution
- **Economic impact** potential retained in southeast Raleigh

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Project Communication:

Dec. 2015	**City Manager and Assistant City Manager**
Jan. 2016	**Council Member Corey Branch**
Feb. 2016	**Private funding partner**
Feb. 2016	**Southeast CAC Parks Committee**
Mar. 2016	**South CAC Chair and Vice Chair**
Apr. 2016	**Ebony Racquet Club**
May 9, 2016	**Project Update at South CAC**
May 12, 2016	**Project Update at Southeast CAC**

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Next Steps:

Barwell Road Park Master Plan

- Request for Qualification
- Situational Assessment (SA)
- **Council** Approval of SA
- Citizen Planning Committee
- Public Input Process
- Board and **Council** Adoption of Master Plan

Biltmore Hills Park Imprvmt

- Request for Qualification
- Schematic Design (SD)
- Public Input on SD
- **Council** Approval of SD
- Design Development
- Bidding and Construction

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City Of Raleigh
NORTH CAROLINA

MEMORANDUM

DATE: May 4, 2016

TO: City Council

FROM: Rich Kelly, PE, Interim Public Works Director

SUBJECT: Staff Report on Status of Implementing Work Plan for Advancing GI/LID in Raleigh

1. PURPOSE AND SCOPE

This memorandum summarizes the status of the City of Raleigh's initiative for advancing use of green infrastructure and low impact development (GI/LID) to help reduce negative effects of land development on water quality and the health of Raleigh's streams and lakes. The City's recent GI/LID efforts have been pursuant to a work plan endorsed by City Council in March 2015 (Work Plan for Advancing GL/LID in Raleigh, February 2015). The GI/LID Work Plan was developed from late 2013 through 2014 through a collaborative process involving City staff from many areas, stakeholders from Council-appointed citizen boards and commissions, development organizations, environmental and conservation organizations, and citizen advocacy organizations, and facilitator Tetra Tech, Inc.

From the outset, the following principles have guided the City's initiative for incorporating GI/LID into new development, redevelopment, and existing development, collectively conveying the message that "Raleigh welcomes GI/LID":

- Demonstrate the City's leadership and set an example
- Accommodate essential City operations
- Ensure scalability and affordability
- Consider long-term cost-effectiveness and sustainability
- Consider strategic timing/phasing of actions
- Add amenities
- Balance multiple City objectives
- Help educate City staff and provide clear vision
- Make sense to citizens and City staff responsible for implementation
- Consider the social component/complexity of Raleigh (i.e., makes sense for Raleigh)

This memorandum presents City staff's recommendations to Council and summarizes the efforts, outputs, and recommendations of two work groups – the Code Review Work Group and the Implementation Work Group – composed of citizen stakeholders and City staff. These work groups completed their work in March 2016, and their efforts, outputs, and recommendations are documented in detailed reports attached to this memorandum. Staff's recommendations are informed by the output of these work groups.

2. STATUS OF THE CITY'S GI/LID INITIATIVE

Raleigh City Council has voiced strong commitment to improving the health of local streams and lakes and the Neuse River by promoting use of GI/LID, which address the main source of pollutants and damaging flows that degrade Raleigh's streams – stormwater runoff from developed land. Council adopted a number of GI/LID policies as part of the City's 2030 Comprehensive Plan and the Raleigh Strategic Plan. However, some of these policies are not yet reflected in the City code or in staff-level policies and practices.

NCSU Central Campus, before and after installation of GI/LID, shows how this approach can enhance aesthetics.

At various times since the early 2000s, City staff, the Stormwater Management Advisory Commission (SMAC), the Environmental Advisory Board (EAB), the Planning Commission, and Council have discussed whether and how to advance the use of GI/LID on City projects and on private land development projects. In February 2013, SMAC presented recommendations to Council for advancing GI/LID with an overall theme of communicating the message that "*Raleigh welcomes LID*". In response, Council directed City staff to evaluate SMAC's recommendations and report to Council about actions needed to implement them. On staff's recommendation, the City retained the services of Tetra Tech, Inc. to provide technical expertise and experience with implementing GI/LID on a municipal scale and to facilitate a process for the City to advance use of GI/LID.

Three phases of work were identified to support broadly advancing GI/LID into the routine practices of the City, land developers and designers, and maintainers of our urban infrastructure (i.e., GI/LID becomes "business as usual"):

1) *Scoping* for evaluating barriers, needs, and opportunities for advancing GI/LID and for developing a strategic work plan for immediate next steps,
2) *Building Capacity* within the City for long-term administration and implementation of GI/LID, and
3) *Implementing* new policies, procedures, and tools needed to advance GI/LID.

The *Scoping* phase was completed from late 2013 through 2014. The GI/LID Work Plan was prepared through a collaborative effort involving City staff from various work areas and stakeholders from citizen boards and commissions, development organizations, environmental and conservation organizations, and citizens' advocacy organizations. It presented seven work items for advancing use of GI/LID in Raleigh, listed in Table 1.

Following Council's endorsement of the GI/LID Work Plan in March 2015, City staff and Tetra Tech set up a structure for *Building Capacity* by forming two work groups: the Code Review Work Group and the Implementation Work Group. Both work groups were composed of City staff and external community stakeholders, including many who had been part of the GI/LID Task Force. Each work group was assigned three GI/LID Work Plan work items, as shown in Table 1. The work groups completed their work in March 2016, and each group's efforts, outputs, and recommendations are documented in a detailed report attached to this memorandum. GI/LID Work Plan work item 6, for identifying GI/LID retrofit opportunities, is being implemented by City staff as part of the Stormwater Management Division's ongoing Capital Improvements Program.

The work groups held a combined 10 meetings over seven months.

The *Implementing* phase will consist of putting in place the recommended new policies, procedures, and tools needed to advance GI/LID and making them part of routine operations of the City, developers, designers, and maintenance service providers.

Table 1. Summary and status of GI/LID Work Plan items

Work Plan Item → Lead Entity	Purposes, Key Outputs, and Benefits	Status
1.Review Ordinances and Policies as They Pertain to Using GI/LID → Code Review Work Group	·Memo that identifies and evaluates barriers, differentiating between residential development and commercial/institutional development ·Memo that describes potential code revisions ·Fewer barriers to using GI/LID ·Clear expectations for developers and designers wanting to use GI/LID ·Get cross-department input and buy in	·Completed: Reviewed code, manual, and policies for explicit or implied barriers to GI/LID; proposed text changes ·Next steps: Pursue text changes through the City's public process ·See recommendations in Section 3.1
2. Develop GI/LID Templates for Streets → Code Review Work Group	·Street typology templates that include GI/LID practices and that address staff concerns about GI/LID's effects on municipal operations ·Clear GI/LID options for streets for use by developers and designers ·Fewer barriers to developers' use of LID with streets	·Completed: Developed a schematic drawing that shows various options and details for siting bioretention devices in the ROW ·Next steps: Pursue adding GI/LID design details to the Street Design Manual through the City's public process ·See recommendations in Section 3.2
3. Develop a Tool for Evaluating GI/LID's Cost and Benefits → Implementation Work Group	·Raise awareness among staff, developers, and designers about costs of using GI/LID ·Build capacity among same for evaluating GI/LID for specific projects ·Memo that compares and evaluates available cost-benefit tools and recommends tool selection ·White paper on triple bottom line benefits of GI/LID	·Completed: Prepared white paper on triple bottom line benefits of GI/LID; evaluated cost-benefit tools and recommended basis for developing a tool for Raleigh ·Next steps: Develop and launch a Raleigh GI/LID cost-benefit tool ·See recommendations in Section 3.3
4. Prepare Fact Sheets and Construction Checklists for GI/LID Practices → Implementation Work Group	·Communicate that Raleigh welcomes GI/LID ·Raise staff awareness of benefits and limitations of GI/LID and advance staff's buy-in ·Promote staff inter-department coordination and consistent policies and practices about GI/LID ·Promote early communication among staff, developers, and designers about GI/LID ·Fact sheets and construction checklists for GI/LID practices ·Get cross-department and development community input and buy in	·Completed: Graphic, descriptive fact sheets for five types of site development (e.g., residential, commercial) ·Next steps: Produce the fact sheets and publicize them with the development community ·Staff removed construction checklists from this work item due to a change in the strategy for content of the fact sheets ·See recommendations in Section 3.4
5. Prepare a Guidance Framework for Maintaining GI/LID Devices → Implementation Work Group	·Systems for tracking inspection and maintenance of dispersed GI/LID devices and for producing management, compliance, and cost reports ·Feedback about maintenance and costs for City use in rate setting and code evaluation and for developers'/designers' decision making	·Completed: Developed a framework for administering maintenance of SCMs on City properties ·Next steps: Develop a central administrative and fiscal function for maintaining City-owned SCMs ·See recommendations in Section 3.5
6. Identify Opportunities for GI/LID Retrofits on Developed Properties → City Staff	·Accelerate and improve the City stormwater retrofit program ·Locate retrofit practices in street ROWs ·Design practices to reduce stormwater volume as well as rate and pollutants ·Include GI/LID practices in designs for new City facilities and modifications to existing facilities ·Get cross-department input and buy in	·Ongoing: Staff continues to investigate, plan, fund, and execute retrofits on City-owned and private properties utilizing recurring funding appropriated annually by City Council. ·See Section 3.6 for additional information
7. Evaluate Using Incentives to Encourage GI/LID → Code Review Work Group	·Establish GI/LID as "business as usual" ·Reduce developers' actual or perceived risk of using innovative approaches such as GI/LID ·Establish new development and redevelopment as prime opportunities for using GI/LID ·Get development community input and buy in	·Completed: Developed Green Raleigh Review expedited process for review and permitting of development plans ·Next steps: Program, implement, and publicize Green Raleigh Review ·See recommendations in Section 3.7

3. SUMMARY OF RECOMMENDED COUNCIL ACTIONS

The recommendations presented herein for advancing GI/LID in Raleigh are the result of research, collaboration, and deliberation by the Code Review Work Group and the Implementation Work Group, whose numerous meetings were facilitated by the City's contract consultant, Tetra Tech, Inc. The work of these groups is documented in separate reports attached to this memorandum.

Sections 3.1 through 3.7 that follow summarize the recommendations of the work group to which the corresponding item was assigned. Following each summary are three consistent items of note. The first, "Staff actions moving forward", states the actions that staff will take to implement the presented recommendation(s). The second, "Staff-recommended Council action", provides the recommended Council action, where appropriate, to allow for full implementation of the recommendations. The third, "Intended outcomes", summarizes the envisioned result of these staff and Council actions.

These recommendations are organized as follows, consistent with their listing in the GI/LID Work Plan and in Table 1:

3.1 Reducing barriers to GI/LID in City code and policies
3.2 Templates for using GI/LID in street rights-of-way
3.3 Cost estimating tool for evaluating use of GI/LID on development sites
3.4 Fact sheets for encouraging use of GI/LID on development sites
3.5 Framework for administering maintenance of GI/LID devices on City properties
3.6 Siting GI/LID retrofits on developed properties
3.7 Using incentives to encourage use of GI/LID on development sites

3.1 Reducing barriers to GI/LID in City code and policies

Ordinances that bear on potential use of GI/LID typically are woven through the body of code, and barriers to using GI/LID often are embedded in those ordinances, sometimes in subtle ways. As part of conveying the message that Raleigh welcomes GI/LID as part of new development and redevelopment, the Code Review Work Group reviewed the City code and identified approximately 25 gaps and barriers that, if remedied, could better promote the use of GI/LID. The Work Group recommends changes to City code and practices intended to remove or reduce these barriers. The following are the most noteworthy recommendations:

- *Multi-use landscaping*. Allow and encourage both GI/LID practices and required landscape areas in the same space as part of site design, rather than totally separate areas dedicated to either stormwater management or landscaping. A multi-functional approach decreases overall landscaping and stormwater management costs and does not require stormwater management to "compete" for available, valuable land area on the site.

Multi-use landscaping, not explicitly allowed or encouraged in the current City code.

- *Street rights-of-way*. Allow developers to install GI/LID in street rights-of-way (ROWs) to treat and manage street stormwater runoff and receive stormwater credit for such practices. This approach can create more developable land area on the development site (where a stormwater pond otherwise would treat street runoff), can reduce infrastructure costs, and can provide more site design flexibility.

- *Design flexibility*. Provide more flexibility in development site design to accommodate GI/LID practices. For example, allowing reductions of required parking spaces to preserve significant trees, allowing street and yard setbacks to accommodate GI/LID SCMs, and allowing approved GI/LID devices within sanitary sewer easement areas.
- *Update ordinances and policies*. Replace dated ordinances and policies, such as those that encourage large "regional facilities" and that require traditional wet ponds as preferred methods for managing stormwater quality and quantity, with ordinances and policies that allow broader stormwater treatment options that encourage reduced stormwater runoff volume, velocity, and pollutant loading and that potentially lower infrastructure costs. Examples are the City's Stormwater Management Design Manual and ordinances for managing stormwater on development sites in the water supply watersheds.

Staff actions moving forward: As authorized by Council, prepare proposed changes to City code text and related guidance documents for consideration by the Planning Commission and support the associated public process. As text changes receive Council approval, publish the changes, publicize them within the City and with the development community, and incorporate them into City policies, practices, and materials as appropriate. Proposed revisions to the City's Comprehensive Plan resulting from this effort will be incorporated through the Comprehensive Plan update process currently under way.

Staff-recommended Council action: Authorize staff to move forward with recommended changes to City code and to the City Street and Sidewalk Ordinance, the City Street and Sidewalk Improvement Policy, and City manuals (including Street Design Manual, Public Utilities Manual, and Stormwater Management Design Manual). Refer to the Code Review Work Group Report for details of the recommended changes.

Intended outcomes: Increased likelihood and frequency of developers and designers choosing to incorporate GI/LID practices into development site designs. With improved definition of what practices are allowed under what circumstances, a more predictable process and timeline for completing development plan reviews and obtaining permits for projects that incorporate GI/LID practices.

3.2 Templates for using GI/LID in street rights-of-way

Streets are a significant source of stormwater runoff in Raleigh, and street rights-of-way (ROWs) are areas over which the City has substantial or total control and that can be used to help advance GI/LID. As the City implements street improvement projects, including new streets, "complete streets", "green streets", maintenance, widening, and installing traffic calming devices, there will be opportunities for integrating GI/LID to mitigate stormwater runoff impacts and improve the appearance of City ROW areas. If private-sector developers could install GI/LID in the ROW to manage and treat street runoff, more developable land area would be made available on the project site where a stormwater pond or other device otherwise would have treated street runoff. This can be especially important in infill and downtown areas with tight space constraints.

GI/LID in a street ROW: bioretention within curb extensions (bumpouts).

The Code Review Work Group identified street cross sections in the UDO that offer good opportunity for GI/LID adaptation, provide community benefits, and are likely to be used in Raleigh. These street types include: Mixed Use Streets (Avenue 3-Lane, Parallel Parking; Avenue 4-Lane, Parallel Parking; and Main Street, Parallel Parking), and Local Streets (all neighborhood street cross sections and the multi-family street cross section). The Work Group recommends that the City adopt new standard design details that show how GI/LID practices can be accommodated in the ROW for these types of streets while providing essential City functions such as stormwater drainage, solid waste collection, fire response, and utility placement.

Staff actions moving forward: As authorized by Council, integrate new standard design details that show how GI/LID practices can be accommodated in the ROW into the City's Street Design Manual for consideration by the Planning Commission and support the associated public process. As changes to the Street Design Manual receive Council approval, publish the changes, publicize them within the City and with the development community, and incorporate them into City policies, practices, and materials as appropriate.

Staff-recommended Council action: Authorize staff to move forward with incorporating recommended new standard design details that provide options for integrating GI/LID techniques within the ROW into the City's Street Design Manual, as recommended in the Code Review Work Group Report.

Intended outcomes: Increased likelihood and frequency that the City and developers will choose to incorporate GI/LID practices into designs for street improvement projects, particularly for new street, street widenings, and traffic calming. With increased treatment of stormwater runoff from streets, water quality and health of local streams will improve.

3.3 Cost estimating tool for evaluating use of GI/LID on development sites

The Implementation Work Group evaluated options for the City to develop an interactive tool for evaluating costs and benefits of using GI/LID on prospective development sites and how the tool might be used. The Work Group's evaluation focused on the following questions regarding use of the tool:

- How would developers benefit?
- How would City staff use it?
- How would the public benefit?
- What would it look like?
- What is needed for the tool to succeed?

The Work Group's priority was for the tool to be available for use, along with GI/LID fact sheets, to promote use of GI/LID in site designs, early in the site design process by developers and designers to help them evaluate function and costs of candidate GI/LID practices. City staff also would use the tool to demonstrate use of GI/LID on real or hypothetical private development sites and on sites proposed for the City's development, such as park facilities and fire stations. For developers promoting sustainability and green design, the tool also could report on co-benefits beyond stormwater management (e.g., habitat and air quality benefits). Beyond design for single development sites, the tool could be used for broader planning and for education about GI/LID. Benefits of GI/LID could be reported for a single lot, a multi-phase development, or a whole drainage area.

Staff actions moving forward: Proceed with developing and launching a GI/LID Cost-Benefit Tool, as recommended in the Implementation Work Group Report.

Staff-recommended Council action: None at this time.

Intended outcomes: For a given set of site conditions and a range of site-development parameters, developers, designers, and City staff will evaluate the effectiveness and installation cost of GI/LID practices, versus traditional stormwater management practices, quickly and collaboratively. City plan reviewers will encourage, and developers and designers will seek, use of this GI/LID Cost-Benefit Tool early in the development planning process, such as during due diligence meetings and pre-application meetings.

3.4 Fact sheets for encouraging use of GI/LID on development sites

The Implementation Work Group developed GI/LID fact sheets for helping raise awareness among developers and designers about GI/LID. The Work Group identified the types of development in Raleigh where GI/LID could be most feasible and effective: Commercial, Mixed-Use, and Low-Density, Medium-Density, and High-Density Residential. In graphical renderings of representative developments, these fact sheets show various GI/LID options and how they can be incorporated into development sites. The fact sheets also provide examples of cost savings realized on example development projects. The Work Group recommends using these factsheets early in the development review process (e.g. sketch plan meetings) to help raise awareness about GI/LID and potential cost savings. Below are sample graphics from fact sheets prepared for High-Density Residential and Commercial Developments.

Staff actions moving forward: Proceed with producing the recommended GI/LID fact sheets, as recommended in the Implementation Work Group Report. Train staff in technical/functional aspects of GI/LID in ROW and development settings, publish and publicize the roll-out of the fact sheets, and evaluate their effectiveness relative to intended outcomes.

Staff-recommended Council action: None at this time.

Intended outcomes: Increased awareness among developers, builders, planners, designers, and City staff about the range of possibilities for incorporating GI/LID practices into development site designs, for a range of

development types, as early as possible in the development planning process. With increased awareness, increased likelihood and frequency of developers and designers choosing to incorporate GI/LID practices into development site designs.

Fact sheet for high-density residential development.
GI/LID options shown include green roofs, cisterns, permeable pavement, urban agriculture, and bioretention areas.

3.5 Framework for administering maintenance of GI/LID devices on City properties

GI/LID devices generally use vegetation, are relatively small and distributed, and use less hard structure than conventional stormwater management devices. As with all infrastructure, including conventional stormwater control measures (SCMs) such as wet ponds, GI/LID devices require routine maintenance to uphold the desired performance and aesthetic quality. As the City anticipates growth in the use of GI/LID in the future, it will need to address widespread and long-term maintenance needs of City-owned GI/LID devices and traditional SCMs.

The Implementation Work Group worked with City staff to assess the City's current practices for maintaining City-owned SCMs. The Work Group identified aspects of current practices that are uncertain or ambiguous and thereby hindering the City's ability to ensure long-term function of SCMs. These practices include on-the-ground maintenance, coordination and communication of responsibilities, and allocation of maintenance funds.

The Work Group recommends the City adopt a maintenance model whereby the Stormwater Management Division would take on responsibility for maintaining all City-owned SCMs, both conventional and GI/LID devices and both regulated and non-regulated devices, drawing on support from City transportation and parks operations and from private contractors as needed. Staff training will be needed for the inspection and maintenance of GI/LID devices.

Staff actions moving forward: Through FY17, develop processes for implementing a centrally administered program and funding mechanism for maintaining SCMs on City properties, based in the Stormwater Management Division. Any necessary adjustments to operating budgets or cash allocations will be reflected in FY18 proposed budgets, with supporting descriptions of proposed changes in responsibilities and functions.

Staff-recommended Council action: None at this time.

Intended outcomes: The City will maintain a complete and current inventory of City-owned SCMs with appropriate procedures and schedules for maintaining each SCM; SCM maintenance procedures and costs will

be consistent across all City departments, and maintenance records will be kept by a single operation and manager responsible for maintenance of all City-owned SCMs. With improved SCM maintenance and cost tracking, SCM performance and compliance will improve, with resultant improvement of water quality and stream health.

3.6 Siting GI/LID retrofits on developed properties

This Work Plan item was not assigned to either of the formal work groups, as it is an ongoing effort by staff required by the City's Stormwater NPDES Permit with the State and by the State's Neuse River Nutrient Sensitive Waters Strategy. The City has constructed a number of LID retrofits, including the constructed wetland at Fred Fletcher Park, a bioretention cell at Marsh Creek Park, and a bioretention cell in a bumpout in the ROW of Pullen Road. The Stormwater Management Program is actively planning or designing several additional retrofit projects in collaboration with other City departments or divisions. Examples include integrating GI/LID into the Oxford Road sidewalk project, incorporating a constructed wetland into the Wooten Meadow Park master plan, and utilizing an innovative technique to restore a degraded stream in Millbrook Exchange Park.

Annually, Council appropriates between $200,000 and $400,000 for water quality retrofit projects and stream stabilization. In addition, the Stormwater Quality Cost Share Program is funded at $250,000 per year and provides significant financial assistance to private property owners who wish to implement GI/LID practices on their properties. Between these three funding sources, the City has invested more than $1 million in retrofitting sites using GI/LID techniques for improving water quality and plans to invest approximately $5 million more over the next five years.

Staff actions moving forward: Continue work to implement water quality retrofits through direct project management and coordination with other City departments and divisions.

Staff-recommended Council action: None at this time

Intended outcomes: Improvement of water quality throughout the City, increase in public awareness of water quality and the mitigating effect that the use of GI/LID techniques can have on increased density and/or imperviousness, reduction in the environmental impact of City transportation and facility projects, increase in use of GI/LID techniques in private development and redevelopment as a result of City's leadership in this area.

3.7 Using incentives to encourage use of GI/LID on development sites

Based on research of processes being used by other communities, expedited review may be the most effective incentive for advancing GI/LID and green design. Although the City has an Express Review option for development plans review and permitting, it does not currently have an expedited review option for GI/LID or for green building. The Code Review Work Group recommends that the City establish a green expedited review process (Green Raleigh Review) to encourage developers to incorporate GI/LID practices and other green practices into site development designs.

Use of GI/LID practices in development site designs can be encouraged through expedited site plan reviews.

The Code Review Work Group recommends that the Green Raleigh Review expedited process provide two tiers:

- *Tier 1 site plan review*. Tier 1 would apply to the development's site plan and would require "matching" of predevelopment and post-development stormwater runoff volumes (the NC Department of Environmental Quality's functional definition of LID).
- *Tier 2 building plan review*. Tier 2 would apply to the development's building plan and would require use of energy-efficient building practices. (Tier 1 is a prerequisite for Tier 2. That is, to be eligible for Tier 2, the development's site plan must first be approved under Tier 1).

Benefits to the site development applicant would include the following:

- *Assigned contacts*. Each eligible project would have an assigned point of contact/project coordinator from project intake through final site plan approval, and another assigned point of contact/field coordinator through building plan approval, to advocate for these projects and facilitate the review and approval process.
- *Access to the Green Team*. Eligible applicants could meet face-to-face with a new Green Team during a weekly Green Raleigh Review meeting. Within time now allotted for weekly Express Review, two time slots would be made available: one for a Tier 1 site plan review, and one for a Tier 2 building plan review. Each review would be completed in meetings of two to three hours. Reviews during this time would not necessarily be exclusive to Green Raleigh Review; other project reviews would continue, as a matter of routine. However, two Express Review slots would be opened for Green Raleigh Review projects, as needed.
- *Certain turnaround timing for plans review and approval*. Site plans and building plans reviewed through Green Raleigh Review each would be processed per the following timeline:
  - Review period by the Green Team of 10 business days following e-submittal of plans
  - Face-to-face meeting with the Green Team
  - Approval of plans within five business days of meeting with the Green Team

  The benefit will be a reduced and definite total time for obtaining approvals. With conventional review and approval, both the length of a review cycle and the number of required review cycles vary, making the timeline for obtaining approval an important unknown for time-sensitive development applicants.
- *Fee waiver*. Review fees would be waived.

Staff actions moving forward: Implement the Green Raleigh Review process, training staff in technical/functional aspects of GI/LID and the workings of this new process, publish and publicize the roll-out of the process, and evaluate its effectiveness relative to intended outcomes. Refer to the Code Review Work Group Report for details about the recommended process.

Staff-recommended Council action: None at this time. If, once Green Raleigh Review is functioning, the level of applicant participation in this new expedited process exceeds staff's capacity to consistently meet performance objectives for reviews and issuance of permits, staff will scale back this program and revisit its effectiveness and utilization with Council, including the possible need for additional staffing resources.

Intended outcomes: Increased likelihood and frequency of developers and designers choosing to incorporate GI/LID practices into development site designs. With assigned review contacts, face-to-face review opportunities with the Green Team, shortened review times, and waived review fees, a preferred and predictable process and timeline for completing development plan reviews and obtaining permits for projects that incorporate GI/LID practices.

4. VISION FOR A PATH FORWARD

City staff will carry forward recommendations for code revisions, operating policies, and tools as described in Section 3 and the attached GI/LID work group reports and as authorized or directed by Council. Additionally, the City will need to continue to build capacity for supporting implementation of the new procedures and tools in the areas described below.

4.1 Develop/update City operating procedures and agreements

There are two elements where interdepartmental collaboration will be critical and will benefit from written standard operating procedures: joint review of development plans and maintenance of SCMs, including GI/LID devices:

- *Joint review of site development plans*. For *City-owned development projects*, this includes ensuring early consideration of GI/LID opportunities in site designs. Examples are street projects, parks, and building sites. For p*rivate development projects*, this includes standard procedures for Green Raleigh Review, roles for departments, and use of templates, fact sheets, and the cost-effectiveness tool, once available.
- *Maintenance of SCMs*. The City will need to develop internal agreements between the Stormwater Management Division, as the responsible management entity, and key City departments for supporting and funding maintenance of City-owned SCMs.

4.2 Continue building capacity for advancing GI/LID

There are several key areas where the City needs to continue building capacity as it advances GI/LID:

- *Cost-benefit tool development*. To move forward in developing a cost-benefit tool, the Implementation Work Group recommended a number of steps, including forming a technical committee to review and test the tool design, train City staff on the tool's use, and regularly update and maintain the tool.
- *Training*. Internal training of City staff will be needed regarding new policies (changes in ordinances, integrated approach to GI implementation); new procedures (e.g., joint plan review, maintenance); and new tools (templates, factsheets, and the cost-effectiveness tool, once available).
- *Outreach*. The City will need to develop an outreach strategy to advertise the package of GI/LID changes, and develop outreach tools to effectively communicate these changes (e.g., City website links, video, brochures, presentations for civic groups, etc.).

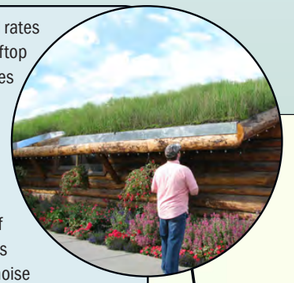
Attached documents:

- Code Review Work Group Report, Advancing Green Infrastructure and Low Impact Development in Raleigh, dated May 2016
- Implementation Work Group Report, Advancing Green Infrastructure and Low Impact Development in Raleigh, draft dated May 2016

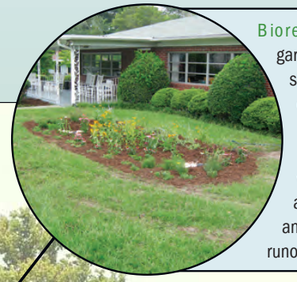
OPTIONS FOR GREENING RALEIGH

Low-Density Residential Development Stormwater Management

March 2016



Green roofs reduce runoff volume and rates by intercepting rainfall in a layer of rooftop growing media that is typically six inches (extensive) or deeper (intensive). Green roofs offer an array of benefits, including extended roof lifespan (due to additional sealing, liners, and insulation), improved building insulation and energy use, reduction of urban heat island effects, opportunities for recreation and rooftop gardening, noise attenuation, air quality improvement, bird and insect habitat, and improved aesthetics.



Bioretention areas, or rain gardens, are structural stormwater controls that capture and temporarily store or infiltrate stormwater runoff using soils and vegetation in landscaped areas to reduce the volume and improve the quality of runoff.

Permeable pavement in driveways allows runoff from the driveway, and potentially the rooftop, to infiltrate, reducing the volume and improving water quality, while providing a structurally stable parking surface.

Cisterns harvest rainwater from rooftops and temporarily store water for uses such as irrigation, washing vehicles, washing laundry, and flushing toilets.

Downspout disconnection. By directing rooftop runoff onto vegetated areas, you can direct the water to areas where it will be useful rather than where it may cause harm or overload pipe systems.

Bioretention areas planted with turf grass have been shown to provide similar treatment as those planted with trees and shrubs.

Vegetated swales are shallow, open grass channels that can be an alternative to traditional curbs and gutters. Vegetated swales are designed to convey runoff while providing limited pollutant removal by sedimentation and horizontal filtration through vegetation.

Green Infrastructure practices use vegetation, soils, and natural processes to manage stormwater runoff by mimicking nature to absorb and store water. Integrating these practices into a site can reduce the area required for conventional stormwater management by incorporating treatment within landscaping features and surfaces that would otherwise be impervious. This can be a cost-effective approach to treating stormwater by making more efficient use of a site with the potential for reduced construction costs, increased property values, and greater revenue generation from the additional space made available.

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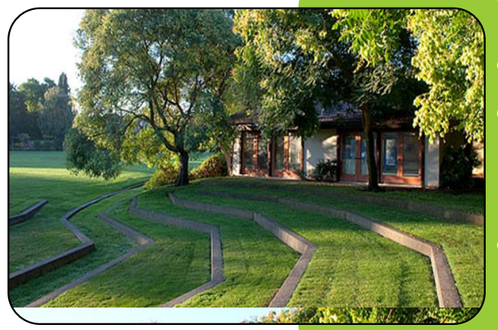
Cost Savings for Low-Density Residential Green Stormwater Management

Boulder Hills Development

- Pelham, NH
- Porous asphalt instead of conventional pavement
- Saved $50,000 (6%) by avoiding curbing, outlet control structures, large stormwater detention ponds



Village Homes Development

- Davis, CA
- Vegetated swales, rain gardens, open space, narrow streets, clustered lots
- Saved $800 per lot, $192,000 for entire neighborhood compared to conventional development

2nd Avenue Neighborhood

- Seattle, WA
- Bioswales, added vegetation, wetlands, reduced impervious area
- Saved $217,255 (25%) compared to conventional retrofits

Gap Creek Subdivision

- Sherwood, AR
- Preserved natural drainage areas, traffic-calming circles, reduced street width
- Saved $4,800 per lot, $678,500 (15%) total compared to conventional development

Auburn Hills Subdivision

- Racine, WI
- 40% of site preserved as open space with wetlands, green space, added open swales, bioretention
- Saved $761,396 compared to conventional development

Downspout Disconnection Program

- Portland, OR
- City offers financial incentives for disconnections ($13-$53 per downspout)
- Estimated reduction = 1 billion gallons of stormwater annually, $250 million reduction in construction for underground pipes citywide (based on 44,000 homeowners participating)

OPTIONS FOR GREENING RALEIGH

Medium-Density Residential Development Stormwater Management

March 2016

Bioretention areas, or rain gardens, are structural stormwater controls that capture and temporarily store or infiltrate stormwater runoff using soils and vegetation in landscaped areas to reduce the volume and improve the quality of runoff.

Rain barrels and cisterns harvest rainwater from rooftops temporarily storing water for uses such as irrigation, washing vehicles, washing laundry, and flushing toilets reducing the volume and improving the quality of runoff and delaying the peak flow.

Bioretention areas located between the curb and sidewalk can treat runoff from the street or adjacent parcel.

ermeable pavement in the parking lanes allows street runoff to infiltrate, reducing the volume and improving water quality, while providing a structurally stable parking surface.

ownspout disconnection can reduce runoff volumes by directing rooftop runoff onto vegetated areas where it can infiltrate rather than being collected in a drainage system.

ermeable sidewalks reduce the volume of runoff by allowing infiltration while maintaining structural stability for pedestrians.

Bioretention located in the right-of-way can treat runoff from the street or rooftops.

ermeable pavement in driveway allows runoff to infiltrate, reducing runoff volume and improving water quality, while providing a structurally stable surface for parking and reducing the overall impervious area.

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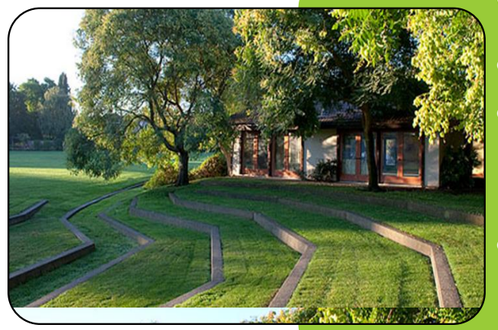

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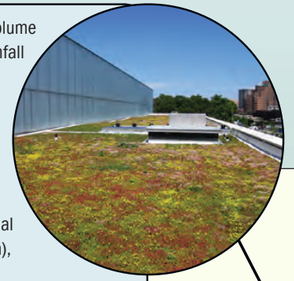
OPTIONS FOR GREENING RALEIGH

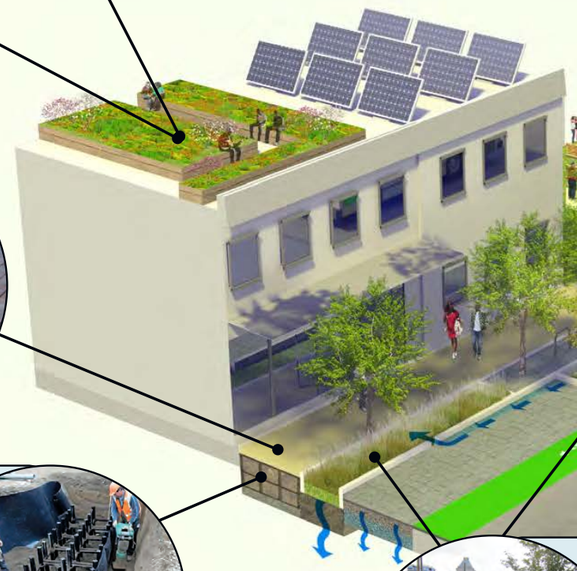
High-Density Residential Development Stormwater Management

March 2016

Green roofs reduce runoff volume and rates by intercepting rainfall in a layer of rooftop growing media that is typically six inches (extensive) or deeper (intensive). Green roofs offer an array of benefits, including extended roof lifespan (due to additional sealing, liners, and insulation), improved building insulation and energy use, reduction of urban heat island effects, opportunities for recreation and rooftop gardening, noise attenuation, air quality improvement, bird and insect habitat, and improved aesthetics.



Urban agriculture is the cultivation, processing, marketing, and distribution of food in urbanized areas. Research regarding soil and water interactions with ecologically-based food production systems indicates that large-scale implementation of urban agriculture can help restore urban hydrology and water quality.

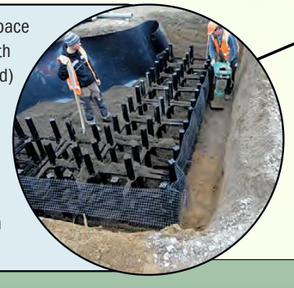


Cisterns harvest rainwater from rooftops and temporarily store water for uses such as irrigation, washing vehicles, washing laundry, and flushing toilets.

Permeable pavement in the parking lane allows rain that falls on the parking lane and the street to infiltrate, reducing the volume and improving water quality, while providing a structurally stable parking surface.

Permeable pavement sidewalks allow rain that falls on the sidewalk and, potentially, the rooftops to infiltrate, reducing the volume and improving water quality, while providing a structurally stable surface.

Suspended pavement maintains void space underneath paved areas that is filled with high-quality soil media (often engineered) and prevents compaction in heavily paved environments allowing for treatment below the surface to reduce the volume and improve the quality of runoff. Suspended pavements are ideal for urban areas and promote tree health by keeping soils loose.



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Pervious plazas. Incorporating permeable pavement in plazas, sidewalks, or open space area can reduce impervious area and provide additional opportunities for treatment and infiltrating stormwater runoff.

Green Infrastructure practices use vegetation, soils, and natural processes to manage stormwater runoff by mimicking nature to absorb and store water. Integrating these practices into a site can reduce the area required for conventional stormwater management by incorporating treatment within landscaping features and surfaces that would otherwise be impervious. This can be a cost-effective approach to treating stormwater by making more efficient use of a site with the potential for reduced construction costs, increased property values, and greater revenue generation from the additional space made available.

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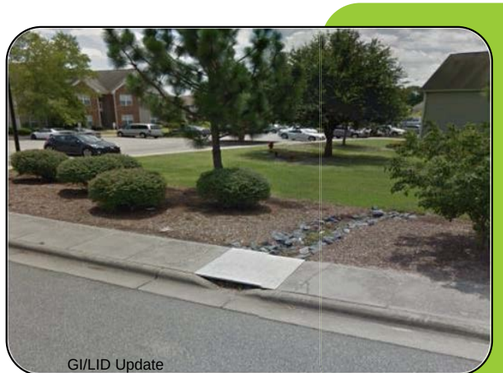
Cost Savings for High-Density Residential Green Stormwater Management

Bronx River Houses

- New York, NY
- Blue and green roofs, rain gardens, perforated pipes, subsurface stormwater chambers
- NYC Green Infrastructure Plan expected to save $2.4 billion in avoided conventional stormwater infrastructure construction

Panther Hollow (Study, not implemented)

- Pittsburgh, PA
- Analysis of green roof cost-saving potential for high-density residential: $260/year/roof saved in conventional stormwater drainage infrastructure



Poplar Street Apartments

- Aberdeen, NC
- 270-unit apartment complex
- Bioretention, channels, swales, stormwater basins
- Saved $175,000 (72%) compared to conventional development

The Natural Resources Defense Council (NRDC) estimates that, using green roofs, strategic tree planting, bioswales, and rain gardens can save $43,500/year for a single building (study assumes 34,000 square feet and 4 stories). This includes: energy cost reduction, tax credits, avoided conventional roof replacement, increased property values, increased rental income, and stormwater fee reduction.

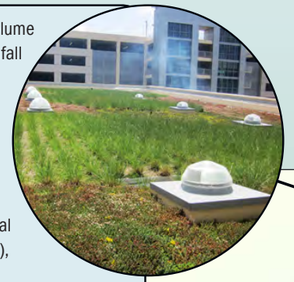
Silver Creek Watershed Area

- Toledo, OH
- Highly developed downtown area, subject to flooding
- Blue roofs, bioswales, permeable pavement
- Estimated benefits, including reduced flooding, exceeding $39,500 annually

OPTIONS FOR GREENING RALEIGH

Mixed-Use Development Stormwater Management

March 2016



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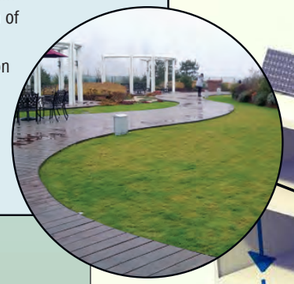

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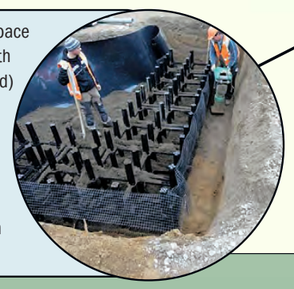
Permeable pavement in the parking lane allows rain that falls on the parking lane and the street to infiltrate, reducing the volume and improving water quality, while providing a structurally stable parking surface.

Cisterns harvest rainwater from rooftops and temporarily store water for uses such as irrigation, washing vehicles, washing laundry, and flushing toilets. Cisterns in highly impervious areas can be installed in parking garages or under buildings and can store a significant amount of water.



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Cost Savings for Mixed-Use Development Green Stormwater Management

Mill Creek

- Kane County, IL
- 1,500 acre mixed-use community with conservation design principles. 45% open space reduces stormwater costs and increases natural beauty.
- Saved $3,411 per lot (27%)

Green Downtown Area

- West Union, IA
- Implementing permeable pavers rather than traditional pavement results in long-term cost savings
- Estimated cumulative savings of a 57-year period of about $2.5 million compared to traditional pavement options with typical maintenance

Capitol Region Watershed District

- St. Paul, MN
- Rain gardens, stormwater planters, infiltration trenches, tree trenches
- Estimated $500,000 saved (20%) compared to conventional stormwater drainage infrastructure

Panther Hollow (Study, not implemented)

- Pittsburgh, PA
- Area is 9.6% commercial, 30% high density residential, 60.4% low density residential
- Estimated $295/year saved in stormwater drainage costs per green roof

City Sidewalks

- Olympia, WA
- City-wide sidewalk analysis determined traditional sidewalks costs $101 per square yard and pervious sidewalks cost $54 per square yard
- Considered construction and long term maintenance costs and the cost for conventional stormwater management required with traditional sidewalks.

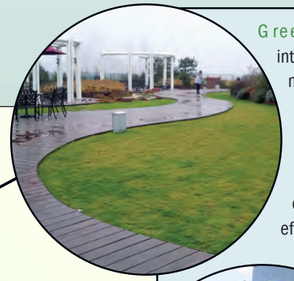
OPTIONS FOR GREENING RALEIGH

Commercial Development Stormwater Management

March 2016

Permeable pavement in the parking stalls allows runoff from the parking lot to infiltrate, reducing the volume and improving water quality, while providing a structurally stable parking surface.

Pervious plazas incorporating permeable pavement in plazas, sidewalks, or open space area can reduce impervious area and provide additional opportunities for treatment and infiltrating stormwater runoff.



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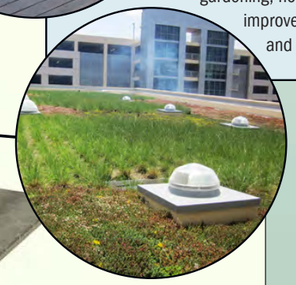
Subsurface storage can be an option on sites were space is a constraint. Below ground systems can be configured to store water for use on site or for treatment through infiltration.



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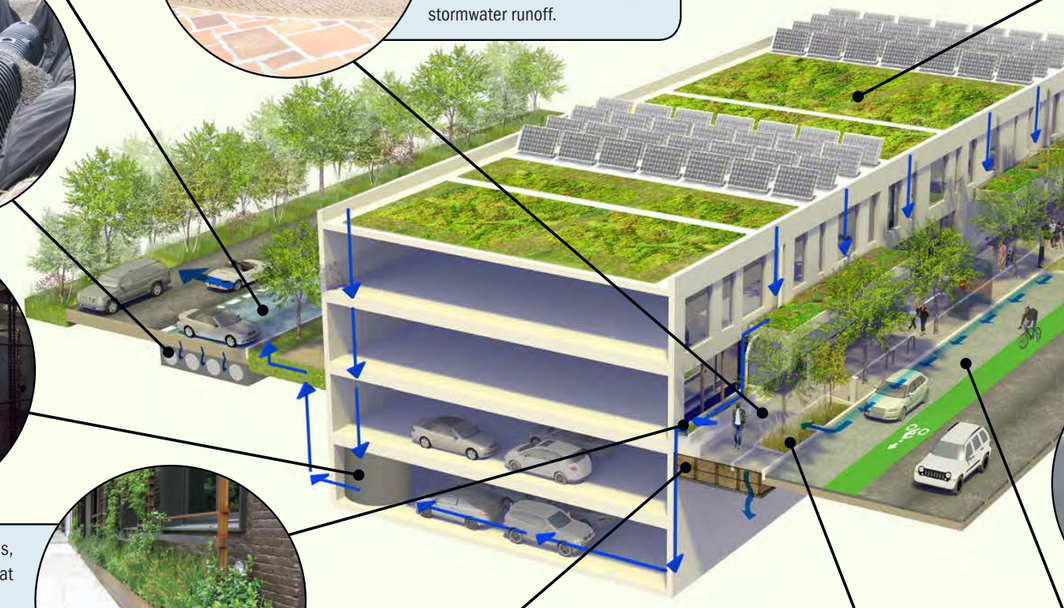

Planter boxes use bioretention functions, including filtration and plant uptake, to treat runoff directly adjacent to structures and foundations without impacting the structural stability of surrounding infrastructure.

Curb bump out bioretention areas can be integrated into traffic calming measures to treat stormwater runoff from the street and meet landscaping requirements.

Suspended pavement maintains void space underneath paved areas that is filled with high-quality soil media (often engineered) and prevents compaction in heavily paved environments allowing for treatment below the surface to reduce the volume and improve the quality of runoff. Suspended pavements are ideal for urban areas and promote tree health by keeping soils loose.

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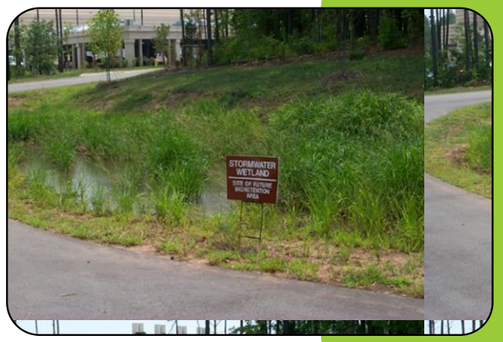
Cost Savings for Commercial Development Green Stormwater Management



US EPA Building

- RTP, NC
- Grassy swales, water quality ponds, bioretention, preserved natural areas, 100-ft lake buffer established
- Saved $500,000 by avoiding curb and gutter and oil-grit separators

Greenland Meadows Retail

- Greenland, NH
- 4.5 acres of porous asphalt, catch basins, sand filter, sub-surface crushed stone reservoir
- Saved $930,000 compared to conventional stormwater management

Vancouver Island Tech Park

- Saanich, British Columbia
- Constructed wetlands, grassy swales and open channels, ponds, permeable pavement, native plants
- Saved $530,000 compared to conventional stormwater management

Tellabs Corporate Campus

- Naperville, IL
  - 330,000 sq ft office space
  - Preserved natural wetlands and drainage, bioswales
  - Saved $461,510 (14%) compared to conventional stormwater retrofits

Oregon Museum of Science and Industry

- Portland, OR
- 6-acre parking lot retrofit with vegetation and bioswales
- Saved $78,000 compared to conventional stormwater management

City Hall, Bloedel Donovan Park

- Bellingham, WA
- Parking lot rain garden retrofits. City Hall converted 5% of parking lot, and Park converted 550 square feet to rain gardens
- Saved $22,000 (80%) and $40,000 (76%) respectively

TETRA TECH

Advancing GI/LID in Raleigh

Presentation to the Raleigh
City Council Work Session

May 10, 2016

Advancing GI/LID
5 Key Characteristics

- Voluntary ✓
- Educational ✓
- Multi-use ✓
- Multi-benefits ✓
- Incentives ✓

First, what do we mean by GI/LID?

Open space

Compact Development

Green Streets

Green Parking

On-site green BMPs

Key Features of GI/LID and Their Overlap

LID

Land development process

- Preserve open space
- Reduce impervious area
- On-site stormwater controls that mimic nature

Goal: Mimic predevelopment hydrology on-site

Green on-site stormwater management practices that mimic nature & provide multiple site amenities

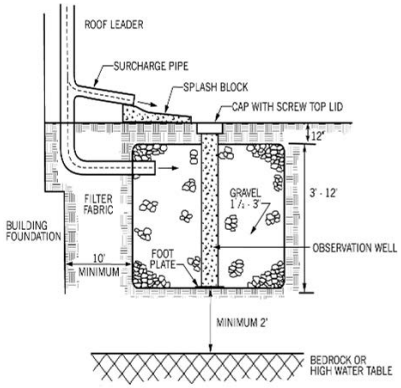
GI

Collection of site's landscape features that help manage stormwater

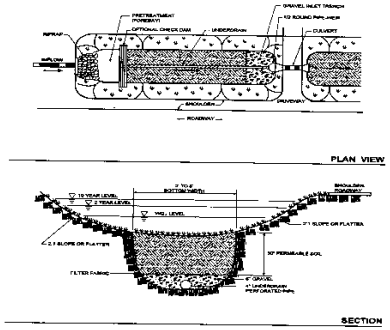
- Natural areas
- Structural engineered practices that mimic nature

Multi-Use

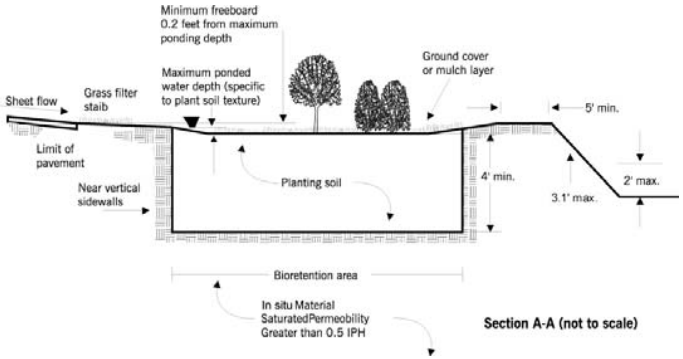
Dry Well



Vegetated Swale



Bioretention Area or Raingarden



Multi-Use Stormwater Approach Can

- Create more developable land onsite (where pond otherwise would be)
- Reduce landscaping costs
- Reduce infrastructure costs
- Provide more site design flexibility

Multi-Benefits

Benefit	Reduces Stormwater Runoff				Increases Available Water Supply	Increases Groundwater Recharge	Reduces Salt Use	Reduces Energy Use	Improves Air Quality	Reduces Atmospheric CO_2	Reduces Urban Heat Island	Improves Community Livability					Improves Habitat	Cultivates Public Education Opportunities
	Reduces Water Treatment Needs	Improves Water Quality	Reduces Grey Infrastructure Needs	Reduces Flooding								Improves Aesthetics	Increases Recreational Opportunity	Reduces Noise Pollution	Improves Community Cohesion	Urban Agriculture		
Practice																		
Green Roofs	●	●	●	●	○	○	○	●	●	●	●	●	◒	●	◒	◒	●	●
Tree Planting	●	●	●	●	○	◒	○	●	●	●	●	●	●	●	●	◒	●	●
Bioretention & Infiltration	●	●	●	●	◒	◒	○	○	●	●	●	●	●	◒	◒	○	●	●
Permeable Pavement	●	●	●	●	○	◒	●	◒	●	●	●	○	○	●	○	○	○	●
Water Harvesting	●	●	●	●	●	◒	○	◒	◒	◒	○	○	○	○	○	○	○	●

● Yes ◒ Maybe ○ No

Source: Center for Neighborhood Technology

Why We're Here – City Council…

- Voiced strong commitment to promoting GI/LID to help improve health of local streams, lakes, and Neuse River.
- Adopted GI/LID policies as part of City's Strategic Plan and 2030 Comprehensive Plan

GI/LID Consistency with Raleigh Strategic Plan

- Growth & Natural Resources focus area:
  - Improve processes for **regulations, regulatory review, policies, and incentives**
  - Increase…**green spaces** that conserve **natural resources**
  - Evaluate infrastructure projects…identify **sustainability** and cross-agency **partnerships**
  - Build on recommendations of the **GI/LID Task Force**…establish a GI policy for City projects…

GI/LID Consistency with 2030 Comp Plan

Element C – Environmental Protection

Policy EP 2.1: Green Infrastructure

Ensure **protection of Raleigh's unique and significant green infrastructure** – its natural resources, landscapes, and ecological systems – through best practices management stewardship and land use regulations.

Policy EP 3.4: Low Impact Systems for Parking

Well maintained pervious pavement or other **low impact systems for parking areas** should be encouraged throughout the City, especially in environmentally sensitive areas and floodplains, as appropriate.

Policy EP 3.8: Low Impact Development

Promote the use of LID techniques to mitigate the impact of stormwater runoff. This includes the use of green roofs, rain gardens, cisterns, rain barrels, and on-site wastewater reuse systems in urban and suburban landscapes.

What makes a successful GI/LID program?

Policies & Ordinances	Coordinated & Trained Staff	Tools & Incentives	Outreach & Education
• **City policy** • **Revised codes** • Legal representation	• Administration • Standard operating protocols (SOPs): - Development - City property (streets, parks, facilities) - Utilities - Emergency services - Solid waste services	• **GI/LID street templates** • **GI/LID factsheets** • **Performance standards** • **Cost-effectiveness tool** • **O&M manual** • **Strategic plan** • **Expedited approval** • **Fees reduction** • **Cost rebate**	• Demonstration projects • Multi-media program • Training and certification

Why We're Here – City Council

Adopted strategic work plan to advance GI/LID

Code Review Work Group

- » Ordinances revisions
- » Incentives
- » Design templates for streets

Implementation Work Group

- » Site planning factsheets
- » O&M guide
- » Cost-effectiveness tool research

Work Group Recommendations for Advancing GI/LID

Advisory Boards and City Council

City Management Comments

How the Pieces Relate to Development

✓ = Supports GI/LID

	New Development	Existing Development
Factsheets	✓	✓
Street templates	✓	✓
Code revisions	✓	
Expedited review	✓	
Cost-Share	✓	✓
O & M	✓	✓

OPTIONS FOR GREENING RALEIGH

Mixed Use Stormwater Management

Green roofs reduce runoff volume and rates by intercepting rainfall in a layer of rooftop growing media that is typically six inches (extensive) or deeper (intensive). Green roofs offer an array of benefits, including extended roof lifespan (due to additional sealing, liners, and insulation), improved building insulation and energy use, reduction of urban heat island effects, opportunities for recreation and rooftop gardening, noise attenuation, air quality improvement, bird and insect habitat, and improved aesthetics.

Urban agriculture is the cultivation, processing, marketing, and distribution of food in urbanized areas. Research regarding soil and water interactions with ecologically-based food production systems indicates that large-scale implementation of urban agriculture can help restore urban hydrology and water quality.

Permeable pavement in the parking lane allows rain that falls on the parking lane and the street to infiltrate, reducing the volume and improving water quality, while providing a structurally stable parking surface.

Cisterns harvest rainwater from rooftops and temporarily store water for uses such as irrigation, washing vehicles, washing laundry, and flushing toilets. Cisterns in highly impervious areas can be installed in parking garages or under buildings and can store a significant amount of water.

Suspended pavement maintains void space underneath paved areas that is filled with high-quality soil media (often engineered) and prevents compaction in heavily paved environments allowing for treatment below the surface to reduce the volume and improve the quality of runoff. Suspended pavements are ideal for urban areas and promote tree health by keeping soils loose.

Permeable pavement sidewalks allow rain that falls on the sidewalk and, potentially, the rooftops to infiltrate, reducing the volume and improving water quality, while providing a structurally stable surface.

Bioretention areas, or rain gardens, are structural stormwater controls that capture and temporarily store or infiltrate stormwater runoff using soils and vegetation in landscaped areas to reduce the volume and improve the quality of runoff. Street trees can be incorporated into bioretention areas to maximize stormwater treatment and meet landscaping requirements.

Green Infrastructure practices use vegetation, soils, and natural processes to manage stormwater runoff by mimicking nature to absorb and store water. Integrating these practices into a site can reduce the area required for conventional stormwater management by incorporating treatment within landscaping features and surfaces that would otherwise be impervious. This can be a cost-effective approach to treating stormwater by making more efficient use of a site with the potential for reduced construction costs, increased property values, and greater revenue generation from the additional space made available.

For more information, visit https://www.raleighnc.gov, www.ces.ncsu.edu/weco/lidguidebook or contact RaleighStormwater@raleighnc.gov.

This fact sheet is intended to demonstrate multiple options for treating stormwater runoff on a site. Site designs must meet the requirement of the City of Raleigh and are subject to regulatory review.

Example Factsheet Back

Cost Savings for Mixed-Use Development Green Stormwater Management

Mill Creek

- Kane County, IL
- 1,500 acre mixed-use community with conservation design principles. 45% open space reduces stormwater costs and increases natural beauty.
- Saved $3,411 per lot (27%)

Green Downtown Area

- West Union, IA
- Implementing permeable pavers rather than traditional pavement results in long-term cost savings
- Estimated cumulative savings of a 57-year period of about $2.5 million compared to traditional pavement options with typical maintenance

Capitol Region Watershed District

- St. Paul, MN
- Rain gardens, stormwater planters, infiltration trenches, tree trenches
- Estimated $500,000 saved (20%) compared to conventional stormwater drainage infrastructure

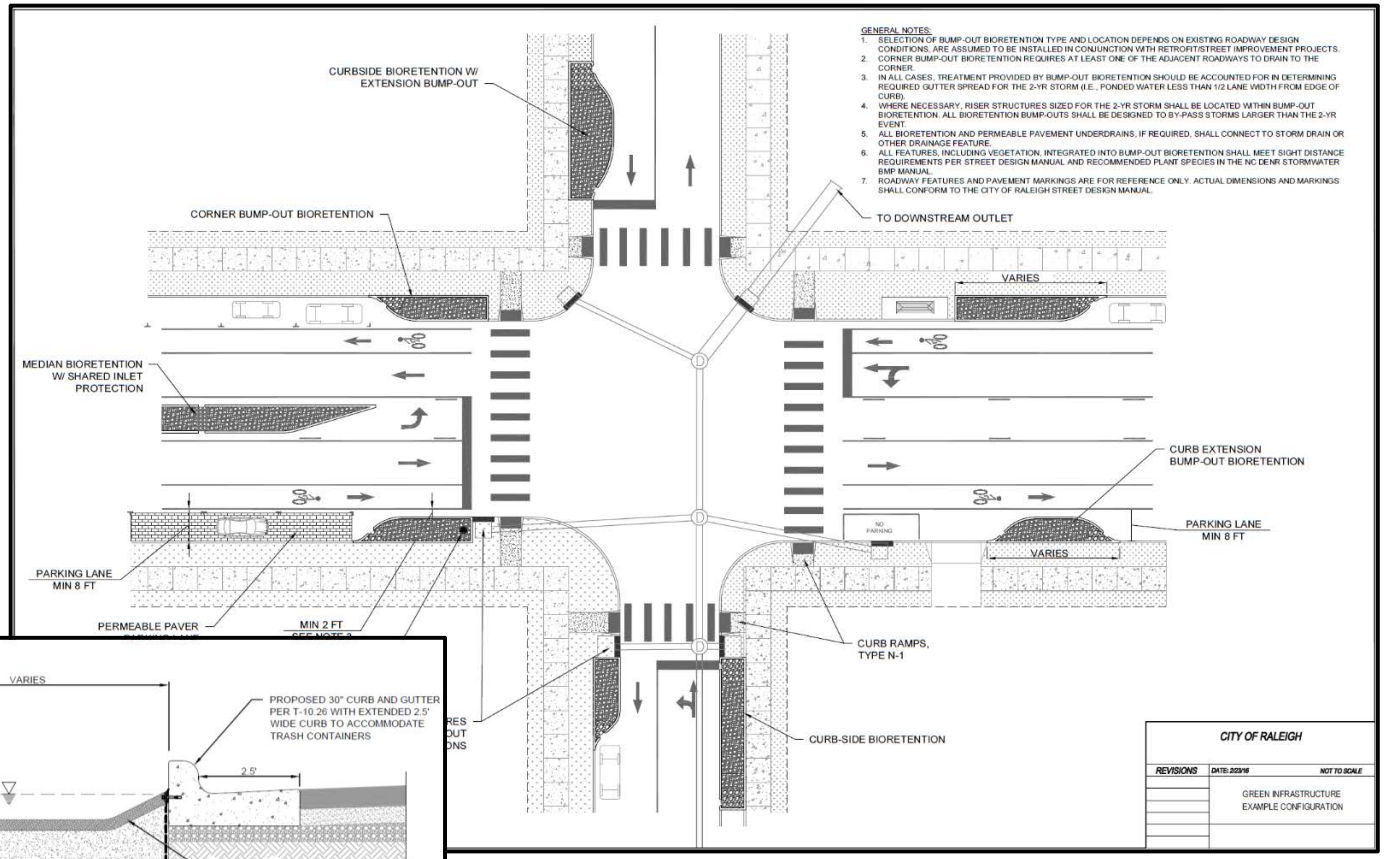
Panther Hollow (Study, not implemented)

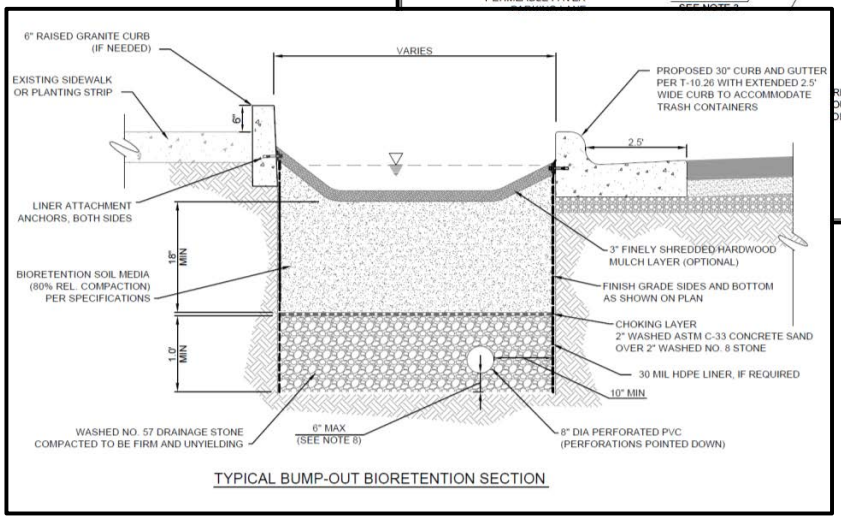
- Pittsburgh, PA
- Area is 9.6% commercial, 30% high density residential, 60.4% low density residential
- Estimated $295/year saved in stormwater drainage costs per green roof

City Sidewalks

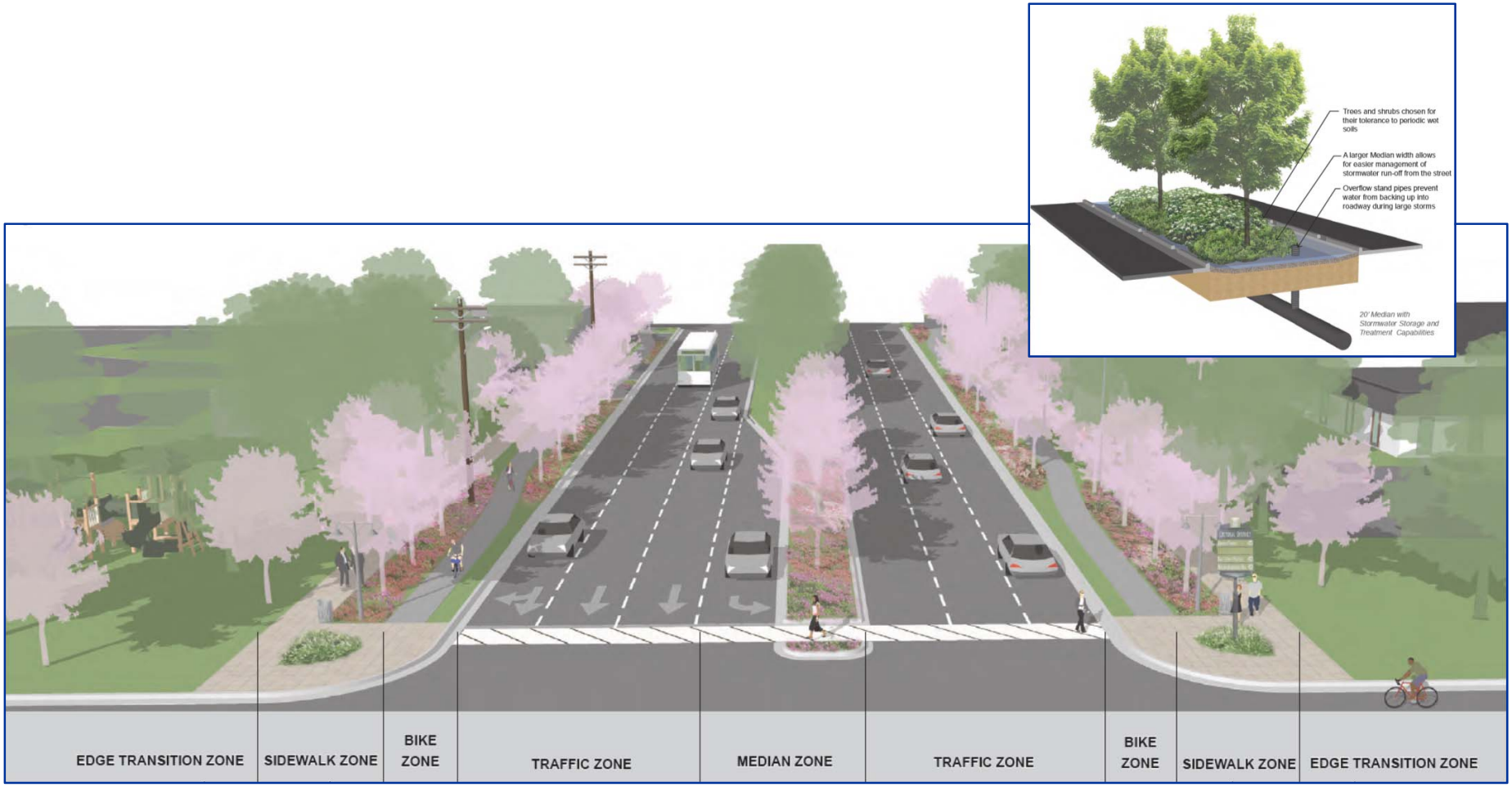
- Olympia, WA
- City-wide sidewalk analysis determined traditional sidewalks costs $101 per square yard and pervious sidewalks cost $54 per square yard
- Considered construction and long term maintenance costs and the cost for conventional stormwater management required with traditional sidewalks.

Using GI/LID in 4 Street Types





Raleigh is already using GI/LID in some plans…



Source: Six Forks Draft Plan

Most Significant Recommended Code Revisions

- Allowing GI/LID to help meet site landscaping requirements
- More flexibility in site design to accommodate GI/LID
- Allowing developers to install GI/LID in the ROW to manage street runoff and get stormwater credit
- Removing language that requires or encourages wet ponds as preferred method

Expedited Review: Green Raleigh Review

- Tier 1:GI/LID for Stormwater Runoff Volume Match
- Tier 2: Tier 1 plus proposed use of energy efficient building practice
- Benefits to applicant:
  - Assigned contact
  - Access to Green Team
  - Certain turnaround timing for review/approval
  - Fee waiver

Tier 1 GI/LID for Stormwater Volume Match

- Preliminary Site Plan Approval Process
  - » Step 1: Presubmittal Conference
  - » Step 2: E-Submittal

    10 day interval max
  - » Step 3: Face to Face Green Team Review on Green Wednesday

    5 day interval max
  - » Step 4: Staff approval

Example: For Preliminary Site Plan, applicant proposes use of permeable paving, planter boxes, underground detention, and green roof to match predevelopment stormwater volume runoff for the 90th percentile storm event.

Tier 2 Energy Efficient Building Practice

- Building Permit Approval Process
  - » Step 1: Presubmittal Conference
  - » Step 2: E-Submittal

    10 day interval max
  - » Step 3: Face to Face Green Team Review on Green Wednesday

    5 day interval max
  - » Step 4: Permit Issuance

Example: For building permit, applicant, applicant has first obtained a Site Plan approval via Tier 1 AND proposes to use solar panels.

Continue Cost-Share Program

- Up to 90% City cost share for GI/LID exceeding requirements in the water supply watersheds and impaired watersheds.
- Up to 75% cost share for GI/LID exceeding requirements in other areas.
- Free site assessment
- Advertising program

Operations and Maintenance

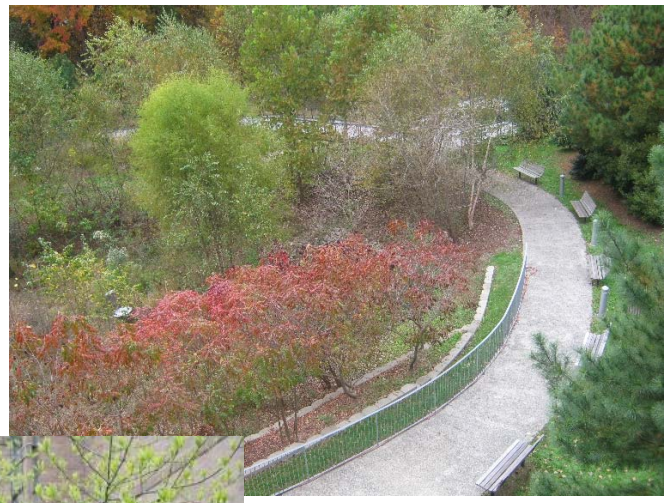
- For privately owned BMPs
  - » Continue to be maintained by property owner
  - » Continue to require long-term maintenance agreement

Operations and Maintenance

- For City-owned BMPs
  - » Stormwater Management Division would assume full responsibility
  - » Assign maintenance tasks cross-departmentally to work teams with appropriate expertise Stormwater Inspection Section would conduct annual inspections

Next Steps

- City Council Work Session (today)
- City Council Meeting (May/June)
- Text Change Process & City Council Public Hearing(TBD)



Next Steps – Path Forward

- Council Action
- Continue Building Capacity
  - » SOPs and Training
  - » Cost-Benefit Tool Development
  - » Outreach program
  - » Performance Tracking

Cost Input **Site 1**

Quantites (LF = linear feet SF = square feet CF = cubic feet)

Site Element	Input Quantity	User-Defined Unit Cost ($)
Bioretention (SF)		$20,000.00
Permeable Pavement (SF)	20,500	
Greenroof (SF)	9,500	
Grassed Swale (LF)	4,500	
Rainwater Harvesting (CF)	6,000	

Info | Project Input | Cost Input | Co-Benefit Input | Report

MOORE SQUARE PARK IMPLEMENTATION

for the City of Raleigh

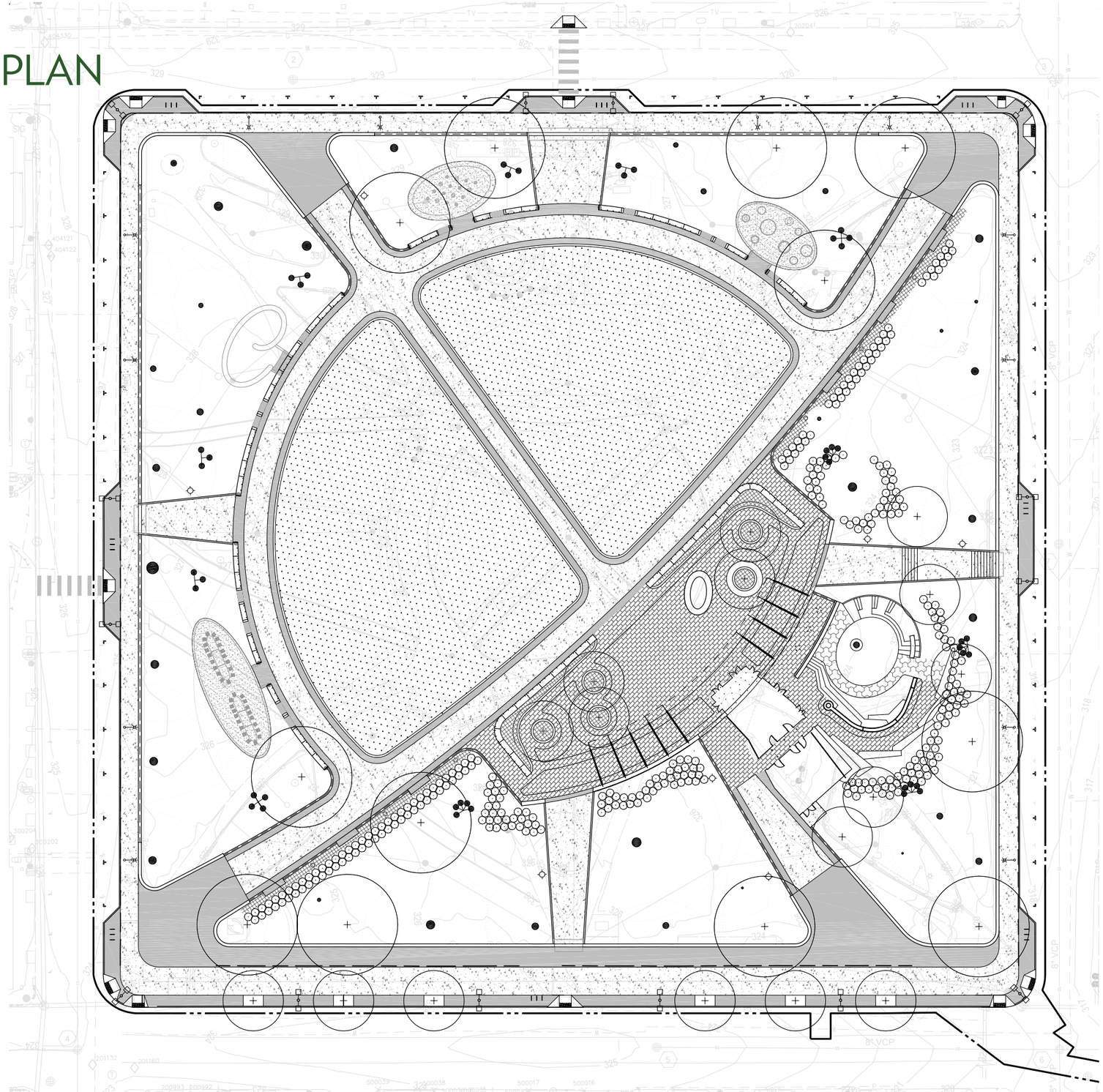
May, 2016

Agenda

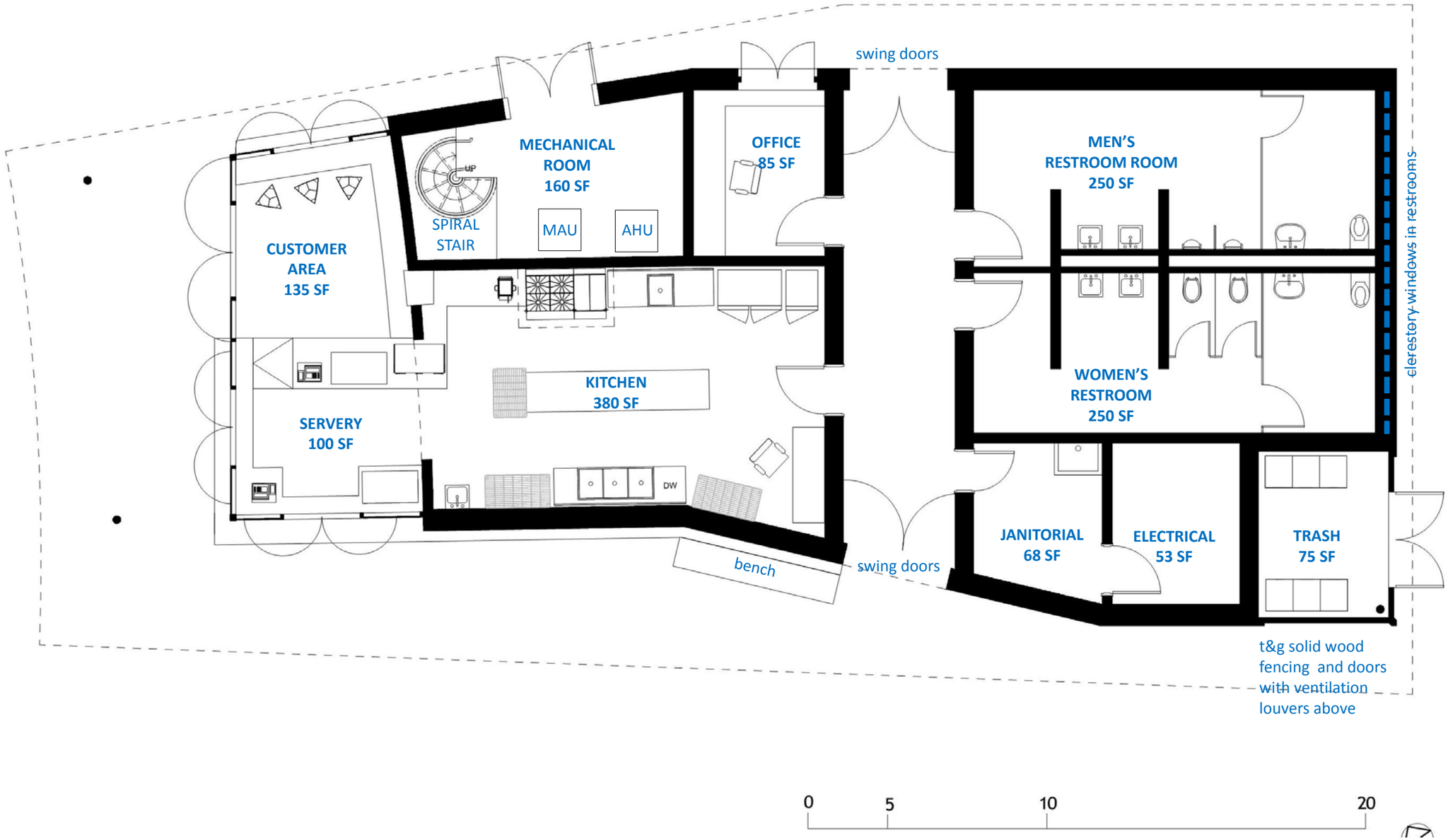
- Design Updates
- Schedule Update
- Cafe Vendor Selection Update

DESIGN UPDATES

LATEST SITE PLAN



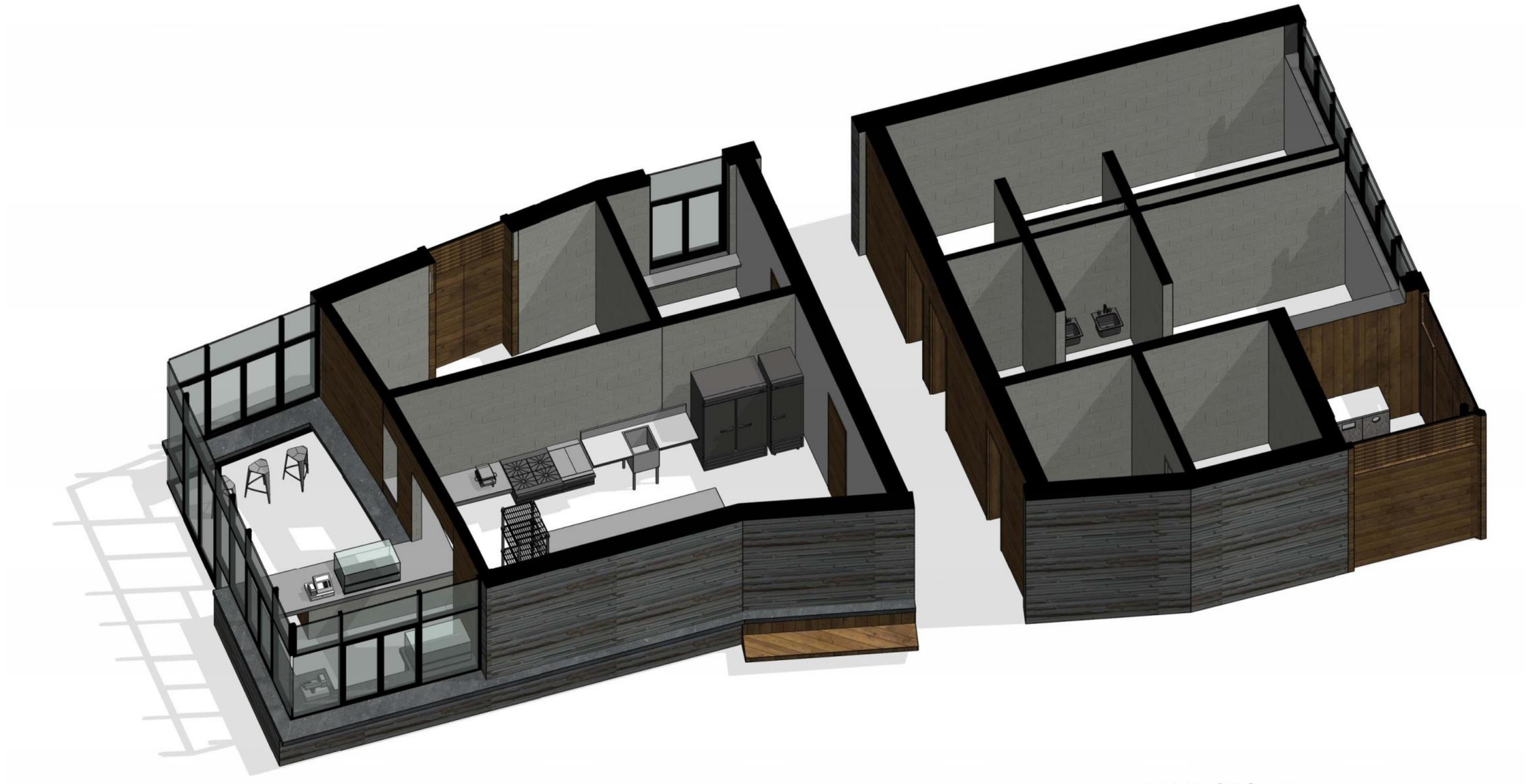
ARCHITECTURE



floor plan

ARCHITECTURE

ARCHITECTURE



exterior materials

- BLUE STONE
- NATURAL OILED WOOD
- BLACK PTD ALUM & STEEL
- INSULATED GLASS

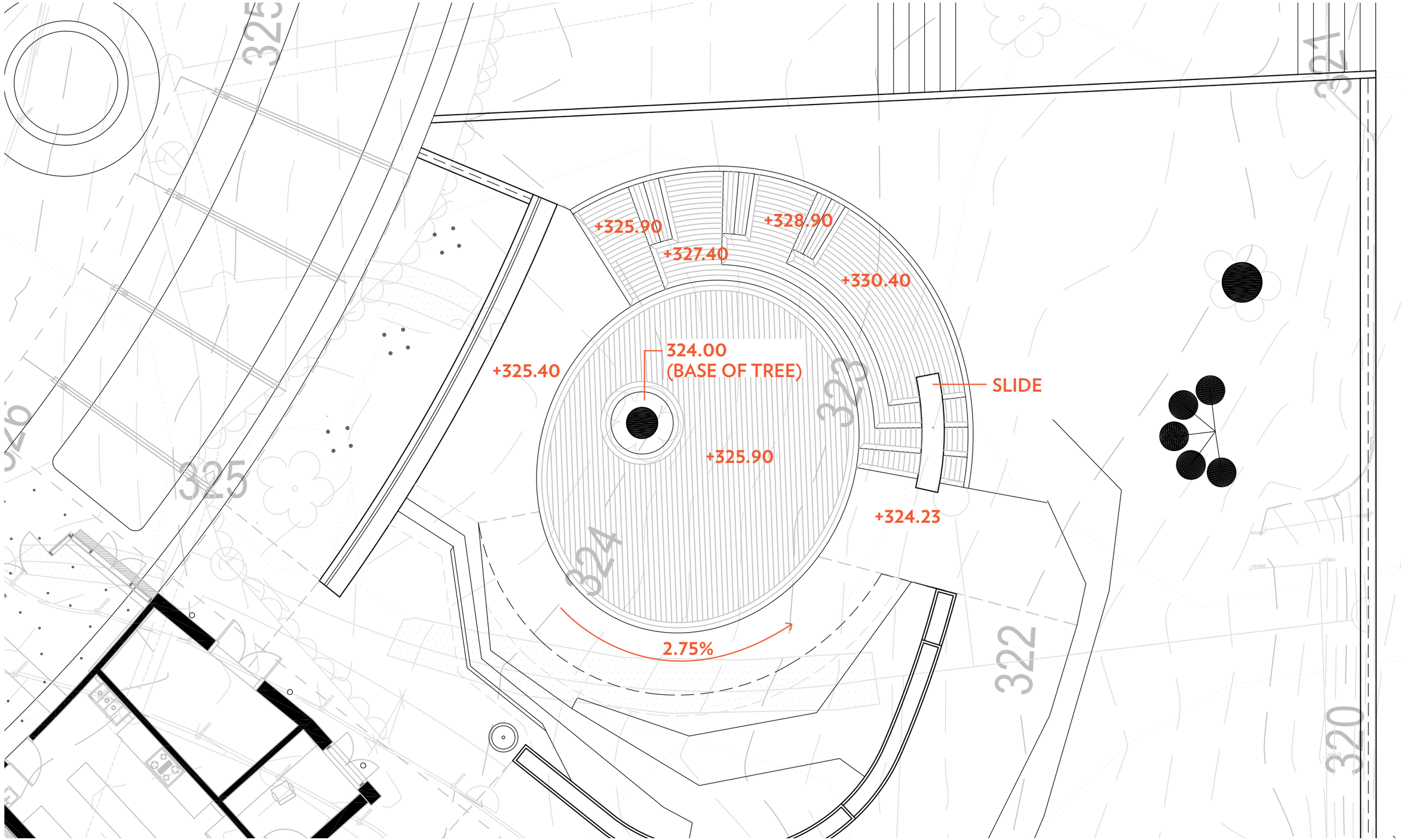
ARCHITECTURE

ARCHITECTURE

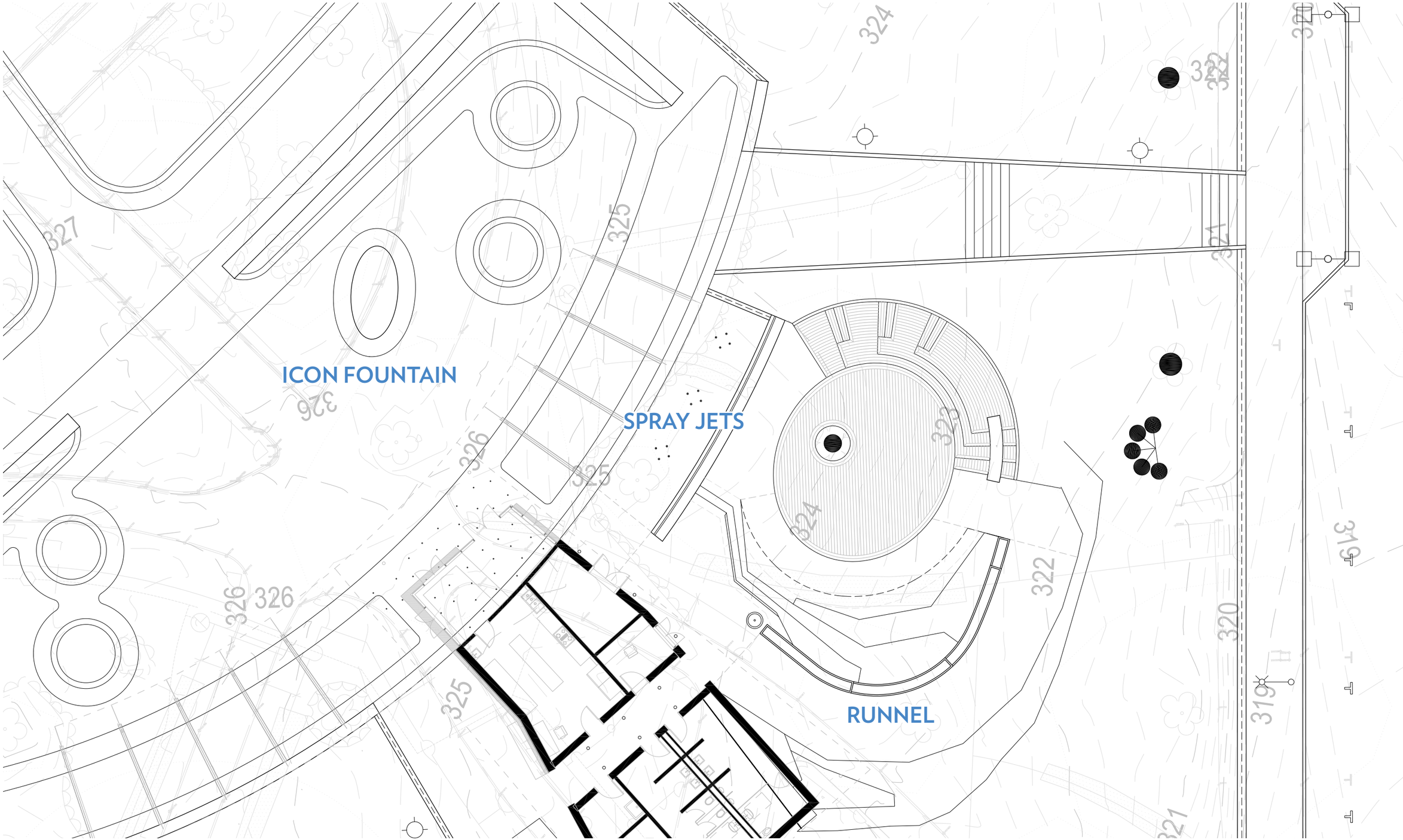
PLAY AREA

PLAY AREA

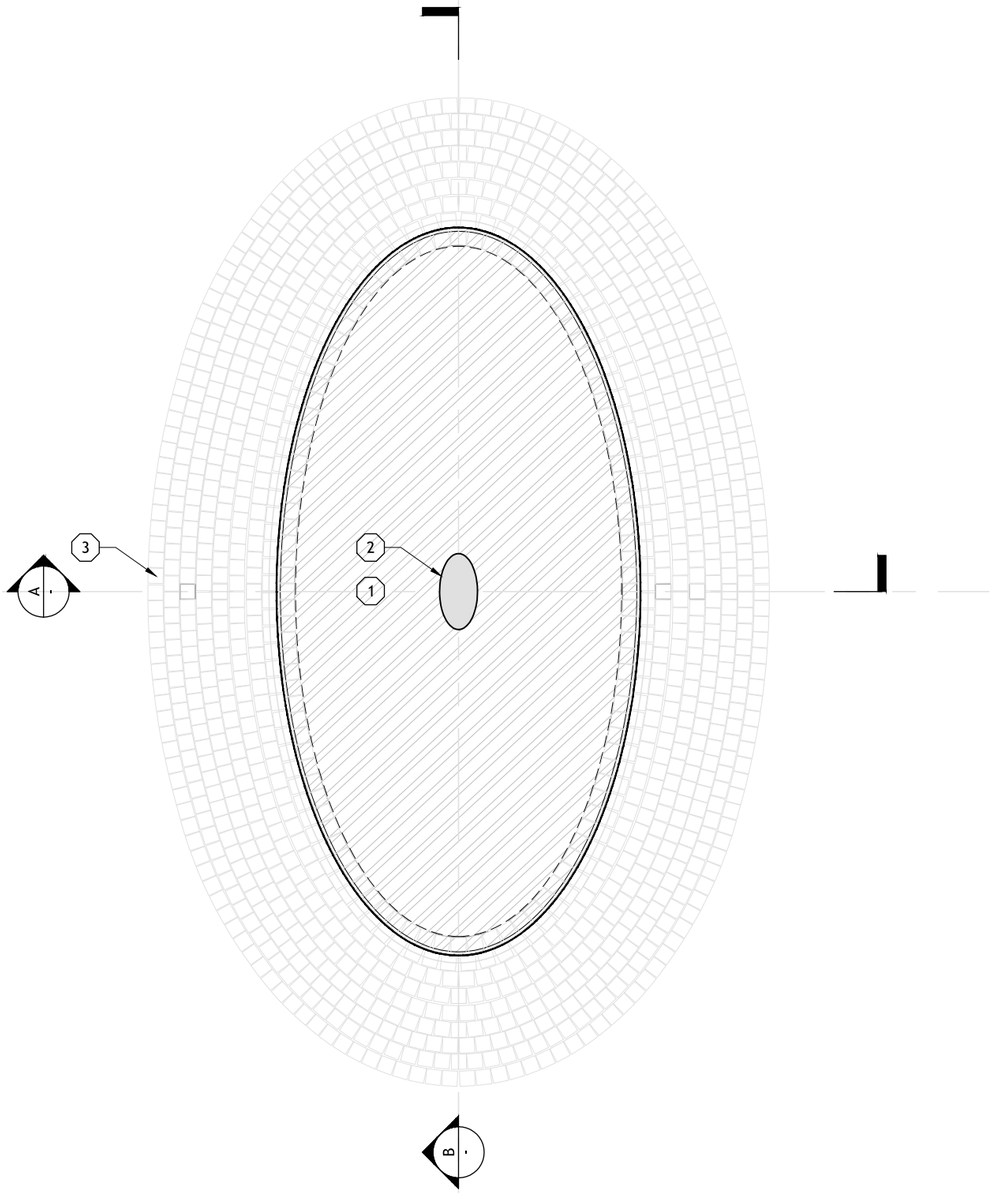
PLAY AREA: SYNTHETIC WOOD STRUCTURE



WATER FEATURES



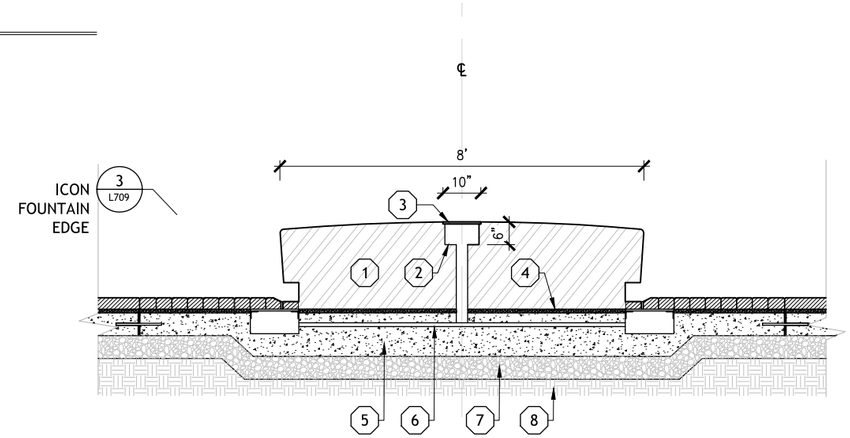
WATER FEATURES: ICON FOUNTAIN



4 ICON FOUNTAIN- PLAN ENLARGEMENT
SCALE: 1/2"=1'-0"

LEGEND

1. GRANITE ICON FOUNTAIN
2. WATER SOURCE
3. WATER SOURCE COVER
4. MORTAR SETTING BED
5. CONCRETE BASE
6. _
7. AGGREGATE BASE (THICKNESS PER GEOTECH RECOMMENDATION)
8. UNDISTURBED OR COMPACTED SUBBASE



2 ICON FOUNTAIN- SECTION B
SCALE: 1/2"=1'-0"

LEGEND

1. GRANITE ICON FOUNTAIN
2. WATER SOURCE
3. WATER SOURCE COVER
4. MORTAR SETTING BED
5. CONCRETE BASE
6. _
7. AGGREGATE BASE (THICKNESS PER GEOTECH RECOMMENDATION)
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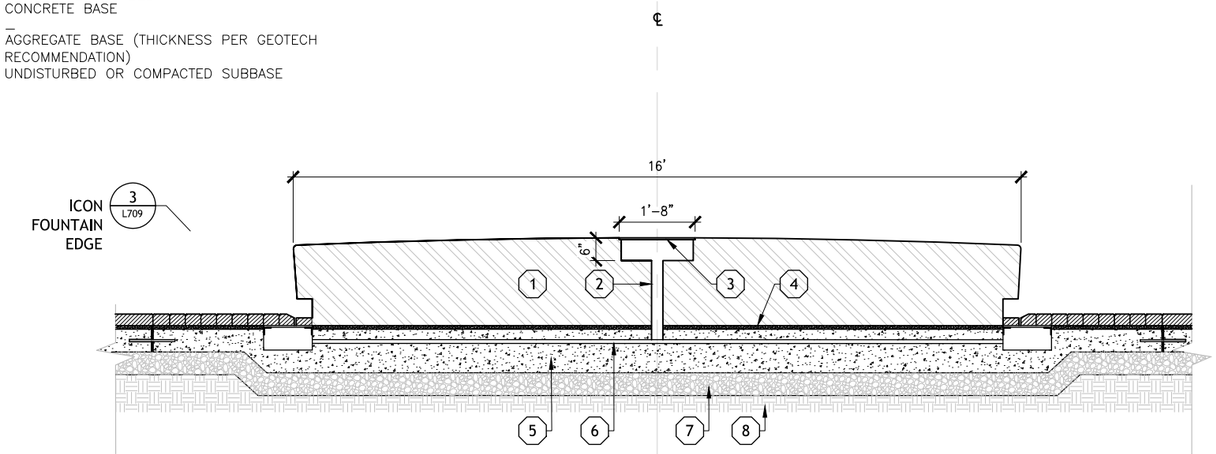
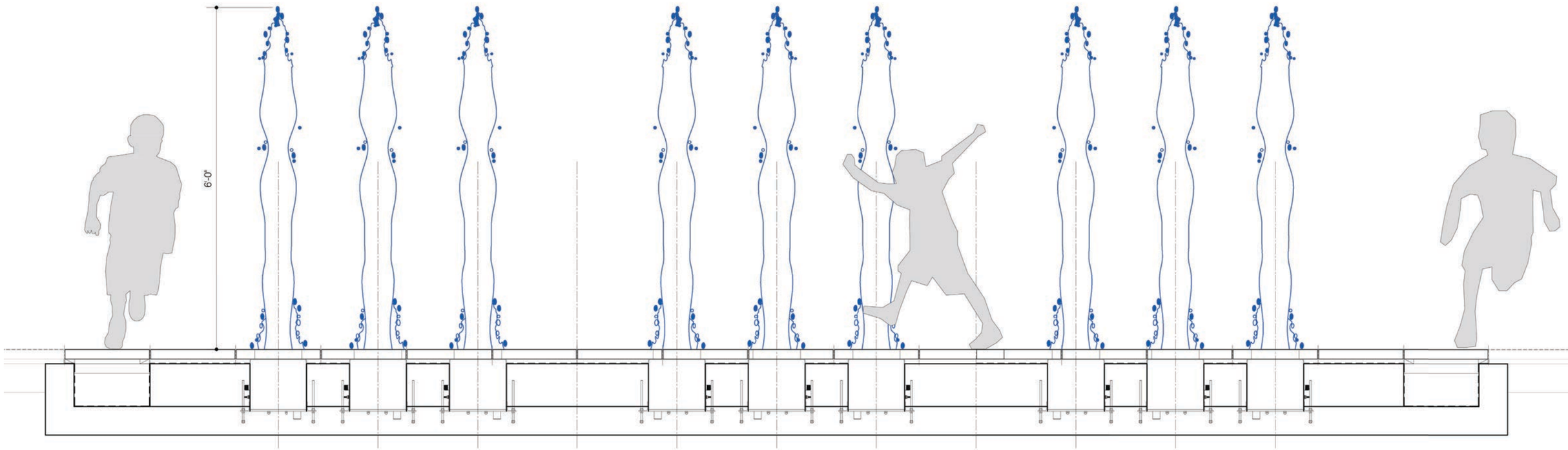


1 ICON FOUNTAN- SECTION A
SCALE: 1/2"=1'-0"

WATER FEATURES: SPRAY JETS



1 Section

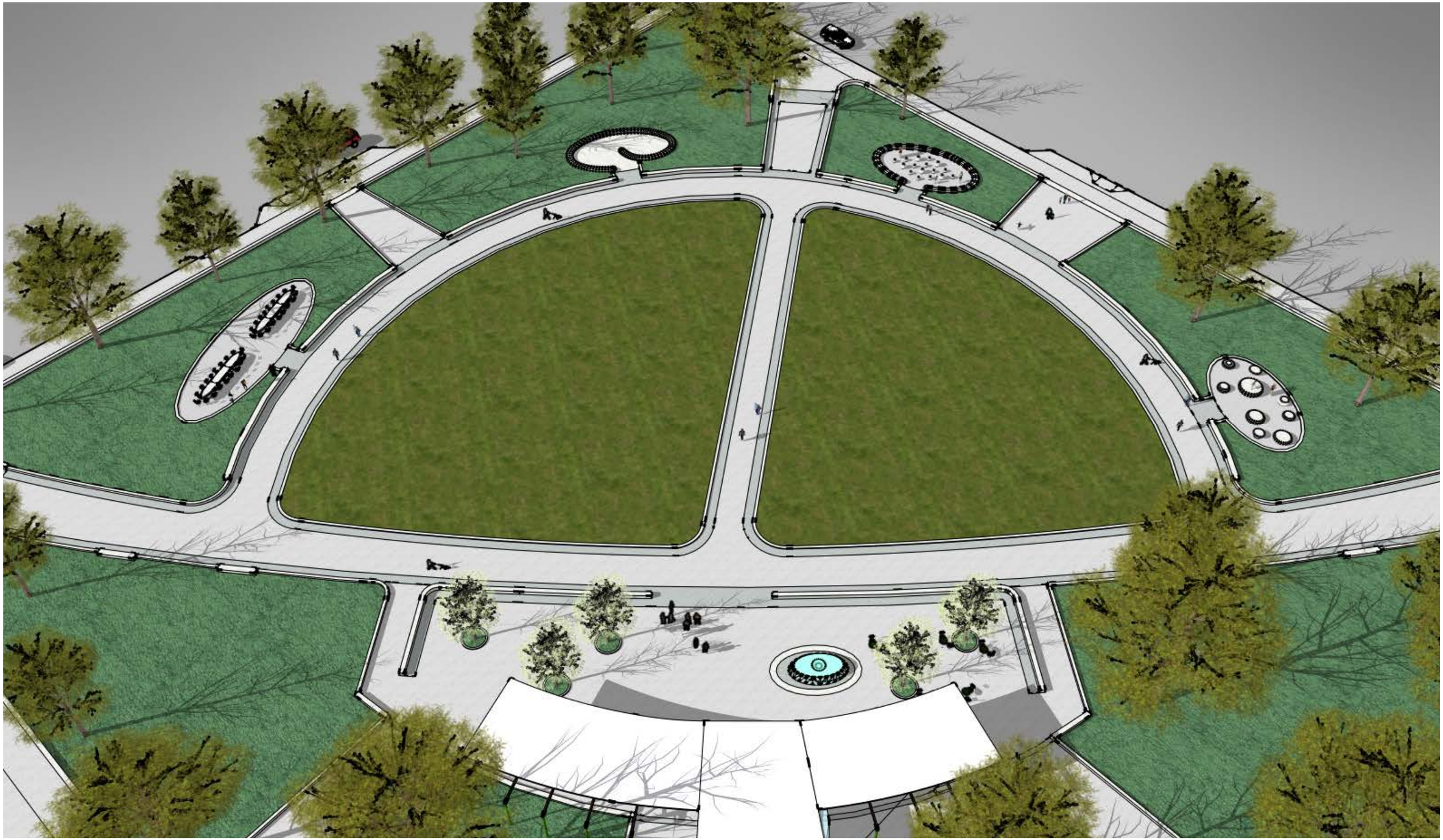
Scale 1" = 1'-0"

0 1' 5

WATER FEATURES: SPRAY JETS

Dynamite Blast illuminated spray nozzle

PUBLIC ART



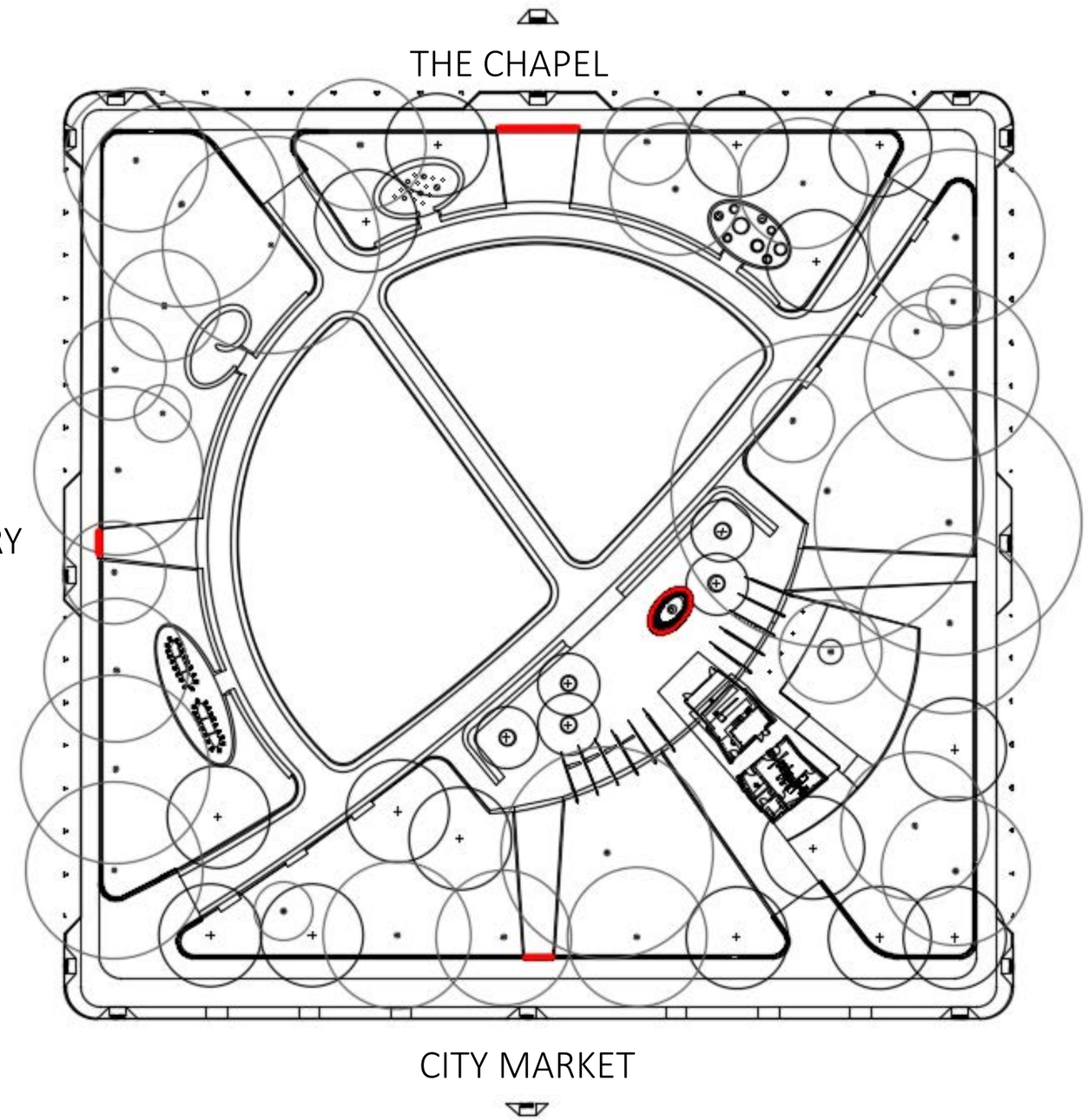
PUBLIC ART

PUBLIC ART

PUBLIC ART

SOUTH PARK HERITAGE WALK

“THRESHOLDS”



SOUTH PARK HERITAGE WALK: THRESHOLD

SOUTH PARK HERITAGE WALK: THRESHOLD


SCHEDULE UPDATE

CURRENT SCHEDULE

- Complete Construction Documents - End of June
- Pricing - June/July
- Permitting Complete and Mobilization - End of August
- Shovel in Ground - September


VENDOR UPDATE

CAFÉ PAVILION FOOD SERVICE OPERATIONS STATUS

Hosted Café Pavilion Focus Group

- Tuesday, March 8 attended by 30+ individuals and businesses
- Solicited feedback on scope and design
- Incorporated comments/changes as appropriate

Posted RFQ to solicit qualified operators for food service at Moore Square

- Posted March 28th, 2016
- Due April 22nd, 2016
- Received 2 qualified proposals

Café Pavilion Food Operator Interviews scheduled

- Wednesday, May 11th, 2016

Identify Café Pavilion Food Operator Finalist

- Friday, May 27th, 2016
- Notify through City Manager update identified Café finalist
- Secure contract

Synchronize opening with Moore Square Park

- 2017