A Connected Waterway | Restored

Forest Park East Waterways

USGBC - Sustainable SITES
Design Process and Documentation
August 9, 2019
Project Context

ROUND LAKE
OXBOW
JEFFERSON LAKE
BOWL LAKE
Existing Site
### SITES v2 Scorecard Summary

#### 1: SITE CONTEXT

<table>
<thead>
<tr>
<th>No.</th>
<th>Score</th>
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#### 2: PRE-DESIGN ASSESSMENT + PLANNING

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#### 3: SITE DESIGN - WATER

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#### 4: SITE DESIGN - SOIL + VEGETATION

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#### 5: SITE DESIGN - MATERIALS SELECTION

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#### 6: CONSTRUCTION + MAINTENANCE

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<td>CONSTRUCTION P7.7 - Support local economy</td>
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### SITE GOALS

#### SITES GOALS

**Create Regenerative Systems and Foster Resiliency**
- Protect and restore natural resources such as soil, water, and vegetation.
- Encourage biodiversity.
- Enhance landscapes to provide multiple ecosystem services such as cleaning air and water, providing habitat, and storing carbon.
- Mitigate for evolving hazards and natural disasters.
- Plan for monitoring and adaptive management.

**Ensure Future Resource Supply and Mitigate Climate Change**
- Minimize energy consumption and encourage use of low carbon and renewable energy sources.
- Minimize or eliminate greenhouse gas emissions, heavy metals, chemicals, and other pollutants.
- Reduce, reuse, recycle, and upcycle materials and resources.
- Conserve water.
- Increase the capacity of carbon sinks through re-vegetation.

**Transform the Market through Design, Development, and Maintenance Practices**
- Foster leadership in industry and professional practice.
- Use a systems-thinking, integrative and collaborative design approach.
- Use lifecycle analyses to inform the design process.
- Support local economies and sustainability policies.

**Enhance Human Well-Being and Strengthen Community**
- Reconnect humans to nature.
- Improve human health (physical, mental, and spiritual).
- Foster stewardship by providing education that promotes the understanding of natural systems and recognizes the value of landscapes.
- Encourage cultural integrity and promote regional identity.
- Provide opportunities for community involvement and advocacy.
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Architect: AFH Design

1228 S. 8th St.
St. Louis, MO 63104

Hydrodramatics

101 S. 18th Street
Cincinnati, OH 45215
513.203.2674

Project ID#:_______________ Date: __________________

Protect air quality during construction
Protect air quality during landscape maintenance
Recycle organic matter
Minimize pesticide and fertilizer use
Provide optimum site accessibility, safety, and wayfinding
Consistently provide optimum site accessibility, safety, and wayfinding
Support public health and safety
Support and communicate a case study
Support public health and safety awareness and education
Support social connection
Support public health and safety
Provide on-site food production
Minimize exposure to environmental tobacco smoke
Encourage fuel efficient and multi-modal transportation
Support pavin
Reduce urban heat island effects
Conduct a pre-design site assessment
Conserve and use native plants
Use appropriate plants
Manage precipitation on site
Manage precipitation beyond baseline
Engage users and stakeholders
Use an integrative design process
Support responsible extraction of raw materials
Reduce stormwater pollutants
Design functional stormwater features as amenities
Support sustainability in plant production
Support and communicate a case study

Legend

C1.6 VICINITY MAP
PEDESTRIAN SITE
BASIC SERVICES

Graphic Scale: 1" = 180’

Map Scale: 1:5,400 if printed on A portrait (8.5” x 11”) sheet.

290 ft.
737400 737500 737600 737700 737800 737900 738000 738100
Tree Protection, Site Access, Staging

2: PRE-DESIGN ASSESSMENT + PLANNING

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LEGEND
- SITES PROJECT BOUNDARY
- VEGETATION AND SOIL PROTECTION ZONE
- STAGING AREA
PROJECT TEAM

Forest Park Forever, St. Louis Parks & Forestry, City of Saint Louis BPS
Client/Owner/Developer

Prime
Project Management
Landscape Architecture
Environmental Design
Engagement
Operations + Maintenance

MEP Engineering
Geotechnical
Surveying

Environmental Art
Educational Graphics
and Interpretives
Signage

Hydraulic/Water Civil
ADA Accessibility
MSD Coordination
Traffic Coordination

Environmental Consulting
Hydrology/Aquatics
Ecology and Biology
Wetland Delination

Water Features
Fountains
Associated MEP
The Forest Park Master Plan calls “for the preservation and maintenance of its natural resources, environment and wildlife habitat to ensure a sustainable, ecologically sound natural system” and that “Forest Park’s natural beauty, scenic value, and historic and cultural institutions should be the basis for the enjoyment of the park, regardless of future changes in types and levels of park activities and park users.” (page 5)

“The open space spine is based upon the park’s natural and man-made features and follows the old River Des Peres’ water course and line of bluffs in the park” (page 11)

The creation of “a park-wide, linear connected water system as the connective thread that unifies the diverse qualities of the passive open space system” (page 158)

The design recommendations include:

- Water character and spatial features
- Functional requirements
- Water quality controls
- Soil erosion controls
- Shorelines vegetation recommendations confluence areas and filtering marshes
- Check dams and upland water controls structures
- A series of long-term design options and site specific recommendations

Step 3 Completed September 2017
Project Goals

- Link The Waterway System
- Enhance Fishing Habitat and Access
- Improve Water Quality
- Bank Edge Erosion and Stabilization
- Reduce Need for Potable Water
- Increase Biodiversity
- Increase and Promote Accessibility
- Improve Overall Aesthetics
- Provide Opportunities for Passive Recreation
- Improve/ Update Park Infrastructure
- Connect Park Institutions
- Sustainable Maintenance Strategies
- Environmental Art Opportunities
Overall Plan
### 3: SITE DESIGN - WATER

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Possible Points: **23**

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Reduce City Water Input by over **110,000** Gallons Per Day
Water System - Dry Weather

Reduced City Water Input by over 110,000 Gallons Per Day
### 4: SITE DESIGN - SOIL + VEGETATION

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**Tree Impacts**

- Oxbow
- Cascade
- Jefferson Lake
- Bowl Lake
Proposed Trees

- **Proposed Trees**: 496
  - **Canopy Trees**: 221
  - **Flowering Trees**: 215
  - **Evergreen Trees**: 60
Landscape Typologies

RAIN GARDEN
SEDGE MEADOW
MEADOW/WET MEADOW
GRAVEL BAR
RIPARIAN
LAWN/TREES
SEDGE MEADOW

OXBOW
JEFFERSON LAKE
BOWL LAKE
SEVEN POOLS
JEFFERSON LAKE
BOWL LAKE
FAULKNER
CLAYTON

Page 19
Proposed Planting - Trees and Shrubs

- Bald Cypress
  Taxodium distichum

- Short Leaf Pine
  Pinus echinata

- Sycamore
  Platanus occidentalis

- Bur Oak
  Quercus macrocarpa

- Sugar Maple
  Acer saccharum

- Swamp White Oak
  Quercus bicolor

- Red Bud
  Cercis canadensis

- 'Appalacian Red'

- Short Leaf Pine
  Pinus echinata

- Sycamore
  Platanus occidentalis

- Bur Oak
  Quercus macrocarpa

- Sugar Maple
  Acer saccharum

- Swamp White Oak
  Quercus bicolor

- Hazelnut
  Corylus americana

- Bladdernut
  Staphylea trifolium

- Swamp Willow
  Salix exigua

- Indigo Bush
  Amorpha fruticosa

- Cardinal Red-twig Dogwood
  Cornus sericea "Cardinal"

- Winterberry
  Ilex verticillata "Red Sprite"

- Winterberry
  Ilex verticillata "Jim Dandy"

- Gro-Low Sumac
  Rhus aromatica "Gro-Low"

- American Beautyberry
  Callicarpa dichotoma

- American Beautyberry
  Callicarpa dichotoma

- Sandbar Willow
  Salix exigua

Page 20
Grasses and Forbs

- Botttlebrush grass (Elymus hystrix)
- Soft Rush (Juncus effusus)
- Bristly Sedge (Carex comosa)
- Slender Sedge (Carex praegracilis)
- Palm Sedge (Carex muskingumensis)
- Fox Sedge (Carex vulpioides)
- Wool Grass (Scirpus cyperinus)
- Little Bluestem (Andropogon scoparius)
- Blue Joint Grass (Calamagrostis canadensis)
- Fowl Mana Grass (Glyceria striata)
- Wool Grass (Scirpus cyperinus)

- Indian Grass (Sorghastrum nutans)
- Bristly Sedge (Carex comosa)
- Soft Rush (Juncus effusus)
- Slender Sedge (Carex praegracilis)
- Palm Sedge (Carex muskingumensis)
- Fox Sedge (Carex vulpioides)
- Wool Grass (Scirpus cyperinus)
- Little Bluestem (Andropogon scoparius)

- Copper Iris (Iris fulva)
- Blue Flag Iris (Iris virginica)
- Joe Pye Weed (Eupatorium dulcidum)
- Marsh Blazing Star (Liatris spicata)
- Ozark Blue Star (Amsonia illustris)
- Black Eyed Susan (Rudbeckia hirta)
- Water Willow (Justica americana)
### 5: SITE DESIGN - MATERIALS SELECTION

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**Possible Points:**
- **MATERIALS P5.1** Eliminate the use of wood from threatened tree species
- **MATERIALS C5.2** Maintain on-site structures and paving
- **MATERIALS C5.3** Design for adaptability and disassembly
- **MATERIALS C5.4** Use salvaged materials and plants
- **MATERIALS C5.5** Use recycled content materials
- **MATERIALS C5.6** Use regional materials
- **MATERIALS C5.7** Support responsible extraction of raw materials
- **MATERIALS C5.8** Support transparency and safer chemistry
- **MATERIALS C5.9** Support sustainability in materials manufacturing
- **MATERIALS C5.10** Support sustainability in plant production
### 6: SITE DESIGN - HUMAN HEALTH + WELL-BEING

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<td>Promote equitable site use</td>
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<td>HHWB C6.4</td>
<td>Support mental restoration</td>
<td>2</td>
<td></td>
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<tr>
<td>2</td>
<td>HHWB C6.5</td>
<td>Support physical activity</td>
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<tr>
<td></td>
<td>HHWB C6.6</td>
<td>Support social connection</td>
<td>2</td>
<td></td>
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<tr>
<td>4</td>
<td>HHWB C6.7</td>
<td>Provide on-site food production</td>
<td>3 to 4</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>HHWB C6.8</td>
<td>Reduce light pollution</td>
<td>4</td>
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<tr>
<td>4</td>
<td>HHWB C6.9</td>
<td>Encourage fuel efficient and multi-modal transportation</td>
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<tr>
<td>2</td>
<td>HHWB C6.10</td>
<td>Minimize exposure to environmental tobacco smoke</td>
<td>1 to 2</td>
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<td>3</td>
<td>HHWB C6.11</td>
<td>Support local economy</td>
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</table>
Open Space

Net Change of Open Space: -0.11 Acres

EXISTING IMPERVIOUS AREA: 2.43 Acres
EXISTING OPEN SPACE: 39.67 Acres
PROPOSED IMPERVIOUS AREA: 2.54 Acres
PROPOSED OPEN SPACE: 39.56 Acres
Jefferson Lake Fishing Opportunities

- Jefferson Lake
- Bowl Lake
- Deep Pool
- Boardwalk
- Lawn Edge
- Accessible Dock
- Gravel Bar
- Rock Outcrop
- City Water Input
- Aeration
Circulation

EXISTING PARKING SPACES: **228**

PROPOSED PARKING SPACES: **225**
### 7: CONSTRUCTION

<table>
<thead>
<tr>
<th>Y</th>
<th>CONSTRUCTION P7.1</th>
<th>Communicate and verify sustainable construction practices</th>
<th>Possible Points: 3 to 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>CONSTRUCTION P7.2</td>
<td>Control and retain construction pollutants</td>
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<tr>
<td>Y</td>
<td>CONSTRUCTION P7.3</td>
<td>Restore soils disturbed during construction</td>
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<tr>
<td>5</td>
<td>CONSTRUCTION C7.4</td>
<td>Restore soils disturbed by previous development</td>
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<tr>
<td>4</td>
<td>CONSTRUCTION C7.5</td>
<td>Divert construction and demolition materials from disposal</td>
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</tr>
<tr>
<td>3</td>
<td>CONSTRUCTION C7.6</td>
<td>Divert reusable vegetation, rocks, and soil from disposal</td>
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<tr>
<td>2</td>
<td>CONSTRUCTION C7.7</td>
<td>Protect air quality during construction</td>
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### 8. OPERATIONS + MAINTENANCE

<table>
<thead>
<tr>
<th>Y</th>
<th>O+M P8.1</th>
<th>Plan for sustainable site maintenance</th>
<th>Possible Points: 3 to 5</th>
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</thead>
<tbody>
<tr>
<td>Y</td>
<td>O+M P8.2</td>
<td>Provide for storage and collection of recyclables</td>
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<tr>
<td>3</td>
<td>O+M C8.3</td>
<td>Recycle organic matter</td>
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<td>4</td>
<td>O+M C8.4</td>
<td>Minimize pesticide and fertilizer use</td>
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<tr>
<td>4</td>
<td>O+M C8.5</td>
<td>Reduce outdoor energy consumption</td>
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<tr>
<td>4</td>
<td>O+M C8.6</td>
<td>Use renewable sources for landscape electricity needs</td>
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<tr>
<td>4</td>
<td>O+M C8.7</td>
<td>Protect air quality during landscape maintenance</td>
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### 9. EDUCATION + PERFORMANCE MONITORING

<table>
<thead>
<tr>
<th>4</th>
<th>EDUCATION C9.1</th>
<th>Promote sustainability awareness and education</th>
<th>Possible Points: 3 to 4</th>
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<tbody>
<tr>
<td>3</td>
<td>EDUCATION C9.2</td>
<td>Develop and communicate a case study</td>
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</tr>
<tr>
<td>4</td>
<td>EDUCATION C9.3</td>
<td>Plan to monitor and report site performance</td>
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</table>
Innovative 9 Step Process
Bowl Lake & Seven Pools

- Accentuate plantings and create an earthen berm near south end of Bowl Lake
- Water outfall at north end of Bowl Lake to be piped into Jefferson Lake
- Restore Stone Bridge
- Provide seating area to enjoy and learn about Bowl Lake
- Provide sediment filtration and shoreline plantings
- Incorporate educational elements in cooperation with the Science Center and Central Institute for the Deaf
Bowl Lake

KEY

1. Restored Seven Pools bridge
2. Cypress island
3. Bowl Lake Landing
4. Aquatic Plants
5. Heels trail
6. Wheels trail
7. Overlook
8. Seven Pools restoration
9. Extend berm for highway buffer
10. Seven Pools Parking

Lighting
Jefferson Lake

- Extend naturalistic landscape features around Jefferson Lake
- Restore existing paved fishing platforms
- Provide aeration and sediment filtration
- Connect to Bowl Lake and the rest of the water system
- Create a cascading water input at the south end of Jefferson Lake
- Provide aeration and sediment filtration
- Reshape and enlarge Jefferson Lake
- Reduce the amount of City water input
- Provide a connected waterway system
The Oxbow

KEY

1. Weir
2. Heels trail
3. Wheels trail
4. Bridge
5. Island
6. Gravel bar
7. Sedge meadow
8. Meadow plantings
9. Cascade
10. Seating node
11. Picnic lawn
12. Water quality improvements

Lighting

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