RIVERFRONT GARDENS
REDEVELOPMENT OF AN INDUSTRIAL SITE
ALONG DOWNTOWN NASHVILLE'S CUMBERLAND RIVER

Final Project Submitted by: Deepal Kilewala

Professor Bruce Dvorak, Committee Chair
Professor Chang Shan Huang, Committee Member
Professor Mardelle Shepley, Committee Member

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Texas A&M University
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Introduction

Waterfront revitalization and redevelopment of industrial sites have proven to be popular and successful development strategies in numerous cities. Waterfront developments can be a source of prosperity and pride. With over half of the world population now residing in cities, landscape architects hold a leading position in designing creative and sustainable ways to upgrade green infrastructure which is a network of open spaces, woodlands, wildlife habitat, parks and other natural areas that can enrich the quality of life.

The Cumberland River is 688 miles long draining about 18,000 square miles of southern Kentucky and north-central Tennessee. Population centers on the Cumberland include Hendersonville, Nashville, Clarksville and Ashland City, Tennessee. Today many of the areas are contaminated due to industrial pollution, large areas of imperviousness, river channeling to control flooding, and combined sewers. In recent years, improvement of the water system has become a priority.
Background

In 2010, Nashville experienced one of the worst floods in its history. In a 36-hour period, over 13 inches of rain fell in the Davidson County, causing over $2.5 billion in damage. The City of Nashville since the flood have focused on determining more sustainable ways the city can approach development to help prevent future disasters.
The project site is located in Nashville, Tennessee, located near the downtown core along the banks of the Cumberland River.

Strategies for redevelopment of the urban cores are increasingly emphasizing the value of sustainable techniques within the city such as waterways, parks and other green corridors which also includes waterfront development. Development patterns are transitioning from separated single-uses and single-mode accessibility, to fully integrated mixed-use, pedestrian friendly communities with multi-modal transportation options. Sustainable impacts from new development are important driving factors for future design considerations.

The purpose of this investigation is to recommend solutions to enhance and maximize the potential of the Cumberland Riverfront development for visitors, businesses and residents. This project encourages the re-development of an industrial site along Downtown Nashville’s Cumberland River with emphasis on sustainable design and planning, storm water management, healthy living along with the LID techniques and criteria’s for energy and environmental design. To redevelop the once brownfield into a mixed use urban setting: while celebrating the sites industrial heritage.

Numerous studies conducted by both the city and private groups over the past decade have reimagined the East Bank as a mixed-use neighborhood, that could better serve the city’s interest and also helps reconnect the neighborhoods of East Nashville to Downtown and the riverfront.

The East Bank of the Cumberland River is chosen as the site, because of its high profile location – immediately accessible and in full view of Downtown, a greenway through the site connects from Downtown to Shelby Park, one of the city’s premier public parks, and it is adjacent to the city’s newest park – Cumberland Park.
SITE INVENTORY
The Movement to make Nashville the healthiest city in the South.

Nashville is known as Music City and it’s also known for its banking, transportation, publishing and number of universities. This project thrives to develop Nashville as the next progressive city for its residents, tourists and continuously evolving urban development. What was once an unwelcoming and unusable parcel of land may become an active sustainable region along the Cumberland River.

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Nashville City

Source: http://www.nashville.gov/

Nashillians love their pets, whether they are dogs, cats or backyard hens.

Source: http://www.nashville.gov/

Thousands of acres of public parks and recreational activities to appeal to all ages fitness levels.

Sports - Louisiana-Pacific Stadium located near the site

Source: http://www.nashville.gov/

Public safety

Living in Nashville - at a glance
Demographics

Social Explorer - Census 2010 Statistics Davidson County, Tennessee

SE:T1. Total Population
Total Population 626,681

SE:T2. Population Density (per sq. mile)
Total Population 626,681
Population Density (per sq. mile) 1,243.3
Area (Land) 504.03

SE:T2A. Land Area (sq. miles)
Area Total: 525.94
Area (Land) 504.03 95.8%
Area (Water) 21.91 4.2%

SE:T3. Sex
Total Population: 626,681
Male 303,540 48.4%
Female 323,141 51.6%

SE:T8. Age
Total Population: 626,681
Under 5 years 44,691 7.1%
5 to 9 years 37,613 6.0%
10 to 14 years 33,904 5.4%
15 to 17 years 20,183 3.2%
18 to 24 years 73,295 11.7%
25 to 34 years 113,401 18.1%
35 to 44 years 85,778 13.7%
45 to 54 years 85,139 13.6%
55 to 64 years 67,274 10.7%
65 and 74 years 34,993 5.6%
75 to 84 years 21,470 3.4%
85 years and over 8,940 1.4%

SE:T58. Households By Household Type
Households: 259,499
Family households: 145,166 55.9%
Married-couple family 95,093 36.6%
Other family: 50,073 19.3%
Male householder, no wife present 11,811 4.6%
Female householder, no husband present 38,262 14.7%
Nonfamily households: 114,333 44.1%
Householder living alone 89,503 34.5%
Householder not living alone 24,830 9.6%

SE:T63. Population in Households By Household Type and Relationship
Total population: 626,681
In households: 600,811 95.9%
In family households: 454,544 72.5%
Householder 145,166 23.2%
Spouse 95,093 15.2%
Child 156,428 25.0%
Grandchild 13,723 2.2%
Brother or sister 8,927 1.4%
Parent 5,523 0.9%
Other relatives 13,681 2.2%
Nonrelatives16,003 2.6%
In nonfamily households: 146,267 23.3%
Living alone 89,503 14.3%
Not living alone 24,830 4.0%
Nonrelatives31,934 5.1%
In group quarters: 25,870 4.1%
Institutionalized population 9,226 1.5%
Noninstitutionalized population 16,644 2.7%

SE:T68. Housing Units
Housing units 283,978

SE:T69. Tenure
Occupied housing units: 259,499
Owner Occupied 145,115 55.9%
Renter occupied 114,384 44.1%
The site is well connected to regional transportation via: three major interstates, a commuter train line, close proximity to downtown's commuter bus service, and the Music City Bikeway, a 26-mile bicycle commuter path through Davidson County.

Source: US Census

Demographics

### Athens of the South

**Cost of Living**
Nashville consistently ranks among the lowest for cost-of-living in comparable cities across the nation ranking more cost-efficient than Atlanta, Austin, Tampa and Indianapolis. The overall cost of living is 88.9% of the national average. (Source: 2010 ACCRA Cost of Living Index) All components (groceries, housing, utilities, etc.) of cost-of-living are typically below the national average.

Source: http://www.nashville.gov/

<table>
<thead>
<tr>
<th>Cost of Living</th>
<th>Population 25 Years and Over</th>
<th>Associate’s Degree</th>
<th>Bachelor’s Degree</th>
<th>Graduate or Professional Degree</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1,050,705</td>
<td>70,830</td>
<td>200,598</td>
<td>111,098</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>6.7%</td>
<td>19.1%</td>
<td>10.6%</td>
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</table>

### Athens of the South

**Population**

<table>
<thead>
<tr>
<th>Geography</th>
<th>2000</th>
<th>2010</th>
<th>2012</th>
</tr>
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<tbody>
<tr>
<td>Nashville MSA</td>
<td>1,311,789</td>
<td>1,593,050</td>
<td>1,726,693</td>
</tr>
<tr>
<td>Nashville Economic Market</td>
<td>1,435,577</td>
<td>1,755,446</td>
<td>1,823,785</td>
</tr>
<tr>
<td>Davidson County</td>
<td>569,927</td>
<td>626,681</td>
<td>648,295</td>
</tr>
</tbody>
</table>

Source: US Census

The demographic picture of the Nashville region is one of a vibrant, growing and prosperous area. Consistent strong gains in population, a high level of educational attainment, and rising income levels are hallmarks of one of the nation’s most dynamic growth centers. The demographic patterns showcase many of the characteristics that illustrate Nashville’s comparative advantages in the nation with regard to young and talented workers, diversity of population, growth throughout the region and a variety of settings from urban to suburban to rural.
Situated in the northwestern part of central Tennessee, Nashville is the twenty-fifth largest U.S. city with an estimated population of 605,413. Classified by age, 23.7% of the population is under 18, 9.4% is 18 to 24, 30.9% is 25 to 44, 25.2% is 45 to 64, and 10.8% is 65 or older. The median age of the population is 36.2. The land area of the city is 502.26 square miles. The city’s population density is 1,179.83 people per square mile.
Race and Ethnicity Maps

Source: U.S. Census Bureau Inter-censal Population Estimates

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<tr>
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</thead>
<tbody>
<tr>
<td>American Indian or Alaska Native (Non-Hispanic)</td>
<td>3,080</td>
<td>4,632</td>
<td>4,696</td>
</tr>
<tr>
<td>Asian or Pacific Islander (Non-Hispanic)</td>
<td>21,047</td>
<td>37,140</td>
<td>40,789</td>
</tr>
<tr>
<td>Black (Non-Hispanic)</td>
<td>104,000</td>
<td>240,779</td>
<td>261,669</td>
</tr>
<tr>
<td>Hispanic</td>
<td>41,173</td>
<td>105,567</td>
<td>112,315</td>
</tr>
<tr>
<td>Two or More Races (Non-Hispanic)</td>
<td>11,399</td>
<td>24,652</td>
<td>27,212</td>
</tr>
<tr>
<td>White (Non-Hispanic)</td>
<td>1,039,718</td>
<td>1,177,956</td>
<td>1,208,694</td>
</tr>
</tbody>
</table>

White Population
At the 2012 census data, the racial complexion of the city was 64.9% White, 27.9% Black or African American, 0.4% Native American, 3.1% Asian, 2.4% from other races, and 1.2% from two or more races. The population was 7.8% Hispanic or Latino of any race.
Employment

The Nashville region is home to more than 1.8 million people and 40,000 businesses. Nashville’s advantages have attracted more diverse new businesses from across the country than any other city its size over the past 20 years. Companies choose to relocate here and continue to prosper here. The major employment opportunities include education, automobile industry healthcare, staffing service and communication.
Transportation Maps

By bike, car, train, bus or foot, getting around Nashville has never been simpler.

Greenways and Walking Trails:
- Metro Greenways via Metro Parks and Recreation
- Greenways for Nashville non-profit association

Cycling:
- WalkBike Nashville non-profit association
- Nashville Green Bikes Bike Sharing
- B-cycle Bike Sharing

Train/Commuter Rail:
- Music City Star - East Corridor Commuter Rail - Regional Transportation Authority

Buses:
- MTA Bus Schedule via Metro Transit Authority

Air Travel:
- Nashville International Airport
- John C. Tune Airport

Taxis/Emergency Vehicles:
- Taxi Companies
- Emergency Wrecker Companies
- Metro Transportation Licensing Commission
Climate

Latitude: +36.16583 (36°09’56.988”N)
Longitude: -86.78444 (86°47’03.984”W)
Time zone: UTC-6 hours
Local time: 23:51:20
Country: Tennessee, United States
Continent: Americas
Sub-region: Northern America
Distance: ~1100 km (from your IP)
Altitude: ~170 m

Annual average high temperature: 69.1°F
Annual average low temperature: 48.8°F
Average temperature: 59.95°F
Average annual precipitation: 48.15 inch
Days per year with precipitation: 119 days
Average annual hours of sunshine: 2634 hours

Thematic map showing no. of damages per state from 1980-2011

Winter Temperature Groups (Coldest, Middle, Warmest)

- Coldest Third (31.0°F to 38.4°F)
- Middle Third (38.5°F to 40.9°F)
- Warmest Third (41.0°F to 48.2°F)
Deepal Kilewala

Some tributaries in the Cumberland River basin and the Four Rivers region are contaminated by agriculture (204 miles of streams), urban runoff (283 miles), resource extraction (1,075 miles), municipal wastewater discharges (358 miles), and waste disposal on the land (192 miles). These sources of pollutants contribute bacteria from sewage or livestock; silt from erosion, construction, or logging; algae blooms fed by nutrients from fertilizers or manure; and various pollutants from mining and industrial or urban wastewater plants.

Source: http://kywatersheds.org/

The Cumberland River is 688 miles long draining about 18,000 square miles of southern Kentucky and north-central Tennessee. Population centers on the Cumberland include Hendersonville, Nashville, Clarksville, and Ashland City, Tenn.

Today many of the areas are contaminated due to industrial pollution, large areas of imperviousness, river channeling to control flooding, and combined sewers. In recent years, improvement of the water system has become a priority.

The Four Rivers Region includes the far western portion of Kentucky, with portions of the Lower Cumberland River basin, Lower Tennessee River basin, and direct tributaries to the Ohio and Mississippi rivers. The Upper Cumberland River basin includes the headwaters of the Cumberland basin down to the Kentucky-Tennessee state line. The Middle Cumberland River basin is all of the Cumberland River basin in the state of Tennessee. Source: http://kywatersheds.org/
### Site History

Nashville was originally established on the periphery overlooking the Cumberland River.

- Nashville was initially established by Native Americans in what is now Sulfur Dell and the east bank Industrial area.

- Nashville originated on the river and nurtured outwards from the river.

- The Downtown had grown considerably and East Nashville stretched all the way to the Floodplain. Sulphur Dell Springs served a source of drinking water.

- By 1887 mills packed the floodplain areas South of downtown between the Cumberland River and Brown’s Creek. The growth of Industry added to further contamination.

- 1889 was considered the height of the Industrial Revolution. Shelby Park, appears to be land with low elevations and prone to flooding. The urban growth and the resulting increases in population density.

- By 1927, Sulphur Springs would be closed due to pollution from Sulphur Dell Stream, and Nashville would experience its worst flooding in history.

- By 1959, the Cumberland River froze over and people walked along its ice. The land adjacent to the Interstate was cheap and strategically located.

- By 1984, we observe some see some noteworthy variations especially along the edge of downtown. Land use pattern in and around the site changed.

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>1780</td>
<td>Site founded on the periphery overlooking the Cumberland River.</td>
</tr>
<tr>
<td>1780</td>
<td>Site founded on the periphery overlooking the Cumberland River.</td>
</tr>
<tr>
<td>1860</td>
<td>The Downtown had grown considerably and East Nashville stretched all the way to the Floodplain.</td>
</tr>
<tr>
<td>1887</td>
<td>Mills packed the floodplain areas South of downtown between the Cumberland River and Brown’s Creek.</td>
</tr>
<tr>
<td>1889</td>
<td>Considered the height of the Industrial Revolution.</td>
</tr>
<tr>
<td>1908</td>
<td>Railways were bursting up all over the state along riverfronts.</td>
</tr>
<tr>
<td>1908</td>
<td>Sulphur Springs would be closed due to pollution from Sulphur Dell Stream.</td>
</tr>
<tr>
<td>1930</td>
<td>Nashville filled in many of these low lying river plains areas to raise buildings out of the floodplains.</td>
</tr>
<tr>
<td>1959</td>
<td>Cumberland River froze over and people walked along its ice.</td>
</tr>
<tr>
<td>1984</td>
<td>Some noteworthy variations especially along the edge of downtown.</td>
</tr>
</tbody>
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### Site Inventory - Planning Timeline

- Public square
- Fresh water springs

- In the 1950’s, it was cold enough that the Cumberland River froze over and people walked along its ice. The land adjacent to the Interstate was cheap and strategically located.

- By 1984, we observe some see some noteworthy variations especially along the edge of downtown. Land use pattern in and around the site changed.
Site History

Nashville established the Interstate highway going along the East side of the site. Minor and major road developments and ruins of railway could be seen on the site.

We can see how the old grid pattern spreaded throughout the site. Site sits across the major roads and state highways. The industrial relics of the site and its brownfield nature is clearly seen.

In 2010, Nashville experienced one of the worst floods in its history. The site contain 100-year flood area which need to be preserved and designed strategically.

The site has many challenges which also provide as an opportunity for its redevelopment. It is a brownfield site disconnected from the neighborhoods of East Nashville by an elevated interstate. The current industrial uses of the East Bank are privately owned but the NCDC (The Nashville Civic Design Center is an independent nonprofit organization that has worked since 2000 to improve the quality of life for Nashvillians) recognizes the opinion of the majority of Nashville’s citizens that the long-term highest and best use of the site is to phase out current industrial use downtown for something more accommodating.

As a brownfield, the sites contamination while invisible provide usage restriction. The site’s inaccessible and functionless condition created a major block, which separated it from the Downtown areas, nearby stadium and the region on the West side by the Interstate Highway.
Context

Through regional context analysis, the design process is infused with an understanding of site and regional potentials and challenges.
Topography
Map Unit Legend

<table>
<thead>
<tr>
<th>Map Unit Symbol</th>
<th>Map Unit Name</th>
<th>Acres in AOI</th>
<th>Percent of AOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ln</td>
<td>Lindell-Urban land complex</td>
<td>104.8</td>
<td>96.9%</td>
</tr>
<tr>
<td>W</td>
<td>Water</td>
<td>3.3</td>
<td>3.1%</td>
</tr>
<tr>
<td>Totals for Area of Interest</td>
<td></td>
<td>108.1</td>
<td>100.0%</td>
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Davidson County, Tennessee (TN037)

Map Legend

- Area of Interest (AOI)
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Burrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravely Spot
- Landfill
- Lane Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saltine Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slides or Slip
- Sodic Spot

Water Features
- Streams and Canals

Transportation
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

Source of Map: Natural Resources Conservation Service
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below:

Soil Survey Area: Davidson County, Tennessee
Survey Area Date: Version 10, Dec 21, 2013

Soil map units are labeled as space allows for map scales: 50,000 or larger.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contacting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Soil Analysis

- Deepal Kilewala
A devastating flood hit Nashville in early May 2010, drenching the city. Today, recovery efforts continue. Hundreds of citizens are rebuilding their homes and their lives, and the Metro Government is improving emergency preparedness and planning for Nashville’s long-term recovery.

20 acres of the site is designated for floodplain conservation and storm water purposes for any proposed development, the challenge is to maximize the greatest use for this site.
Sections showing relationship of Cumberland river with its east and west ends. They vary at each cross section. The river width varies anywhere from 934' to 458'. Normal pool level is 388'.
Visual Analysis

Rolling Mill Hill features mixed-income residential apartments, artist studios, and commercial office and retail/restaurant space, with sweeping views of the city and the Cumberland River. Residents and tenants enjoy central locality, access to public transportation, and a connection to Nashville’s greenway system. It is a live work community.
Visual Analysis

Site Character and Constraints

Source: http://maps.google.com
Though most of the historic buildings, rails, and other industrial artifacts were removed from the site as they fell into disuse because of the flood and other events and were deteriorated with time, these cylindrical structures near the river side, provides some of the only remaining site characters from which to draw visual meaning and a link to sites past.
Existing land use analysis suggests that most of the site consists of industrial and parking parcels. Parking lots merge into various industrial and warehouse lands. Cumberland River is a working river and is available for the water recreational activities. But this is constrained by the various hazardous potentials of the current conditions.
Zoning Map

Legend
- Industrial
- Commercial
- Office
- Mixed Use Zoning
- Recreational areas
- Multi Family
Earlier the site was accessible by roads and was connected to the surrounding urban fabric. Later on, roadways, rails, bridges cut the site across for various means of transport. Interstate highway on the East side of the side further cut the site off from its neighboring areas.
Existing parks and green space
Primary Canopy Trees

Red Buckeye
(Aesculus pavia)
Height: 10’ to 20’
Width: 10’ to 20’
Attracts hummingbirds and bees. Blooms at early age

Adirondack Crabapple
(Malus ‘Adirondack’)
Height: 10’ to 20’
Width: 6’
Makes an excellent screen. Disease-resistant

Lipan Crape Myrtle
(L. indica x L. fauriei ‘Lipan’)
Height: 13’ to 20’
Width: 13’ to 20’
Highly mildew resistant

Stellar Pink Flowering Dogwood
(Cornus florida x Cornus kousa ‘Stellar Pink’)
Height: 15’ to 20’
Width: 15’ to 20’
Excellent resistance to disease

Chinese Fringetree
(Chionanthus retusus)
Height: 15’ to 25’
Width: 10’ to 25’
Exfoliating bark. Very adaptable. Tends to flower better in

Tulip poplar
(Liriodendron tulipifera)
Height: 10’ to 20’
Width: 10’ to 20’
Attracts hummingbirds and bees. Blooms at early age

Greenleaf American Holly
(Ilex opaca ‘Greenleaf’)
Height: 25’ to 30’
Width: 10’ to 15’
Cold-hardy and drought-resistant

Jane Magnolia
(Magnolia liliiflora ‘Jane’)
Height: 10’ to 20’
Width: 10’ to 20’
Strong and vigorous. Blooms late enough to avoid late frosts

Flame Amur Maple
(Acer ginnala ‘Flame’)
Height: 15’ to 20’
Width: 15’ to 20’
Leaves out in early spring. Casts dense shade. Attractive to bees, butterflies, and birds.

Blackhaw, Plum Leaf Viburnum
(Viburnum prunifolium)
Height: 10’ to 20’
Width: 10’ to 20’
Attracts hummingbirds and bees. Blooms at early spring

Alternate leaf dogwood
(Cornus alternifolia)
Fauna Inventory

Alasmidonta atropurpurea, common name Cumberland elktoe, is a species of freshwater mussel, an aquatic bivalve mollusk in the family Unionidae, the river mussels.

Chickadees may be found in any habitat that has trees or woody shrubs, from forests and woodlots to residential neighborhoods and parks, and sometimes weedy fields and cattail marshes. They frequently nest in birch or alder trees.

Blue Jays are birds of forest edges. A favorite food is acorns, and they are often found near oaks, in forests, woodlots, towns, cities, parks.

Look for Cedar Waxwings in woodlands of all kinds, and at farms, orchards, and suburban gardens where there are fruiting trees or shrubs.

The goldfinch’s main natural habitats are weedy fields and floodplains, where plants such as thistles and asters are common. They’re also found in cultivated areas, road-sides, orchards, and backyards.

American Crows are common birds of fields, open woodlands, and forests. They thrive around people, and you’ll often find them in agricultural fields, lawns, parking lots, athletic fields, roadsides, towns, and city garbage dumps.

The lake sturgeon (Aci-penser fulvescens) is a North American temperate freshwater fish, one of about 25 species of sturgeon. Like other sturgeons, this species is an evolutionarily ancient.

The slackwater darter, (Etheostoma boschungi) is a small freshwater fish of the stippled darter group. The slackwater darter has a conspicuous dark subocular bar and three prominent saddles.

The Tennessee cave salamander (Gyrinophilus pallidus) is a species of salamander in the Plethodontidae family, endemic to the United States. Its natural habitats are inland karsts and caves. It

The snail darter (Percina tanasi) is a species of fish that is found in East Tennessee freshwater in the United States. It is in the perch family (family Percidae) of the order Perciformes.

The Percidae are a family of perciform fish found in fresh and brackish waters of the Northern Hemisphere. The majority are Nearctic, but there are also Palearctic species.
<table>
<thead>
<tr>
<th>SWOT</th>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strengths</strong></td>
<td>Close to downtown Nashville</td>
<td>A big part of the area with industrial architecture is abandoned</td>
<td>Opening up and designing green areas on site.</td>
<td>Lack of accessibility.</td>
</tr>
<tr>
<td></td>
<td>Good central district, site located in the center</td>
<td>Linear one-function activity along the roadways.</td>
<td>Providing storm water management and beautification to the riverfront.</td>
<td>Flooding</td>
</tr>
<tr>
<td></td>
<td>Lot of recreational, commercial and workers surrounding the site</td>
<td>Lack of open and green spaces</td>
<td>Make the area look more attractive.</td>
<td>Ability to maintain due to its industrial contamination.</td>
</tr>
<tr>
<td></td>
<td>Many recreational facilities like stadium, parks surround the site.</td>
<td>High land values along the Urban Waterfront.</td>
<td>Provide recreational areas near the river and mix use development towards the downtown road side.</td>
<td>The paths entering the site are not well maintained and could prevent access for some possible users.</td>
</tr>
<tr>
<td></td>
<td>Views and wide open landscape, Sky views and sun access.</td>
<td>The current condition of site is not attractive.</td>
<td>Community, education programs.</td>
<td>Overgrown and could appear threatening.</td>
</tr>
<tr>
<td></td>
<td>The 20 acres preserved flood zone can be looked as strength as it provides a haven for fauna and flora and recreational zones.</td>
<td>Lot of industrial building and relics contaminate the site.</td>
<td>Integration of surrounding streets network.</td>
<td>Probabilities of building sprawl in surrounding open surfaces.</td>
</tr>
<tr>
<td></td>
<td>Redesign to create a space which is more flexible and have many uses.</td>
<td>No green areas / tress.</td>
<td>Use of existing paths as an alternative pedestrian environment.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Opportunity to link the river as there is currently little ecological value in the vegetation. It is currently not visible as it is hidden by a slope and so does not contribute to the site visually.</td>
<td>Isolated with the neighbors and the state highway cuts it more.</td>
<td>Bridge across direct links to the waterfront.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Easy access due to its location in downtown.</td>
<td>Neglected among all other surrounding areas.</td>
<td>Opportunity to bring more people in from the downtown side.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cumberland River represents a strong historical identity.</td>
<td>Poor circulation and transport links, disconnected from grid pattern of the city.</td>
<td>Opportunity to provide more of a human nature connection along the side of the river.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Traces of ancient history in a lot of areas.</td>
<td>Lack of maintenance / visual pollution.</td>
<td>Many unstructured spaces could be offered for green areas and parks tourist attraction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>An increasing population and predominantly of young age.</td>
<td>Storm water contamination.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nashville adopted and flexible towards positive changes.</td>
<td>Site has little character and ecological value.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Buildable area approximately 73 %.</td>
<td>Lack of policies and sustainable initiatives for preservation and protection of environment.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Sited along the Menomonee River, this brownfield is an example of a sustainable design that developed from a specific spectrum of factors and needs—environmental, social and economics within the neighborhood, city and region.

Source: http://www.wenkla.com/featured-projects/
Introduction

LOCATION: Milwaukee, Wisconsin, USA

SITE SIZE: 140 acres (70 acres open spaces/70 acres development). The park and the area discussed in this case study comprises of 20 acres.

CLIENT: City of Milwaukee

DESIGNERS: Landscape architect- Wenk Associates, Inc

ECOLOGICAL CONSULTANT: Applied Ecological Services, Brodhead, Wisconsin

ENGINEERS/PLANNERS: HNTB, Milwaukee, Wisconsin

FORMER SITE USES: Industrial, Vacant land

LANDSCAPE BUDGET: $1.75 million

DATE OF COMPLETION: 2007

OVERVIEW:
Sited along the Menomonee River, this brownfield is an example of a sustainable design that developed from a specific spectrum of factors and needs- environmental, social and economics within the neighborhood, city and region.

KEY GOAL:
- Stormwater Management
- Economic Impact
- Environmental Improvement
- Community Connections

For the purpose of this case study, the redevelopment is discussed as a whole, but the focus is the design of the open spaces. A total of 70 acres of open spaces, comprising of River Lawn, Chimney Park, and Airline Yard.
CASE STUDY - Menomonee Valley Industrial Center

The primary core of the Milwaukee’s historic community structure is now being viewed as a source of green infrastructure and economic development.

Dense, well defined neighbourhoods surround the Menomonee River Valley.
Project Inception

The site has a heavy industrial history leaving it contaminated with variety of materials and compounds that rendered it a brownfield site following its large scale abandonment in the 1980s.

The site was unusable for any redevelopment program without a plan for environmental remediation that would:

- Remove the contamination
- Protect the Groundwater
- Restore ecological health

The availability of this vast former industrial property in the middle of Milwaukee surrounding by communities in need of employment provided the right ingredients for a unique development.
Milwaukee River Basin
The Milwaukee River Basin, which includes the Menomonee River, consists of six watersheds and covers 900 square miles. It contains approximately 400 miles of perennial streams and more than 85 natural glacial lakes and ponds.

The project lies in the National Forest Service vegetation classification systems Southern Great Lakes Province. (US Natural Regions)

The Miller Stadium parking lot pavement significantly increased impervious land cover in the valley watershed, further exacerbating storm water management and water quality challenges for the area.

http://www.planthevalley.org/
The gridded road network of the surrounding urban fabric was extended and curved down the valley slopes into the former industrial areas.
Design Concept

Multifunctional Stormwater management

A stormwater park becomes a civic recreational and ecological centerpiece for industrial development sites that are raised out of floodplain.

The concerns of water quality and detention are integrated with active and passive recreation.

The stormwater management scheme, based on the need to cap contaminated site, provides progressive levels of stormwater storage/open spaces flooding and biological filtration. Placement of the park is intended to allow the open space to function as both a destination spot and node along the larger river greenway.

CASE STUDY - Menomonee Valley Industrial Center

Design Concept

Sand hoppers have been incorporated into the river front grounds of downtown Milwaukee’s new Harley Davidson Museum as reminders of the city’s industrial heritage and sites former use as a sand processor.

Legend
Open Space Zones

- River Lawn
- Chimney Park
- Airline Yard

The iconic scale and location of these structures near the raised viaduct roadway that crosses through the site and connects the two sides of the valley.

By the time of the site design, all that remained above ground on the site were these two chimneys.
Design form

Deep pools around the stormwater outfall areas spreading basins gain intensity as they get closer to the river. The lower basins closest to the river are shown during both a dryer period on left and following a heavy rainfall on right, illustrating the site’s flexibility and multipurpose capacity.

The park layout reflects two major patterns. The grid of the old and new development and organic ribbon like lines of the river and former rail lines. The park’s primary form - giving reflects the flowing lines of the river and rails through the sculpted land-form created to provide the stormwater management function of the park.

The project is analyzed with respect to two critical dimensions of sustainable site design:
- Landscape Form
- Landscape Function

Source - http://www.wenkla.com/
The pedestrian paths, creates ribs that define the basins. Sections illustrate the progression of water treatment and the integrated relationship of pedestrian and vehicular circulation to the park’s stormwater functions.

Materials used include granular surfacing concrete for curved seat walls that mimic pathway alignments and enclose the space and elliptical pipe for benches. 8 foot and 6 foot asphalt pathways
Stormwater basins are fed from the two developed sides of the site approximately 8 feet of fill has raised the land out of the original floodplain. A series of successively larger and deeper basins, or storm water treatment train (STT) is designed into the landform of the park land, providing storage for 2-year, 5-year and 100-years storm events.

The site is contaminated with free petroleum and arsenic from its former industrial use.

Infiltrated storm flow will be collected and transpired through the plant material at the Swamp Forest. This system removes particulate and pollutants and detains the 100-year storm, eliminating the need for traditional detention basins within the industrial development parcels themselves.
**Site engagement**

*Movement is an essential function of site: Movement both of people and water.*

River Points connect visitors to the Menomonee River: an open space resource that has been inaccessible due to past industrial uses. The Hank Aaron State Bike Trail will run from Doyne Park to the lakefront, offering a commuter route and recreational opportunities. The Community Green will be built around the remnant chimneys and offer athletic fields, court games, arts/cultural events, festivals and informal park activities.

Design developed a plan to bring businesses back to the Menomonee River Valley and reconnect valley communities, knitting new development to open spaces focused on a restored, accessible river. The open spaces mitigate stormwater while fostering recreation and outdoor activities.


**INDUSTRIAL CHIMNEYS**

Two 80 ft. tall smoke stacks are the only remnants of the site’s long history as one of the nation’s largest rail yards. The southern chimney is grounded in a paved area within several benches and the northern chimney is in the main lawn area. The chimney hearth creates a frame that is eye level and planned for art installations.
Site engagement
**Lessons learned**

<table>
<thead>
<tr>
<th>Connectivity</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Models a healthy, visibly connected flow of stormwater from development, including upstream off-site parcels through a filtering open space and into a watershed.</td>
<td>Evokes the areas rich industrial history while actively renewing a productive and sustainable industrial life for the site.</td>
</tr>
<tr>
<td>Creates a vital and multifaceted connection between downtown Milwaukee and the city’s stadium and outskirts beyond.</td>
<td>Immerses site users in a landscape whose comprehensive form based on storm water process, integrating human paths and nodes with water paths and nodes.</td>
</tr>
<tr>
<td>Links two sets of neighborhood, which had previously been separated by follow and contaminated land, with recreational pathways and open spaces as well as economic opportunity.</td>
<td>Describes the site natural history through landscape, restoration, artistic implementation and educational signage.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creates storm water infrastructure, which would normally be hidden or separated from usable open space, that takes on civic identity and a centralized place in the development.</td>
<td>Optimizes usefulness of open spaces by integrating recreational, habitat, and storm water treatment functions.</td>
</tr>
<tr>
<td>Takes a land use-industrial that would typically be driven by the creation of individual autonomous private Parcels, and uses the landscape as a central organization, unifying and functional entity.</td>
<td>Minimizes public expenditure on open space maintenance through a program of volunteer management.</td>
</tr>
<tr>
<td>Boasts low maintenance landscape zone.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stewardship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creates a new ethic of industrial sustainability through connections of industrial site function to open space, in contrast to conventional relationships where industry neither relies on, nor is responsible for its effect upon public open space.</td>
</tr>
</tbody>
</table>
Built on a brownfield of a former industrial site, Houtan Park is a regenerative living landscape on Shanghai’s Huangpu riverfront. The park’s constructed wetland, ecological flood control, reclaimed industrial structures and materials, and urban agriculture are integral components of an overall restorative design strategy to treat polluted river water and recover the degraded waterfront in an aesthetically pleasing way.

Source: http://www.turenscape.com/
Introduction

LOCATION: Shanghai, China
SITE SIZE: 14-hectare (34.6-acre)
CLIENT: Shanghai World Expo Land Development Co., Ltd.
DESIGNERS: Turenscape
LAND USE: Brownfield Park/Open space
PROJECT TYPE: Wetland creation/restoration Waterfront redevelopment
FORMER SITE USES: Industrial, Vacant land
DATE OF COMPLETION: 2010

CHALLENGES
Restoring the degraded environment.

The site is a brownfield littered with industrial and construction debris both on the surface and buried throughout the site.

The water of Huangpu River is highly polluted and is considered unsafe for swimming and recreation and devoid of aquatic life.

To improve flood control.

The area is long and narrow locked between the Huangpu River and an urban express way with water frontage is over 1.7 kilometers (one mile) in length.

Source: http://www.turenscape.com/
Design Strategy

**Constructed Wetland**

A linear constructed wetland, 1.7 kilometers (one mile) long and 5-30 meters (16.5 – 100 feet) wide was designed to create a reinvigorated waterfront as a living machine to treat contaminated water from the Huangpu River.

**Path Network**

An ecologically recovered landscape, urban agriculture and industrial spirit are the three major layers of the park, woven together through a network of paths where visitors are educated about green infrastructure within a lushly restored recreational area.

**Heritage and Vision**

Overlapped in the matrix of ecologically regenerated landscape are layers of agricultural and industrial past of the site and the future of the postindustrial ecocivilization.

Lessons Learned

Houtan Park demonstrates a living system where ecological infrastructure can provide multiple services for society and nature and new ecological water treatment and flood control methods.

Pedestrian network ensures seamless connections between the park and its surroundings, encourages access within the site that not only effectively accommodates the massive pedestrian flows expected during the Expo, but ensures a pleasant and accessible public park at the human scale afterwards.

The post-industrial design demonstrates a unique productive landscape evoking the memories of past and the future of the ecological civilization, paying homage to a new aesthetics based low maintenance and high performance landscapes.

The wetland also acts as a flood protection buffer between the levees. The meandering valley along the wetland creates visual interest. The terrace design of the wetland alleviates the elevation difference between the city and the river, safely reconnecting people to the water’s edge.

The industrial spirit of the site is celebrated through the reclamation of industrial structures and materials. Shanghai is the birthplace of China’s modern industry and the iconic structures that remained onsite have been transformed into hanging gardens and overlook platforms.

Source: http://www.turenscape.com/
DESIGN PROGRAM
Mission Statement
To create a mixed use district at the core of the Nashville city, connecting the site with the surrounding areas and transform the degraded industrial site and the waterfront into a vibrant public realms, integrating natural landscapes and processes into the urban setting.

Goal & Objectives

<table>
<thead>
<tr>
<th>GOALS</th>
<th>OBJECTIVES</th>
</tr>
</thead>
</table>
| 1. CONNECTIVITY  
- Site to context connections.  
- Cultural systems and natural systems connection.  
- Temporal connections that recognize the life of landscape over time. | • Reconnect the disconnected site ecologically to the riverfront.  
• To improve connections of the site with its neighbourhood communities.  
• Design and encourage multi-modal means of transportation in and around the site.  
• Rejoin and improve site stormwater system by improving site runoff.  
• Build a network of green connections and public spaces that connect visually and physically to the water.  
• Create easy access to site and improve the major nodes which act as a gateway.  
• The waterfront will be an increasingly attractive place for walkers, bicyclists, joggers, recreational boaters and others. |
User Analysis

A day at the riverfront

Morning

Evening

Night

Morning

Evening

Night

Morning

Evening

Night

Play
walk
Run
Water Garden
Chatting
Sitting
Biking
Sports
Water Play
Boating

Shopping
walking
Chatting
Eating
Strolling
Jogging
Gardening
Dancing
Outdoor Cafe
Reading
Jogging
Sports

Relaxing
Gardening
Walking
Seating
Chatting
Sleeping
Viewing
Reading
Meeting

Play
walk
Run
Water Garden
Chatting
Sitting
Biking
Sports
Water Play
Boating

Shopping
walking
Chatting
Eating
Strolling
Jogging
Gardening
Dancing
Outdoor Cafe
Reading
Jogging
Sports

Relaxing
Gardening
Walking
Seating
Chatting
Sleeping
Viewing
Reading
Meeting

- 55 - Deepal Kilewala
Program Development

**RELAX**
- Amphitheatre Park
- Urban Square
- River Promenade
- Piano Plaza
- Fountain Play Area
- Camping Forest
- Great Meadow
- Waterplay

**LEARN**
- Museum
- Arts and Music Exhibition
- Workshops
- Music School
- Central Plaza
- Garden Festival Area
- Morning Exercise Zones
- Multipurpose Court
- Outdoor Sports Area

**EXPERIENCE**
- Pedestrian Promenade Squares
- Auditorium
- Island of Joy
- Watch tower garden
- Great steps
- Sculpture Garden
- Ferris Wheel
- Camping
- Entrance Boulevard
- Siting Spaces
- Hotel Entrance
- State Tree Bikeway
- Yellow Flower Garden
- Picnic Zone
- Purple Flower Path
- Pink flower Path
- Red Flower Path

**WORK**
- Offices
- Shops
- Restaurant
- Market
- Conference Hall
- Convention Hall
- Workshop Spaces
- Boat House

**RESIDE**
- Hotel
- Artists Village
- Lofts / Apartments
- Parking garage
- Surface Parking
Proposed design elements

CONNECTIVITY

Promenade  Strolling  Walking  Sitting

Biking  Boating  Commuting  Entrance
Proposed design elements

MEANING

- Museums
- Art Gallery
- Performances
- Viewing

- Sculpture Garden
- Observation tower
- Sense of place
- Adaptive reuse
Proposed design elements

Museums  Art Gallery  Performances  Cruising

Restaurants  Outdoor cafe  Residential  Street shopping / retail
### Proposed design elements

#### EFFICIENCY

<table>
<thead>
<tr>
<th>Native vegetation</th>
<th>Wildlife</th>
<th>Pedestrian</th>
<th>Stormwater management</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Flood control</th>
<th>Terraced landscape</th>
<th>Active landscapes</th>
<th>Materials</th>
</tr>
</thead>
</table>
Proposed design elements

**STEWARDSHIP**

<table>
<thead>
<tr>
<th>Farmers market</th>
<th>Land form</th>
<th>Waterplay</th>
<th>State tree promenade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood Control</td>
<td>Education events</td>
<td>Childrens event</td>
<td>Riparian Preservation</td>
</tr>
</tbody>
</table>
Program typical diagram

Generally we see mixed use urban settings, parks and landscapes are organized around a similar frame. Open spaces with various activities and these are blended with an effective circulation corridors. Accommodating various kinds of commercial, recreational and green spaces. The project program derive its inspiration from this successful space distribution diagram.

Legend
- Designed open spaces / landscapes
- Activity areas / events / nodes
- Promenade
- Riverfront

THIS SITE PLAN HAS A CIRCULAR ARRANGEMENT WITH THE MUSIC CENTRAL PLAZA, A FESTIVE GARDEN IN BETWEEN, REMINISCENT OF THE DROP OF WATER. DIFFERENT WATER FEATURES EVOKE THE DIFFERENT IMAGES OF WATER, CALM, ROUGH, WATER JETS, MUSICAL FOUNTAIN. AS THE WATER SCATTERS DIFFERENT EVENTS TAKES PLACE IN THE SITE. HERE PEOPLE COME TO HAVE FUN, RESIDE, AND FRESHEN UP.
Conceptual framework

Legend
- Green space
- Mix use district
- Promenade
- Riverfront
- Connections
- Gateway
- Focal point

- Downtown
- Sports stadium
- Residential
- New development
- Rec./open areas
- Live/work community
Contextual Plan

Legend
- Green space
- Destinations
- Links
- River

Downtown
LP Field Stadium
Music Hall and Museum

River
Building Height Plan

Legend
- Building - 5 Floors
- Building - 4 Floors
- Building - 3 Floors
- Building - 2 Floors
- Building - 1.5 Floors
- Building - 1 Floors

GRAPHIC SCALE

- 69 - Deepal Kilewala
Circulation Diagrams

Legend

- Bike Paths

GRAPHIC SCALE
Circulation Diagrams

Legend

- Primary Road

GRAPHIC SCALE

0 20 30 60 120 240'
Circulation Diagrams

Legend

- Secondary Road
Typical Road Sections
By organizing the site in such a way that, it develop a series of gathering joints as well as view point. The focus of the design gives the view of all the building towards the central plaza. The center celebrates the cultural aspect of the city. As well as celebrate the connection with the river.
Planting plan

Legend

- Formal Tree Row
- Buffer Zone Plantation
- Tn State Tree Boulevard
- Forest Zone
- Formal Shrubs
- Screen Plant Rows
- Linear Planting
- Tree Clusters
- Yellow Flower Pathway
- Purple Flower Pathway
- Pink Flower Pathway
- Red Flower Pathway
- Hedges
Plant List

- Formal Tree Row

- Buffer Zone Plantation

- Forest Zone
The site design in the flooding zone is such that it allows to cater various flooding events. The stormwater events distribute the water to other zones and still make it accessible. The stepping garden makes it possible that the garden can be used in various events of flood. Controlling soil erosion and making it more water and ecologically sustainable.
Flower Park

Legend
- Site connections
- Bike + Pedestrian pathways
- Pedestrian ways
- Rows of flower
- Green open spaces / Buffers

SECTION A - A'

Boardwalk    Bike Path    Pink Flower Path    Red Flower Path    Stone Garden    Purple Flower Path    Yellow Flower Path
Flower Park

Legend
- Mixed Use Pathways
- Bike Paths
- Pedestrian Paths
- Stone Garden
- Picnic Area
- Stepping Stones
- Great Meadow
- Siting under the tree
- Yellow Flower path
- Purple Flower path
- Red Flower path
- Pink Flower path

Site Plan

Stone Garden

soil erosion

a series of plantation and deep rooted trees prevents soil erosion
Flower Park
Flower Park

- Stone Garden
- Red Flower Paths
- Yellow Flower Paths
- Purple Flower paths
Connecting People & Water

Legend
- Green space / Buffers
- Waterway
- River Access
- Pedestrian Zones / Relaxation spaces
- Greenway

EDGE CONDITION DIAGRAM

Wildlife Habitat for birds and other species in the forest zone

Flood Zone is covered with dense vegetation, preventing soil erosion and promoting forest ecology

Vegetation edge encourages aquatic life

Aquatic life

SECTION A - A’
Connecting People & Water

Legend
- Green space / Buffers
- Waterway
- Sculptor Garden
- Ferris Wheel
- Group Seating areas
- Fishing
- Boating area
- Boat House
- Camp Fire / Grilling Zones
- Reading areas near the river
- River walk
- Star Gazing areas
- Bike path
- Board Walk

Site Plan - River Edge

KEY MAP - n.t.s

GRAPHIC SCALE
Connecting People & Water - Boardwalk

Perspective of the Riverwalk

Section A - A’

Graphic Scale

0 10’ 20’ 40’ 80’

Boardwalk  Mized use path  Great Lawn  Flower gardens
Piano Garden

Flowering Calendar

<table>
<thead>
<tr>
<th>JAN</th>
<th>FEB</th>
<th>MAR</th>
<th>APR</th>
<th>MAY</th>
<th>JUN</th>
<th>JUL</th>
<th>AUG</th>
<th>SEP</th>
<th>OCT</th>
<th>NOV</th>
<th>DEC</th>
</tr>
</thead>
</table>

Legend
- Seating Area
- Flower Zone
- Path to reach the Piano
- Piano

Plantation Map

KEY MAP - n.t.s

Deepal Kilewala
Piano Garden

Concept Sketch

KEY MAP - n.l.s

GRAPHIC SCALE

Piano Garden Section

- 88 - Deepal Kilewala
Piano Garden

- Restaurant Area
- Water Play
- Grand Piano
- Rose Garden
- Seating

KEY MAP - n.t.s
Central Plaza

Legend

1. Music Plaza
2. Benches
3. Amphitheatre
4. Stepping Stone
5. Walking and sitting area
6. Access to the flower garden
7. Musical Fountain
8. Flower Beds
9. Gazibo Garden
10. Relaxing Zone
11. Play Lawns
12. Buffers

Site Plan

Central Perspective

Cultural consideration
LID Techniques

Stormwater run-off filtered and attenuated on site in parking lot strategies. Impervious Surface Increase Biodiversity

Evaporation

Filtration

Infiltration

Evapotranspiration

Climate Regulation

Recreational

Run-off

Shared Spaces

LID Corridor

Stormwater Infrastructure is planned to make the site more sustainable and ecologically sound.

Artist Village Design Incorporated shared green spaces and areas. This makes the run off and stormwater control easy by connecting the houses with green areas.
Construction Details

- CURB AS PER DETAIL
- STABALIZED DECOMPOSED GRANITE COMPACTED FLUSHED WITH TOP OF CURB WITH 4” MIN THICKNESS
- COMPACTED BASE AS PER THE FLOOD CONTROL MEASURES AND ACCESS
- FINISH GRADE OF SOIL IN TURF AREA 1” BELOW TOP OF CURB
- UNDISTURBED NATIVE SOIL
- COMPACTED SUBGRADE
- FINISH GRADE OF MULCH IN PLANTING AREA 1/2” BELOW THE CURB
- ADA APPROVED WOOD FIBER COMPACTED TO 12” THICK MIN.
- CONCRETE CURB 12” WIDE MIN x 20” DEEP MIN.
- CONCRETE PER DETAIL
- #4 REBAR @ 36” O.C.
- PATH DETAIL
- PLAY AREA CURB
- CONTINUOUS #4 REBAR
- FILTER FABRIC (COVER ENTIRE AREA)
- GRAVEL
Perspectives

Before and After
Outcomes - going back to goals!

**CONNECTIVITY**
1. Reconnects the site with river with a biodiverse, repaired landscape.
2. Models a healthy development through filtering open spaces into the larger watershed.
3. Creates connection between downtown and city stadium.
4. Link the neighbourhood which was previously separated by highways and vacant land.

**MEANING**
1. Engage site users in landscape whose forms derives inspiration from site challenges.
2. Integrate paths and nodes for humans and nature.

**PURPOSE**
1. Transforms an industrial land which would otherwise be a barren land into beautiful landscapes.

**EFFICIENCY**
1. Low maintenance landscape zones and design.
2. Promote public private partnership.

**STEWARDSHIP**
1. Creates a new ethic of sustainability through connections between industrial land and public activities. In contrast with conventional theory where industrial land stay away from public realms of life.
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