Indianapolis / City as Living Laboratory

Sustainability Made Tangible through the Arts

Indianapolis / City as Living Laboratory

September, 2016

Stream/Lines

The White River and Tributaries
Indianapolis, Indiana

Reflection in Central MIrror, Mary Miss

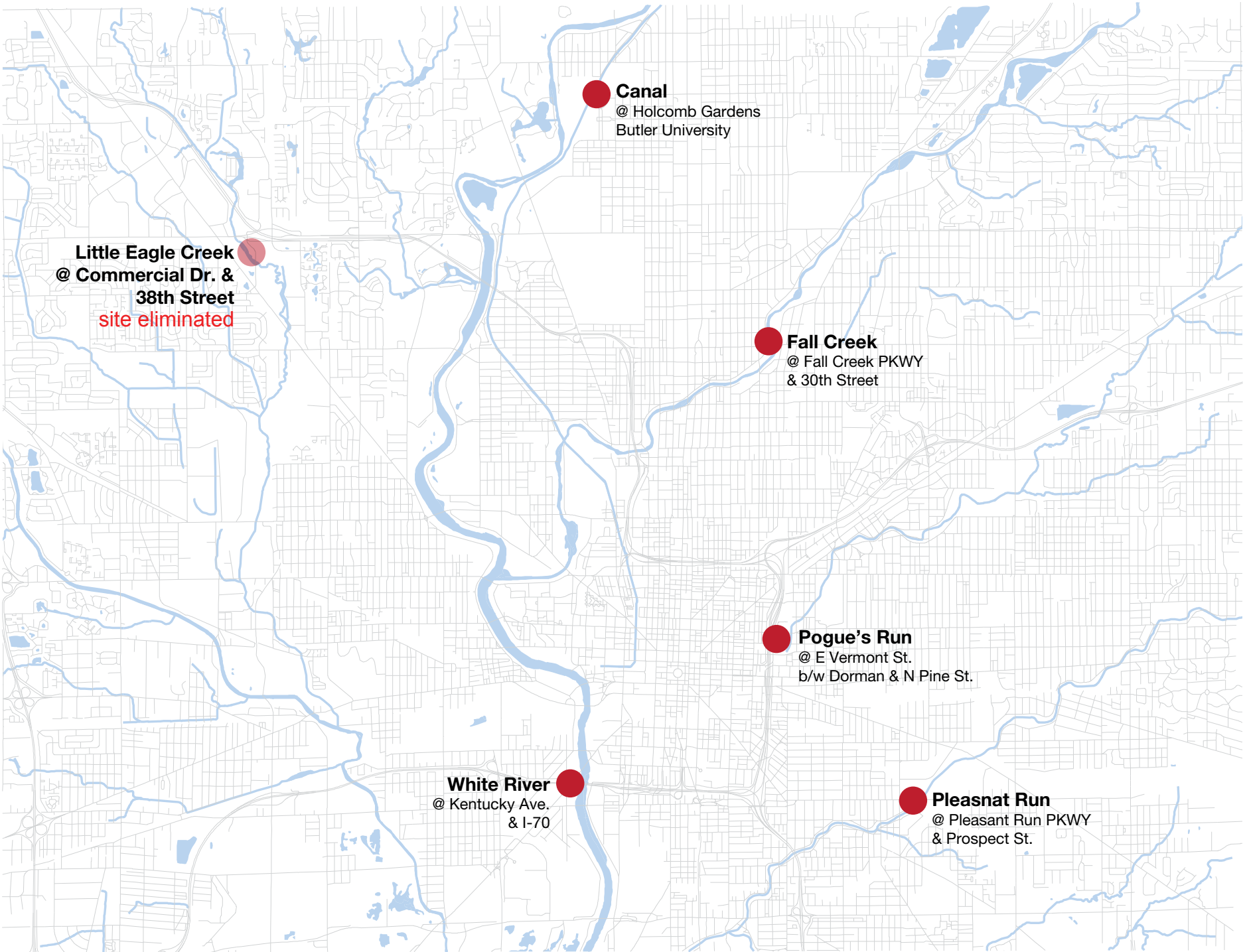
Overview

StreamLines is a city-wide initiative to engage the citizens of Indianapolis with the ways the White River watershed and its tributaries support their lives. Six communities along the six major waterways have been selected as part of this project. Evolving from the 2011 installation FLOW (Can You See the River?) and other precedent projects in the city, a community network was formed. This network, Reconnecting Our Waterways (ROW), has worked with neighborhood facilitators to select the six locations which are distributed throughout the city.

The intention is to give adjacent communities a better sense of how their homes, streets and businesses are connected to the river system and how the river supports their daily lives. The goal is to arouse curiosity and a desire to visit all six locations. In combination, these sites will reveal multiple aspects of the city's water system. By dispersing sites around the city, StreamLines will increase water awareness throughout Indianapolis.

This is an implementation of *'City as Living Laboratory (CaLL): Sustainability made Tangible Through the Arts'*. CaLL is a framework intended to make issues of social, economic and environmental sustainability compelling to the public. It envisions the city as a laboratory where collaborations amongst artists, scientists, communities and policy makers can make a city's pressing issues apparent to its citizens through place-based projects and events. For this National Science Foundation AISL sponsored project, four different art forms (visual, music, poetry, and dance) are combined with relevant science content about the watershed to create informal learning sites in the city.

We need... 'to draw bright lines around what is possible and what is not."
-Eric Sanderson, **TerraNova**


Canal
@ Holcomb Gardens
Butler University
Little Eagle Creek
@ Commercial Dr. &
38th Street
site eliminated
Fall Creek
@ Fall Creek PKWY
& 30th Street
Pogue's Run
@ E Vermont St.
b/w Dorman & N Pine St.
White River
@ Kentucky Ave.
& I-70
Pleasnat Run
@ Pleasant Run PKWY
& Prospect St.

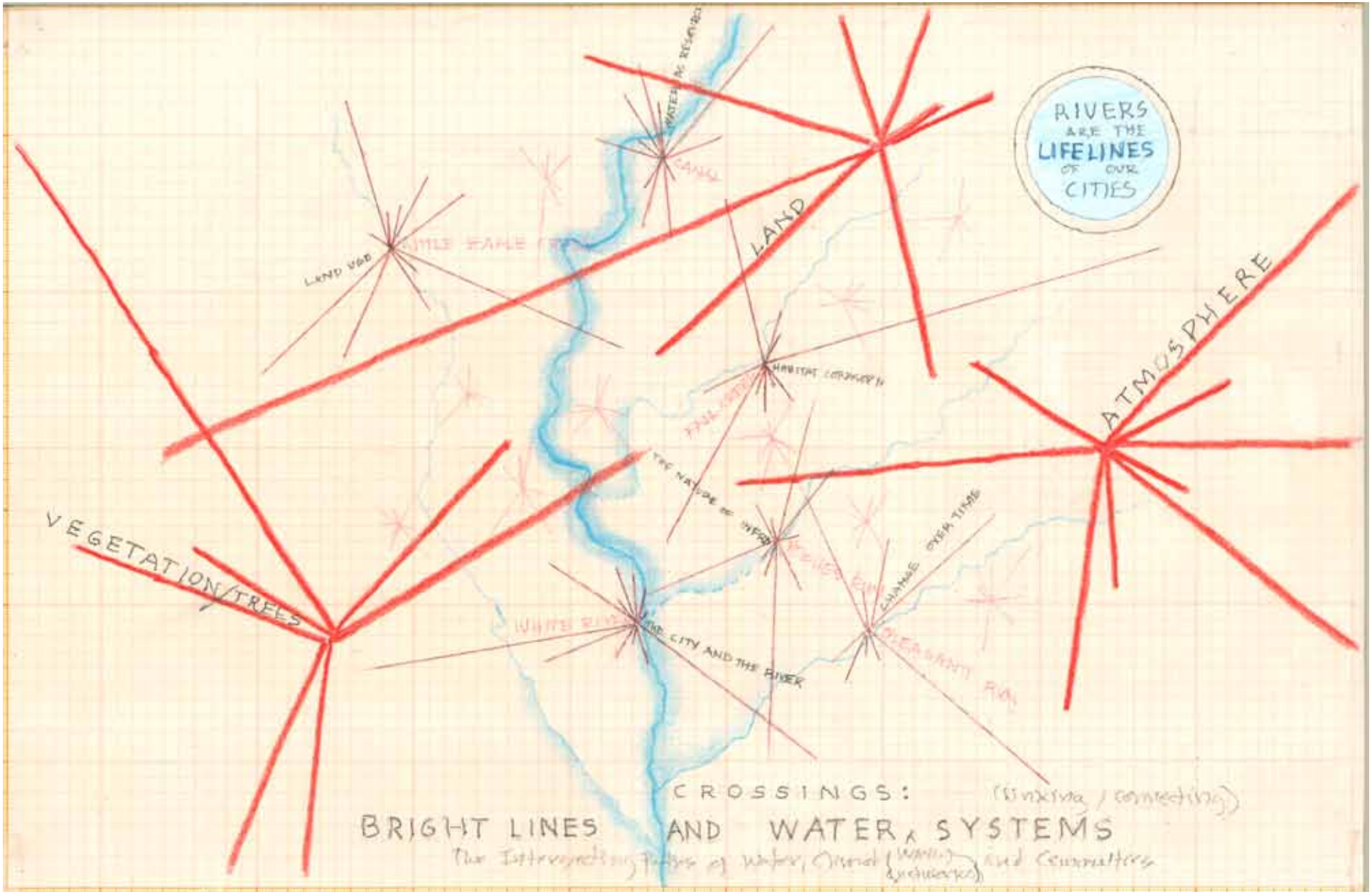
The Sites

Each site will focus on specific water related topics and expand from that point to illustrate the connected networks through which the city is built. *What happens to a drop of water as it falls from the sky, touches the asphalt, gets absorbed into the ground, soaked up and evaporated into the air we breath and sky above, before it falls back down to the ground again during a weather event? How do urbanization and our choice of transportation modes and building patterns effect our climate, weather, food we eat, health of our waterways, vitality of wildlife, and quality of life?* These are questions and topics that StreamLines will seek to address in hopes of evoking changes in our collective behavior and perceptions to elevate the entire city ecology and help us live more healthy and conscious lives.

A community facilitator worked with each neighborhood to identify general areas where installations could be implemented; this dialogue with the neighborhoods is an ongoing part of the process. Site analysis have been conducted over several visits to each site to identify more specific locations.

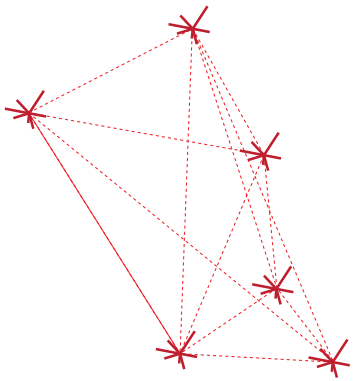
Each site was studied to note the characteristics specific to that particular location and through a dialogue between the artist and a group of scientists, general topics were arrived at for all six. The topics range from habitat corridors, to water infrastructure, to atmosphere and land use, to water as a resource and change over time. Those general headings are associated with ‘key words’. For instance: precipitation, infrastructure, temperature, contamination, restoration. Some of the ‘key words’ are shared between all sites while others are specific to single locations.

* Little Eagle Creek was originally a site focused on permeability of surfaces but due to circumsatnaces out of our control artwork was not installed on this site.

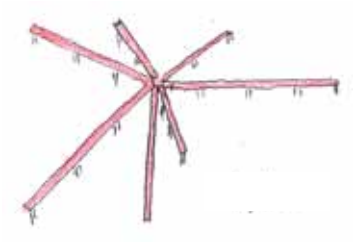


Concept Drawing, Mary Miss

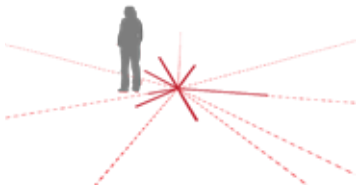
icon



content



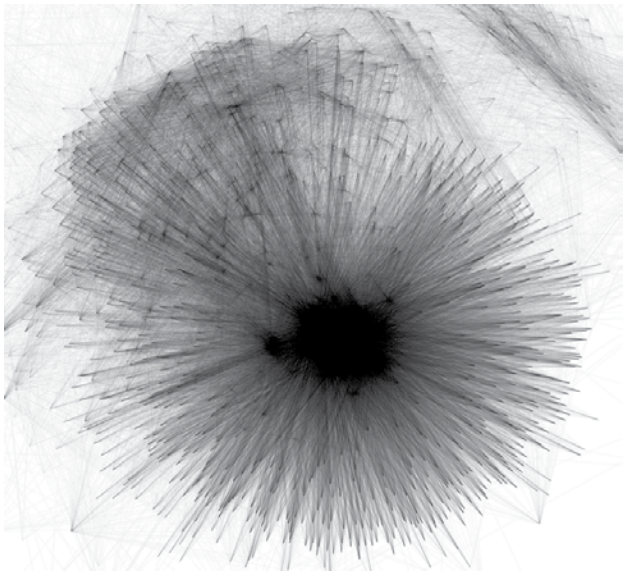
installation



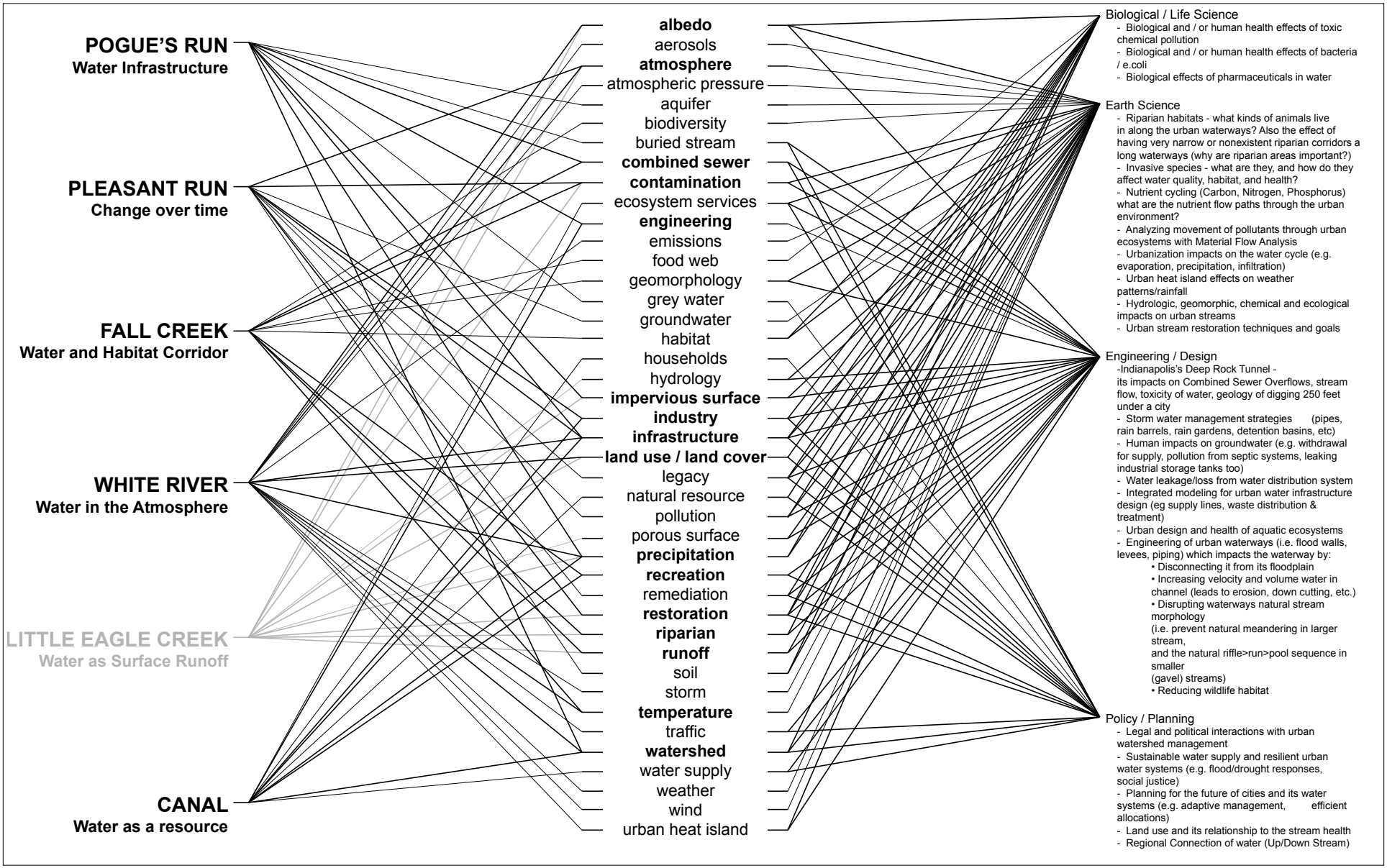
seek out

The Concept

The conceptual framework was inspired by and evolved from the Muir web. The Muir web is a graphic representation of habitat relationships, with a given organism in the center, and its habitat relationships such food, water, territory, shelter and reproductive resources spreading out. It illustrates the intricate network through which species and environemnt are connected. Similar to the Muir web, the project icon of a splayed star pattern demonstrates the multiple ways StreamLines is intended to operate. At its most basic, it represents several paths of exploration out from each site that visitors will be encouraged to take. It also reflects the site configuration and how site topics are related.

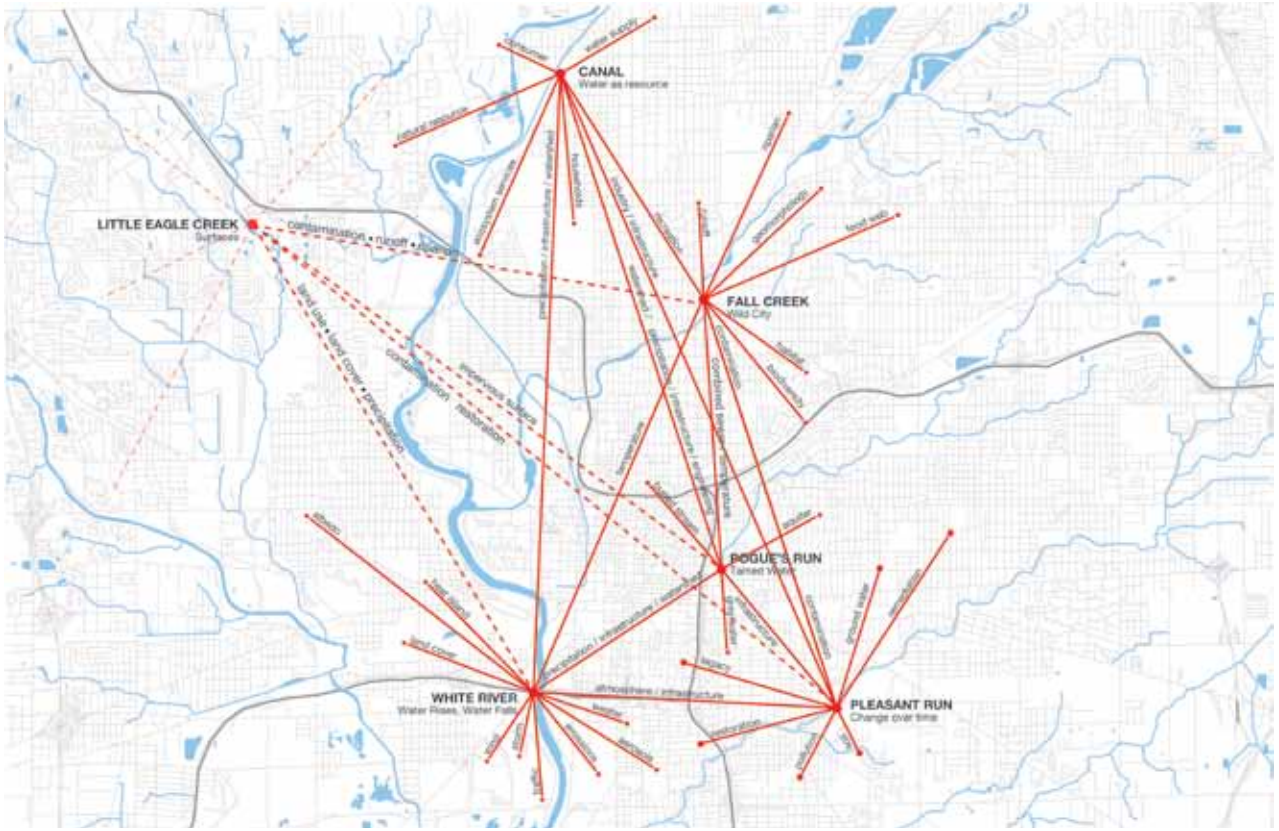


This Muir Web shows all the habitat relationships for all the species on Mannahatta. Visualiztion by Chris Harrison of Carnegie-Melon University. ©WCS



Science keyword connectivity diagram

Science Content



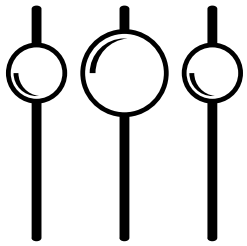
Site connectivity diagram based on science keywords

Visitors will be encouraged to explore the sites through a series of on-site interventions, virtual devices, and programs. On site interventions will include visual arts components in the form of constructed markers and mirrors, rows of Redbud trees, areas with plantings for cleaning storm water, and areas to sit and reflect on issues that shape our waterways. Signage will include educational texts as well as literary texts selected by Indiana poets. Original musical compositions commissioned specifically for the sites will be accessed through virtual devices. Voices of community members will be available through dial-up.

Visitors will be encouraged to explore the five sites in a playful manner, allowing themselves to respond to the landscape according to their personal interests. A series of prompts on signs will invite each person to seek out the aspects of each site that are of most interest to them. The most salient topics at each site will be noted with keywords. At each site, a map / diagram will show all six locations with their associated 'keywords' Visitors can use the keywords to formulate their own tour of sites, according to their own interests. For instance if 'habitat' is their area of interest there may be three out of six sites they can visit where 'habitat' is also a focus. Live programming will enliven the sites. Dance performances involving the community and developed specifically for each site will be held over a two year period.

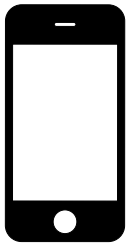
SCIENCE

+



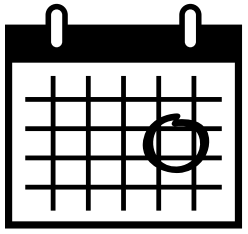
Art Works

- Visual Art
- Dance
- Music
- Poetry



VIRTUAL

- Dial up
- Ludogeography
- Track-a-raindrop



EVENTS

- Projections
- Readings
- Musical Performances
- Research Stations
- Walks

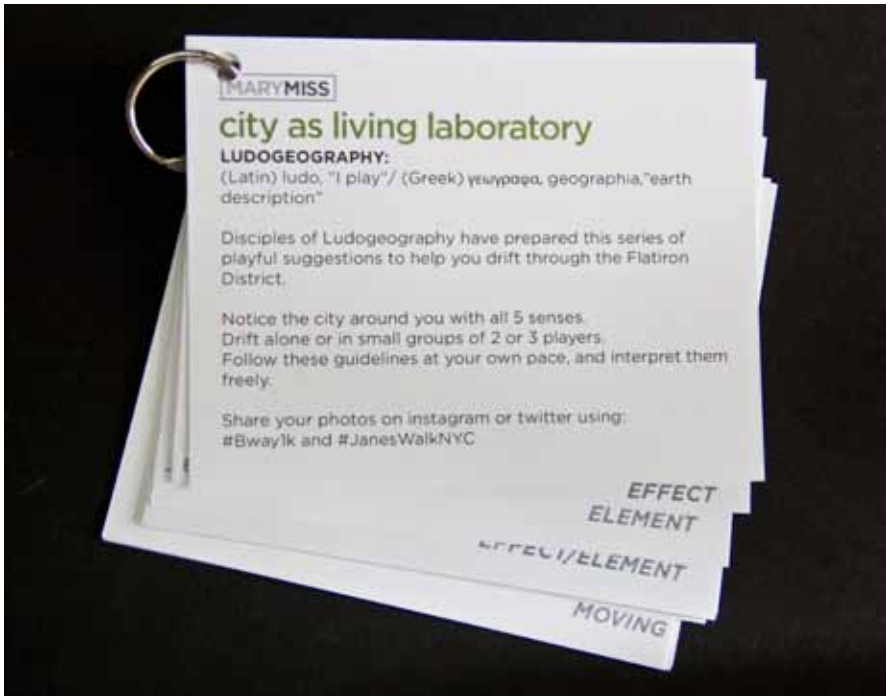
The Means

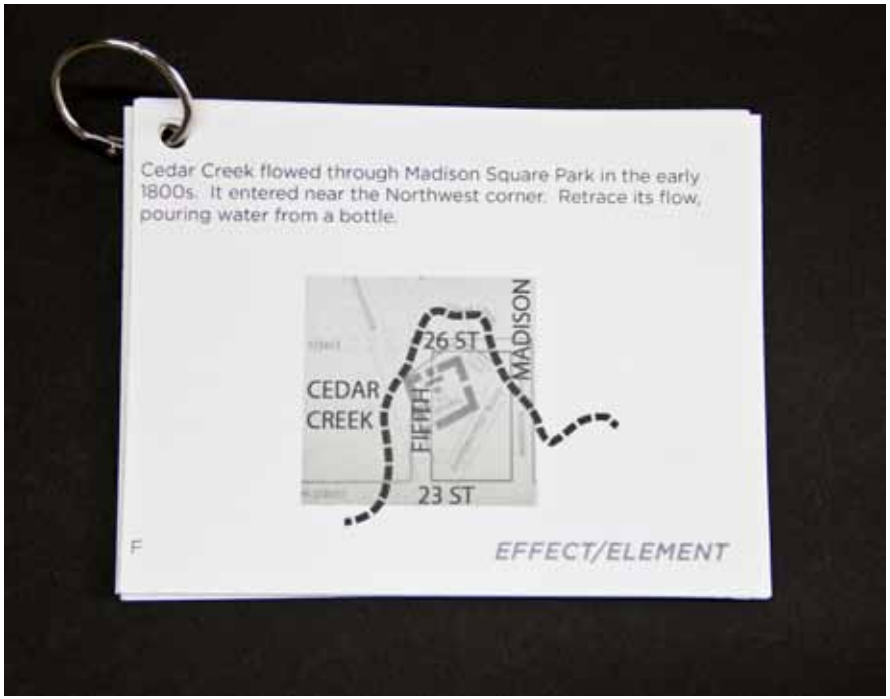
Means of Engagement

- Set up a situation where the community can become engaged with the place, the stream, and the topics over time
- Create a hub within the neighborhood
- Encourage exploration and connection between all six sites

Installation

- Build on existing elements on site - repurpose
- Create places to:
  - Engage people with topics
  - Provide new ways of seeing the site
  - Provide for gathering and performances
  - Encourage reflection
- Programming Team / Research Station
  - Create community, artist, scientist teams for each site that will be engaged in an ongoing capacity
  - Explore most effective means of engaging community
- Events
  - Projections
  - Readings
  - Music
  - Performances
  - Research
  - Walks
  - Demonstration projects in each neighborhood. For instance: creating demonstration rain gardens and plant trees around industrial site.





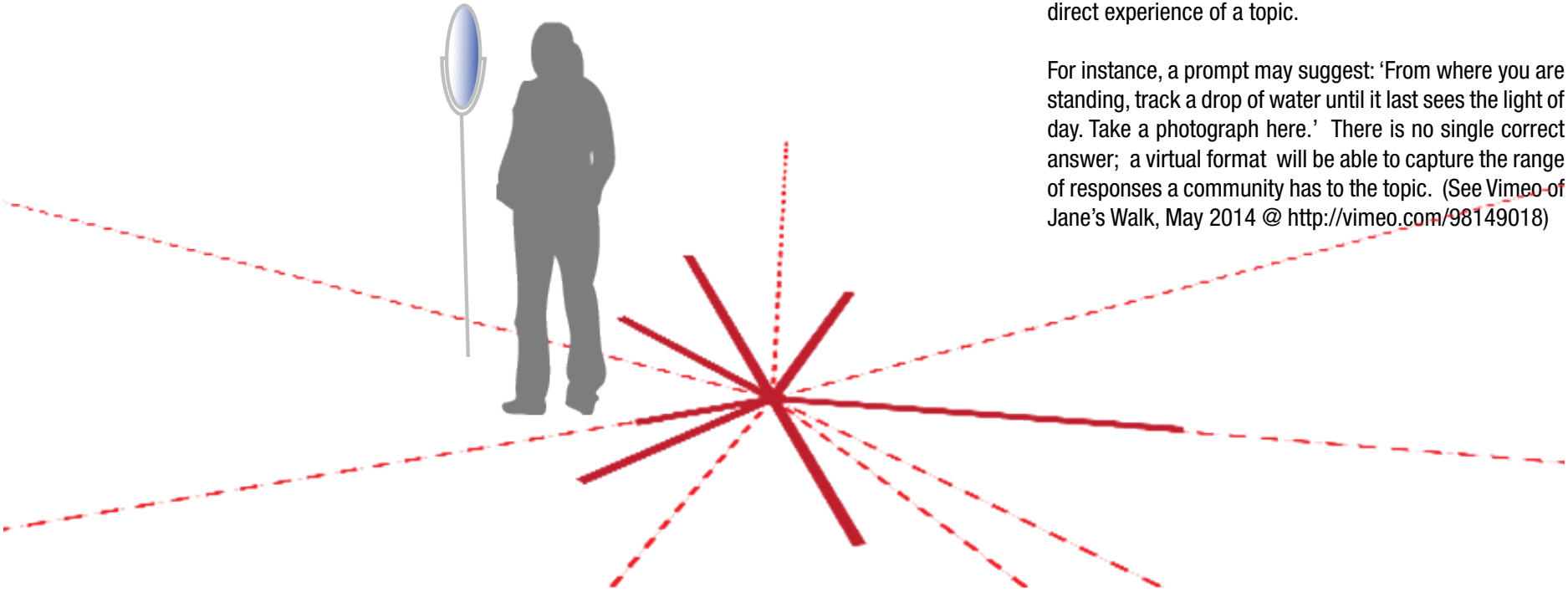
Ludogeography cards for Broadway: 1000 Steps play test
(Madison Square Park. City as Living Laboratory)

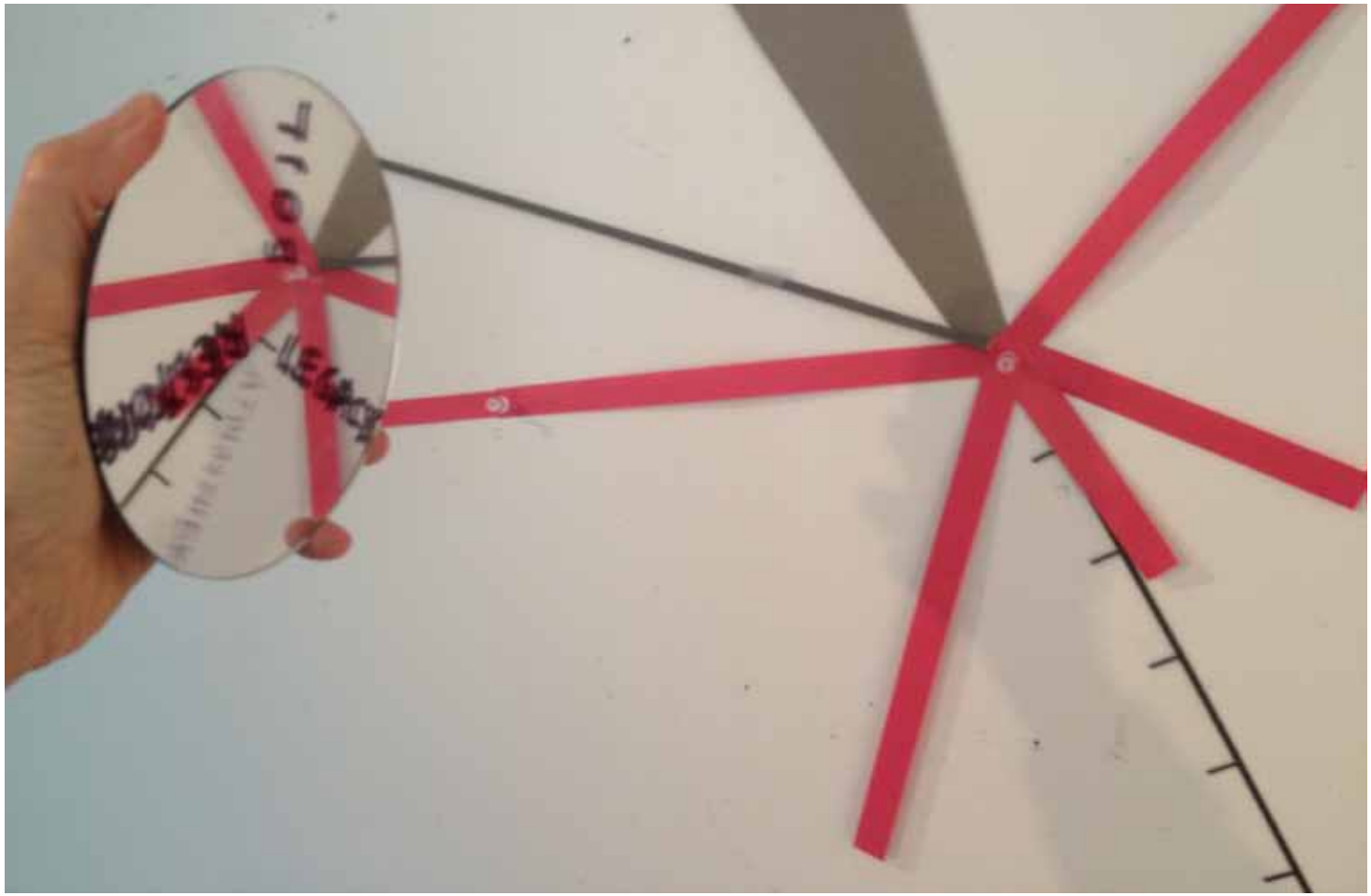
Ludogeography

Visitors will be encouraged to explore the six sites through a derive-like walk or ludogeography. Derive, a practice theorized by Guy Debord and used by the Situationists, is a technique of passing through urban spaces in a playful manner, allowing oneself to be drawn by the “attractions of the terrain” and the encounters found there. Ludogeography is a type of emergent game - where the rules of a game emerge from choices made by the players.

Ludogeography is a game-based site exploration that grows out of ‘derive’ as a means of exploring a city. Game designer Josh De Bonis, naturalist Gabriel Willow, and poet Carlos Hernandez developed the site specific game for the project. Visitors are given a series of prompts in text form or virtually that encourage them to explore a site. These are intended to be playful and encourage a direct experience of a topic.

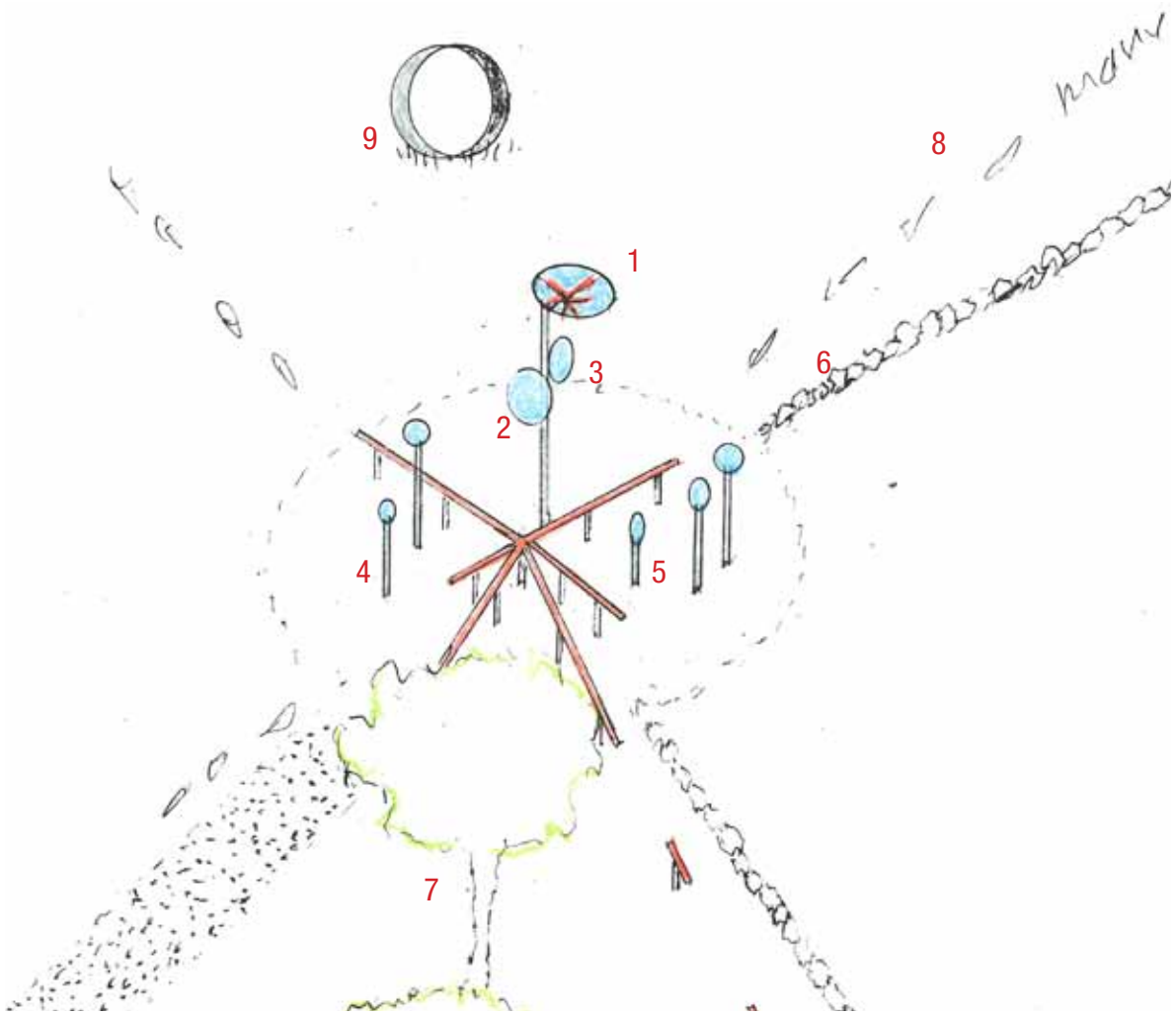
For instance, a prompt may suggest: ‘From where you are standing, track a drop of water until it last sees the light of day. Take a photograph here.’ There is no single correct answer; a virtual format will be able to capture the range of responses a community has to the topic. (See Vimeo of Jane’s Walk, May 2014 @ http://vimeo.com/98149018)





Conceptual model, Mary Miss

Visual Art Elements & Site Layout



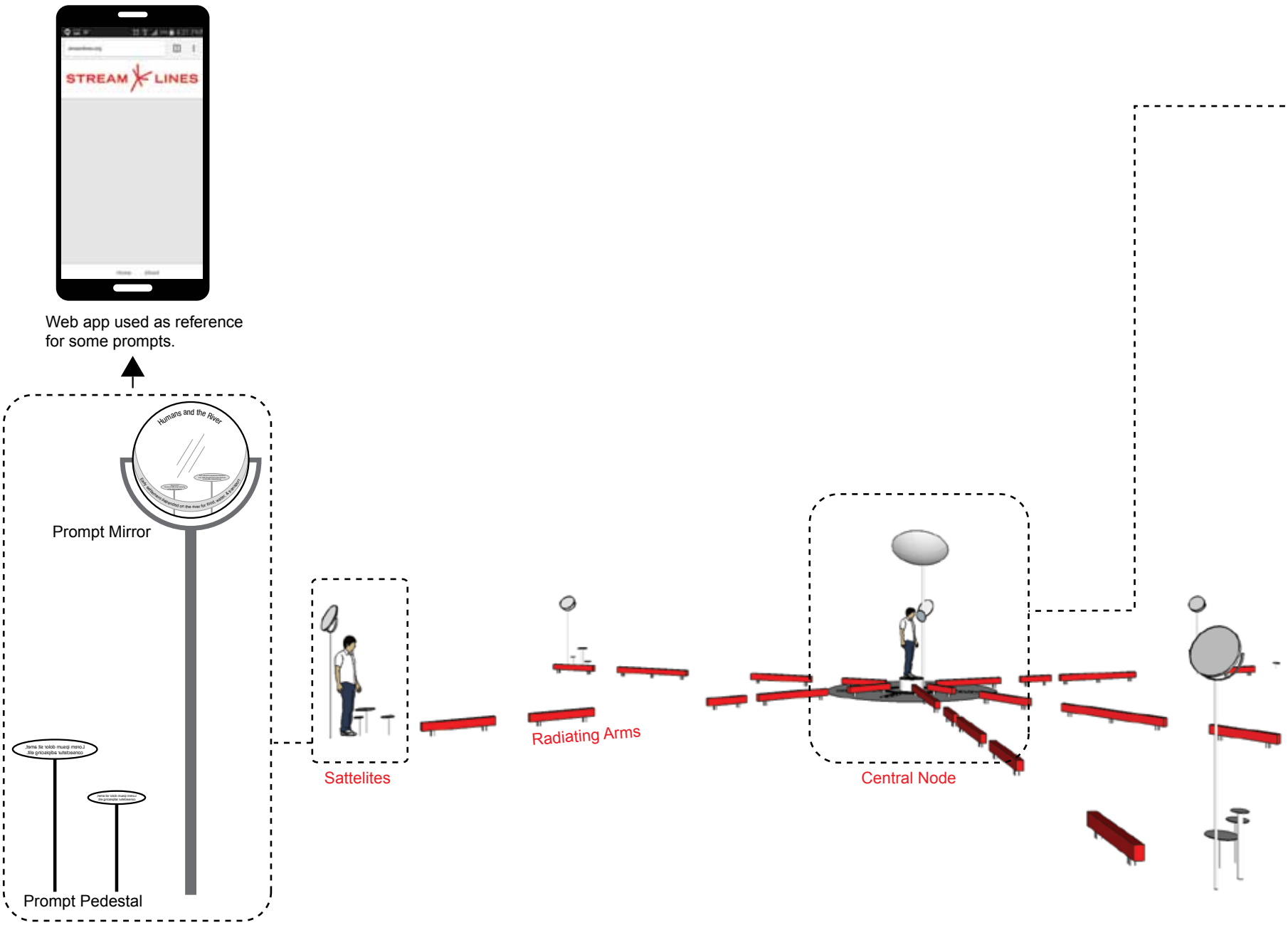
All five sites have a consistent approach, in both the physical installation and layout of content, while acknowledging the specific characteristics of each site. This template will allow visitors to easily navigate all sites after visiting the first. The layout, with its central marker and radiating arms, suggests that each of these sites is only the start of the exploration of the streams and the neighborhoods.

The elements include the central site marker with 48" diameter convex mirror hovering above, reflecting the surrounding site; site topic; repurposed mirrors from FLOW that address sub-topics and ludogeography; and seating areas that provide space for reflection.

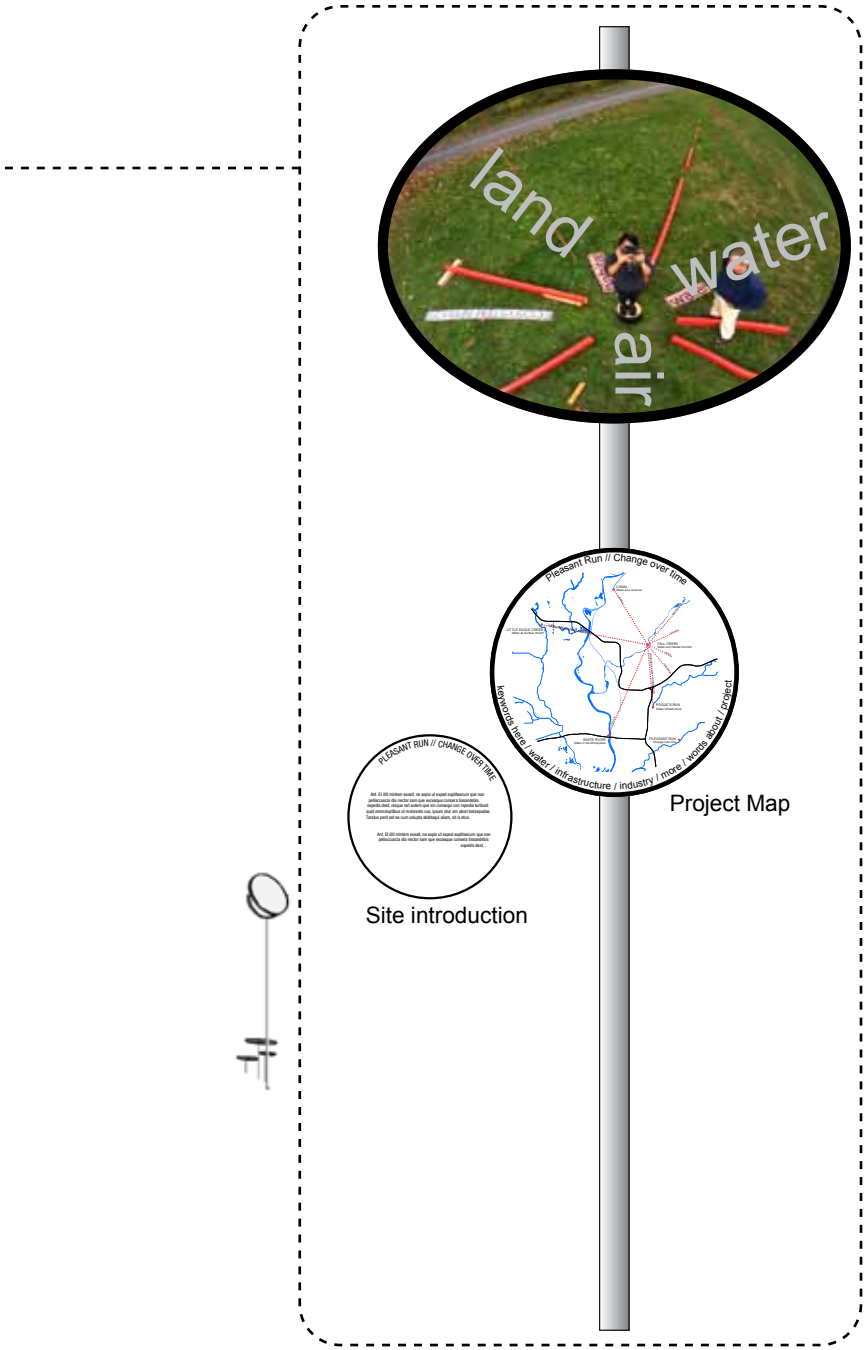
These may be reduced or expanded in scale or reconfigured based on further site studies and cost estimates.

All the sites will have:

1. Central marker and mirror
2. Project map showing all six sites
   (#2-5 will use repurposed FLOW mirrors)
3. Site topics and subtopics
4. Ludogeography prompts
5. Trackaraindrop.org info
6. Radiating paths
7. Redbud trees
8. Plantings
9. Pipe Slice


STREAM LINES
Web app used as reference for some prompts.
Humans and the River
Prompt Mirror
Prompt Pedestal
Sattelites
Radiating Arms
Central Node

The Constellation



Central Node

components @ all sites:

- **42” convex mirror** w/ ‘land’, ‘water’, ‘air’
- **Project Map:** 18” mirror w/ connectivity to other 5 sites
- **Site introduction:** 12” mirror w/ site topic, streamlines.org, trackaraindrop.org
- **Podium:** 24” dia. x 12” h w/ ‘Step up for water.’ inscribed.
- **3 in-ground** words unique to the site
- **14-foot dia. circle** filled w/crushed granite

Radiating Arms

components @ all sites:

- **Red Balance Beams:** 4” x 6” beams at varying lengths
- **12” poetry mirrors:** varying heights

site specific components:

- **ADA path**: 5-foot wide w/ crushed gravel (White River, Pleasant Run, Fall Creek)
- **Redbud trees** pleanted at 25-feet apart (Pleasant Run)
- **18” dia. Concrete pipes**: capped at ends and secured to the ground. (Little Eagle Creek, Pogue’s Run)
- **12”-18” dia. Stones**; varying color and finish (Pogue’s Run)
- **Areas of planting**. Species and planting schemes are in development. (Pogue’s Run and Pleasant Run)

Sattelies

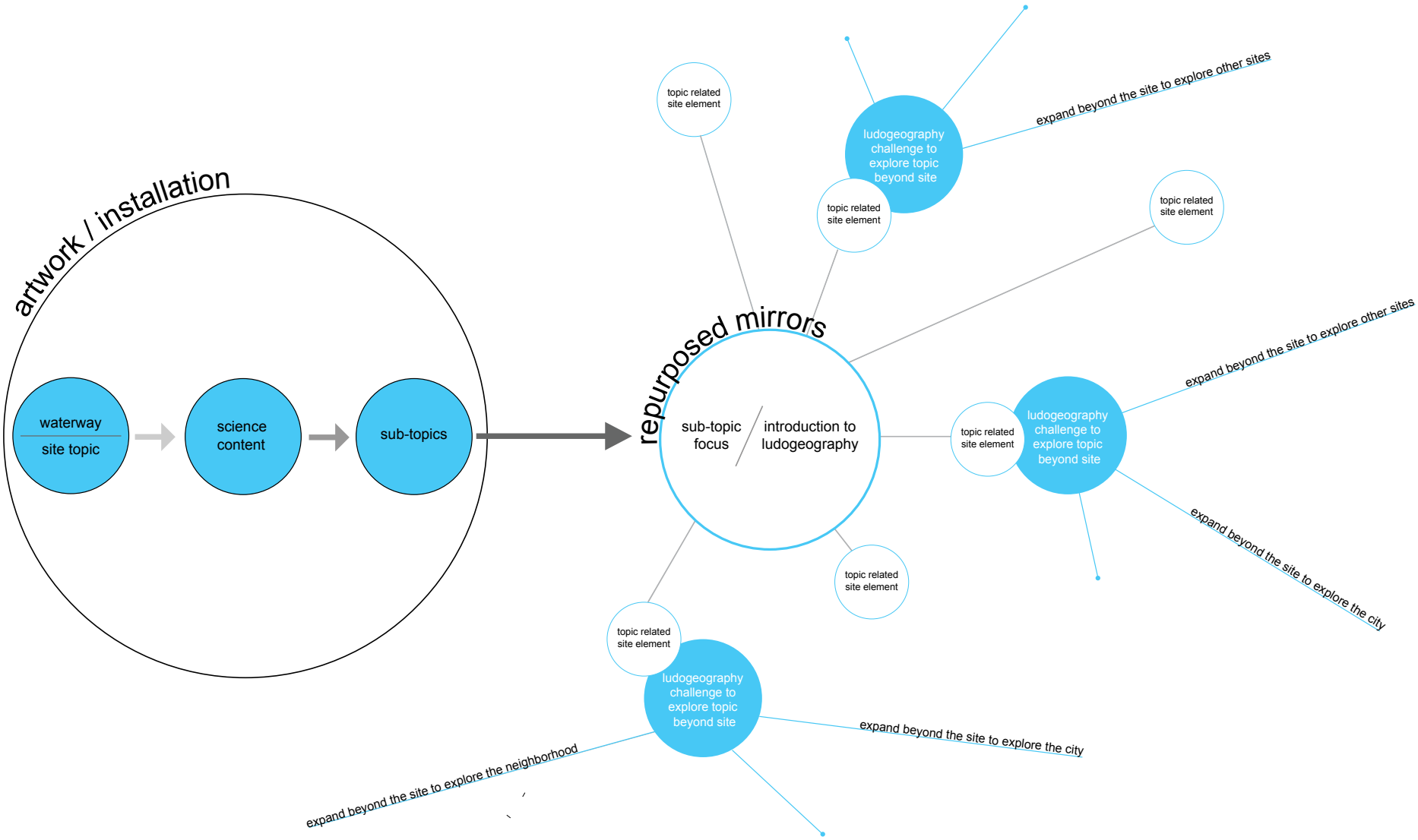
components @ all sites:

- **Prompt Mirror:** 18” mirror w/ a refrain etched on the surface and byline etch backwards on the inner frame but read correctly when reflected in the mirror. Mirror mounted at varying heights.
- **Prompt Pedestals:** 6” dia. & 8” dia. w/ prompts etched backwards but read correctly when reflected in the 18” mirror. Prompt pedestals mounted at varying heights.

site specific components:

- **Pipe seating**: 8-foot dia. concrete pipes filled w/dirt and planted for seating.

Content Layout Diagram



Sites Strategies

Strategy At Each Site

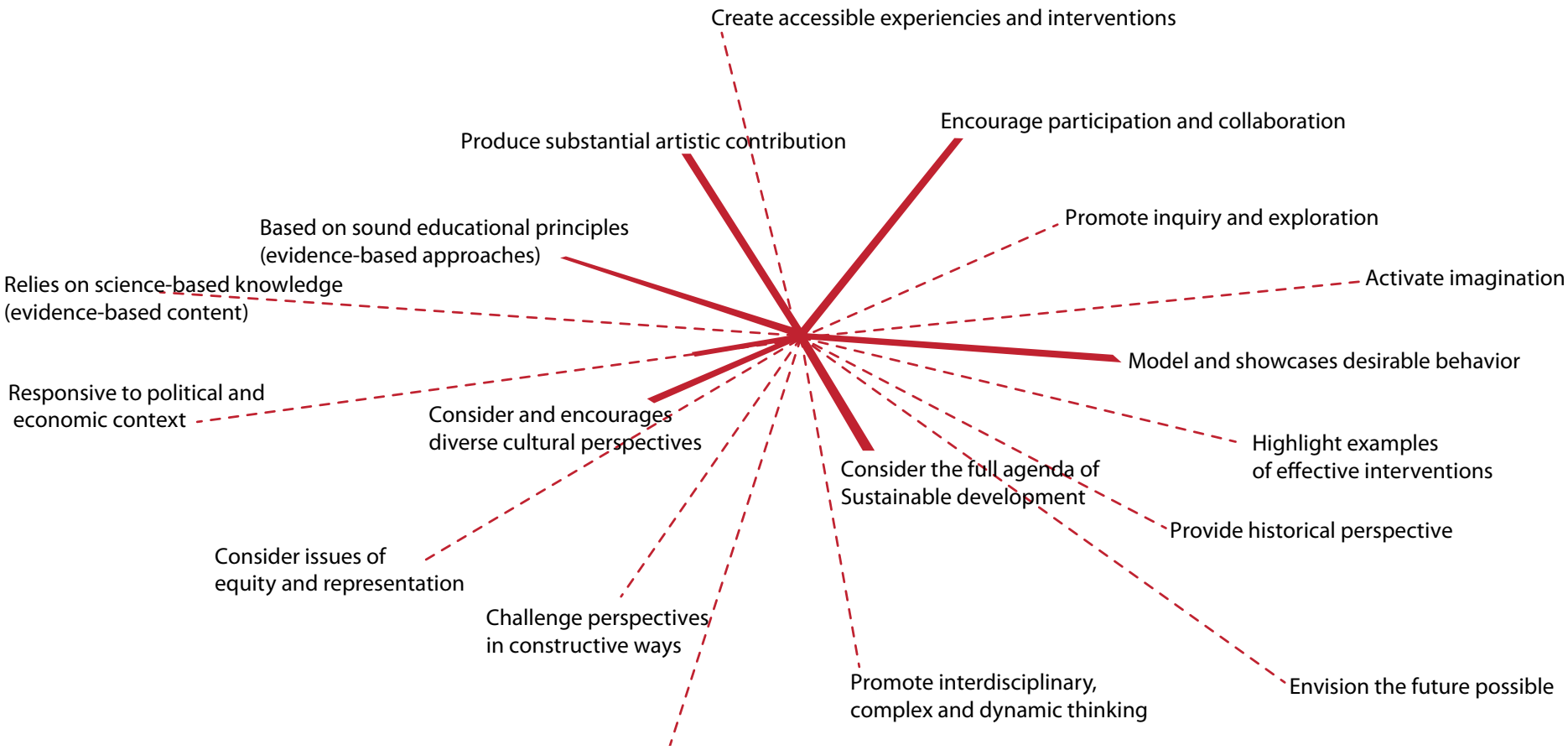
- Introduce the topic
- Build on the unique nature of each site
- Make connections to topics spatially, temporally, and conceptually
- Give people the tools to decode and relate to the site topic
- Reveal that water and their neighborhoods are part of a complex and interconnected ecological landscape
- Show how site specific topics are emblematic of larger territories upstream and downstream

Tactics At Each Site

- Kinesthetic Experience of Place
  - walking / moving
  - guided viewing at specific points
  - the search or treasure hunt
- The senses of the site
  - sight - focus on unnoticeable things
  - sound - introduce new sounds, stories, or voices
  - touch - allow an intimacy
  - smell - find the differences
- Metrics / Equivalencies
  - show human scale references to flows and consumption
    - volume of flow
    - miles of pipe
    - distance travelled
- Minimal intervention in the existing landscape
  - build on what is already present

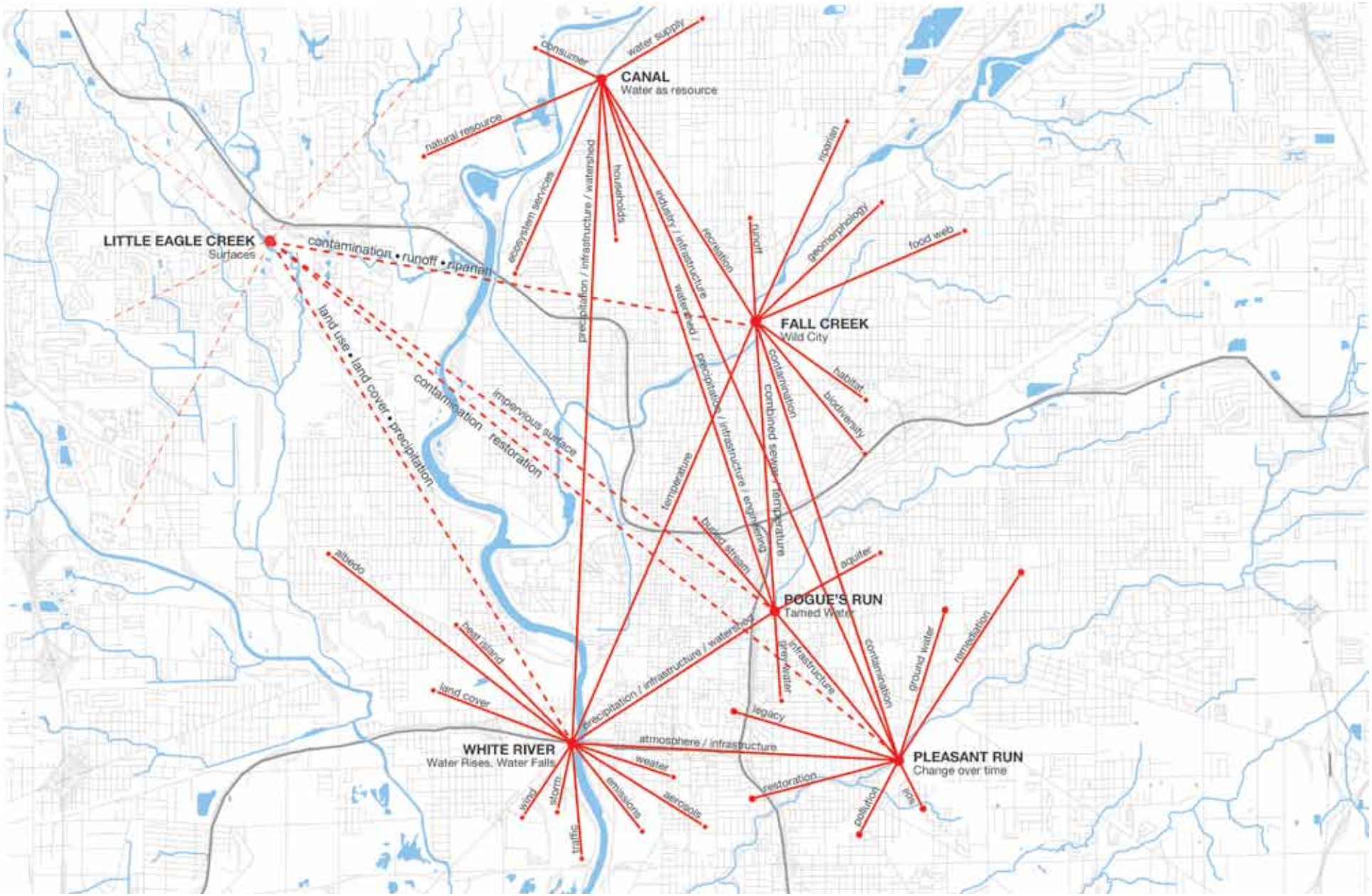
Principals for Activation

Connecting knowledge, perspectives, and artistic interventions with actions to promote sustainable development



Programming Principles

The completed installations act as anchors for the starts of programs to be held over a period of time. these will consists of events, walks, activities and perfromances that are intended to foster curiosity and engagement with the topics raised at the 5 sites.


CANAL
Water as resource
consumer
water supply
natural resource
ecosystem services
households
precipitation / infrastructure / watershed
LITTLE EAGLE CREEK
Surfaces
contamination • runoff • riparian
land use • land cover • precipitation
contamination
impervious surface
restoration
tributary / infrastructure
recreation
riparian
runoff
geomorphology
food web
FALL CREEK
Wild City
watershed / precipitation / infrastructure / engineering
contamination
combined sewer / temperature
habitat
biodiversity
temperature
buried stream
albedo
heat island
land cover
aquifer
POGUE'S RUN
Tamed Water
precipitation / infrastructure / waterways
grey water
infrastructure
contamination
ground water
remediation
legacy
WHITE RIVER
Water Rises. Water Falls
atmosphere / infrastructure
weater
wind
storm
emissions
aerosols
traffic
restoration
pollution
PLEASANT RUN
Change over time
soil

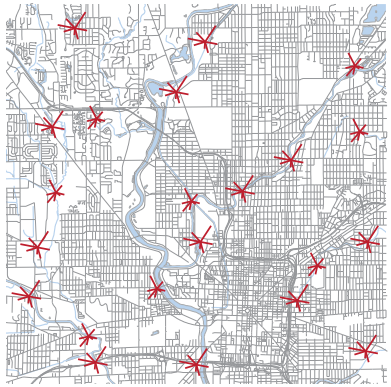
Creating a Network

How can these projects seed future projects and help the network proliferate?

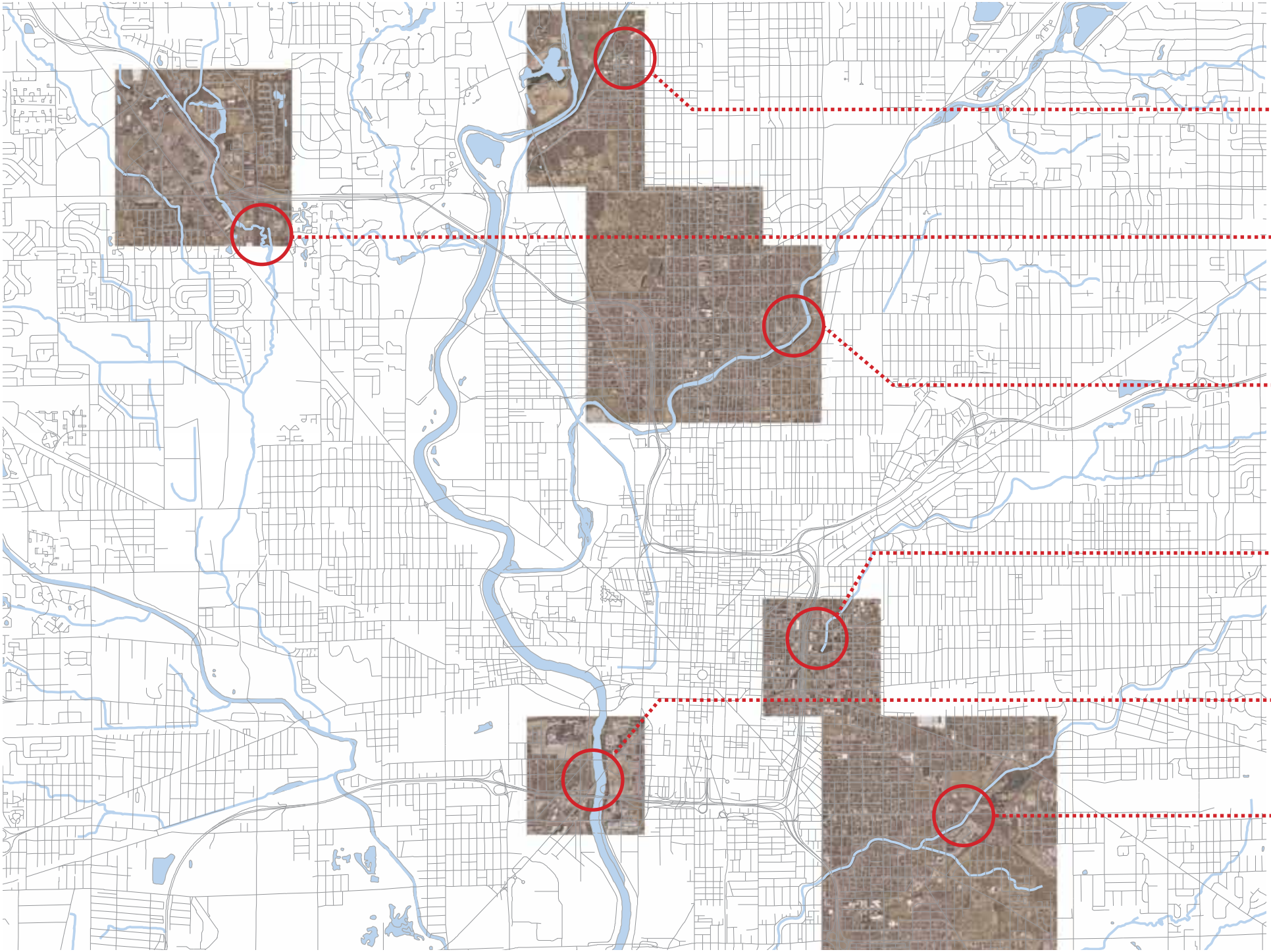
A riff on the environmental ecologist Eric Sanderson's prompt to 'draw bright lines...' makes it possible to imagine the incremental evolution of i/CaLL's StreamLines into a city-wide network. Bright cities will be drawn around the places in our cities, highlighting the natural systems that support life in the city. This forms a dense network where the systems of the city are revealed to its inhabitants.

Phase 1 - building off of the FLOW: Can You See the River? project, i/CaLL expands to the 6 major waterways in Indianapolis. It is hoped that this phase seeds other collaborative projects around the city.

Phase 2 - Encourage by i/CaLL more collaborative projects begin to proliferate around the city. These projects highlight the expanding sustainability issues of urban living.



Phase 3 - The city becomes a place for informal learning with the multitude of collaborative projects located around the city.



StreamLines Sites and Topics

Canal / Butler University campus
Resources
page 26

Musician: Matthew Skjonsberg
Poet: Alessandra Lynch
Dance: TBD

Little Eagle Creek / Lafayette Place
Urbanization and Land Use
page 34 (installations eliminated at this site)

Musician: Roberto Lang
Poet: Adrian Matejka

Fall Creek / MFC @ 30th St.
Stream Ecology & Habitat Corridor
page 38

Musician: Moses Sumney
Poet: Cathrine Baumann
Dance: TBD

Pogue's Run / Holy Cross @ Vermont St.
Infrastructure
page 46

Musician: Stuart Hyatt
Poet: Cathrine Baumann
Dance: TBD

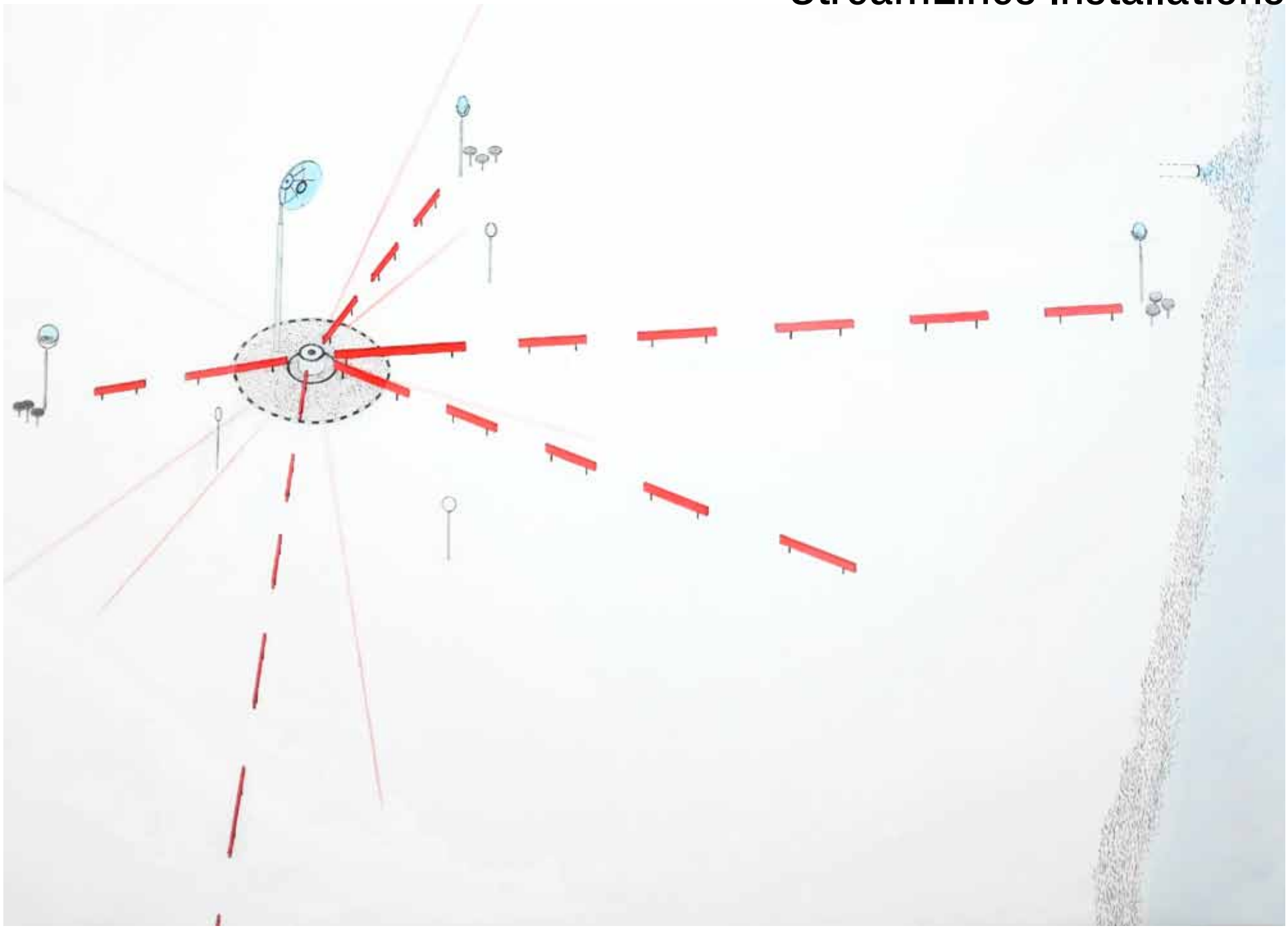
White River / West Indy @ Kentucky Ave.
The City & The River [weather & climate]
page 54

Musician:Hanna Benn
Poet: Alessandra Lynch
Dance: TBD

Pleasant Run / Fountain Sq. South @ Prospect St.
Industry & Change over time
page 62

Musician: Olga Bell
Poet: Adrian Matejka
Dance: TBD

StreamLines Installations



Canal / Butler University Campus

Water as a Resource

The Canal winds its way down from Rocky Ripple to downtown Indianapolis. On an initial look the Canal may appear to be a natural tributary with wildlife living in its waters and around its banks. On the contrary, the Canal is a living engineering relic that is deeply rooted in the political and economic history of Indianapolis that currently supplies the city with 60% of its drinking water. How and where does Indy get its drinking water? What role does the Canal play in the city's water cycle? What are the regional connections upstream / downstream? And what is the water footprint of agriculture from upstream?

- How and where does Indianapolis get its drinking water?
- How does it move and where does it go?
- What are the uses of this water?

KEYWORDS:

- natural resource
- water supply
- ecosystem services
- infrastructure
- recreation
- watershed
- precipitation
- industry
- households


CENTRAL CANAL & TOWPATH

Canal / Butler University Campus

Site Analysis and Photos

- Waterscape scene approaching site:
- Broad curving flood plain
- Indianapolis skyline on the horizon
- Elements: slow bend in river; snow and ice flows on silt and stone; bridge; buildings; cement pillars

Architecture / Infrastructure:

- Linking nature to the global transport industry
- Arched stone bridge to/from center city
- Highway: overhead branch of I-70 [modernity, fragmentation; gallery of pillars, flat ground w/variegated materials like stone, asphalt, cement, earth, water]
- Parking and access to bike trail under construction
- Bike lane hugs riverside
- Combined sewage/storm water system

Neighborhood:

- Immigrant, tucked back in off the road

Environment:

- Impression of ‘fresh air’, wide open space
- Non-point source pollution (highway runoff) flows through the site
- Pumping industrial smokestacks (skyline dynamics)
- Sewage overflows during flood events from Pogue’s Run CSO across river

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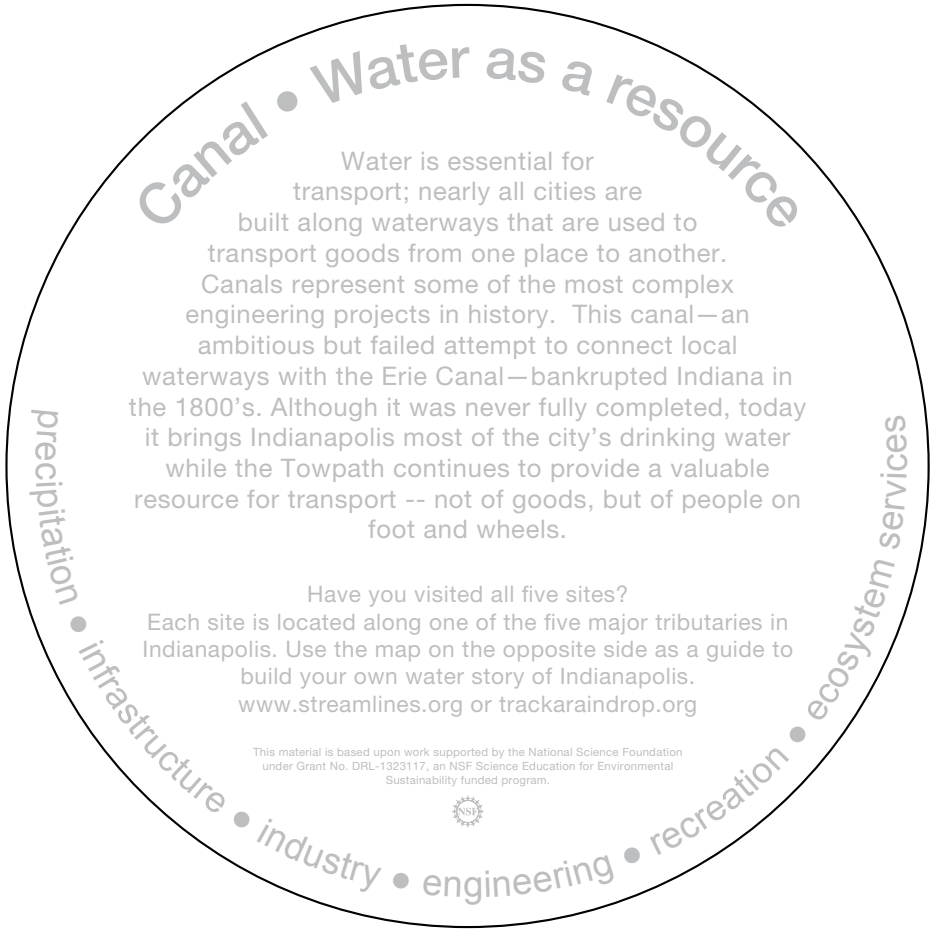
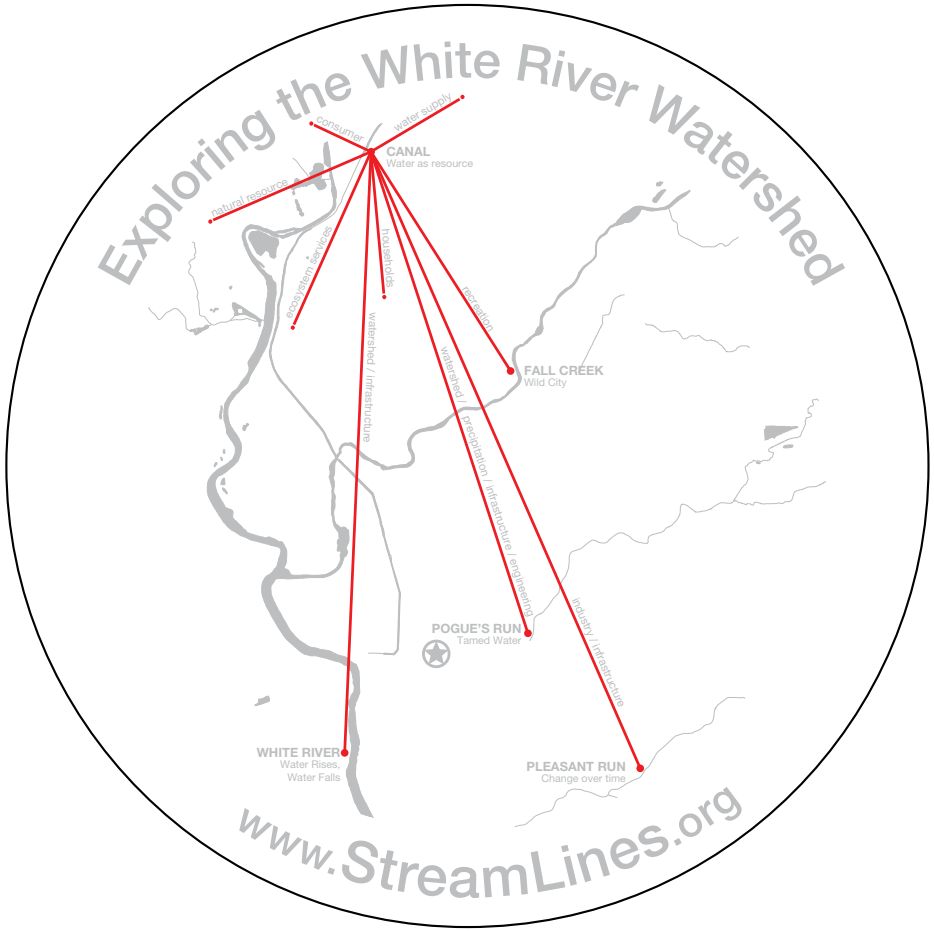
Canal / Butler University Campus

Installation Photos


Canal • Water as a resource
Water is essential for transport; nearly all cities are built along waterways that are used to transport goods from one place to another. Canals represent some of the most complex engineering projects in history. This canal—an ambitious but failed attempt to connect local waterways with the Erie Canal—bankrupted Indiana in the 1800's. Although it was never fully completed, today it brings Indianapolis most of the city's drinking water while the Towpath continues to provide a valuable resource for transport -- not of goods, but of people on foot and wheels.
Have you visited all five sites?
Each site is located along one of the five major tributaries in Indianapolis. Use the map on the opposite side as a guide to build your own water story of Indianapolis.
www.streamlines.org or trackaraindrop.org
This material is based upon work supported by the National Science Foundation under Grant No. DRL-1323117, an NSF Science Education for Environmental Sustainability funded program.
precipitation • infrastructure • industry • engineering • recreation • ecosystem services

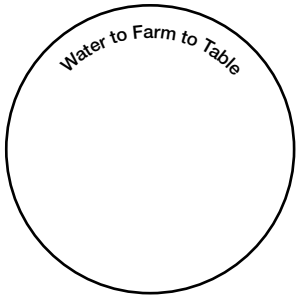

Exploring the White River Watershed
CANAL
Water as a resource
FALL CREEK
Wild City
POGUE'S RUN
Tamed Water
WHITE RIVER
Water Rises, Water Falls
PLEASANT RUN
Change over time
www.StreamLines.org

Canal / Butler University Campus

Ludography

This canal supplies Indianpolis with 70% of its drinking water.

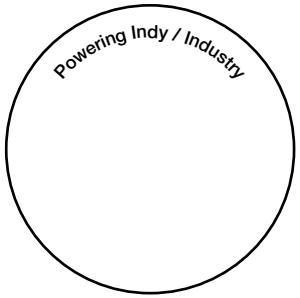
- Streamlines drinking game: every time someone says ‘canal’, drink a gulp of water.
- Construction of the Canal bankrupted the state of Indiana in 1841. Recite more Canal facts from streamlines.org
- Listen and look for what lives in the water we drink.



Water to Farm to Table

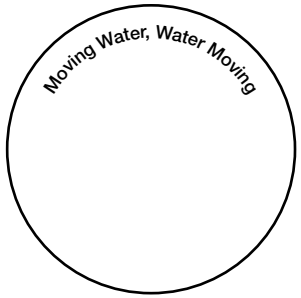
- Water is required at every step to give you the food you eat.
- Add up how many liters of water were used behind the scenes to make your breakfast this morning:
  - cup of coffee = 140
  - glass of Orange Juice = 170
  - glass of milk = 200
  - slice of bread = 40
  - bowl of cereal = 80
  - 2 egg omlette = 200
  - 1 apple = 70
  - 1 slice of cheese = 125
  - 1 teaspoon of butter = 90

  Find out more at streamlines.org
- Snap a photo of something delicious! Try the Butler CUE farm in the practice fields across the Canal. #streamlines
- Seek far and near for the 5 hidden red symbols of drinking water.



Power plants are the greatest consumers of water.

- 694 gallons of water flow by every second in the Canal. Stand still and watch enough water pass by you to power one of these for a year: Cell Phone: 1 millisecond Refrigerator: 29.5 seconds Electric Car: 4.5 minutes Household: 10.8 minutes Calculations at streamlines.org.
- Stand on the podium. Read a poem or tell a joke from streamlines.org.



Though designed for transport, now the canal carries drinking water.

- The Canal drops 75 feet from source in Broad Ripple to its destination at the White River water treatment plant. Photograph something this tall. #streamlines
- Walk along the Canal at the speed of the water for 10 seconds. Notice how far you’ve traveled.
- Pick up a rock or stick. Place it somewhere meaningful.

Little Eagle Creek / Lafayette Place

Urbanization and Land Use

What is surface runoff and why is it important?

Surface runoff is defined as water that flows over the land surface into streams, rivers, lakes, and oceans. Surface runoff contributes to flooding, pollution, and stream temperature variations. Urbanization increases impervious surfaces (parking lots, streets, driveways) and increases the amount of surface runoff into local bodies of water. In addition, impervious surface areas are often contaminated with petroleum, pesticides, pet waste, and fertilizers, and are frequently a source of pollutants.

What are the effects of surface runoff from impervious surfaces on water bodies?

When water hits an impervious surface, like concrete or asphalt or the roof of a building, and then runs into storm water infrastructure or streams, it carries particles, oils, and other debris from the surface. Impervious surfaces also tend to retain heat, creating local temperature anomalies. When rainfall comes into contact with this surface it raises the water temperature as it runs off into streams causing stream temperatures to rise and stream ecosystems to be impacted?

KEYWORDS:

- hydrology
- impervious surface
- contamination
- stream shape (geomorphology)
- restoration
- precipitation
- runoff
- riparian
- albedo
- atmosphere
- land use
- land cover
- porous surface

Installations eliminated at this site.


SPACE
AVAILABLE

Little Eagle Creek / Lafayette Place

Site Analysis and Photos

- Waterscape scene approaching site:
- Broad curving flood plain
- Indianapolis skyline on the horizon
- Elements: slow bend in river; snow and ice flows on silt and stone; bridge; buildings; cement pillars

Architecture / Infrastructure:

- Linking nature to the global transport industry
- Arched stone bridge to/from center city
- Highway: overhead branch of I-70 [modernity, fragmentation; gallery of pillars, flat ground w/variegated materials like stone, asphalt, cement, earth, water]
- Parking and access to bike trail under construction
- Bike lane hugs riverside
- Combined sewage/storm water system

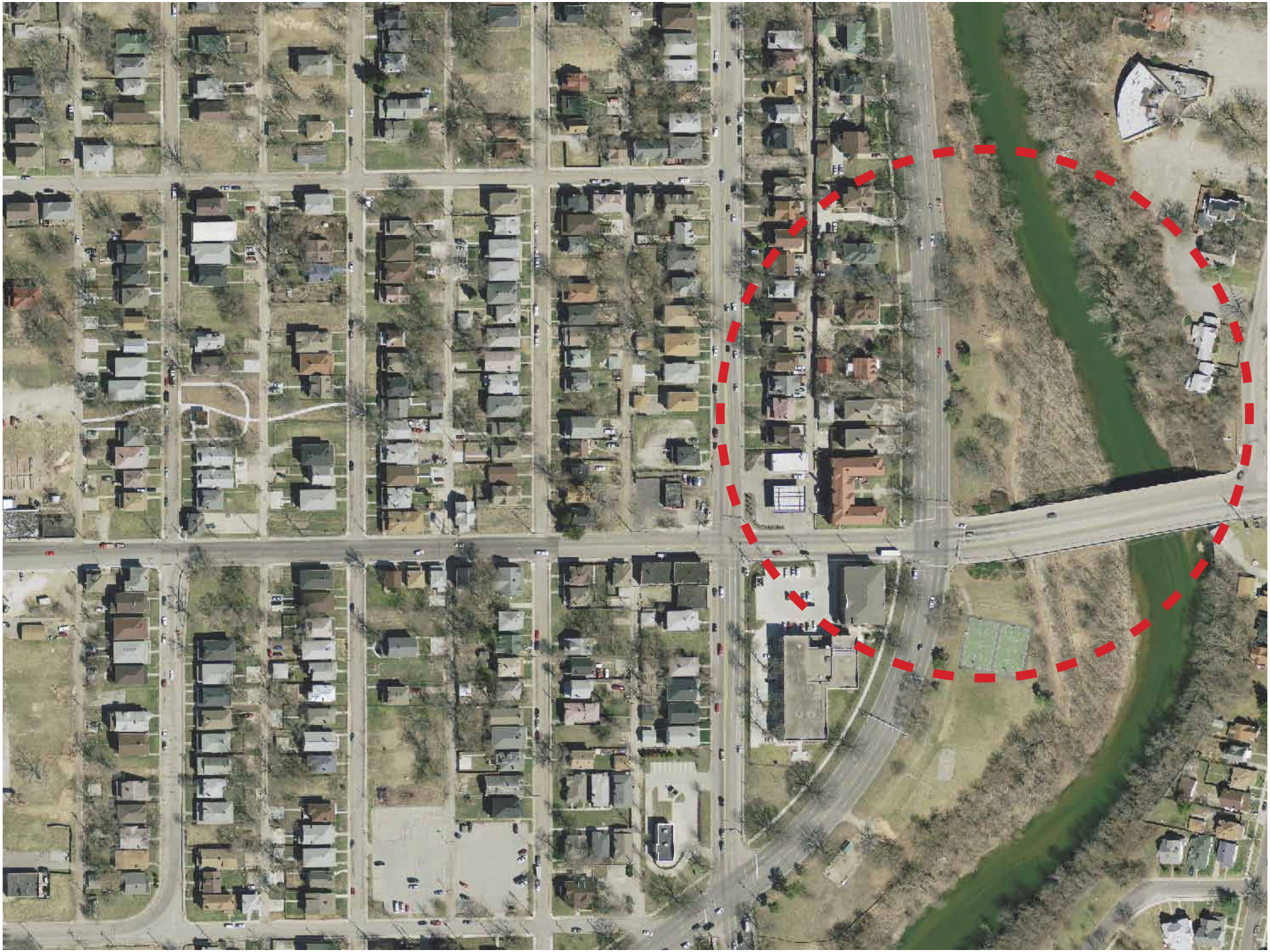
Neighborhood:

- Immigrant, tucked back in off the road

Environment:

- Impression of ‘fresh air’, wide open space
- Non-point source pollution (highway runoff) flows through the site
- Pumping industrial smokestacks (skyline dynamics)
- Sewage overflows during flood events from Pogue’s Run CSO across river

Installations eliminated at this site.



Fall Creek / Mapleton Fall-Creek @ 30th Street

Stream Ecology and Habitat Corridor

Imagine a Fall Creek Parkway specifically for egrets, sparrows, geese, turtle, and fish - dedicated habitat lane for native flora and fauna to migrate. Stream and rivers are the natural habitat super highway for plants and animals to not only live but move around the city and region. As streets and highways are a key component in moving the city and can affect the city's health so are the estuaries of Indianapolis. Stream ecology and habitat health are vital in the city's health.

- What are the indicators of stream health?
- What affects the health of this stream corridor?
- What lives here?
- What do increases in phosphorus and nitrogen do to streams?
- What happens to a stream's ecology as the city grows along its sinuous path?

Why are stream ecology and habitat health important?

Stream ecology and habitat health are indicative of our overall health. Rivers are migration corridors for animals and fish who move for the purpose of breeding and feeding.


TRAIL
NARROW

Fall Creek / Mapleton Fall-Creek @ 30th Street

Site Analysis and Photos

- Waterscape scene approaching site:
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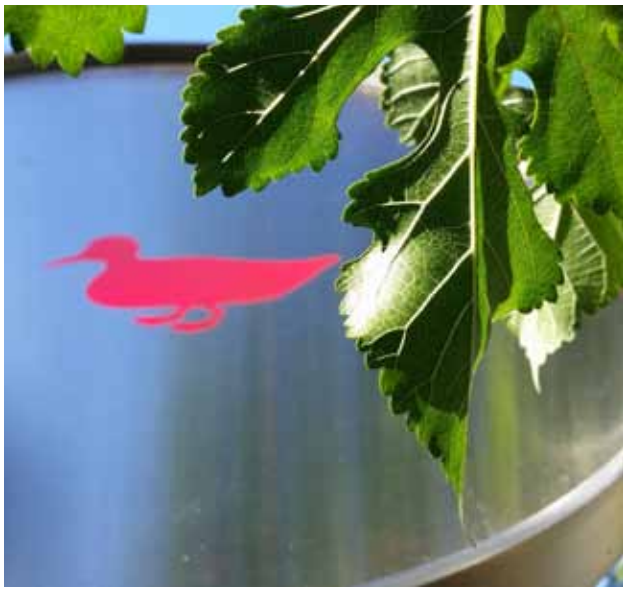



habitat
corridor

Fall Creek / Mapleton Fall-Creek @ 30th Street

Installation Photos

Fall Creek • Wild City

Fall Creek, like many waterways around Indianapolis, is a haven for plants and animals. Aquatic mammals, birds, fish, turtles, insects, and other animals inhabit its waters and banks. The rich vegetation growing alongside the creek provides additional habitat for numerous creatures, as well as parkland for people to enjoy its natural beauty. The creek also acts as a wildlife highway that allows animals to travel through the river or along its banks from one area to another. Over 30 species of fish and 90 species of birds can be found here!

Have you visited all five sites?
Each site is located along one of the five major tributaries in Indianapolis. Use the map on the opposite side as a guide to build your own water story of Indianapolis.
www.streamlines.org or trackaraindrop.org

This material is based upon work supported by the National Science Foundation under Grant No. DRL-1323117, an NSF Science Education for Environmental Sustainability funded program.

temperature • combined sewer • recreation • biodiversity • riparian • contamination • runoff

Exploring the White River Watershed

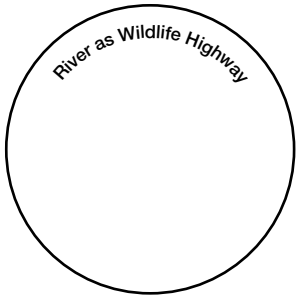
www.StreamLines.org

Fall Creek / Mapleton Fall-Creek @ 30th Street

Ludography

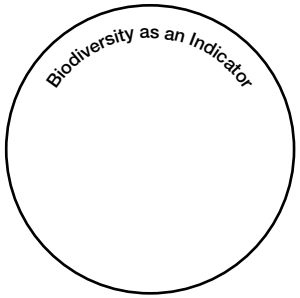
Animal and plant diversity is highest along waterways.

- Listen for birds. When you hear one call, call back.
- Stand on the podium. Read a “wild” poem from streamlines.org.



Life travels with the river.

- Walk like the animals! Tell your friend to run, hop, or fly like your favorite animal.
- Beavers cut down trees to build dams and their homes in the river. Look for signs of this activity nearby!
- Hug a Tree: Biologists measure tree diameter at chest height. Find the biggest tree you can and give it a hug! How many people does it take to encircle the tree?

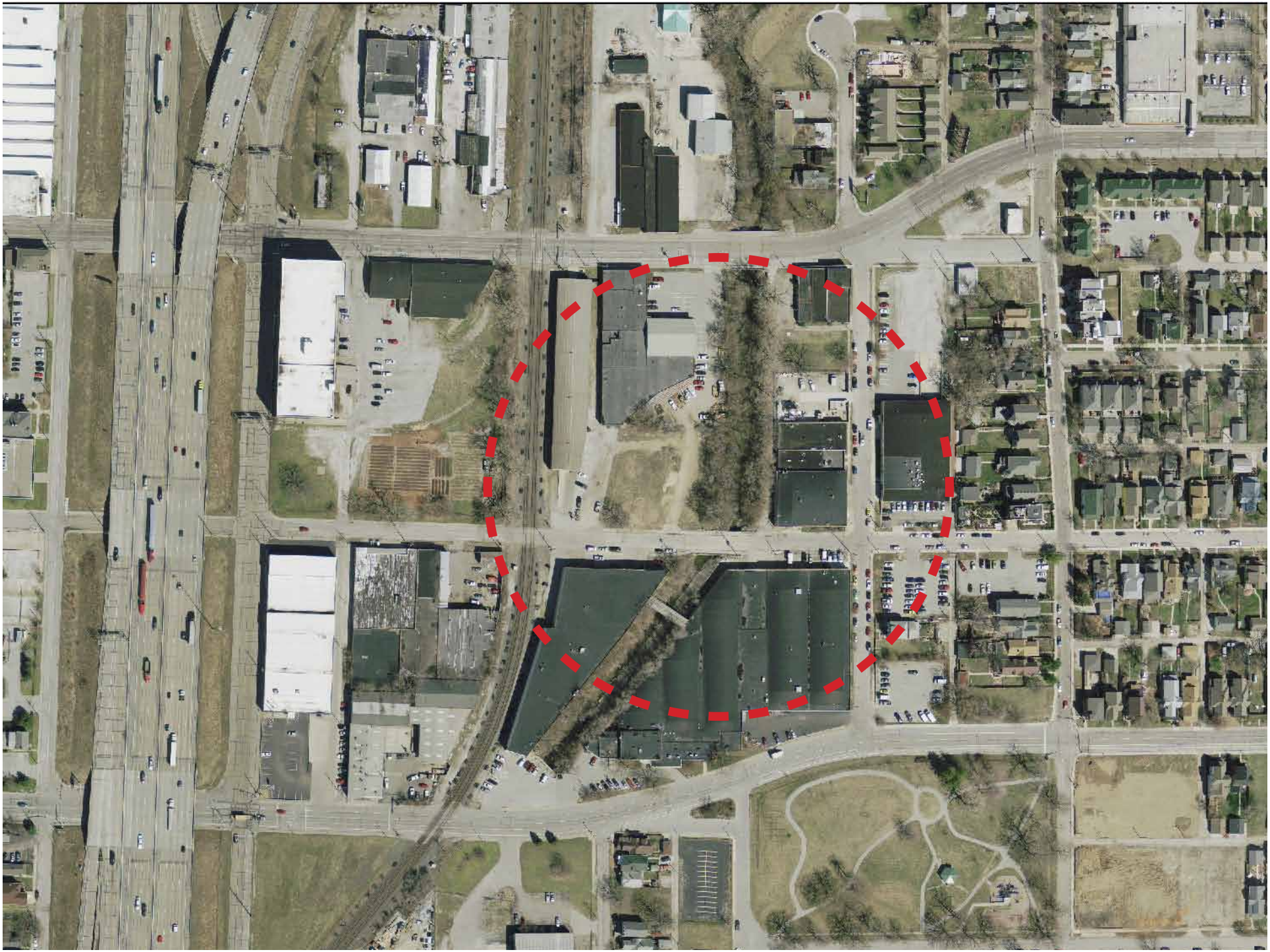


A healthy ecosystem supports a high diversity of plants and animals.

- How many kinds of bugs can you find in 3 minutes? (Species at streamlines.org.)
- How many plant species can you find in 3 minutes? (Species at streamlines.org.)

Shape, temperature and current determine what can live in waterways.

- Explore the site; travel between the warmest and coolest spots.
- Seek far and near for the 5 hidden red inhabitant symbols.
- Flow like water: go over, under, around and through whatever crosses your path.



Pogue's Run / Holy Cross @ Vermont Street

Infrastructure

When we think of water infrastructure we think of pipes buried underground that supply and remove the water we consume. But what about the water that goes into constructing and maintaining the other amenities of modern life like energy, roadways, and electricity? How does water keep us moving from the human scale to the city scale? Pogue's Run will look at water consumption, disposal through the Deep Tunnel project, and the water energy nexus.

Depending on its relationship to us, water can be viewed as a luxury or nuisance. Global communities with little or no access to water view water as a luxury. High-end waterfront developments can charge more rent because of their riverfront views and access. On the other hand water can be terrible destructive and devastating; massive floods during heavy rainfall can damage structures, uproot trees, and even threaten human lives. At the Canal we focus on water as a luxury and resource. Here we will focus on water a nuisance to be overcome.

How has development / urbanization effected water bodies?

Pogue's Run was an estuarine corridor that animals and Native Americans followed for food and water originally. Around 1913, it

Pogue's Run / Holy Cross @ Vermont Street

Site Analysis and Photos

Site Observations:

- Waterscape Scene Approaching Site:
  - Stream flows underneath E Vermont St. between Dorman and RR
  - Rocky & wooded edges along stream where
  - Light industrial, no one walking

Architecture / Infrastructure:

- Access path east of stream and between Flat 12 Bierworks.
- Mural along above access path mentioned above.
- Open space west of stream
- Elevated building crossing visible looking south
- USGS gauging station just south of E Vermont where crossing stream

Neighborhood:

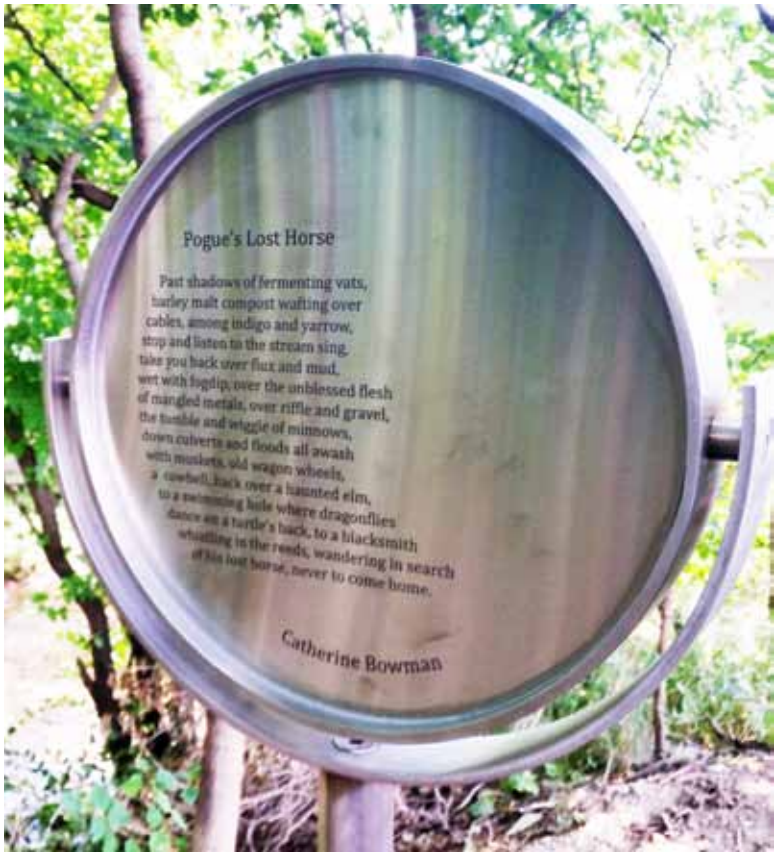
- Holy Cross Community District
- Winery and brewery
- Development of Vermont St. walking corridor

Usable Space:

- Open space west of the creek
- Access path east of stream and between Flat 12 Bierworks

Pogue's Run / Holy Cross @ Vermont Street

Installation Photos



Pogue's Run • Tamed Water

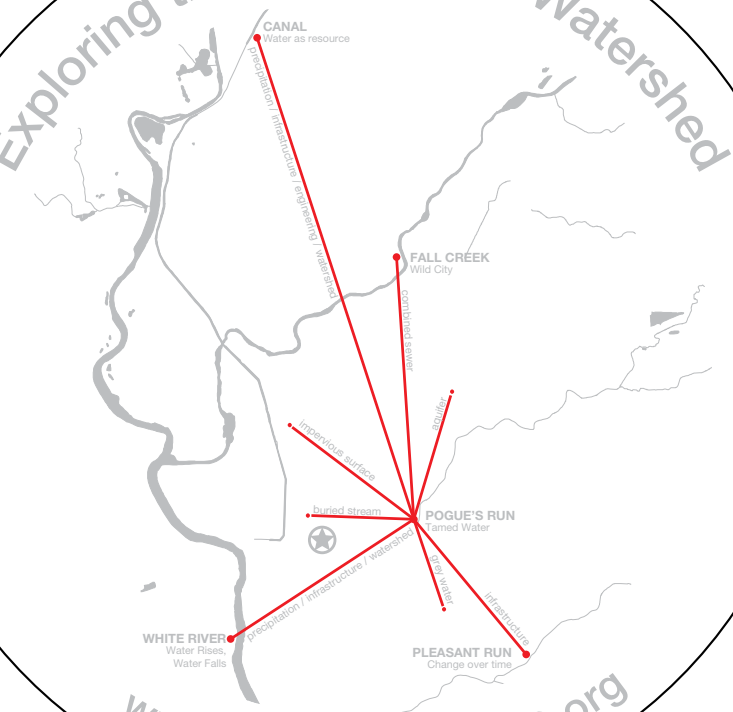
Water is crucial for our sities to function: for transport, drinking water, and industrial uses. But it can be a nuisance as well, such as during a flood. We have designed elaborate ways to direct water where we want it and redirect unwanted water to build towns and cities unimpeded by streams or rainfall. One of the most extreme examples in Indianapolis is here at Pogue's Run, a former woodland stream that has been partially diverted into an underground tunnel for over a mile before it spills into the White River west of downtown, so that the grid of city streets and buildings could be built over the stream.

Have you visited all five sites?
Each site is located along one of the five major tributaries in Indianapolis. Use the map on the opposite side as a guide to build your own water story of Indianapolis.
www.streamlines.org or trackaraindrop.org

This material is based upon work supported by the National Science Foundation under Grant No. DRL-1323117, an NSF Science Education for Environmental Sustainability funded program.

precipitation • infrastructure • impervious surface • combined sewer • buried stream • grey water

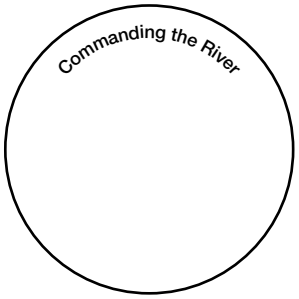
Exploring the White River Watershed



www.StreamLines.org

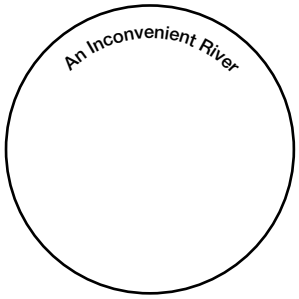
Pogue's Run / Holy Cross @ Vermont Street

Ludography



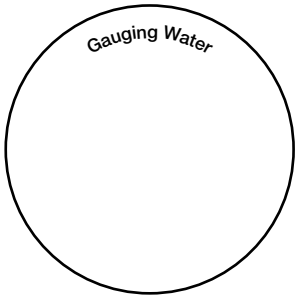
We dig. We pipe. We drain. We dam. We channel.

- Build a little bridge with sticks and stones.
- Can you find the man-made bank of Pogue's Run downstream from the bridge? What materials were used to build it?
- Stand on the podium. Tell a joke or some river facts from streamlines.org.



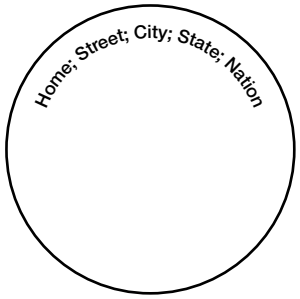
When cities are planned, water might be seen as a nuisance.

- Discuss: how many times do you cross over a body of water each day?
- When you're finished here, explore the neighborhood. Look for ways water is seen as a nuisance.
- Pick up a stck;
  imagine it has ears.
  Throw it in the river to hear what it hears.
  Play the audio on streamlines.org.



We assess our infrastructure by collecting data.

- Find the solar-powered box. What secrets lie within? Find out at streamlines.org.
- Throw twigs in the stream. Now look both ways and cross the bridge to see which twig emerges first.
- To measure river velocity, divide stick-travel distance by time. Hint: the bridge is 50 feet wide.



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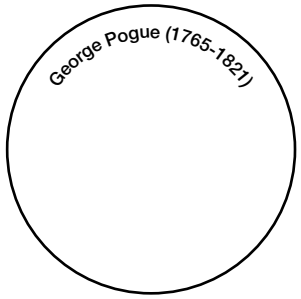

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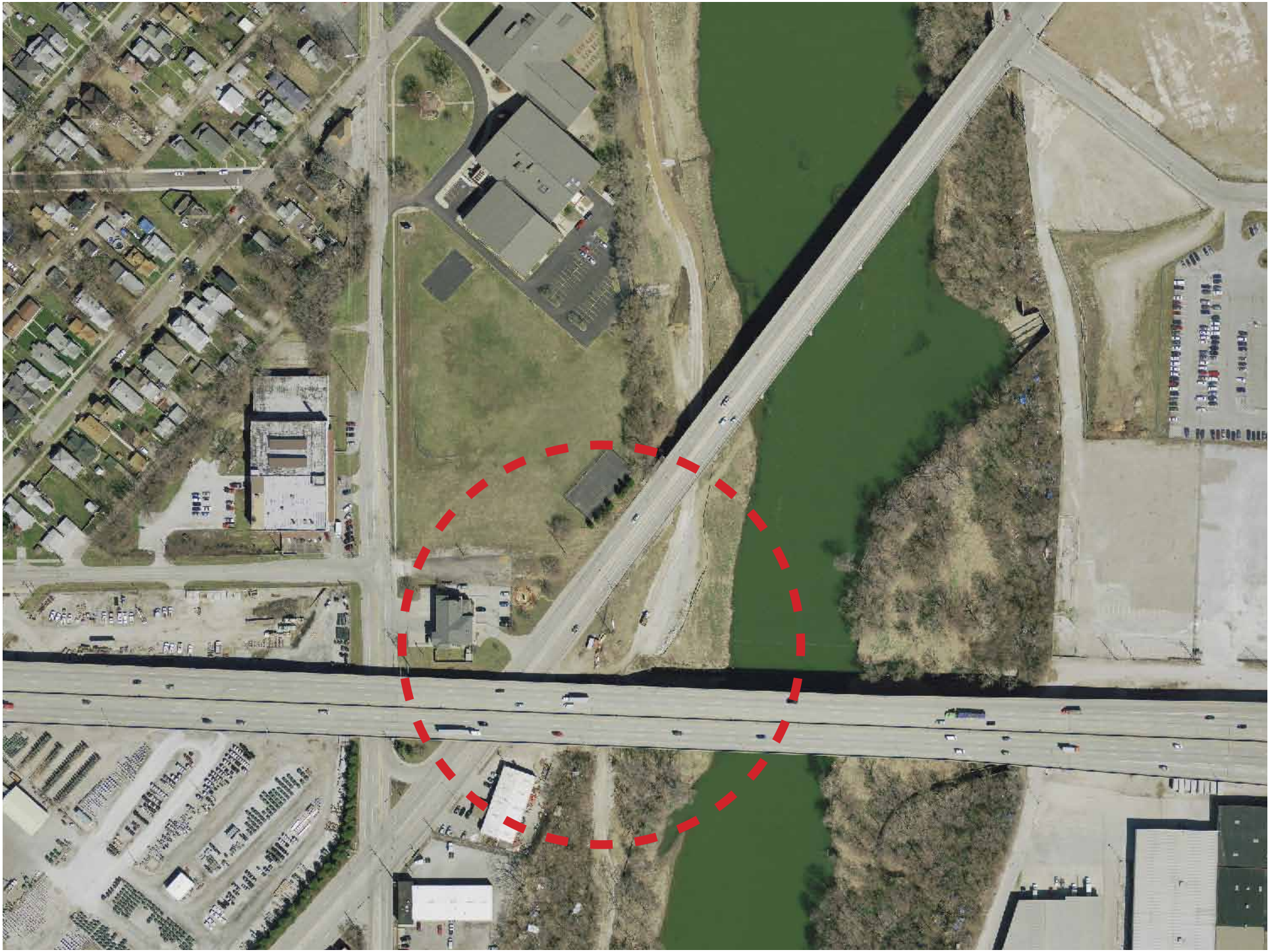

White River / West Indy @ Kentucky Avenue

The city and the River [weather and climate]

The word atmosphere typically conjures thoughts of the sky, clouds, or images hovering above the clouds in the upper atmosphere bordering outer space. Weather, water, or what effect our human existence might have on our atmosphere is not typically thought of even though water is embedded in our weather vocabulary. Rain, precipitation, humidity, and storms are just a few commonly used words that are relative to water in our atmosphere. We understand that weather events can affect our daily routine – extreme weather can cause havoc on transportation systems, cause power outages, disrupt school days, and prevent crops from growing, just to name a few. What is not commonly thought about are the ways in which our population and the choices that we make are effecting and causing certain weather events. What is the different between weather and climate? What role does water play in the atmosphere and why is it important?

- What is the difference between weather and climate?
- Why is water in the atmosphere important?
- How is weather formed?
- Is there a connection between weather and traffic patterns?
- Is there a connection between weather and urban development?

What is the difference between weather and climate?

Weather is defined as a specific short-term atmospheric behavior and how it effects people.

The time scale for weather occurs from minutes to months. It is specific to place and point in time. Climate, on the other hand, is atmospheric behavior that reveals

itself over a longer period of time, a rough minimum of 30 years. Climate can be thought of as the statistics, patterns, or more specifically, averages of weather. "You pick your vacation destination based on climate but pack your suitcase based on weather." (Climate Impacts Group, University of Washington)

What role does water play in the atmosphere?
Water moves through the atmosphere through precipitation, evaporation, transpiration, and condensation. Expand on how weather is shaped?

Why is water in the atmosphere important?
We don't always make the connection between what happens on the ground, from our land cover choices and traffic patterns, to weather events. Recent studies have linked land cover and traffic patterns to the frequency and intensity of weather events.

How can citizens be 'activated' to help address 'climate change'?

KEYWORDS:
- weather
- atmosphere
- emissions
- aerosols
- precipitation
- infrastructure
- temperature
- storm


and spe

White River / West Indy @ Kentucky Avenue

Installation Photos

White River • Water Rises, Water Falls

The White River is one of the largest rivers in Indiana, flowing for over 350 miles from Randolph County, through the heart of Indianapolis, to the Wabash River. This river connects the city to the rest of the state through snowmelt, rainwater, and smaller streams that find their way to the river's rainfall catchment area, also known as a watershed. The total White River basin watershed is nearly 6,000 square miles! The river was once wide and clear. Local Native Americans called it the Wapahani or "White Sands." Although heavily polluted due to agricultural runoff and industrial usage, the river is cleaner than it has been in the past.

Have you visited all five sites?
Each site is located along one of the five major tributaries in Indianapolis. Use the map on the opposite side as a guide to build your own water story of Indianapolis.
www.streamlines.org or trackaraindrop.org

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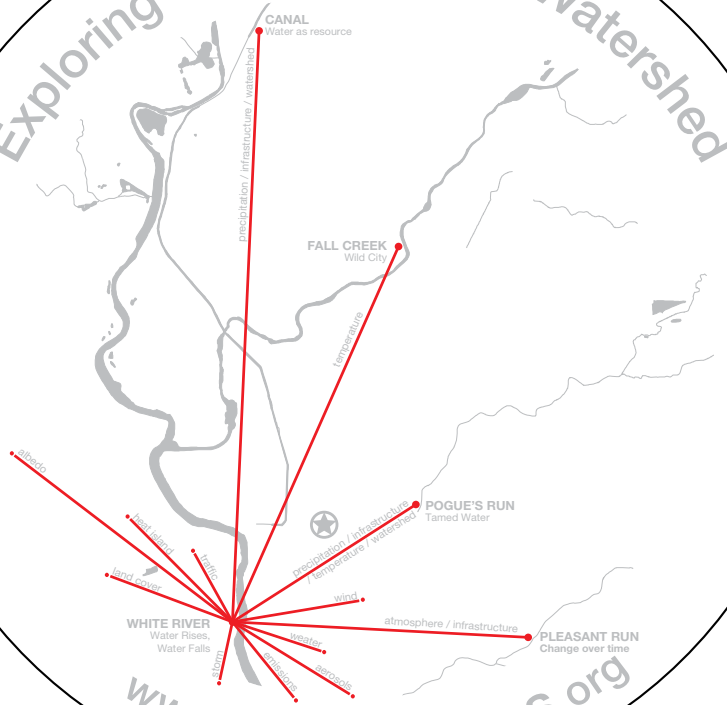
atmosphere • precipitation • infrastructure • watershed • albedo • land cover • heat island

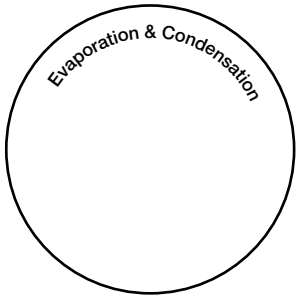
Exploring the White River Watershed



www.StreamLines.org

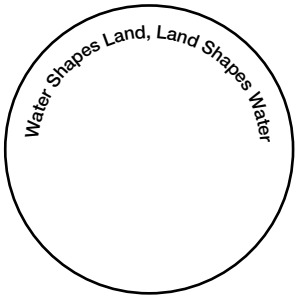
White River / West Indy @ Kentucky Avenue

Ludography



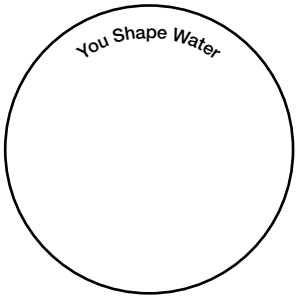
Clouds form when water vapor rises & condenses.

- Look up! Name an animal you see in a cloud.
- Look up! Identify types of clouds using the key at streamlines.org.



As it collects, rain links all things within a watershed.

- Stand on the podium. Recite a poem from streamlines.org.
- Cup your hands together and imagine raindrops filling them. This is a tiny watershed!
- Look at the height of the river. It's been higher before. What has been submerged by flooding in the past?



Weekday traffic emissions push rain to the weekend.

- Measure the wind using the Beaufort scale at streamlines.org.
- The sound of traffic = the sound of thunder. Imitate the pattern of the traffic by stomping your feet.
- Seek far and near for the 5 hidden red symbols of the water cycle.

Pleasant Run / Fountain Square South @ Prospect Street

Industry and change over time

The industrialization boom in the United States helped advance the country economically and changed our lifestyles drastically. At the time we were not aware of, or chose to ignore, the environmental effects that would result from the manufacturing and processing of the resources that were helping to propel the nation. Industrialization helped to provide jobs, process raw materials that provided electricity for our homes and gas for our cars. Some of the unseen burdens to our environment can still be seen today. The legacy of our choices are visible in our infrastructure and through the layers of earth.

- What is the legacy of industrialization?
- How can the city develop and grow in a more responsible manner that acknowledges the past but proposes a more sustainable future?
- What steps can be taken to remediate the land?

KEYWORDS:

- industry
- legacy
- restoration
- contamination
- infrastructure
- soil
- remediation
- pollution
- groundwater
- atmosphere

Pleasant Run / Fountain Square South @ Prospect Street

Site Analysis and Photos

Site Observations:

- Waterscape Scene Approaching Site:
  - Open, spacious triangle opens up between creek & road
  - Road curves under railroad bridge, bridge frames coke plant beyond
- Waterscape Scene Creekside Juxtaposition:
  - Old industry once dependent on stream (ambivalent intimacy)
  - Looking away from coke plant (144 acres), downstream: can see the lovely character of the natural stream
- Waterscape Scene Adjacent:
  - Clapboard houses

Architecture / Infrastructure:

- Stone & cement surfaces; iron pipes link RR; coke plant and road - lock into the streambed w/small scale engineering embedded in stream
- Large limestone blocks of bridge abutment & in stream - remains of Prospect Falls
- Two big storm pipes (labeled w/arrow in green ink, intermingling w/ graffiti tags)
- A third, unmarked, partially hidden pipe set below, another further up the stream in the stone
- Continuous parallel flows:
  - old watercourse
  - railway and coke plant
  - parkway
- Pleasant Run bike trail to come by site

Environment:

- Stepped falls in disarray
- Toxic space in the past but still?
  - What's coming out of the unmarked pipe?
  - Sewage will be mixed in the storm drains during floods
  - Houses once turned purple

Usable Space:

- Triangle good gathering place
- What utilities are available on site? (3 utility poles)

Neighborhood:

- Over time German, Irish, Italian, Appalachian
- Active community, happy the project is coming, get neighborhood voice on site

Pleasant Run / Fountain Square South @ Prospect Street

Installation Photos


Pleasant Run • Change over time
Pleasant Run was formed at the end of the last Ice Age (about 12,000 years ago), when glaciers from the north carried rocks here from as far away as Michigan, exposing portions of the Indiana limestone bedrock. This wild-flowing woodland stream changed when European settlers cleared forests to make way for industry along its banks. The nearby coke plant became an important source of fuel for steel manufacturing in the early-1900s, but consequently contaminated the area with pollutants until it closed in 2007. Today, our renewed focus on the environment is allowing life to flourishonce again along the waterway.
Have you visited all five sites?
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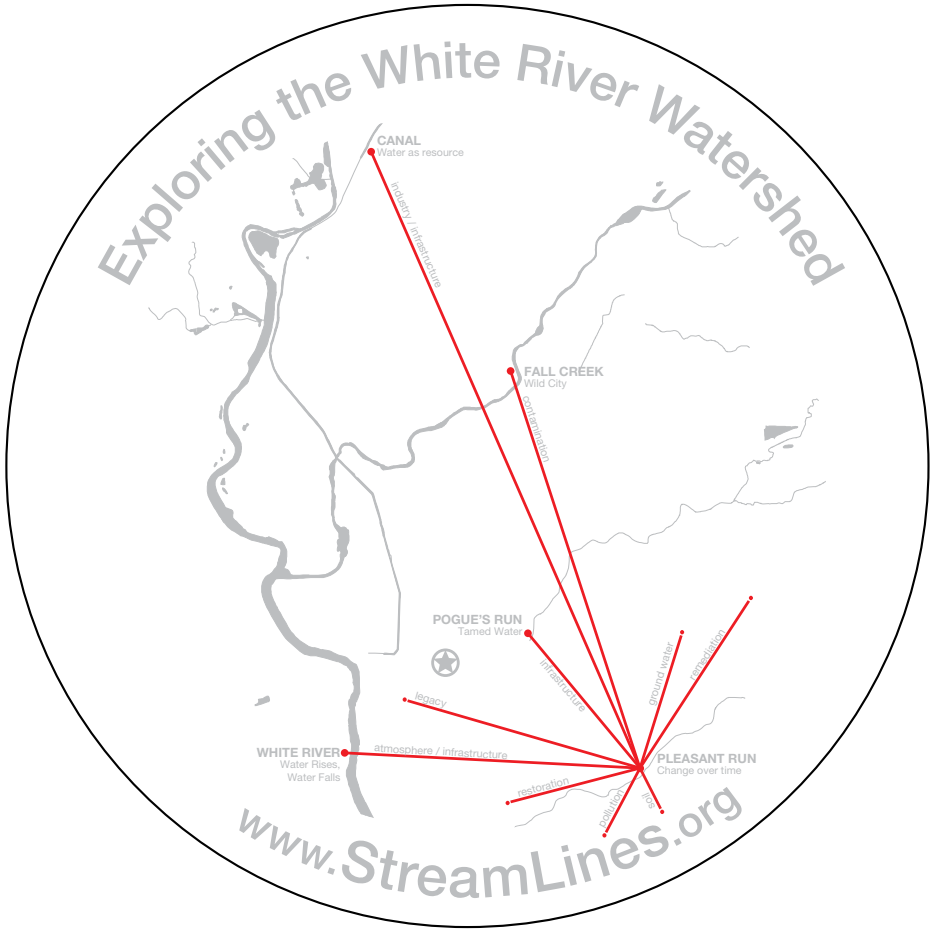
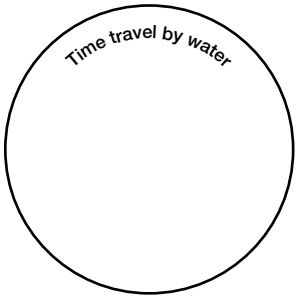
atmosphere • infrastructure • industry • contamination • restoration • groundwater • remediation


Exploring the White River Watershed
CANAL
Water as resource
industry / infrastructure
FALL CREEK
Wild City
contamination
POGUE'S RUN
Tamed Water
infrastructure
ground water
remediation
legacy
WHITE RIVER
Water Rises, Water Falls
atmosphere / infrastructure
PLEASANT RUN
Change over time
restoration
pollution
loss
www.StreamLines.org

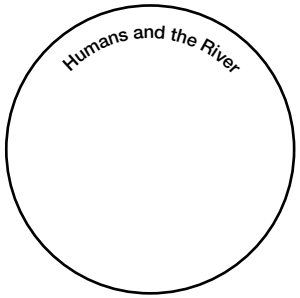
Pleasant Run / Fountain Square South @ Prospect Street

Ludography



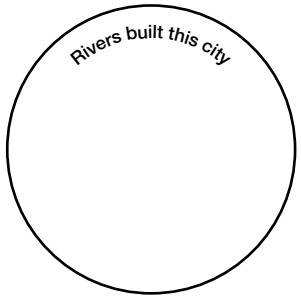
This stream has flowed here for the last 12,000 years.

- Ice Age glaciers carried dark igneous (volcanic) rocks here from Michigan 12,000 years ago. Search for these Motor City rocks and place them around the artwork.
- Stand on the podium. Read a poem or tell a joke from streamlines.org.
- 'Balance' on 'industry' and 'legacy'. Spell new words by stepping on one letter at a time.



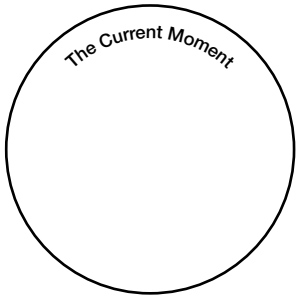
People here depended on the river for food, water and transport.

- Tag: you're it! Humans are safe when balancing on the red streamlines.
- Explore: look for signs of human action on this site.



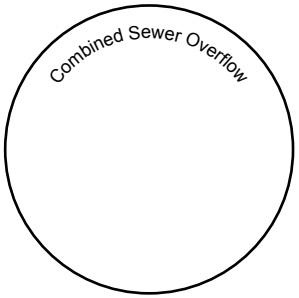
Industrial plants like the nearby coke plant consume the most water.

- Photograph as large of an area as you can without including any sign of industrialization. #streamlines
- Seek far and near for the 5 hidden red symbols.
- Coke is a highly refined coal product that is used as fuel by steel mills and foundries. Find a good view of the coke plant.



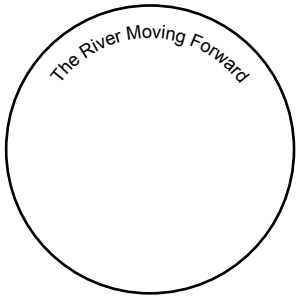
The water's in your hands... but please wear gloves.

- Turn around; state the first thing you hear, smell, and see.
- Write a "haiku" poem about this place. A haiku is three lines long and should have 5, 7, then 5 syllables.
- Imagine testing the soil below your feet. Discuss what you think the results would show.



CSO: when combined sewage & surface runoff overflow into our water.

- 51 CSOs drain into Pleasant Run. Discuss: what might be in the water flowing from the outfall? (Those big pipes across the stream.)
- Pick any NOUN and any VERB. As they say, combining sewage and stormwater is like trying to ---VERB--- a ---NOUN---.



Certain types of plants and fungi can clean soil of contaminants.

- Turn around; state something you can imagine here in the future.
- Discuss: What could make the park a better place for plants, animals, and people?

Installation Photos

Central Mirror, Canal at Butler University Holcomb Gardens

Central Mirror, White River

Canal site on Butler University campus, Holcomb Gardens

Balance beams and prompt mirror at the Canal site on Butler University campus, Holcomb Gardens

Prompt Mirror, Canal at Butler University Holcomb Gardens

Site map and central mirror, White River

Poetry Mirror, White River

Central Mirror, Canal @ Butler University

Prompts reflectged in mirror

Prompt Mirror, White River

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www.cityaslivinglab.org.

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Indianapolis Fabrications