Reimagining Mill Creek

A Design Studio Project of Washington State University,
SDC Landscape Architecture 362, Fall 2016

Two Years Ago
L.A. 470 Studio: West Mill Creek

One Year Ago
L.A. 362 Studio: Downtown Mill Creek

This Year (Fall 2016)
L.A. 362 Studio: East Mill Creek

The Project Process (October to December 2016)

Site Visit (Oct. 2016)

The project team toured Mill Creek from downtown to Bennington Lake and met with Mayor Pomraning, advocates for the creek, and local scientists.

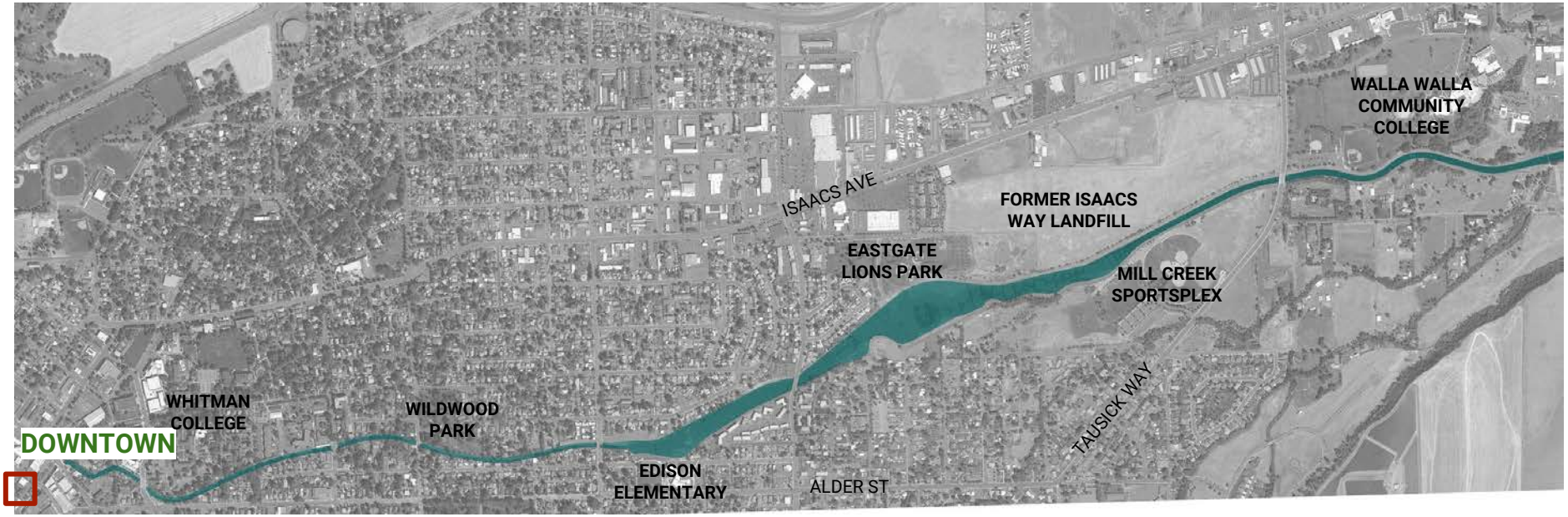
Community Meeting (Nov. 2016)

Several dozen people provided valuable feedback on the project - including students of watershed management at Walla Walla Community College.

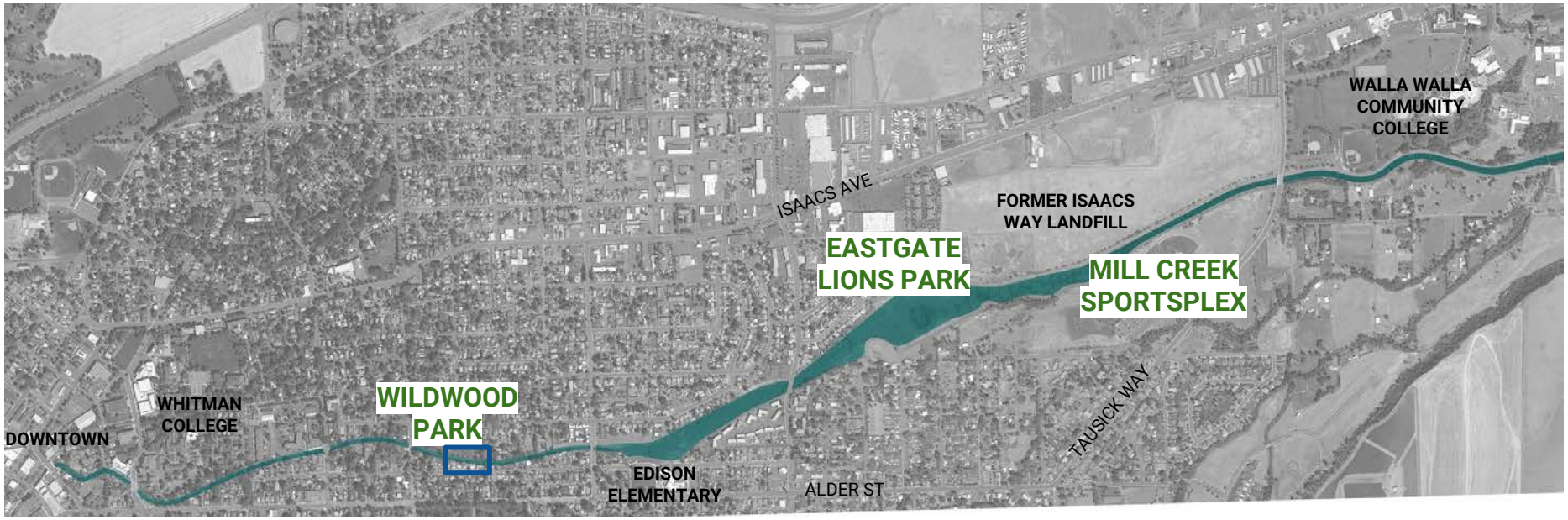
Mill Creek Greenway Conceptual Master Plan

The Mill Creek Greenway could connect Walla Walla's open spaces while enhancing the habitat and scenic beauty of urban Mill Creek.

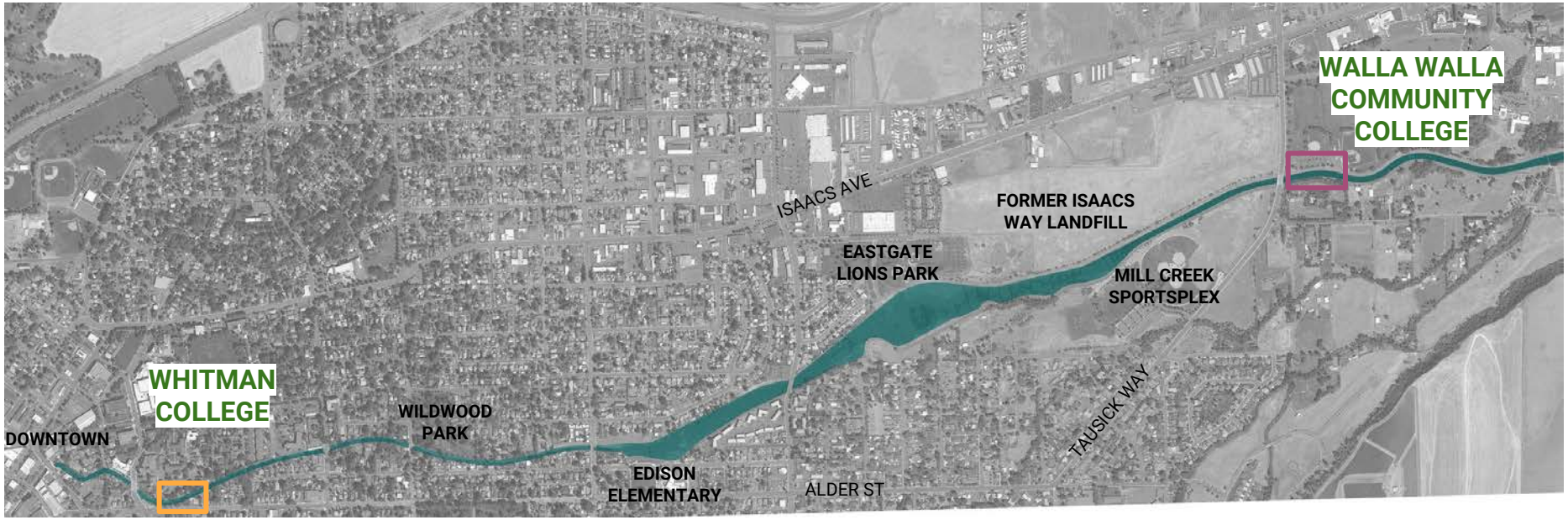
Mill Creek Greenway



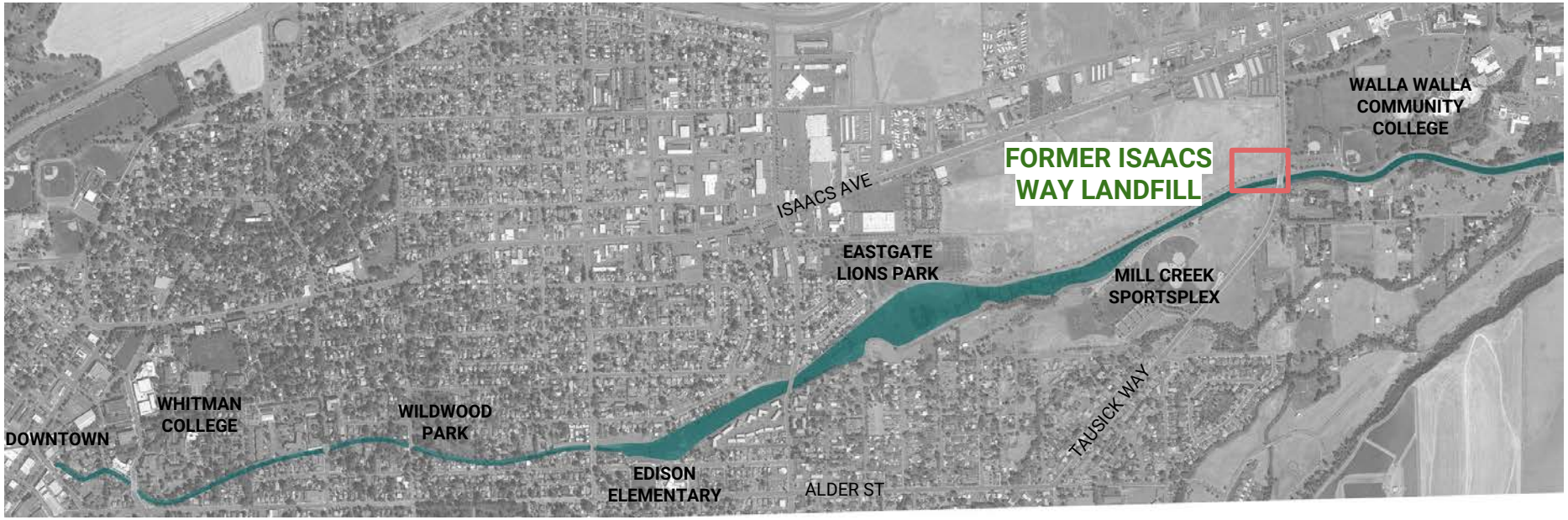
A Mill Creek Greenway would connect Downtown with...



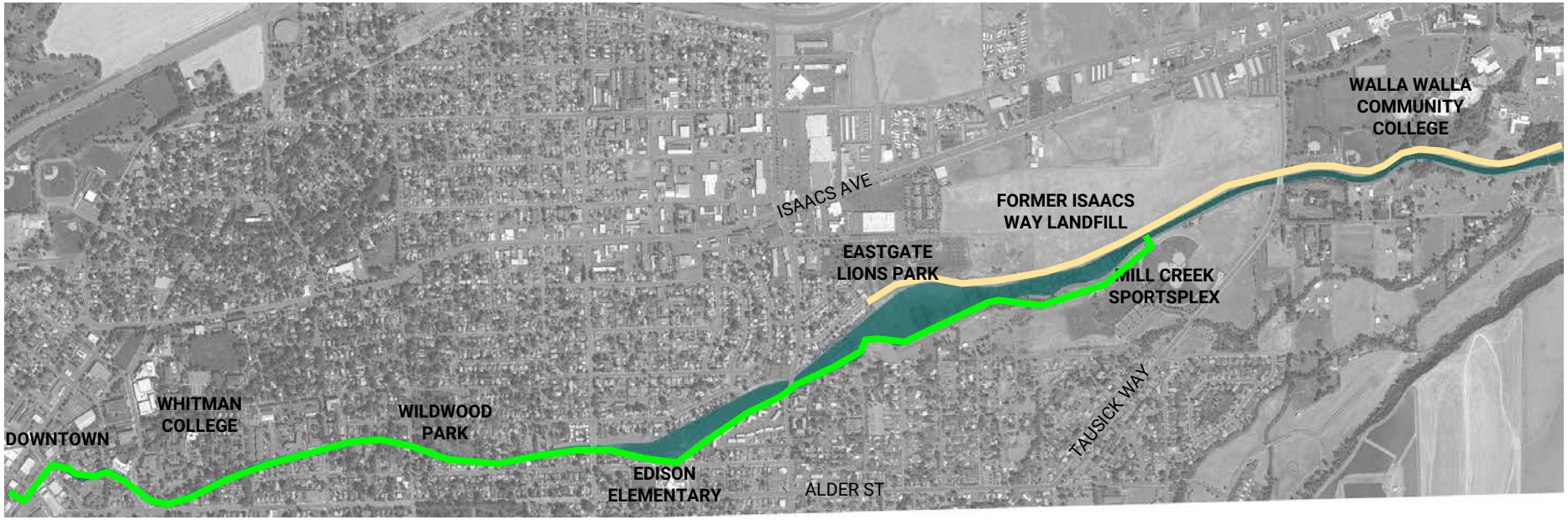
… three existing city parks...



… two college campuses...

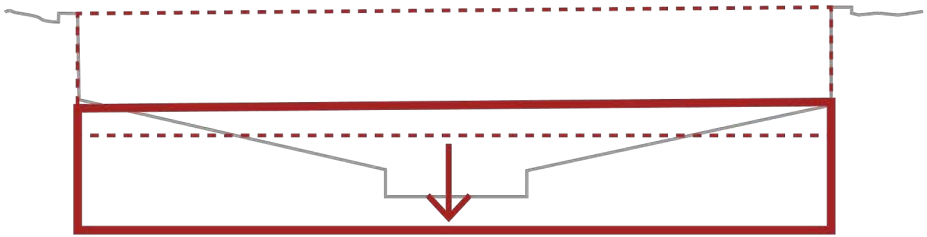


… and approximately 70 acres of former landfill, which could be renovated into an accessible natural area.

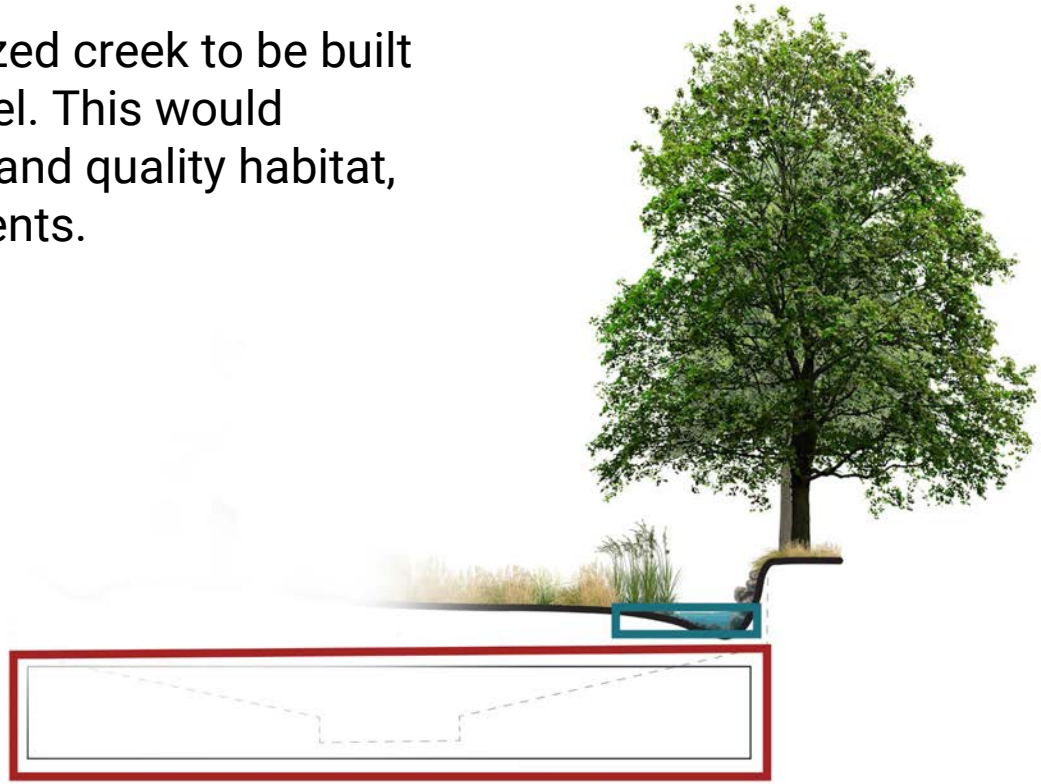


The Greenway connection could be created by extending the **existing Mill Creek Trail (in tan)** 2.4 miles to downtown. The **new trail (in green)** could be placed within the existing footprint of the levees and concrete channel.

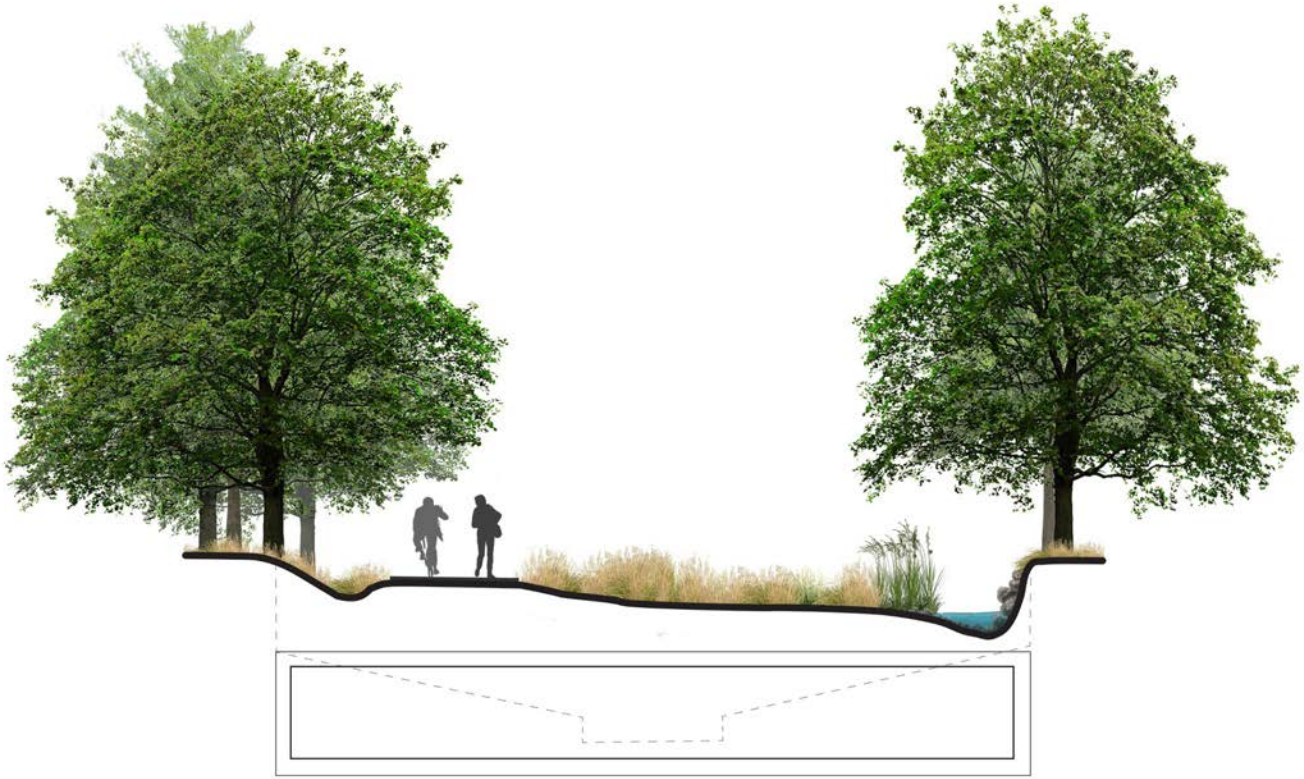
The project visualized the Mill Creek channel as it would exist under one potential renovation scenario, which would lower and cover the concrete flood channel...



… allowing a naturalized creek to be built above the flood tunnel. This would ensure fish passage and quality habitat, even during flood events.



This scenario would also open up space for habitat restoration and the extension of the Mill Creek Trail into downtown.



Existing

Possible

Mill Creek could once again become a scenic and recreational centerpiece of Walla Walla.

Edison Elementary Creek Classroom

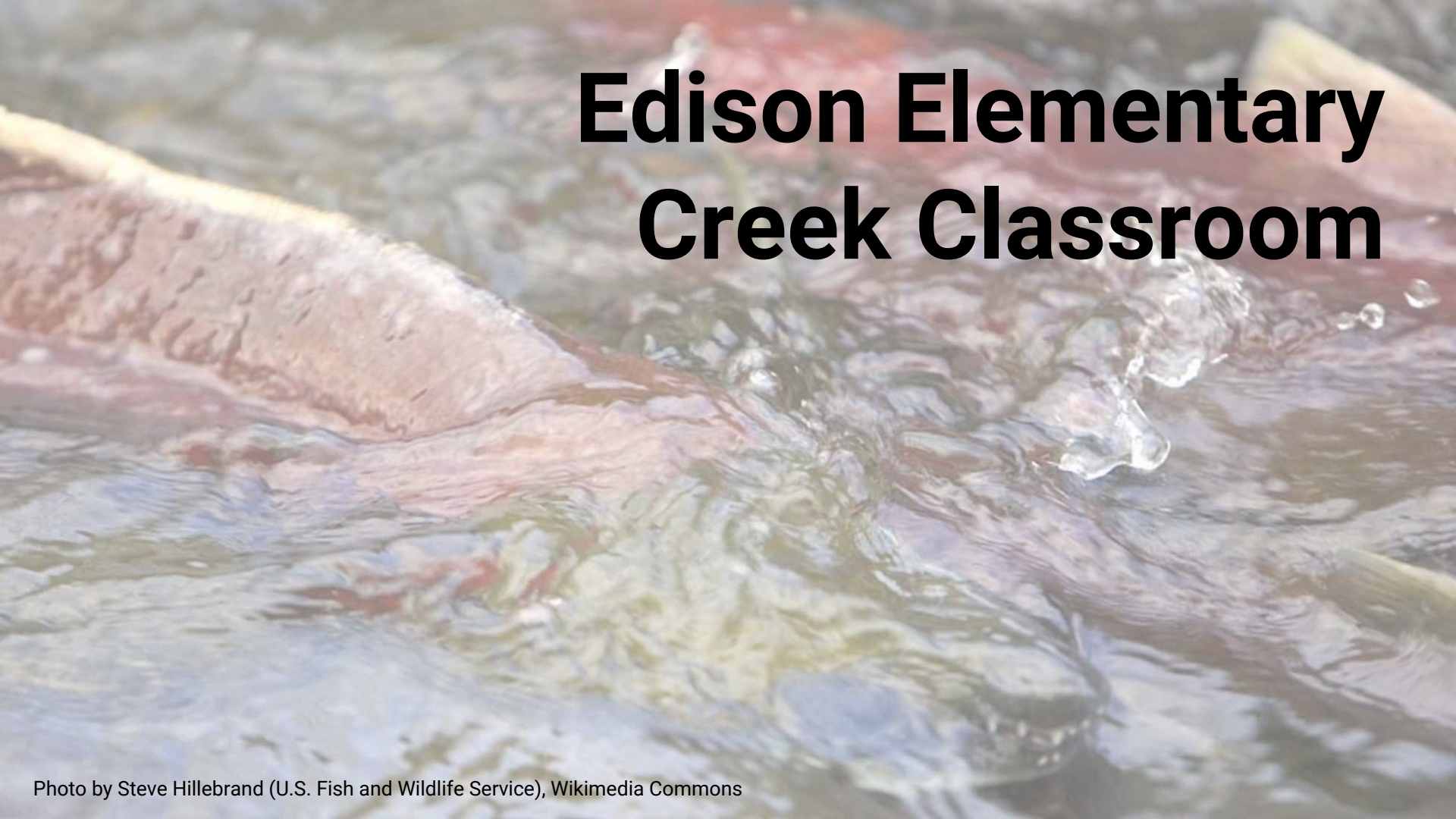


Photo by Steve Hillebrand (U.S. Fish and Wildlife Service), Wikimedia Commons

The creek classroom would engage students outside Edison Elementary.

The Classroom, as with all of the open spaces along the Greenway, would celebrate and provide habitat for the historic first foods of the Cayuse, Walla Walla and Umatilla people.**These five first foods supported the people who lived around Walla Walla for thousands of years:**

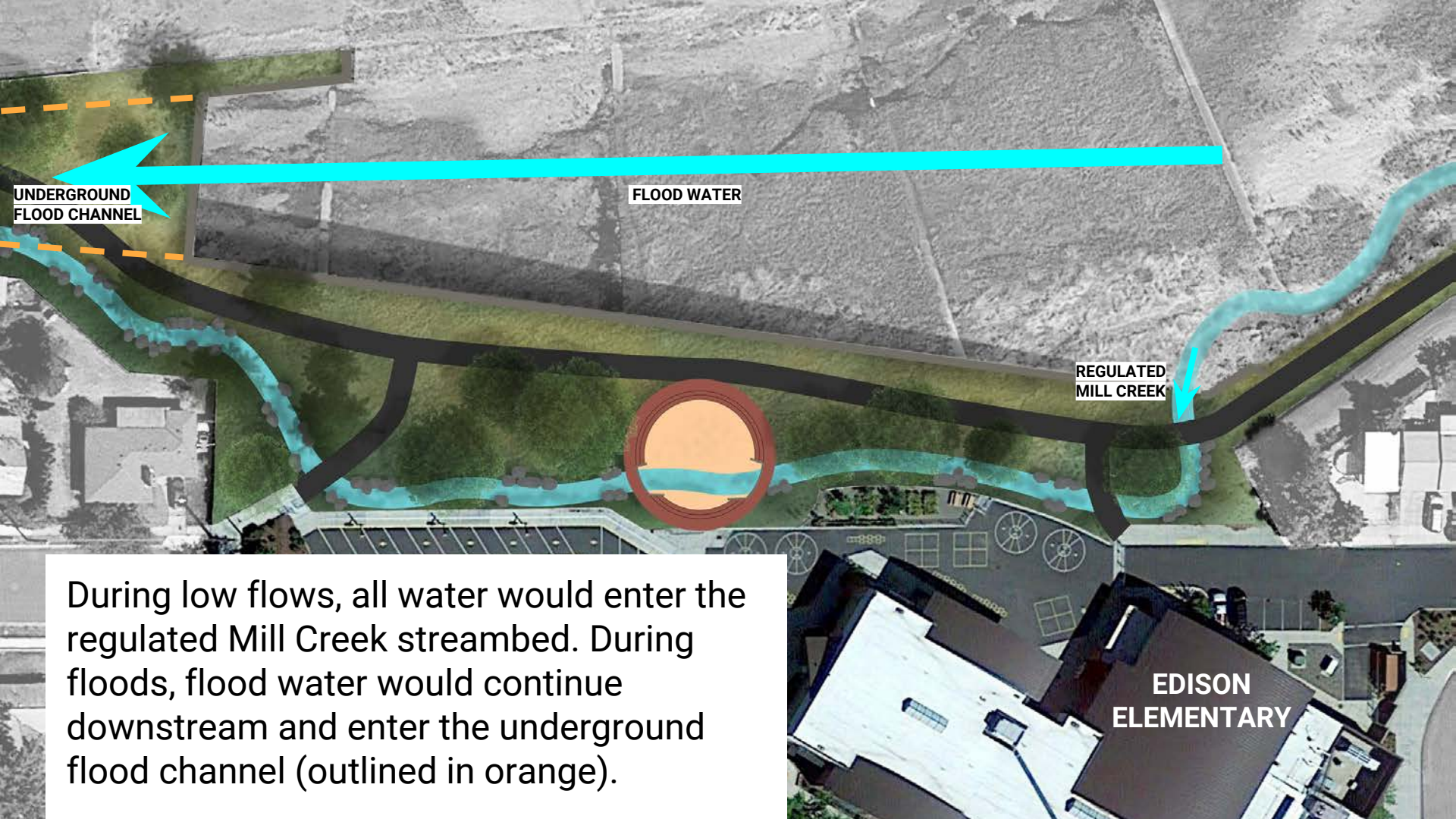
WATER **SALMON** **COUS ROOT** **HUCKLEBERRIES** **DEER**





Photos by various authors, Wikimedia Commons

Naturalized Mill Creek could be rerouted past Edison Elementary. This would allow students to see the creek daily and interact with it through science labs, observational writing, and field sketching in a controlled and safe outdoor classroom space.

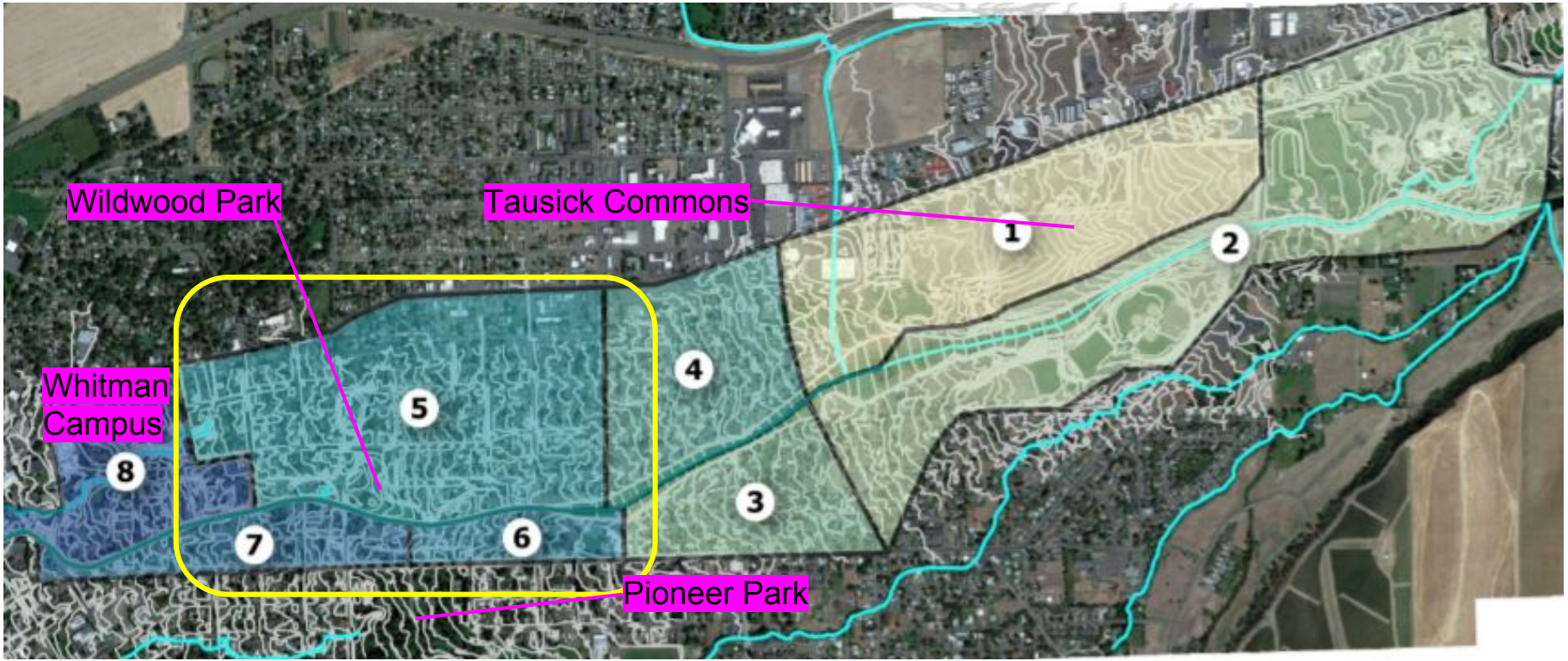


During low flows, all water would enter the regulated Mill Creek streambed. During floods, flood water would continue downstream and enter the underground flood channel (outlined in orange).

Stormwater Quality

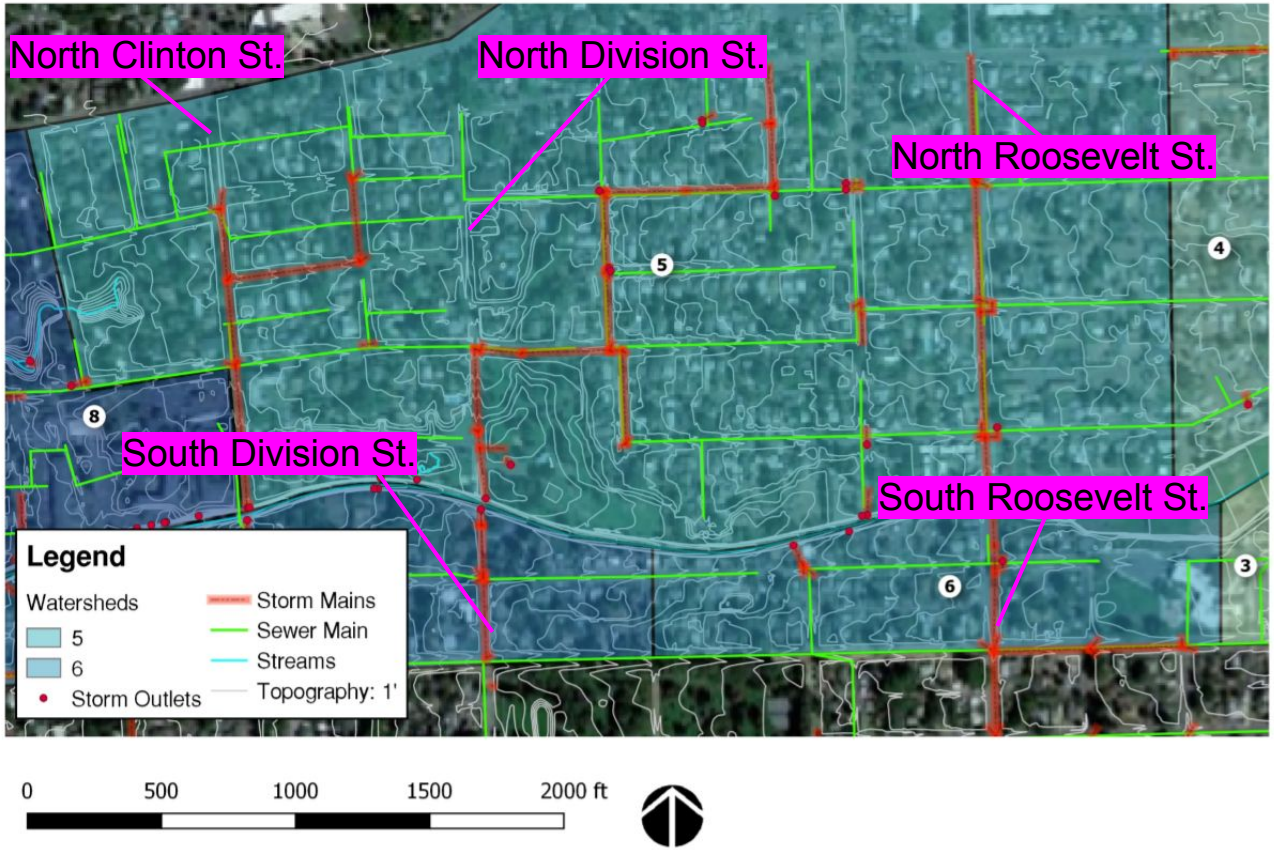
Watershed Analysis

Watersheds are areas with distinct stormwater management systems. Watersheds 5 and 6 were singled out as being the most impactful areas for managing stormwater within the project boundaries.



Watershed Analysis

Typical stormwater infrastructure takes water runoff from impervious surfaces and runs it through drainage pipes back to the creek.



Stormwater Analysis

Yellow areas indicate places where the water is moving too fast to percolate. Blue lines indicate where the water is moving slow enough to infiltrate better.

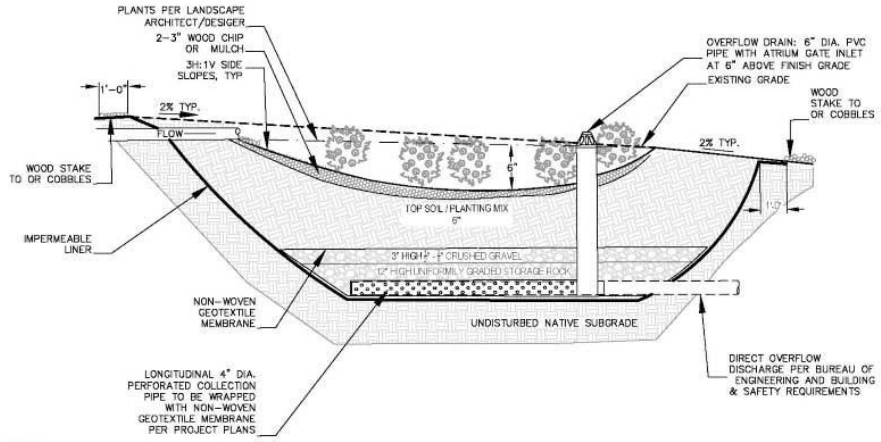
Low Impact Development

“Low Impact Development (LID) is an innovative stormwater management approach with a basic principle that is modeled after nature: manage rainfall at the source using uniformly distributed decentralized micro-scale controls.”

Quotation from www.lid-stormwater.net/background.htm

Low Impact Design Strategies

Example Rain Garden



B+W bwengr.com

Rain Gardens

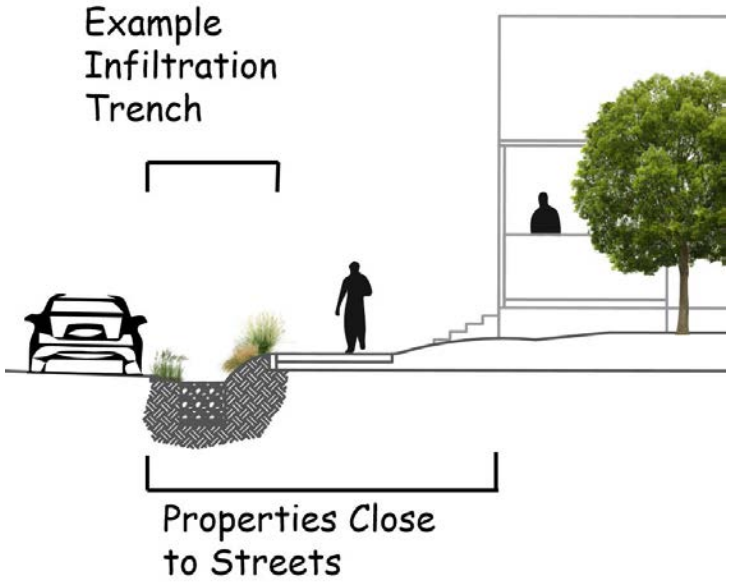
- One of the most commonly known strategies for cleaning and holding stormwater.
- Utilizes an overflow pipe to prevent backflow.
- Consists of plants that are drought tolerant and capable of holding large amounts of water.

Low Impact Design Strategies

Example of a bioswale.
Photo by Seattle Public Utilities

Bioswales

- Hold more water than Rain Gardens.
- Typically much larger than rain gardens and with more plants that handle large amounts of water differently.

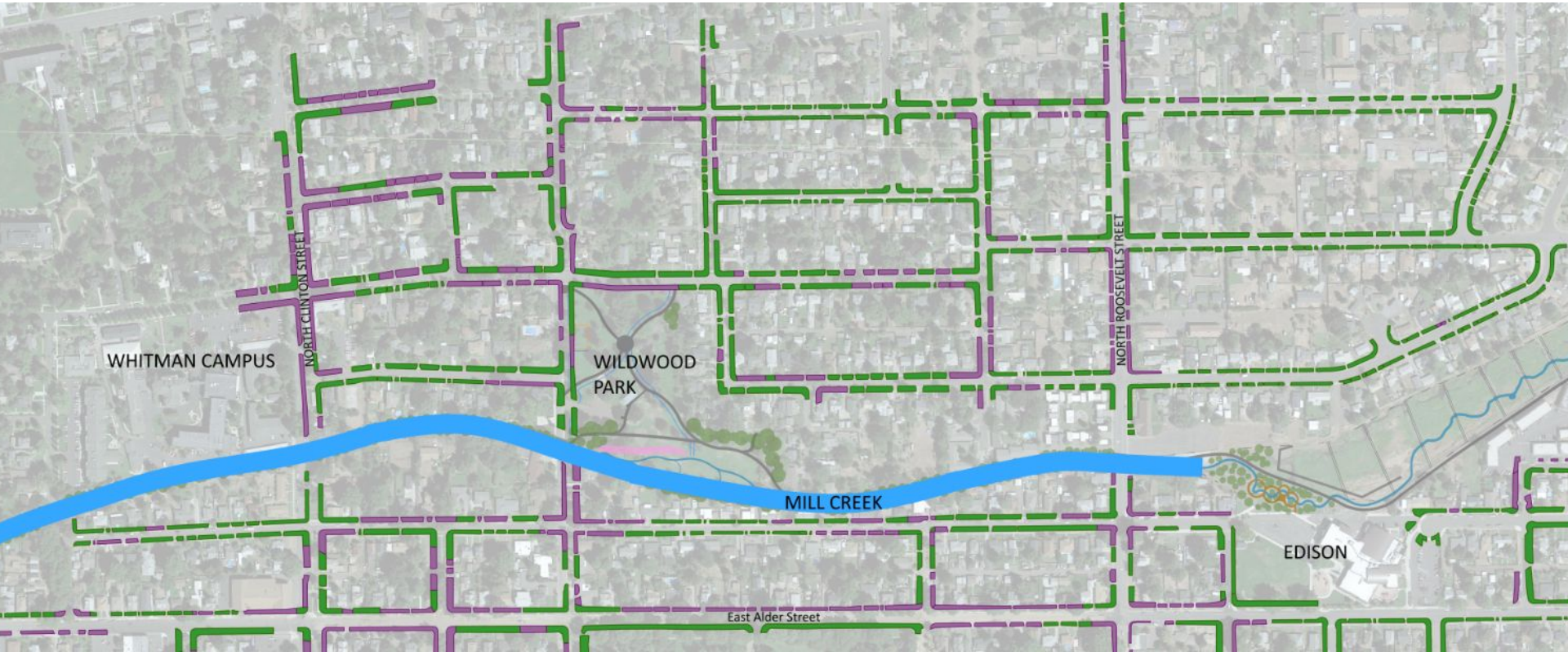


Infiltration Trenches

- Most small-scale strategy, minimum of 6 feet of space.
- Couples gravel and sand to drastically improve water penetration.

LID Suitability Study

This initial study takes into account existing infrastructure and available space, identifying spaces with room for Low Impact Design. Purple areas indicate spaces that are too narrow and cluttered with existing infrastructure. Green areas indicate spaces with room for Low Impact Design.



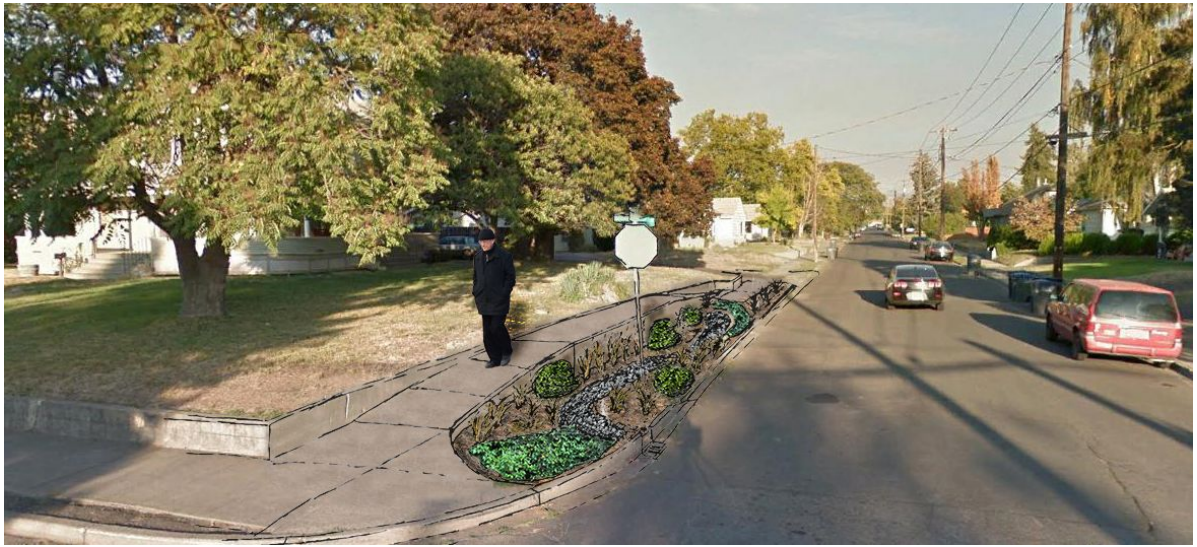
Stormwater Visualization Locations

These locations were selected to illustrate concepts, not as proposed project sites.

Conceptual Design 1: South Clinton St (at E Alder St)

Conceptual Design 1: Components

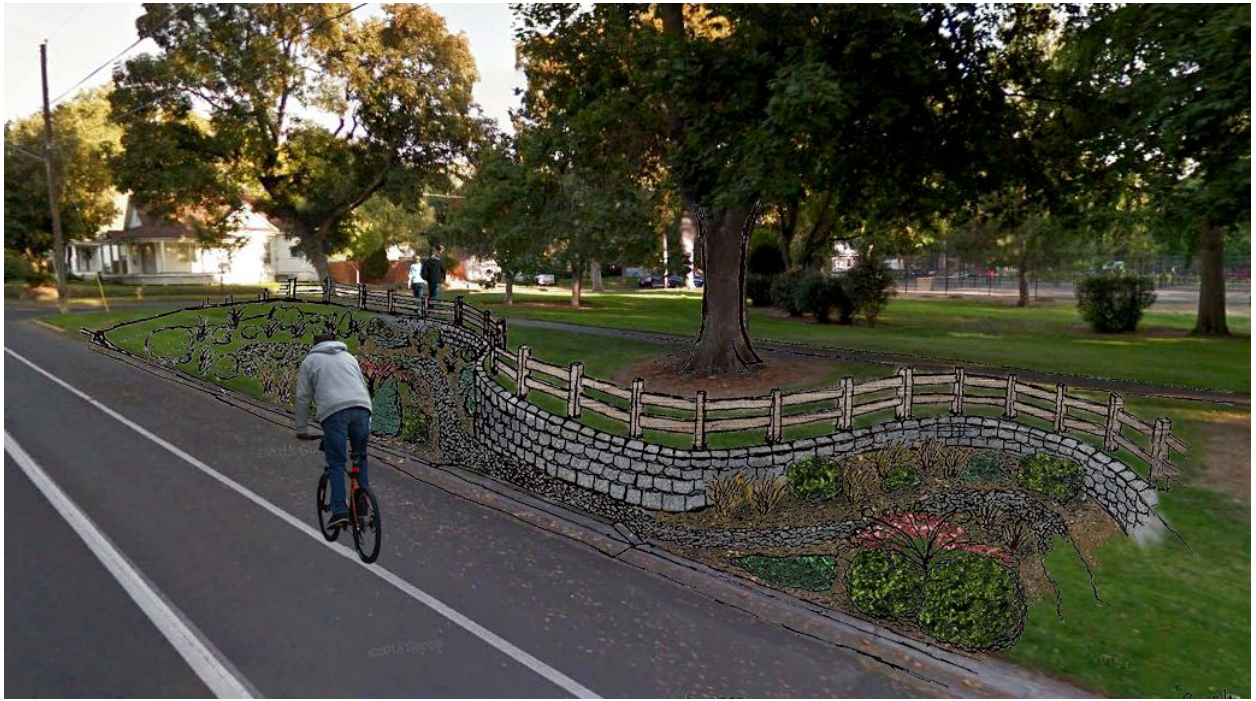
Conceptual Design 2: S Roosevelt St and Boyer Ave



Conceptual Design 3: S Roosevelt St looking West toward Olive St

Conceptual Design 3: Components

Conceptual Design 4: Pioneer Park (northern edge)



Conceptual Design 4: Components

Mill Creek Fish Passage

Photo by Jarvin, Wikimedia Commons

What do you think of when you hear creek or stream?

Elements in a creek/stream system

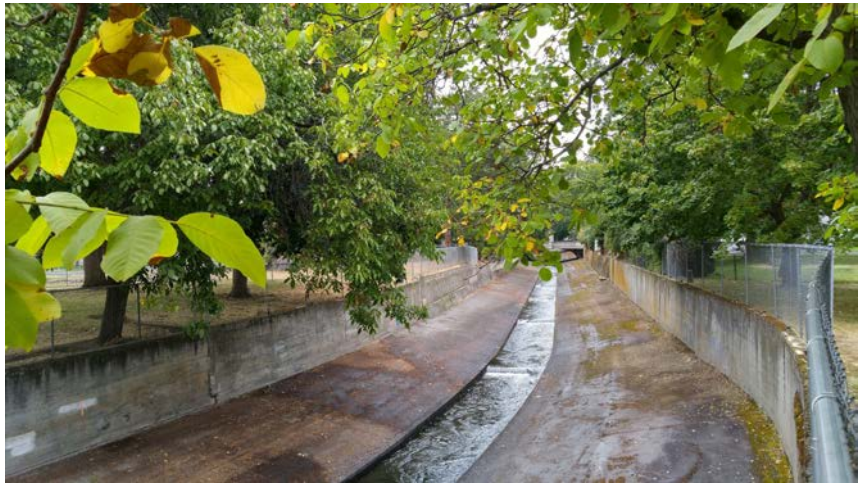
- Cool waters
- Areas of whitewater
- Areas of calm water
- Deeper pools and shallower beds
- Heavily vegetated embankments
- Diversity of biology

Does Mill Creek achieve these elements?

Photos from www.forestwander.com and Wikimedia Commons

Existing Conditions

Channelizing Mill Creek has prevented flooding, but it has also drastically reduced fish populations.



Reach Type 3: Trapezoidal Flume with 6ft baffles

- Harsh concrete covered
- Hot
- Minimal water depth in low flow (months)
- High velocity of water during high flow (months)
- Baffles provide minimal resting only during low flows
- Low vegetation on sides
- No connection to community

Reach Type 1: Channel Sills (Weirs)

- Long 5ft tall concrete sills (or weirs) cross channel
- Impede fish passage during low flow
- Shallow water in low flow (months)
- Warm water, no shade
- Areas of wetlands, unsuitable for fish
- Low vegetation on sides
- Low connection to community

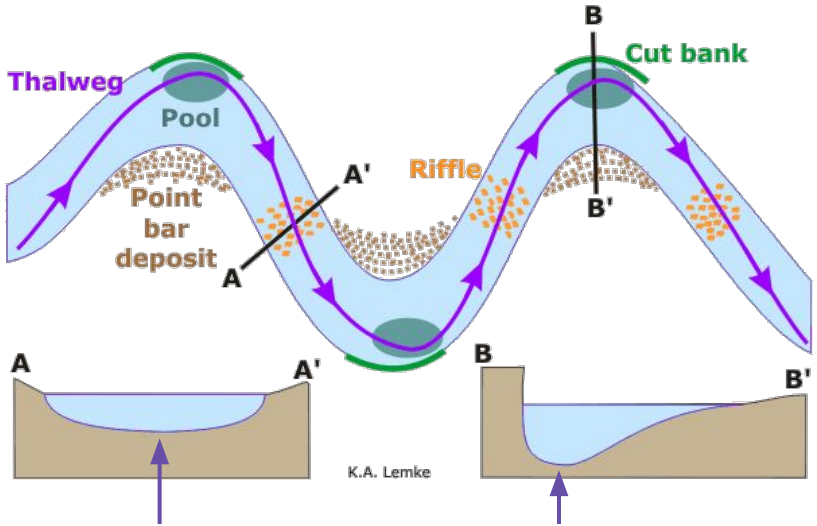
History of Mill Creek

Pre-Channelization
Mill Creek was a part of a braided, meandering stream system that stretched for miles from the Blue Mountains to the Columbia River. It was a center of life for fish and other wildlife, as well as native people.

Objective: Combine the flood control capacities that are current, combined with the elements that made Mill Creek a key passage for fish and a habitat for wildlife in the past.

Image Source: Carcophony and Argo Dag, Wikimedia Commons and Matt Singer, Flickr

What goes into a creek or stream?



Elements to consider in a creek or stream

- Thalweg - lowest cross-sectional point in a river or valley. Provides the base and a deep flow of water point for fish passage.
- Pools- deep, slow moving points in a stream system
- Riffles- shallow, fast moving points in a stream system

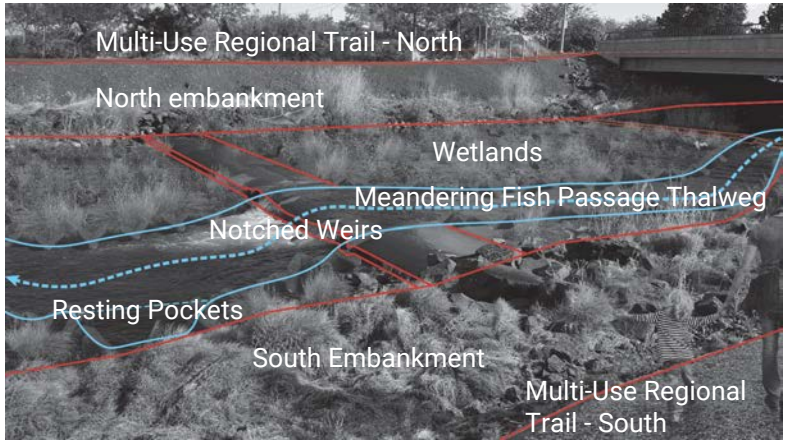
Thalweg, Pool, & Riffle combinations create a diverse system that provides healthy, thriving habitat for fish, birds, reptiles, amphibians, mammals, and benthic-dwelling creatures.

Image Source: K.A. Lemke, University of Wisconsin

Fish Passage and Habitat Restoration: Sill Section

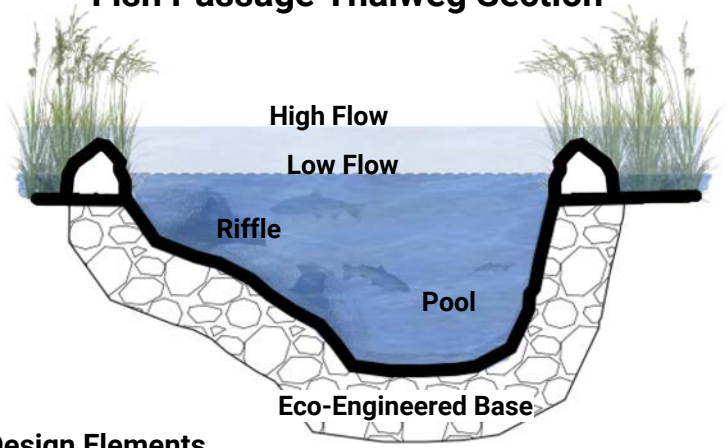
Creating a restored natural creek system

- Developing a thalweg system, with pools and riffles, that meanders through the entire sill section of the creek.
- Diverts water into a single channel, creating a wetland habitat outside of the primary fish passage.
- Notches in sills (weirs) allow for easement of passage for fish upstream.
- Regional multi-use trail enters stream re-establishing connection of creek to community.

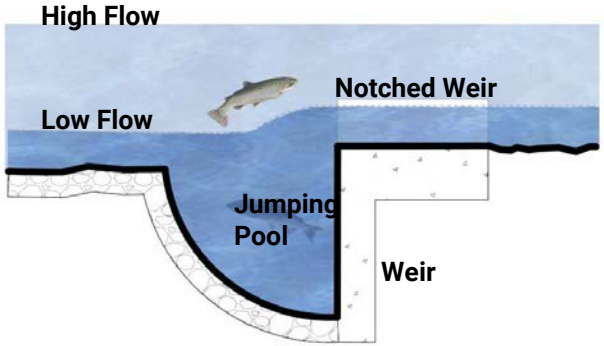


Fish Passage and Habitat Restoration: Sill Section

Fish Passage Thalweg Section



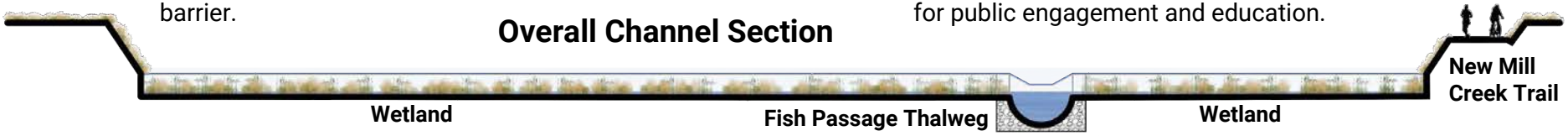
Sill Interaction Section



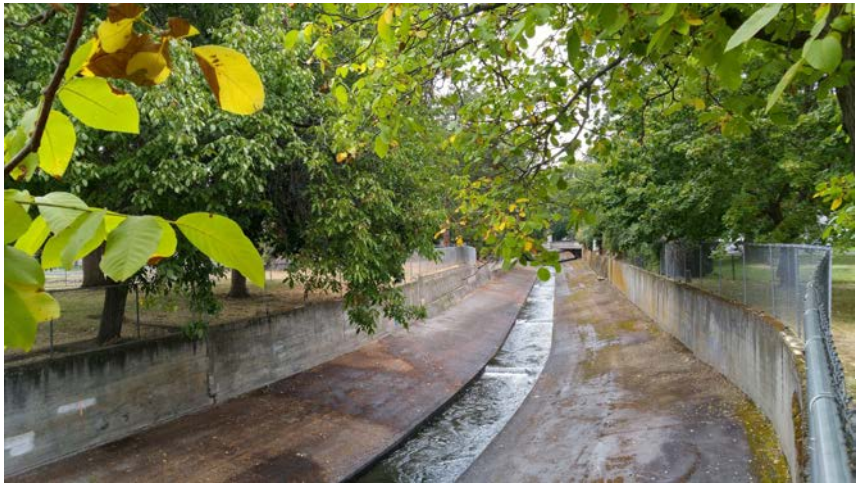
Design Elements

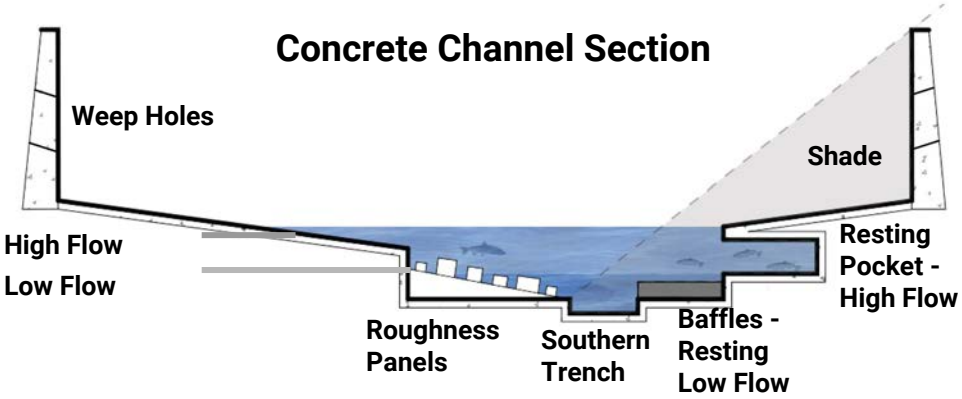
- (Above left) Cross section of the eco-engineered thalweg system. Incorporates a shallower riffle system and a deeper pool system
- (Above right) Section detailing the interaction of the fish passage stream and the sills (weirs). A pool is made below each sill to allow for space for fish to jump. A notch is provided in the sill to eliminate height barrier.
- (Below) A cross section example of the entire sill channel. Wetlands develop on left and right of primary fish passage thalweg. Allow for habitat, and biodiversity to emerge in the channel while wetlands act as floodplain. Thalweg stays on southern portion of channel, to capture any shade to help cool the stream. Multi-use regional trail enters channel to allow for public engagement and education.

Overall Channel Section



Transitional Fish Passage Design





Currently

The harsh system of concrete is overall a huge barrier to overcome for fish passage and will not be an easy fit to fix. But will result in a healthy, green, and recreational symbol for the community if achieved. In order to overcome the challenges, there will be a set of temporary solutions that can be done to the channel to help fish passage until the final stage of the Re-imagined Mill Creek is finished.

Design Elements of temporary solutions

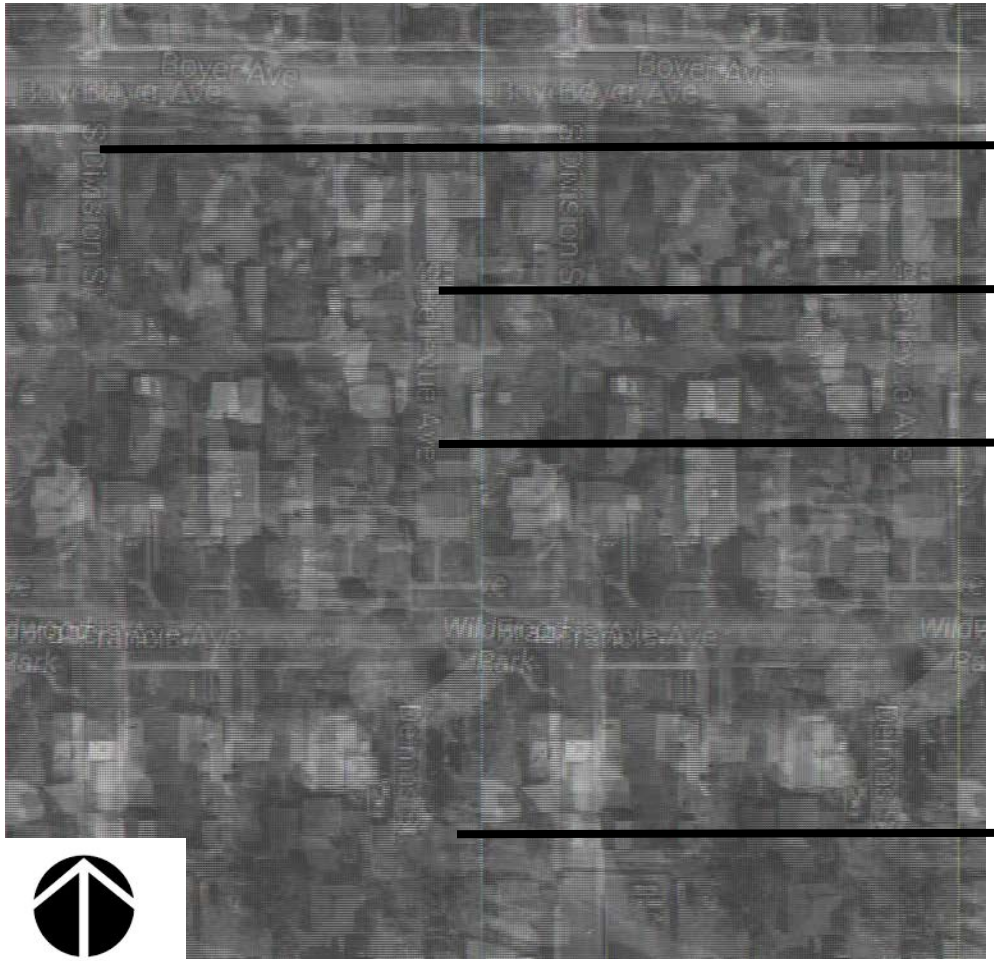
- Movement of central trench to south side to capture natural shade from surrounding objects of channel.
- Utilizing the ideas developed by the Tri-State Steelheaders of “Roughness-panels” and 20ft-spaced baffles. This will create resting area for fish during low flows in the channel, as well as provide friction during high flows that will slow the water down for fish passage.
- Pockets in the channel will allow for cool resting areas during high flows.
- Weep holes drilled into the sides of the channel to tap into the cool groundwater to help recharge the stream.

This project’s goal was to take into account history and current achievements to create a system that develops fish passage, biodiversity, and community connection to establish a unique symbol to the region.

Wildwood Waterways Park

Wildwood Park

Existing Site Issues



Minimal Connectivity to Neighborhoods

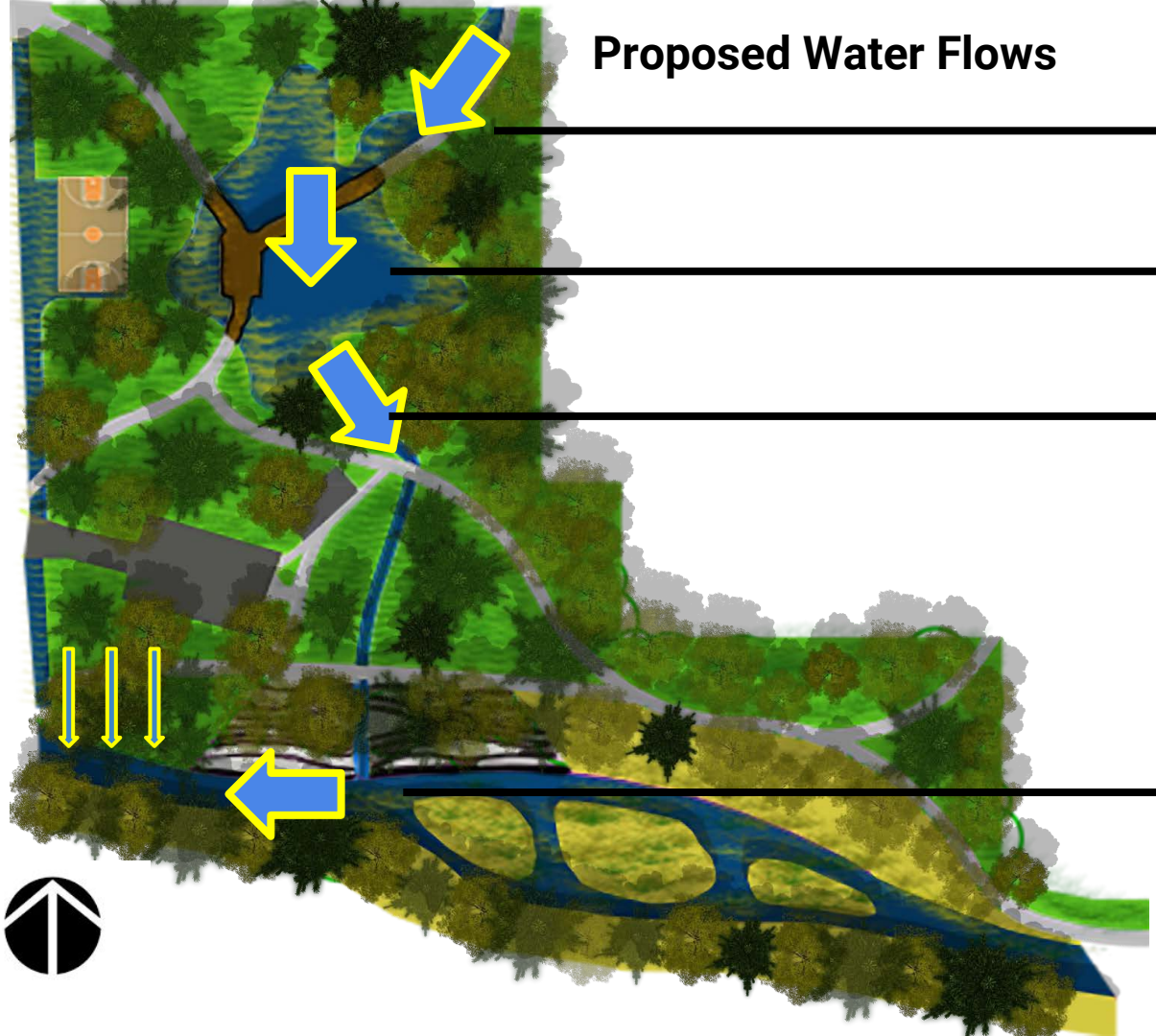
Drainage Issue

Lack of Program Elements

No Connection To Water

Imagery from Google Earth.

Proposed Water Flows



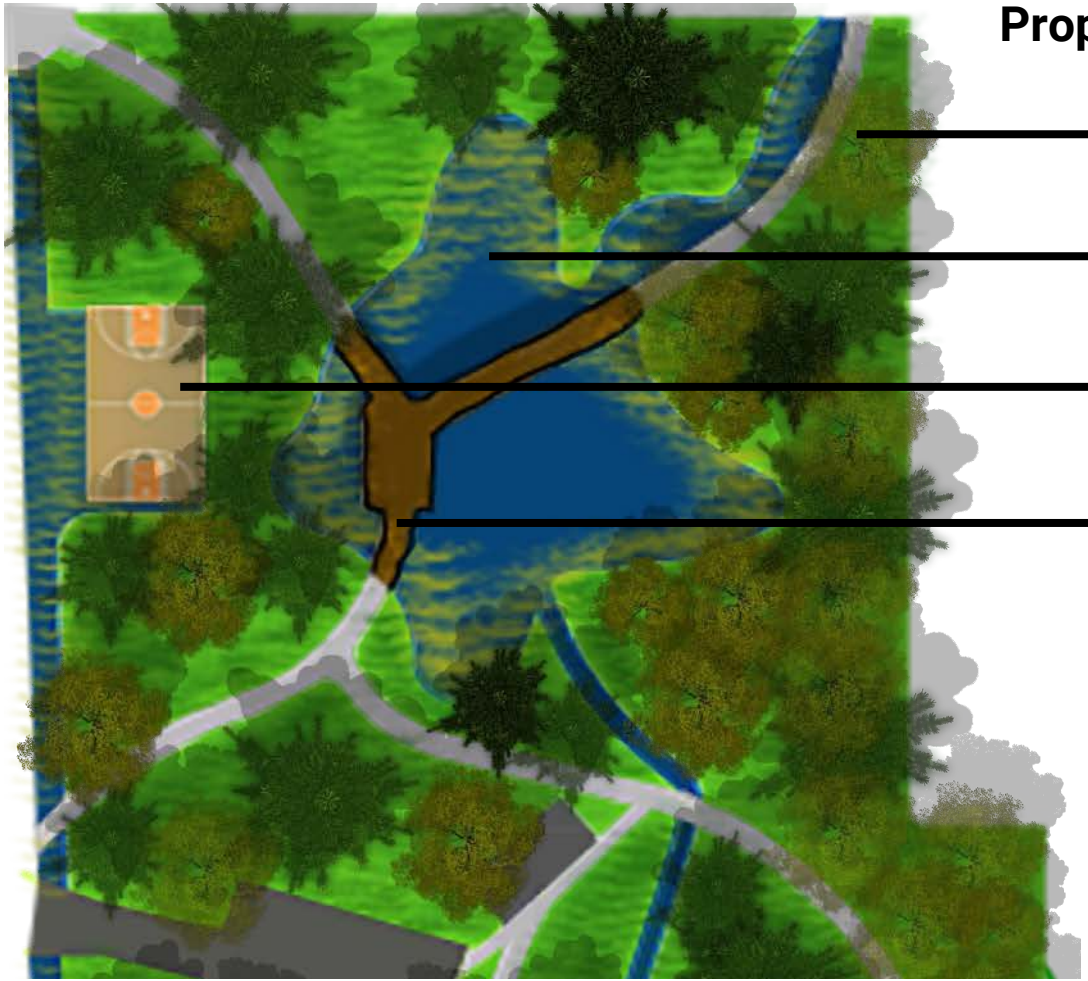
Collection through Bioswale

Bioretention pond allowing infiltration of water

Overflow allowing excess water to escape

Overflow water enters stream/ groundwater discharges into creek

Proposed Site Features



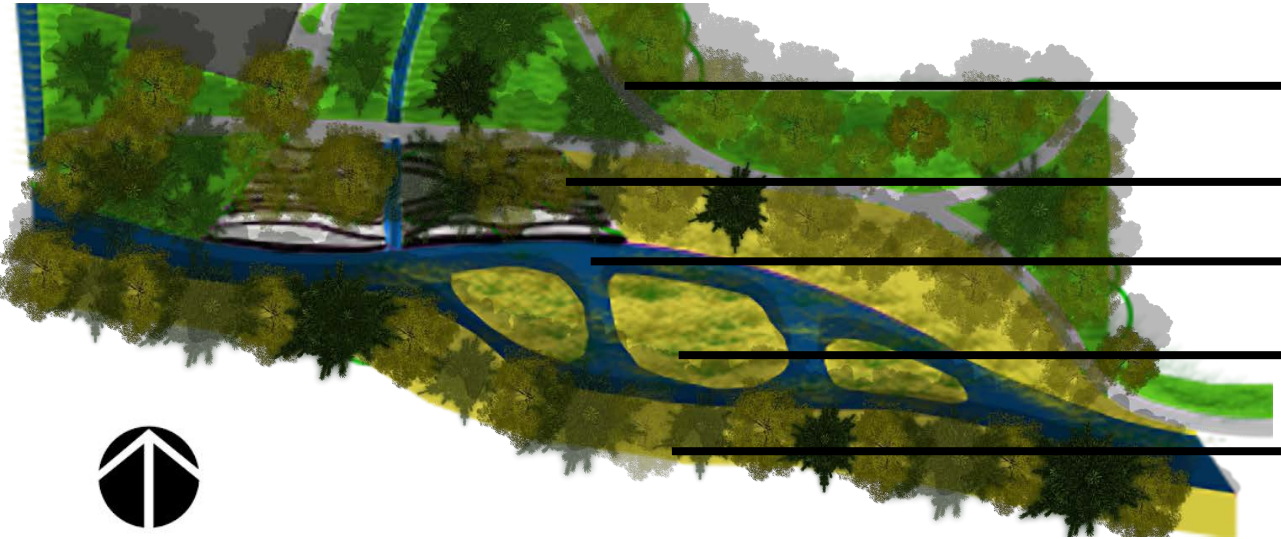
Connectivity to Neighborhoods

Constructed Wetland

Sports Court

Boardwalk/ Viewing Deck

Proposed Site Features: Part Two



Regional Bike Trail

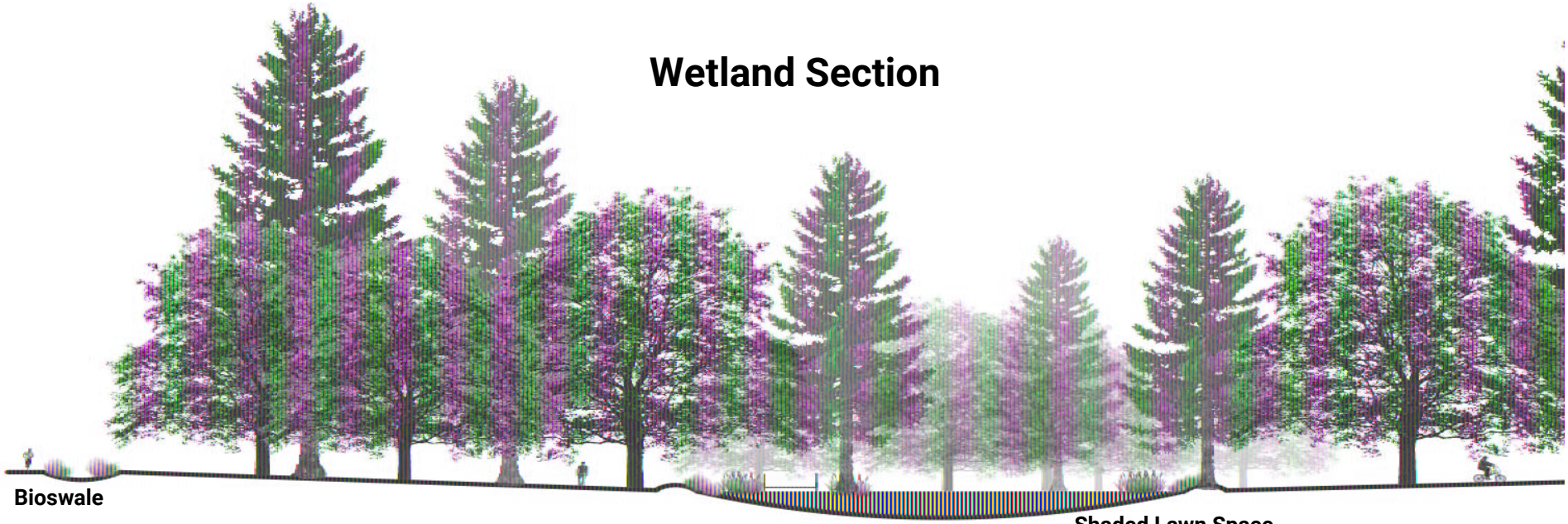
Terraced Connection to Water

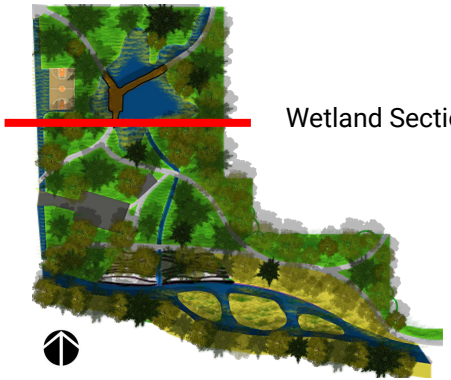
Braided Stream

Habitat Island Chain

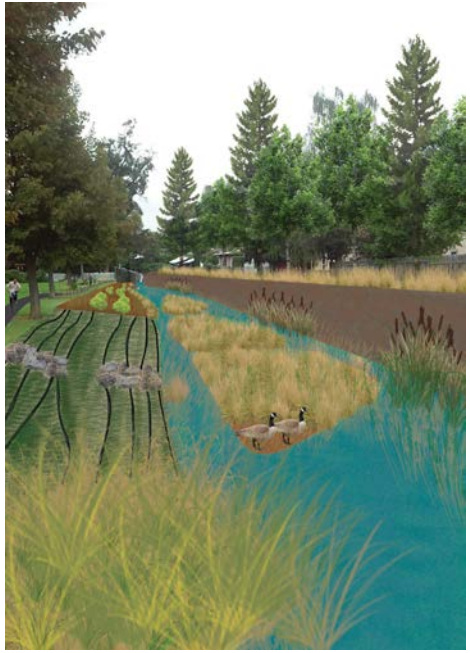
Constructed Shade Buffer

Wetland Section



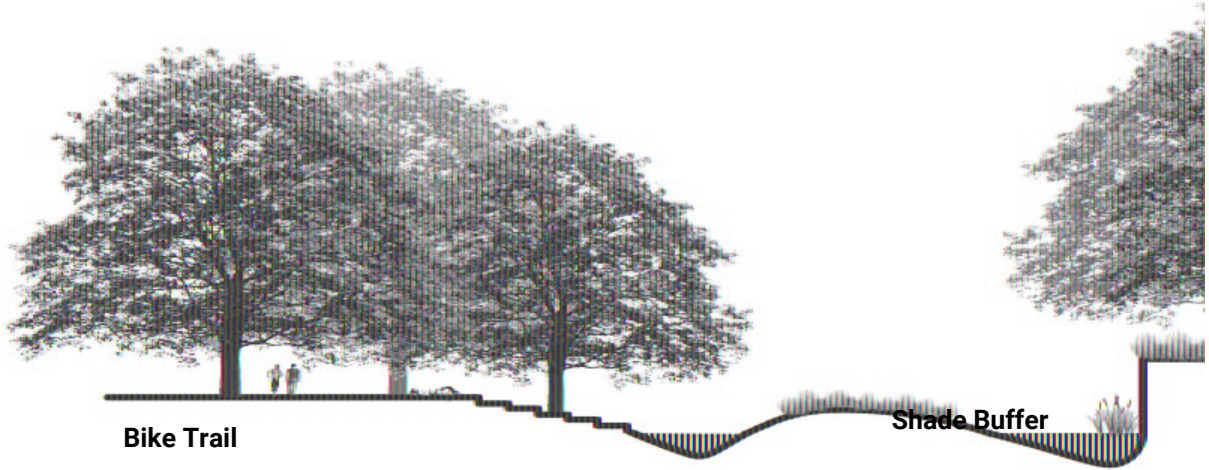


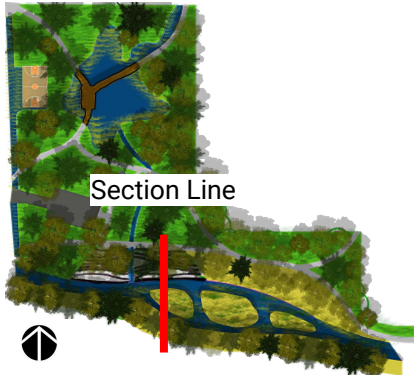
Wetland Section Line



Perspective Rendering looking upstream.

Braided Stream and Creek Access Section





Mill Creek Sportsplex and Neighborhood Park

Image from Pictometry.

Mill Creek Sportsplex & Neighborhood Park

Existing Site Issues

UNUSED LAND

SUN EXPOSURE

LITTLE OR NO VEGETATION

Image from Pictometry.

Proposed Site Features

MIXED-COMMERCIAL PLAZA

RENOVATED BASEBALL FIELDS

RENOVATED SOCCER FIELDS

DECIDUOUS TREES

RAIN GARDENS

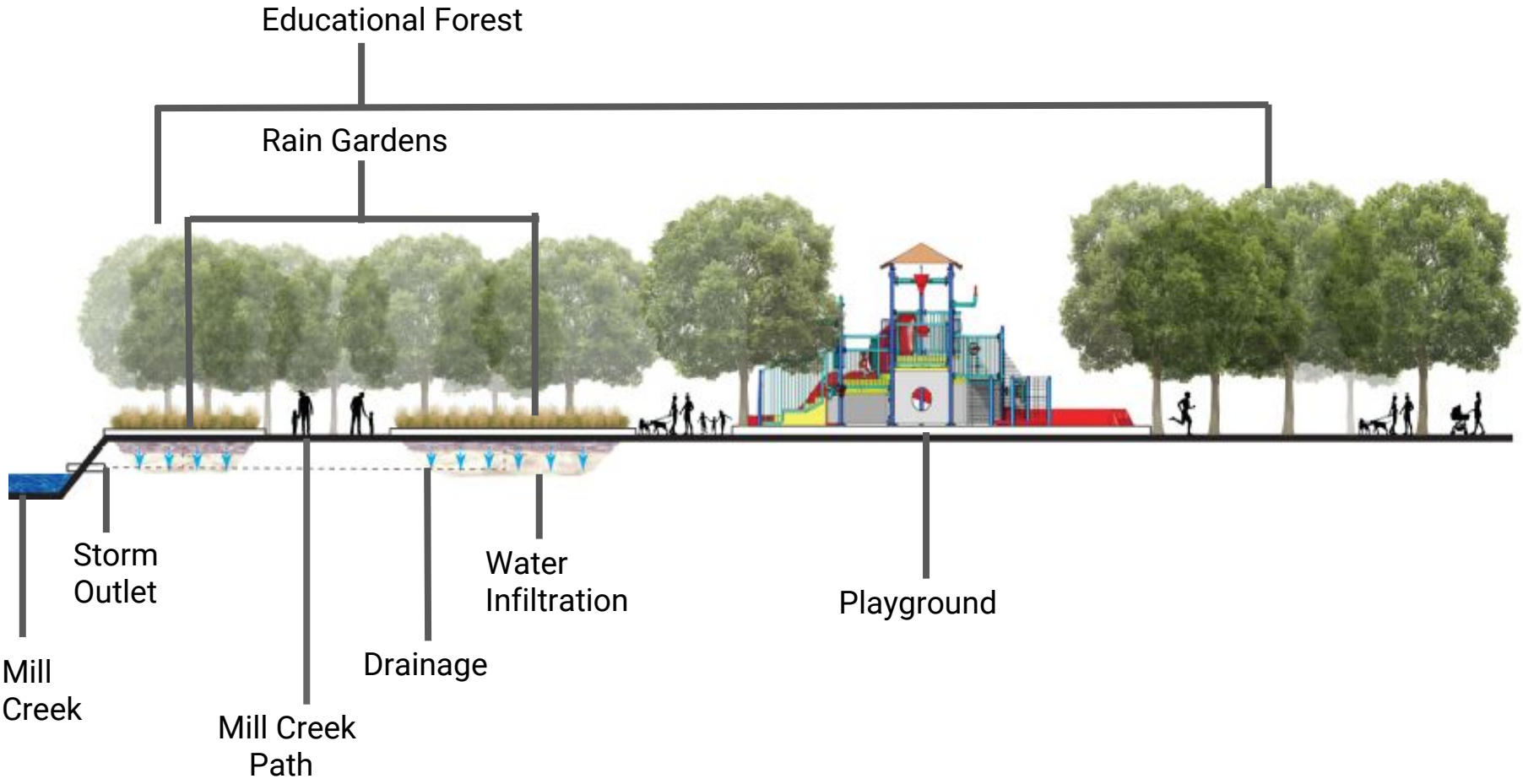
PLAYGROUND

BASKETBALL COURT

The addition of a neighborhood park (outlined in green) to the sportplex would provide a play area and gathering space for residents south of Mill Creek (outlined in red), who currently lack a neighborhood park within walking distance.

Sportsplex Master Plan

Section A-A: Neighborhood Park

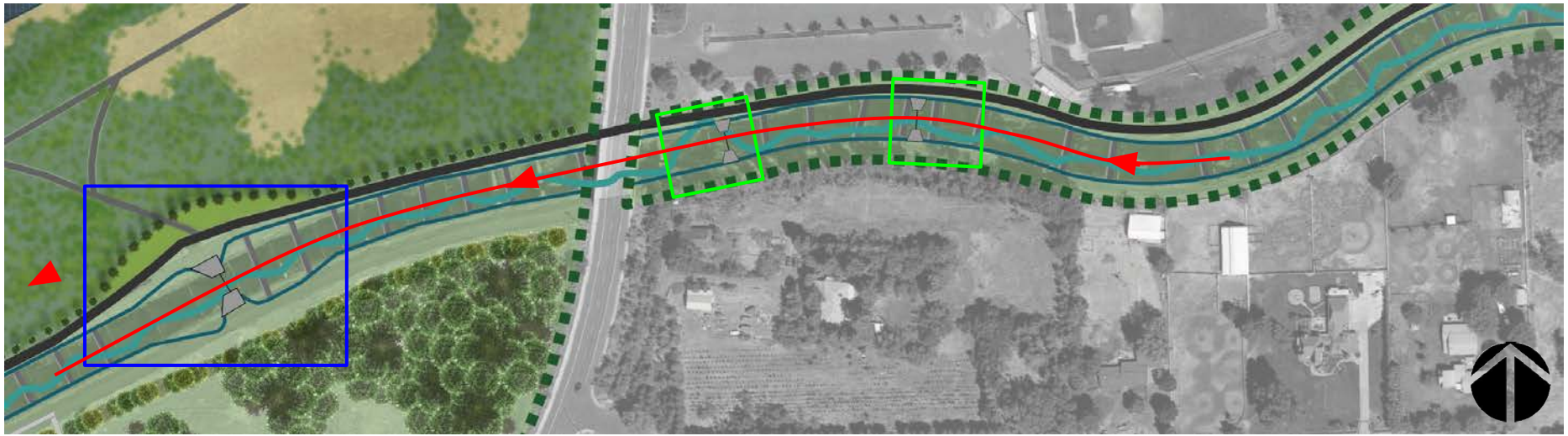


Whitewater Park

Proposed location of the Whitewater park because of its easy parking access and good slope.

The whitewater park concept features two different rapid feature sizes, which make the facility more diverse as well as more accessible for different ages and skill levels. The advanced feature is located on the western end of the park in the blue square and the intermediate features are located on the eastern edge in the green squares.

Intermediate Features

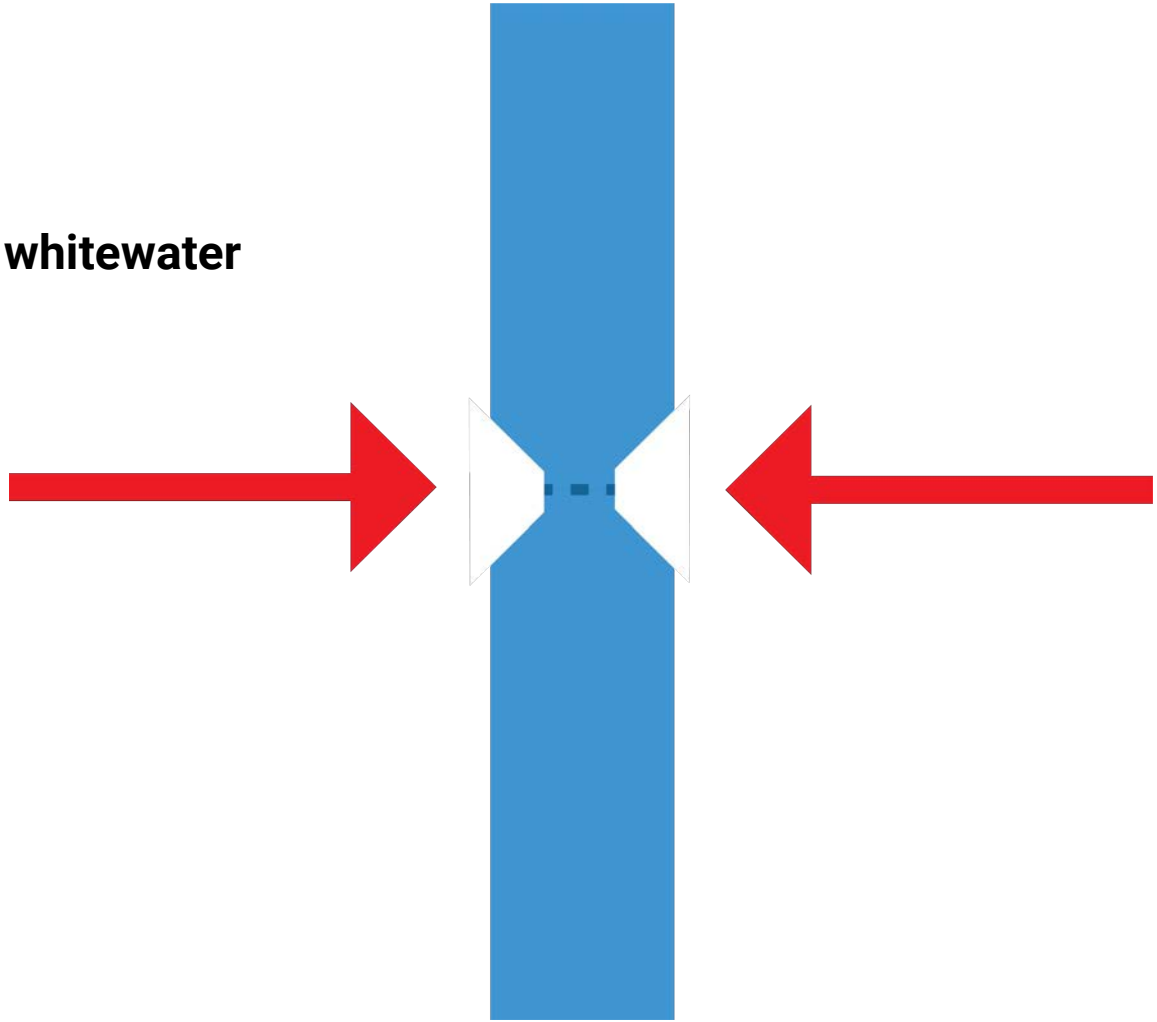


Advanced Feature

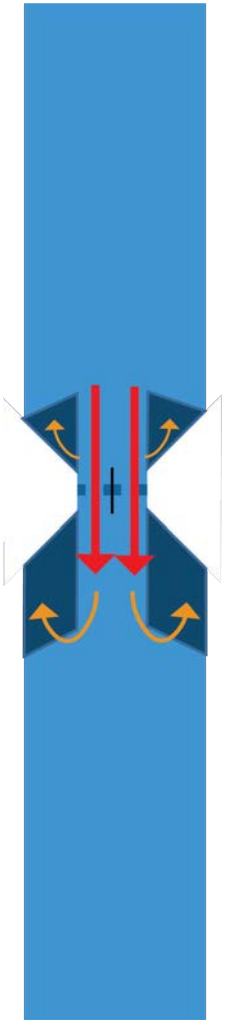
Whitewater Park Design Process

The existing channel could be...

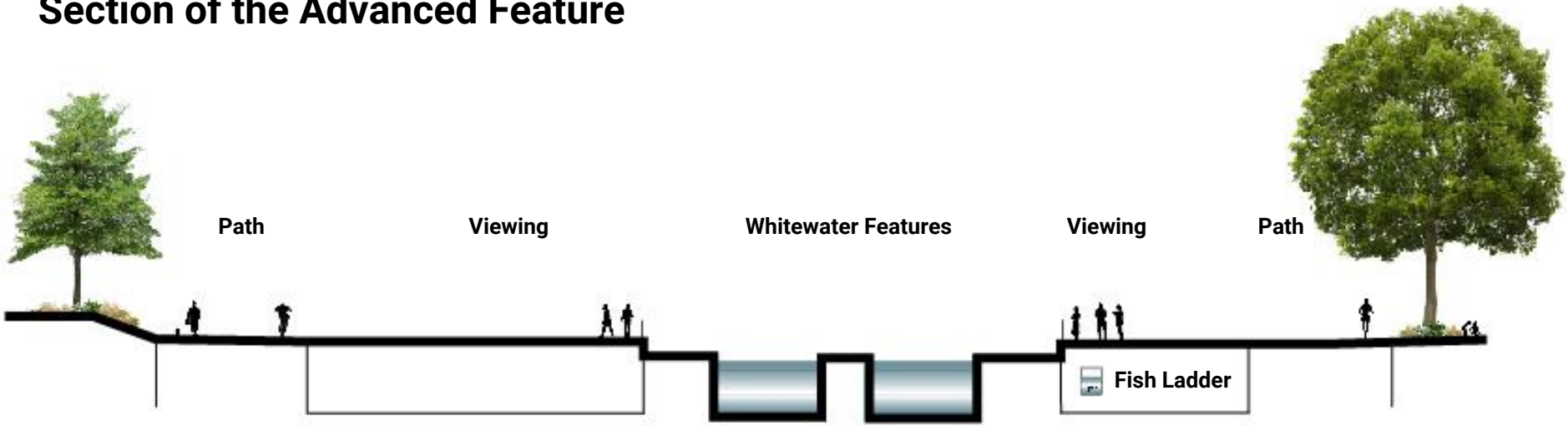
… compressed to create the whitewater rapid...



… with backwaters on the upstream and downstream sides to allow easy and safe access.

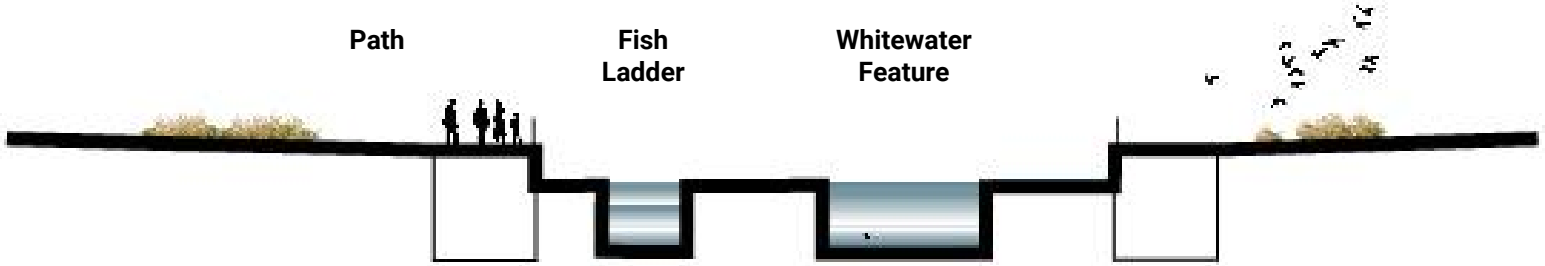


Section of the Advanced Feature



The Advanced Mill Creek Whitewater Park features incorporate two separate rapids to maximize available active space for kayakers on busy days. Each rapid will be structured slightly differently to create a more or less rough creating an environment suitable for both kayakers and surfers. Backwaters and access ramps are available above and below the rapids on both sides in case of emergency. Viewing platforms are located on either side of the channel pinching the flow into the features. A fish ladder built into the retaining wall on the south side of the channel connects the lower and upper backwaters to allow for effective fish passage and rest.

Section of the Intermediate Feature



The Intermediate Mill Creek Whitewater Park features are a series of two structures upstream of the advanced feature. Each has a single feature perfect beginners, practicing or for learning how to surf, kayak or raft in a lower risk environment. Like the advanced feature the structures have viewing platforms on either side but the intermediate features only have upper and lower backwaters on the north side of the channel. The structures incorporate an open air fish ladder much like the boxed currently in place in some of the weirs.

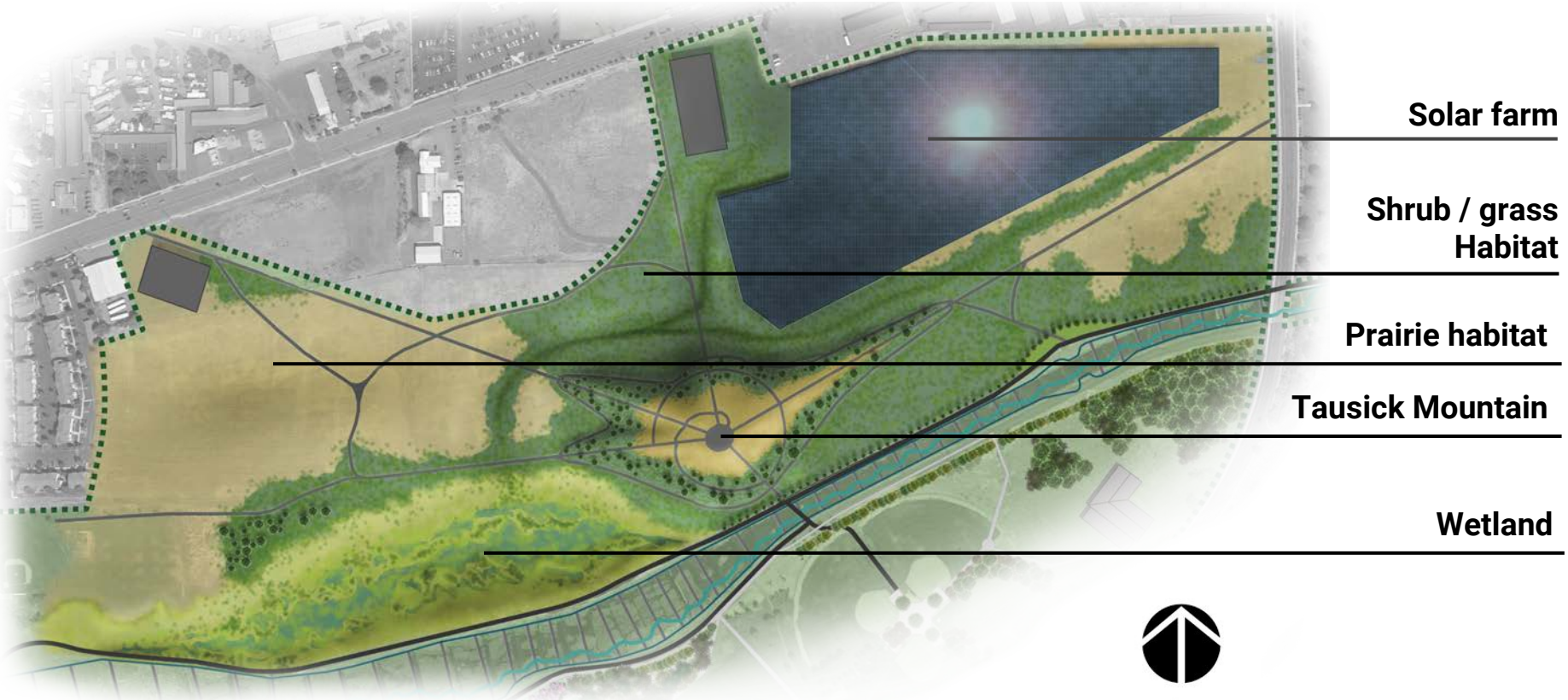
Imagine a community that has a physical relationship with its water, aware of its health and invested in its future. Connection leads to preservation, stewardship and identity. Creating a recreational connection between the community and Mill Creek fosters the growth of positive relationships with the waterway - leading to the development of self-initiated reverence for the surrounding environment and water ecology.

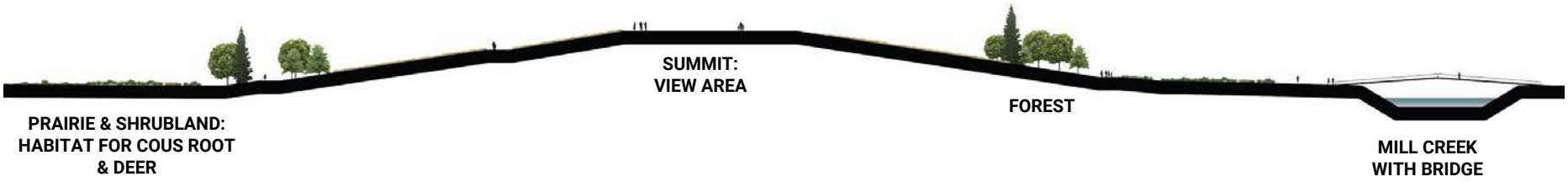
Tausick Commons Natural Area

The former Tausick Landfill could provide critical habitat for the cous root and deer, two of the first foods of the region.

Tausick Commons is a proposed community nature area focused around showcasing the historic floodplain environment by establishing prairie, shrub and wetland habitat zones and enhancing views of the surrounding landscape. The site engages the community through passive recreation, facilitating interaction with each habitat zone on a convenient and connective network of walking paths.

Tausick Commons Natural Area Master Plan





Tausick Mountain

Tausick Mountain enhances views of the blue mountains to the south as well as east and west along the channel connecting the site with the regional landscape, it is a destination feature along the regional bike path and a circulation node for the park. The earthwork feature creates a deeper soil profile able to support trees allowing for the development of a tree canopy for shade making it a comfortable place to get out of the heat during the summer on an otherwise exposed site.

We hope the ideas in this presentation feed your thoughts as you imagine what the channel could look like in the future!