FERN HOLLOW RESTORATION

SCHEMATIC DESIGN MEMORANDUM

MAY 2026

SUBMITTED BY:

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water-energy-climate-community

SUBMITTED TO:

upstream pittsburgh

Fern Hollow Creek, Image Credits: Upstream Pittsburgh

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Introduction and Background

This memorandum builds on a decade of visioning, community engagement, and technical study in the Fern Hollow Creek corridor—including most recently the Fern Hollow Vision Plan, the USACE Water Resources Masterplan, and Upstream Pittsburgh's RIPPLE Watershed Plan—to advance the most constructable and actionable restoration framework developed for the valley to date. Where prior efforts established the foundation, this document provides the roadmap: a clear, site-specific path from planning to tangible project execution.

The central goal of this work is to restore sustainable flow and ecological function to Fern Hollow Creek. Decades of urbanization have severed the creek from the majority of its natural drainage area, leaving it intermittent through much of its length and vulnerable to the erosive forces of unmanaged stormwater. The five project areas described in this memorandum address this condition through a coordinated set of interventions: mitigating erosion and sedimentation that degrade the stream channel and its banks; improving and restoring natural stormwater flow pathways; rehabilitating riparian and wetland ecology; and increasing sustainable baseflow to the creek by reconnecting captured drainage through green stormwater infrastructure.

Rather than treating Fern Hollow as a single, monolithic restoration challenge, this document breaks the work into five discrete, right-sized projects—each independently implementable, each representing meaningful progress toward the larger restoration vision. For every project area, the document presents a schematic design, identifies the key barriers and constraints that must be resolved before construction, and outlines the next steps needed to move from this schematic framework to permitting, funding, and implementation. Taken together, these five projects constitute a credible, phased strategy for achieving lasting restoration of Fern Hollow Creek.

Timeline

WHERE WE CAME FROM:

2024

Fern Hollow Vision Plan, Neighborhood Allies

2025

Fern Hollow Vision Plan: Public Art Recommendations, Shiftworks

WHERE WE ARE:

2026

Fern Hollow Restoration Schematic Design Memorandum, Ethos Collaborative

2026

RIPPLE Environmental Justice Watershed Plan, Upstream Pittsburgh

2026

Fern Hollow Creek Water Resources Masterplan, U.S. Army Corps of Engineers, Pittsburgh District, Planning & Environmental Branch

WHERE WE ARE GOING:

- Fundraising
- Continued stakeholder engagement
- Site investigations (Geotech, Survey, SUE, Stream and Wetland Delineation)
- Final design & Permitting
- Bidding & Construction
- Long-term O&M

PROJECT SITES

1. BIDDLE LOT GSI
2. WETLAND
3. CONFLUENCE
4. HENRIETTA STREET GSI
5. OVERTON STREET GSI

Master Plan Overview

Existing Conditions

Fern Hollow Stream and Valley

Image Credits: Upstream Pittsburgh via Site Viewer 360 by Nodeology

Fern Hollow Creek originates in Homewood Cemetery and flows approximately 2.7 miles through Frick Park before joining Nine Mile Run near Beechwood Boulevard. Though classified as perennial, the creek behaves as a losing stream due to combined sewer infrastructure installed throughout the corridor during neighborhood development. Storm inlets capture approximately 65% of the contributing watershed, leaving most sections at or near zero flow between storm events. The perennial reach is now limited to approximately 0.3 miles, from the pond along Tranquil Trail to just south of the Biddle/Tranquil Trail intersection, below which flow diminishes over a 0.71-mile reach to the Nine Mile Run confluence. The mid-valley wetland complex—the corridor's most ecologically significant habitat—depends on this diminished flow regime and is further compromised by trail infrastructure sitting within the floodplain, which restricts natural storage capacity. USACE hydraulic modeling confirms that removing trail fill from the floodplain would meaningfully increase wetland storage and reduce flood inundation extents. Ecological stress accumulates throughout the corridor. Chronic low flows degrade aquatic habitat and water quality. Unmanaged MS4 discharges from the Biddle parking lot and neighborhood streets erode banks, mobilize sediment, and raise stream temperatures. At the Nine Mile Run confluence, combined sewer overflow from the Fern Hollow culvert erodes banks, smothers downstream habitat, and renders Nine Mile Run unsafe for recreation during wet weather. Invasive species—Japanese knotweed, multiflora rose, and others—have colonized disturbed riparian areas throughout the corridor, suppressing native vegetation and accelerating erosion. Mature trees and canopy throughout the hollow represent significant ecological assets; all project designs have been developed to protect them.

Infrastructure Conditions

The valley's infrastructure reflects a century of incremental decisions that have profoundly altered how water moves through the landscape. Combined sewer infrastructure is present throughout the corridor—not only running parallel to the stream beneath Tranquil Trail, but crossing the channel at multiple points as the sewer network follows the valley's contours and tributary branches. A large-diameter, 60-inch circular brick combined sewer runs beneath Tranquil Trail for much of the corridor's length, acting as a hydraulic barrier between upland groundwater and the stream channel. Smaller combined sewer laterals cross beneath Fern Hollow Creek at several locations, complicating any in-stream or near-channel work and creating a subsurface infrastructure network that is only partially mapped. Pittsburgh Water is presently completed completing a shotcrete lining rehabilitation of thea reach of the 60-inch brick sewer below the Fern Hollow Bridge in 2025 to reduce inflow and infiltration (I&I), but the sewer system as a whole remains a source of significant I&I across the study area, with the shallow depth of many laterals and their age contributing to ongoing groundwater intrusion into the combined sewer.

The most consequential infrastructure condition for stream baseflow is the broken stone subdrain underlying the 96″×54″ box culvert that conveys the main Fern Hollow combined sewer trunk. This subdrain was originally designed to relieve hydrostatic pressure around the exterior of the brick culvert by draining surrounding groundwater back into the sewer—a feature, not a defect. The practical effect, however, is that it functions as a continuous drain on the groundwater table along the stream corridor. The USACE Masterplan identifies this subdrain as a primary suspect in the dramatic loss of baseflow observed downstream of the Wetland and Confluence project areas: rather than sustaining stream flow, groundwater that might otherwise discharge to Fern Hollow Creek is instead intercepted by the subdrain and carried into the combined sewer. A geotechnical inspection of the junction manhole and the upstream end of the box culvert is recommended to locate the principal sources of stream loss and determine the feasibility of installing a natural or synthetic impermeable liner to partially decouple the subdrain from the surrounding groundwater system.

The park's trail network introduces a third and more visible infrastructure condition affecting the study area. Tranquil Trail and Biddle Trailand it's connecting trails are gravel-surfaced paths that run within or immediately adjacent to the floodplain for much of the corridor. Both tThese rails are subject to frequent flooding from the stream during moderate and larger storm events, and to persistent erosion from upland drainage that flows across the trail surface rather than through below it. Gravel and fine sediment mobilized during these events migrate downslope into the stream channel, contributing to the sediment loading that degrades habitat in the wetland and downstream reaches. The trail infrastructure itself sits on fill within the floodplain in the wetland zone, restricting the channel and limiting the wetland's natural storage capacity—a condition the USACE hydraulic model confirms is directly correlated with elevated flood inundation extents in the area. Culverts along the trail network vary in size, material, age, and condition; several were surveyed by UpstreamPgh due to the absence of existing data. Addressing trail drainage, surface erosion, and the relationship between trail fill and floodplain function is a central objective of the Wetland project area design.

Existing Conditions Map

Design Considerations

Site Selection & Project Scope

The five project areas were selected from a broader field of potential interventions identified through the Fern Hollow Vision Plan and refined through the USACE Water Resources Masterplan, which modeled five distinct restoration alternatives for the corridor. Project areas were evaluated against consistent criteria: hydraulic connection to Fern Hollow Creek; measurable potential to restore flow, reduce erosion, or improve ecological function; constructability within the constraints of a functioning park; and near-term permitting and funding feasibility.

Two alternatives at the northern end of the study area were evaluated and tabled for future development. Alternative 3—a culvert installation intended to reconnect the upper headwaters—and Alternative 4—a right-of-way GSI system along South Homewood Avenue—both run into a common problem: the absence of a well-defined stream channel along Tranquil Trail between Homewood Cemetery and Fern Hollow Bridge. Water currently drains overland through that section, often across the trail surface rather than in a defined channel. Without comprehensive channel reconstruction and likely trail realignment, adding stormwater to this portion of the valley would worsen existing conflicts among surface drainage, trail infrastructure, and the shallow sewer system beneath. The South Homewood Avenue GSI would also require a lined underground detention facility and coordination with multiple adjacent property owners, significantly increasing both cost and complexity. These upper watershed projects are recommended for a future design phase, developed as a comprehensive solution from Homewood Cemetery to Fern Hollow Bridge.

The remaining USACE alternative—a single right-of-way GSI system along the Regent Square neighborhood edge—was split into two discrete projects: Henrietta Street GSI and Overton Street GSI. Though geographically adjacent, these two areas drain to separate and distinct points of reconnection to the stream, and treating them as independent projects allows each to be designed, permitted, funded, and constructed on its own timeline without interdependency. The Biddle Parking Lot GSI was added as a new project not in the original USACE alternatives. Relative to the other sites, Biddle avoids in-stream regulatory work and right-of-way permitting complications, making it a strong candidate for early implementation and a tangible early demonstration of the project's goals.

Environmental Constraints and Standards

Steep and landslide-prone terrain flanks the valley on both sides throughout the study area. The City of Pittsburgh's steep slope overlay (grades ≥25%) and landslide-prone area designation affect portions of every project area. These overlays trigger Zoning and Development Review for all five sites, constrain construction methods, prohibit subsurface infiltration where slopes and soil conditions introduce saturation risk, and require geotechnical investigation before grading, foundation design, or stormwater conveyance work can be finalized. At Biddle and Overton, the proximity of steep and landslide-prone slopes to proposed detention facilities makes geotechnical assessment a specific prerequisite. These constraints are real and shape the design approach at every site, but they are not prohibitive—they define the envelope within which each design has been developed.

The Henrietta Street and Overton Street GSI projects require coordination with the City's Department of Mobility and Infrastructure (DOMI) for right-of-way work, and with the Department of Public Works (DPW) for the MS4 outfall connections that redirect drainage currently entering the combined sewer system. Pittsburgh Water coordinates on combined sewer catchbasin relocation and reconnection. All projects involving 10,000 square feet or greater of earth disturbance are subject to the City of Pittsburgh Stormwater Code and Stormwater Design Manual, governing BMP selection, volume reduction, peak rate control, and water quality treatment.

Work in or adjacent to streams, wetlands, and floodplains requires PA DEP review under Chapter 105 (Dam Safety and Waterway Management). Projects with substantial encroachment require an Individual Permit, processed jointly with the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act. The Confluence stream restoration and Wetland projects are expected to require joint DEP/ACOE Individual Permits; some trail improvement and stream maintenance work at the Wetland may qualify for a Chapter 105 General Permit (GP-7, Minor Road Crossing). The three GSI projects may require Chapter 105 review for their MS4 outfall connections, with the permit pathway—general or individual—determined by final design.

Sewer Infrastructure and Flow Paths

Existing Conditions Photo Log

PHOTO NOTES

1. View of Biddle Avenue Parking Lot
2. View from Biddle Trail Stairs Overlooking Wetland Area
3. View from Tranquil Trail Culvert at Wetland Area Showing Lower Channel & Trail Erosion
4. View Looking Across Falls Ravine Trail towards defunct Pavilion and Bathroom Area
5. View Looking Upstream Fern Hollow Creek from Bridge at Bottom of Wooden Stairs
6. View Looking at Henrietta St & Milton St Intersection in Front of the ECS Intermediate School
7. View Looking at Henrietta St & LaClair Ave Corner
8. View Looking Downhill at Overton St & LaClair Ave Intersection
9. View Looking at Lawn Space at the Corner of Overton St & Macon Ave

Existing Conditions Photo Log

Green Infrastructure Strategies + Typologies

Networked Right-of-Way Green Infrastructure: Street Creeks

Networked right-of-way green infrastructure uses the street system itself as a connected stormwater landscape. Rather than treating each inlet, bump-out, planter, or rain garden as an isolated facility, this typology links those elements together along the natural slope of the street. Runoff is intercepted from curbs, sidewalks, intersections, and roadway surfaces, then conveyed through a sequence of visible or partially visible green-gray infrastructure elements before reaching a larger downstream storage, infiltration, or treatment area.

The concept is sometimes described as a "street creek" because it reintroduces a simplified version of a headwater drainage network into the urban right-of-way. Water is not merely removed from the street as quickly as possible; it is slowed, routed, filtered, and made legible. Green inlets, stormwater curb extensions, linear planters, trench drains, stone runnels, cascades, and subsurface conveyance can work together as a distributed system. Each block contributes a manageable amount of runoff, while the full network behaves like a small urban watershed.

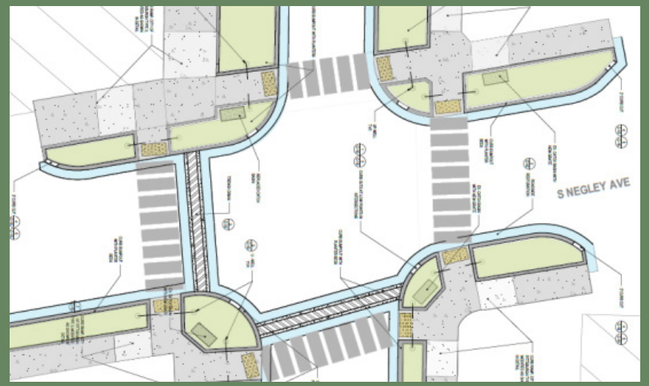
This approach is especially useful where public streets drain toward a park, plaza, trail corridor, vacant lot, or other civic landscape that can serve as the downstream stormwater node. The right-of-way system can reduce peak flows, improve water quality, add planting and shade, calm traffic, and create a more intuitive public understanding of where stormwater goes. In this way, the street becomes more than transportation infrastructure: it becomes a visible ecological connector between the neighborhood and its receiving landscape.

Design Considerations

- Coordinate curb extensions, planters, and surface conveyance with traffic patterns, ADA access, utilities, crossings, snow removal, and maintenance needs.
- Provide clear overflow routes so larger storms bypass safely without flooding travel lanes, sidewalks, or adjacent properties.

Project Applicability

The entirety of the Project Area 4 (ECS GSI) and Project Area 5 (Overton GSI) have effectively been designed a networked "street creek" concepts - a natural fit for the topography and historic drainage patterns in these neighborhoods. See the plan rendering in subsequent report sections for layout, locations and extents.



Curbed Stormwater Planter

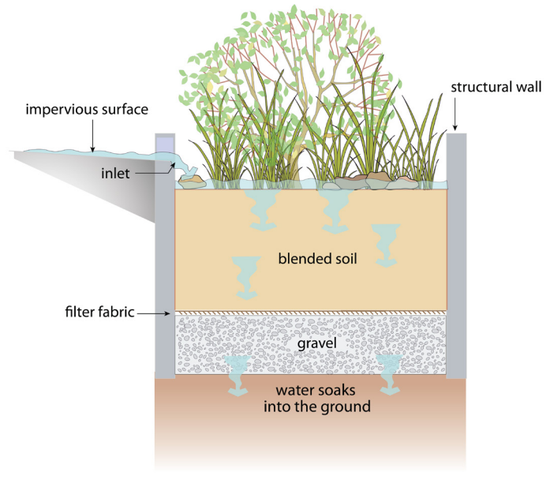
Curbed stormwater planters at street intersections not only serve as traffic calming and pedestrian safety measures, but they also introduce an opportunity to collect, store and treat rainwater. Constructed with engineered soil and walled to allow for temporary ponding, these bioretention areas feature flood and drought-tolerant plants to absorb a portion of the stormwater volume captured during rain events while also being low maintenance during dry weather.

Design Considerations

- When redesigning an intersection to include a curb extension, the designer is to consider the current road conditions, only reallocating road space where traffic patterns and use allow. Considerations should be taken for subsurface conditions in the project area. Existing utility information should be well understood so as to avoid any potential conflicts within bioretention area.
- Changes to the road configuration and planting selection shoud consider the locality's road maintenance regime.

Project Applicability

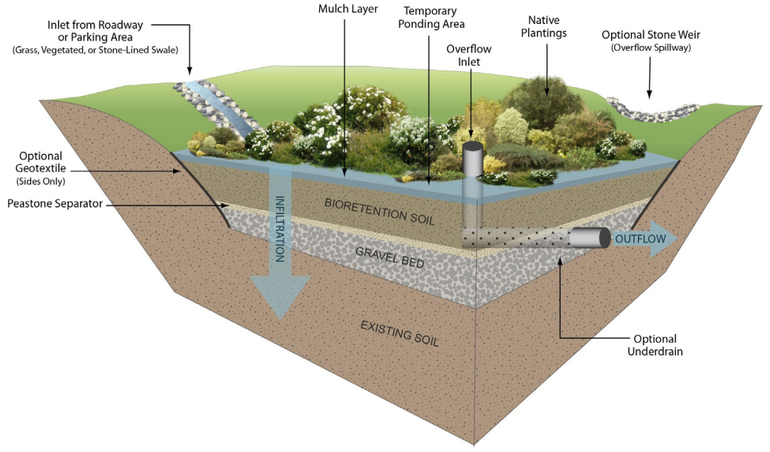
Curbed stormwater planters are proposed along Milton Street, Henrietta Street and Laclair Avenue within Project Area 4 (ECS GSI), and along Overton Street, Macon Street and Laclair Avenue in Project Area 5 (Overton GSI). See the plan rendering in subsequent report sections for layout, locations and extents.



Green Infrastructure Strategies + Technologies

Rain Gardens and Bioswales

Bioretention swales can be constructed along the street right-of-way in order to reintroduce surface infiltration space for runoff in an area that is otherwise impervious. A bioswale is a gently graded, vegetated depression into which street runoff would be directed via curb cuts, drains or pipes. The flat bottom of the swale would promote infiltration of rainwater into the native soil. Thus, widening the swale ultimately increases the infiltration volume achieved. Overall, when space allows for them, bioswales offer a solution for low to moderate flows of runoff.



Design Considerations

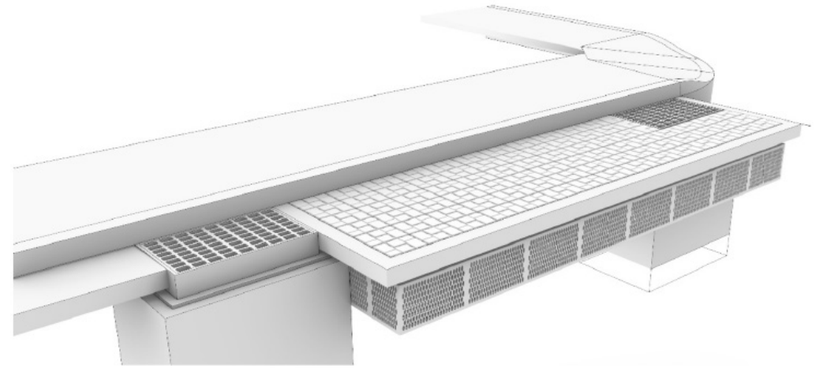
- When planning for a bioretention swale, the designer should be mindful of current sidewalk conditions, only reallocating sidewalk space where appropriate.
- Considerations should be taken for subsurface conditions in the project area. Existing utility information should be well understood so as to avoid any potential conflicts within the infiltration area.
- The sides of the graded area should have a slope no steeper than 3:1, and the flat bottom no narrower than 12".

Project Applicability

Rain gardens and bioswales are proposed at the Biddle Street Parking, capturing runoff from the surface for treatment and volume reduction during rain events. See the plan rendering in subsequent report sections for layout, locations and extents.

Porous Gutter Strip / Parking Lane

The integration of porous pavers or pavement along the gutter line of a road would prove beneficial in scenarios where adequate stormwater conveyance cannot be achieved with superficial gutter enhancement alone. By allowing stormwater to infiltrate through the porous media along the gutter, the volume of water conveyed on the street surface is then greatly reduced, as is the rate at which the stormwater ultimately flows into the sewer system. The width of the porous strip could vary case by case, as could the subsurface gravel depth.

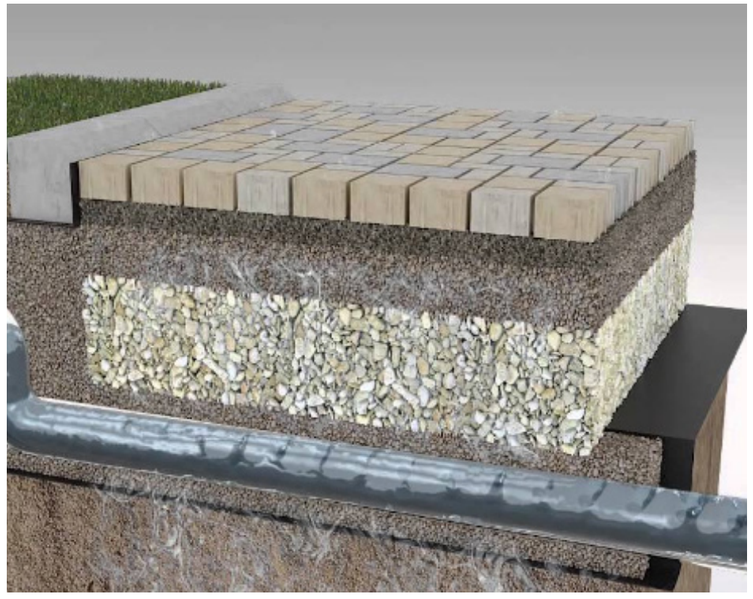


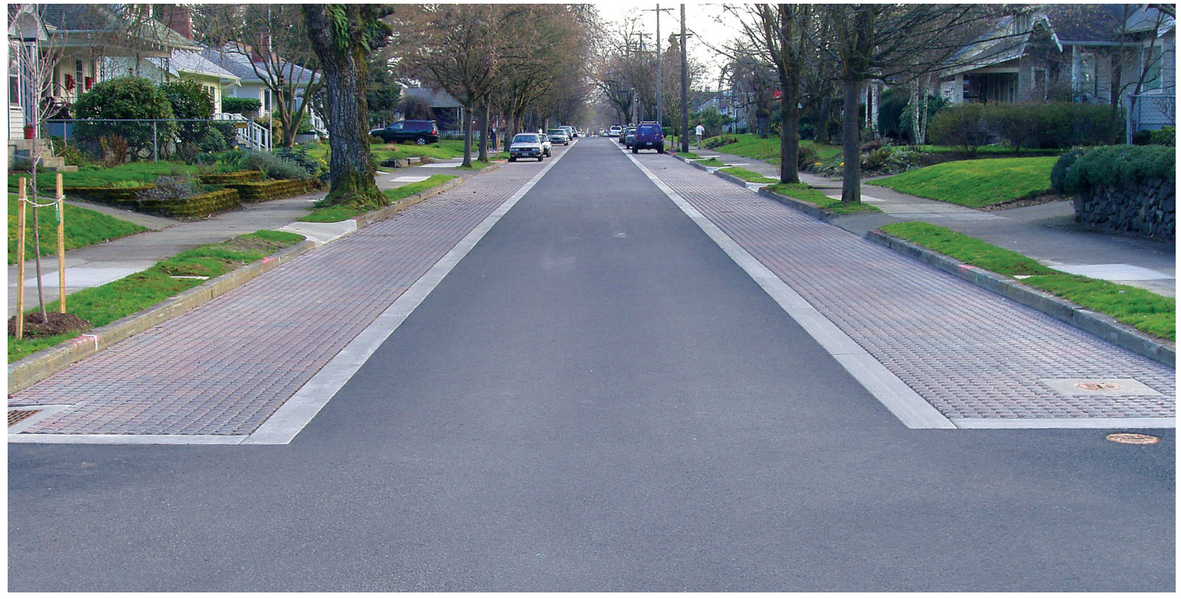
Design Considerations

- When designing a porous gutter strip, considerations should be taken for subsurface conditions in the projet area, existing utility information should be well understood so as to avoid any potential conflicts.
- Porous material selection shall be mindful of the locality's road maintenance regime.

Project Applicability

Porous gutter strips / parking lanes are proposed along Milton Street, Henrietta Street and Laclair Avenue within Project Area 4 (ECS GSI), and along Overton Street, Macon Street and Laclair Avenue in Project Area 5 (Overton GSI). See the plan rendering in subsequent report sections for layout, locations and extents.





Green Infrastructure Strategies + Technologies

Green Alley

The "greening" of an alley could greatly help alleviate the amount of stormwater that accumulates superficially on roads that are otherwise typically not well maintained and do not have proper drainage infrastructure in place. Very commonly, alleyways are not designed or maintained to the same standards as higher-volume streets. Thus, overtime, they are prone to degrade in ways that allow for insufficient and problematic drainage patterns. By introducing improvements such as an inverse crown, a pervious surface, and even subsurface storage, these alleys will control the runoff during storm events to reduce the burden on the sewer infrastructure as well as the infrastructure at the street-level.

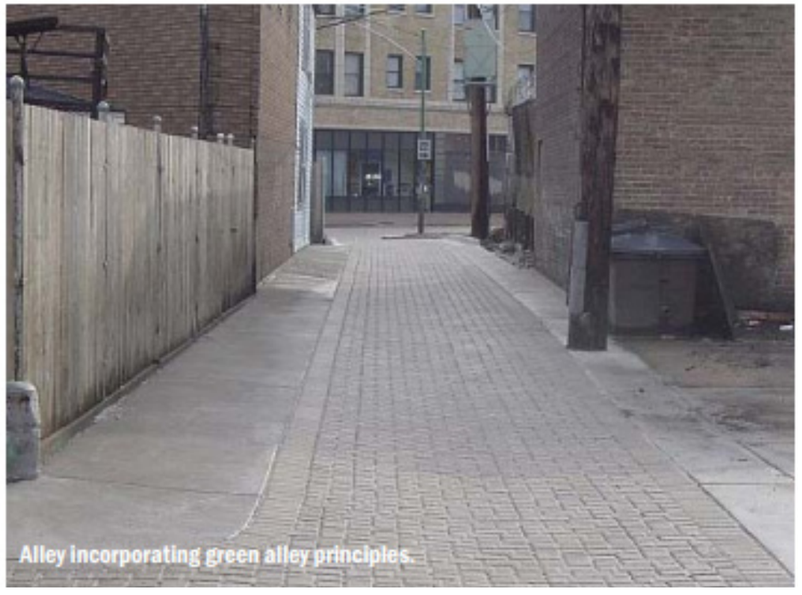
Design Considerations

- When designing a green alley, considerations should be taken for subsurface conditions in the project area. Existing utility information should be well understood so as to avoid any potential conflicts.
- Porous material selection shall be mindful of the locality's road maintenance regime.

Project Applicability

A portion of Gamma Way at the intersection with Henrietta Street within Project Area 4 (ECS GSI) is proposed to be green alley. See the plan rendering in subsequent report sections for layout, locations and extents.

Alley with impermeable pavement and poor drainage.



Alley incorporating green alley principles.

Subsurface Storage

Subsurface storage provides stormwater detention, retention, or infiltration below paved areas, lawns, planting beds, or other usable surface spaces. These systems may be constructed using open-graded stone, modular storage grids, arch chambers, or similar structures, depending on site constraints, loading requirements, maintenance needs, and available depth.

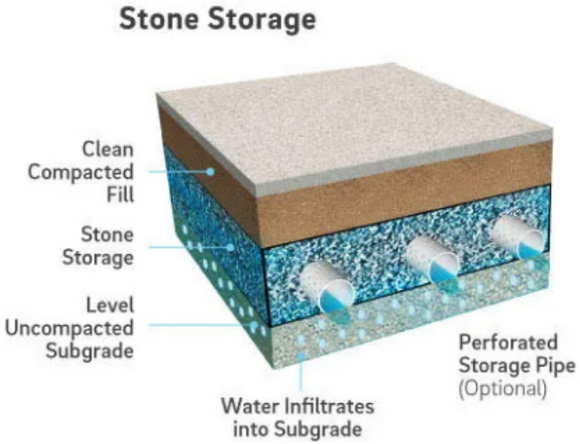
This typology is useful where surface space is limited but stormwater volume control is still needed. Runoff is typically routed through pretreatment, stored underground, and then released through an outlet control, infiltrated into suitable soils, or conveyed to a downstream drainage system. Because the storage is below grade, the surface can often remain available for recreation, parking, streetscape improvements, or other site uses.

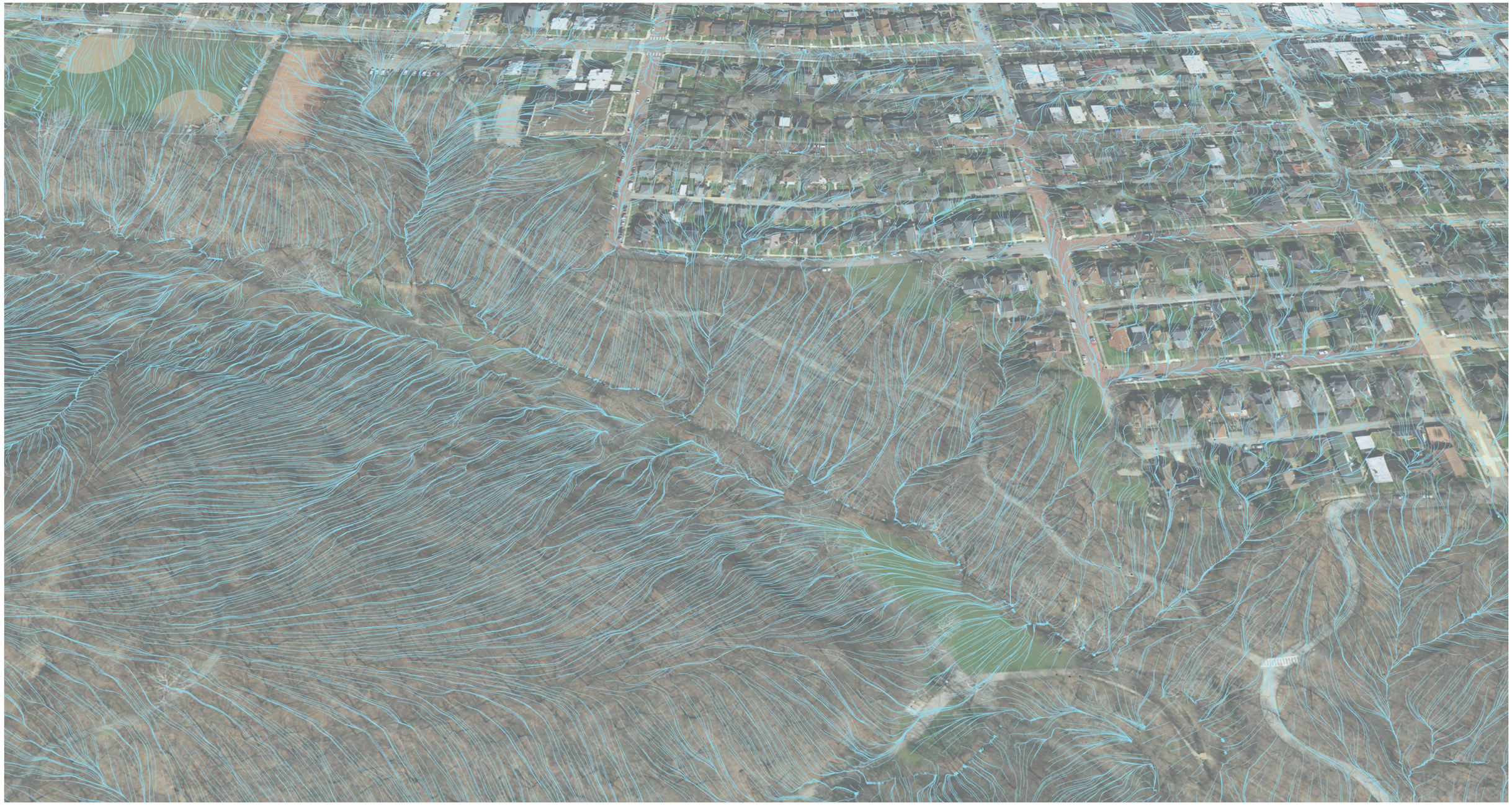
Design Considerations

- Evaluate storage volume, available footprint, depth, groundwater, soil conditions, and utility conflicts to confirm the system can meet stormwater goals within the available subsurface space.
- Coordinate access, inspection, pretreatment, and sediment management so the system can be maintained regardless of whether storage is provided by stone, grid chambers, or arch chambers.
- Provide clear inlet, outlet, and overflow controls so the system fills, drains, and bypasses safely without causing surface flooding or impacts to adjacent structures.

Project Applicability

Except where geotechnical, environmental, or ecological concerns exists, subsurface storage if feasible at any of the proposed projects areas. Budget and regulatory requirements often dictates the sizing, with the upstream contributing drainage area volume during large storm events, as an upward bound.





Schematic Designs

Biddle Parking Lot

Site Introduction & Existing Conditions

The Biddle Avenue parking lot sits at Frick Park's eastern edge in Regent Square, serving as one of the park's primary access points for trail users and park visitors. The lot consist of 0.X acres of unmanaged asphalt with no existing stormwater controls: runoff from the parking surface and adjacent impervious areas drains to Fern Hollow Creek via an existing MS4 outfall. While this drainage already reaches the stream, it arrives unmanaged—at volumes and velocities that contribute to streambank erosion and channel instability in the receiving reach. Existing trees adjacent to the lot must be protected, and the park-edge terrain immediately west of the lot falls within the City's steep slope and landslide-prone overlays, precluding in-situ infiltration and requiring careful management of any new discharges to the hillside.

Proposed Solution

The schematic design proposes a bioretention GSI retrofit of the existing parking lot—a system of vegetated, engineered planting beds that capture, filter, and slowly release stormwater runoff. Bioretention cells are sized to capture runoff from the lot and its directly connected impervious drainage area, providing stormwater quality treatment, volume reduction, and peak rate and temperature control before flows are released to the existing MS4 outfall and on to Fern Hollow Creek. By attenuating peak flows the project reduces the erosive impact of parking lot runoff on the receiving stream channel and its banks. The design prioritizes preservation of existing mature trees surrounding the parking lot and avoids grading and infiltration within the steep slope buffer.

Expected Performance & Implementation Considerations

The Biddle Lot GSI project is among the most straightforward of the five project areas from a regulatory standpoint, because the intervention avoids work both right-of-way work requiring coordination with DOMI and instream work in Fern Hollow itself requiring DEP/ACOE Chapter 105 permitting. Chapter 105 review could be required for any modifications to the existing MS4 outfall connection to the creek. Key implementation steps could include subsurface utility investigation and/or CCTV to confirm pipe condition and capacity, tree protection planning during construction, and coordination with the City on parking lot modifications.

DESIGN FEATURES:

- Bioretention GSI retrofit of existing parking lot
- Provides stormwater quality, volume, and rate control to existing MS4 outfall tributary to Fern Hollow
- Reducing erosion of hillside

SITE CONSTRAINTS:

- Existing mature trees
- Adjacent to steep and landslide prone slopes
- Infiltration not permitted

PERFORMANCE METRICS:

- Note

DESIGN NOTES

1. CONVERT EXISTING STORM INLET TO OUTLET CONTROL STRUCTURE WITH SLOW RELEASE OUTLET TO EXISTING MS4
2. LINED BIORETENTION RAIN GARDEN
3. POROUS PAVER PARKING STALLS
4. CONCRETE CURB WITH CURB CUTS TO BELGIAN BLOCK FOREBAYS (PER YWCA DETAIL)
5. ASPHALT DEPAVING
6. ASPHALT MILLING & REPAVING

Biddle Parking Lot

Wetland

Site Introduction & Existing Conditions

The Wetland project area is located mid-valley within Frick Park, roughly midway along the Fern Hollow Creek corridor. It encompasses one of the most ecologically significant habitats in Pittsburgh's urban park system: a functioning wetland complex supporting hydrophytic vegetation, seasonal ponding, and a range of wetland-dependent wildlife. The wetland and adjacent stream valley also serve as a natural floodplain, providing important water storage and flow attenuation during storm events. Despite its ecological value, the area is crossed by existing aggregate pathways and trail and sewer infrastructure that restrict the natural course of Fern Hollow Creek, concentrate surface flows, and contribute to erosion of both the trail surfaces and adjacent streambanks. Biddle Trail side drainage runnels are inadequate, leading to erosive flow across trail surfaces and into the wetland. The project area falls within the City's landslide-prone overlay and within 50 feet of the steep slope overlay, and existing sewer infrastructure in the area is shallow and incompletely mapped. The shallow sewer infrastructure running beneath and adjacent to Tranquil Trail is a defining constraint at this site: it limits grading options, influences boardwalk foundation design, and — as the hydraulic barrier between the surrounding groundwater and the stream channel — is a primary driver of the altered hydrology that the project seeks to partially address.

Proposed Solution

The schematic design addresses the wetland area's trail and hydrology problems through three coordinated interventions. First, existing aggregate pathways that restrict the course of Fern Hollow Creek through the wetland are replaced with elevated fiberglass boardwalks, removing physical obstructions from the stream channel and wetland and allowing natural floodplain inundation to occur without trail damage. Second, Tranquil Trail's grade is raised above the floodplain elevation and fitted with cross drains, allowing the wetland and stream valley to flood naturally during storm events without eroding the trail surface. Third, Biddle Trail side drainage runnels are reinforced and improved with cross drains to intercept and manage erosive side flows before they reach the trail and wetland. Together, these interventions restore more natural hydrology to the wetland complex, improve ecological conditions, and provide an accessible, low-impact trail experience through one of the park's most distinctive habitats. Seating, educational signage, and a small outdoor classroom space are incorporated into the boardwalk design.

Expected Performance & Implementation Considerations

The Wetland project carries the most significant regulatory complexity of the five project areas. All three design interventions involve work within or immediately adjacent to a jurisdictional wetland and regulated waterway. While some of the trail improvement work could possibly be completed through a Chapter 105 GP-7 Minor Road Crossing permit, realizing the full extent of proposed improvements would require a joint Individual Permit from PA DEP (Chapter 105) and the U.S. Army Corps of Engineers (Section 404), including a formal alternatives analysis and wetland impact mitigation assessment. Phasing and coordination with multiple agencies—including DPW, PA DEP, and USACE—will be essential. A tree survey and geotechnical investigation are required before design can be finalized. On the performance side, the USACE hydraulic model indicates that removing trail fill from the floodplain will increase wetland storage capacity and reduce flood inundation extents—measurable hydrologic benefits that complement the ecological restoration goals of the project.

DESIGN FEATURES:

- Existing aggregate pathways restricting the course of Fern Hollow to be replaced by elevated boardwalks
- Tranquil Trail grade raised above floodplain with cross drains permit wetland and stream valley to flood without eroding the trail
- Biddle Trails side drainage runnels reinforced and improved with cross drains to mitigate trail erosion

SITE CONSTRAINTS:

- Existing mature trees
- Existing jurisdictional wetland and multi threaded watercourse
- Extensive network combined sewers and relief sewer connections crisscross the site just below the surface.
- Intersection of multiple major trails that serve park users, and maintenance and emergency access

PERFORMANCE METRICS:

- Linear feet of trail to boardwalk conversion
- Cubic yards of trail bed transferred from floodway
- Area of wetland vegetation restored
- Linear feet of trail runnels repaired
- Number of cross drain connections

DESIGN NOTES

1. WETLAND OVERLOOK DECK AND SEATING
2. EXISTING TRAIL BE REPLACED WITH BOARDWALK AND WETLAND RESTORATION BELOW
3. BELGIAN BLOCK DRAINAGE RUNNEL TO STREAM
4. HILLSIDE REVEGETATION / STABILIZATION
5. RIPARIAN ENHANCEMENT PLANTINGS
6. TRANQUIL TRAIL GRADING ADJUSTMENTS

Wetland

Confluence

Site Introduction & Existing Conditions

The Confluence stream restoration project area is located at the lower end of the Fern Hollow Creek corridor, where the creek's main stem meets Falls Ravine Creek near the intersection of Tranquil and Falls Ravine Trails. This reach of Fern Hollow is among the most ecologically stressed in the corridor: the hillside to the northeast is steep, highly eroded, and actively delivering sediment to the stream through gully erosion and bank failure. Established trees line the existing streambanks and must be preserved to the greatest extent possible, as their root systems provide critical bank stabilization. To the southwest, a combined sewer and a popular event lawn run parallel to the stream channel, constraining how far restoration grading and riparian planting can extend in that direction and limiting the available footprint for stream restoration work. Despite these constraints, the confluence node is a high-visibility, high-traffic location that presents a meaningful opportunity to demonstrate what a restored and ecologically functional Fern Hollow Creek can look like.

Proposed Solution

The schematic design proposes a suite of nature-based interventions focused on stabilizing the stream corridor and restoring its ecological function. Streambank and hillslope stabilization techniques—including live staking, brush layering, log toe protection, and riparian buffer plantings—address active erosion on the northeast hillside and along the creek's banks, reducing sediment inputs and rebuilding bank structure without hard armoring. The riparian buffer zone is restored and expanded where space allows, replacing invasive species with native riparian plantings that reinforce bank stability, improve habitat connectivity, and enhance the ecological character of the corridor. A streamside trail extension and a series of access nodes—modest, low-impact interventions that bring park users to the water's edge at carefully selected points—provide opportunities for education and environmental engagement while concentrating foot traffic away from sensitive bank areas. The existing event lawn to the southwest is preserved as a community asset and incorporated into the design.

Expected Performance & Implementation Considerations

Performance at this site is measured in ecological and physical restoration terms rather than hydrologic metrics. Key indicators include linear feet of streambank stabilized, area of riparian vegetation restored and expanded, number of stream access points provided, and area of event lawn preserved. This project carries significant regulatory complexity: all streambank stabilization and riparian restoration work within or adjacent to the Fern Hollow Creek channel and its floodplain requires a joint Individual Permit from PA DEP (Chapter 105) and the U.S. Army Corps of Engineers (Section 404). The presence of the combined sewer infrastructure adjacent to the project area will require coordination with Pittsburgh Water throughout design development. A tree survey is needed to document existing bank trees before final stabilization techniques can be selected, and geotechnical assessment of the eroded northeast hillside is a prerequisite for hillslope stabilization design.

DESIGN FEATURES:

- Nature-based streambank and hillslope stabilization
- Riparian zone restoration and expansion
- Streamside trail extension and access nodes for education and engagement

SITE CONSTRAINTS:

- Existing watercourse with established trees along banks
- Steep and highly eroded hillside to the NE
- Combined sewers and existing popular event lawn to the SW run parallel to stream bound limits to space available for stream restoration

PERFORMANCE METRICS:

- Linear feet of trail to boardwalk conversion
- Cubic yards of trail bed transferred from floodway
- Area of wetland vegetation restored
- Linear feet of trail runnels repaired
- Number of cross drain connections

DESIGN NOTES

1. STREAMSIDE TRAIL
2. EXPANDED RIPARIAN BUFFER
3. ROCK SILL ACCESS NODES
4. SANDSTONE BOULDER TERRACE / SEATWALL WITH ACCESS RAMP
5. CROSS VANE
6. LIVE CRIBBING BANK STABILIZATION AT CULVERT
7. EXISTING BRIDGE / CULVERT
8. HILLSIDE REVEGETATION / STABILIZATION

Confluence

Confluence Enlargement

Site Introduction & Existing Conditions

The Confluence pavilion and restroom project focuses on the trail node at the intersection of Tranquil Trail and Falls Ravine Trail—the most heavily trafficked convergence point in Frick Park and a natural gathering place for trail users arriving from multiple neighborhoods. Despite its prominence as a park destination, the site currently lacks permanent restroom facilities, covered rest areas, and wayfinding amenities. Existing sewer and electrical utility connections that once served facilities at this location have been severed, leaving the site without the infrastructure needed to support new facilities. Mature trees are present adjacent to the trail and throughout the proposed facility area, constraining siting and requiring careful protection during construction. The intersection itself serves not only recreational trail users but also park maintenance and emergency access routes, a function that must be preserved throughout construction and in the permanent design.

Proposed Solution

The schematic design proposes reconstruction of an accessible restroom and picnic pavilion at the Confluence node, with restored water, sewer, and electrical utility connections. The facility program includes accessible restrooms, covered picnic shelter, a bike repair station, and a dog water fountain—amenities identified as priorities through the Fern Hollow Vision Plan community survey. An informational kiosk is sited at the confluence of Falls Ravine and Tranquil Trails, providing wayfinding, park history, and interpretive information at the point where most park users naturally pause. Additionally covered benches along Tranquil Trail offer respite, shelter, and views of the event lawn and Fern Hollow's enhanced riparian border. The kiosk and shelter structures are designed to complement the natural character of the Fern Hollow valley, using materials and forms appropriate to a forested park setting.

Implementation Considerations

The utility restoration challenge is the central implementation hurdle at this site. Reconnecting water, sewer, and electrical service to a facility deep within Frick Park will require tracing, investigating, and likely reconstructing utility runs of significant length through established park land—a process that demands early coordination with Pittsburgh Water, Duquesne Light, and the City's Department of Parks & Recreation. CCTV of the existing sewer lateral is a high-priority prerequisite before sewer tap-in plans can be finalized. Construction access and staging must be carefully planned to maintain pedestrian, maintenance, and emergency vehicle access through the active trail intersection at all times, and tree protection measures must be established early given the density of mature canopy at and around the facility site. Coordination with Parks & Recreation on design standards, long-term maintenance responsibilities, and operational requirements—including restroom hours and seasonal closures—will be essential before the project can be finalized.

DESIGN FEATURES:

- Reconstruction of accessible restroom and picnic pavilion with restored water, sewer, and electrical utility connections.
- Additional covered rest areas and kiosk at the "confluence" Falls Rivine and Tranquil Trails.

SITE CONSTRAINTS:

- Intersection of multiple major trails that serve park users, and maintenance and emergency access
- Existing sewer and electric utility connections severed
- Mature trees adjacent to trail and facilities

PERFORMANCE METRICS:

- Note

DESIGN NOTES

1. EXISTING RESTROOM REPLACED WITH ACCESSIBLE CXT PREFABRICATED RESTROOM
2. LOW PITCHED GABLE WOOD SHELTER - 20X28' WITH RESTORED CONCRETE FOUNDATION
3. CONFLUENCE INFORMATION KIOSK
4. MILLED TIMBER BENCH WITH CANOPY COVERING
5. RESTORE ELECTRIC SERVICE TO RESTROOMS AND PAVILION
6. REPLACE BROKEN SEWER LATERAL CONNECTION FOR RESTROOMS

Confluence Enlargement

Henrietta GSI

Site Introduction & Existing Conditions

The Henrietta Street GSI project area encompasses the residential rights-of-way along Henrietta Street and LaClair Street in Regent Square, immediately adjacent to Frick Park's eastern boundary. The project area drains a combined total of 6.27 acres, of which 3.70 acres is directly connected impervious surface—residential streets, driveways, a parking lane, and an alley whose runoff currently enters the combined sewer system via street catchbasins, bypassing Fern Hollow Creek entirely. The adjacent Environmental Charter School campus generates significant pedestrian and vehicular traffic pressure during school pickup and drop-off, a factor that constrains both construction sequencing and the design of right-of-way features. Existing utilities within the ROW, mature street trees, and the steep and landslide-prone slopes along the flow path from the street to the park are additional constraints that shape where and how GSI features can be placed.

Proposed Solution

The schematic design proposes a "street creek" networked ROW GSI retrofit—a connected series of green infrastructure features distributed along Henrietta Street and LaClair Street that collectively capture, treat, and slowly release stormwater that currently flows to the combined sewer. Features include curb bumpout stormwater planters, a porous paving parking lane, a porous paving "green" alley retrofit, and subsurface stormwater storage with slow release. Together, these features intercept combined-sewer-bound runoff at or near its source and route treated stormwater to a new, energy-dissipating MS4 outfall within Frick Park, restoring flow to Fern Hollow Creek while reducing the volume of stormwater entering the combined sewer system. This reduction in combined sewer inflow directly lowers the risk of CSO discharges to Nine Mile Run during storm events. The networked design is intentionally phased and expandable, allowing individual features to be constructed incrementally as funding and right-of-way coordination allow.

Expected Performance & Implementation Considerations

Based on schematic-level analysis, the project is sized to detain approximately 15,908 cubic feet of stormwater during the 95th percentile storm event across a contributing drainage area of 6.27 acres. Implementation requires DOMI coordination for all right-of-way work; DPW coordination for connection to the existing MS4 outfall in the park; and Pittsburgh Water coordination for work around and/or relocation of existing combined sewer catchbasins. Subsurface utility investigation and CCTV inspection of existing infrastructure are prerequisites before design can be finalized. Construction phasing should be coordinated with the Environmental Charter School academic calendar to minimize disruption during peak school traffic periods. The project's networked, modular design allows individual features to be permitted, funded, and constructed in phases—an important advantage given the complexity of ROW coordination in an active residential neighborhood.

DESIGN FEATURES:

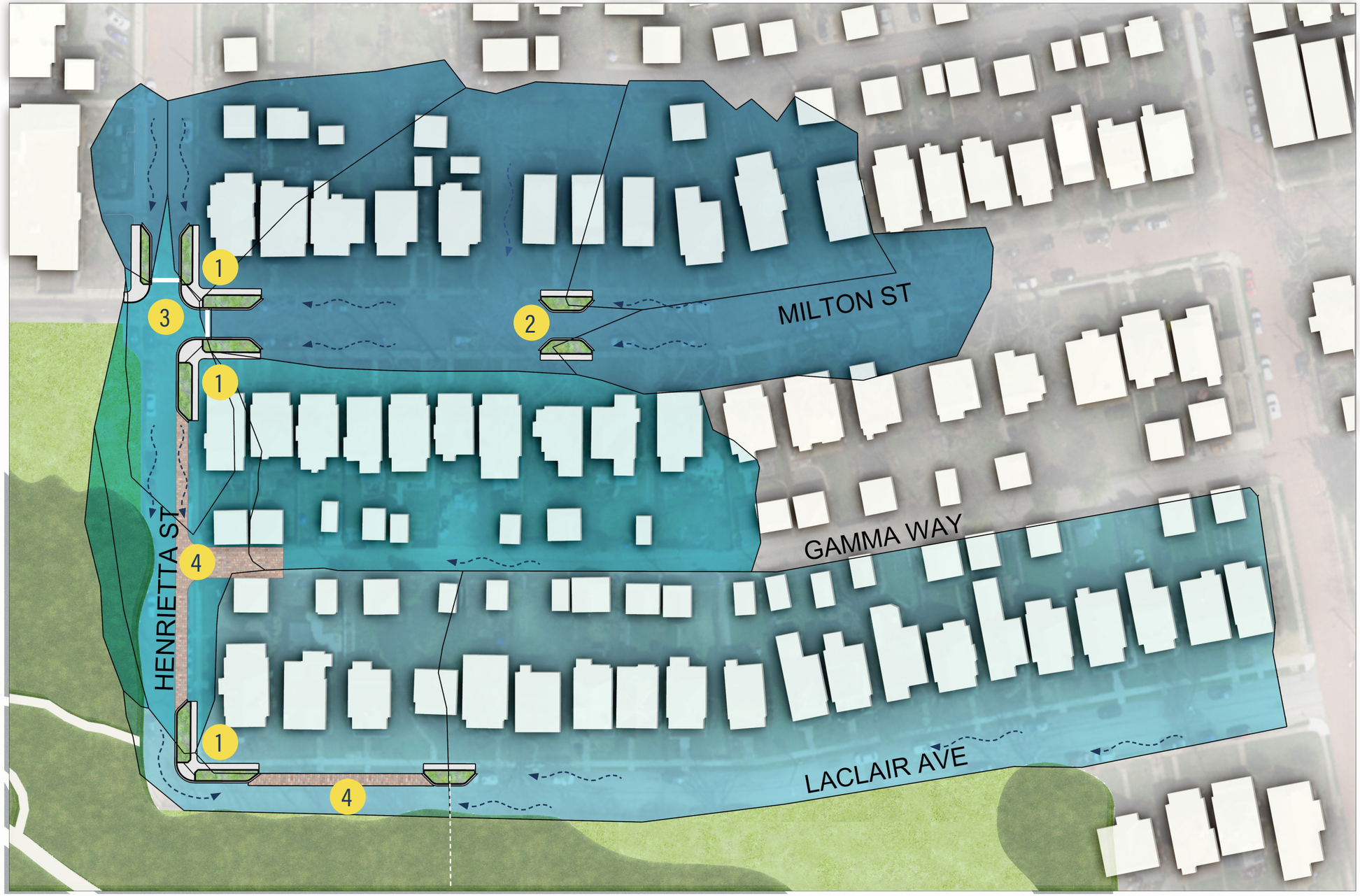
- "Street creek" networked ROW GSI retrofit
- Curb bumpout stormwater planters
- Porous paving parking lane
- Porous paving "green" alley retrofit
- Subsurface stormwater storage with slow release

SITE CONSTRAINTS:

- Steep and landslide prone slopes adjacent to project area and along flow path to stream
- Existing utilities within ROW
- Existing flood control level service within the neighborhood
- Mature trees along right of way
- Heavy pedestrian and vehicular parking and traffic pressure at school pickup / drop off times

PERFORMANCE METRICS:

- Total Drainage Area Captured: 6.27 Acres
- Directly Connected Impervious Area: 3.70 Acres
- 95th Percentile Storm Volume Detained: 15,908 CF
- GSI Footprint:
- Loading Ratio:
- Cost per Impervious Acre Managed:



DESIGN NOTES

1. CURBED BIORETENTION GARDENS WITH SIDEWALK RESTORATION AND CONCRETE GUTTER
2. FLOW THROUGH STORMWATER PLANTERS
3. TRENCH DRAIN CONVEYANCE
4. POROUS PAVER PARKING LANE CAPTURE AND CONVEYANCE SYSTEM
4. PIPE SLOPE OVERFLOW AND CONVEYANCE SYSTEM TO FERN HOLLOW CREEK

LEGEND

- Drainage Area - Primary Capture
- Drainage Area - Secondary Capture
- Drainage Area - Tertiary Capture
- Stormwater Flow Direction

Henrietta GSI

Overton GSI

Site Introduction & Existing Conditions

The Overton Street GSI project area encompasses residential rights-of-way along Overton Street in Regent Square, north of the Henrietta Street corridor and closer to the upper portion of the Fern Hollow Creek watershed. The project area drains 5.37 acres, of which 3.01 acres is directly connected impervious surface whose runoff currently enters the combined sewer system via street catchbasins—bypassing Fern Hollow Creek and contributing to combined sewer overflow risk in Nine Mile Run downstream. As with Henrietta Street, steep and landslide-prone slopes run adjacent to the project area and along the flow path from the street to the park, existing utilities are present within the ROW, and mature street trees constrain feature placement. The existing combined sewer system provides a degree of flood control service to the neighborhood that the GSI design must account for—ensuring that stormwater intercepted from the combined system is managed in a way that does not increase flood risk for adjacent properties.

Proposed Solution

The schematic design proposes a "street creek" networked ROW GSI retrofit combining surface and subsurface stormwater management features. Curb bumpout stormwater planters capture and filter runoff along Overton Street, while a neighborhood "parklet" subsurface stormwater storage node at the corner of Overton and Macon Avenue serves as the project's primary detention element. The storage node adapts an existing sloped parklet space—gently regrading to create a small "event lawn" at grade while providing subsurface detention volume below—and routes treated stormwater with slow release to the existing MS4 outfall within Frick Park and on to Fern Hollow Creek. By intercepting combined-sewer-bound runoff and returning it to the stream through a managed, attenuated release, the project restores flow to Fern Hollow while reducing combined sewer inflow and the associated risk of CSO discharges to Nine Mile Run.

Expected Performance & Implementation Considerations

Based on schematic-level analysis, the project is sized to detain approximately 12,812 cubic feet of stormwater during the 95th percentile storm event across a contributing drainage area of 5.37 acres. Implementation requires DOMI coordination for all right-of-way work; DPW coordination for connection to the MS4 outfall connection; Pittsburgh Water coordination for work around and/or relocaction of existing combined sewer catchbasins. Subsurface utility investigation and CCTV inspection of existing infrastructure are prerequisites before design can be finalized. The subsurface storage node will require geotechnical assessment given the proximity of steep and landslide-prone slopes along the flow path to the park.

DESIGN FEATURES:

- "Street creek" networked ROW GSI retrofit
- Curb bumpout stormwater planters
- Neighborhood "parklet" subsurface stormwater storage node with slow release to existing MS4 outfall in park
- Storage node adapts sloped parklet space, flattening the grades slighting to create a small "event lawn" space at the corner of Overton and Macon ave

SITE CONSTRAINTS:

- Steep and landslide prone slopes adjacent to project area and along flow path to stream
- Existing utilities within ROW
- Existing flood control level service within the neighborhood
- Mature trees along right of way

PERFORMANCE METRICS:

- Total Drainage Area Captured: 5.37 Acres
- Directly Connected Impervious Area: 3.01 Acres
- 95th Percentile Storm Volume Detained: 12,812 CF
- GSI Footprint:
- Loading Ratio:
- Cost per Impervious Acre Managed:

DESIGN NOTES

1. CURBED BIORETENTION GARDENS WITH SIDEWALK RESTORATION AND CONCRETE GUTTER
2. FLOW THROUGH STORMWATER PLANTERS
3. TRENCH DRAIN CONVEYANCE
4. UNDERGROUND STORMWATER STORAGE SYSTEM WITH PIPED CONNECTION FROM BIORETENTION SYSTEM
5. MINOR GRADING OF EXISTING LAWN AREA TO ACCOMMODATE UNDERGROUND STORAGE SYSTEM
6. PIPE SLOPE OVERFLOW AND CONVEYANCE SYSTEM TO FERN HOLLOW CREEK

LEGEND

- Drainage Area - Primary Capture
- Drainage Area - Secondary Capture
- Stormwater Flow Direction

Overton GSI

Implementation Strategy

The schematic designs presented in this memorandum represent foundational steps of a longer process toward realizing the vision of resilient park and water infrastructure and a regenerating Fern Hollow Creek ecosystem. Each project area will require additional site investigation, stakeholder coordination, design development, permitting, and funding before construction can begin — with long-term operations and maintenance responsibilities to follow. The five project areas are largely independent and can be developed simultaneously, sequenced, or phased in any combination. Within individual sites, incremental implementation can deliver early benefits and build momentum while more complex elements advance through design and regulatory review. Upstream Pittsburgh and its partners should review these designs with funders and stakeholders to establish a practical sequence that reflects both near-term opportunity and long-term vision.

The Sewer Regionalization Wildcard

A significant wildcard shapes the long-range outlook for the corridor. ALCOSAN is advancing a regionalization strategy that would transfer ownership of primary inter-municipal combined sewer segments — including the large box culvert extending from Nine Mile Run through the Wetland project area, nearly half the valley's length — from the municipalities it serves to ALCOSAN itself. That culvert's broken stone subdrain is the suspected primary driver of Fern Hollow losing baseflow over the lower half of its reach. The potential abandonment and removal of the culvert, replaced by a new sewer microtunneled in parallel, represents a transformational restoration opportunity: restoring baseflow, improving wetland hydrology, and opening the lower valley to comprehensive ecological recovery. The timeline, however, is uncertain — five years at the optimistic end, fifteen to twenty at the other. This plan has been developed accordingly: project areas were selected to be completable before ALCOSAN takes ownership, minimally disrupted by eventual sewer replacement, or understood as near-term improvements that a more comprehensive future effort could build upon.

Near-Term Implementation Priorities

The Biddle Parking Lot GSI retrofit is the clearest early win — the simplest permitting pathway, no in-stream or right-of-way complications, and a project type Upstream Pittsburgh has demonstrated success delivering.

At the Confluence, the USACE Masterplan identifies channel alignment and widening as capable of reducing flooding and erosion, but that scope demands significant design, permitting, and construction investment — and risks being partially superseded if the box culvert is ultimately removed. A near-term approach scoped to Chapter 105 General Permits — GP-1, GP-3, and/or GP-11 — can improve resilience and function now while preserving the opportunity for transformational work later.

The Wetland site offers a similar phasing opportunity, though with added complexity. Raising Tranquil Trail and converting Biddle Trail connections to boardwalks may qualify for General Permits and could be constructed within a year. The full build-out, however — cantilevered overlooks, wetland buffer restoration, and a more accessible and ecologically engaging experience — will most likely require a joint Chapter 105 / Section 404 Individual Permit. Shallow and incompletely mapped sewer infrastructure, steep slope and landslide-prone overlays, and the extent of proposed wetland and boardwalk work make Individual Permit review the prudent base case. Upstream Pittsburgh should plan accordingly, treating General Permit eligibility as an opportunity to accelerate discrete elements rather than a reliable pathway for the project as a whole.

Critical Collaborations for Long-Term Success

The Henrietta Street and Overton Street GSI projects are not directly affected by the regionalization wildcard but require coordination across a broad stakeholder cohort: DOMI, DPW, Pittsburgh Parks Conservancy, Pittsburgh Water, gas, electric, and telecom utilities, the Environmental Charter School, and surrounding neighbors. The success of the Wightman Park and Street GSI demonstrates that networked right-of-way stormwater infrastructure can be built successfully in Pittsburgh — but that project was led by DPW and Pittsburgh Water, who accepted ownership of the finished infrastructure. These projects are presently nonprofit-led, and long-term ownership and maintenance responsibilities for right-of-way improvements have not yet been defined. Resolving that question through early engagement with DPW, Pittsburgh Water, and DOMI is a prerequisite for advancing each project with confidence and reconnecting these upstream neighborhoods with the regeneration of Fern Hollow below.

Appendices

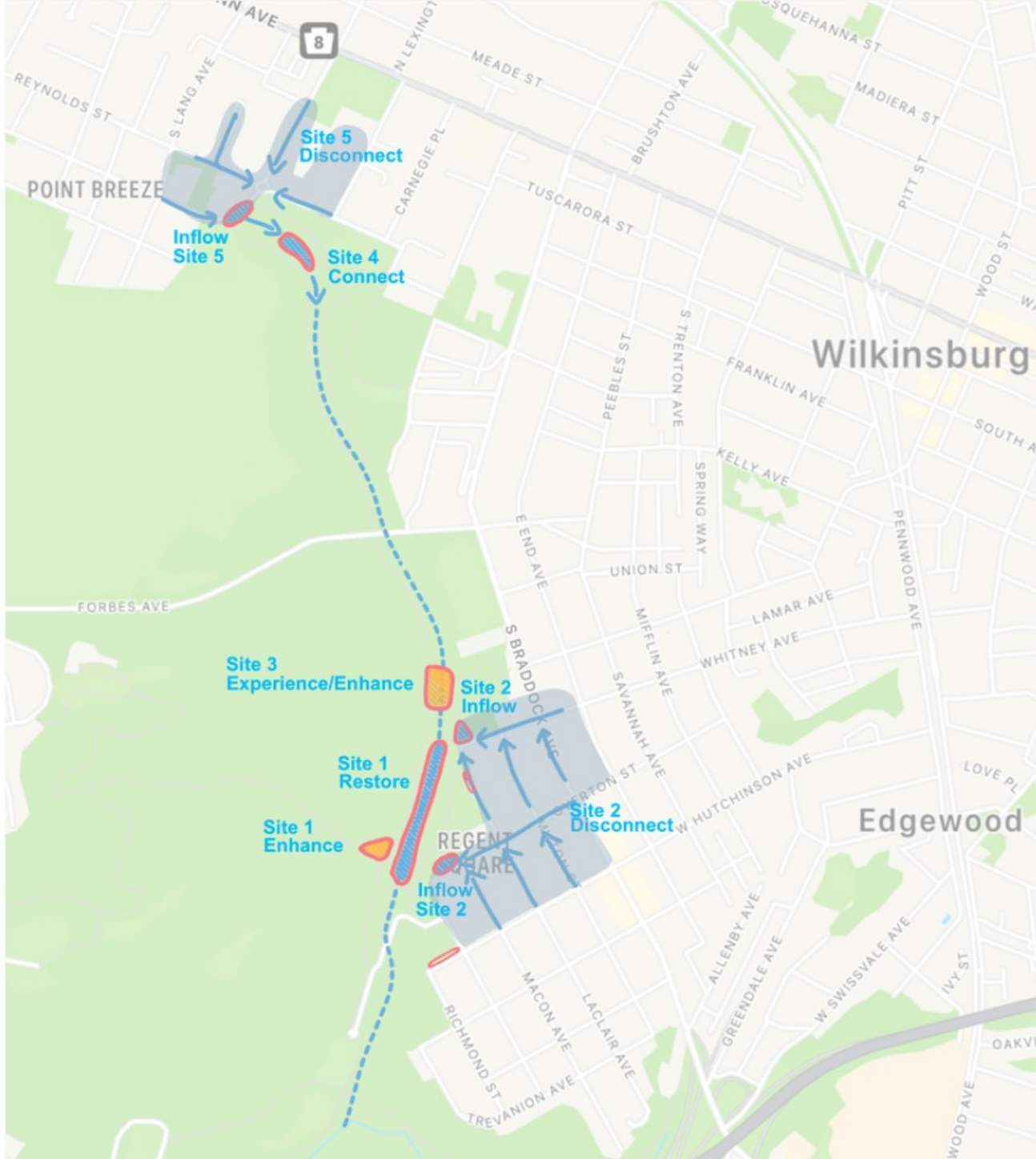
SITE ASSESSMENTS
WETLANDS CONCEPTS
CONFLUENCE CONCEPTS

Fern Hollow Restoration Design & Planning

Environmental Site Assessment

Project Areas

1. The Confluence
2. The Wetlands
3. Regent Square GSI Park Inflow
4. Point Breeze GSI Park Inflow

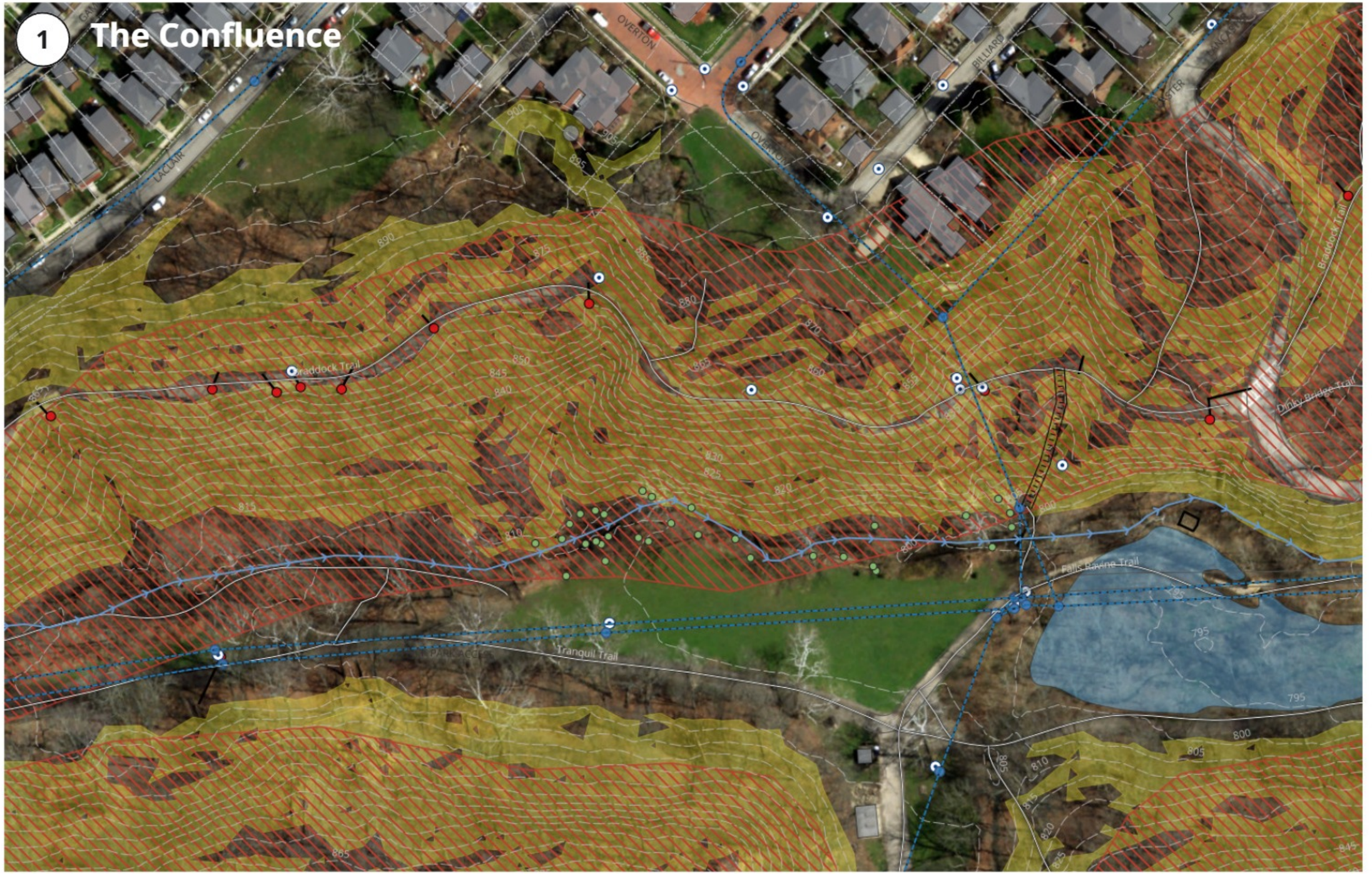


Project Areas

Pittsburgh Water
Impervious Surface
Billing Areas

LEGEND

- Trees Survey
- Streams
- Park Culverts
- Culvert Outfalls
- ImperviousSurface_Billing
- Transportation



Environmental Overlay

LEGEND

- Trees Survey
- Streams
- Sewer Pipes

Trails

- Multi Use
- Park Pathway
- Pedestrian
- Steps

- Sewer Structures
- PWSA Inlets
- Parcels
- Streets
- Park Culverts
- Culvert Outfalls
- Building Footprints
- Landslide_Prone
- Steep Slope Overlay
- FEMA FloodPlain
- Contours 5ft

Opportunities

1. Address erosion from tributary channels
2. Realign creek channel to buffer hillside slope
3. Redefine creek channel to increase connectivity
4. Improve and enhance riparian buffer ecology
5. Provide opportunities to engage with creek ecology
6. Establish new restroom & pavilion facilities
7. Establish new seating and amenities
8. Existing field enhancements

Constraints

1. Creek is located in a landslide prone overlay zone
2. Creek is within 50' of steep slope overlay zone
3. Creek realignment will require DEP/ACOE joint permit.
4. Tributary channels located in steep slope overlay zone
5. Existing tree survey and geotech needed to finalize
6. Gap in existing sewer infrastructure mapping
7. Condition of existing utilities for restroom facility
8. Phasing and permitting with multiple agencies

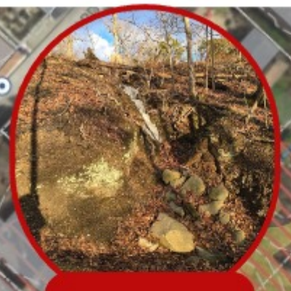
1 The Confluence

Inflow sediment & undercutting

Inflow sediment & hillside cutting

Tributary channel erosion

Tributary channel & trail erosion



MS4 Outfall erosion

Tributary channel erosion

Tributary channel erosion

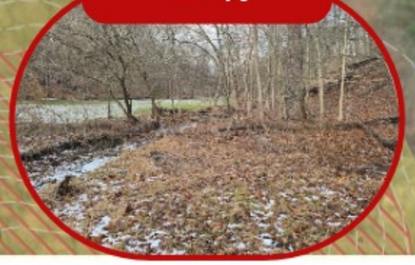
Improve trail &

Potential creekI&I

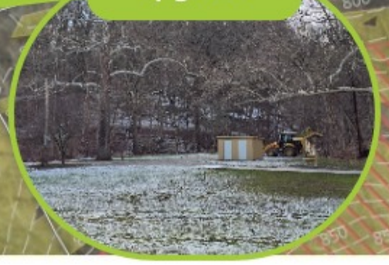
Improve flow connectivity

Creek cutting exposed

Existing canopy



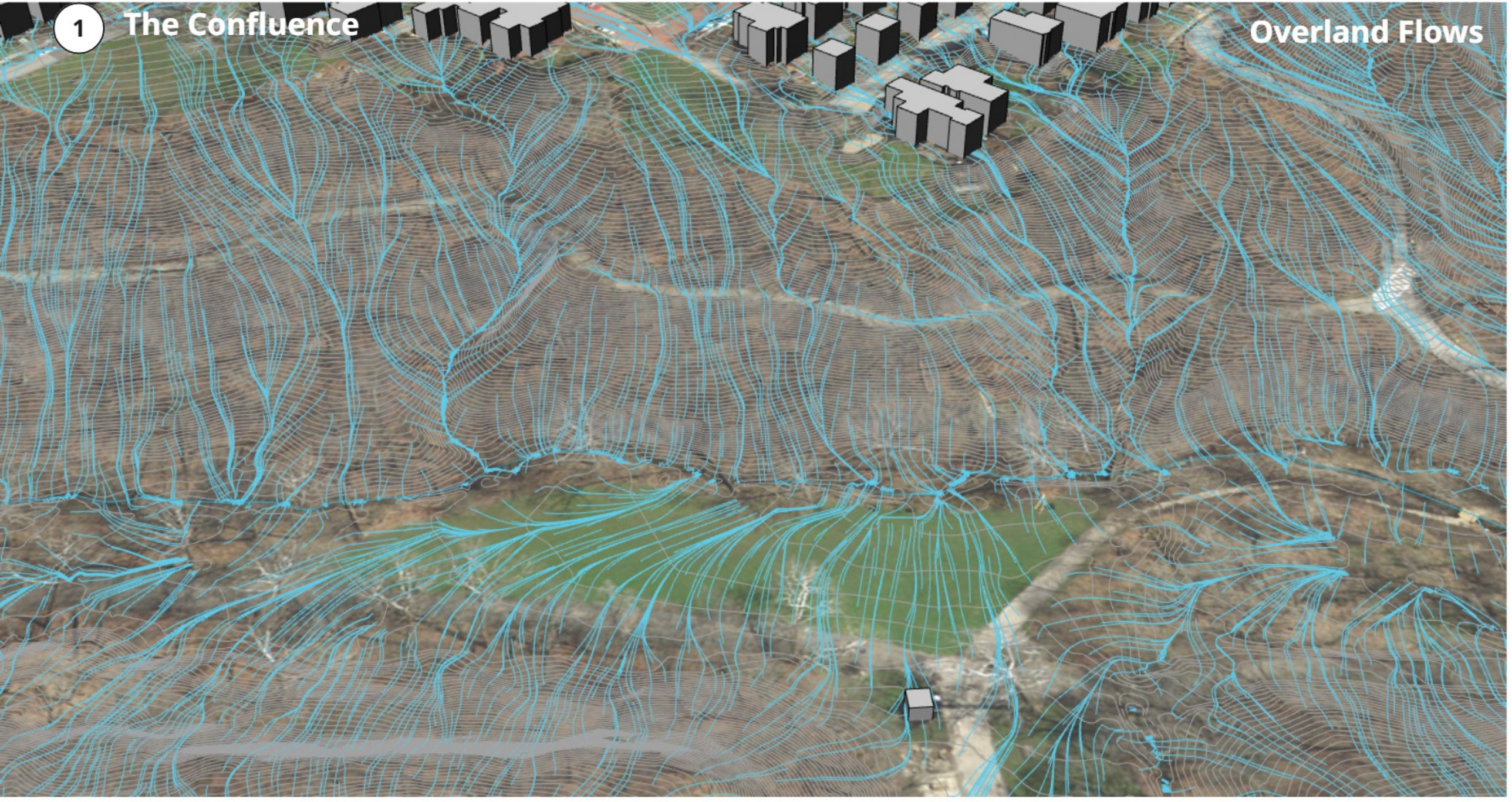
Facility upgrade



Pittsburgh Water
Impervious Surface
Billing Areas

LEGEND

- Trees Survey
- Streams
- Park Culverts
- Culvert Outfalls
- ImperviousSurface_Billing
- Transportation


1
The Confluence
Overland Flows

Environmental Overlay

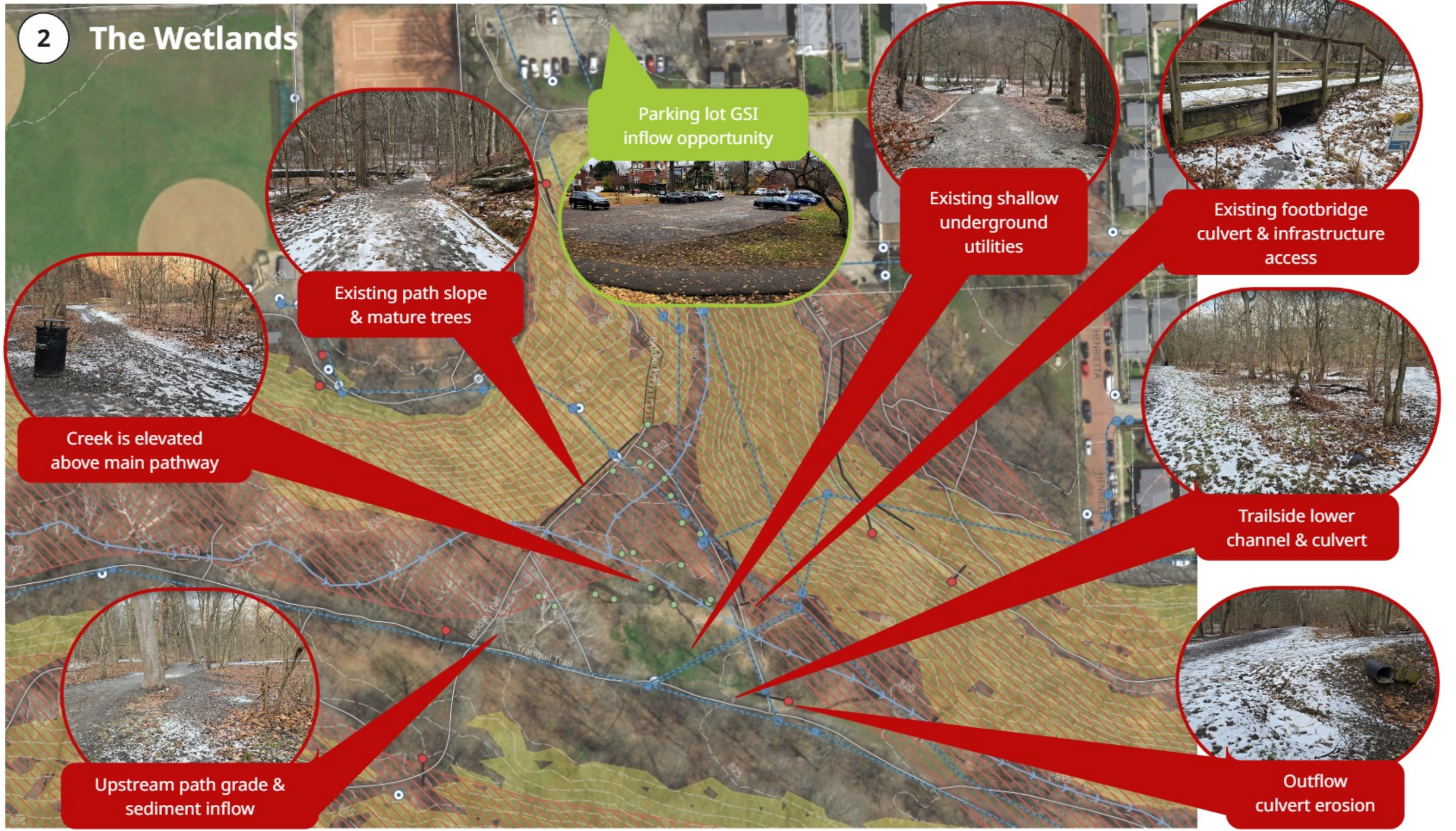
Opportunities

1. Improve adjacent drainage connectivity to stream
2. Improve elevation relationship between stream & trails
3. Redefine stream channel & wetland edge
4. Improve and enhance wetland buffer ecology
5. Provide opportunities to engage with wetland ecology
6. Establish new boardwalk stream crossings
7. Establish new seating area and educational amenities
8. Reduce City's stormwater fee charges from parking, paths, and tennis courts

Constraints

1. Project area is located in a landslide prone overlay zone
2. Project area is within 50' of steep slope overlay zone
3. Wetland project will require DEP/ACOE joint permit
4. Tributary channels located in steep slope overlay zone
5. Existing tree survey and geotech needed to finalize
6. Gaps in existing sewer infrastructure mapping
7. Existing sewer infrastructure is very shallow
8. Phasing and permitting with multiple agencies

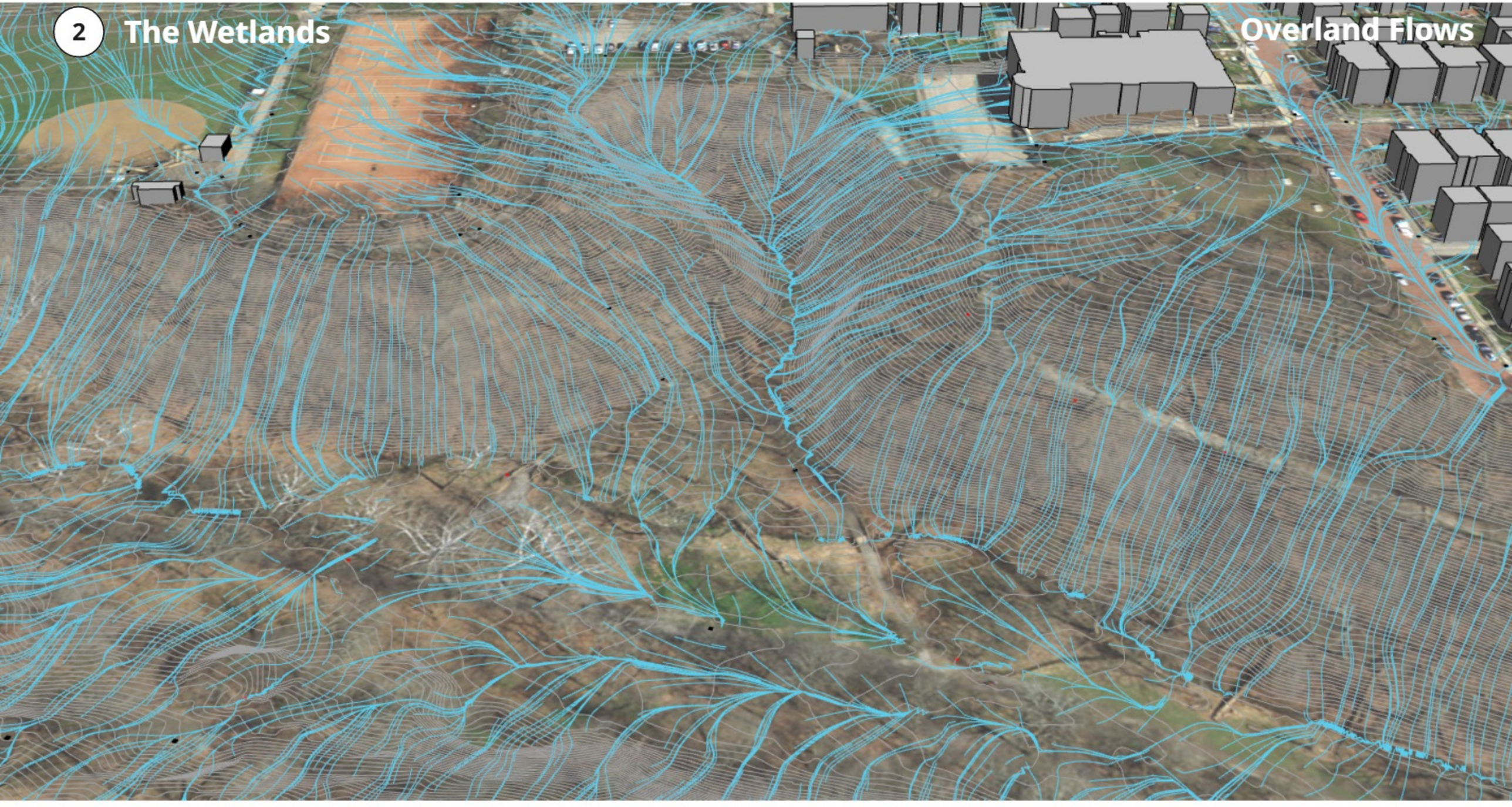
2 The Wetlands



Pittsburgh Water
Impervious Surface
Billing Areas

LEGEND

- Trees Survey
- Streams
- Park Culverts
- Culvert Outfalls
- ImperviousSurface_Billing
- Transportation


2
The Wetlands
Overland Flows

3 Regent Square GSI Park Inflow

3 Regent Square GSI Park Inflow

Opportunities

1. Utilize existing MS4 outfall to park & channel to creek
2. Address existing/historical erosion tributary to creek
3. Minimal risk opportunity to bring in offsite stormwater
4. Project includes ability to phase/expand capture area
5. Provide opportunities to enhance existing trailhead
6. Increase and regulate inflow to Fern Hollow Creek
7. ?
8. ?

Constraints

1. Project is located in a landslide prone overlay zone
2. Project area is within 50' of steep slope overlay zone
3. Project will require ROW work & coordination with DOMI
4. Tributary channels located in steep slope overlay zone
5. Existing tree survey and geotech needed to finalize
6. Will require tributary channel stablization
7. May require engagement with neighboring property
8. ?

3 Regent Square GSI Park Inflow

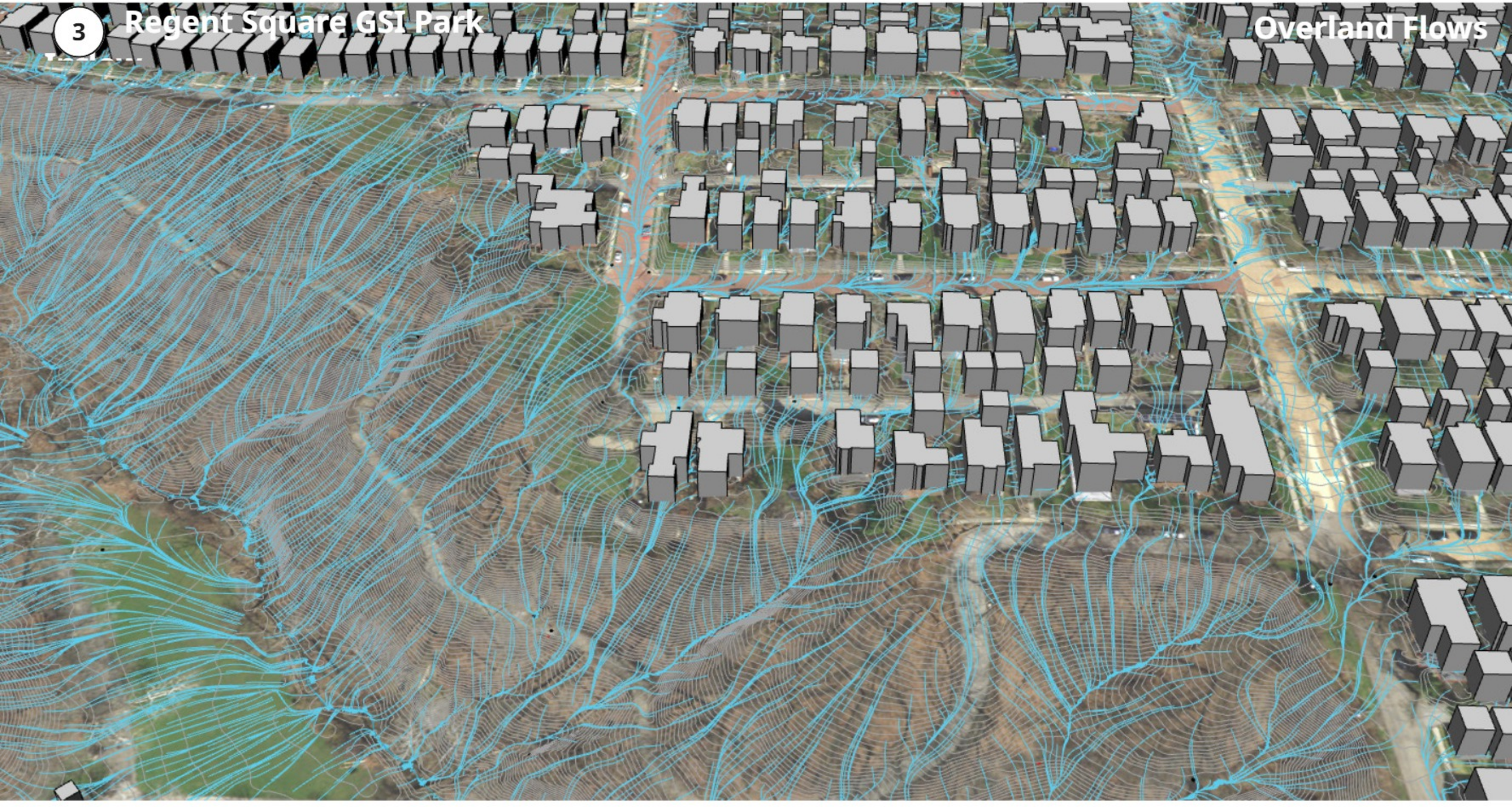
Open area for surface and/or subsurface GSI & trailhead

ROW GSI requires utilty coordination & street restoration

Existing infrastructure to MS4 outfall

Existing infrastructure to MS4 outfall

Existing MS4 outfall


3
Regent Square GSI Park
Overland Flows

Pittsburgh Water
Impervious Surface
Billing Areas

LEGEND

- Trees Survey
- Streams
- Park Culverts
- Culvert Outfalls
- ImperviousSurface_Billing
- Transportation


3
Regent Square GSI Park Inflow
HENRIETTA
OVERTON
LACLAIR
THAYS
Braddock Trail
Tranquil Trail
Environmental Overlay
LEGEND
Trees Survey
Streams
Sewer Pipes
Trails
Multi Use
Park Pathway
Pedestrian
Steps
Sewer Structures
PWSA Inlets
Parcels
Streets
Culvert Outfalls
Park Culverts
Contours 5ft
Building Footprints
Landslide_Prone
Steep Slope Overlay
FEMA FloodPlain

3 Regent Square GSI Park Inflow

Opportunities

1. Address existing erosion at Henrietta & Laclair
2. Partner with Environmental Charter School
3. Improve pedestrian ROW safety & vehicle staging
4. Integrate with outdoor education space
5. Provide slow release inflow to Fern Hollow Creek
6. Increase and regulate inflow to Fern Hollow Creek
7. ?
8. ?

Constraints

1. Project is located in a landslide prone overlay zone
2. Project area is within 50' of steep slope overlay zone
3. Project will require ROW work & coordination with DOMI
4. Tributary channels located in steep slope overlay zone
5. Project would require lined underground detention
6. Existing tree survey and geotech needed to finalize
7. May require engagement with multiple property owners
8. May reduce existing street parking capacity

3 Regent Square GSI Park Inflow

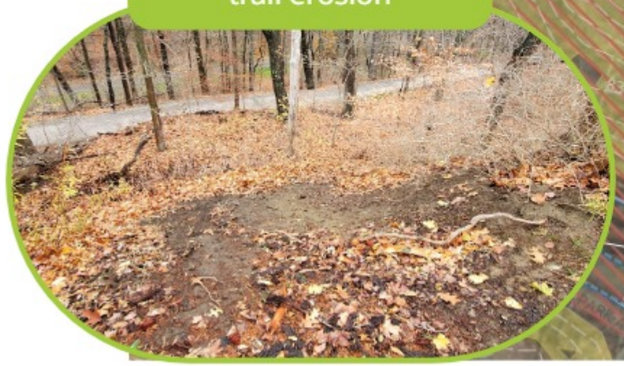
ROW GSI requires utilty coordination & street restoration

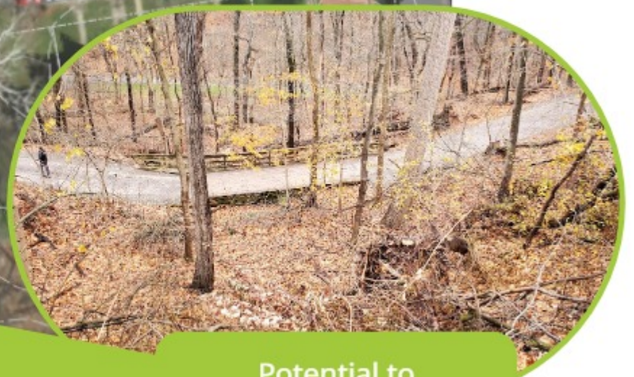
Opportunity for ROW GSI to slow release to

Opportunity for ECS partnership and ROW GSI to enhance pedestrian safety

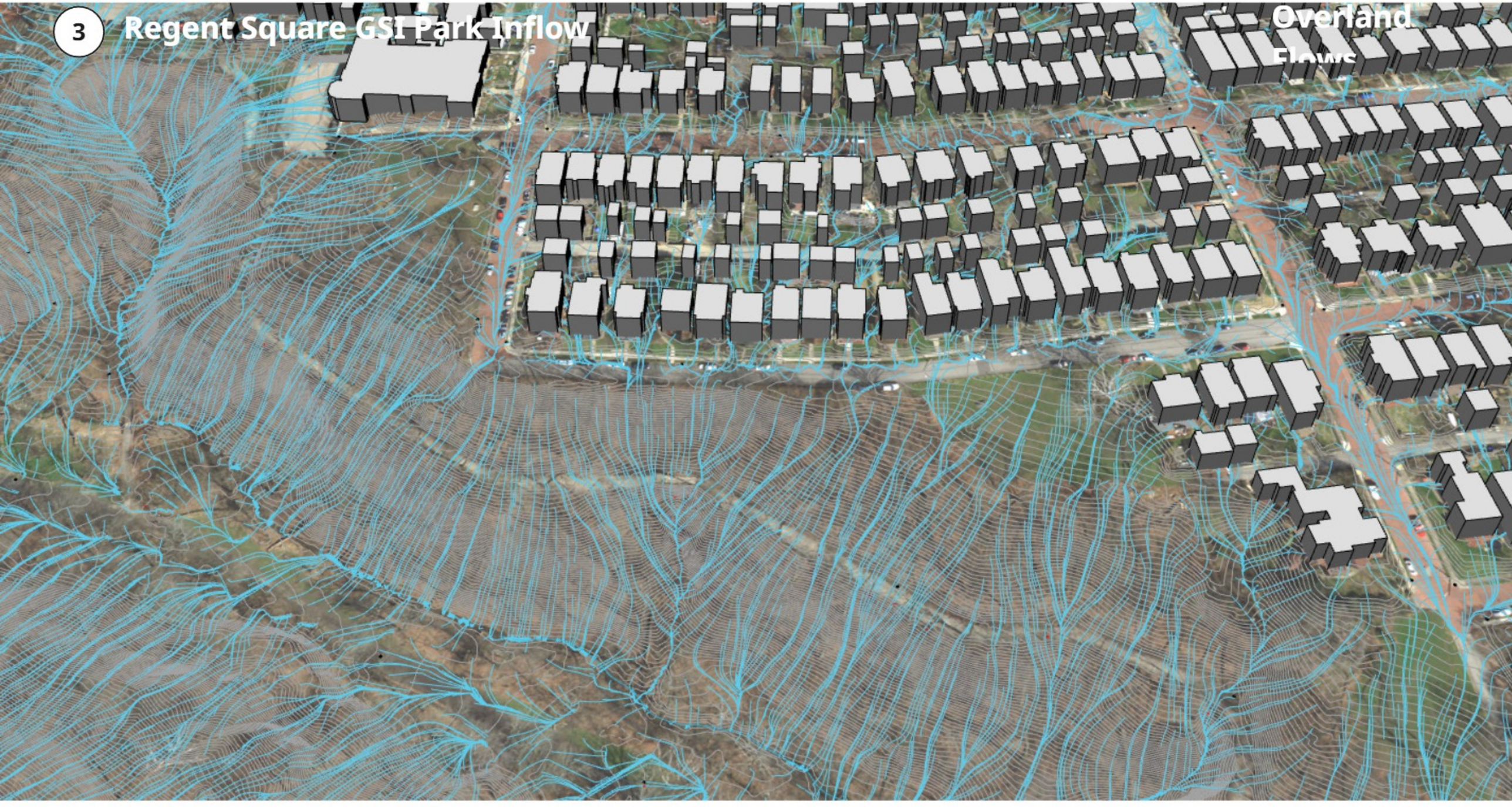
Outleting to steep slope requires significant stabilization or pipe slope

Potential to address existing trail erosion





Potential to address erosion at existing culvert


3
Regent Square GSI Park Inflow
Overland


3
Regent Square GSI Park Inflow
Pittsburgh Water
Impervious Surface
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LEGEND
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Park Culverts
Culvert Outfalls
ImperviousSurface_Billing
Transportation

4 Point Breeze GSI Park Inflow

Environmental Overlay

LEGEND

- Trees Survey
- Streams
- Sewer Pipes

Trails

- Multi Use
- Park Pathway
- Pedestrian
- Steps
- Sewer Structures
- PWSA Inlets
- Parcels
- Streets
- Culvert Outfalls
- Park Culverts
- Contours 5ft
- Building Footprints
- Landslide_Prone
- Steep Slope Overlay
- FEMA FloodPlain

3 Point Breeze GSI Park Inflow

Opportunities

1. Utilize existing MS4 outfall to park & channel to creek
2. Project includes ability to phase/expand capture area
3. Partner with PPS Sterrett Classical Academy
4. Provide environmental education and storytelling
5. Increase and regulate inflow to creek headwaters
6. Provide opportunities to enhance existing trailhead
7. Leverage natural basin for detention
8. ?

Constraints

1. Increased inflow may be intercepted by sewer I&I
2. Project area is within 50' of steep slope overlay zone
3. Project will require ROW work & coordination with DOMI
4. Outfall channel located in steep slope overlay zone
5. Vague existing channel could increase trail flooding
6. Existing tree survey and geotech needed to finalize
7. May require engagement with multiple property owners
8. May reduce existing street parking capacity

4 Point Breeze GSI Park Inflow

Partnership opportunity

Existing MS4 area draining to park

Potential sewer I&I

Culvert required to pass flow

Additional capture area to MS4 outfall

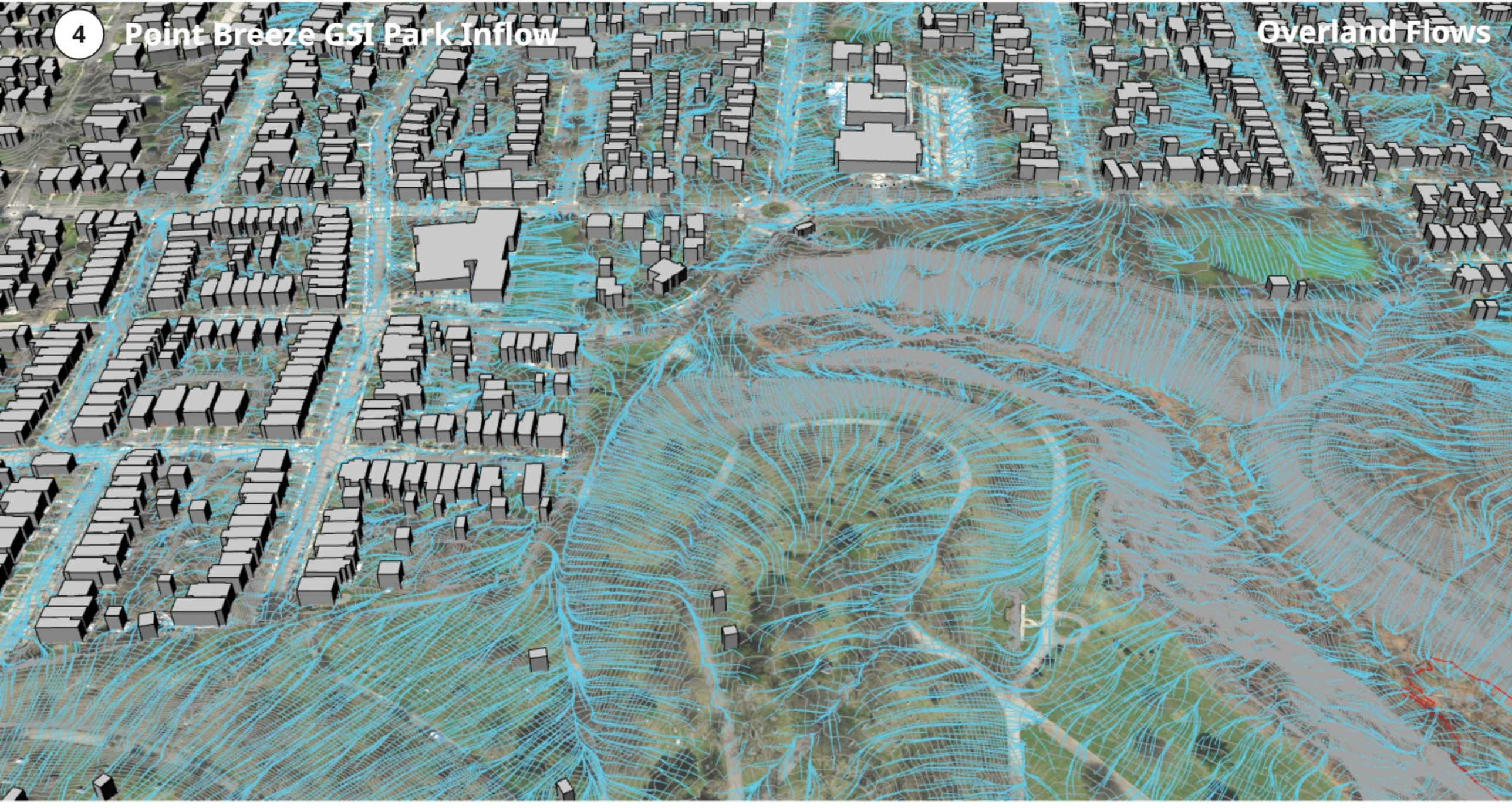
Creek looses definition and runs down Tranquil Trail

4 Point Breeze GSI Park Inflow

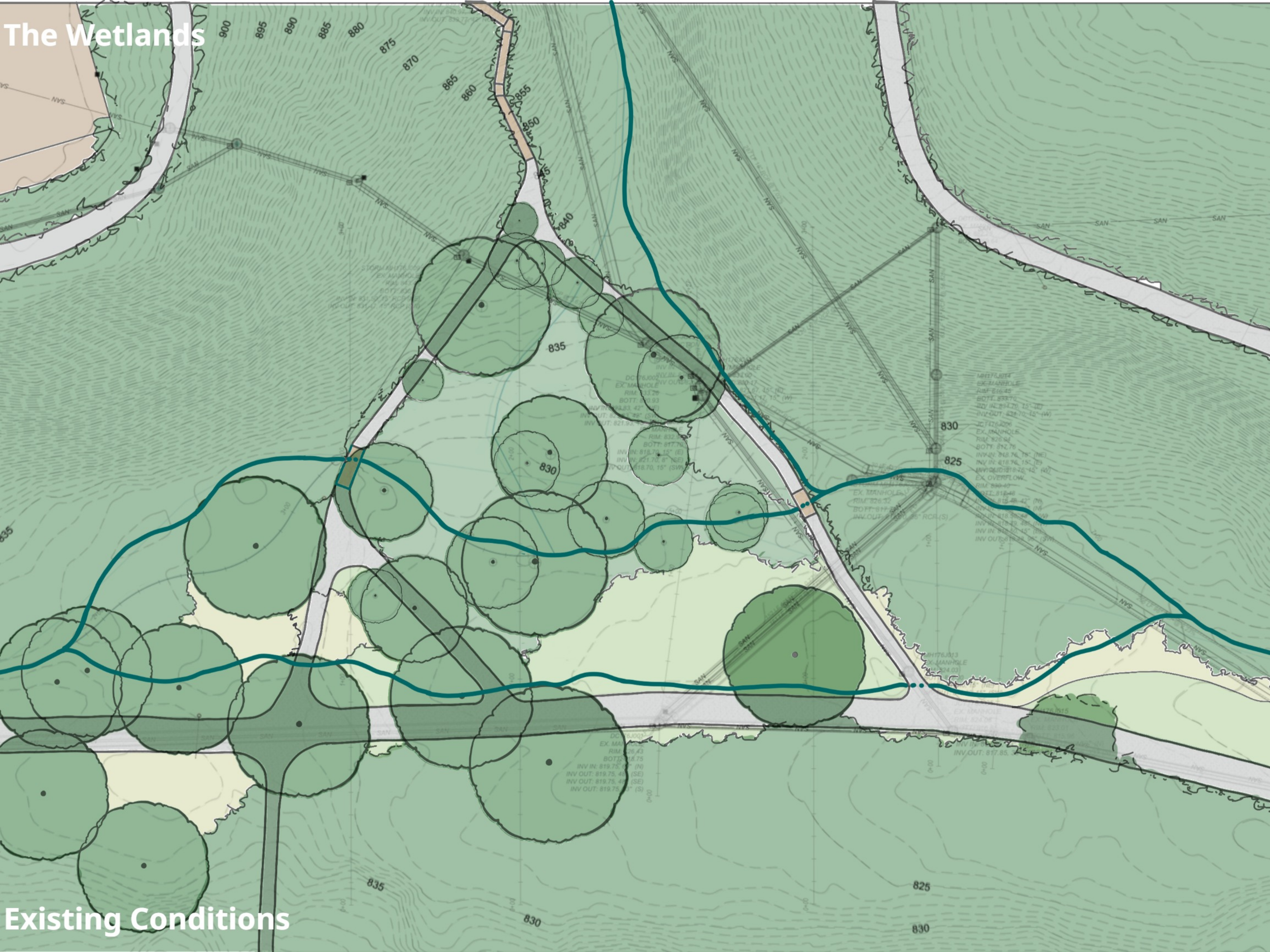
Pittsburgh Water
Impervious Surface
Billing Areas

LEGEND

- Trees Survey
- Streams
- Park Culverts
- Culvert Outfalls
- ImperviousSurface_Billing
- Transportation


4
Point Breeze GSI Park Inflow
Overland Flows

The Wetlands



Existing Conditions

The Wetlands

Existing Primary Channel

Existing Secondary Channel

Disconnected Flow

Existing Primary Drainage Flows

The Wetlands

Existing Mature Trees

Sanitary Junctions

Existing Sanitary

Existing Sanitary

Existing Sanitary

Existing Sanitary

Existing Sanitary

Existing Mature Trees

Existing Sanitary

Existing Design Constraints

The Wetlands

LOWER GRADE

HOLD GRADE

HOLD GRADE

RAISE GRADE

290'

Grading Potential Analysis

The Wetlands

Proposed Primary Channel

Proposed Secondary Channel

Proposed Design Intervention - 1

The Wetlands

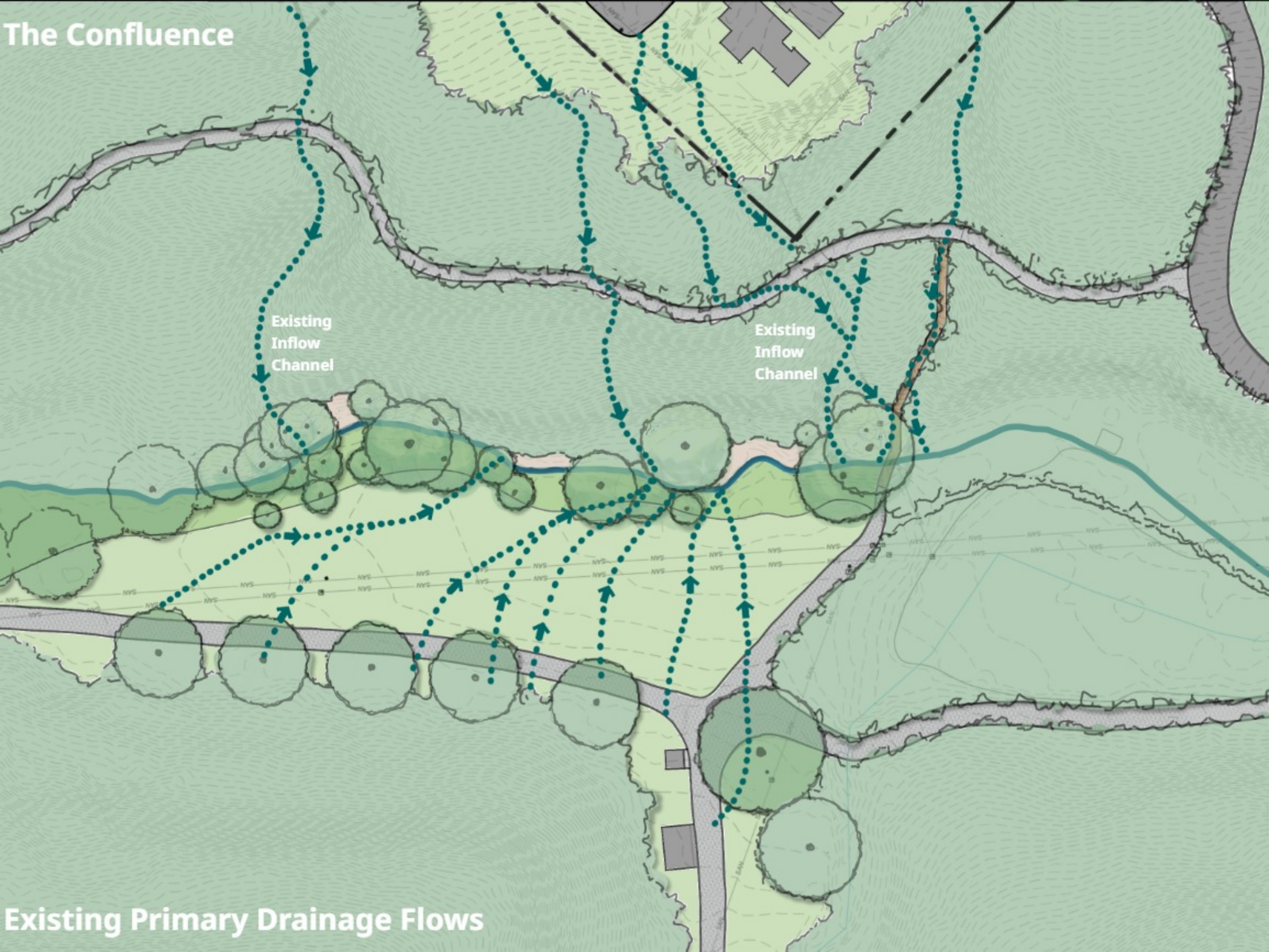
Proposed Wetland System

Proposed Secondary Channel

Proposed Design Intervention - 2

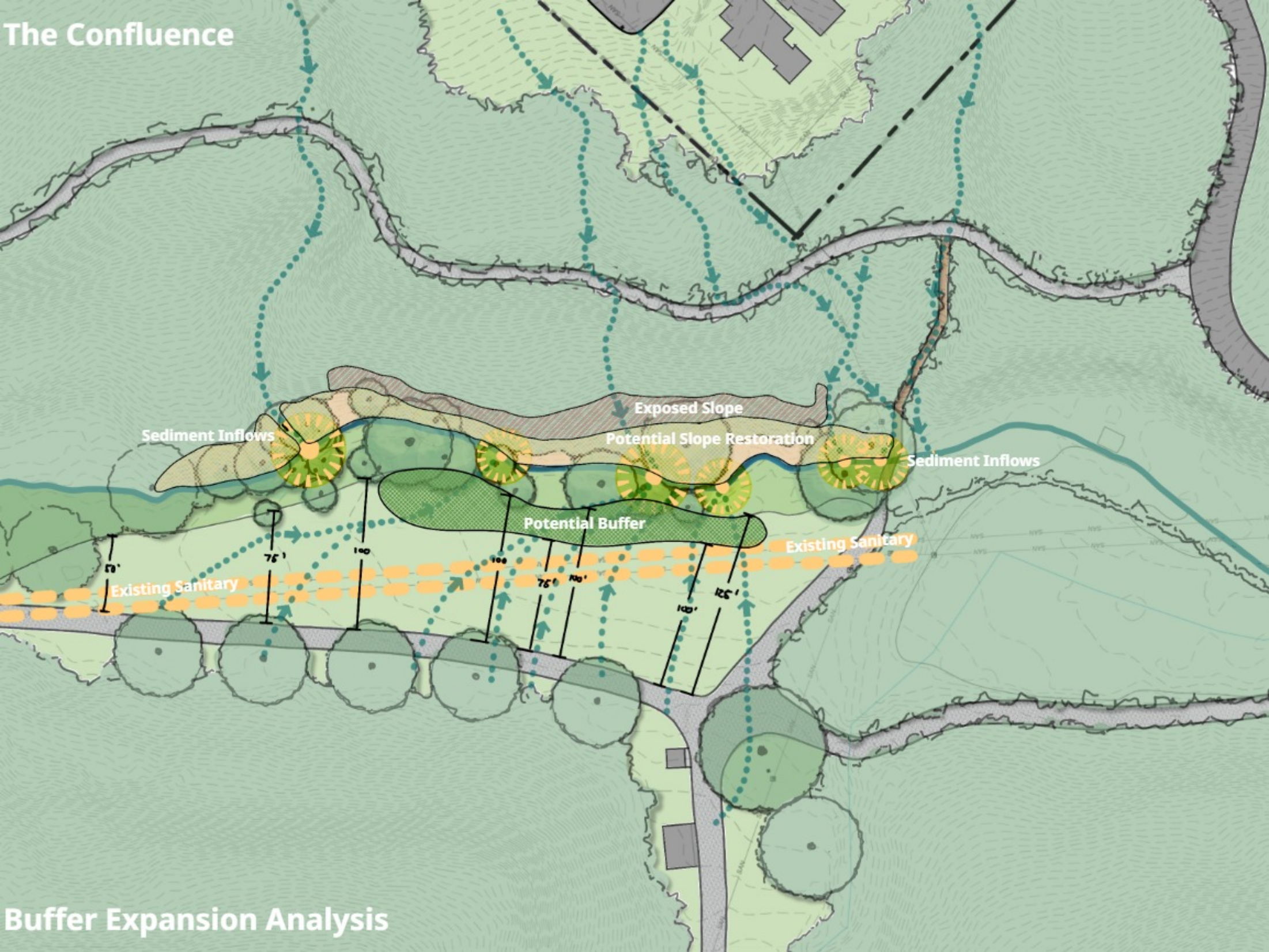
The Confluence

Existing Conditions

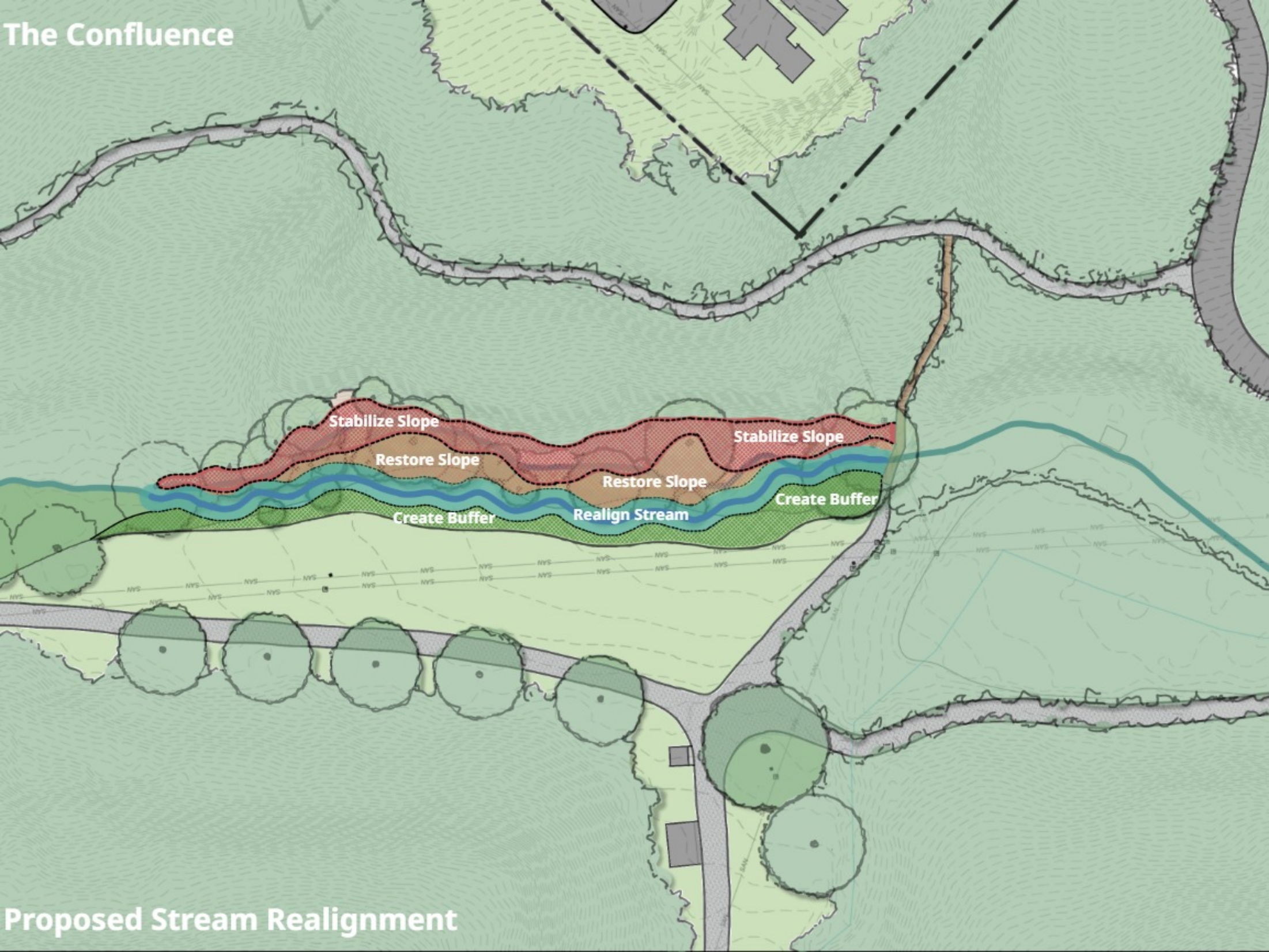

The Confluence
Existing
Inflow
Channel
Existing
Inflow
Channel
Existing Primary Drainage Flows

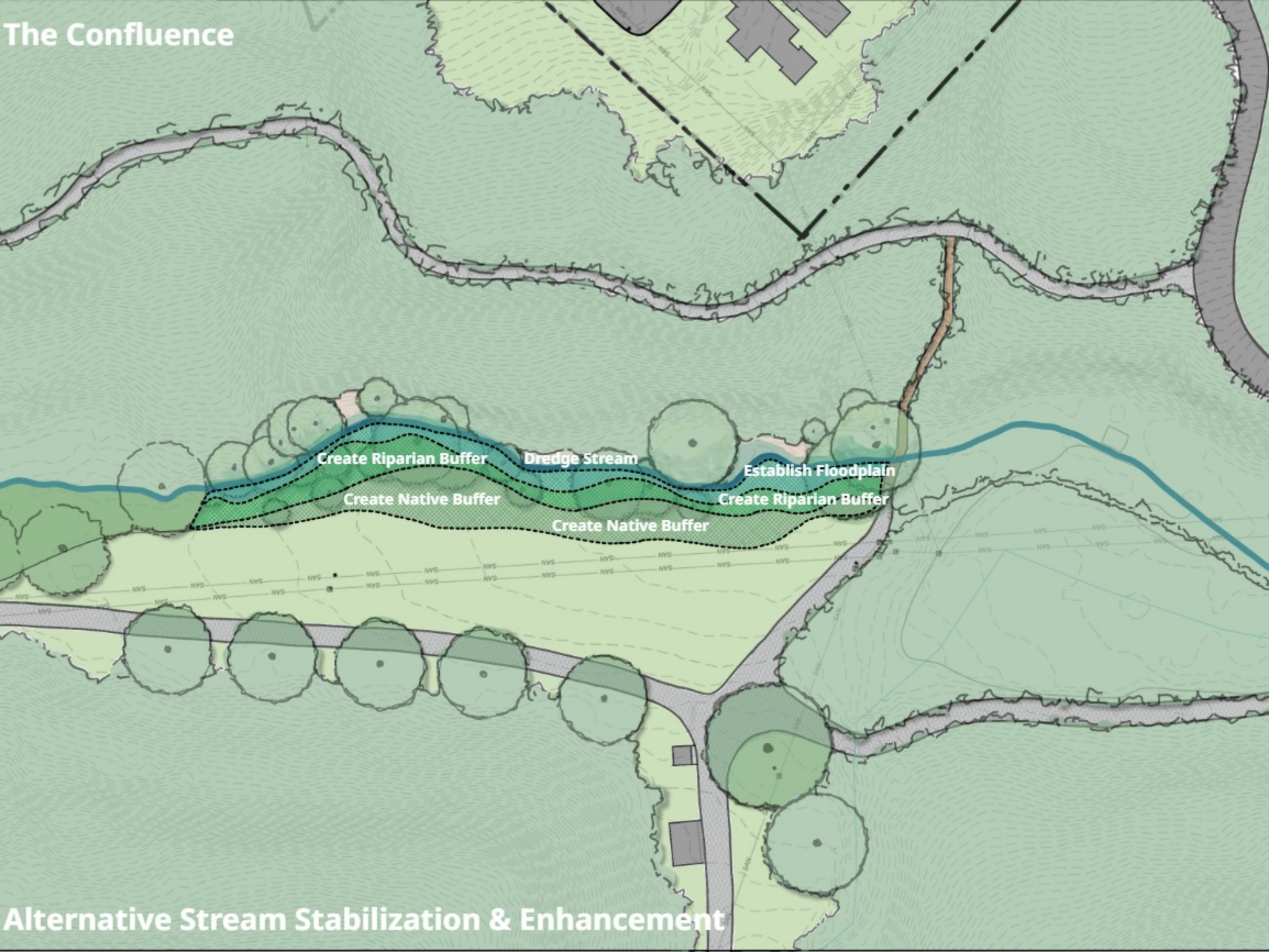

The Confluence
Exposed Slope
Potential Slope Restoration
Sediment Inflows
Sediment Inflows
Existing Sanitary
Existing Sanitary
Existing Design Constraints

The Confluence



Buffer Expansion Analysis


The Confluence
Stabilize Slope
Restore Slope
Create Buffer
Realign Stream
Restore Slope
Stabilize Slope
Create Buffer
Proposed Stream Realignment


The Confluence
Create Riparian Buffer
Dredge Stream
Establish Floodplain
Create Native Buffer
Create Riparian Buffer
Create Native Buffer
Alternative Stream Stabilization & Enhancement