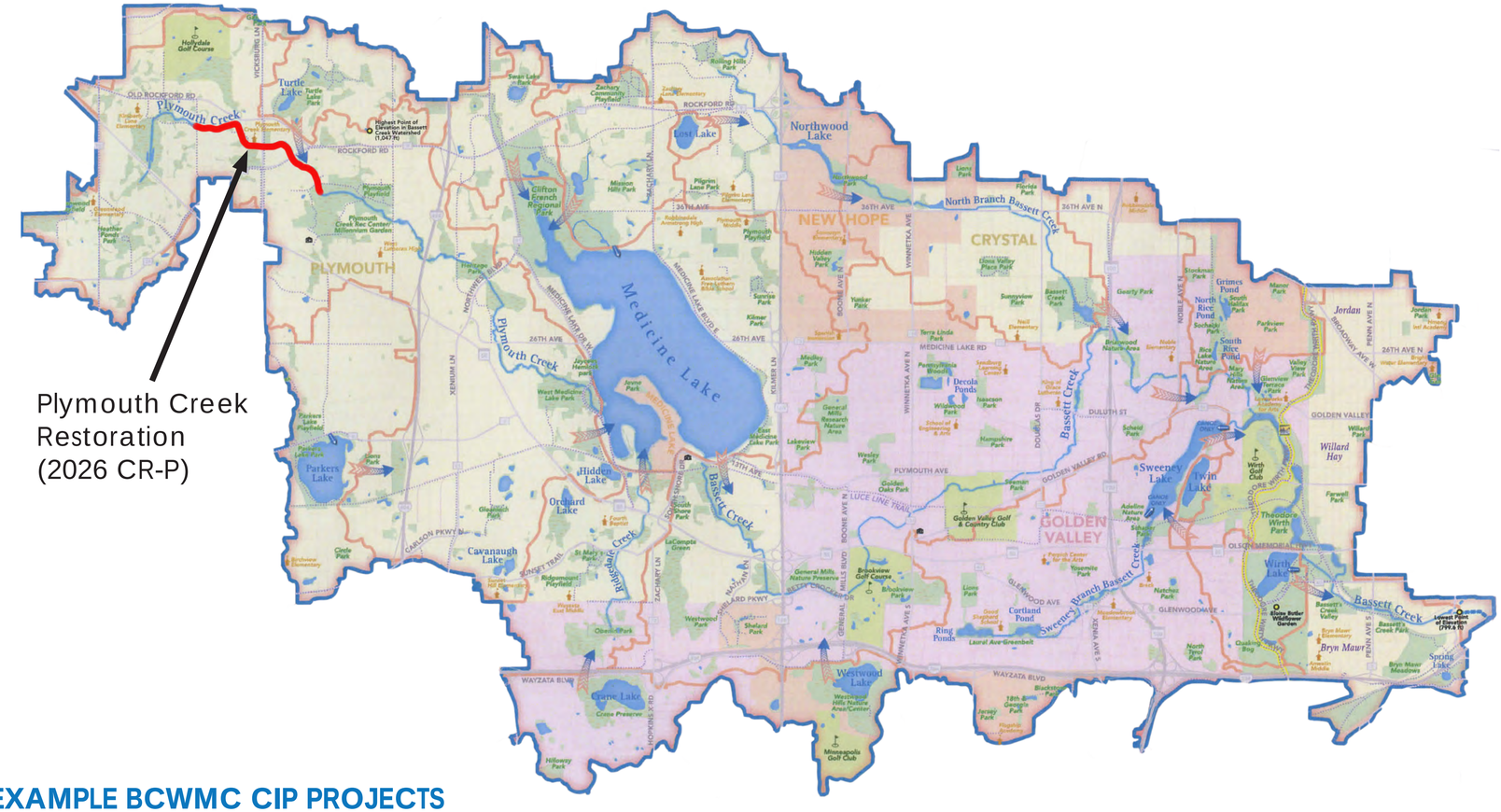
About the Bassett Creek Watershed Management Commission (BCWMC)

The vision: stewardship of water resources to protect and enhance our communities



About the BCWMC

- **Regional government organization** formed in 1969 to focus on flood control along Bassett Creek
- **Operates under a 10-year management plan**
- **Focused on providing flood management and improving and protecting the water quality** of Bassett Creek and lakes/streams
- **Nine member cities:** Crystal, Golden Valley, Medicine Lake, Minneapolis, Minnetonka, New Hope, Plymouth, Robbinsdale, St. Louis Park,
- **Area:** approximately 40 square miles

Commission funding

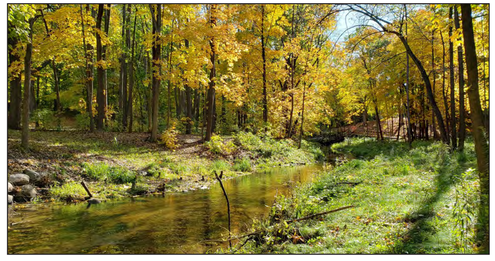
- Contributions from nine member cities (approximately $600,000 per year)
- Hennepin County tax levy for major projects (approximately $1.5–2 million per year)
- Grant funds and application fees (varies)

Commission activities

- Implements capital improvement projects that reduce flooding and improve lakes, streams, and wetlands throughout the watershed
- Monitors water quality, performs studies, maps resources
- Provides water resource education and watershed-wide coordination
- Reviews developments for compliance with standards and requirements

EXAMPLE BCWMC CIP PROJECTS

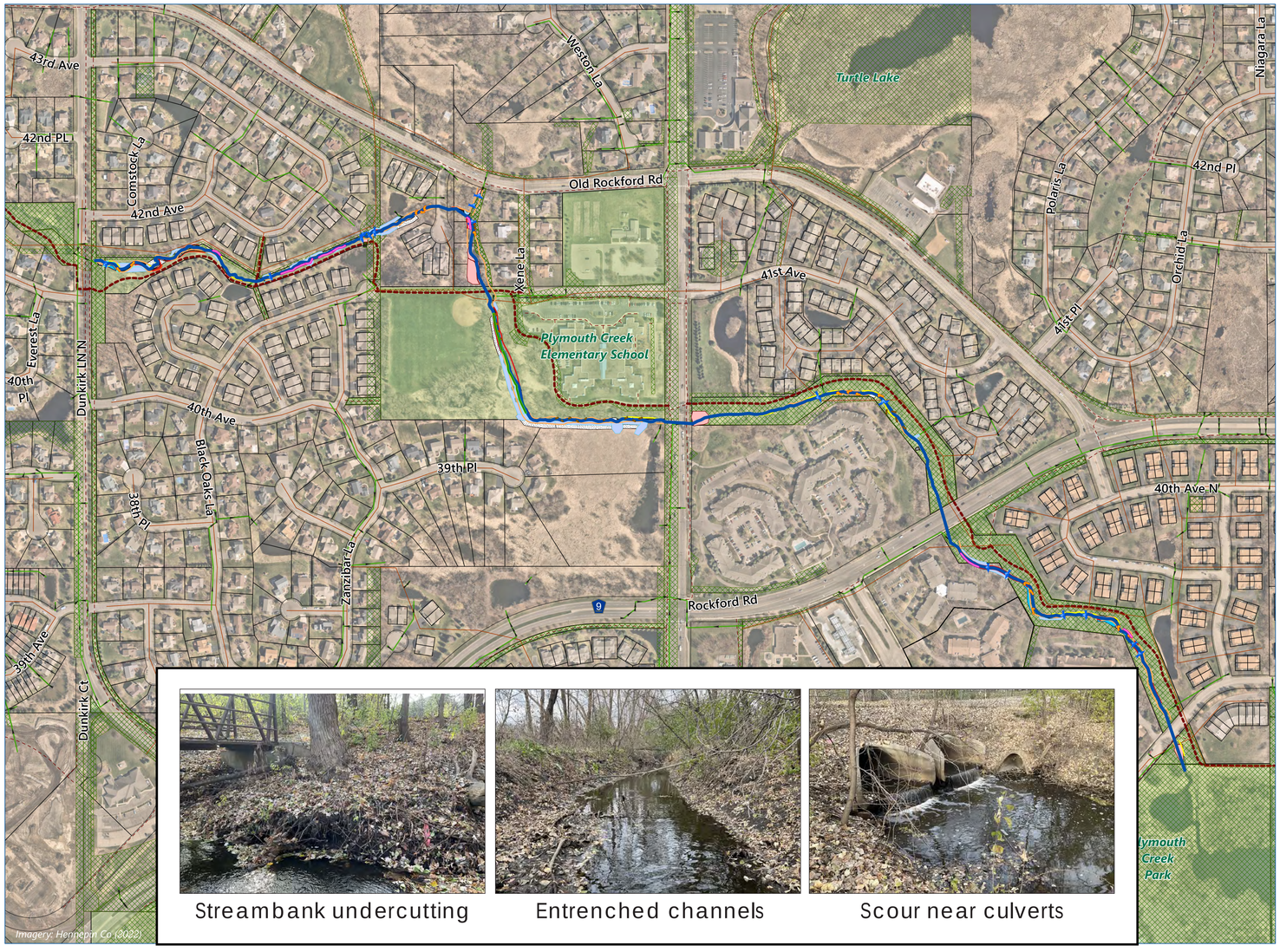
Wirth Lake outlet



Plymouth Creek restoration (before and after)

Plymouth Creek Restoration Project

Plymouth Creek Erosion Issues and Restoration Prioritization



- Plymouth Creek
- Bike and/or Pedestrian Trail
- Parcel Boundary
- Public Parcel
- Easements

Bank Erosion Hazard Index (BEHI)
- Very High
- High
- Moderate
- Low

Utilities
- Gravity Storm Sewe
- Sanitary Main

Bioengineering Features
- Coir Log
- Cross-Vanes
- J-Hook
- Root Wads
- Vanes
- Brush Mattresses
- Plug Planting
- Grading
- Live Staking
- Rock Riprap
- Seeding
- VRSS
- Debris Removal

0 500
Feet

Restoration Prioritization Factors

Several factors will impact prioritization of Plymouth Creek restoration locations, including:

- Severity of existing erosion
- Public access/ownership
- Protection of existing structures/infrastructure
- Impact to surrounding areas
- Public visibility/accessibility
- Potential for future erosion (near-bank stress and bank erosion hazard index ratings)
- Opportunity for habitat creation or restoration
- Maintaining healthy, native significant trees (minimize removal)
- Vegetation establishment potential (exposure to sunlight)
- Ease of construction access
- Consideration of proximity/possibility for other improvements (e.g. new sediment trapping device in nearby storm drains)
- Potential for public education/ signage

Any type of erosion comes with the associated issues:

- Introduction of sediment to stream and downstream waterbodies
- Degradation of bank vegetation and reduced potential for re-growth
- Degradation of in-stream and bank habitats
- Increased risk of continued erosion
- Changed stream shape and size over time

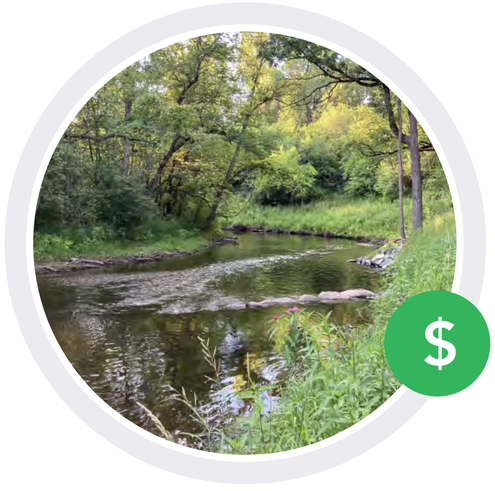
City of Plymouth

Bassett Creek Watershed Management Commission

Plymouth Creek Restoration Project

Stream Stabilization Methods

1



In-stream structures

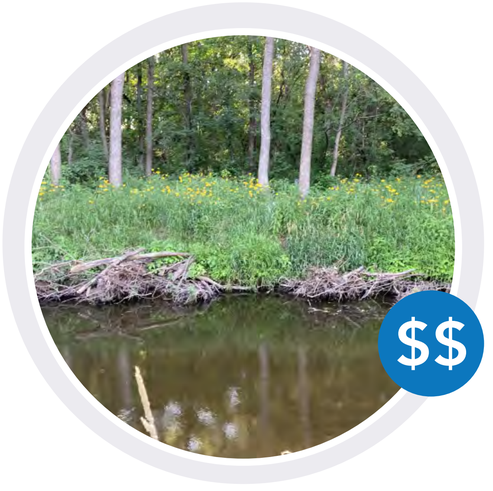
Pros

- Reduces near-bank stress
- Minimal bank disturbance
- Lowest construction cost
- Diversifies flow within stream, including energy dissipation pools
- Provides in-stream habitat

Cons

- In-stream features can be obstructed with sediment and debris
- Continued erosion on unprotected bank toe outside the zone of influence of the structures

2



Bank stabilization with bioengineering methods

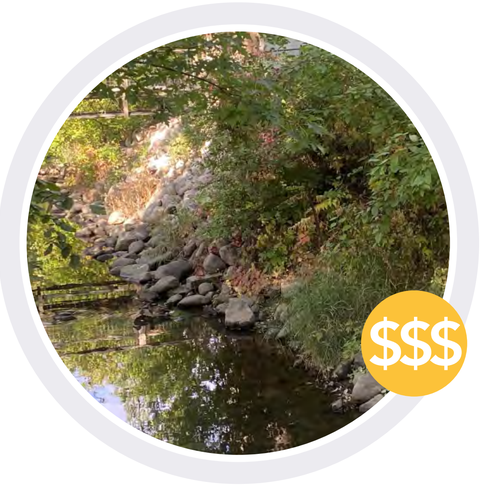
Pros

- More erosion protection along the base of the bank, also known as the bank toe
- Bioengineering and vegetation features can improve in-stream and bank habitat

Cons

- Requires establishment period for vegetation features
- Moderate grading can increase construction costs, bank disturbance, and potential tree removal

3



Bank grading with riprap and vegetation establishment

Pros

- Riprap allows for the most protection against damaging (high shear stress) flows
- Immediate stabilization of eroding areas

Cons

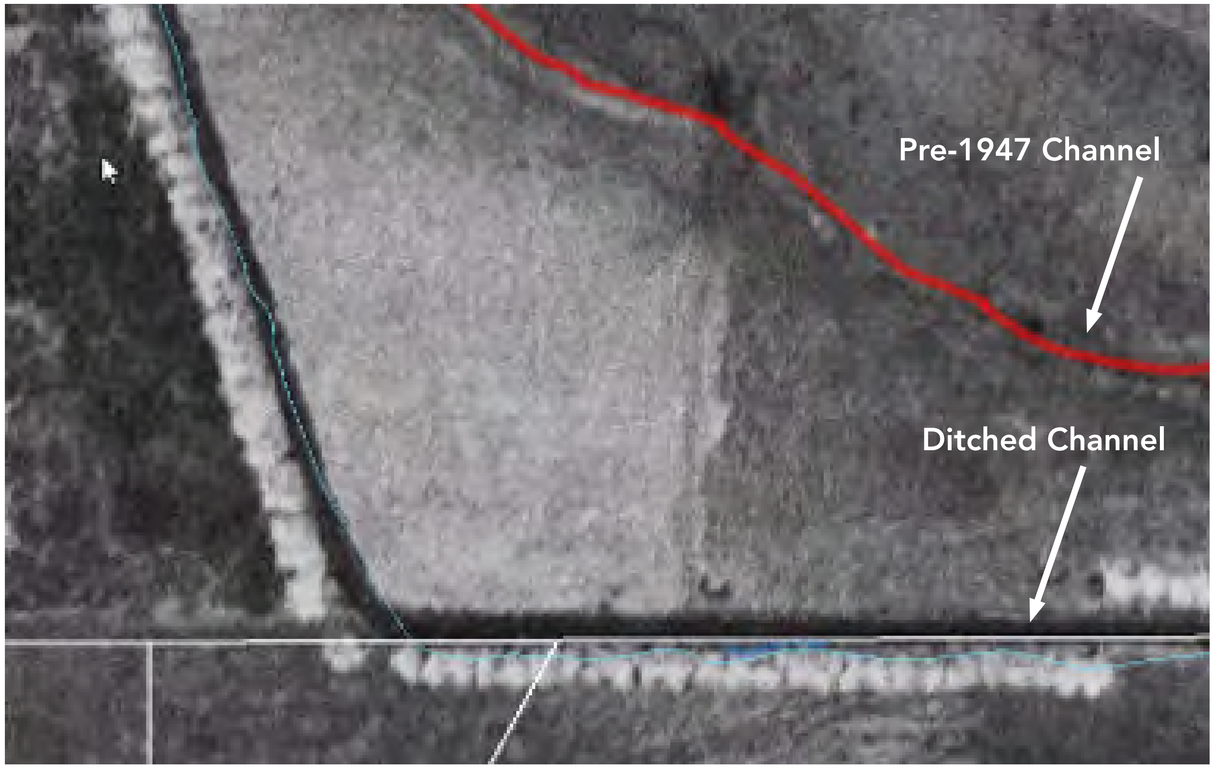
- Riprap provides minimal in-stream or bank habitat
- Riprap and grading are more cost intensive
- Most bank disturbance during construction, and potential tree removal

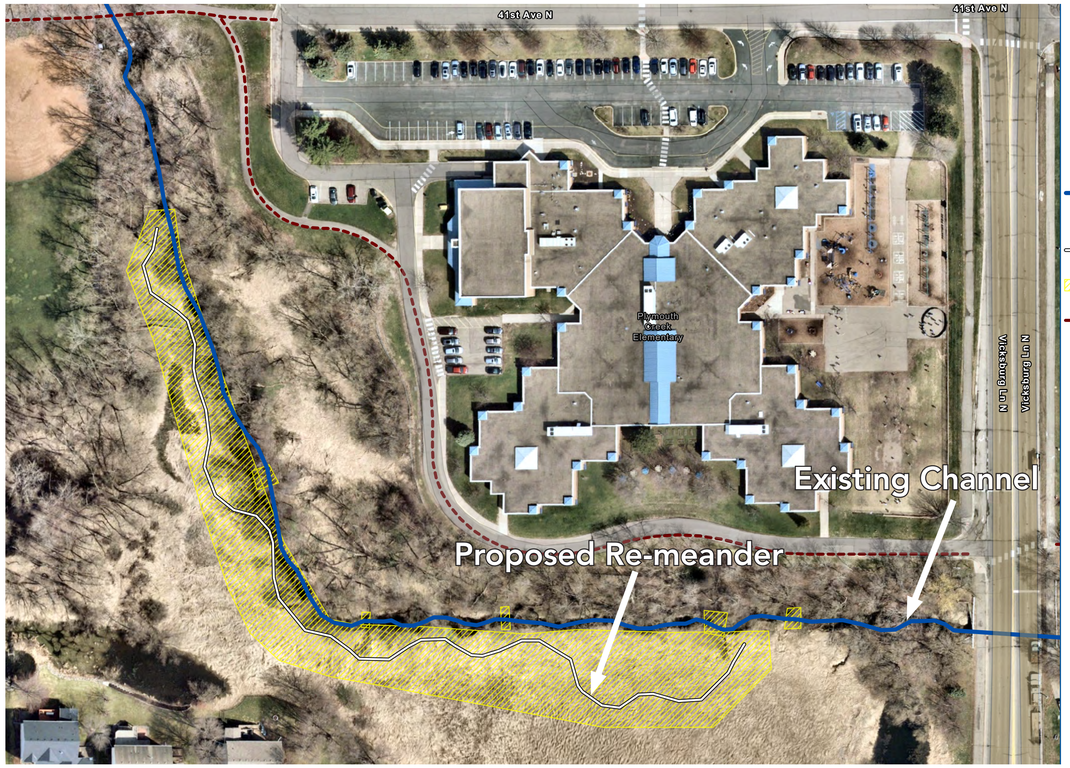
Potential Re-meandering

In 1947, Plymouth Creek was ditched and straightened, possibly to improve access to agricultural fields. It is likely that even the pre-1947 channel had been altered from the original stream flowpath. Natural channels are typically sinuous, and re-establishing a meandering pattern can be an important part of restoring a ditched and straightened stream. Creek re-meandering is one restoration option under consideration for the portion of the creek that is west and south of Plymouth Creek Elementary School.

Benefits of Re-meandering

- Increases stream length and sinuosity
- Decreases flow rates and likelihood of bank erosion
- Increases resiliency during higher flow storm events
- Enhances habitat
- Promotes groundwater connectivity
- Enhances geomorphic processes including sediment transport and deposition





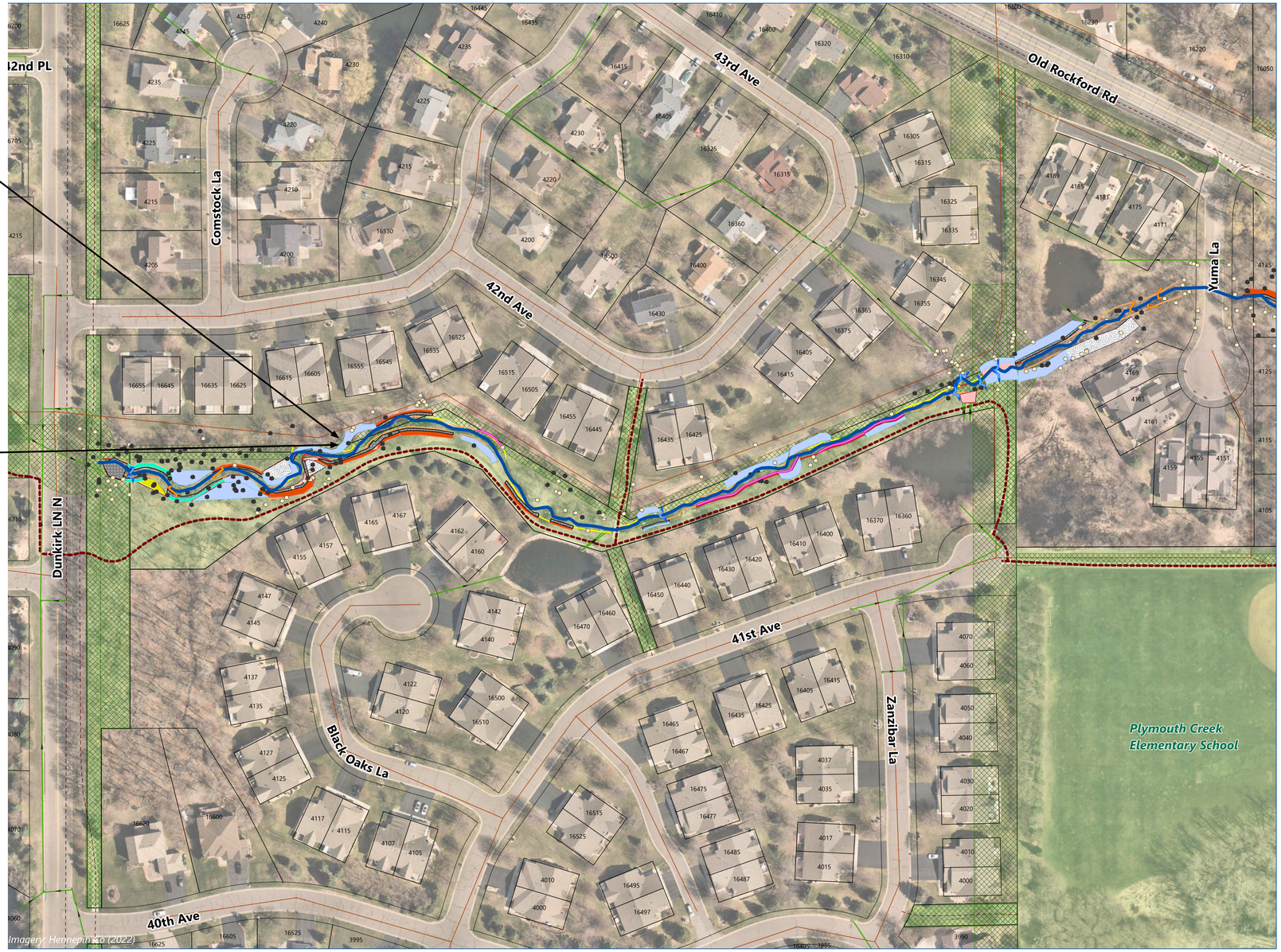
Plymouth Creek Restoration Project

City of Plymouth

Bassett Creek Watershed Management Commission

Preliminary Concept for Reach 1, Dunkirk Lane to Yuma Lane

- Regrade channel and stream banks to improve floodplain connection and soften tight curves
- Stabilize stream bank toe with rock riprap, coconut-fiber (coir) log, or root wads
- Stabilize stream bank with vegetative material (seed, live plugs, shrubs, and/or live cuttings)
- Remove invasive buckthorn within riparian zone and replace with native plantings



- Significant Trees
- Plymouth Creek
- Bike and/or Pedestrian Trail
- Parcel Boundary
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- Gravity Storm Sewer
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Bioengineering Features

- Coir Log
- Cross-Vanes
- J-Hook
- Brush Mattresses
- Grading
- Live Staking
- Plug Planting
- Rock Riprap
- Seeding
- VRSS

* Significant tree: Any healthy tree measuring 8 inches in diameter or larger at a height of 54 inches above ground for deciduous trees, and measuring 4 inches in diameter or larger at a distance of 54 inches above ground for coniferous trees.

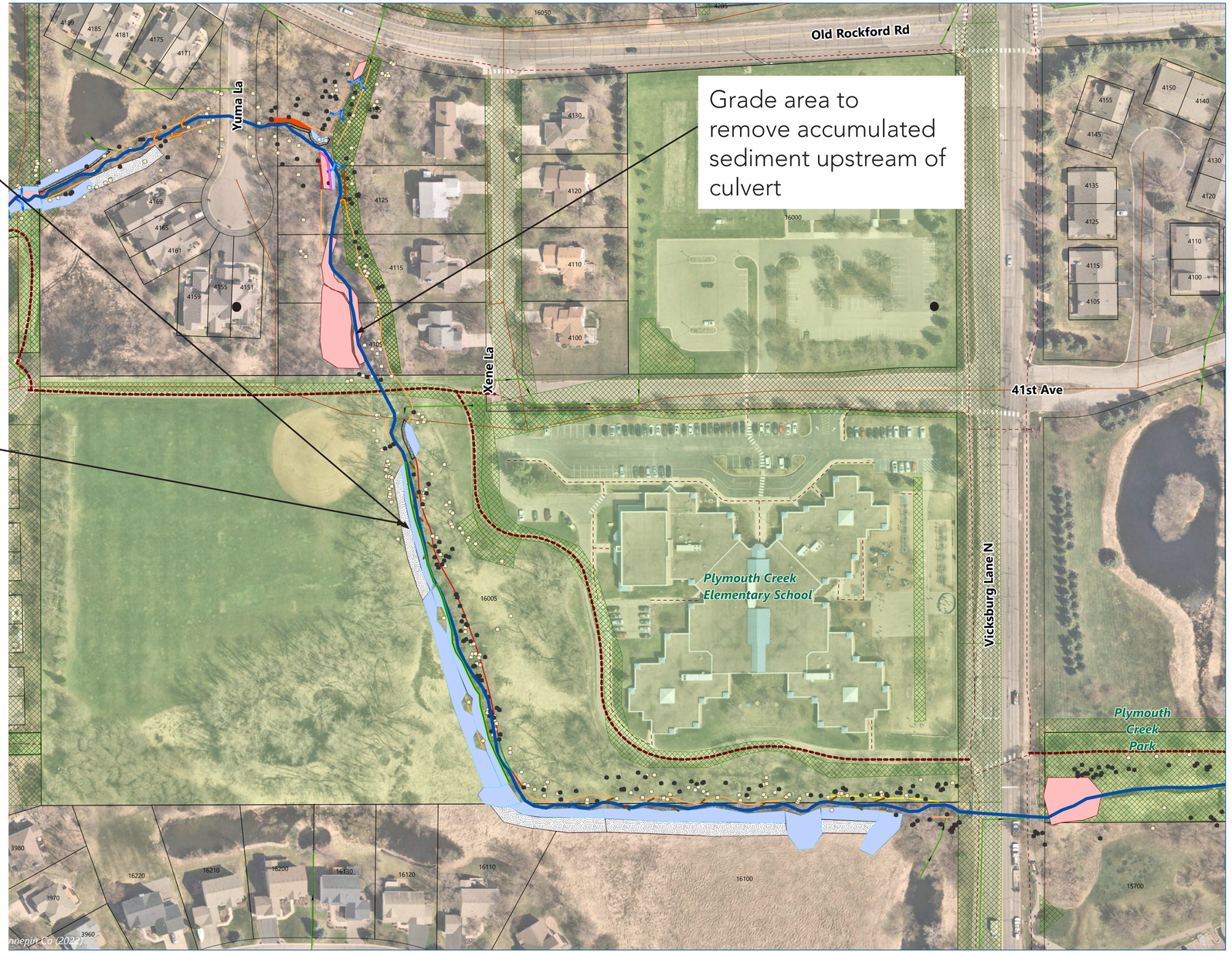
0 100 200
Feet

Plymouth Creek Restoration Project

Preliminary Concept for Reach 2, Yuma Lane to Vicksburg Road

- Regrade channel and stream banks to improve floodplain connection
- Install rock vanes to maintain channel grade and route erosive flows away from stream banks
- Stabilize stream bank with vegetative material (seed, live plugs, shrubs, and/or live cuttings)
- Remove invasive buckthorn within riparian zone and replace with native plantings

* See channel re-alignment board for potential stream meander layout next to school.



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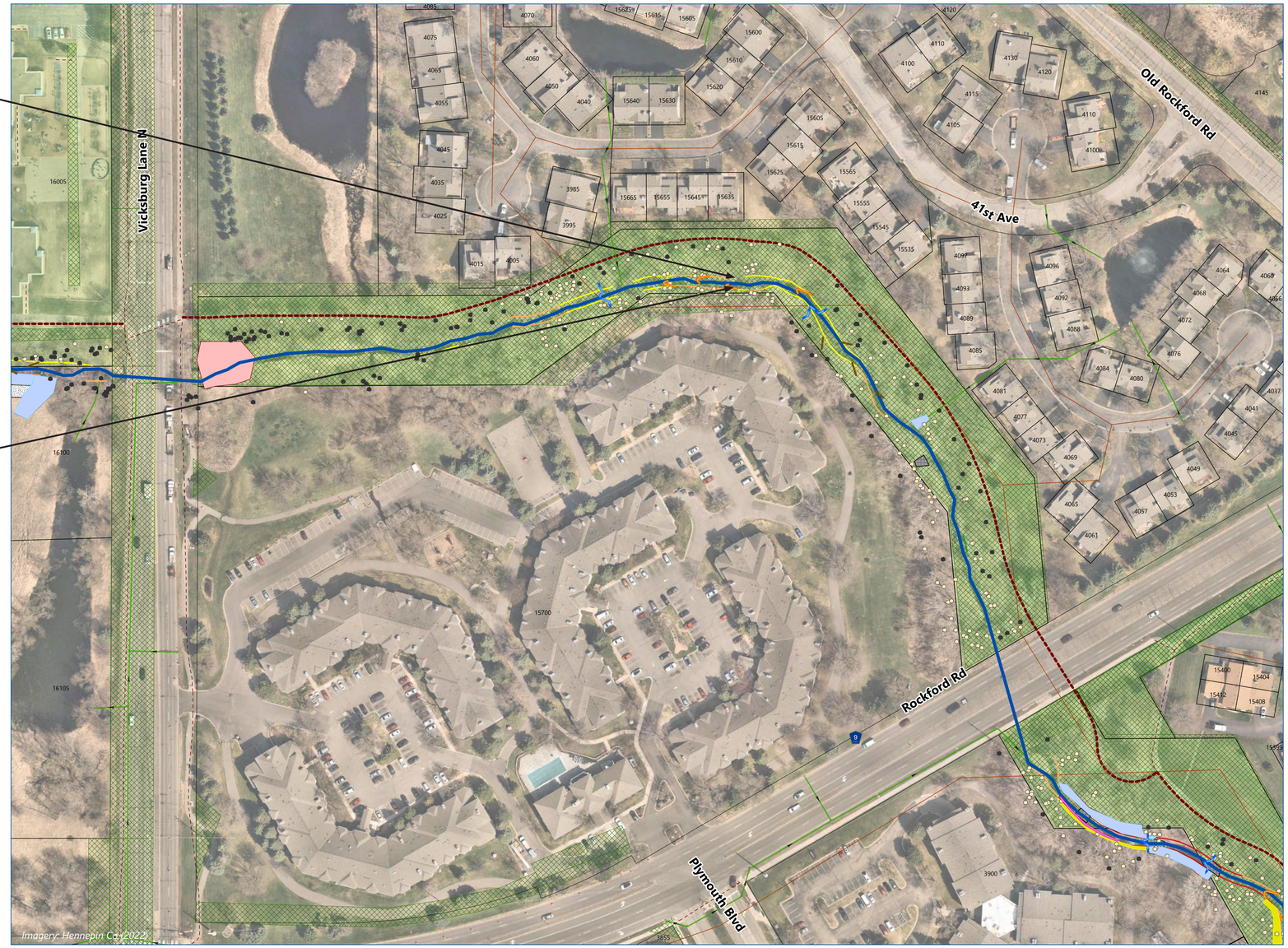
Plymouth Creek Restoration Project

City of Plymouth

Bassett Creek Watershed Management Commission

Preliminary Concept for Reach 3, Vicksburg Road to Rockford Road

- Install rock vanes to maintain channel grade and J-hook vanes to route erosive flows away from stream banks
- Stabilize culvert outlets with grading, riprap, erosion control blanket, and/or live plugs and seed
- Remove invasive buckthorn within riparian zone and replace with native plantings



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Feet

Plymouth Creek Restoration Project

Preliminary Concept for Reach 4, Rockford Road to 38th Avenue

- Install rock vanes to maintain channel grade and J-hook vanes to route erosive flows away from stream banks
- Grade banks, place erosion control blanket and live plugs with live stakes and seeding to enhance floodplain
- Remove invasive buckthorn within riparian zone and replace with native plantings

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Feet

Plymouth Creek Restoration Project

Timeline, Funding, and Project Impacts

Timeline (watch for project updates!)

September 19, 2024 — BCWMC Public Hearing

Winter 2024-Spring 2025 — Project Design

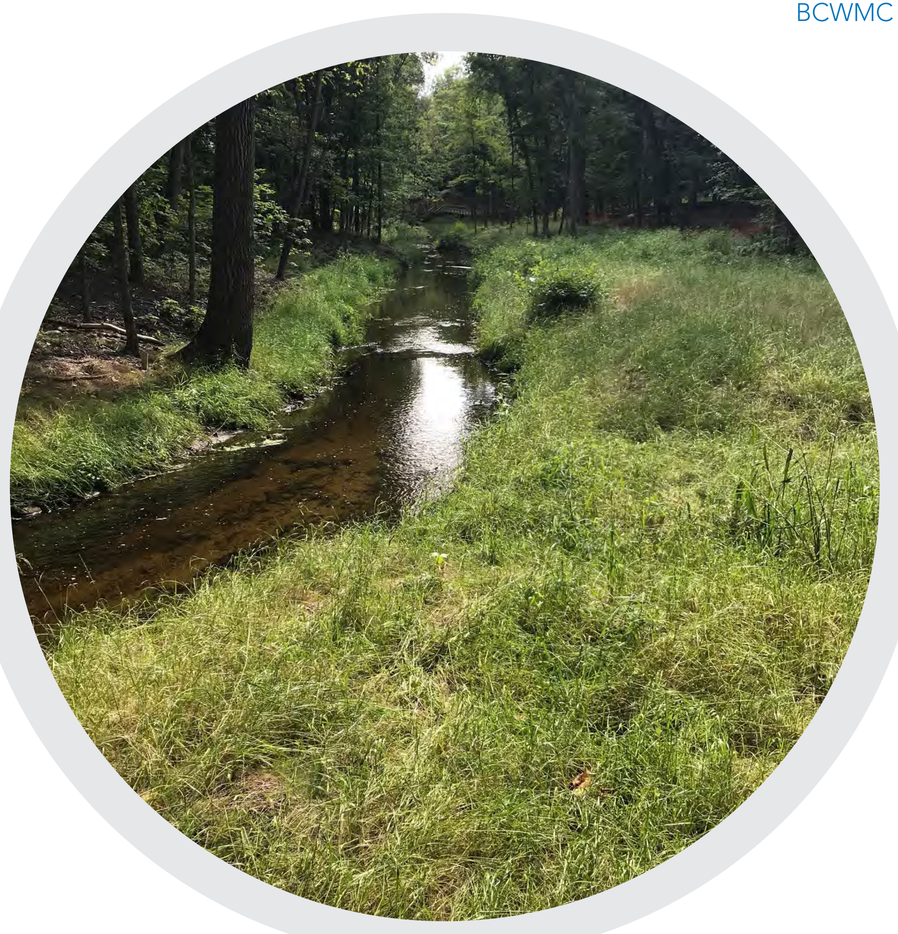
Spring 2025 — Contacting Individual Landowners

Winter 2025/2026 and Potentially Winter 2026/2027 — Project Construction

BCWMC Project Page

Funding

BCWMC Capital Funds levied by Hennepin County on all watershed residents



Project Impacts

- Improve water quality
- Reduce erosion along creek
- Improve in-stream and riparian habitat
- Protect infrastructure and utilities along creek
- Limit trail closures
- Limit tree removals or replace, as warranted

City of Plymouth

Bassett Creek Watershed Management Commission

Plymouth Creek Restoration Project

Plymouth Creek Potential Riparian Vegetation Regeneration Overview

Plymouth Creek riparian areas have lost much of their ecological value and stormwater runoff treatment capacity due to changes within the watershed. Regenerating native vegetation within the riparian zone of Plymouth Creek provides many opportunities to meet District goals including:

- **to restore ecological value**
- **to provide additional stormwater runoff treatment**
- **to clean up debris**
- **to restore wildlife habitat**
- **to provide passive recreation**

Understory and herbaceous ground layer species within the riparian corridor vary from non-native invasives (e.g., Tatarian honeysuckle, common burdock, thistles, and buckthorn) to native generalists (e.g., snakeroot, woodbine, Canada goldenrod, and asters). This plant community structure and species composition is a direct result of past human disturbance (e.g., plowing, grading, grazing, etc.).

An invasive plant is defined as a plant that is non-native or native (e.g., Canada goldenrod, ragweed, and box elder) and has negative effects on our economy, environment, or human health. Invasive plants are aggressive species that can establish rapidly and outcompete native plants. When invasive species displace native plants they degrade wildlife habitat by altering the physical structural cover of a plant community and by eliminating essential food sources. Invasive species present along the creek, like buckthorn and garlic mustard, can create areas of exposed soils which lead to erosion and result in the degradation of water quality in lakes and streams. The removal of invasive species and the prevention of future species establishing is a project priority.

Existing Plant Community: **Plymouth Creek & Dunkirk Ln**

Existing Plant Community: **Plymouth Creek & Rockford Rd**

Existing Plant Community: **Plymouth Creek & 41st Ave**

Target Community

Example Target Plant Community: **Sedge Meadow**

Example Target Plant Community: **Sedge Meadow**

Example Target Plant Community: **Woodland**

Selective Clearing

Before re-introducing native plant communities, invasive and non-native perennial plants will be cleared. In addition, trees that are diseased, dying, and prone to infestation are to be identified for removal. Opening up the tree canopy allows for the reintroduction of the native plant communities that were once present. Trees targeted for tree removal include:

- Buckthorn
- Ash (emerald ash borer)
- Siberian elm
- Boxelder
- Dead or dying trees that may be a hazard

Plymouth Creek Riparian Area: **Existing Invasive Species**

Example of Tree Removal: **Forestry Mower Clearing Trees**

Example of Degraded Woodland Restoration: **Before**

Example of Degraded Woodland Restoration: **After**

How long will it take?

It can take 5-7 years for restored native plant communities to reach full maturity. Proper site maintenance following a planting is essential to reduce weed competition and ensure the success of the restoration project.

Year 1

The site will look bare and weedy during the first growing season. Cover crop grasses establish quickly (to stabilize soils) but native perennial plants may only grow to a height of six inches in a season. Mowing is the best way to control annual weeds during the first few years. Site mowing is typically done 2-3 times in the first year to prevent annual weeds from going to seed.

Example Woodland Restoration: **Year 1**

Year 2

Some of the short-lived flowering species bloom in abundance during the second year. Plants like wild bergamot, fragrant hyssop, and black-eyed Susan are usually the first to flower during restoration.

Mowing is generally limited to one or two times during the second year. Some herbicide spot spraying is anticipated for persistent woody invasive species.

Example Woodland Restoration: **Year 2**

Year 3 & Beyond

The composition and appearance of these planted communities will continue to fluctuate and evolve over time. Most native flowers and grasses begin to reach maturity during the third year.

The frequency of weed management activities will be reduced over time but continued management is going to be important for most restoration projects.

Example Woodland Restoration: **Year 3**