

Focus Group Workshop Summary

Stormwater Utility Vegetation Plan

May 2024

City of Madison Engineering Division



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Background

Development of the stormwater utility vegetation management plan includes evaluating vegetation-specific stormwater management goals such as stabilization, groundwater recharge, and improved water quality, as well as multiple ecosystem services to address other ecosystem services and environmental concerns.

As part of this plan development, the City of Madison Stormwater Utility solicited volunteer assistance from > 180 academics and professionals in the fields of stormwater engineering, lake and water quality, soil science, climate, urban heat islands, pollinators and wildlife, forestry, ecology, and land conservation.

Approximately 20 experts expressed interest and attended a focus group workshop to discuss land management strategies. This report summarizes that workshop.

Land Management Exercise

This exercise included asking meeting attendees to work in four groups to select a pond or greenway they would prioritize and complete a questionnaire on land management for the selected property. Each group included at least one person with an ecological restoration background.

The sites that were provided for this exercise include two pond sites and two greenway sites, reflective of the characteristics of stormwater utility land.

Each option included supplemental materials the groups could review including a site plan, example tree species and condition ratings characteristic of the site, the historical aerial photograph from 1937, species identified in the crowd source application iNature, and a link to web applications from the Wisconsin Department of Natural Resources and Dane County that includes additional information.

Meeting participants were asked to complete the questions in Figure 1 for their selected site, focusing on goals that prioritize stormwater solutions, provide multiple ecosystem services, and can be implemented within existing resources.

Figure 1: Land Management Exercise

Goal #1: Create a strategy that prioritizes stormwater (e.g. erosion control, bank stabilization, etc.) and is sustainable with existing resources.

Goal #2: Develop strategies that provide multiple ecosystem services within existing resources.

- Existing Resources:
 - (2) Ecologists
 - (2) Summer Interns: College Students with Ecological Background
 - General staff who can provide mowing, brush removal, under direction of ecological staff – but do not have technical expertise in plant identification or management.
 - Operation Fresh Start youth crews who can provide brush removals, seeding, invasive plant removals, plug plantings under guidance of ecological staff – but do not have technical expertise in plant identification or management.
- \$95,000 for citywide supplies or contracted services

1. What short- and long-term management objectives should there be for a site like this?
(e.g. remove all nonnative vegetation to biodiverse wetland community, focus only on the most aggressive invasive species, not do anything, remove species like poison ivy and wild parsnip)
2. Based on the above objectives and species list what methods of removal would you use?
(e.g. allow aggressive natives, allow nonnatives, use herbicide, mow, burn, hire contractor).
3. Based on the above objectives and species list what species would you propose replanting?
4. Fill out first, second, third, fourth year and beyond land management recommendations?

	Description of Work	Number of Hours/Year to Complete Task
Year 1		
Year 2		
Year 3		
Year 4		
Year 5		
Year 6		

5. Does this approach seem feasible to implement citywide given existing resources?

The following is a summary of each of the four groups selected site and recommendations. More detailed information on each specific site and the completed land management exercise for each group is in Attachment A.

Group 1

Selected the Sycamore/Stoughton Greenway Asset ID GR 6435-002. This greenway is a mix of herbaceous and woody species located adjacent to a large commercial retail property and is dominated by aggressive native and invasive species. This greenway also includes a portion of Starkweather Creek. The understory includes a variety of aggressive native and nonnative species that are typical in unmanaged areas of urban watersheds that include reed canary grass, wild parsnip, honeysuckle and Queen Anne's lace.

This group recognized that this would be a difficult site to manage for ecological restoration. Ideas mentioned included "difficult site to restore, best approach might be to let existing be or select a small area "island" area." "Potentially remove fruiting buckthorn."

Group 2

Selected the North Pennito Creek Greenway Asset ID GR 7052-005 adjacent to residential single-family homes. This greenway is wooded and adjacent to residential land uses. Trees include a mix of woodland species including a potential remnant oak/hickory woodland. Species also included many aggressive invasive species including buckthorn and black locust.

This group recommended a geomorphic assessment, surveying residents to understand their visions, and to recommend solutions reflective of stormwater issues at site. This group discussed the difference in various canopy coverage and herbaceous understory goals.

Group 3

Selected the Sister Oak Drive Ponds Asset ID PD 1452-003 adjacent to residential single-family homes. These ponds are relatively new and have a primarily herbaceous ground layer with several areas of established successful native wetland plants amongst a mix of other species typical of non- or limited management urban areas.

This group recommended prioritizing the existing native species and recommendations for interseeding and specific species to be removed to restore a native ecosystem. Recommendations also included recruiting a land steward, increasing educational opportunities, and working with residents to implement native landscaping on their adjacent private property.

Group 4

Selected the North Pennito Creek Greenway Asset ID GR 7052-005 adjacent to residential single-family homes. This greenway is wooded and adjacent to residential land uses. Trees include a mix of woodland species including a potential remnant oak/hickory woodland. Species also included many aggressive invasive species including buckthorn and black locust.

This group recommended community engagement and using volunteers to manage the land based on community input. They also discussed prioritizing removal of seed-bearing invasives.

Land Management Exercise Survey Response

Four of the approximately 20 participants completed the post-workshop review of the individual group proposals. The results of these reviews are in Attachment C.

Systemwide Priorities Exercise

The second half of the focus group workshop asked participants to provide input on a series of questions related to implementing larger regional goals. These responses are included in Attachment C.

Responses were varied, with no unanimous consensus on any question. Answers are categorized below based on general topic, but many of the specific responses and discussions included nuances. It is recommended to review Attachment C for a detailed description of individual responses.

Figure 2: How would you implement draft strategies for citywide implementation?

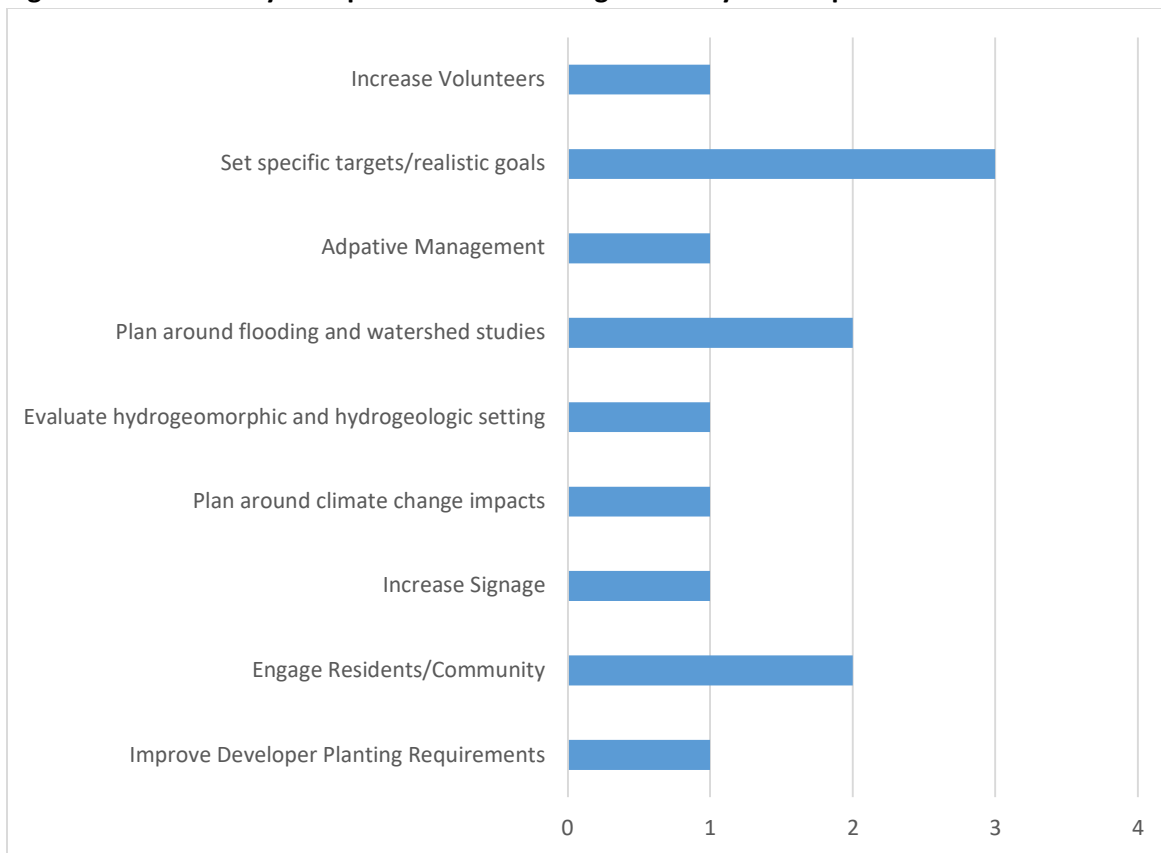


Figure 3: What sites would you target first with limited resources? New restorations? Oak woodlands? Wetlands?

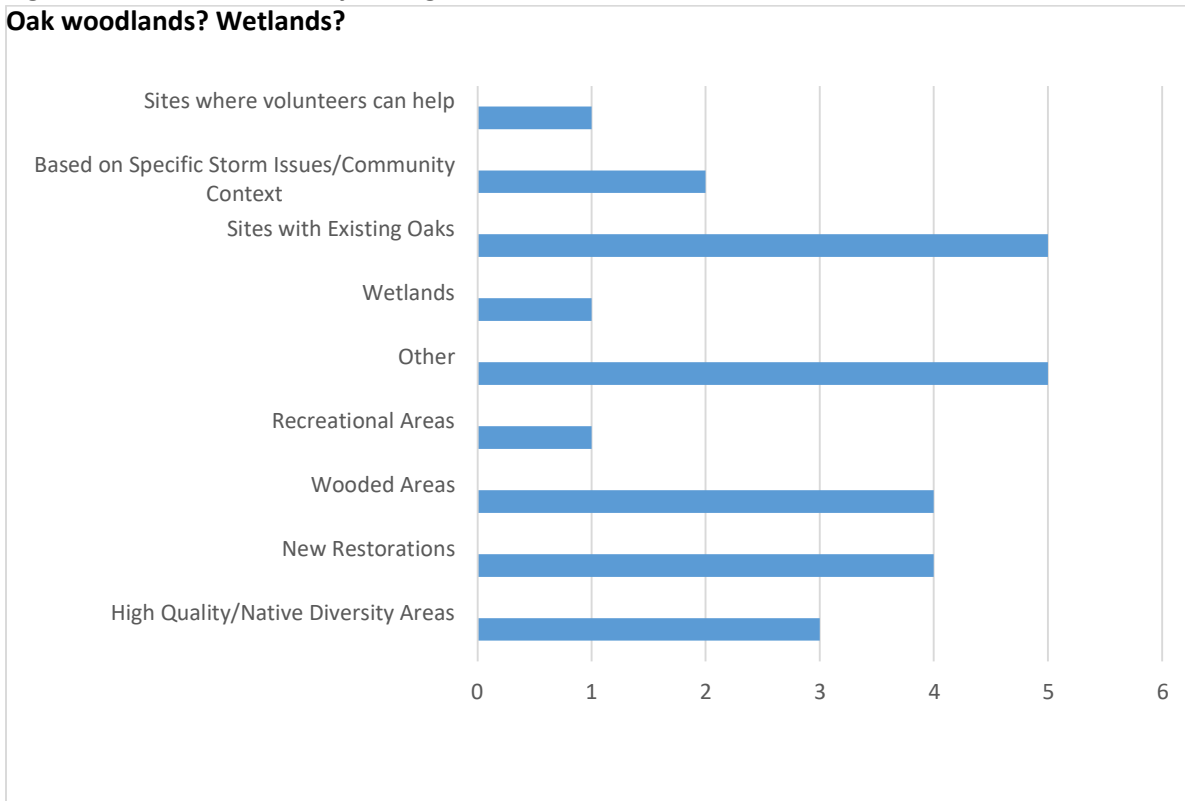


Figure 4: What Integrated Pest Management Strategies would you use?

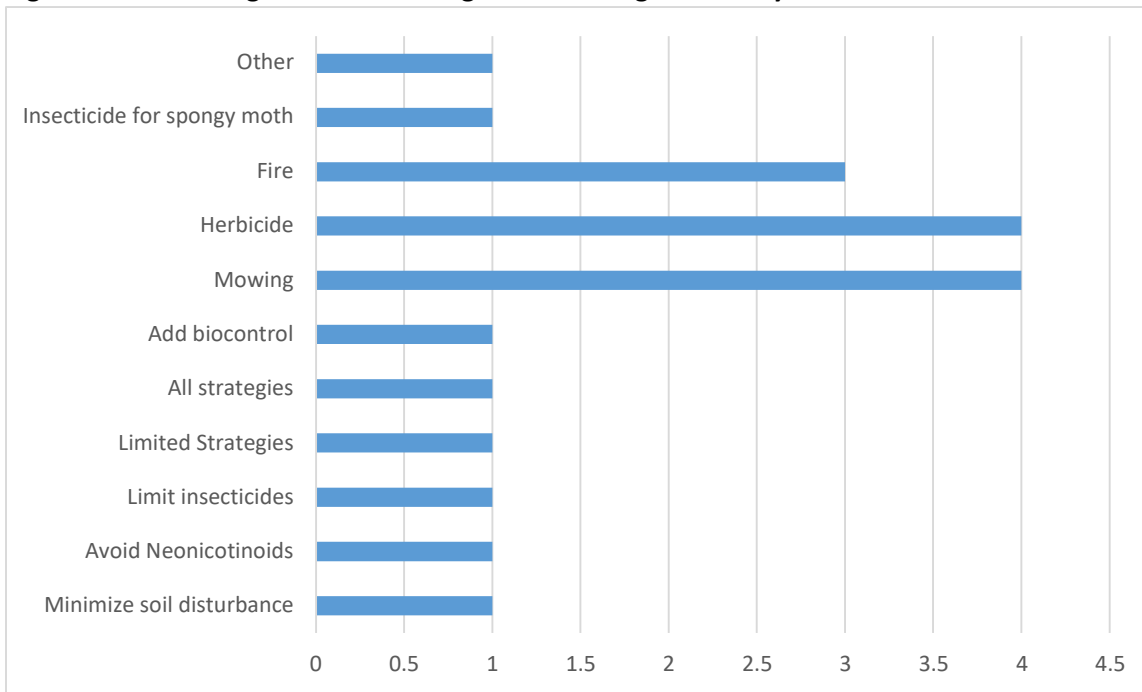


Figure 5: Would you prioritize specific ecosystems or locations? Or generally try to improve all sites?

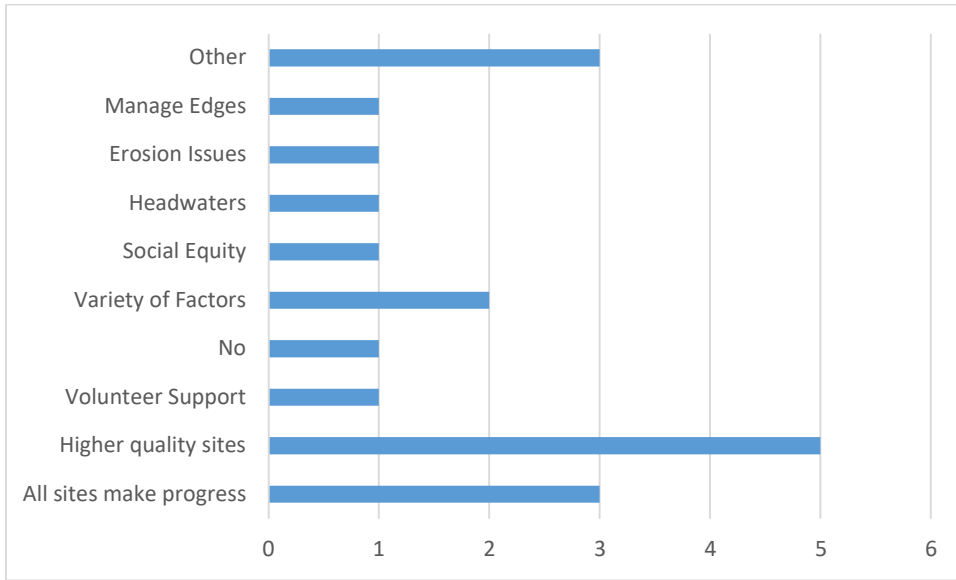


Figure 6: Would you prioritize based on specific land uses?

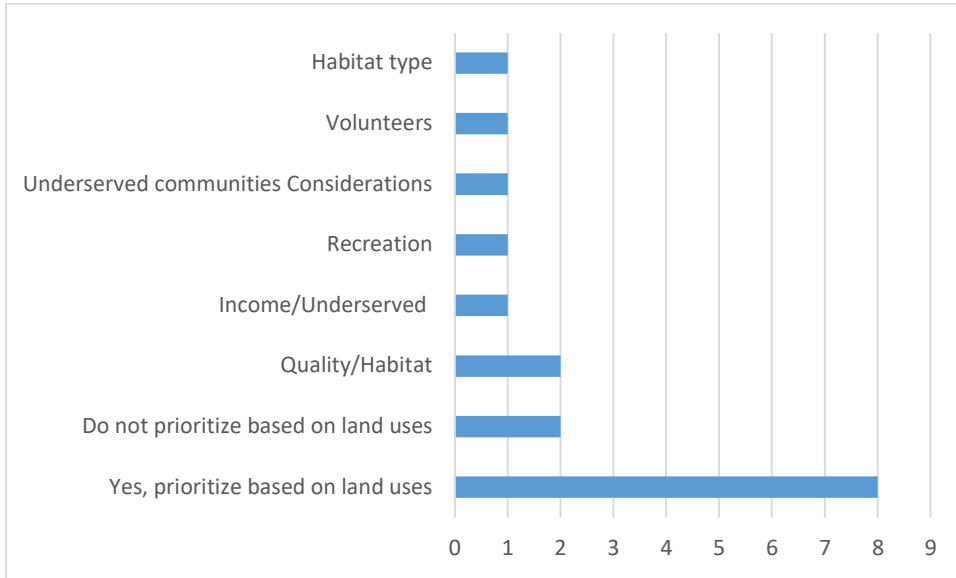
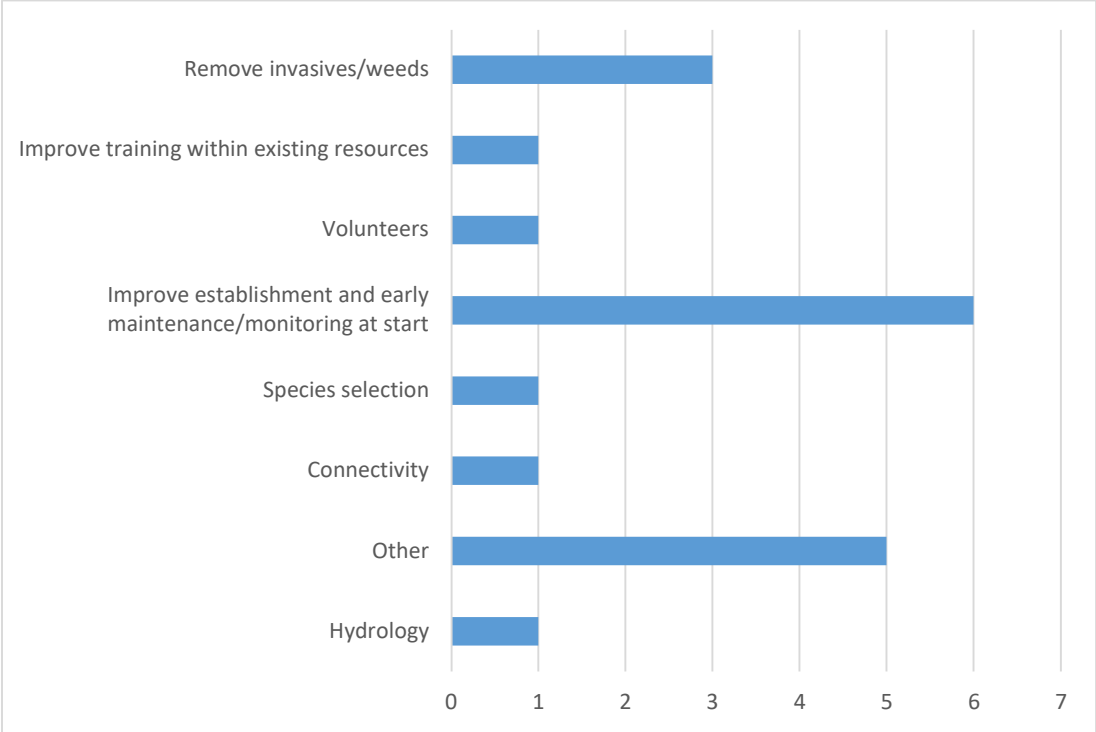


Figure 7: What are ways to achieve low maintenance, high biodiversity land management properties.



Attachment A – Land Management Exercise
Group Proposals

Stormwater Utility Vegetation Plan
June 2024

Group 1
Sample Land Management Plan Exercise
Sycamore/Stoughton Greenway GR 6435-002

Goal #1: Create a strategy that prioritizes stormwater (e.g. erosion control, bank stabilization, etc.) and is sustainable with existing resources.

Goal #2: Develop strategies that provide multiple ecosystem services within existing resources.

- Existing Resources:
 - (2) Ecologists
 - (2) Summer Interns: College Students with Ecological Background
 - General staff who can provide mowing, brush removal, under direction of ecological staff – but do not have technical expertise in plant identification or management.
 - Operation fresh start youth crews who can provide brush removals, seeding, invasive plant removals, plug plantings under guidance of ecological staff – but do not have technical expertise in plant identification or management.
- \$95,000 for citywide supplies or contracted services

1. What short- and long-term management objectives should there be for a site like this?
(e.g. remove all nonnative vegetation to biodiverse wetland community, focus only on the most aggressive invasive species, not do anything, remove species like poison ivy and wild parsnip)

- Ignore It
- Tough project to tackle to overhaul vegetation to improve drainage
- Not a good use of personnel or money
- Exposed roots – can still slow down flashy flows, riprap curved areas
- Deeper rooted species
- Incremental things
 - Chose a section that is isolated – Dixon street greenway is a good example (fabric – reed canary grass)
 - Tiny isolated island incremental where you can limit noxious weed
 - Grade, encourage floodplain without scouring
- Identify habitat areas and work from that worth restoring, upstream maybe
- If doesn't work upstream won't work downstream
- Adjacent land uses pose a problem
- Is there a habitat connection?

2. Based on the above objectives and species list what methods of removal would you use?
(e.g. allow aggressive natives, allow nonnatives, use herbicide, mow, burn, hire contractor).

Hypothetical upstream –

- Target buckthorn, can you invest in it 10 years down the road

- Herbicide, cut stump treatment – maybe just buckthorn
- Or just cut out fruiting buckthorn
- Remove Siberian elm
- Start with removing female buckthorn
- Remove box elder
- Start over
- Weedy species, but also riparian
- Not worth trying to use broadcast herbicide at this site – native bees love sedge.
- Let the thistles go (not remove)

3. Based on the above objectives and species list what species would you propose replanting?

Maybe try fire – help sedge

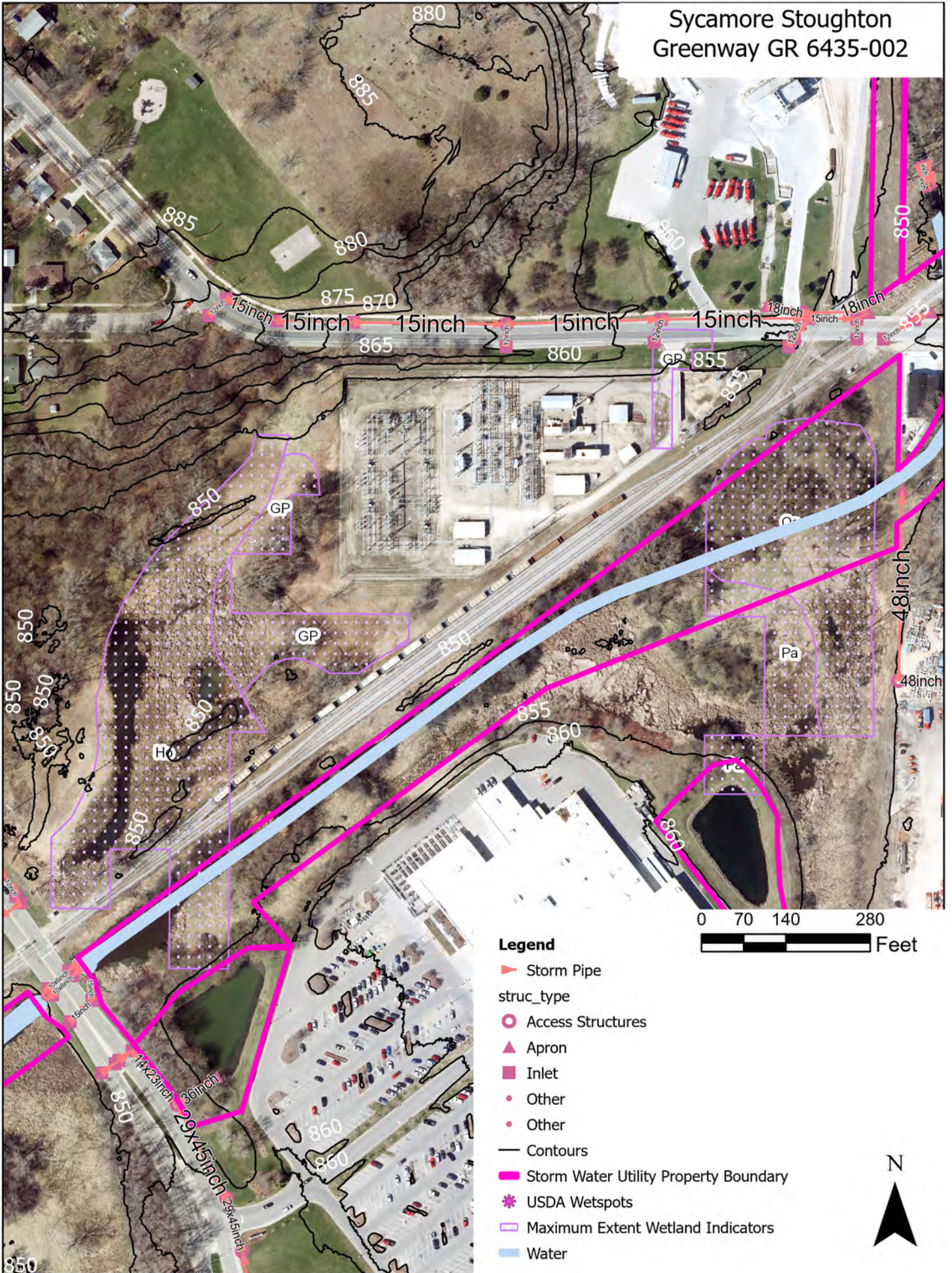
4. Fill out first, second, third, fourth year and beyond land management recommendations?

	Description of Work	Number of Hours/Year to Complete Task
Year 1		
Year 2		
Year 3		
Year 4		
Year 5		
Year 6		

5. Does this approach seem feasible to implement citywide given existing resources?

Yes

Sycamore Stoughton Greenway GR 6435-002



Sycamore Stoughton Greenway GR 6435-002
4018 Commercial Avenue

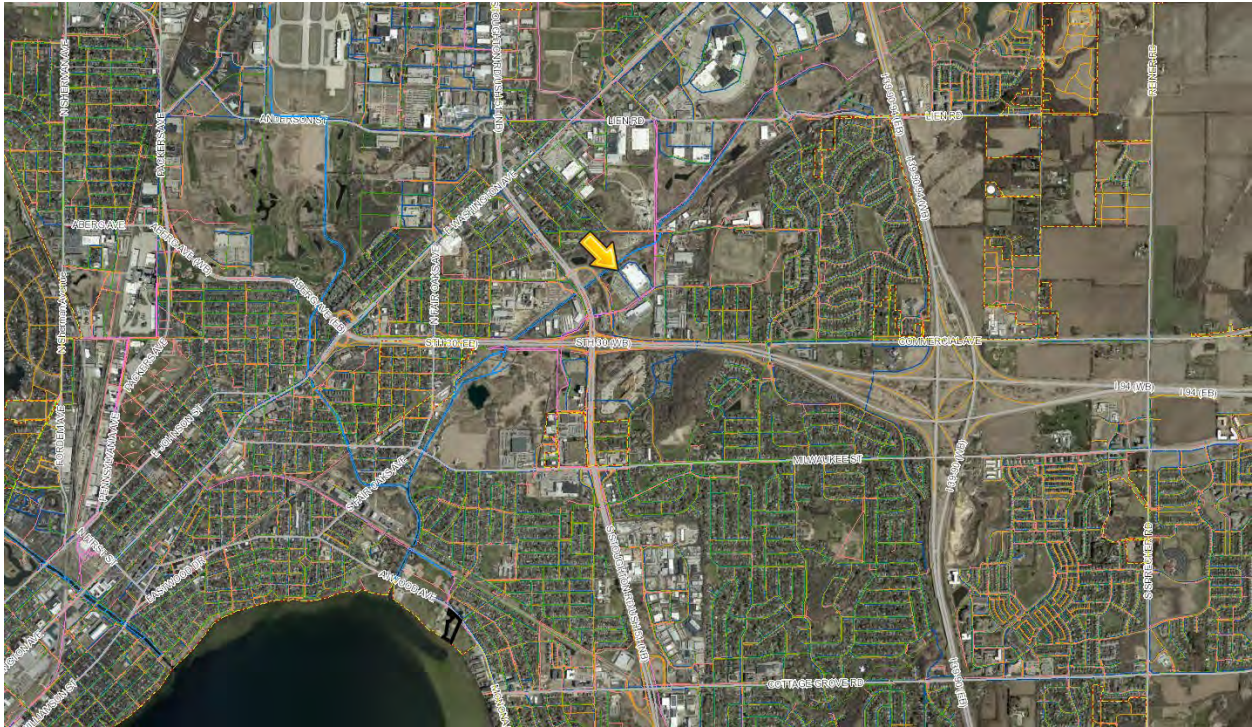
iNaturalist Observations:

- Lake Sedge
- Swamp Milkweed

257,635 SF (5.9 Acres)

Soil: Houghton and palms muck, poorly drained
Starkweather Creek Watershed

Location Map



1937 Ortho Image



Additional Information

- [DNR surface water Viewer](#)
- [DCiMap](#)

Example Tree Inventory

(This inventory has been fabricated based on species and quantities reflective of the composition of this site and similar sites)

Scientific Name	Common Name	Quantity (EA)	% Dead	% Low Condition Rating	% Medium Condition Rating	% High Condition Rating
<i>Acer negundo</i>	Box Elder	100	2	50	28	20
<i>Celtis occidentalis</i>	Northern hackberry	5	0	15	35	50
<i>Fraxinus pennsylvanica</i>	Green ash	25	70	30	0	0
<i>Morus alba</i>	White mulberry	35	0	60	0	40
<i>Populus deltoides</i>	Eastern cottonwood	3	0	20	50	30
<i>Prunus serotina</i>	Black cherry	20	5	5	50	50
<i>Rhamnus cathartica</i>	Common buckthorn	107	0	0	40	60
<i>Tilia americana</i>	Basswood	100	5	10	35	50
<i>Ulmus americana</i>	American Elm	3	5	30	25	40
<i>Ulmus rubra</i>	Red Elm	45	10	0	60	30
<i>Ulmus pumila</i>	Siberian Elm	2	0	20	50	30
<i>Acer saccharinum</i>	Silver maple	20	0	20	50	30
TOTAL		465				

Example Understory

(This inventory has been fabricated based on species and quantities reflective of the composition of this site and similar sites)

<i>Abutilon theophrasti</i>	Velvetleaf
<i>Alliaria petiolata</i>	Garlic mustard
<i>Amaranthus tuberculatus</i>	Rough-fruited amaranth
<i>Ambrosia artemisiifolia</i>	Annual bur-sage
<i>Carduus acanthoides</i>	Plumeless thistle
<i>Carex pensylvanica</i>	Pennsylvania sedge
<i>Chenopodium simplex</i>	Maple-leaved goosefoot
<i>Cirsium arvense</i>	Canada thistle
<i>Cirsium vulgare</i>	Bull thistle
<i>Conyza canadensis</i>	Canadian horseweed
<i>Daucus carota</i>	Queen Anne's-lace
<i>Echinochloa crus-galli</i>	Barnyard grass
<i>Elymus virginicus</i>	Common eastern wild-rye
<i>Erechtites hieraciifolius</i>	American burn-weed
<i>Erigeron annuus</i>	Annual fleabane
<i>Eriochloa villosa</i>	Chinese cup grass
<i>Festuca arundinacea</i>	Reed fescue

Lonicera tatarica	Honeysuckle
Panicum dichotomiflorum fall panic grass	Fall panic grass
Pastinaca sativa	wild parsnip
Phalaris arundinacea	Reed canary Grass
Phalaris arundinacea	reed canary grass
Polygonum x bohemicum	Japanese/Bohemian Knotweed
Rosa multiflora	Multiflora rose
Rumex crispus	Curly dock
Salix interior	Sandbar willow
Setaria faberi	Giant foxtail
Solidago canadensis	Canadian goldenrod
Sonchus arvensis	Field sow-thistle
Sonchus asper	Prickly sow-thistle
Symphyotrichum pilosum	Frost aster
Typha x glauca	Hybrid Cattails

















Group 2

Sample Land Management Plan Exercise North Pennito Creek Greenway GR 7052-005

Goal #1: Create a strategy that prioritizes stormwater (e.g. erosion control, bank stabilization, etc.) and is sustainable with existing resources.

Goal #2: Develop strategies that provide multiple ecosystem services within existing resources.

- *Existing Resources:*
 - (2) Ecologists
 - (2) Summer Interns: College Students with Ecological Background
 - General staff who can provide mowing, brush removal, under direction of ecological staff – but do not have technical expertise in plant identification or management.
 - Operation fresh start youth crews who can provide brush removals, seeding, invasive plant removals, plug plantings under guidance of ecological staff – but do not have technical expertise in plant identification or management.
- \$95,000 for citywide supplies or contracted services

1. What short- and long-term management objectives should there be for a site like this?
(e.g. remove all nonnative vegetation to biodiverse wetland community, focus only on the most aggressive invasive species, not do anything, remove species like poison ivy and wild parsnip)

Important to know the hydrologic connections of a site in order to inform recommendations.

Learn about stormwater utility's priority for these sites.

- erosion reduction and flow control. Not necessarily infiltration. Needs to convey water safely and effectively.

Vegetation discussion

- important to get vegetation to grow, less focus on species composition as long as it's not a noxious plant
- let the vegetation do the work to maintain the channel, use natural flood management techniques. How can vegetation in adjacent areas be used to mitigate flooding downstream?
 - ASFPM – experts on natural floodplain management
- Plants can help with infiltration too
- Madison is about 21% tree cover. Expand tree cover. Trees can slow down erosion. Provide shade.
- If there's been flooding, look at whether its an issue in the greenway or in the surrounding area.
- No FEMA floodplain here. Looks like there's steep slopes.
- Looks like sheet piles stemmed erosion, but might have moved it somewhere else. Would be good to know where there are erosion problems in here.

- Would be good to see if you could use soil bioengineering techniques – could open up canopy to let light in for vegetation.
- Light would benefit native plants in the understory.
- Photos show a lot of cool season grass cover – replacing with native grasses and wildflowers that have deeper roots would do a better job of holding the soil in place.
 - Could also help with bank stabilization/reformation
- Counter point – important to search the lit – could be an overuse of that technique/undervalue of trees – good topic to examine with regard to vegetation types.
 - Esp for steep slopes

Think about where storm pipes come into the drainage way. Right now, they're piped directly into the channel. There are natural techniques - outfall retrofits – could be used here.

Sometimes the storm water pipes can cause erosion. Same can be true for sheet pile and other older engineered features.

2. Based on the above objectives and species list what methods of removal would you use? (*e.g. allow aggressive natives, allow nonnatives, use herbicide, mow, burn, hire contractor*).
3. Based on the above objectives and species list what species would you propose replanting?

What does the group think about Box Elder?

Could think of these areas as floodplain systems. Species that do well there include box elder, silver birch, silver maple. They store carbon, stabilize the site, helps infiltrate water. Have value in stabilizing the system.

They are a native riparian species.

Keep tree canopy at a level that still allows herbaceous vegetation so they can work together to hold the soil in place. If tree cover is too dense, there could be more erosion during flooding.

Need to customize solution for the site – tailor amount of canopy cover that allows understory vegetation at each site.

Manning's Roughness Coefficient – in forested floodplain, you get sedimentation because there's so much roughness. If you have sparse trees and herbaceous cover, water and sediment both move down stream fast.

Full canopy and root coverage work together to prevent erosion.

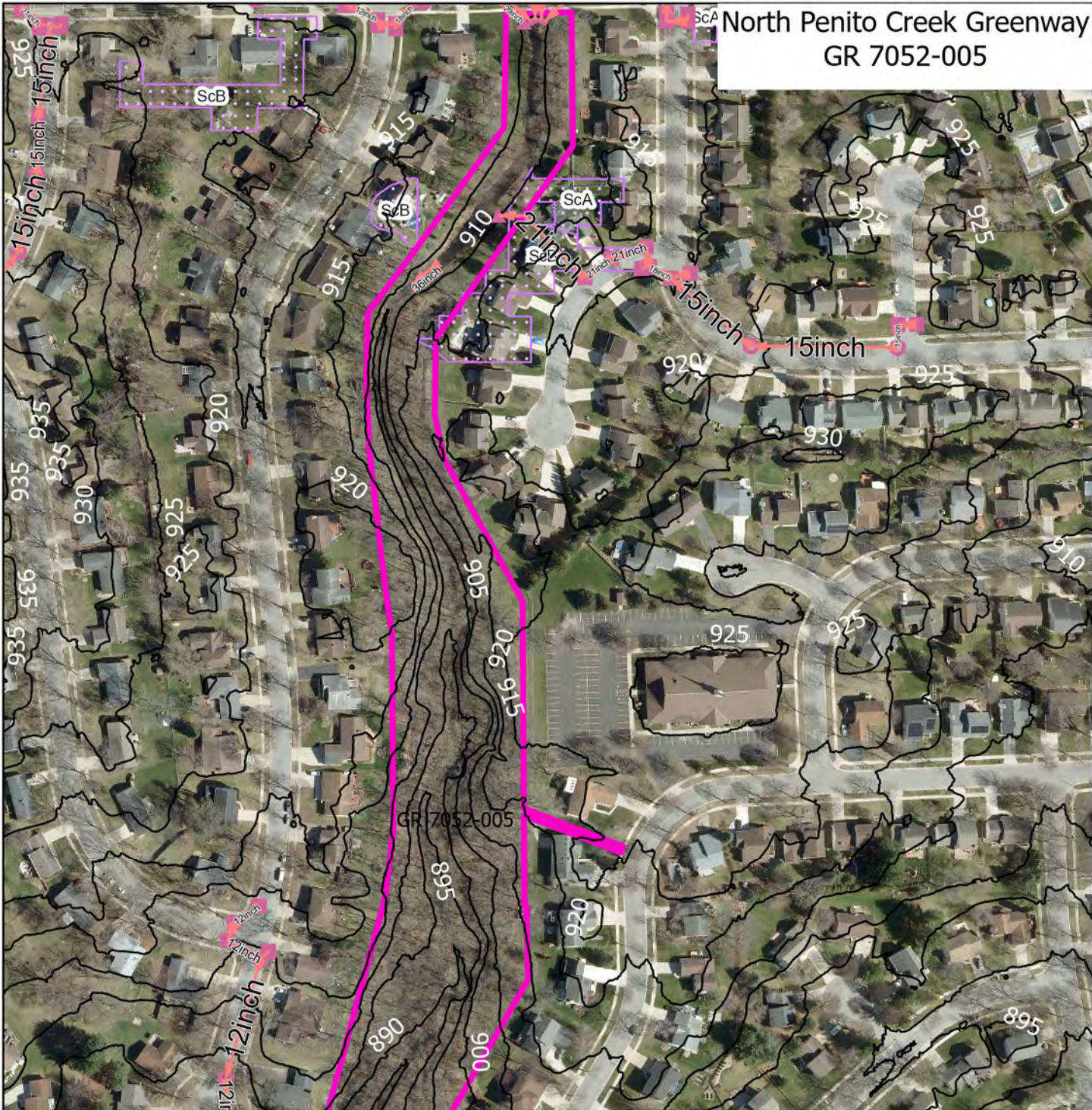
Gradient of vegetation important for steep slopes.

4. Fill out first, second, third, fourth year and beyond land management recommendations?










	Description of Work	Number of Hours/Year to Complete Task
Year 1	a. Geomorphic assessment (includes streambank erosion assessment and vegetation survey) b. Needs to be underpinned by a watershed study c. Survey residents to understand their vision	a & b. Contracted work, could take a month
Year 2		
Year 3		
Year 4		
Year 5		
Year 6		

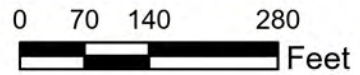
5. Does this approach seem feasible to implement citywide given existing resources?

North Penito Creek Greenway GR 7052-005



Legend

-  Storm Pipe
- `struc_type`
-  Access Structures
-  Apron
-  Inlet
-  Other
-  Contours
-  Storm Water Utility Property Boundary
-  USDA Wetspots
-  Maximum Extent Wetland Indicators



North Pennito Creek Greenway GR 7052-005
5509 E Buckeye Road

iNaturalist Observations:

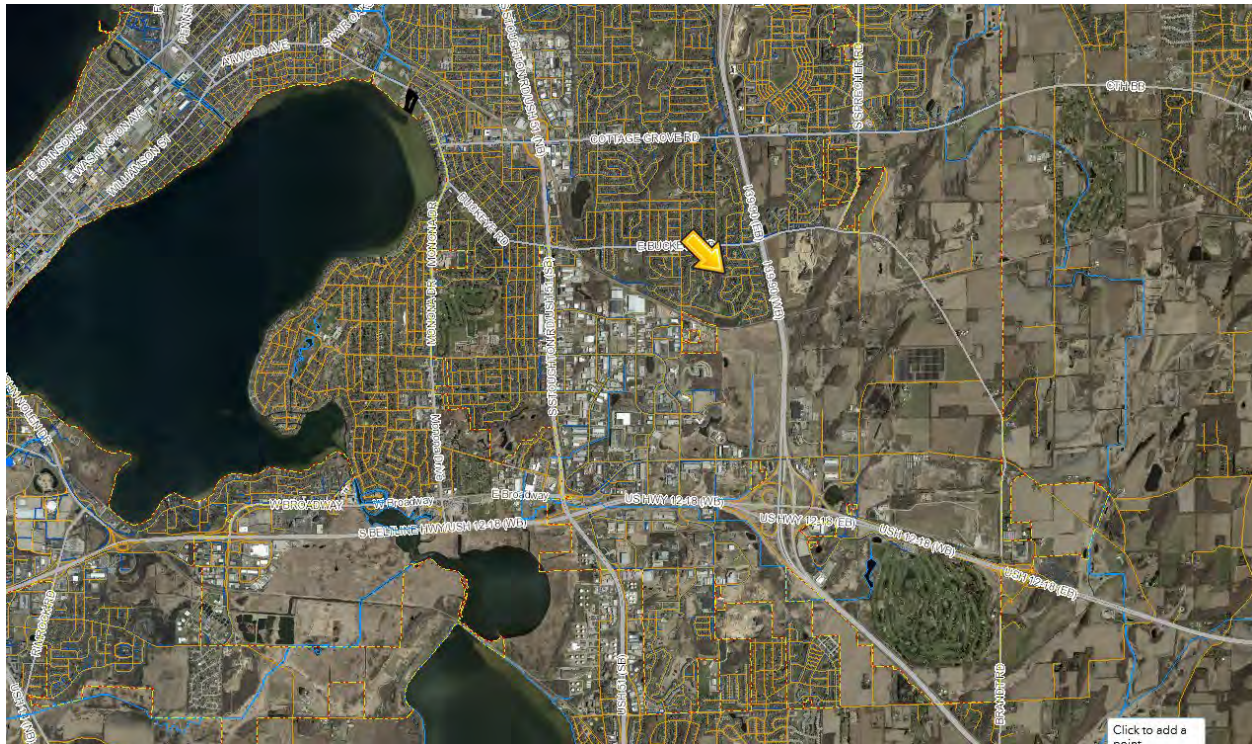
- Virginia bluebells
- Grass spiders
- Lactarius psammicola (fungi)

330,204 SF (7.5 Acres)

Soil: Well drained silt loam

Pennito Creek Watershed

Location Map



1937 Ortho Image



Additional Information

- [DNR surface water Viewer](#)
- [DCiMap](#)

Example Tree Inventory

(This inventory has been fabricated based on species and quantities reflective of the composition of this site and similar sites)

Scientific Name	Common Name	Quantity (EA)	% Dead	% Low Condition Rating	% Medium Condition Rating	% High Condition Rating
<i>Acer negundo</i>	Box elder	250	2	50	28	20
<i>Acer ginalla</i>	Amur maple	30	1	20	40	10
<i>Acer platinoides</i>	Norway maple	50	1	20	0	20
<i>Acer scahharum</i>	Sugar maple	1	0	100	0	0
<i>Carya ovata</i>	Shagbark hickory	20	5	15	0	30
<i>Catalpa bignoides</i>	Catalpa	10	0	10	0	15
<i>Celtis occidentalis</i>	Northern hackberry	50	0	15	0	50
<i>Fraxinus pennsylvanica</i>	Green ash	12	70	30	0	0
<i>Juglans nigra</i>	Black walnut	117	5	20	0	40
<i>Juniperus virginiana</i>	Eastern red cedar	1	0	100	0	30
<i>Morus alba</i>	White mulberry	50	0	60	0	40
<i>Populus deltoides</i>	Eastern cottonwood	15	0	20	50	30
<i>Prunus serotina</i>	Black cherry	180	5	5	55	50
<i>Quercus alba</i>	White oak	50	10	5	45	40
<i>Quercus macrocarpa</i>	Bur oak	5	5	20	30	45
<i>Quercus rubra</i>	Red oak	2	0	100	0	
<i>Quercus velutina</i>	Black oak	10	0	100	0	0
<i>Rhamnus cathartica</i>	Common buckthorn	107	0	0	40	60
<i>Robinia pseudocacia</i>	Black locust	105	0	10	30	60
<i>Tilia americana</i>	Basswood	100	5	10	30	50

Ulmus americana	American elm	80	5	30	25	40
Euonymus alatus	Burning bush	10	0	40	0	60
Malus spp.	Crabapple	15	0	50	10	40
Ulmus rubra	Red elm	35	10	0	60	30
Cercis canadensis	Redbud	4	0	0	40	60
Ulmus pumila	Siberian elm	45	0	20	50	30
Acer saccharinum	Silver maple	20	0	20	50	30
Picea abies	Norway spruce	8	20	15	55	10
Picea glauca	White spruce	12	5	15	70	10
Pinus strobus	Eastern white pine	8	0	20	70	10
Thuja occidentalis	Arborvitae	2	0	20	70	10
TOTAL		1404				

Example Understory

(This inventory has been fabricated based on species and quantities reflective of the composition of this site and similar sites)

Ageratina altissima	White snakeroot
Alliaria petiolata	Garlic mustard
Ambrosia trifida	Giant ragweed
Arctium minus	Common burdock
Bromus inermis	Hungarian brome
Carex pensylvanica	Pennsylvania sedge
Dactylis glomerata	Orchard grass
Eriochloa villosa	Chinese cup grass
Geum canadense	White avens
Hackelia virginiana	Beggar's-lice
Hesperis matronalis	Dame's rocket
Hostas	Hostas
Leonurus cardiaca	Motherwort
Ligustrum vulgare	Common privet
Lonicera x bella	Bell's honeysuckle
Mertensia virginica	Virginia bluebells
Panicum dichotomiflorum	Fall panic grass

<i>Ambrosia trifida</i>	Giant ragweed
<i>Arctium minus</i>	Common burdock
<i>Bromus inermis</i>	Hungarian brome
<i>Carex pensylvanica</i>	Pennsylvania sedge
<i>Dactylis glomerata</i>	Orchard grass
<i>Eriochloa villosa</i>	Chinese cup grass
<i>Geum canadense</i>	White avens
<i>Hackelia virginiana</i>	Beggar's-lice
<i>Hesperis matronalis</i>	Dame's rocket
<i>Hostas</i>	Hostas
<i>Leonurus cardiaca</i>	Motherwort
<i>Ligustrum vulgare</i>	Common privet
<i>Lonicera x bella</i>	Bell's honeysuckle
<i>Mertensia virginica</i>	Virginia bluebells
<i>Panicum dichotomiflorum</i>	Fall panic grass
<i>Parthenocissus quinquefolia</i>	Virginia creeper
<i>Persicaria virginiana</i>	Jumpseed
<i>Phalaris arundinacea</i>	Reed canary grass
<i>Phlox paniculata</i>	Garden phlox
<i>Pilea pumila</i>	Canadian clearweed
<i>Polygonum x bohemicum</i>	Japanese/Bohemian knotweed
<i>Ribes cynosbati</i>	Dogberry
<i>Rosa multiflora</i>	Multiflora rose
<i>Rubus allegheniensis</i>	Allegheny blackberry
<i>Rubus idaeus var. strigosus</i>	American red raspberry
<i>Rubus occidentalis</i>	Black-cap
<i>Rudbeckia subtomentosa</i>	Sweet black-eyed Susan
<i>Scilla siberica</i>	Squill
<i>Setaria faberi</i>	Giant foxtail
<i>Solidago gigantea</i>	Giant goldenrod
<i>Symphotrichum lateriflorum</i>	Side-flowering aster
<i>Toxicodendron radicans</i>	Poison ivy
<i>Typha x glauca</i>	Hybrid Cattails
<i>Urtica dioica</i>	Stinging nettle
<i>Verbena urticifolia</i>	Nettle-leaved vervain
<i>Vinca minor</i>	Vinca
<i>Viola sororia</i>	Common blue violet















Group 3
Sample Land Management Plan Exercise
Sister Oak Ponds PD 1452-033

Goal #1: Create a strategy that prioritizes stormwater (e.g. erosion control, bank stabilization, etc.) and is sustainable with existing resources.

Goal #2: Develop strategies that provide multiple ecosystem services within existing resources.

- Existing Resources:
 - (2) Ecologists
 - (2) Summer Interns: College Students with Ecological Background
 - General staff who can provide mowing, brush removal, under direction of ecological staff – but do not have technical expertise in plant identification or management.
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Pre-Planning Questions, Comments, and Observations:

- Choosing to work on a residential site is ideal due to likelihood for volunteers and community engagement.
 - Is there budget for native seeds? *Answer – limited budget usually used for cheaper grass/sedge species, and a couple diversity boosters. This purchased seed is used to complement the forb species collected by field staff (average 100 species).*
 - Observation – there are both a wet pond and infiltration basin, so those areas will have different management goals/ species compositions to consider.
 - There is a need to consider what the land to the south is going to be – in the future this may be developed and not be a great provider of infiltration. How will that change the site conditions?
 - Wish that cattails and other rhizomatous perennials had been addressed earlier in establishment.
 - Would like to know more about requirement/standard of contractors during development of new sites? *Answer – contractors are required to sow an appropriate native seed mix at the appropriate time of year, follow up with establishment mowing and invasive species control until the site is formally “Accepted” by the City. This has been a rough area of transition as developers get used to the new requirements.*
- 1. What short- and long-term management objectives should there be for a site like this? (e.g remove all nonnative vegetation to biodiverse wetland community, focus only on the most aggressive invasive species, not do anything, remove species like poison ivy and wild parsnip)**

There needs to be a balance between what you can feasibly tackle now vs everything you want to tackle...

- **Recruit a land steward volunteer to help with community collaboration.** Takes lots of resources to do this, but often very worth the investment.
 - **Engage with community and provide ample educational opportunities.** Have meeting with residents and volunteer land steward. They should collaborate to put together a plan that would put OFS, other staff, and any volunteers on site throughout the weed season – frequency ideally once a month. Get the residents on board EARLY.
 - **Convince residents to do native landscaping in their yards** to help manage storm water and prevent potential for source of invasives – could add much habitat and reduce edge effect.
 - **Analyze your resources and allocate strategically.** Everybody has to play their part – put together a good yearly work plan so everyone understands their role. IE – If coming in with large equipment/ big sprayer/chainsaw either way need to define what people are good at and that playing people to their strengths.
 - **Get to know the site first.** Research how wet infiltration basin gets, how long it stays wet, figure out what will be suitable to plant. Will there be much sediment? What is the surrounding land going to be in the future? Goals for each basin need to be based off of how high the water gets in each. There may be more potential room for management in dry pond
 - **Create some sort of border between lawn grass and storm feature parcel.**
 - **Promote areas as desirable.** City could capitalize off these residential areas that look wild – increase desirability and opportunity for education all while improving stormwater function and habitat.
 - **Educational postings!** Explain value, use pictures. Lead prairie tours. Let people know that there is active management.
 - **Broad long-term goals – all participants are in the know, on-board, and playing to their strengths.**
 - **Assess what species that could become problematic are low hanging fruit.**
 - **Assess what species have the greatest potential to derail the site.**
2. Based on the above objectives and species list what methods of removal would you use? *(e.g. allow aggressive natives, allow nonnatives, use herbicide, mow, burn, hire contractor).*
- What are problematic species have a manageable population now? Tackle those first to save time and resources later. IE – This site only had a few volunteer cottonwoods - cut and treat them.
 - What species have greatest potential to derail site? Reed canarygrass was one species that was seen as having the potential to outcompete native habitat. Management approach from many directions – repeated mowing, mowing with follow-up herbicide treatment, prescribed burning – all of this with eventual intentional repopulation of native species.
 - Recruit volunteers (or OFS) to help dig biennial species like sweet clover, biennial thistles.
 - Use overseeding with native mix where work has been done – cover bald spots

- Prioritize for Rx burn, ideally with a yearly cycle with interseedings to follow (but only when species with ability outcompete native vegetation have been successfully eradicated).
- Promoting aggressive but showy species might work well to captivate nearby residents. If more involved and interested, these residents perhaps may notice problematic new species and notify the City!
- Canada goldenrod would ideally like to control for, and maybe cup plant BUT they are still better than reed canarygrass.
- Use prescribed fire! Is burning every year realistic with houses on 3 sides? Try to find days with light winds and be careful when deciding condition criteria – more education for concerned residents. Have an extra crewmember (maybe our new volunteer land steward?) dedicated to correspondence with residents – make them feel validated, safe, and understanding of the goals of this management method.
- Would want to control woody plants (cut stump), and cattails.

3. Based on the above objectives and species list what species would you propose replanting?

- Highly competitive and showy native species like black eyed Susan, but be cautious with certain ones such as cup plant. Showy species may help garner surrounding resident support.

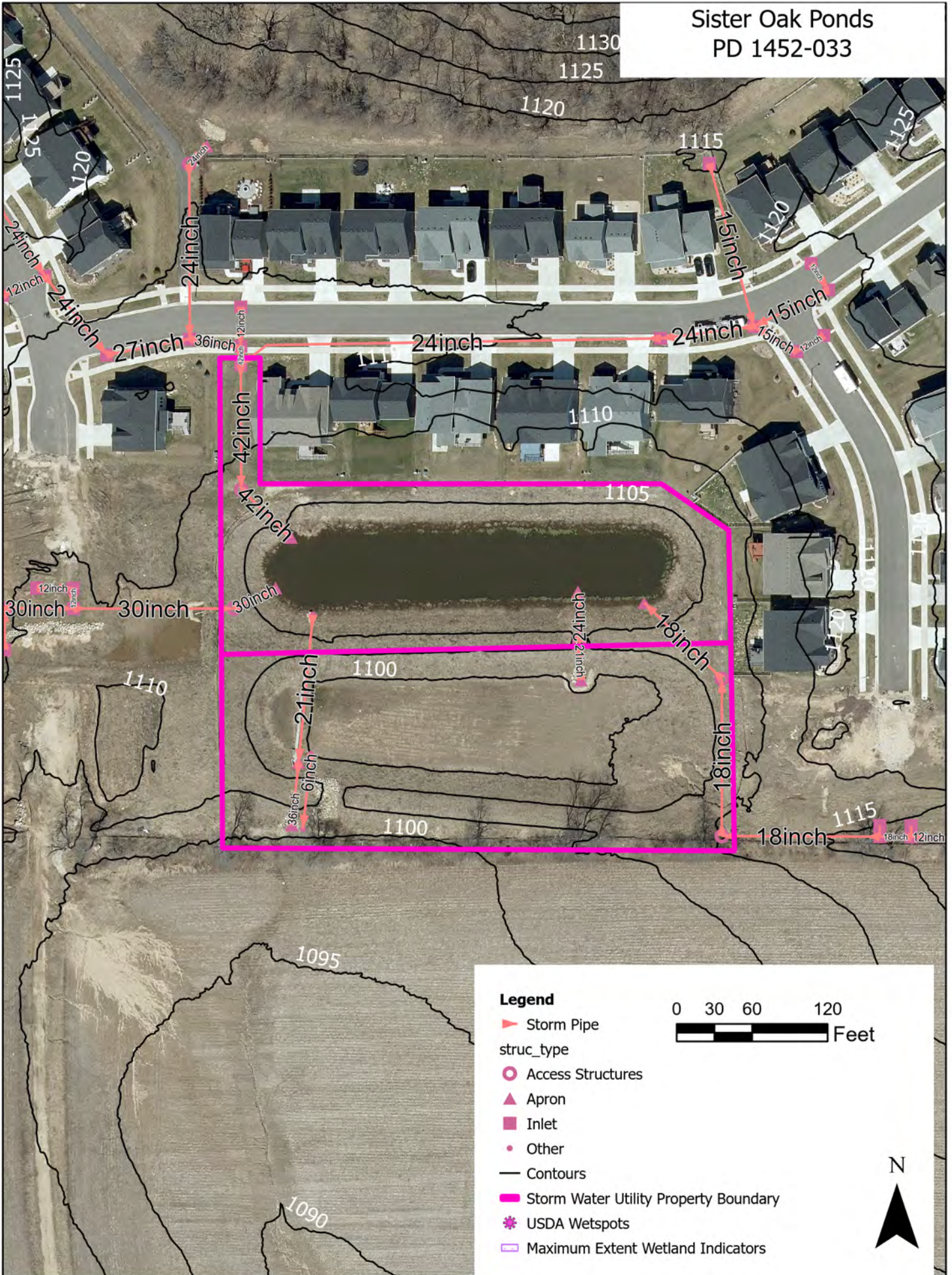
4. Fill out first, second, third, fourth year and beyond land management recommendations?

	Description of Work	Number of Hours/Year to Complete Task
Year 1	Burn, reach out to neighborhood to educate, focus on invasive control (prioritize perennials like reed canarygrass and cattails)	
Year 2	Burn, focus on invasive control. Make sure site is actually ready and prepped before adding any native seed.	
Year 3	Burn, interseed, invasive follow up	
Year 4	Burn, interseed, invasive follow up	
Year 5		
Year 6		










5. Does this approach seem feasible to implement citywide given existing resources?

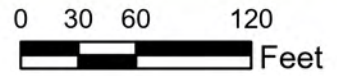
Yes! This site is relatively small – along with the fact that it is new and has some native cover makes it feasible to manage -especially with community support. However, the City would just need to tackle as soon as possible before invasive cover increases and biodiversity decreases.

Sister Oak Ponds
PD 1452-033



Legend

-  Storm Pipe
- struc_type
-  Access Structures
-  Apron
-  Inlet
-  Other
-  Contours
-  Storm Water Utility Property Boundary
-  USDA Wetspots
-  Maximum Extent Wetland Indicators



Sister Oak Ponds PD 1452-033
10327 Sister Oak Drive

iNaturalist Observations:

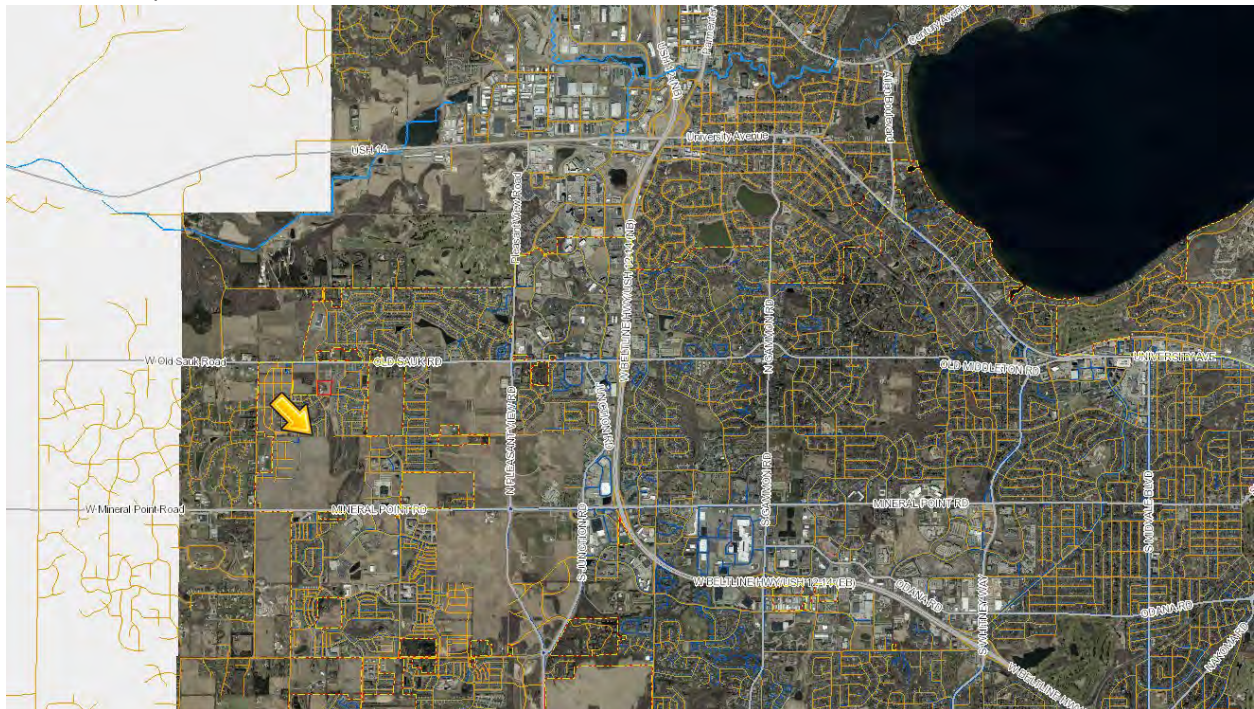
- Goldenrods
- Tall Boneset
- Purple crown vetch
- Narrow-leaved Cattail
- Bulrushes and Cattails

120,043 SF (2.7 Acres)

Soil: Ringwood Silt Loam

Lower Badger Mill Creek Watershed

Location Map



1937 Ortho Image



[DNR surface water Viewer](#)
[DCiMap](#)

Example Tree Inventory

(This inventory has been fabricated based on species and quantities reflective of the composition of this site and similar sites)

Scientific Name	Common Name	Quantity (EA)	% Dead	% Low Condition Rating	% Medium Condition Rating	% High Condition Rating
Populus deltoides	Eastern cottonwood	8	0	20	50	30
TOTAL		8				

Example Understory

(This inventory has been fabricated based on species and quantities reflective of the composition of this site and similar sites)

Botanical Name	Common Name
Alisma subcordatum	American water plantain
Ambrosia trifida	Giant ragweed
Baptisia alba	White false indigo
Carex bicknellii	Bicknell's sedge
Carex vulpinoidea	Brown fox sedge
Cirsium canadensis	Canada thistle
Cirsium vulgare	Bull thistle
Daucus carota	Queen Anne's Lace
Desmodium canadensis	Canada tick trefoil
Echinacea purpurea	Purple coneflower
Elymus canadensis	Canada wild rye
Fescue	Fescue
Helianthus grosseserratus	Sawtooth sunflower
Heliopsis helianthoides	Early sunflower
Monarda fistulosa	Bergamot
Oligoneuron rigidum	Stiff goldenrod
Pahlaris arundinacea	Reed canary grass
Panicum virgatum	Switchgrass
Parthenium integrifolium	Wild quinine
Pastinaca sativa	Wild Parsnip
Poa pratensis	Kentucky bluegrass
Ratibida pinata	Gray-headed coneflower

Rudbeckia hirta	Black-eyed Susan
Rumex crispus	Curly dock
Sambucus canadensis	Elderberry
Scirpus atrovirens	Dark green bulrush
Silphium perfoliatum	Cup plant
Silphium terebinthinaceum	Prairie dock
Solidago canadensis	Canada goldenrod
Sorghastrum nutans	Indian grass
Symphotrichum novae-angliae	New England aster
Symphotrichum pilosum	Frost aster
Typha x glauca	Hybrid cattails
Zizia aurea	Golden Alexander







Group 4
Sample Land Management Plan Exercise
North Pennito Creek Greenway GR 7052-005

Goal #1: Create a strategy that prioritizes stormwater (e.g. erosion control, bank stabilization, etc.) and is sustainable with existing resources.

Goal #2: Develop strategies that provide multiple ecosystem services within existing resources.

- Existing Resources:
 - (2) Ecologists
 - (2) Summer Interns: College Students with Ecological Background
 - General staff who can provide mowing, brush removal, under direction of ecological staff – but do not have technical expertise in plant identification or management.
 - Operation fresh start youth crews who can provide brush removals, seeding, invasive plant removals, plug plantings under guidance of ecological staff – but do not have technical expertise in plant identification or management.
- \$95,000 for citywide supplies or contracted services

[Before we even selected a site we had a discussion about whether to select a residential site. Initially we were leaning towards PD1452 for the residential location and higher diversity, but the pull of working in a wooded area was greater for folks.]

Initiate a Friends group, get local buy-in. Part of why our group selected a residential site. Get interest in experimental plantings. Long-term maintenance is key, start with small wins, start with something that is not already fully degraded. Residential sites have more visibility. Easier for residents to make connections with stormwater nutrients and their residential yards, i.e. lawn fertilizers etc. Adds to the educational process. Eng. Can help facilitate their own work simply by selecting sites for priority that are residential.

Newer vs. older residential: Easier to get volunteers in older neighborhoods—populations tend to be retired/semi-retired, more active in their neighborhoods. Direct contrast between the two residential sites. Older neighborhoods could have existing resources, neighborhood assoc. or non-profits to tap.

Local school groups another source of local buy-in. We could have a campaign for adopt a stormwater.

Wooded site—residential: older oaks, something special in an urban area. Shaded areas might be more enticing for inviting volunteers, could help with path-building. Intriguing opportunity to preserve

1. What short- and long-term management objectives should there be for a site like this?
(e.g. remove all nonnative vegetation to biodiverse wetland community, focus only on the most aggressive invasive species, not do anything, remove species like poison ivy and wild parsnip)

Favor the natives, eliminate the invasives beginning with the invasive shrub layer as a priority. Not reasonable to eliminate all invasives.

Prioritize near the channel. GO after seed-bearing invasives, preferably a few years before opening up the canopy to prevent some of the seed from dropping. Buckthorn, burdock, multiflora rose could be a slow start with volunteers. For faster approach go after higher light areas. Eventually eliminate all invasive shrubs.

Long-term monitoring, keeping an eye on what is expanding, what may be problematic in future—requires locals to keep tabs.

Get community engaged from very beginning on how they would like to use the site, how the community is engaged in this site currently. Let them weigh in on those objectives even if that's not how we'd normally go about restoring the site. Offer training on "why" they should be involved/interested, education.

Timeline is key: deciding whether to hire a contractor for a faster timeline vs. slower implementation (in-house, volunteer).

In forested areas there may be areas with greater light coming in—good locations to id wildflowers and get folks excited about what the area could be. Species lists native woodland wildflowers already so try to open up light to build on that.

Churches in the area, another community org to tap right away for stewardship and engagement.

Put your resources where you have volunteers to help. A reward for volunteers and extends our ability to get things done. If City staff can work more on partnerships than on doing the work in-house. Media, get publicity to help draw attention to areas.

Find a few core folks that want to champion the restoration cause, work with City staff on goals and timing of work.

Can be difficult to wrangle volunteers. Certified sawyers is a limitation to getting volunteers involved in work on City land. If only cert. can use chainsaws that limits.

How to advocate for more resources in City budget for this work?

If we don't have the staff to coordinate volunteers, monitor and be on site then in the end initiating restoration work here is a waste of time. A real need here: more resources need to be put forth for projects like this esp. more City staff.

There should be a staff member who is trained in community engagement.

Disagreement about where to try to draw in volunteers: If we only put resources where there is already volunteer interest then we won't get a balanced volunteer work force. Younger folks may not have the time to volunteer. Good approach to partner with orgs to get around this—churches, youth groups, schools. Be willing to let go of standard approach and cede decision-making, esp. to younger folks to get them engaged. Getting young folks engaged could be more impactful than one restoration project. Pushing folks to do the "expert" approach can push them away from ownership/engagement of the project.

Counterpoint: It's a real challenge to rely on young volunteers because the turn-over is so high. Key to success in county parks/city parks volunteer programs is getting dedicated volunteer leaders in the community who will be in the role long-term (10 – 20 years). The challenge then is to keep recruiting younger folks to replace the long-term volunteers. The City doesn't have the staff to do the training/engagement with younger volunteers.

2. Based on the above objectives and species list what methods of removal would you use? (e.g. allow aggressive natives, allow nonnatives, use herbicide, mow, burn, hire contractor).

All of the above (i.e. cut/treat, herbicide, burn, mow, goats, dig, etc.)

Start with cut/treat woodies. Follow up next season with herbaceous weed control with herbicide. Burn in future years.

3. Based on the above objectives and species list what species would you propose replanting?
Swamp white oak, can be hard to make recommendation in this exercise format.
Groundcover for disturbed areas—prairie cordgrass (high tolerance to range of hydrological conditions), tussock sedge (tolerates some shade, "restoration superplant").

(Not having seen site = difficult) Grasses to allow for burn fuel. Seeding and seeding grasses in particular is relatively inexpensive.

Need to be attuned to light conditions—seed-to-soil contact. Burning, then scattering

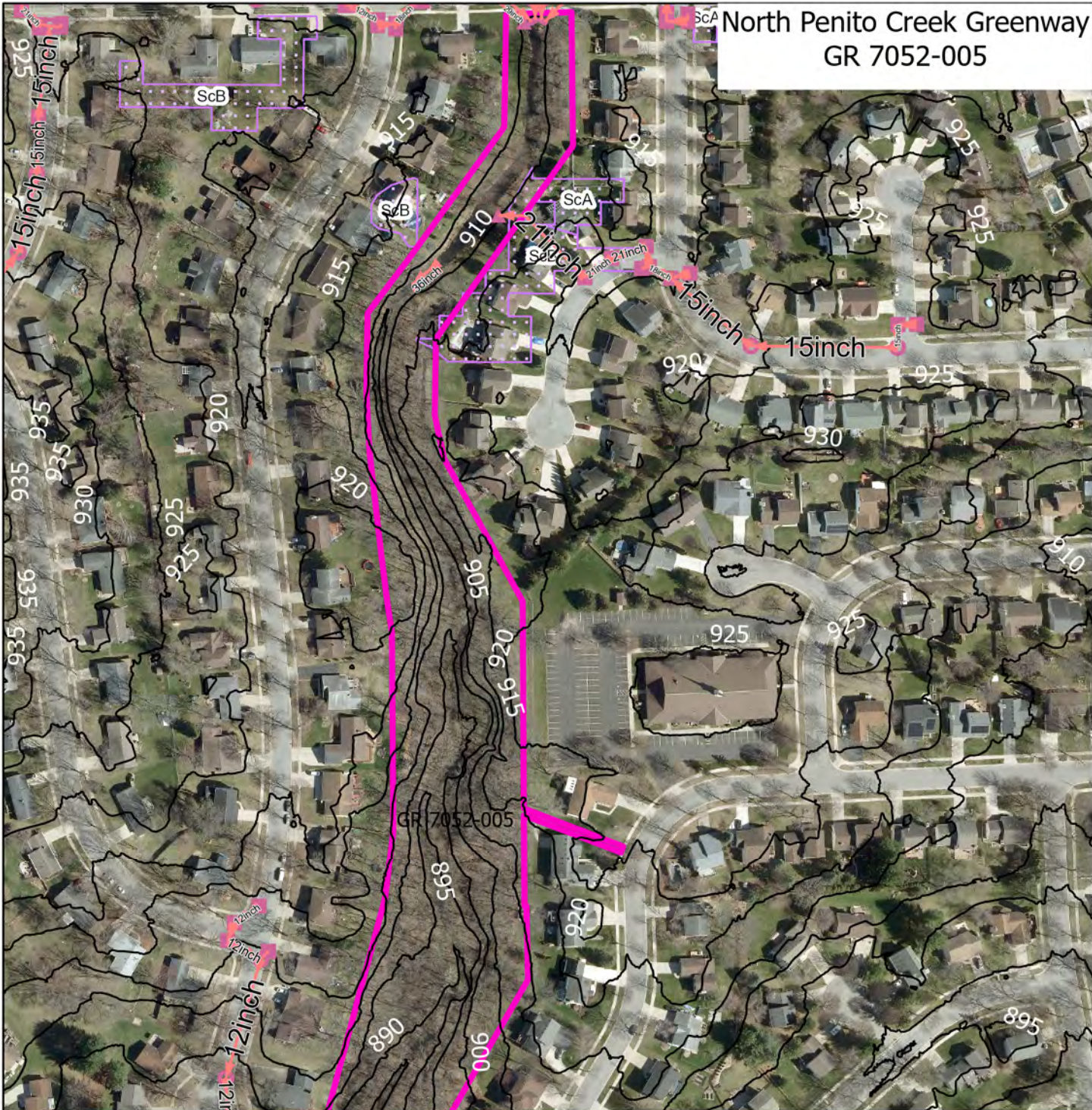
4. Fill out first, second, third, fourth year and beyond land management recommendations?

	Description of Work	Number of Hours/Year to Complete Task
Year 1		










Year 2		
Year 3		
Year 4		
Year 5		
Year 6		

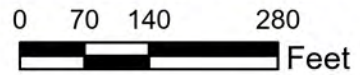
5. Does this approach seem feasible to implement citywide given existing resources?

North Penito Creek Greenway GR 7052-005



Legend

-  Storm Pipe
- `struc_type`
-  Access Structures
-  Apron
-  Inlet
-  Other
-  Contours
-  Storm Water Utility Property Boundary
-  USDA Wetspots
-  Maximum Extent Wetland Indicators



1937 Ortho Image



Additional Information

- [DNR surface water Viewer](#)
- [DCiMap](#)

Example Tree Inventory

(This inventory has been fabricated based on species and quantities reflective of the composition of this site and similar sites)

GR 7052-005						
Scientific Name	Common Name	Quantity (EA)	% Dead	% Low Condition Rating	% Medium Condition Rating	% High Condition Rating
Acer negundo	Box elder	250	2	50	28	20
Acer ginalla	Amur maple	30	1	20	40	10
Acer platinoide s	Norway maple	50	1	20	0	20
Acer scahharu m	Sugar maple	1	0	100	0	0
Carya ovata	Shagbark hickory	20	5	15	0	30
Catalpa bignoides	Catalpa	10	0	10	0	15
Celtis occidentalis	Northern hackberry	50	0	15	0	50
Fraxinus pennsylvanica	Green ash	12	70	30	0	0
Juglans nigra	Black walnut	117	5	20	0	40
Juniperus virginiana	Eastern red cedar	1	0	100	0	30
Morus alba	White mulberry	50	0	60	0	40
Populus deltoides	Eastern cottonwood	15	0	20	50	30
Prunus serotina	Black cherry	180	5	5	55	50
Quercus alba	White oak	50	10	5	45	40
Quercus macrocarpa	Bur oak	5	5	20	30	45

Quercus rubra	Red oak	2	0	100	0	
Quercus velutina	Black oak	10	0	100	0	0
Rhamnus cathartica	Common buckthorn	107	0	0	40	60
Robinia pseudocacia	Black locust	105	0	10	30	60
Tilia americana	Basswood	100	5	10	30	50
Ulmus americana	American elm	80	5	30	25	40
Euonymus alatus	Burning bush	10	0	40	0	60
Malus spp.	Crabapple	15	0	50	10	40
Ulmus rubra	Red elm	35	10	0	60	30
Cercis canadensis	Redbud	4	0	0	40	60
Ulmus pumila	Siberian elm	45	0	20	50	30
Acer saccharinum	Silver maple	20	0	20	50	30
Picea abies	Norway spruce	8	20	15	55	10
Picea glauca	White spruce	12	5	15	70	10
Pinus strobus	Eastern white pine	8	0	20	70	10
Thuja occidentalis	Arborvitae	2	0	20	70	10
TOTAL				1404		

Example Understory

(This inventory has been fabricated based on species and quantities reflective of the composition of this site and similar sites)

Ageratina altissima	White snakeroot
Alliaria petiolata	Garlic mustard

<i>Ambrosia trifida</i>	Giant ragweed
<i>Arctium minus</i>	Common burdock
<i>Bromus inermis</i>	Hungarian brome
<i>Carex pensylvanica</i>	Pennsylvania sedge
<i>Dactylis glomerata</i>	Orchard grass
<i>Eriochloa villosa</i>	Chinese cup grass
<i>Geum canadense</i>	White avens
<i>Hackelia virginiana</i>	Beggar's-lice
<i>Hesperis matronalis</i>	Dame's rocket
<i>Hostas</i>	Hostas
<i>Leonurus cardiaca</i>	Motherwort
<i>Ligustrum vulgare</i>	Common privet
<i>Lonicera x bella</i>	Bell's honeysuckle
<i>Mertensia virginica</i>	Virginia bluebells
<i>Panicum dichotomiflorum</i>	Fall panic grass
<i>Parthenocissus quinquefolia</i>	Virginia creeper
<i>Persicaria virginiana</i>	Jumpseed
<i>Phalaris arundinacea</i>	Reed canary grass
<i>Phlox paniculata</i>	Garden phlox
<i>Pilea pumila</i>	Canadian clearweed
<i>Polygonum x bohemicum</i>	Japanese/Bohemian knotweed
<i>Ribes cynosbati</i>	Dogberry
<i>Rosa multiflora</i>	Multiflora rose
<i>Rubus allegheniensis</i>	Allegheny blackberry
<i>Rubus idaeus var. strigosus</i>	American red raspberry
<i>Rubus occidentalis</i>	Black-cap
<i>Rudbeckia subtomentosa</i>	Sweet black-eyed Susan
<i>Scilla siberica</i>	Squill
<i>Setaria faberi</i>	Giant foxtail
<i>Solidago gigantea</i>	Giant goldenrod
<i>Symphotrichum lateriflorum</i>	Side-flowering aster
<i>Toxicodendron radicans</i>	Poison ivy
<i>Typha x glauca</i>	Hybrid Cattails
<i>Urtica dioica</i>	Stinging nettle
<i>Verbena urticifolia</i>	Nettle-leaved vervain
<i>Vinca minor</i>	Vinca
<i>Viola sororia</i>	Common blue violet













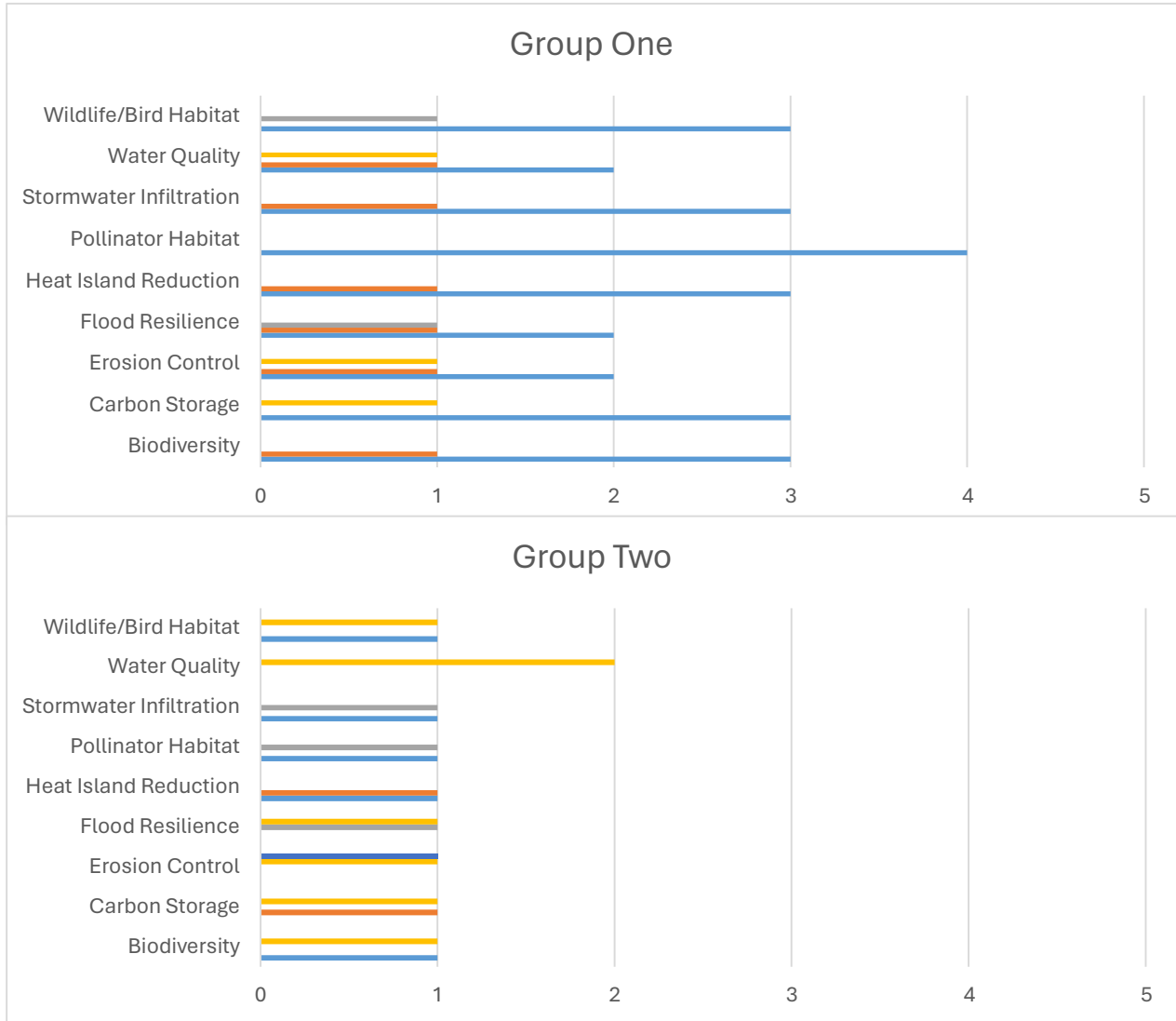


Attachment B – Land Management Exercise Survey
Response

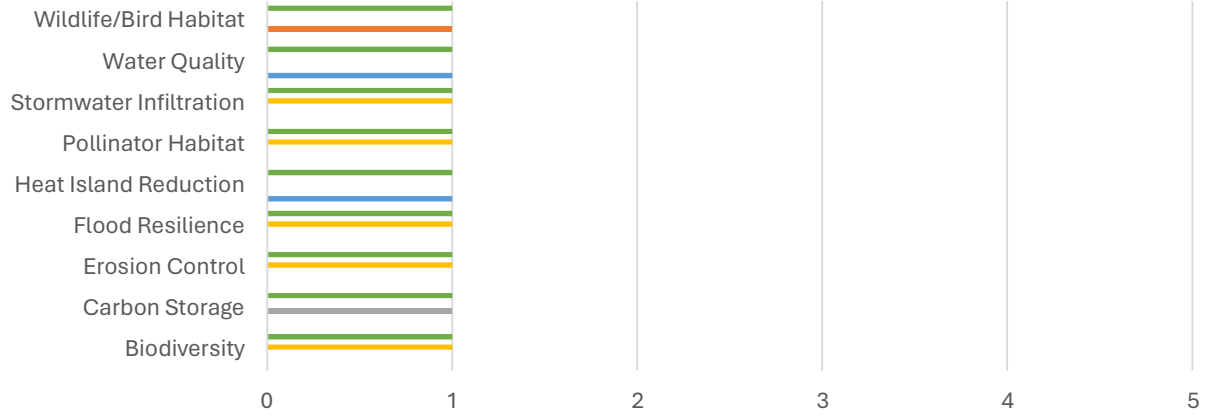
Stormwater Utility Vegetation Plan
June 2024

Survey Responses to Group Land Management Proposals

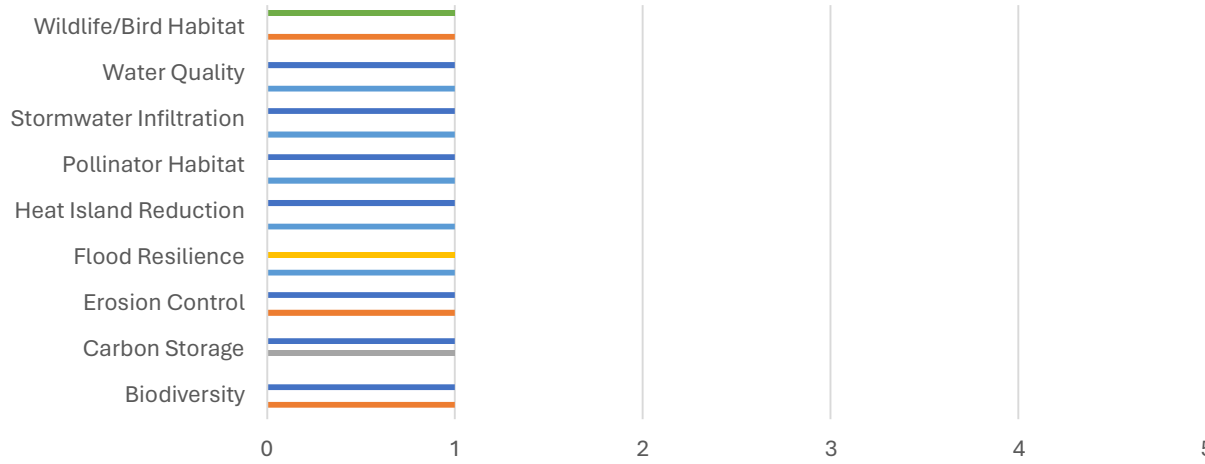
Question 1. Please identify how you feel this proposal provides the below ecosystem services. Scale is 0 to 5, with 0 providing no ecosystem service and 5 providing the maximum ecosystem service.



Group 3

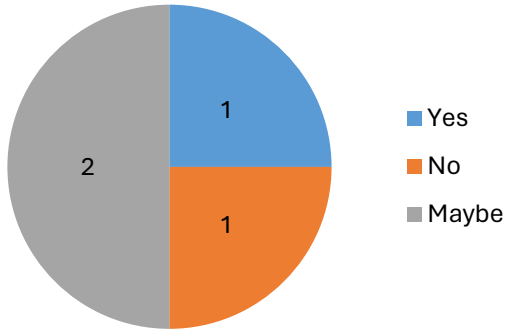


Group 4

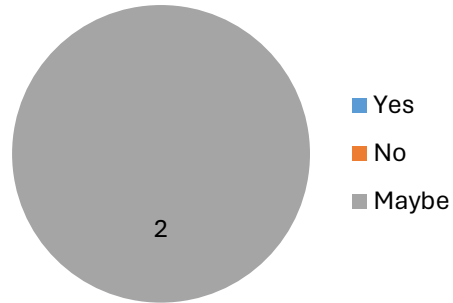


Question 2. Please identify how you feel this proposal provides the below ecosystem services. Scale is 0 to 5, with 0 providing no ecosystem service and 5 providing the maximum ecosystem service.

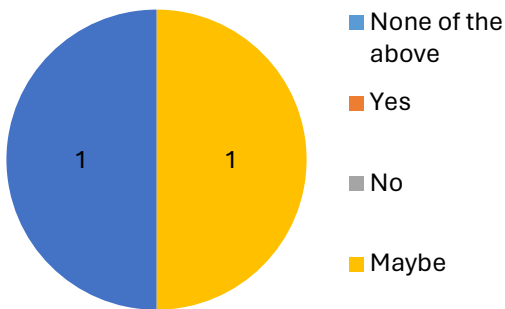
Group 1



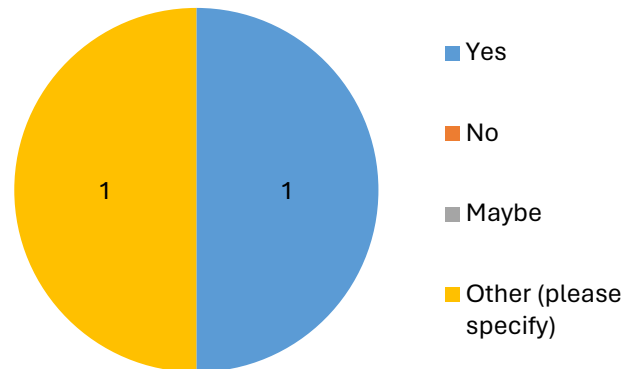
Group 2



Group 3



Group 4



Other: probably not because of the status/degradation of other sites

Other: volunteer could make this project possible

Question 3&4. What are your thoughts on this approach? And and other comments?

Responses to Group One Proposal

- Anything short of a long-term overhaul and maintenance plan on this property is wasting time
- You have to make priorities when you have limited budgets. This site would likely be down the priority list a long way and not receive management.
- The site by site veg first approach won't work which is why i voted a 0 on the above. Engineering is in charge of 2.5 square miles of riparian corridors. These are hydrologic pathways for floods and shallow/alluvial aquifer (used for drinking water) across a very diverse landscape from uplands to the lakes. Any vegetation plan needs to be closely linked to these hydrologic pathways. Besides hydrologic pathways, the riparian corridors are very important wildlife and important habitat connectors. This is a very important role that needs recognition in planning. Trust the vegetation to do the work, don't fight it.

Responses to Group Two Proposal

- This approach wasn't much more than "do the research and see what would work best". This area has serious water problems. Right now it is only serving as a chute for water. Anything short of full management with maintenance treatments is wasting money. A room full of experts should be giving better advice than "consult the lit".
- I think that the tree's on this site although native to Wi are not native to this eco-region. I native herbaceous plants do better at erosion control then some of the trees species on this site. I believe that the native plants do a great job at helping cool temperatures near the earths surface not just trees.
- This site poses the oppurtunity for a logging of Black Walnut tree's. I'm not sure of the size of them but this could have a pretty large monetary value which could help subsidize the restoration work on this property. It might pay to wait until these trees are of marketable size if they are not already.

Responses to Group Three Proposal

- rehabbing and maintaining existing areas of diverse and functional habitat is a great approach. Keeping what the city already has in terms of quality areas is the best approach until funding expands.
- This site can be a winner because of its current vegetation status. It would likely be a medium to high priority site in the property inventory.

Responses to Group Four Proposal

- Putting the work in the hands of others can take nearly as much time as just doing it. Another totally degraded area with a handful of remnant oaks. If the city deems that the oaks are worth is they can simply clear the woody species around them. Any further work on this site short of a full restart and replant is wasted. I support community involvement on this work but I don't have as much faith in it as this group.
- If vol's are involved this site could raise the level of prioritization. I like the thought process of getting rid of invasive species and getting some native biodiversity. Good to replant oaks also but the grow in can be tough. Consider acorn planting instead.
- I like this groups approach to this site. Diversity provides stability!

Do you have any additional feedback on the workshop?

1. I enjoyed this workshop and I think the City can make some good steps forward on their land management work. Maintaining quality areas is the best way to start on a limited budget. Going halfway on any project is just wasting money. Without serious effort and investment, low quality areas are going to stay low quality.
2. I thought this was a really great exercise. It really made me realize how difficult it is to prioritize smaller tracts of land to manage. Maddie and Emily have a very difficult task in front of them. I know they will do an amazing job for the City! Thanks for having us and getting the input from such a diverse groups of individuals.
3. yes -- we need a workshop of the role of forests/trees, floodplains, and channel geomorphology. There seems to be some misunderstanding that "bare" (no herbs) ground = erosion. It would be good to work through the hydrologic and hydraulic roles of a floodplain forest for flood mitigation. It would be great if we could get involvement from ASFPM since their headquarters are in Madison.

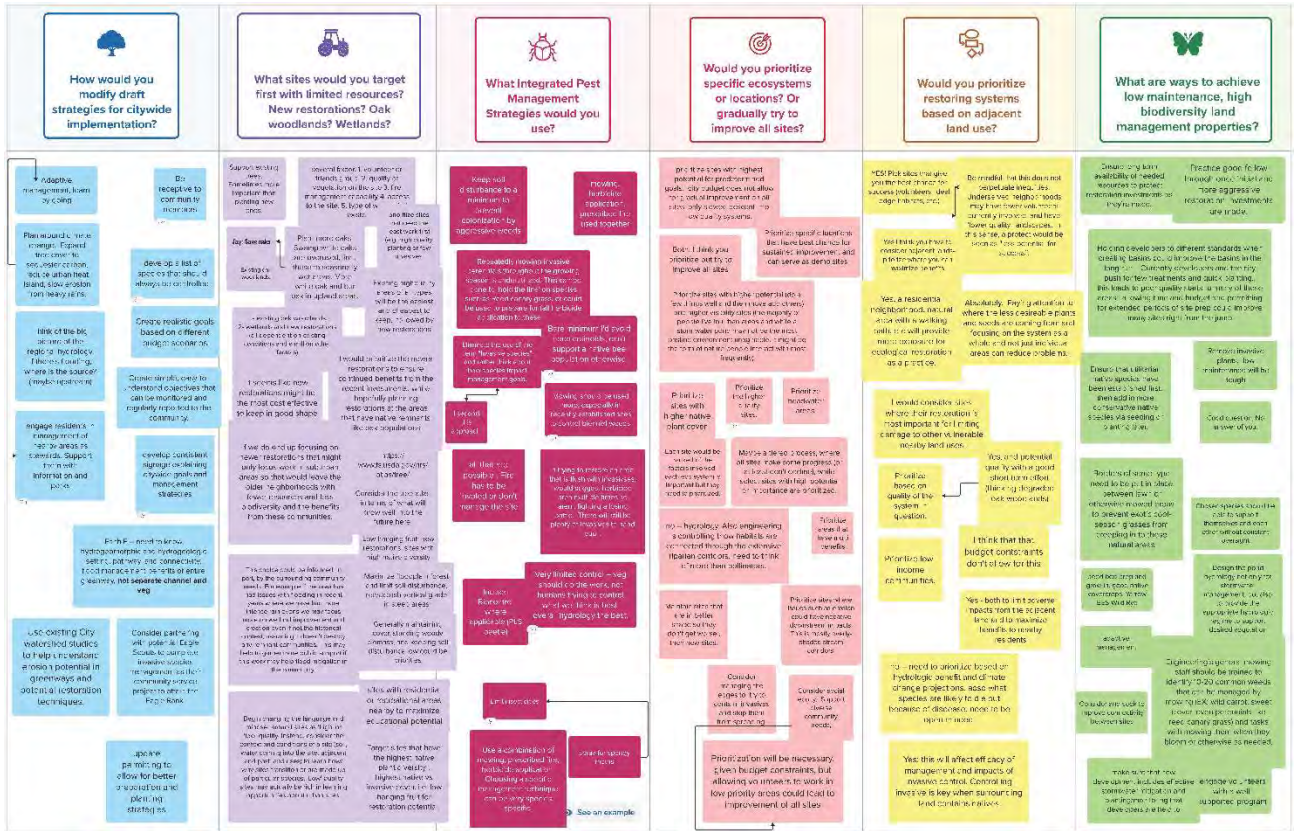
Attachment C – Systemwide Priorities Exercise

Stormwater Utility Vegetation Plan

June 2024

Image of Exercise

Link to full size downloadable pdf at <https://www.cityofmadison.com/media/169916>



Individual Responses from Exercise in List Format

How would you modify draft strategies for citywide implementation.

- Update permitting to allow for better preparation and planting strategies.
- engage residents of management of nearby areas as stewards. Support them with information and perks.
- Develop consistent signage explaining citywide goals and management strategies.
- Need to know hydrogeomorphic and hydrogeologic setting, pathway, and connectivity, flood management benefits of entire greenway, not separate channel and veg
- Plan around climate change. Expand tree cover to sequester carbon, reduce urban heat island, slow erosion from heavy rains.
- ~~Me~~ receptive to community members.
- Think of the big picture of the regional hydrology. If there's flooding, where is the source? (maybe upstream)
- Use existing watershed studies to help understand erosion potential in greenways and potential restoration techniques.
- Consider partnering with potential Eagle Scouts to complete invasive species management as their community service project to attain the Eagle rank.
- Adaptive management, learn by going.
- Develop a list of species that should always be controlled.
- Create realistic goals based on different budget scenarios.
- Create simple, easy-to-understand objectives that can be monitored and regularly reported to the community.



What sites would you target first with limited resources? New restorations? Oak woodlands? Wetlands?

- Existing high-quality areas of all types will be the easiest and cheapest to keep, followed by new restorations.
- Generally maintaining cover, standing woody biomass, and keeping soil disturbance low could be priorities.
- Low hanging fruit, new restorations, site with high native diversity.
- Sites with residential or recreational areas nearby to maximize educational potential.
- Begin changing the language and mindset around sites as 'high' or 'low' quality. Instead, consider the context and conditions of a site (soil, water coming into the site, adjacent and



past land uses) to learn how/why sites transition or are made up of particular species. 'Low' quality sites may actually be rich in learning opportunities about urban sites.

- Maximize floodplain forest and limit soil disturbance, reestablish vertical grade in steep areas.
- existing oak woodlands 2 - wetlands and new restorations (all dependent on existing conditions and a million other factors)
- <https://www.fs.usda.gov/nrs/atlas/tree/> Consider the tree atlas in terms of what will grow well in the future here.
- I would prioritize the newer restorations to ensure continued benefits from the recent investments, while hopefully planning restorations at the areas that have native remnant live oak populations.
- This choice could be informed, in part, by the surrounding community needs. For example, if the areas has had issues with flooding in recent years where we have had more intense rain events we may focus more on wetland improvements and creating even if not in the historical context, assuming it doesn't destroy any remnant communities. This may help to garner more public support of this work may help flood mitigation in the community.
- Support existing trees. Sometimes more important than planting new ones.
- It seems like new restorations might be the most cost effective to keep in good shape.
- Plant more oaks. Swamp white oaks are overused, limit these to seasonally wet areas. More white oak and bur oak in upland areas.
- Target sites that have the highest native plant diversity highest native vs invasive cover i.e. low hanging fruit for restoration potential.
- If we do end up focusing on newer restorations that might only focus work in suburban areas so that would leave the older neighborhoods with fewer resources and less biodiversity and the benefits from these communities.
- Save oaks
- Prioritize sites that need the least work first (e.g. high-quality planting or few invasives)
- Existing oak woodlands
- Several factor 1. volunteer or friends' group 2. quality of vegetation on site 3. fire management capability. 4. access to the site 5. types of weeds that exist.

What Integrated Pest Management Strategies would you use?

- Keep soil disturbance to a minimum to prevent colonization by aggressive weeds.
- Bare minimum I'd avoid neonicotinoids, can't support a native bee population otherwise.
- Limit insecticides.
- spray for spongy moths
- Very limited control - veg should do the work, not humans trying to control what we think is best. Overall hydrology the best.
- All that are possible. Fires has to be involved or don't manage a site.
- Include biocontrol where applicable (PLS beetle)



- Repeatedly mowing invasive perennials throughout the growing season is underutilized. This can be done to 'hold the line' on species such as Reed Canary grass, or could be used to prepare for fall herbicide application to these species.
- Use a combination of mowing, prescribed fire, herbicide application. Choosing a specific management technique can be very species specific.
- If trying to restore an area that is flush with invasives, would suggest herbicide area multiple times so aren't fighting a losing battle. There will still be plenty of invasives to hand pull.
- mowing, herbicide application, prescribed fire used together
- Mowing should be used more, especially in recently established sites to control biennial weeds.
- Eliminate the use of the term 'invasive species' and rather think about how species impact management goals.

Would you prioritize specific ecosystems or locations? Or generally try to improve all sites?

- Maybe a tiered process, where all sites make some progress (or at least don't decline) while select sites with hit potential or importance are prioritized.
- Prioritize the higher quality sites.
- Prioritization will be necessary, given budget constraints, but allowing volunteers to work in low priority areas could lead to improvement of all sites.
- no - hydrology. Also engineering is controlling how habitats are connected through the extensive riparian corridors. Need to think of more than pollinators.
- Each site would be ranked of factors involved. Each ecosystem is important, but they need to be prioritized.
- Consider social equity. Support diverse community needs.
- Prioritize headwater areas.
- Prioritize sites where issues such as erosion could have negative downstream impacts. This is mostly overly shaded stream corridors.
- Consider managing the edges to try to contain invasives and stop them from spreading.
- Prioritize sites with higher native plant cover.
- prioritize areas that have multiple benefits
- Maintain sites that are in better shape, so they don't get worse.
- Prioritize sites with the highest potential for predetermined goals. City budget does not allow for gradual improvement on all sites, only slowed descent into low quality systems.
- Both. I think you prioritize but try to improve all sites.
- Prioritize specific locations that have best chance for sustained improvement can serve as demo sites.
- Prioritize sites with higher potential (do a few things well and then move add others) and higher visibility sites (the majority of people live in urban areas and while a stormwater



pond may not be the most pristine environment imaginable, it might be the form of nature people interact with most frequently).

Would you prioritize restoring systems based on adjacent land use?

- "Yes, and potential quality with a good short term effort (thinking degraded oak woodlands).
- Prioritize based on the quality of the system.
- Prioritize low income communities.
- I would consider sites where their restoration is most important for limiting damage to other vulnerable nearby land uses.
- Yes to both limit adverse impacts from the adjacent land and to maximize benefits to nearby residents.
- Yes; this will affect efficacy of management and impacts of invasive control. Controlling invasive is key when surrounding land contains natives.
- Yes, a residential neighborhood, natural area with a walking path, etc. will provide more exposure for ecological restoration as a practice.
- No - need to prioritize based on hydrologic benefit and climate change projection, also what species are likely to die out because of disease. Need to be more open minded.
- I think that budget constraints don't allow for this.
- Comment on this "Be mindful that this does not perpetuate inequities. Underserved neighborhoods may have fewer volunteers currently involved, and have 'lower quality' landscapes. In this sense, a project would be seen as "less potential for success"
- YES! Pick sites that give you the best chance for success (volunteers, ideal edge habitats, etc.)
- Yes, I think you have to consider adjacent lands - prioritize where you can maximize benefits.
- Absolutely. Paying attention to where the less desirable plants and seeds are coming from and focusing on the system as a whole and not just individual areas can reduce problems.



What are ways to achieve low maintenance, high biodiversity land management properties?

- Design the pond hydrology not only for stormwater management, but also to provide appropriate hydrologic regime to support desired vegetation.
- Good question, no answer of you.
- Consider and seek to improve connectivity between sites.
- Chosen species should be able to support themselves and each other without constant oversight.



- Make sure that new development includes effective stormwater mitigation and planting/monitoring that developers are held to.
- Engage volunteers with a well-supported program.
- Engineering's general mowing staff should be trained to identify 10-20 common weeds that can be managed by mowing (ex. Wild carrot, sweet clover, even perennials like reed canary grass) and tasks with mowing them when they bloom or otherwise as needed.
- Remove invasive plants, low maintenance will be tough
- seed bed prep and grow in good native cover crops. Yarrow BES Wild Rye
- Holding developers to different standards when creating basins could improve the basins in the long run. Currently developers and the city push for few treatments and quick planting..this leads to poor quality starts to many of these areas. Allowing time and budget and permitting for extended periods of site prep could improve many sites right from the jump.
- Practice good follow through once initial and more aggressive restoration investments are made.
- Ensure long-term availability of needed resources to protect restoration investments as they're made.
- Borders of some type need to be put in place between lawn or otherwise mowed areas to prevent exotic cool season grasses from creeping into these natural areas.
- Ensure that utilitarian native species have been established first, then add in more conservative native species via seeding or planting later.
- Adaptive management