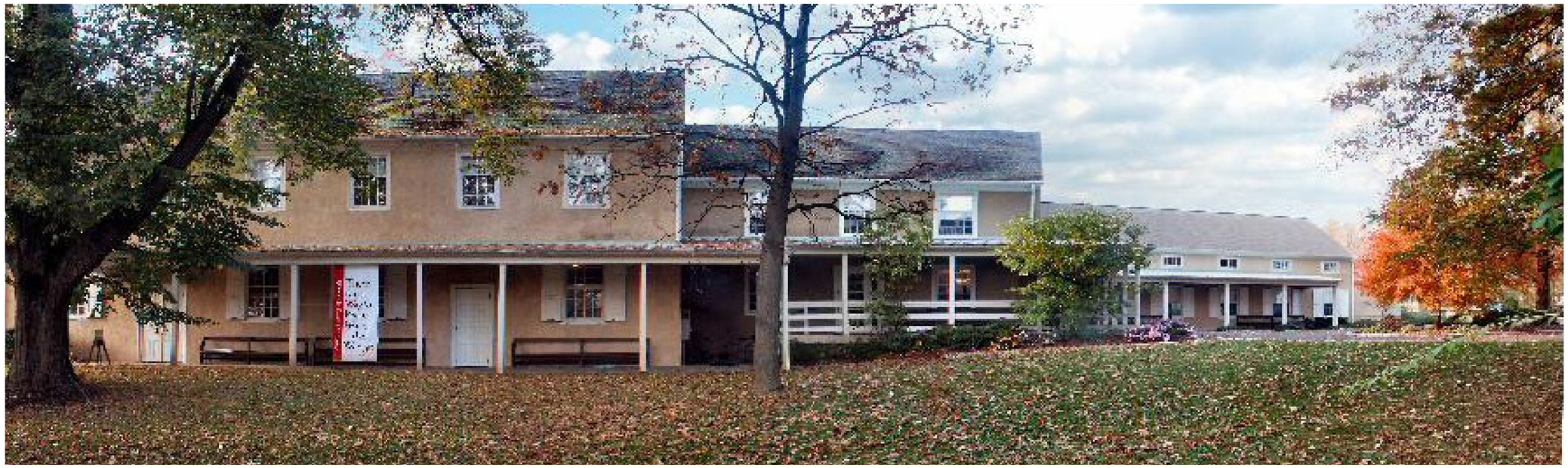


Gwynedd Friends Meeting
Landscape Master Plan

December 2020
Revised February 2021

Roofmeadow

INTRODUCTION

Landscapes organize themselves based on environmental function and as humans we have learned to intuitively read those organizational patterns. We also associate cultural needs and uses with landscape patterns. As stewards of the landscape, we can use those cues and patterns to guide future landscape improvements in a way that supports both environmental function and cultural expectations.

Patterns in the landscape can be as clearly defined and expressed as patterns in architecture. We can change and reorganize landscape patterns but need to be consistent and clear-sighted about how we're doing so. This landscape master plan is a guide for recognizing the environmental and cultural patterns on the property and how to use those patterns to implement thoughtful and cohesive landscape improvements.

Within this document there are several environmental 'big moves' proposed but more often the combination of many 'small moves' is suggested. These small moves allow for quick and impactful implementation that can be adjusted as the community's priorities and needs change. For example, reducing mowing frequency, fostering a new generation of trees, or increasing stormwater infiltration on-site don't change the way the landscape supports the functional every day needs of the community but they do provide a highly impactful boost to the environmental function of the property.

This document is also meant to serve as a guideline for future in-depth discussions regarding programming additions to the property and how those additions can support increase enjoyment of the property.

THANK YOU

This landscape master plan document is the result of many discussions and meetings with the Ad-Hoc Committee and members of the Gwynedd Friends Meeting.

Thank you to all the members of the Gwynedd Friends Community for your thoughtful participation in the process of creating the landscape master plan.

A special thanks to the members of the Ad-Hoc Committee for your never ending commitment to being responsible stewards of this property now and for future generations.

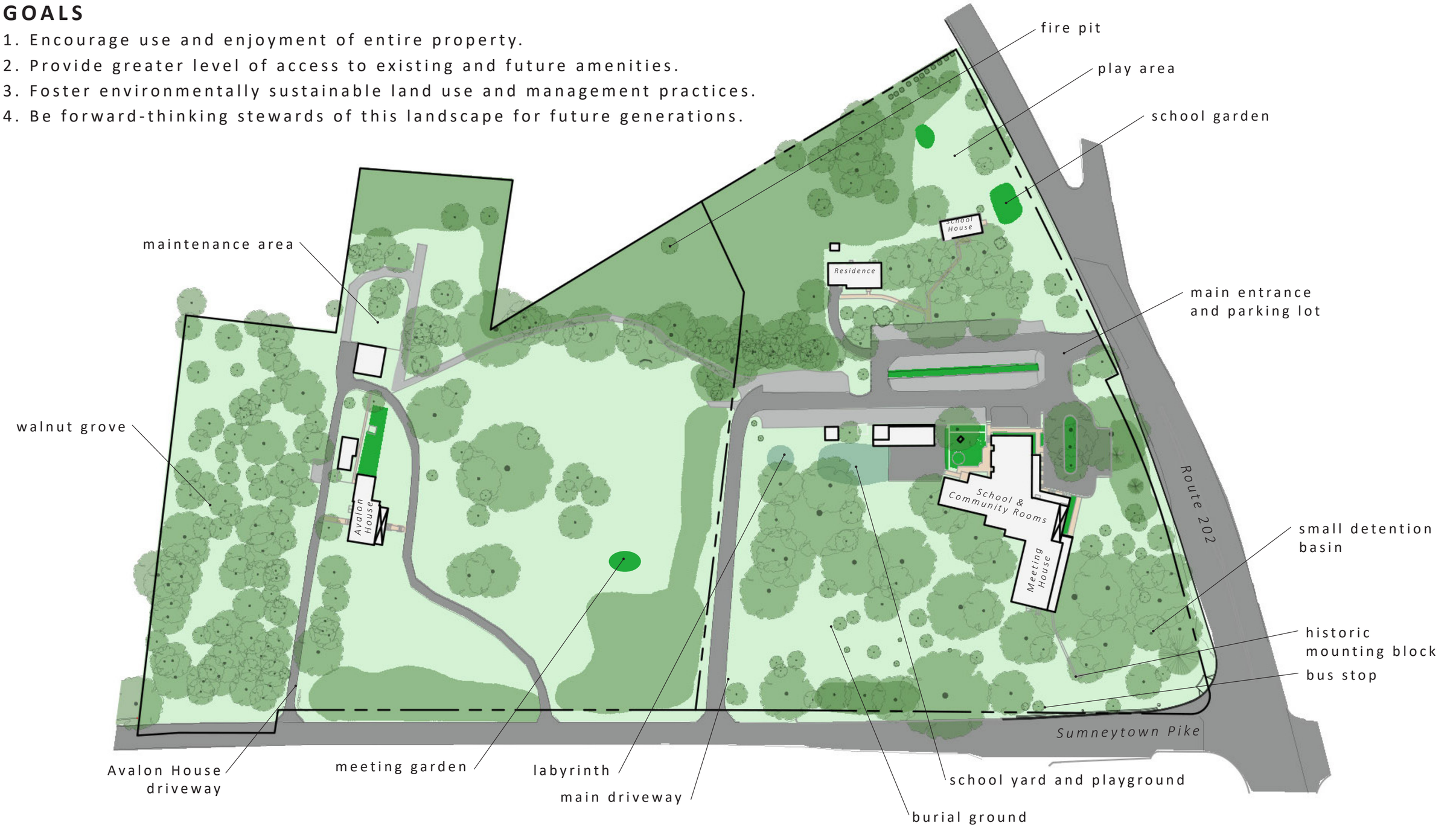
A MAN HAS MADE AT LEAST A START ON DISCOVERING THE MEANING OF HUMAN LIFE WHEN HE PLANTS SHADE TREES UNDER WHICH HE KNOWS FULL WELL HE WILL NEVER SIT.

-D. ELTON TRUEBLOOD

Table of Contents

GOALS

1. Encourage use and enjoyment of entire property.
2. Provide greater level of access to existing and future amenities.
3. Foster environmentally sustainable land use and management practices.
4. Be forward-thinking stewards of this landscape for future generations.



Existing Conditions Site Plan

Gwynedd Friends Meeting | Master Plan | February 2021

existing conditions

contemplative and family gathering pavilion

accessible trail to fit pit

rain garden

pocket parking

community garden

play field& overflow parking (+\-60 cars)

plant nursery

earthen berm with buffer planting

expanded nature play opportunities

home owner demonstration garden

William Penn tree turned into play feature

water play area

roadside buffer planting that allows 'windows through the trees'

new paths and protection for vigil attendees

vigil area

showcase stormwater management

open views to meeting house by limbing up trees and provide new signage

wooded buffer

community gathering space

pocket parking

low height cool season grasses and wildflower

expanded wooded wetland

meadow or meadow ribbons

convert driveway to pedestrian path

informal boardwalk gathering areas

stormwater swale

expanded wooded wetland

low height cool season grasses and wildflowers

path and bus shelter

Route 202

Sumneytown Pike

School House

Residence

Avalon House

School & Community Rooms

Meeting House

0' 100' 200'

SCALE: 1" = 100'-0"

Illustrative Landscape Site Plan

PROGRAMMING AND CIRCULATION

A. **Bus Shelter & Intersection Walkways**: ADA and SEPTA compliant bus stop along Summneytown Pike. Paved and lighted walkways from intersection to the shelter and to the meeting house.

B. **Vigil Area:** Safe place for vigil attendees to stand with potential permanent signage.

C. **Informal Gathering Area:** Gathering area with seating that can be used seasonally.

D. **Water Play Area:** Play area with focus on natural water elements.

E. **Expanded Nature Play Area**: Natural play elements incorporated into sound barrier berm along Route 202.

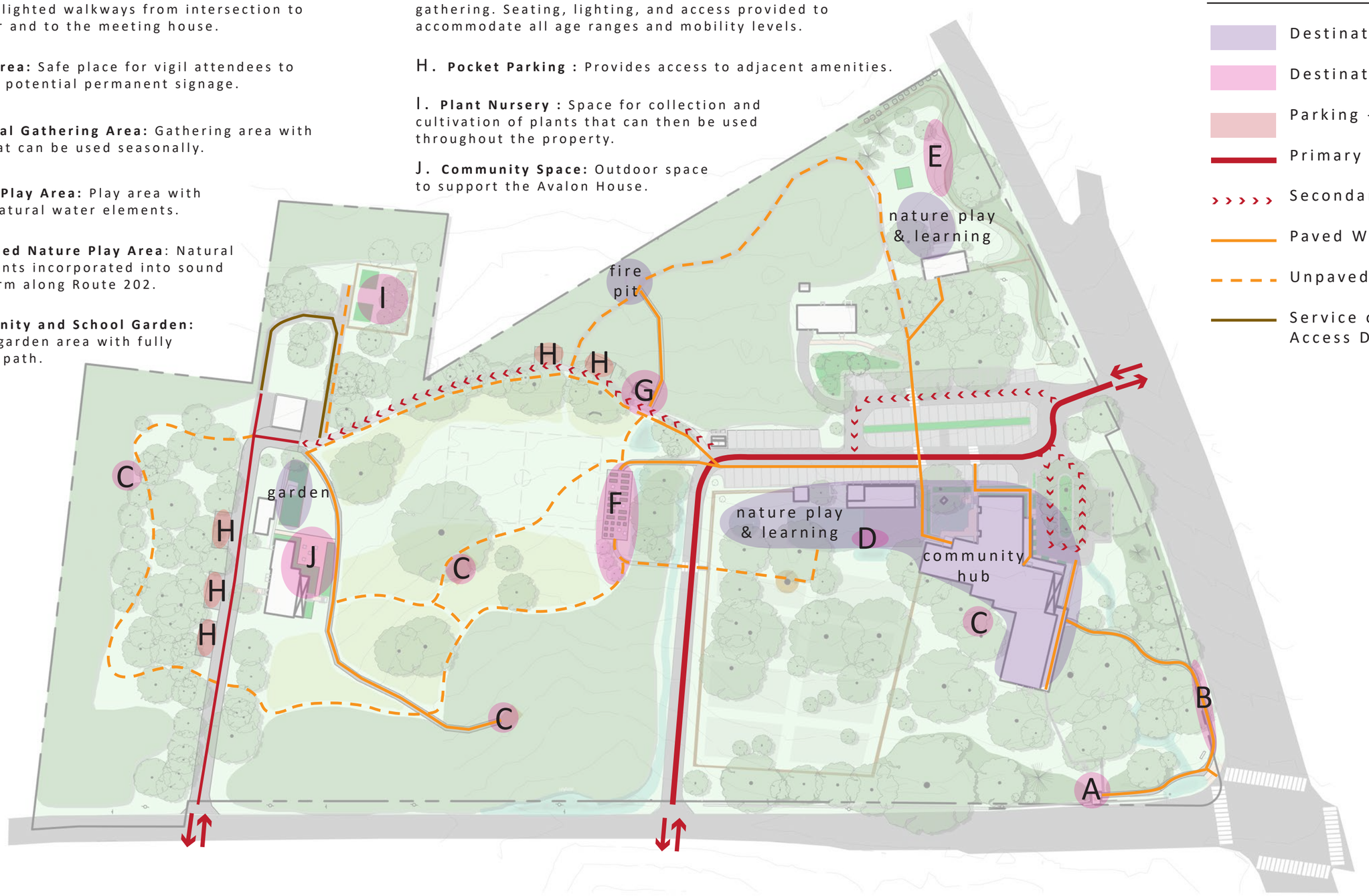
F. **Community and School Garden:** Expanded garden area with fully accessible path.

G. **Multi-use Gathering Space:** Covered gathering space that can be used for outdoor worship, learning, or family gathering. Seating, lighting, and access provided to accommodate all age ranges and mobility levels.

H. **Pocket Parking :** Provides access to adjacent amenities.

I. **Plant Nursery :** Space for collection and cultivation of plants that can then be used throughout the property.

J. **Community Space:** Outdoor space to support the Avalon House.



KEY

- Destination - Existing
- Destination - Proposed
- Parking - Proposed
- Primary Vehicular Drive
- Secondary Vehicular Drive
- Paved Walkway
- Unpaved Trail
- Service or Limited Access Drive

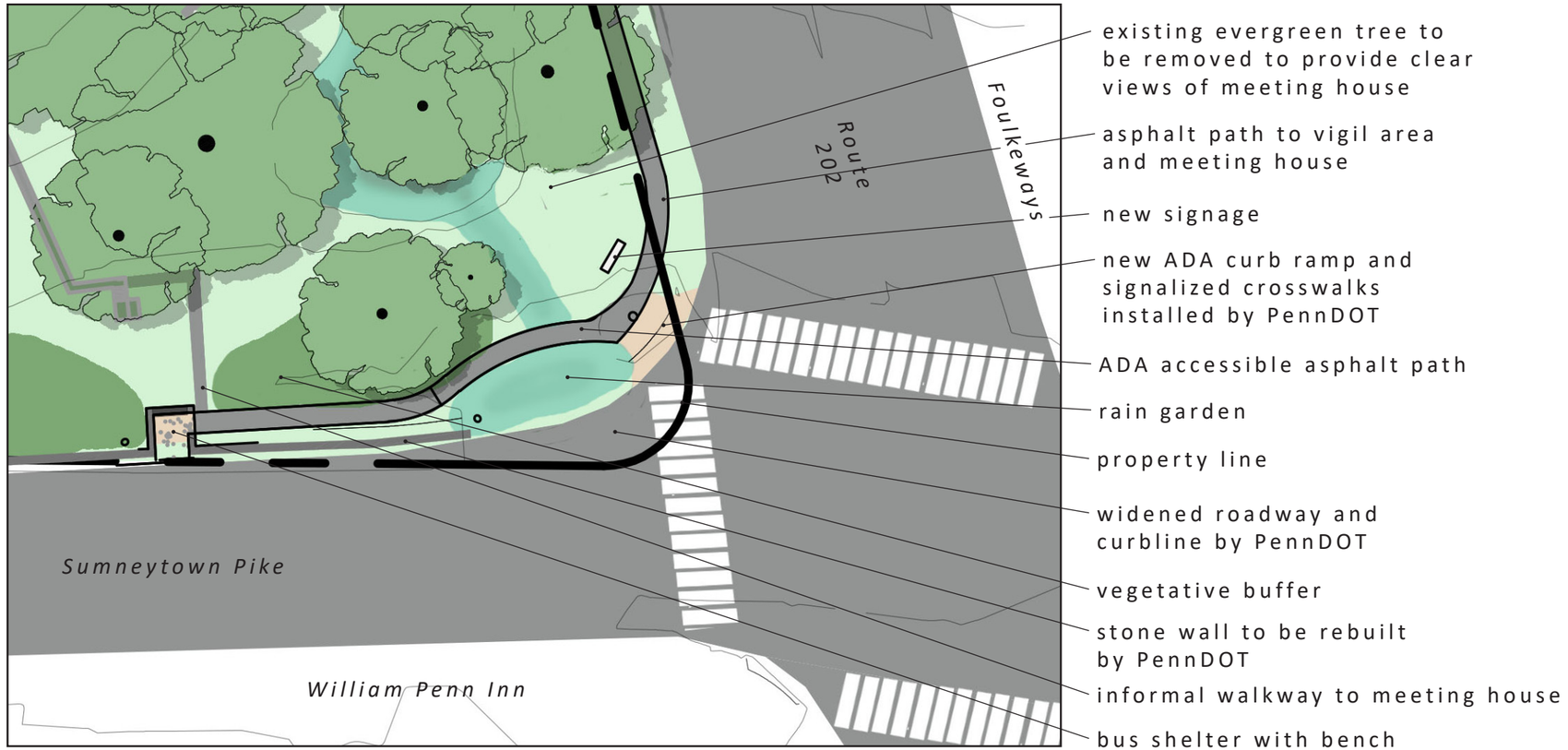
Proposed Programming & Circulation

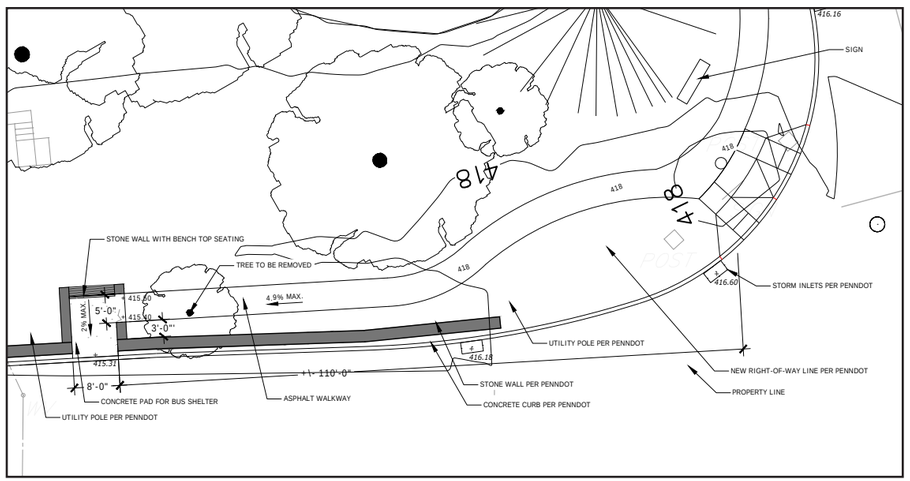
Gwynedd Friends Meeting | Master Plan | February 2021

BUS SHELTER AND INTERSECTION WALKWAYS

Methods

- Accessible via paved path with lighting from Sumneytown Pike
- Shelter is located to avoid buried historic features in the area.
- Strong vegetative buffer for noise and view mitigation.
- Implement a vegetative 'Roadside Buffer' which maintains windows through the trees and openness at intersection for framed views into the property. Refer to page 24 for more details.
- Additional path connects from intersection to Meeting House- refer to Vigil Area page 6.





Bus shelter technical plan

Bus shelter design precedent

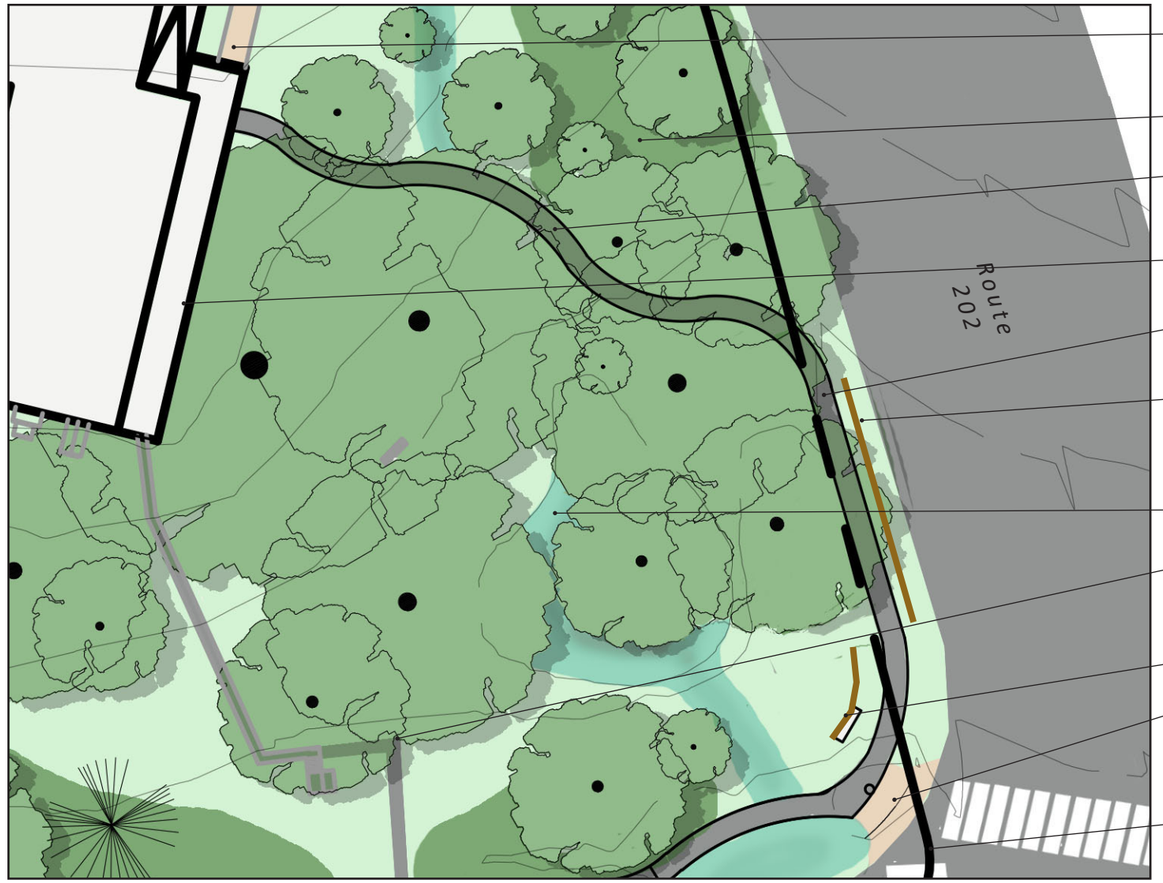
Wood top seating on stone wall

Shelter signage precedent

VIGIL AREA

Methods

- Accessible via paved path with lighting.
- Physical distance and barrier between paved are and roadway for safety with clear sightlines.
- Suggestions for barrier include large stone boulders or low stone wall. Barrier will need to be coordinated with PennDOT if paced within the right-of-way.
- Opportunity for permanent signage near intersection that can be integrated with physical barrier along vigil path.



Members stand along existing paved median during vigils

Existing signage and banner area

Signage precedent

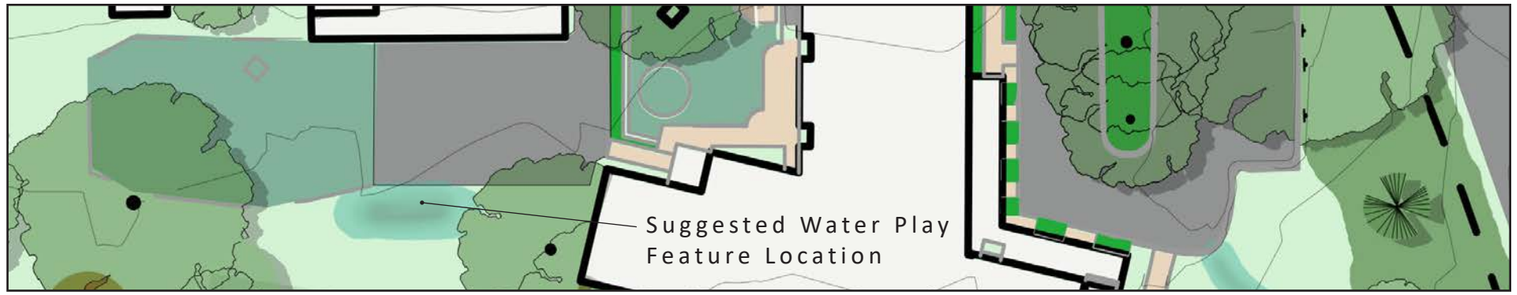
Roadway barrier precedent

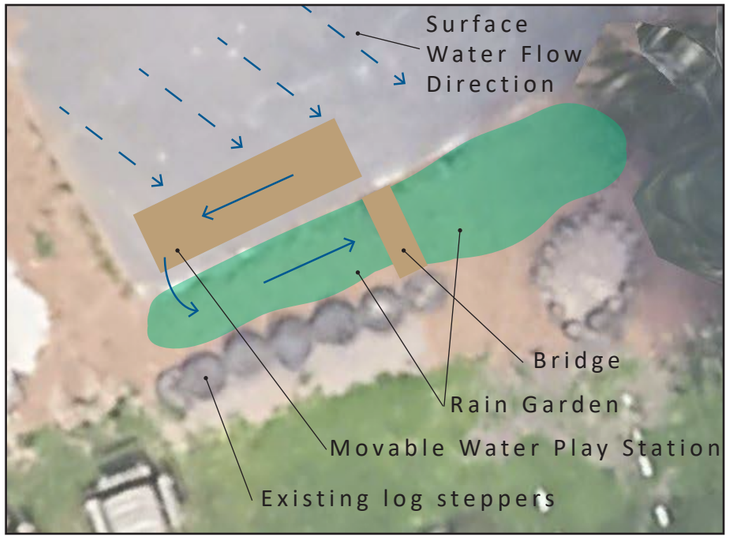
WATER PLAY AREA

Methods

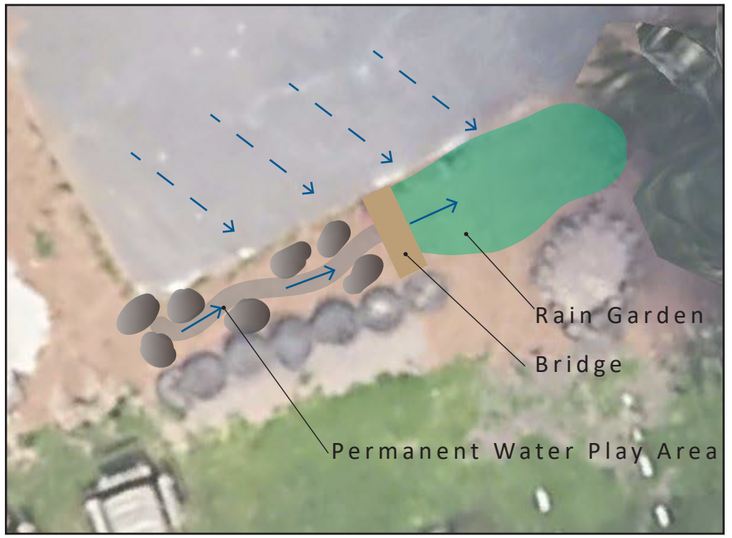
- Accommodate a range of ages and capabilities.
- Water play activities that don't require an outfit change or major cleanup.
- Connection with adjacent rain garden to manage runoff and provide educational opportunities.
- Play feature fed by hose or via buckets and rain barrel adjacent to warming shed or school building.

Rain garden also functions as a play feature





MOVABLE WATER PLAY FEATURE



PERMANENT WATER PLAY FEATURE

Creative depaving can add stormwater management and play opportunities

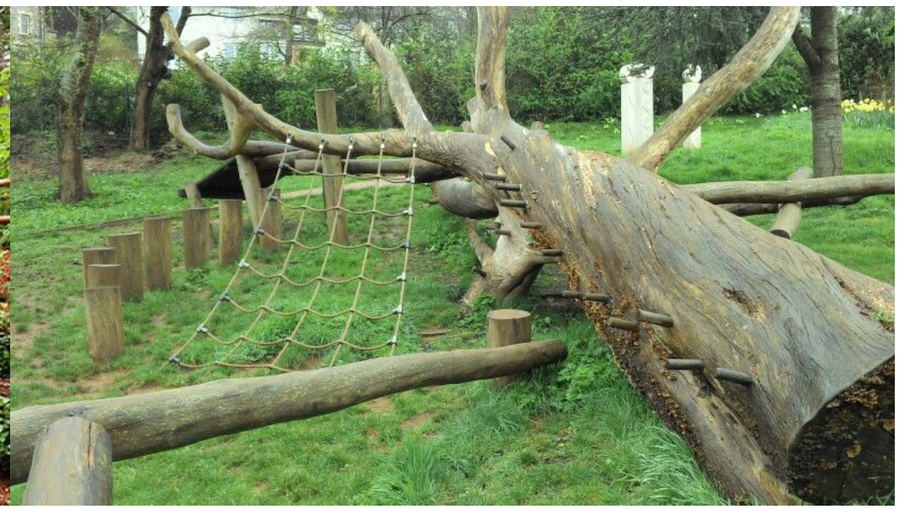
Movable water play feature

Permanent water play feature

NATURE PLAY AREA

Methods

- Use earthen berm sound barrier as basis for new play features
- Play features that use off-the-shelf components mixed with materials available on the property, like large wood logs
- New fencing placed on ridge of berm for safety



existing berm tied into new berm with fencing added

landscape berm with new fencing

landscape berm used to create play area and incorporate play equipment

existing tree to remain and be supplemented with new trees and shrubs to provide screening of route 202

existing swing set

school garden relocated and additional play space added

new fencing continues to edge of school house

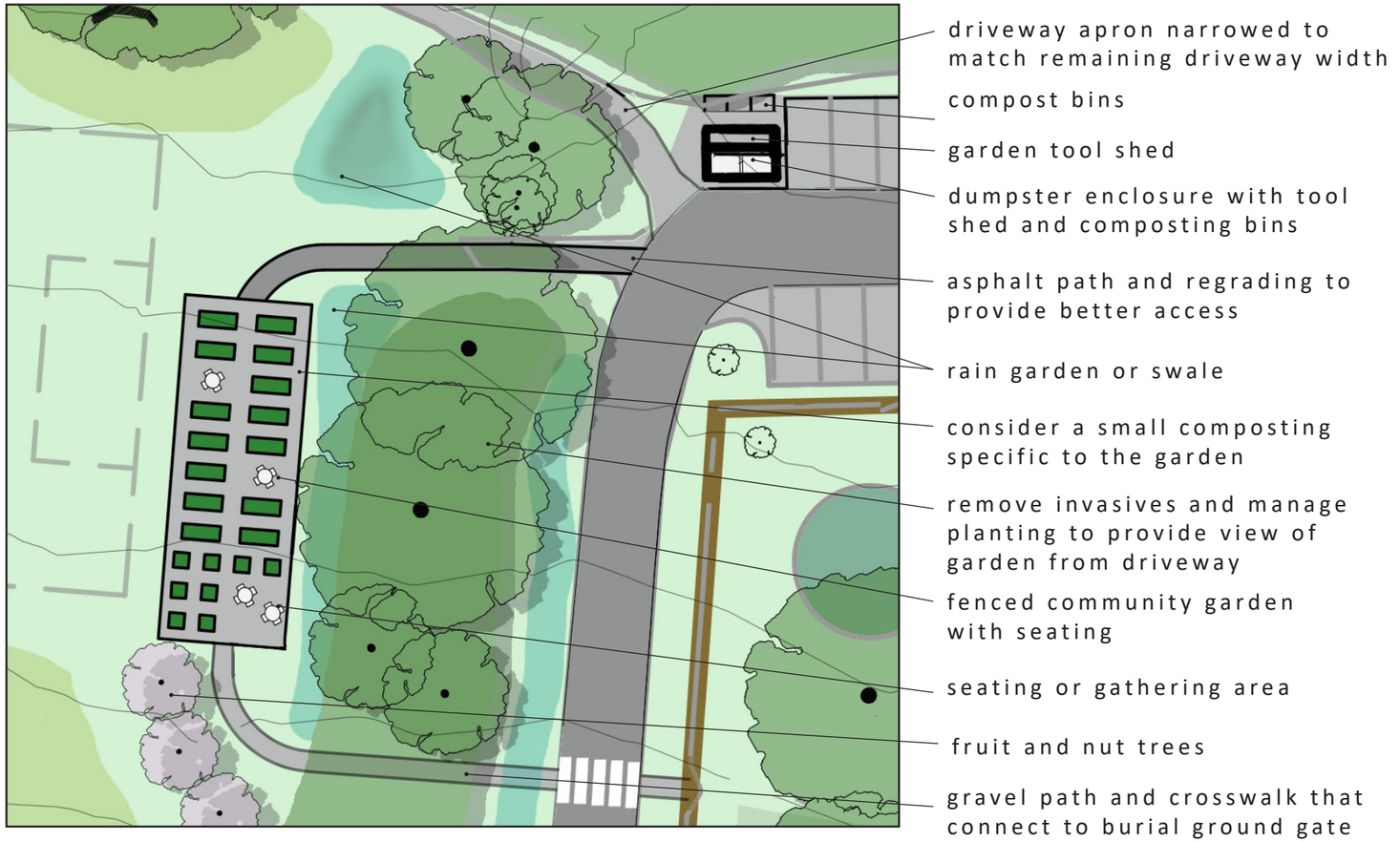
landscape berm with new fencing

existing berm tied into new berm

COMMUNITY GARDEN

Methods

- Locate garden to avoid natural swale and low spots along hedgerow.
- Use rain gardens to mitigate stormwater runoff and protect garden from flooding. Rain garden plants could also support pollinators.
- Manage invasives in hedge row and selectively limb-up trees to provide view of garden from the driveway.
- Provide accessible path from driveway to north end of garden. Provide gravel trail connection at south end of garden for school children.
- Consider adding fruit and nut trees and fruiting shrubs, like highbush blueberry and elderberry, for additional gardening opportunities.
- Include seating and informal gathering areas throughout the garden. Seating can double as storage benches.
- Create a maintenance yard at the edge of the parking lot for large tool storage and composting bins.



Composting bins

Raised accessible planter

Small plant beds for school children

CONTEMPLATIVE OR FAMILY GATHERING SPACE

Methods

- Meant for medium size group gathering (10-25 people)
- Multipurpose space that could be used for worship, a classroom, family picnics, or other small events.
- Seating that accommodates multiple uses and age groups.
- Suggest adding accessible path to fire pit so both can be used by all ages and mobility levels.
- Suggest resurfacing beginning of driveway with stabilized aggregate or similar for better accessibility. Refer to page 14.

View from proposed location

Pavilion with some enclosure and strategic views

Pavilion with open connections on multiple sides

Flexible seating options

INFORMAL GATHERING AREAS

Methods

- Meant to provide informal opportunities for small groups to gather or for individual use.
- Provide destinations throughout the property to encourage wider circulation and use.

1. Wood Grove
Small seating opportunties to stop enjoy the setting while on a walk through the property.

2. Meadow Boardwalk
Slightly elevated boardwalk gathering space. Provide seating with focus on overlook views.

3. Wetland Overlook
A boardwalk overlook that emphasizes the environmental and historical importance of this area.

4. Community Garden
Provide a variety of seating options that encourage enjoyment of the garden, even for non-gardeners.

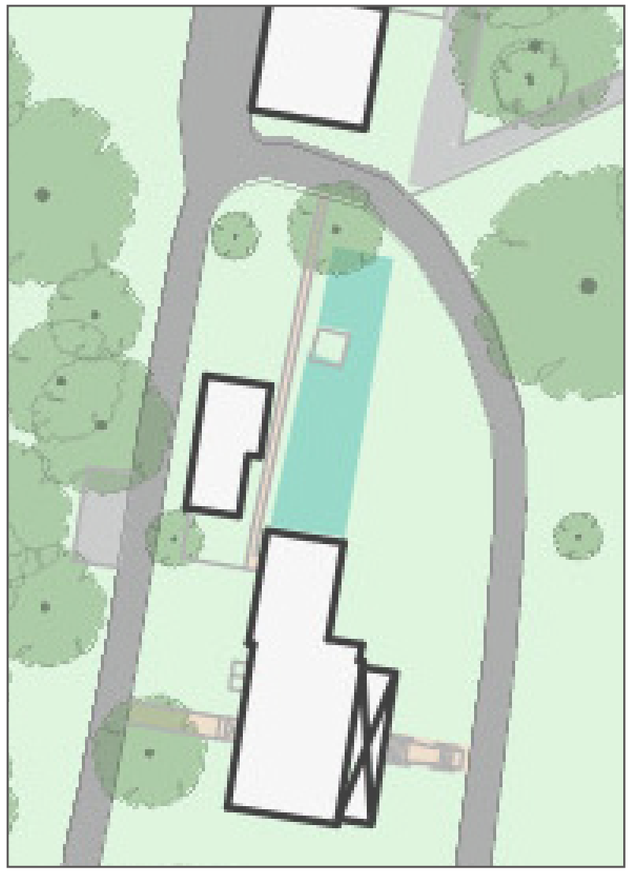
5. Fire Pit
Already a beloved gathering space, consider adding better access for all mobility levels.

6. Community Gathering Area
Space with flexible group seating that can be used after worship or community events. Provides easy access to interior gathering spaces and kitchen.

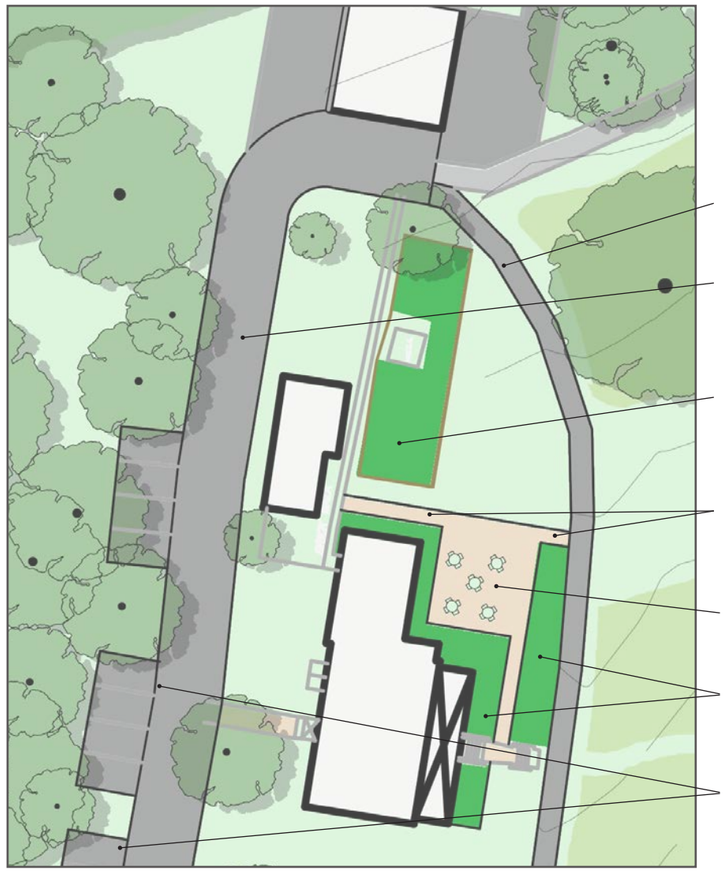
SHARED COMMUNITY SPACE

Methods

- Add outdoor space to extend use of Avalon House into the surrounding landscape.
- Could be used for community events or rented to outside groups for retreats, conferences, or weddings.
- Reduce vehicular drive in front of Avalon House to a paved pedestrian path.
- Foster connection, through programming and physical links, to the remainder of the property.



Existing Conditions



Proposed Conditions

Avalon House is naturally sited higher which provides opportunities for views out over the rest of the property.

Small patio that relates to building architecture and provides some seating opportunities.

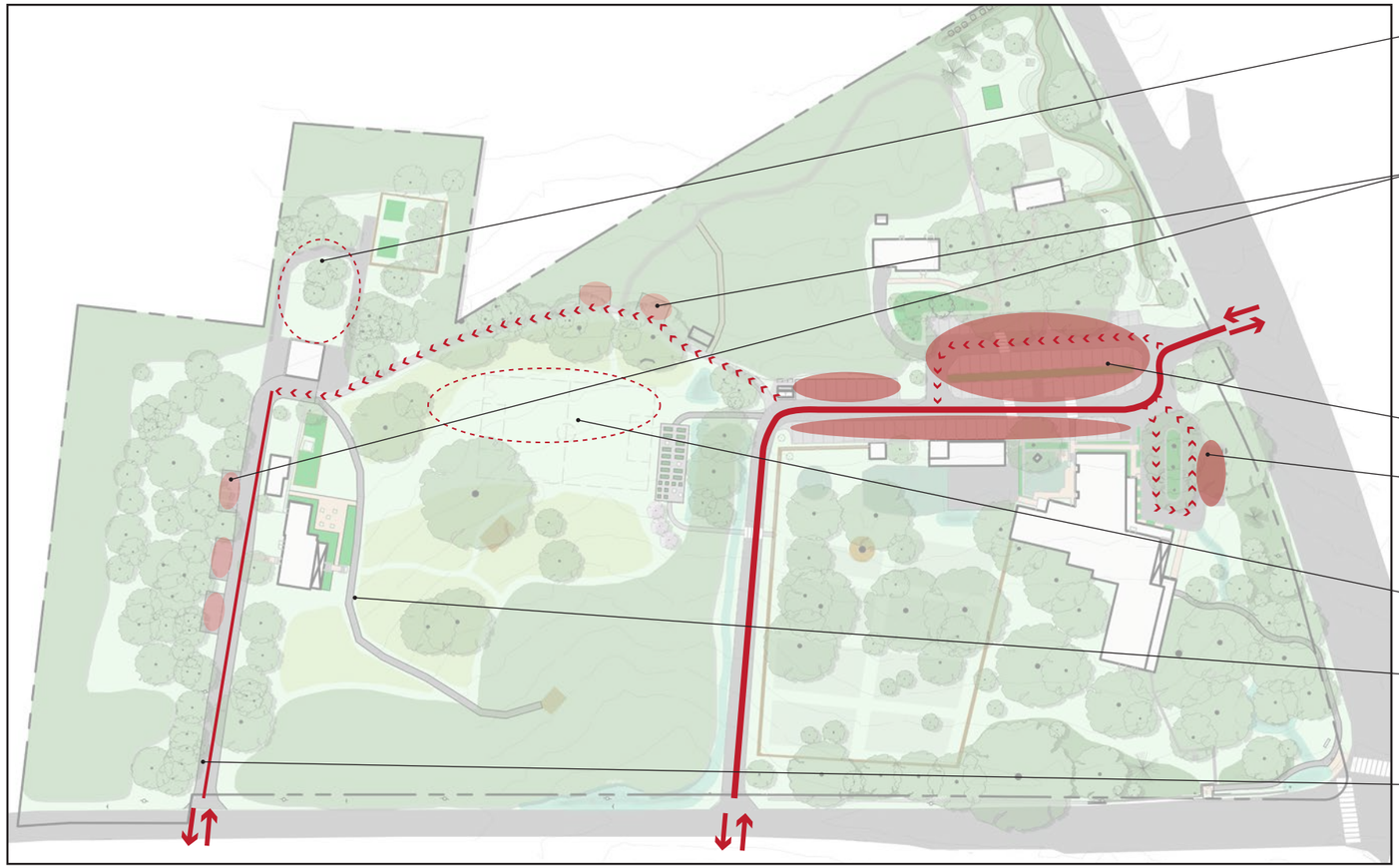
Small patio with overlook views and flexible seating options.

Small patio that is mostly enclosed by building and planting to provide a sense of privacy.

PARKING

Methods

- Treat parking as a supporting element of other site uses, rather than a primary use.
- Sensitively tuck small parking areas in close proximity to uses throughout the site rather than large concentrated areas.
- Allow landscape and vegetation to frame parking spaces and provide the experience of parking in a garden.
- Consider use of porous paving where funding and maintenance capabilities allow. Manage runoff from impervious parking areas in adjacent vegetated areas.
- Consider using curb stops to demarcate parking spots for better efficiency. Wood logs along planted areas provide a cost effective and low impact option.



Vegetation frames small parking areas to create the experience of 'parking in the garden'

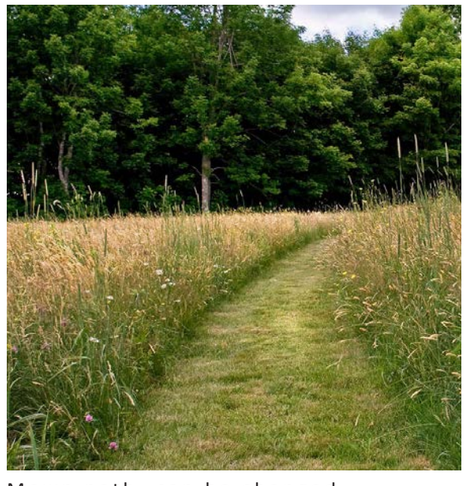
A change in materials and small pockets of planting can help minimize the visual impact of paved areas

Wood curbs to demarcate parking spots

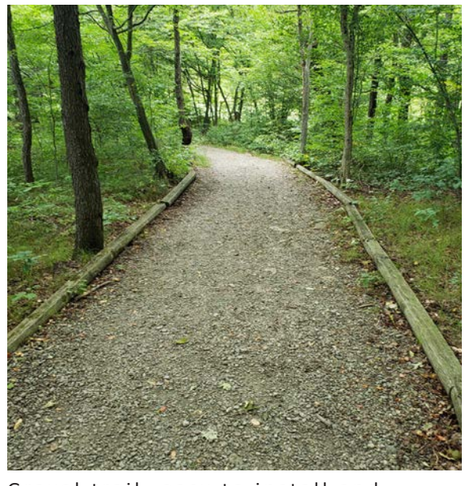
ACCESSIBILITY

Methods

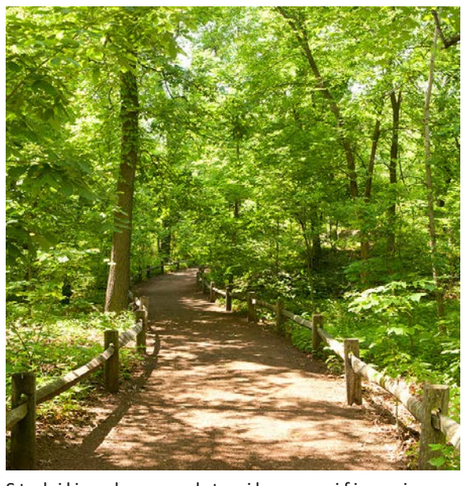
- Focus accessibility improvements in high traffic areas.
- To balance inclusiveness and environmental goals, focus on providing a high level of access to one of each type of activity or location on the property.
- Use pocket parking to strengthen access to features throughout the property, rather than focusing on access to all locations from the Meeting House.
- Consider use of porous paving where funding and maintenance capabilities allow.
- Consider using bonded or stabilized aggregate paths for higher level of accessibility:
  - http://www.chameleonways.com/products/addastone-resin-bonded-surfacing
  - https://www.dirtandgravel.psu.edu/general-resources/driving-surface-aggregate-dsa



Mown path- can be changed seasonally or over the years

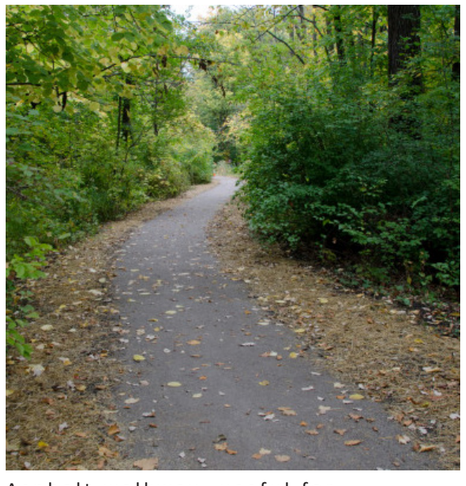


Gravel trail- easy to install and medium level of accessibility



Stabilized gravel trail- specific mix of gravel sizes allows for long-term stabilized surface with high level of accessibility

Elevated boardwalk path- great for areas where minimal earth disturbance is required



Asphalt walkway- useful for areas with high use by a range of pedestrian mobility levels and paths that require snow removal

LIGHTING

Methods

- Focus lighting improvements in areas of frequent year-round use, like walkways and building entrances.
- Additional lighting could be used gently throughout the rest of the property where three-season use or access is desirable, like the fire pit path.
- Lighting fixture types and sizes should relate to scale of areas to be lit. Small solar powered bollards are better suited for trails and walkways while pedestrian light poles are better suited for driveways and parking lots.
- Consider using solar powered fixtures where tree cover allows which removes the need for trenching and wiring throughout the property.
- Many lighting manufacturers will provide recommendations for fixtures and spacing with direction on intended use. They can be a great resource without having to immediately involve a lighting designer or engineer.

Existing pedestrian pole lighting

Solar powered bollard from First Light Technologies

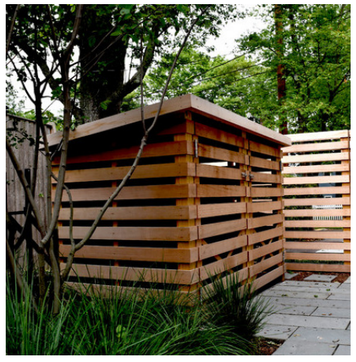
FENCING & BUILT AESTHETIC

Methods

- As existing fencing wears out, replace it with a consistent fencing type
- When new structures are built, relate architectural style and proportions to fencing and other new structures.
- Fencing and architectural patterns can share the same forms and patterns with a change in density based on screening needs.

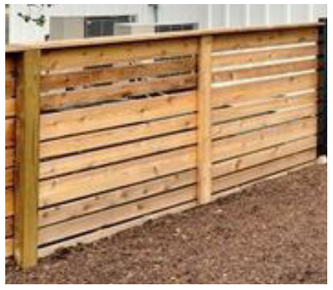

Gathering pavilion


Bus Shelter (preliminary draft)


Dumpster screening


Solar panel trellis

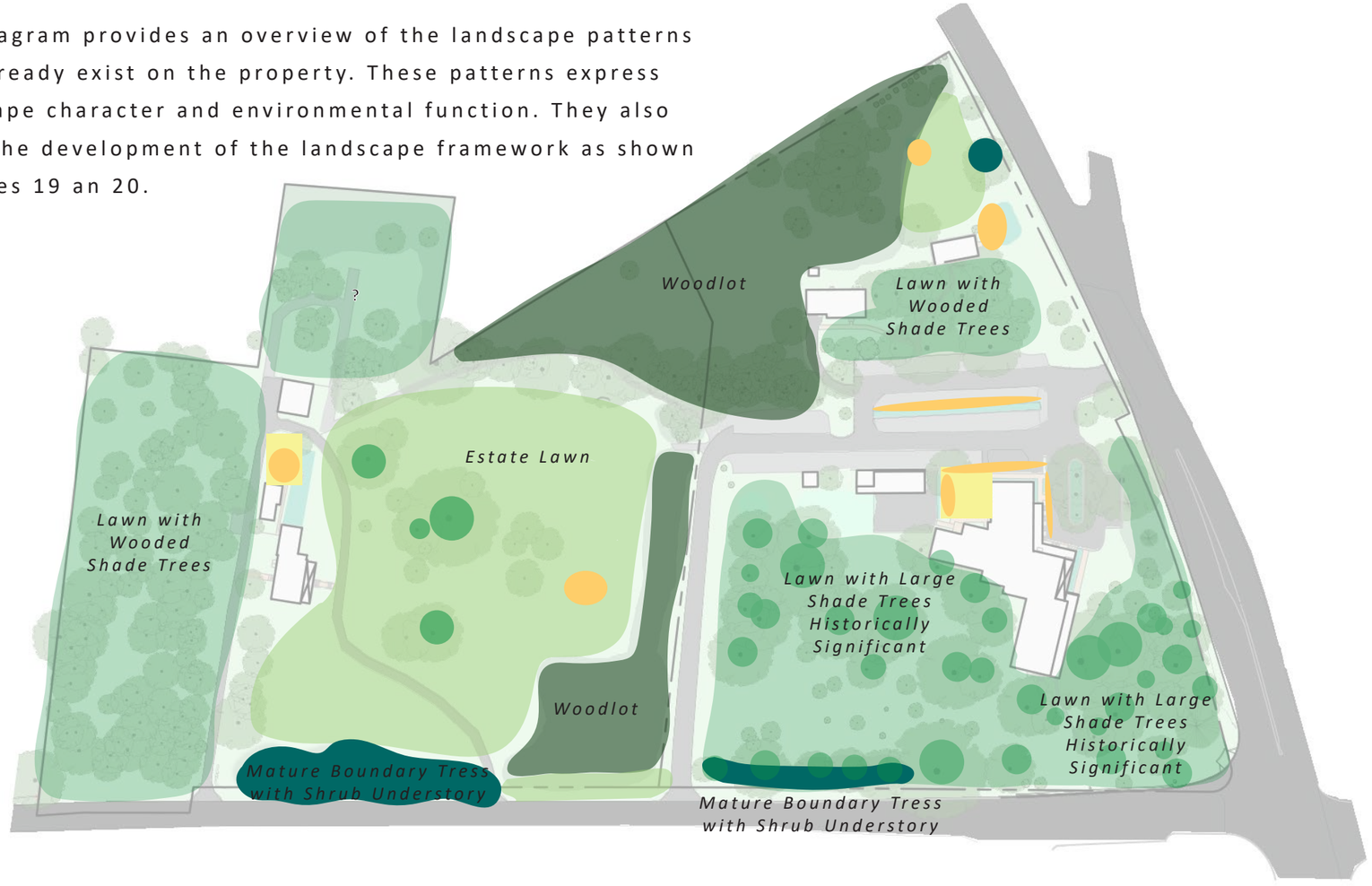

Fencing with varied levels of opacity




Prefered fence option

LANDSCAPE FRAMEWORK & PATTERNS

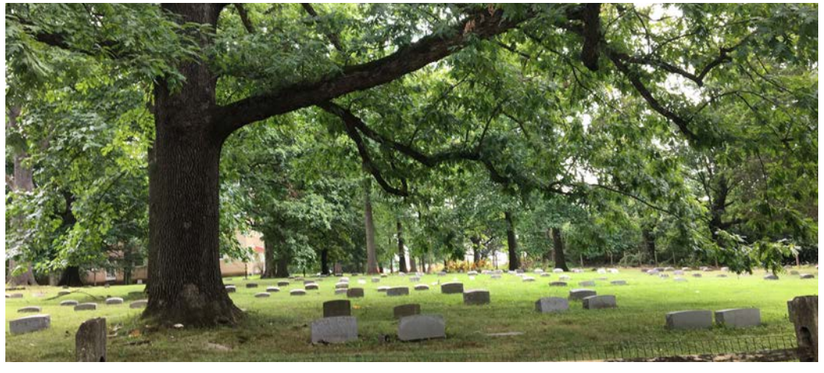
This diagram provides an overview of the landscape patterns that already exist on the property. These patterns express landscape character and environmental function. They also guide the development of the landscape framework as shown on pages 19 an 20.



courtyard garden

lawn with woodland shade trees

estate lawn



lawn with large shade trees and historical significance

Existing Landscape Pattern

This diagram divides the property into threes zones based on frequency of use and cultural landscape expectations. These zones can be used to guide the placement of new landscape features as shown on the following page. They can also be used to guide the management practices within each zone with manicured zones having a higher level of maintenance and wild zones being maintained only as needed to remove safety hazards or invasive species.

KEY

- Manicured Landscape
- Semi-Wild Landscape
- Wild Landscape

0' 100' 200'

SCALE: 1" = 100'-0"

Proposed Landscape Framework

The landscape patterns on the property, both existing and proposed, can be categorized into one of the three landscape zones. These patterns are organized by cultural expectations of the landscape where you expect to see 'tider' landscapes, like lawn or courtyard gardens, adjacent to buildings and 'messier' landscapes, like fallen trees and dense shrubs, on the periphery. Environmental function, at varying levels, is built into each of these patterns.

KEY

Manicured Landscape:

- *courtyard garden*
- *pollinator garden*
- *community garden*
- *lawn*

Semi-Wild Landscape:

- *meadow or meadow ribbons*
- *wooded grove*
- *roadside buffer*

Wild Landscape:

- *boundary screening*
- *woodland*

0' 100' 200'

SCALE: 1" = 100'-0"

Proposed Landscape Patterns

MEADOW OR MEADOW RIBBONS

Methods

- Characterized by lack of understory or canopy trees.
- Often contains warm season grasses and flowering perennials.
- Height can vary depending on implementation and mowing frequency.
- Can be implemented in large or small areas or concentrated ribbons.
- Mow edges, paths and other visual cues, like bird houses, can mitigate the unkempt perception.
- Refer to page 33 for implementation suggestions.

Visual maintenance cues like a mown edge and bat boxes

Grass and perennial meadow ribbons framed by lawn

Warm season grass meadow

Warm season grass meadow ribbons framed by lawn

Stormwater meadow ribbons

WOODED GROVE

Methods

- Characterized by low height groundcover, often cool season grasses, and an abundance of canopy trees.
- Some understory trees and large shrubs may be appropriate.
- Wildflowers, bulbs, and spring ephemerals are great additions and can be introduced by seed/bulbs, salvaged transplants, or plugs.
- At the burial ground, mown paths could be used for wayfinding.
- Overseeding new grass species may not be necessary. A reduction in mowing frequency and strategic invasive removal may be sufficient.

Turf and spring bulbs

Wild flowers mixed with taller cool season grasses

Mown grass paths at burial ground

Low height cool season grasses with some flowers

Medium height cool season grasses with some flowers

Ferns in denser tree canopy conditions

ROADSIDE BUFFER & BOUNDARY SCREENING

Methods

- The density, in both height and spacing, of vegetation should respond to specific screening needs:
  - *Roadside Buffer*: In areas where strategic sightlines are important but screening is still desired, provide a strong understory and shrub layer but strategically limb up trees to provide views.
  - *Boundary Screening*: In areas where a complete visual buffer is desired inter-mix canopy trees, understory trees, and shrubs.
- Provide a mix of slow and fast growing tree species so the buffer can self regenerate as older trees die out.
- In areas where clear visibility is needed, like adjacent to driveways, a wooded grove pattern should be used (refer to page 22).

Roadside Buffer: Naturalized placement of trees and shrubs

Roadside Buffer: Strategic limbing up of trees and selective understory planting allows a 'window' through the trees

Boundary Screening: Very dense tree planting will provide heavy screening

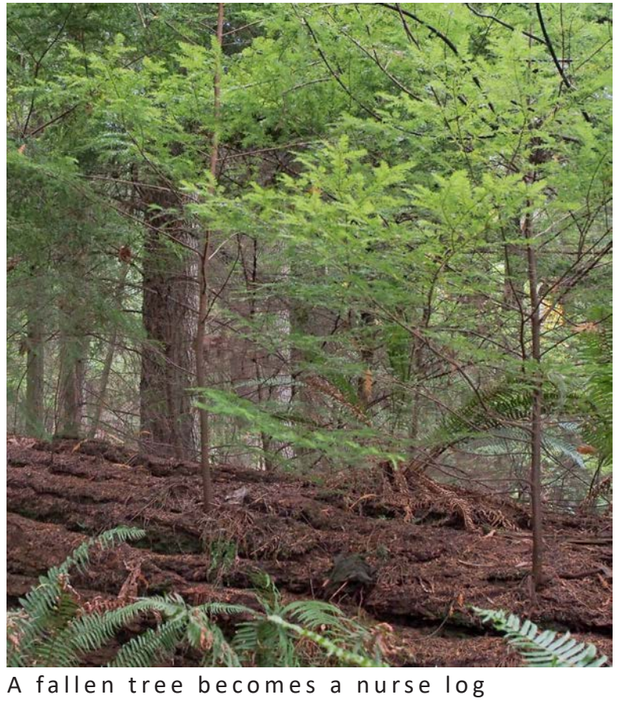
Boundary Screening: Existing hedgerow along Sumneytown Pike uses vegetation at different heights to form a solid screen

WOODLAND

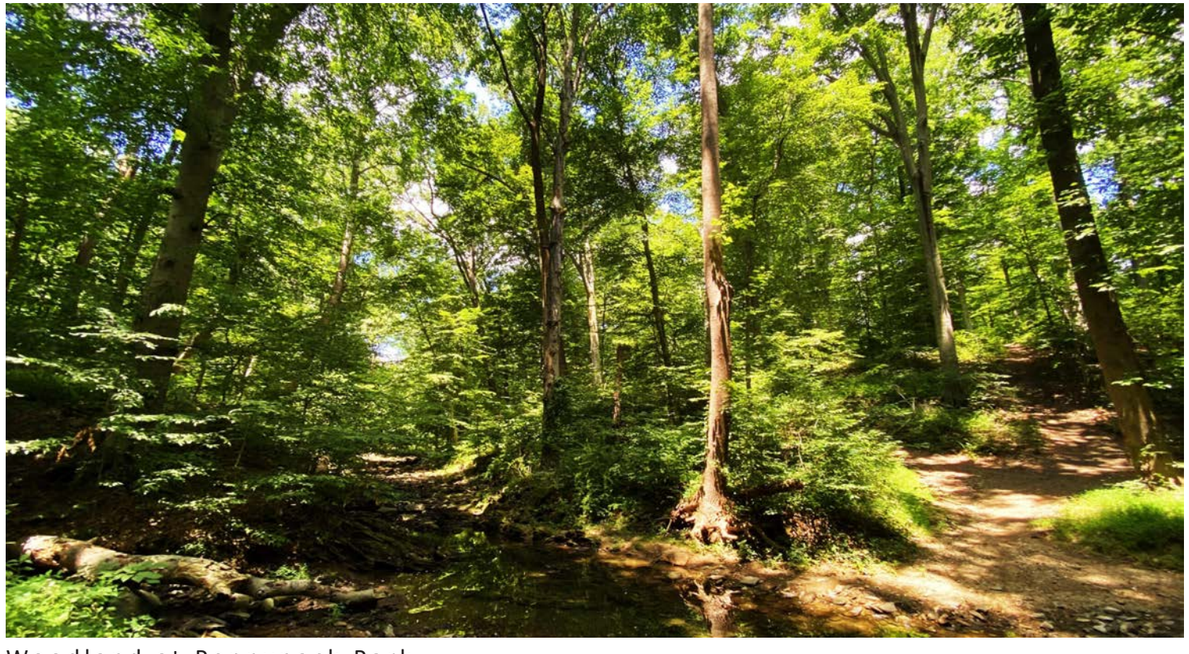
Methods

- Characterized by a strong combination of canopy trees, understory trees, and shrubs.
- Limit maintenance practices to removing safety hazards and invasive species.
- Use existing trees and shrubs as source for new plants. Consider propagation techniques, like collecting acorns, or the use of small deer exclosures.
- Bare root trees are available from several local PA nurseries and are great for installations where planting space is limited. They are more affordable and much easier for volunteers to plant.
- Leave fallen trees as nurse logs for new trees and plants.
- When planting new canopy trees, prioritize areas where dead or dying trees will leave an opening in the canopy cover. Closing the canopy will also disadvantage some invasive species.
- New trees will need protection from deer browse and rub. Refer to page 37 for more deer management resources.
- Avoid human tendency to plant trees in orderly patterns. Mimic natural patterns and spacing.
- The *Terrestrial & Palustrine Plant Communities of Pennsylvania* prepared by the Pennsylvania Natural Heritage Program is a great resource for identifying Pennsylvania community associations. It can help identify compatible additions to existing woodlands. It is available for free download here: *https://www.naturalheritage.state.pa.us/Communities_Classification.aspx#collapse3*

Combination of canopy trees, understory trees, and shrubs



A fallen tree becomes a nurse log



Woodland at Pennypack Park

STORMWATER MANAGEMENT

STORMWATER CORRIDORS VERSES SPECIFIC SITE INTERVENTIONS

stormwater corridor: broad moves, like reducing lawn and supporting healthy plant communities, that allows for dispersed infiltration

site intervention: targeted improvements, like rain gardens and swales, that respond directly to impervious site features or drainage low spots

KEY

- drainage pattern
- existing inlet
- low spot

0' 100' 200'

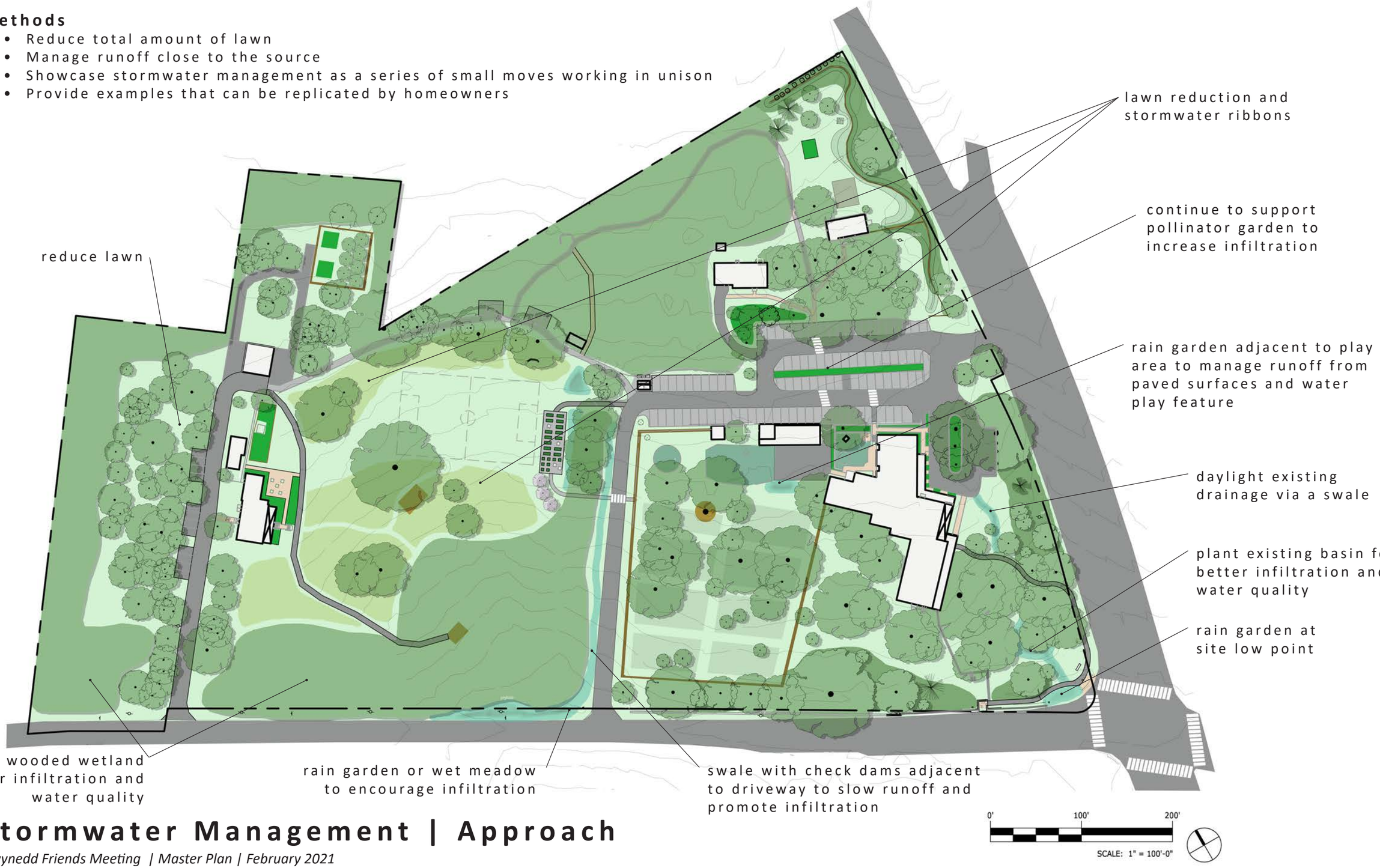
SCALE: 1" = 100'-0"

Stormwater Management | Existing Drainage Patterns

STORMWATER MANAGEMENT TECHNIQUES

Methods

- Reduce total amount of lawn
- Manage runoff close to the source
- Showcase stormwater management as a series of small moves working in unison
- Provide examples that can be replicated by homeowners



Stormwater Management | Approach

RAIN GARDEN

Methods

- A shallow depression that temporarily holds water to allow for infiltration. Will generally drain completely within 2 or 3 days of a storm event. Should be sized to reflect the total amount of impervious area square footage it is managing. A good guideline is using a 25:1 ratio. That means for every 25 square feet of impervious surface you provide 1 square foot of rain garden.
- Soil quality and infiltration rates will effect the rain garden's ability to manage stormwater.
- Placement is critical because water is often directed to a rain garden via surface overland flow. If water can not be directed to an immediately adjacent rain garden, use a swale or series of swales to convey the water to the rain garden.
- Rain gardens can also be placed at points where traditional infrastructure, like piping, daylights or could be daylighted.
- Small bridge and stepping stones can be used to provide a circulation path through rain gardens.
- Since the rain garden is often dry, except for during and immediately after rain events, the plant selections should focus on species that thrive is mesic conditions but can handle temporary inundation.

Rain garden to manage runoff from adjacent lawn

Suggested plants

- Sunny sites:

  Fox Sedge (Carex vulpinoidea), Bur Sedge (Carex grayi), Lurid Sedge (Carex lurida), Soft Rush (Juncus effusus), New Englad Aster (Aster novae-angliae), Milkweed (Asclepias species), Mistflower (Eupatorium coelestinum), Joe Pye Weed (Eupatorium dubium 'Little Joe'), Boneset (Eupatorium perfoliatum), Sneezeweed (Helenium autumnale), Soft Rush (Juncus effusus), Blazing Star (Liatris spicata), Scarlet Beebalm (Monarda didyma), Switchgrass (Panicum virgatum), Obedient Plant (Physostegia virginiana), Appalachian Mountain Mint (Pycnanthemum flexuosum), Mountain Mint (Pycnanthemum muticum), Green Headed Coneflower (Rudbeckia laciniata), Fireworks Goldenrod (Solidago rugosa 'Fireworks'), Indian Grass (Sorghastrum nutans), Spiderwort (Tradescantia ohiensis)

- Shady sites:

  Creek Sedge (Carex amphibola), Gray Sedge (Carex grayi), Pennsylvania Sedge (Carex pensylvanica), Eastern Star Sedge (Carex radiata), Turtlehead (Chelone glabra), Northern Seaoats (Chasmanthium latifolium), Tufted Hairgrass (Deschampsia cespitosa), Joe Pye Weed (Eupatorium dubium), Boneset (Eupatorium perfoliatum), Iris (Iris versicolor), Golden Ragwort (Senecio aureus)

Circulation bridge through a rain garden

Rain garden doubles as a play area in between storms

WET MEADOW

Methods

- An area that is often wet or saturated, even in between rain events. This can be due to location but often is attributed to slow draining soil types.
- The woodland along the Sumneytown driveway and the roadside ditch parallel to Sumneytown Road are great examples.

Suggested plants

- Refer to page 35 for more information on sourcing plants.
- Sunny sites: Fox Sedge (Carex vulpinoidea),Virginia Wildrye (Elymus virginicus), Lurid Sedge (Carex lurida), Blue Vervain (Verbena hastata), Soft Rush (Juncus effusus), Swamp Milkweed (Asclepias incarnata), Oxeye Sunflower (Heliopsis helianthoides), Common Sneezeweed (Helenium autumnale), New England Aster (Aster novae-angliae), Joe Pye Weed (Eupatorium fistulosum), Wrinkleleaf Goldenrod (Solidago rugosa)

- Shady sites: Fox Sedge (Carex vulpinoidea),Virginia Wildrye (Elymus virginicus), Lurid Sedge (Carex lurida), Blunt Sedge (Carex scoparia), Blue Vervain (Verbena hastata), Soft Rush (Juncus effusus), Oxeye Sunflower (Heliopsis helianthoides), Boneset (Eupatorium perfoliatum), Woolgrass (Scirpus cyperinus), New York Ironweed (Vernonia noveboracensis)

Saturated wet meadow

Boardwalk trail through a wet meadow

A wet meadow in the floodplain of a small creek

A wet meadow adjacent to a stormwater culvert

IMPLEMENTATION

GETTING STARTED

Methods

1. *Start small and exciting:* start with realistic projects that provide a tangible result and help build excitement for future projects.
2. *Use signage and visual maintenance cues:* help folks understand the process and the intention of the project.
3. *Leverage community days:* focus on projects that can be undertaken by volunteers over a couple of days.
4. *Find ways to stay engaged:* Look for educational opportunities and seasonal events that re-engage the community with the landscape.

Signage to guide maintenance

Signage for education


Visual maintenance cues like a mown edge and bat boxes


Bird box camera for continued engagement

Invasive species disposal station to encourage long-term engagement

REMOVING INVASIVES & TURF

Methods

1. Weed Barrier Site Preparation

- Black plastic, newspaper, or cardboard can be used to suppress turf or invasives
- The goal is to interrupt the plant's growing cycle so the barrier should be placed in the late spring and kept in place until late fall or until the following spring, depending on the plant species in the replacement seed mix (warm or cool season).
- Can be used in small or large areas depending on the amount of volunteer staff to manage the area post-seeding.

2. Mowing After Planting

- Most annual invasives can outpace native plant growth within one month.
- Mowing should happen when the invasive plants are 6-12 inches higher than the native plants. Invasives should be mown when they are flowering but before they set seed.
- For the first 2-3 growing seasons, an area usually needs to be mown once a month to control invasives. After those first growing seasons, the mowing can usually be reduced to two or threes times in a season (roughly every 2-3 months)

3. Natural Herbicides

- Horticultural vinegar, clove oil, or citrus oil can be used for targeted or wholesale management.
- Work best when it is sunny with high temperatures

4. Pre-emergents

- Corn gluten based products can help suppress weed germination without harsh chemicals.
- Works best around seed germination cycles, early spring (cool season weeds) or early summer (warm season weeds). Use only in areas where you are not over-seeding with beneficial plants.

Dead turf where black plastic was placed for 9 months

Mowing to knock invasives back

Selective invasive removal

CONVERTING LAWN TO MEADOW & MOWING GUIDELINES

Methods

***It is strongly recommended to obtain professional assistance to help guide the conversion, establishment, and management of a meadow.**

1. 'Let It Go' Approach

- Works best where a good seed bank is likely present. Also works best when the area is not bordered by other areas with high levels of invasive species.
- May through late June, mow to maintain 6" height.
- In July, stop mowing to see which native plants are growing in the area.
- Selectively remove invasives and undesirable vegetation. Pulling, cutting, or spot application of natural herbicides such as horticultural vinegar, clove oil, or citrus oil could be used. Several rounds of invasive removal may be necessary depending on the growth habits of those species.
- Overseed in late fall or mid-spring with supplemental native species or install supplemental plugs.

2. Strategic Plug Planting Directly Into Lawn

- This strategy should be limited to small areas where turf grass species are not currently thriving.
- Plug species should be competitive enough to out compete turf root systems.
- Meadow maintenance should consider frequent late-spring to early summer 'high' mowing, following by a rest period during the summer through fall (per method #1). This strategy will further suppress the turf in favor of summer-growing native species.

3. Strategic Removal Of Turf With Seeding Or Plug Installation

- Remove turf grass in limited areas, such as ribbons or areas that are manageable for volunteers. Strip sod and upper layers of topsoil down to mineral soil.
- There are several alternative natural methods for suppression of turf like the use of black plastic or newspaper. These can be highly effective but require a longer time commitment.
- After initial suppression and removal, allow time for one or two rounds of weed germination and removal prior to new planting. Site preparation is essential to minimizing weed control needs later.
- Turf removal should be timed according to proposed seed species (cool versus warm season plants)

4. Strategic Removal Of Turf And Topsoil

- In areas where grading changes are desirable, consider stripping the first few inches of topsoil for use elsewhere.
- Most native meadow species prefer lean soil and can out compete invasives in tough soil conditions. Do not add fertilizer. Do not add compost from sources that may contain weed seeds.

Suggested Deer Resistant Plant Species

Little Bluestem (Schizachyrium scoparium), Virginia Wildrye (Elymus virginicus), Big Bluestem (Andropogon gerardii), Switchgrass (Panicum virgatum),Indiangrass (Sorghastrum nutans), Sideoats Grama (Bouteloua curtipendula), Purple Coneflower (Echinacea purpurea), Partridge Pea (Chamaecrista fasciculata), Lanceleaf Coreopsis (Coreopsis lanceolata), Blackeyed Susan (Rudbeckia hirta), Oxeye Sunflower (Heliopsis helianthoides) Marsh Blazing Star (Liatris spicata), Wild Senna (Senna hebecarpa), Golden Alexanders (Zizia aurea), Aromatic Aster (Aster oblongifolius), Narrowleaf Mountainmint (Pycnanthemum tenuifolium), Blue False Indigo (Baptisia australis), White Beardtongue (Penstemon digitalis), Wild Bergamot (Monarda fistulosa), Mistflower (Eupatorium coelestinum), Gray Goldenrod (Solidago nemoralis)

Before meadow seeding

Meadow seeding a few months after installation

Meadow three years later

TREE ESTABLISHMENT FROM SEED

Methods

- Delay lawn mowing in the spring. Wait till after the early crocuses bloom, and then delay each mowing by about 1-2 weeks from your normal timing. Before mowing, walk the lawn around desirable large mature trees and look for young tree seedlings. Seedling trees should emerge in mid to late spring.
- Stake desired seedlings so they're not run over with a mower. Provide an open wire mesh tree shelter to discourage deer browse.
- Provide a small ring of mulch around the seedling tree to discourage thick lawn growth immediately next to the tree. Avoid placing mulch against the stem. Seedling trees competing with lawn will grow more slowly.
- Young sapling trees can be transplanted in early spring before they leaf out, if you want to move them to a final location.
- Thin your young tree grove selectively. Remove smaller / weaker/ storm damaged young saplings to favor the stronger saplings. This can be done over a 5+ year period. Some of this thinning will happen naturally, due to weather and natural selection. Only half the seedling trees may survive to adulthood. Note that conventional tree plantings, if planted and left with minimal follow up care, may also have 30-50% losses.

Note: you can also collect seed / acorns and grow trees in pots, but this represents more planning and time up front. Potted acorns need to be protected from squirrels.

Advantages: seed-grown trees are genetically diverse, locally adapted, and – as the offspring of long-lived historic trees on the property – represent the future heritage of our regional forests. Nursery grown trees, by contrast, are predominantly vegetatively propagated clones grafted onto separate root stock; they are typically selected for horticultural merit, but they are genetically identical. The seedlings are volunteers and are free.

Disadvantages: seedling trees take more time to grow – some patience is required. Some additional maintenance provisions are needed to protect the young trees within the lawn area. Not every seedling will survive long term, so it's best to start with more seedlings than you ultimately want; this mimics the natural plant community processes.

Seedling oak in lawn

Approx. 1 year old seed grown oak in lawn (same tree as left image)

Seed grown oak at approx. 15 years

SOURCING PLANTS & RESOURCES

Methods

- Reduce mowing frequency in areas where mature trees and shrubs already exist. Flag or fence seedlings to protect them from future mowing and wildlife.
- Collect acorns and seed from existing vegetation and manually distribute seed in new areas or propagate for future planting.
- Several local environmental centers, like Longwood Gardens and Mt. Cuba Center, offer low cost seed collection and propagation classes.
- For plant species that don't exist on the property or are hard to establish from seed, consider purchasing plugs or containers from local native plant nurseries. Many do not sell to directly to homeowners but will work with non-profits and business owners. Here are some suggestions:
  - North Creek Nursery
  - New Moon Nursery or Pollen Nation
  - Redbud Native Plant Nursery
- Always source new seed from reliable distributors. Often these distributors can help with species selection, seeding mixes, and installation guidance. Ernst Seed is a great resource and will sell and ship directly to homeowners. Bowman's Hill Wildflower Preserve sells hard to source native plants in smaller sizes. Brandywine Conservancy also collects and sells seed from their property. They can be a great source for local species that are otherwise hard to source.

Plants that area easy to propagate from seed:

Trees: Silver Maple (Acer saccharinum), Red Maple (Acer rubrum), Red Oak (Quercus rubra), American Holly (Ilex opaca), Black Locust (Robinia pseudoacacia), Black Walnut (Juglans nigra)

Shrubs: Eastern Red Cedar (Juniperus virginana), Blue False Indigo (Baptisia australis), Staghorn Sumac (Rhus typhina), some native Viburnums, Northern Bayberry (Myrica pennsylvanica)

Grasses: Splitbeard Bluestem (Andropogon ternarius), Big Bluestem (Andropogon gerardii), Sideoats Grama (Bouteloua curtipendula), Purple Lovegrass (Eragrostis spectabilis), Little Bluestem (Schizachyrium scoparium), Indian Grass (Sorghastrum nutans), Redtop (Agrostis gigantea), Switchgrass (Panicum virgatum)

Perennials: Columbine (Aquilegia canadensis), Purple Coneflower (Echinacea purpurea), Pale Purple Coneflower (Echinacea pallida), Lanceleaf Coreopsis (Coreopsis lanceolata), Large Leaf Coreopsis (Coreposis grandiflora), White Beardtongue (Penstemon digitalis), Nodding Onion (allium cernuum), Swamp Milkweed (Asclepias incarnata), Black-eyed Susan (Rudbeckia hirta),

Annuals and Biennials: Indian Blanket (Gaillardia pulchella), Spotted Horsemint (Monarda punctata), Plains Tickseed (Coreopsis tinctoria)

Plants that area easy to propagate from cuttings or suckering:

Red Twig Dogwood (Cornus sericea), New Jersey Tea (Ceanothus americanus), Summersweet (Clethra alnifolia), Bottlebrush Buckeye (Aesculus parviflora), Willows (Salix)

MANAGING LANDSCAPE DEBRIS

Methods

- Use the landscape framework on page X to guide debris management.
  - 'Wild' areas should be left alone aside from occasional safety hazards adjacent to trails or occupied spaces. Let leaves and trees lie where they fall.
  - 'Semi-Wild' areas should have only occasional debris removal if it impacts use of the area. Consider mowing to mulch leaves in place in the early spring. Remove dead or fallen trees if they pose a safety hazard.
  - 'Manicured' areas should be maintained at the level that supports it's use (ie, play area, garden, etc.). Raking leaves in play areas helps support better use of that area.
- If a dead tree is a safety concern, consider leaving the tree as a standing snag (where the upper portion of the tree is removed).
- Use Hugelkultur, the practice of mounding logs and decomposable debris, as a soil creating device.
- Consider landscape debris as an educational moment and a chance to foster healthy landscape practices in future generations.

Hugelkultur used in a woodland setting

Hugelkultur used to create landscape forms

Use trees and logs as play features or temporary art installations in the landscape

A fallen tree in a woodland becomes habitat and a play feature

Example of a standing snag left to provide habitat

Example of a standing snag turned into a play feature. Consider this approach for significant trees like the William Penn Tree

DEER MANAGEMENT

Methods

- A traditional deer fence, 8 foot high with small openings, is very successful in keeping deer away from sensitive plants but can be expensive. Also, placing such tall fencing around all side of a property or select property areas can often be incompatible with uses in those areas.
- Rigid protection mesh around the trunks of young trees can help protect against buck rub but it will not prevent deer browse.
- Without additional fencing, newly planted trees will need to be tall enough to minimize damage from deer browse.
- Micro-exclosures can be useful for temporarily protecting certain areas. Overall size should be small, around 16ft x 16ft, to be effective. Would be a great option for test pilot areas. Would also be useful in figuring out what plants are already in the seedbank in certain areas, before undertaking larger changes in cover type.

Traditional deer fence

Traditional deer fence at Valley Forge National Park

Rigid protection fence

Micro-exclosure

Adjustable micro-exclosure fence

PHASING OVERLAY & BUDGET

PHASING

This diagram provides a starting point for community discussions about project phasing and should be adapted over time based on priorities. To aid those discussions, this diagram illustrates which projects could likely be accomplished with just volunteers, which need professional involvement, and which will likely need a combination of volunteers and professionals. For example, it may be worthwhile to involve a professional for the meadow conversion project to ensure a higher success and satisfaction rate, especially when only using natural invasive species suppression methods. Often, such professionals can remain involved in the project for several years, providing guidance and answering questions as needed.

KEY

- volunteer built project
- volunteer landscape improvements
- volunteer and limited professional involvement built project
- volunteer and limited professional involvement landscape project
- professionally documented and contractor built project

0' 100' 200'

SCALE: 1" = 100'-0"

UNIT COSTS

This table provides unit and labor costs for materials suggested within the master plan. Unit, or material, costs are provided separately from the labor costs to aid in project estimating for community built projects. When estimating contractor built projects, unit and labor costs should be added together. A schematic summary of approximate project sizes is provide below for initial cost comparison purposes.

NOTES:

1. Unit costs are based on past project experience and RS Means Site and Landscape Cost Data. Unit costs are contractor rates and will vary from retail costs.
2. The unit costs are meant to help generate comparative cost estimates and a project order of magnitude cost but a specific cost estimate should be obtained from a contractor prior to the start of any work.
3. Costs do not include contractor profit, contingency, or general conditions. These mark-ups can very greatly based on the scale and scope of the project. Generally, a contingency of 10-15% should be applied when generating an order of magnitude cost estimate with greater contingency applied to projects with structural components or extensive earthwork.
4. Total project costs can vary greatly depending on scale of individual installations.
5. Costs do not include any maintenance expenses.

AREA	SIZE	UNIT
Community Garden -fence	180	LF
Community Garden-north pathway	430	SF
Community Garden-south pathway	400	SF
Parking Pockets-along existing gravel drive (each)	430	SF
Parking Pockets-along Avalon House drive (each)	575	SF
Avalon House- expanded driveway	7,700	435
Avalon House- courtyard	1,000	SF
Intersection Paths- to bus shelter	550	SF
Intersection Paths- to Meeting House	1,200	SF
Berm- fill	5,000	CF
Berm- fence	435	LF
Meadow Planting	43,500	SF

CATEGORY	MATERIAL	SIZE	UNIT	UNIT PRICE	LABOR PRICE
Paving					
	Asphalt path paving-1 1/2" thick binder course, 1 1/2" thick wearing course, 3" stone base		SF	$10.00	$6.00
	Asphalt roadway paving- 3" thick binder course, 2" thick wearing course, 6" stone base		SF	$18.00	$6.00
	Porous asphalt paving- 8" stone base		SF	$20.00	$8.00
	Concrete paving- unreinforced, 4" thick, 6" stone base, for small areas		SF	$14.00	$6.00
	Pavers- concrete unit pavers, 4" stone base		SF	$14.00	$6.00
	Pavers- natural stone pavers, 4" stone base		SF	$22.00	$12.00
	Gravel path- 3/4" crush stone, 3" thick, compacted		SF	$2.00	$1.00
	Wood deck or boardwalk- pile support, 5ft x 20 ft		SF	$27.00	$33.00
Grading					
	Rough grading- areas less than 400 SF		EA	-	$650.00
	Rough grading- areas 1000 - 3000 SF		EA	-	$1,100.00
	Rough grading- areas 3000 - 5000 SF		EA	-	$1,600.00
	Fine grading- for paving, small area		SY	-	$4.50
	Fine grading- for paving, large area		SY	-	$2.00
Fencing					
	Wood Board Fence- 3ft ht, 1"x4" boards, 4"x4" posts, pressure treated		LF	$11.00	$9.00
	Wood Board Fence- 6ft ht, 1"x4" boards, 4"x4" posts, pressure treated		LF	$19.50	$10.25
	Wood Board Fence- 3ft ht, 1"x4" boards, 4"x4" posts, cedar		LF	$13.25	$9.00
	Wood Board Fence- 6ft ht, 1"x4" boards, 4"x4" posts, cedar		LF	$21.00	$10.25
	Welded Wire- 5ft ht, galvanized, with wood posts		LF	$12.00	$9.00
	Wire Mesh- 6ft ht.		LF	$2.50	$3.00
Deer Protection					
	Tree shelters- 4ft ht. with stake		EA	$4.00	-
	Snow fencing- black open mesh 4ft ht. with posts		LF	$2.50	-
	Snow fencing- wood 4ft ht. with posts		LF	$7.50	-
	Fence- 8ft ht. metal mesh, galv. steel post		LF	$22.00	$10.00
Planting					
	Tree- B&B (ball and burlap)	2" cal.	EA	$175.00	$55.00
	Tree- container	#15	EA	$60.00	$35.00
	Tree- bare root	4ft ht.	EA	$30.00	$25.00
	Shrubs - container	#5	EA	$55.00	$8.00
	Plant- plug	tray of 50	EA	$1.25	$1.50
	Plant- container	#1	EA	$5.50	$2.50
	Bulb	-	EA	$0.50	$1.00
	Seeding- native grass and perennial mix, push spreader	-	MSF (1,000 SF)	$15.00	$55.00
	Seeding- native grass and perennial mix, drill seeder	-	MSF (1,000 SF)	$15.00	$80.00
	Weed Control- black plastic and metal stakes	-	MSF (1,000 SF)	$30.00	$10.00

Phasing and Budget

PLANTING COSTS

The table below illustrates a typical planting budget for 1,000 SF of space and includes professional labor costs. This estimate does not include site preparation work like grading or soil placement.

As illustrated in the table, the plant size at installation can result in a significant cost difference. Plugs, container, and bare root trees are available from several local plant nurseries and can be a great cost savings strategy if adequate deer protection can be provided while the plants establish.

For areas where the community would like a quicker impact from the planting, say to generate excitement for a future project or in a highly visible area, use of large plant sizes at installation may be worth the additional cost.

CATEGORY	QTY		PLANTING TYPE	SIZE	NOTES	UNIT PRICE & LABOR			
Garden Areas									
	1000 SF								
PLUG SIZES									
	65%	650	native grasses	tray of 50	12" o.c.	$1,787.50			
	35%	438	native perennials and groundcovers	tray of 50	9" o.c.	$1,203.13			
	35%	350	bulbs		clusters of 3-5	$525.00			
			overseeding by hand		entire area	$15.00			
							$3,515.63	budget total	$ 3.52 budget/SF
Garden Areas									
	1000 SF								
#1 SIZES (GALLON)	65%	163	native grasses	#1	24" o.c.	$1,300.00			
	35%	350	native perennials and groundcovers	#1	12" o.c.	$2,800.00			
	35%	350	bulbs		clusters of 3-5	$525.00			
			overseeding by hand		entire area	$15.00			
							$4,625.00	budget total	$ 4.63 budget/SF
Woodland Screening Areas									
	1000 SF								
		10	trees - bare root	#15	1 per 100 SF	$550.00			
		6	shrubs - container	#5	3 per 500 SF	$378.00			
			native groundcover seeding		entire area	$70.00			
	35%	350	bulbs		clusters of 3-5	$525.00			
							$4,318.94	budget total	$ 4.32 budget/SF
Woodland Screening Areas									
	1000 SF								
		10	trees - B&B	#15	1 per 100 SF	$2,300.00			
		6	shrubs - container	#5	3 per 500 SF	$378.00			
	50%	500	native perennials and groundcovers	LP 72	12" o.c.	$1,375.00			
	35%	350	bulbs		clusters of 3-5	$525.00			
							$7,373.94	budget total	$ 7.37 budget/SF

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