Massachusetts Department of Conservation and Recreation

Wompatuck State Park

Circulation Master Plan

Draft Trail Typology and Trail System Design

October 3, 2023

Commonwealth of Massachusetts

Governor
Maura Healy

Lieutenant Governor
Kim Driscoll

Energy and Environmental Secretary
Rebecca Tepper

Department of Conservation and Recreation Commissioner
Brian Arrigo

DCR MISSION

To protect, promote and enhance our

commonwealth of natural, cultural

and recreational resources

for the well-being of all.

Meeting Logistics

- Please provide feedback after the presentation

  - You will find information on how to give feedback at the end of the presentation

- Chat and Q&A function is open for comments during the presentation

- Cameras + microphones

  - Your camera is off

  - We will enable your microphone only when you are speaking after the presentation

Please note that this public meeting will be recorded at the recording will be posted online shortly after.

Meeting Agenda

- Introductions

- Project Summary

- Brief Summary of Inventory

- Framework for Typology and System Design

- Draft Typology

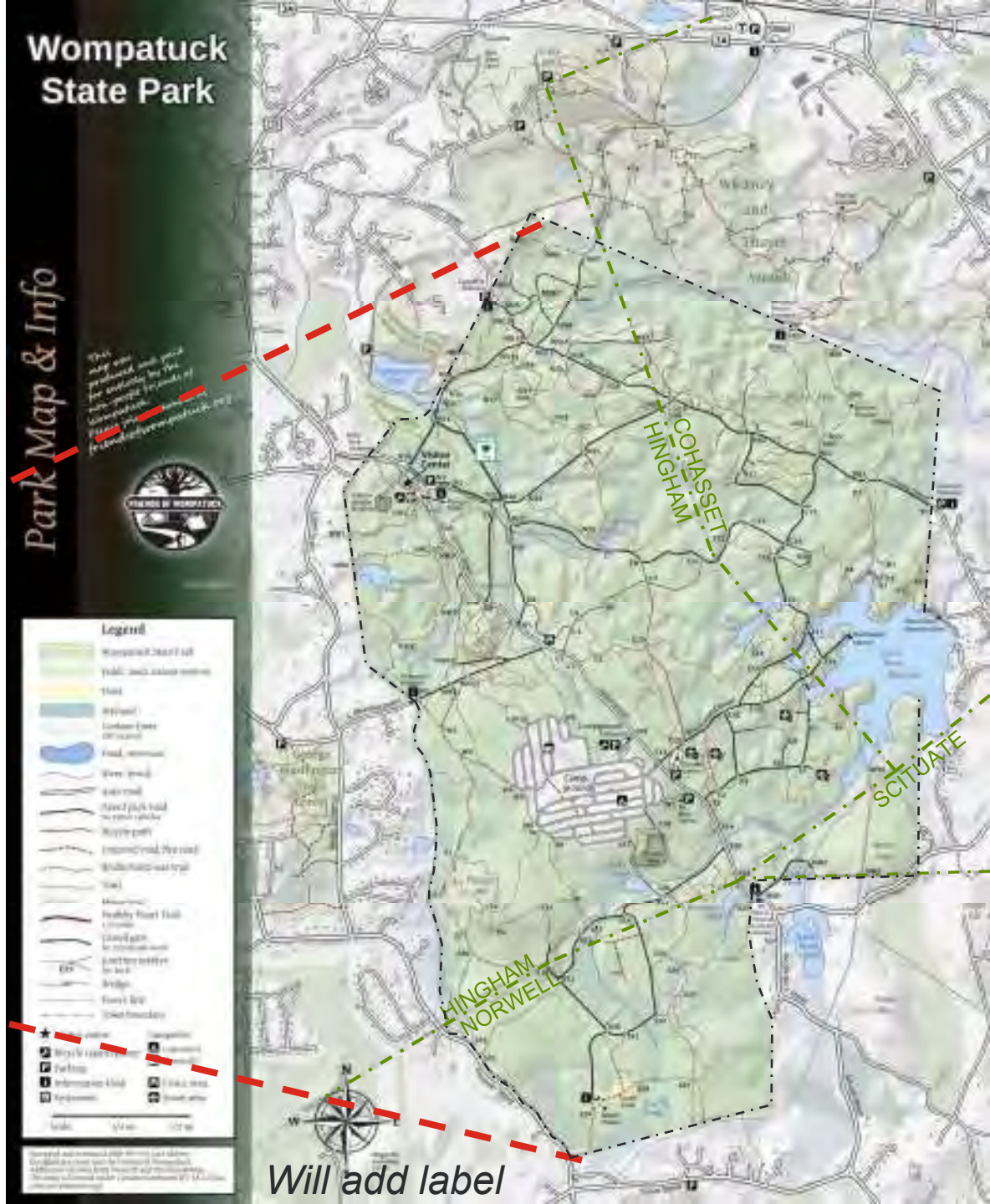- Draft System Design

- Listening Session

Aaron Reservoir

Project Team

- DCR: **Cass Chroust - PM**

- Consultant Team:

Toole Design

> Karen Fitzgerald – PIC
> **Kathleen Fasser – PM**
> John Dempsey – Deputy PM/LA
> Jacob Stein – Planner

LEC - Environmental Assessment

PAL - Archeological and Cultural Assessment

Natural trail in the northern area of the Park

PROJECT SCOPE AND SCHEDULE

Project Location

Context map

N

BOSTON

HULL

COHASSET

HINGHAM

WEYMOUTH

SCITUATE

NORWELL

SUFFOLK COUNTY

Massachusetts Bay

PLYMOUTH COUNTY

Wompatuck State Park

Park Map & Info

Legend

COHASSET
HINGHAM

SCITUATE

HINGHAM
NORWELL

Will add label

September 2023

Vision for Wompatcuk

The Wompatuck State Park circulation design is an organized system of a wide variety of trekking experiences, each uniquely composed to capture the full range of natural and human-made landscapes and encourage the discovery of the diverse environmental and cultural resources in the park.

Vision for Wompatuck State Park Trail Circulation

GOALS:

- Highlight ecological, scenic, and cultural features
- Provide specific, enjoyable recreational experiences
- Connect important destination inside and outside the park

Objectives:

- Avoid and protect sensitive areas (environmental and cultural)
- Meet expectations of users
- Minimize ecological impacts
- Minimize maintenance requirements
- Be physically, ecologically, and economically sustainable
- Enhance climate resiliency

TOOLE DESIGN   dcr

Project Scope

Circulation Master Plan

- Identify and evaluate trails, connections and environmentally & culturally sensitive areas

- Develop a hierarchical trail network master plan

- Develop new trail typology

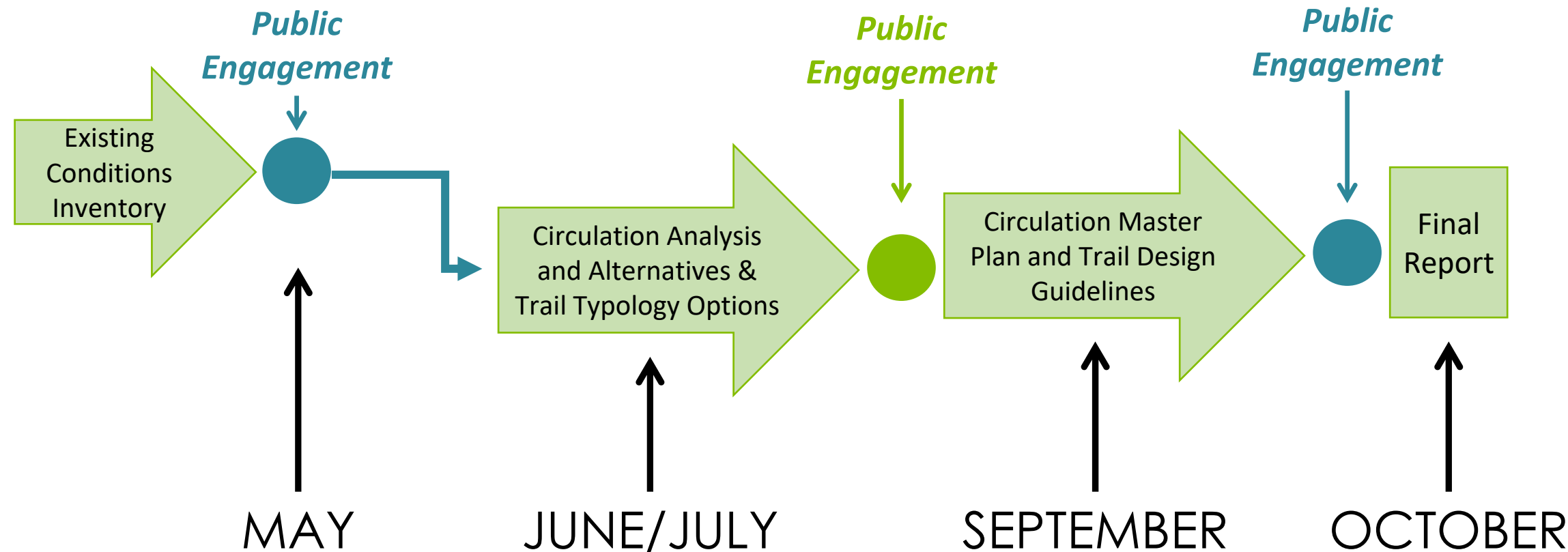- Recommend wayfinding changes to improve visitor orientation

Develop a comprehensive park guide with long-term and short-term trail circulation recommendations that will balance these recreational opportunities with the natural and cultural environment

Project Goal

Wompatuck Visitor Center

Project Timeline

Public Engagement

Public Engagement

Public Engagement

Existing Conditions Inventory

Circulation Analysis and Alternatives & Trail Typology Options

Circulation Master Plan and Trail Design Guidelines

Final Report
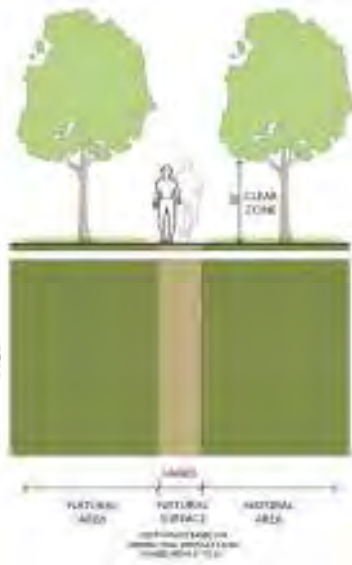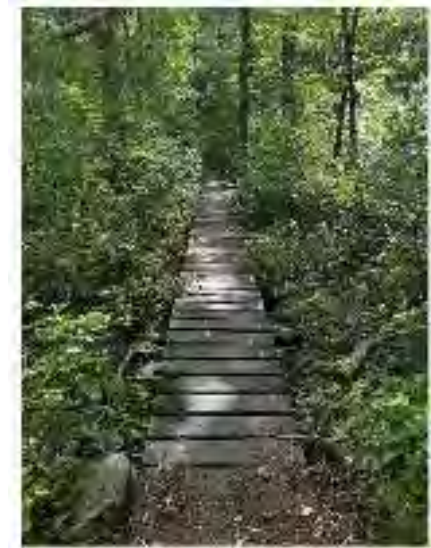
MAY

JUNE/JULY

SEPTEMBER

OCTOBER

Key Take-aways

Initial Input Meetings: Public May 16, 2023, Friends of Wompatuck (FOW) June 12, 2023

- Most important circulation goals:
  - Maximize universally accessible trails
  - Enhance the environment
  - Make it better than before
  - Bring people into park
  - Maximize ability for everyone to use the trails
- Opportunities to develop adaptive trails
- More parking at all access points
- Very steep curved trail in area C should be decommissioned or re-routed
- Clear loop between campground and visitor center
- Route to safely hike or ride to ice cream
- Consider a turnaround at Mount Blue St. gate
- New parking lot at Grove St/Norwell has been a great addition!

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Draft Trail Typology and Draft Trail System Design

SUMMARY OF EXISTING INVENTORY

Existing Conditions

Wompatuck State Park

- 3,526 acres

- >80 miles of trails

- 175 feet of elevation change

- 30% of park is in low-lying areas

Inventory Process

- Desktop document review

- GID Data Gathering

- DCR Trail Guidelines and Best Practice Manual

  - Used for Assessment Factors

- Fieldwork (Toole Design, LEC, PAL) Documented *OBSERVATIONS* & photographed conditions

- Mapped fieldwork data

Base Map

Inventory

Assessment Factors

(More information is included at the end of this presentation)

FACTOR	RATIONALE
Trail Network	
Network	Provides information on capacity and length of time to explore the entire trail system.
Trail Density in Park	Provides information about the physical area of trails relative to the area of the park to ensure the balance DCR aims to achieve between recreational access and protecting natural and cultural resources.
Interconnectivity	
Trail Connectivity	Provides information about access to trails for park visitors, maintenance, and emergency services as well as potential needs for wayfinding and parking.
Trail Density at Trail Junctions	Provides information about the number of trails intersecting at any one point and the need for wayfinding, and reduction of potential conflict points between different trail uses and/or conflict points with vehicles.

FACTOR	RATIONALE
Trail Design and Condition	
Surface Material	Provides information on accessibility, maintenance, erosion, and target user groups.
Width	Provides information on capacity, target user groups, and maintenance.
Surface Condition	Provides information on current accessibility, maintenance needs, and erosion vulnerability.
Permitted Use	Related to potential user conflicts, wayfinding, maintenance and co-requisite amenities.
Diversity	DCR trail systems should be developed and managed for multiple recreational uses, some single-use opportunities may be appropriate.
Geophysical	
Trails by Slope Class	Steep slopes are associated with potential erosion, increased maintenance burden and reduced accessibility for users of various abilities.
Water Crossings	Indicates a potential risk of erosion, impact on sensitive environments and permitting needs, or seasonal closures. Stream crossings may require altered trail design, maintenance, or realignment.
Environmental Resource Proximity	Indicates potential impact on sensitive environments and permitting needs, risk of erosion, trail damage, or seasonal closures. Trail segments in or near environmental resources may warrant realignment. Provides information about potential trail users, interpretive signage, and marketing.
Cultural Resource Proximity	Identifies areas of conflict between trails and archaeologically sensitive areas or have high historic value. Provides information about potential trail users, interpretive signage, and marketing.
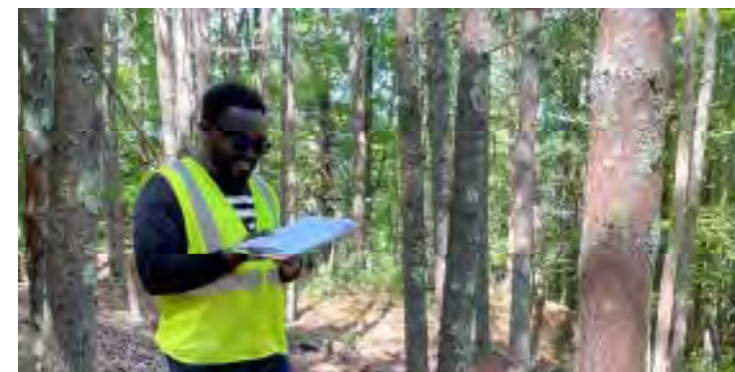
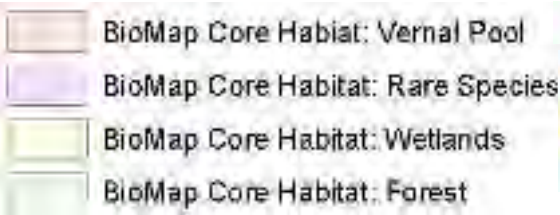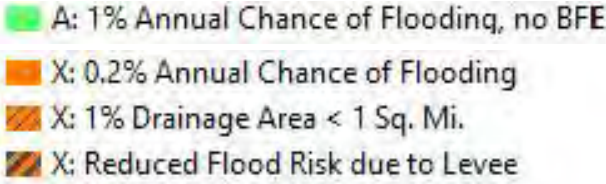| FACTOR	RATIONALE
Safety and Security	
Trail Obstacle - Object	Indicates potential safety hazards per user type, and the potential need for maintenance or warning signs.
Trail Obstacle - Location	Indicates potential safety hazards per user type, and the potential need for maintenance or warning signs.
Trail Obstacle - Height	Indicates potential safety hazards per user type, and the potential need for maintenance or warning signs.
Slope Observations	Indicates potential fall hazard, and the potential need for barriers or re-grading; identifies limits on trail width.
Erosion On or Across Trails	Indicates potentially unstable trail surface, uneven surface, need for slope stabilization, need for maintenance or realignment.
Observed Flooding and Ponding	Indicates potentially unstable trail surface, potential icing, and uneven surface may indicate a conflict with environmental resources, a need for maintenance or realignment.

LEC PAL TOOLE DESIGN dcr

Existing Trail Conditions
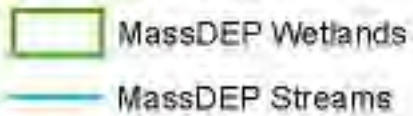
Environmental Inventory & Assessment

NHESP *BioMap2*

- BioMap Core Habiat: Vernal Pool
- BioMap Core Habitat: Rare Species
- BioMap Core Habitat: Wetlands
- BioMap Core Habitat: Forest

FEMA Flood Map

- A: 1% Annual Chance of Flooding, no BFE
- X: 0.2% Annual Chance of Flooding
- X: 1% Drainage Area < 1 Sq. Mi.
- X: Reduced Flood Risk due to Levee

National Heritage and Endangered Species Program (NHESP)

- ✳ Certified Vernal Pool
- ◉ Potential Vernal Pool

MassDEP Wetlands
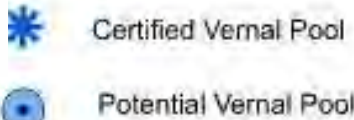
- MassDEP Wetlands
- MassDEP Streams

Cultural Inventory & Assessment

- A total of 325 inventoried, field-verified, and documented historic and archaeological resources within park lands

- Preliminary archaeological sensitivity has been assigned to nearly all upland, well-drained areas, including the Whitney Spur Rail Trail

- PAL assumes that all or some of these resources could contribute to the historical significance of the Wompatuck State Park as an historic district covering multiple periods of pre- and post-contact occupation(s).

- Only non-sensitive areas: 125-acre parcel in the northwest previous subjected to intensive survey, lowlands, steeply sloping terrains >15%, mapped "pits" natural soils have been removed

1978 Archaeological Survey of U.S. Army Reservation (Hammer)

1988 Archaeological Survey (USACE - Bourassa and Atwood) and 1997 Historic Buildings and Archaeological Surveys (PAL)

Wompatuck State Park Boundary — DCR CRI Building
Recorded Pre-Contact Site — DCR CRI Structure
Recorded Post-Contact Site — DCR CRI Object
State Inventoried Property — DCR CRI Landscape
US Navy and Other Resources on Lidar
Documented Resource
Archaeological Non-Sensitive Area

* All other areas within the park boundary are areas of archaeological sensitivity

FRAMEWORK FOR TYPOLOGY AND SYSTEM DESIGN

Framework for Trail Typology and Trail System Design

1. MA Department of Conservation and Recreation (DCR) Trail Guidelines and Best Practices Manual, 2019

2. US Forest Service Trail Fundamentals and Trail Management Objectives (FSTFM), 2011

3. US Forest Service Trail Accessibility Guidelines (FSTAG), 2013 Update

4. Minnesota Department of Natural Resources Trail and Waterways Trail Planning, Design and Development Guidelines (MN), 2007

Natural trail through southern field

Framework for Trail Typology and Trail System Design

Trail Typology – guides design of new trails and maintenance of existing trails

- Trail Type - all are considered "Standard/Terra Trails"
- Trail Design Parameters
- User Groups

Trail System Design – proposes actions and maps networks to enhance connections and increase visitor orientation

- Planning Considerations
- Sustainability
- Recommended Actions

DRAFT TRAIL TYPOLOGY

Trail Typology Framework

Trail Types – guides all are considered "Standard/Terra Trails"

- Standard Natural Surface Trails:

  - Narrow Multipurpose Trail
  - Wide Multipurpose Trail
  - FSTAG Adaptive Trail
  - Mountain-bike Optimized Trail

- Paved / Stabilized Surface Trails (these may overlap):

  - Shared Use Path
  - ADA Accessible Trail
  - Administrative and Emergency Road

Trail Design Parameters

- Tread Width
- Surface Material
- Running Grade
- Cross-Slope
- Other (if applicable)

User Groups

- Hike/Walk
- Cycle
- Mountain Bike
- Equestrian (Pack and Saddle)
- Cross-country ski and snowshoe
- Accessible (ADA)
- Adaptive

Draft Trail Typology

Natural Surface - Narrow Multipurpose Trail

- Single-track, one user at a time, single-file

- Also refer to FSTAG Adaptive Trail

DESIGN PARAMETERS	
Tread Width	Between 6"-36"
Surface Material	Natural surface
Running Grade	• Target range of less than 18% • Can be routed with steeper running slopes to less than 25% (depending on local soil conditions)
Cross-slope	Between 2-20%
Rating	Hiking: Easy, Moderate, Difficult Mountain Biking: Easier, more difficult, very difficult, extremely difficult

User Groups

HIKERS, WALKER, & JOGGERS

MOUNTAIN BIKERS

EQUESTRIANS

CROSS COUNTRY SKIERS

CLEAR ZONE

VARIES

NATURAL AREA   NATURAL SURFACE   NATURAL AREA

WIDTH VARIES BASED ON DESIRED TRAIL DIFFICULTY AND RANGES FROM 6' TO 36'

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Draft Trail Typology

Narrow Multipurpose Trail

Wide Multipurpose Trail

FSTAG Adaptive Trail

Mountain-bike Optimized Trail

Draft Trail Typology

Shared Use Path

Administrative / Emergency Road

ADA Accessible Trail

DRAFT TRAIL SYSTEM DESIGN

Trail System Design Framework

Planning Considerations

- Who will it serve?

- What does it connect to?

- Significance, need or value

- Cultural resources/impacts

- Environmental resources/impacts

Recommended Actions

- Enhance promotion for existing successful trails

- Upgrade "Enhance"/ Change use of existing trail

- Relocate / Re-route existing trail

- Create New Trail

- Decommission Trail

TOOLE DESIGN   dcr

Trail System Design Framework

Sustainability

- Physical
  - Retain structure and form
  - Designed to anticipate change

- Economic
  - Capacity for lifetime support
  - Maintenance strategy

- Engender Stewardship
  - Foster a sense of individual user responsibility

- Ecological
  - Protect resources
    - Avoid sensitive areas
    - Minimize impacts
  - Develop in areas already impacted
  - Provide buffers
  - Build nature-based stormwater management
  - Ensure trail remains sustainable
  - Decommission and restore as needed

Trail System Design Framework

Decommissioning

- Halt damage

- Reduce maintenance costs

- Enhance user experience

- Safety

- Unsustainable Trail Characteristics

  - Tread is unstable and incapable of supporting intended use

  - Displacement of soils is excessive

  - Does not drain well and ongoing erosion that cannot be mitigated

  - Restricted hydrology (surface and/or subsurface) and/or creating mudholes

  - Ecological impacts caused by trail alignment, cross-country travel, bypassing

  - Cultural resource impacts caused by trail alignments or proximity

Wompatuck State Park
Circulation Master Plan

Planning Considerations

Who will it serve?

- Existing users

Legend

Landmine MTB 2023 (cat 1/2) - 25 mi *

Landmine MTB 2023 (cat 3) - 11.5 mi

Landmine MTB 2023 (cat 4) - 5.7 mi

Landmine MTB 2023 (cat 5) - 3.3 mi

5K Course (USATF certified) **

Healthy Heart Trail

* Mountain Biking (MTB) **US Athletics Track and Field (USATF)
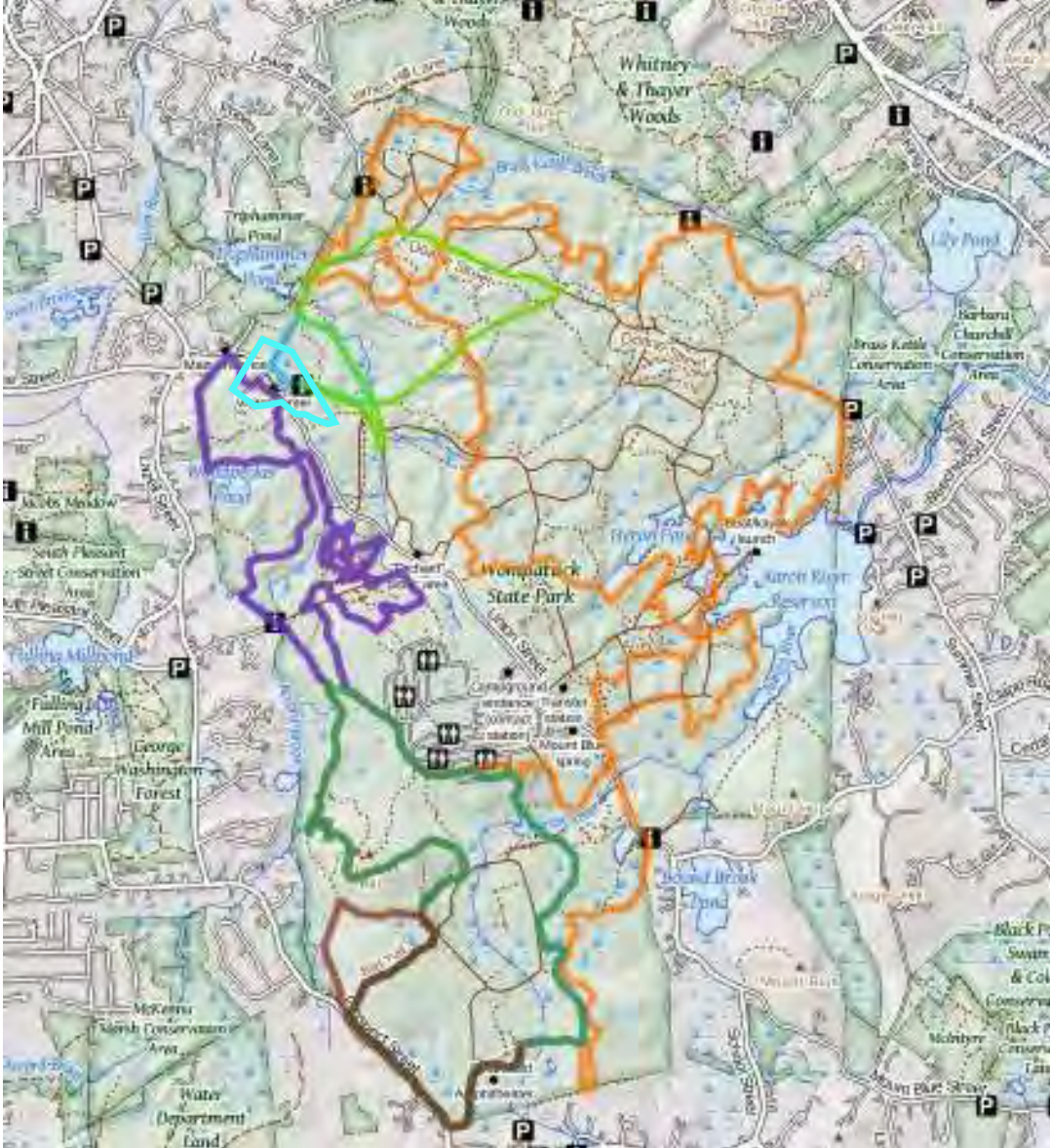
Friends of Wompatuck (FOW) online trail map indicating existing trail routes

TOOLE DESIGN | dcr

Planning Considerations

Who will it serve?

- Understanding typical Speed and Distance of Users

Pedestrian Strolling / Wheelchair User, 2 miles @1-2 mi/hr

Bicyclist Recreational, 10 miles @ 10-15 mi/hr

General Hike / Casual Backpacker, 7 miles @ 2-3 mi/hr

Mountain Biker, Recreational – trail network on public land, 25 miles @ 6-15 mi/hr

Planning Considerations

What does it connect to?

- Points of Interest

- Destinations

- Locations of

  o historical significance

  o unique natural conditions

  o beauty or other interest

Visitors Center

Aaron Reservoir

Orchard Picnic Area

Friends of Wompatuck (FOW) Trail Map indicating some Points of Interest

Planning Considerations

Significance, need or value

- Reduce user conflicts

- Maintenance and emergency access

- Accessibility (ADA) to major destinations, parking, trailheads

Draft Trail System Design

Draft Trail System Design

Legend

- Park Entrance
- Primary Destination
- Secondary Destination
- Trailhead at Union St.
- Trailhead at Campground
- Proposed Information Kiosk
- Proposed Interpretive(s)
- Certified Vernal Pool
- Proposed Parking and handicapped parking (HCP)
- Accessible Trail (per ADA)
- Adaptive Trail (per FSTAG)
- Existing Trail - re-routed / re-graded, typical
- Existing Trail - re-routed / re-graded, Accessible
- Existing Trail - re-routed / re-graded, Adaptive
- New Trail
- Consider Decommissioning
- Paved Administrative Road existing width (also accessible)
- Shared Use Path (also accessible) - narrowed paved Administrative Road
- Shared Use Path (also accessible) - re-pave Administrative Road
- Accessible Trail (per ADA) - remove poor paved Administrative Road
- Shared Advisory Shoulder along Union Street
- Crosswalk

TOOLE DESIGN dcr

Draft Trail System Design

Reduce user conflict along Union Street

↗ Trailhead at Union St.

(P) Proposed Parking (HCP)
and handicapped parking

✕✕✕ Consider Decommissioning

Shared Advisory Shoulder
along Union Street

Crosswalk

*Example of Advisory Shoulder
(photo by: David Loutzenheiser)*

Draft Trail System Design

Reduce user conflict along Union Street

↗ Trailhead at Union St.

Ⓟ Proposed Parking Ⓗⓒⓟ
and handicapped parking

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Shared Advisory Shoulder
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Example of Advisory Shoulder
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Draft Trail System Design

Maintenance and emergency acces

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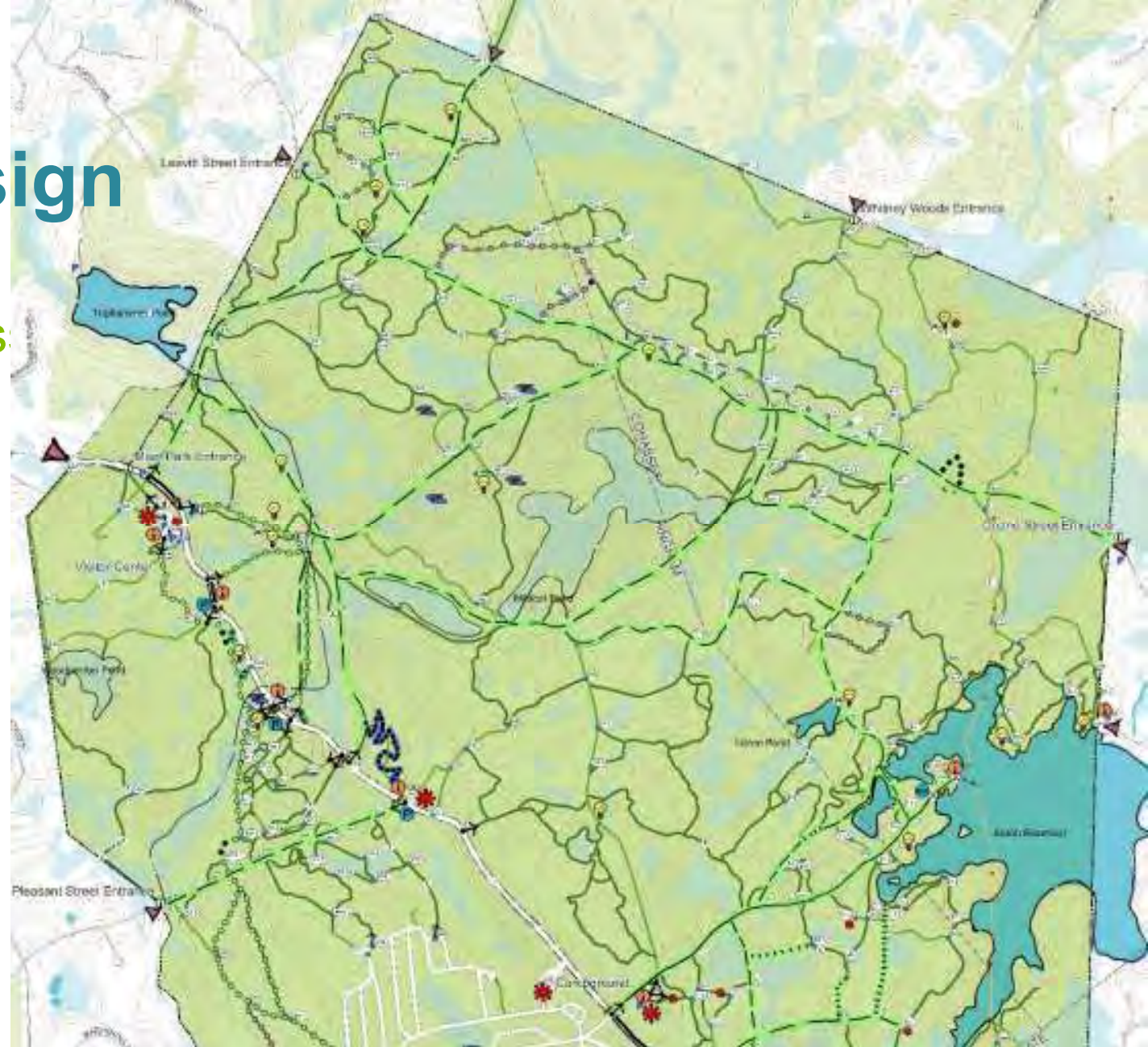
Draft Trail System Des

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Grove Street Parking

Draft Trail System Design

Accessibility

- Parking
- Trailheads
- Destinations

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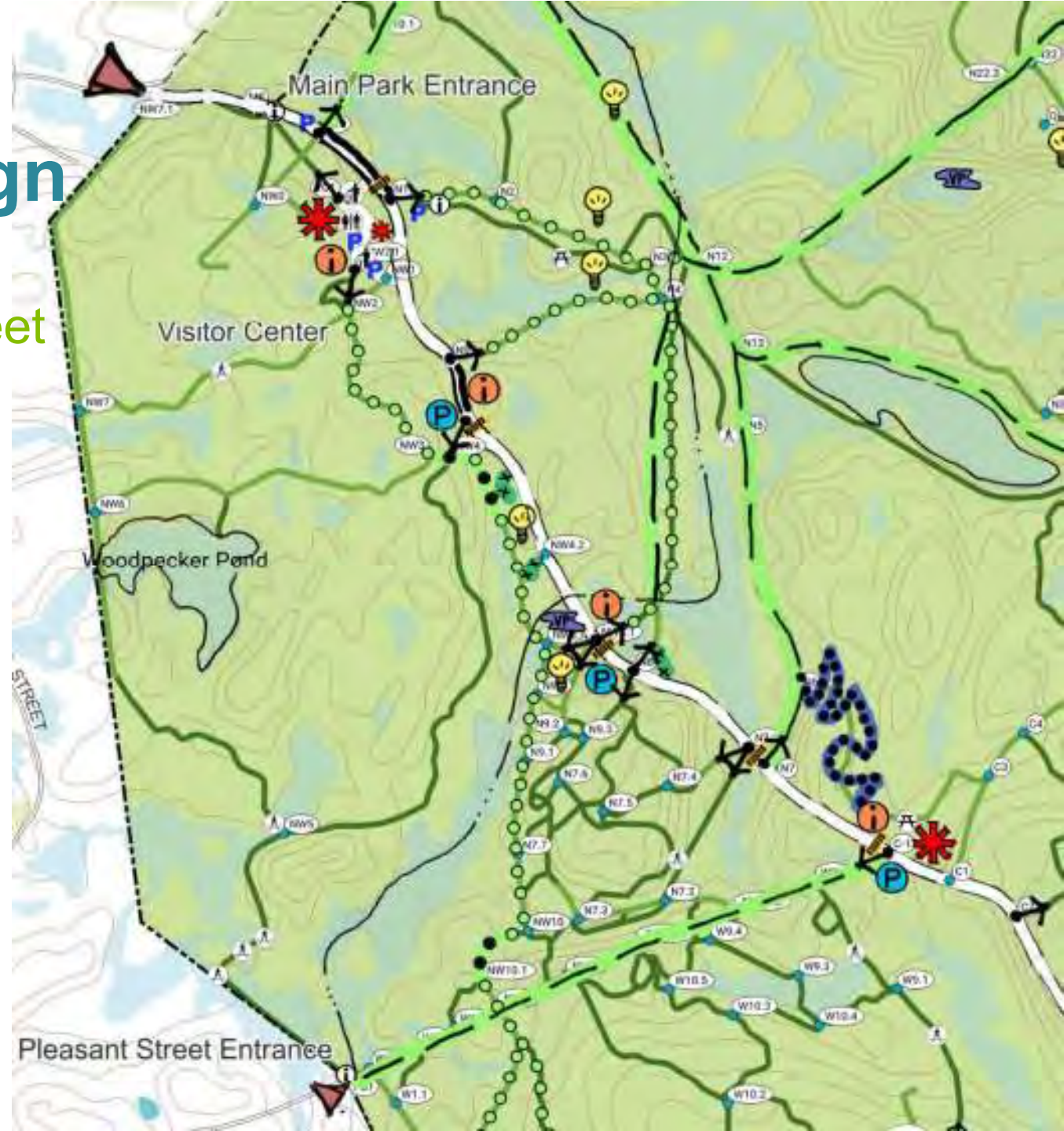
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TOOLE DESIGN   dcr

Draft Trail System Design

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Park Entrance

Primary Destination

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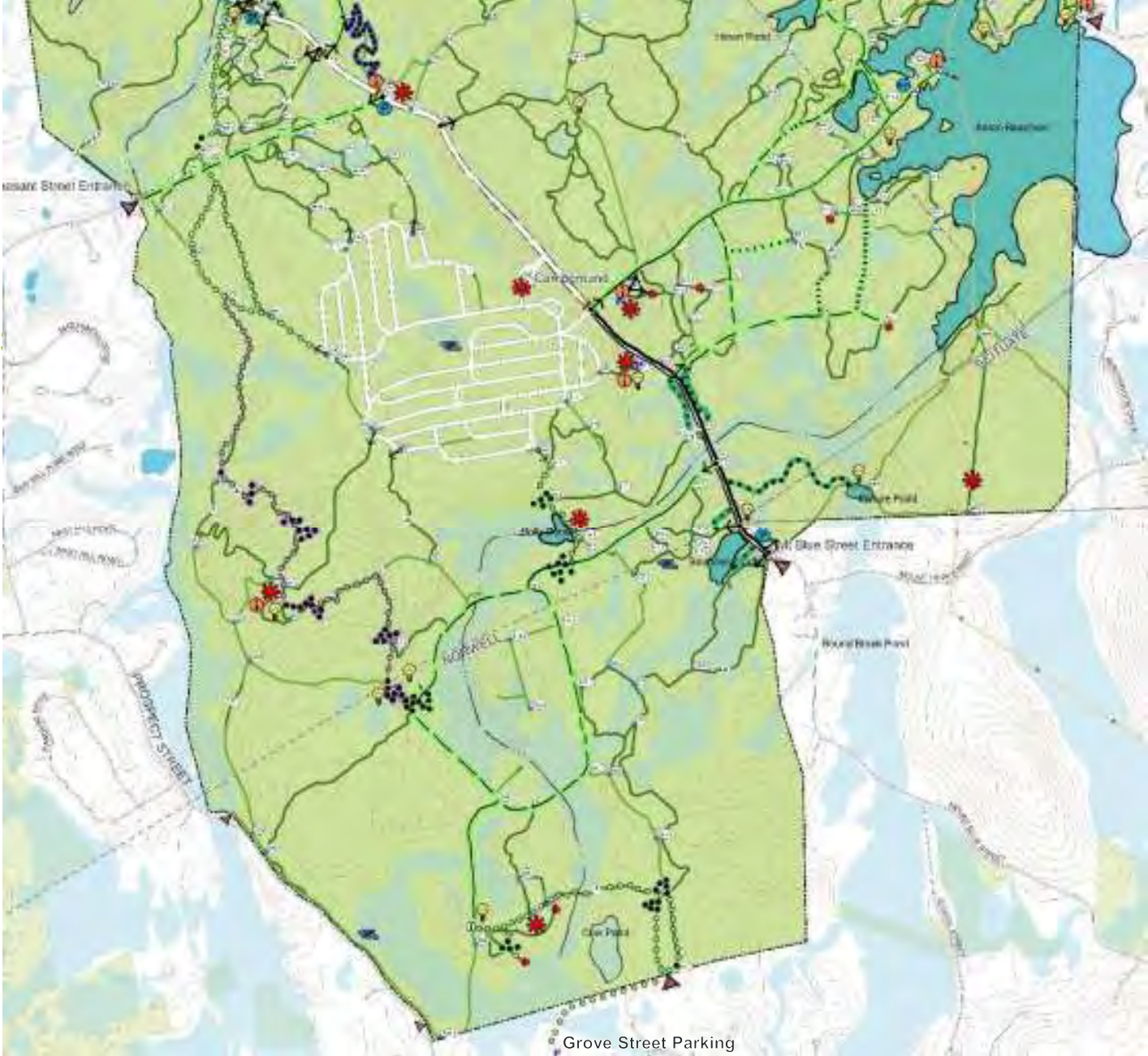Accessible Trail (per ADA) - remove poor paved Administrative Road

Park Entrance

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Proposed Interpretive(s)

Certified Vernal Pool

Proposed Parking and handicapped parking

Accessible Trail (per ADA)

Adaptive Trail (per FSTAG)

Grove Street Parking

TOOLE DESIGN   dcr

OPEN DISCUSSION

Listening Session

- We will take comments in the order hands are raised
  - If calling in, dial *9 to raise your hand and *6 to unmute

- Additional comments can be made using the Q+A function and/or the chat function

- In order to allow everyone to speak, please try to limit your time to 1 minute

- Approximately every 15 minutes, we will provide responses to Q/A and chat

- The meeting is scheduled to end at 7:30 PM

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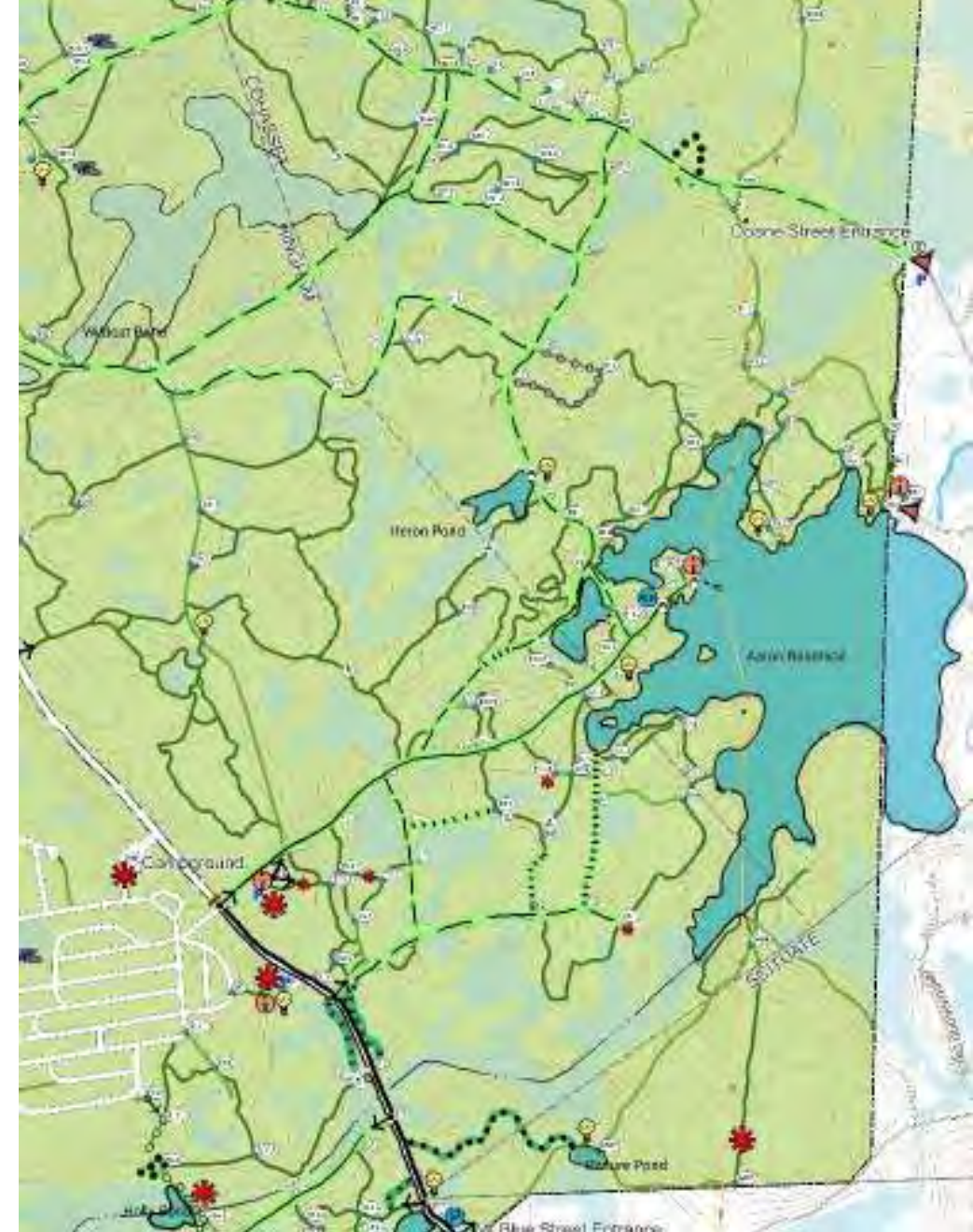
Draft Trail System Design

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CLOSING AND NEXT STEPS

Additional Information

- Recording and slide deck will be available at:

  - https://www.mass.gov/dcr/past-public-meetings

- If you have comments on this project, please use the link
  below. The public comment period will end on (three weeks from Public Mtg) TBD:

  - *Submit online:* www.mass.gov/dcr/public-comment

  Please note: the contents of comments submitted to DCR, including your name, town and zip code, will be posted on DCR's website. Additional contact information provided, notably email address, will only be used for outreach on future updates to the subject project or property.

- If you wish to subscribe to a DCR general information or project-related listserv: contact
  DCR's Office of Community Relations via email at mass.parks@mass.gov

Next Steps

- Summarize input from this meeting

and direction from DCR

- Finalize Master Plan

Thank you!

The following are additional slides in case there are questions

Draft Trail Typology

Natural Surface - Narrow Multipurpose Trail

- Single-track, one user at a time, single-file

- Also refer to FSTAG Adaptive Trail

DESIGN PARAMETERS	
Tread Width	Between 6"-36"
Surface Material	Natural surface
Running Grade	• Target range of less than 18% • Can be routed with steeper running slopes to less than 25% (depending on local soil conditions)
Cross-slope	Between 2-20%
Rating	Hiking: Easy, Moderate, Difficult Mountain Biking: Easier, more difficult, very difficult, extremely difficult

User Groups

HIKERS, WALKER, & JOGGERS

MOUNTAIN BIKERS

EQUESTRIANS

CROSS COUNTRY SKIERS

CLEAR ZONE

VARIES

NATURAL AREA   NATURAL SURFACE   NATURAL AREA

WIDTH VARIES BASED ON DESIRED TRAIL DIFFICULTY AND RANGES FROM 6' TO 36'

TOOLE DESIGN   dcr

Draft Trail Typology

Natural Surface - Narrow Multipurpose Trail

Draft Trail Typology

Natural Surface - Wide Multipurpose Trail

- Double-track, more than one user at a time, side-by-side

- Refer also to FSTAG Adaptive Trails

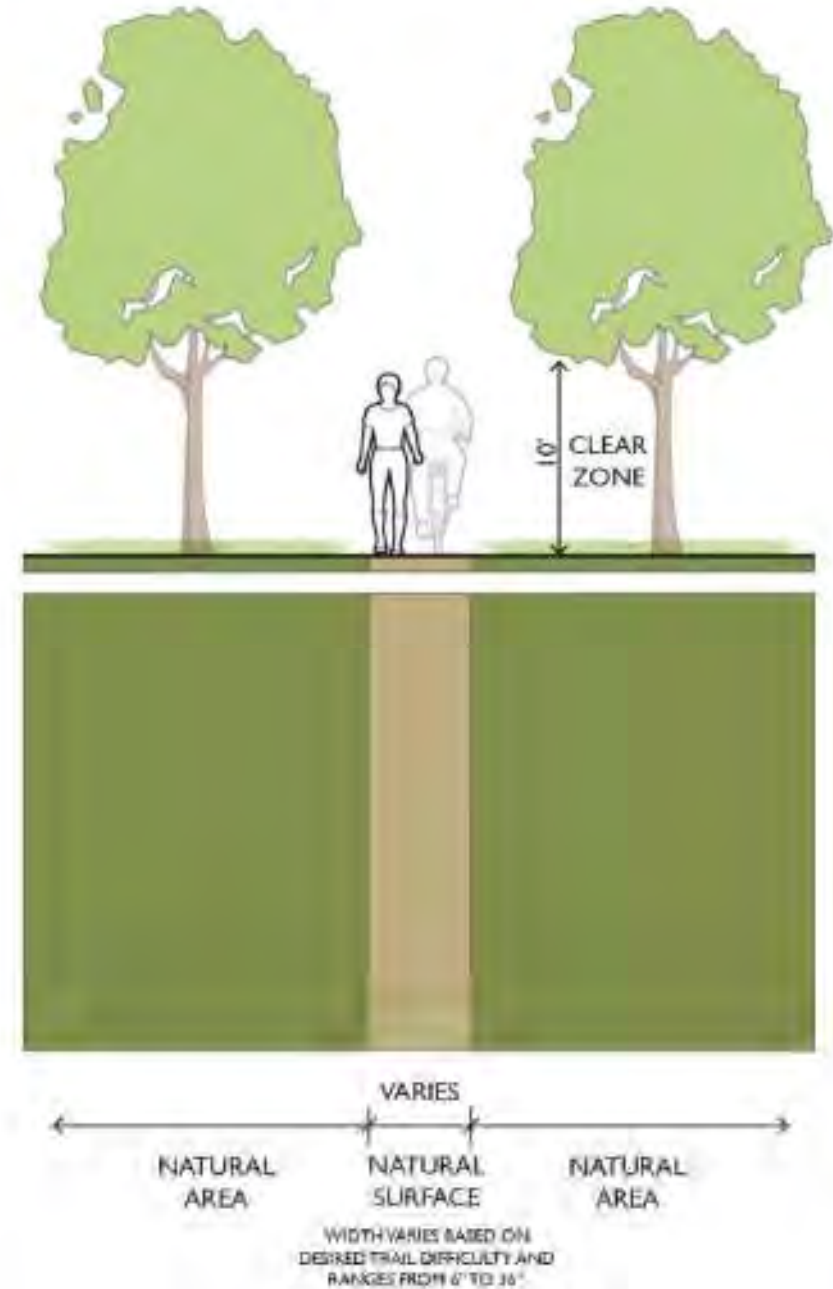| DESIGN PARAMETERS	
Tread Width	Between 36"-72" or more
Surface Material	Natural surface
Running Grade	• Target range of less than 18% • Can be routed with steeper running slopes to less than 25% (depending on local soil conditions)
Cross Slope	Between 2-20%
Ratings	Hiking: Easy, Moderate, Difficult Mountain Biking: Easier, more difficult, very difficult, extremely difficult

User Groups

MOUNTAIN BIKERS

HIKERS, WALKER, & JOGGERS

EQUESTRIANS

CROSS COUNTRY SKIERS

CLEAR ZONE

VARIES

NATURAL AREA   NATURAL SURFACE   NATURAL AREA

WIDTH VARIES BASED ON DESIRED TRAIL DIFFICULTY AND RANGES FROM 24" TO 72" OR MORE

TOOLE DESIGN   dcr

Draft Trail Typology

Natural Surface - Wide Multipurpose Trail

TOOLE DESIGN   dcr

Draft Trail Typology

Natural Surface – FSTAG Adaptive Trail

▪ Complies with the Forest Service Trail Accessibility Guidelines (FSTAG)

DESIGN PARAMETERS	
Tread Width	Minimum of 36"
Surface Material (Typical)	Natural that is firm and stable
Running Grade	• Running slope of 1:20 (5%, any distance) • >1:20 to 1:12 (8.33%, max 200') • >1:12 to 1:10 (10%, max 30') • >1:10 to 1:8 (12%, max 10')
Cross Slope	2% maximum (concrete, asphalt, boards), 5% maximum (other surfaces)

User Groups

HIKERS, WALKERS, & JOGGERS

MOUNTAIN BIKERS

ADAPTIVE CYCLISTS

ADAPTIVE HIKERS

NATURAL AREA

PAVED PATH
TRAIL WIDTH IS 36" MIN.
60" OR MORE PREFERRED

NATURAL AREA

5'

TOOLE DESIGN   dcr

Draft Trail Typology

Natural Surface – FSTAG Adaptive Trail
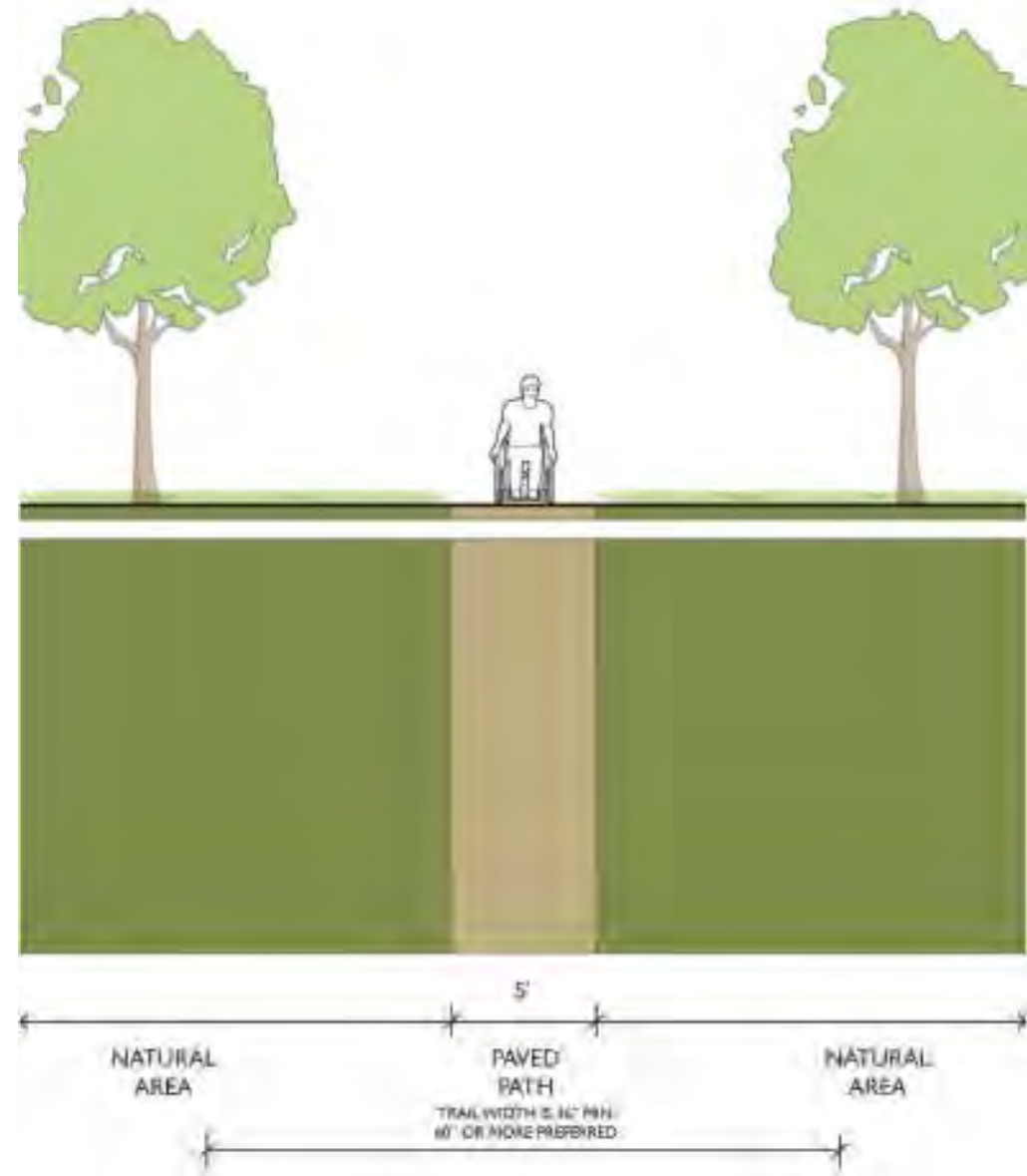
TOOLE DESIGN   dcr

Draft Trail Typology

Natural Surface – Mountain-bike Optimized Trail

- Constructed for enhanced experience and efficiency of mountain biking

DESIGN PARAMETERS	
Tread Width	Between 6"-72" or more
Surface Material (Typical)	Natural surface
Running Grade	• 6-8% or less (up to 15% for short segments 50-100') • Uphill bicycles: overall running slope of 10% or less (up to 15% for short segments)
Cross Slope	Cross slope ranging from 5-10%
Ratings	• Easier, more difficult, very difficult, extremely difficult • Uphill only, downhill only, gravity oriented

User Groups
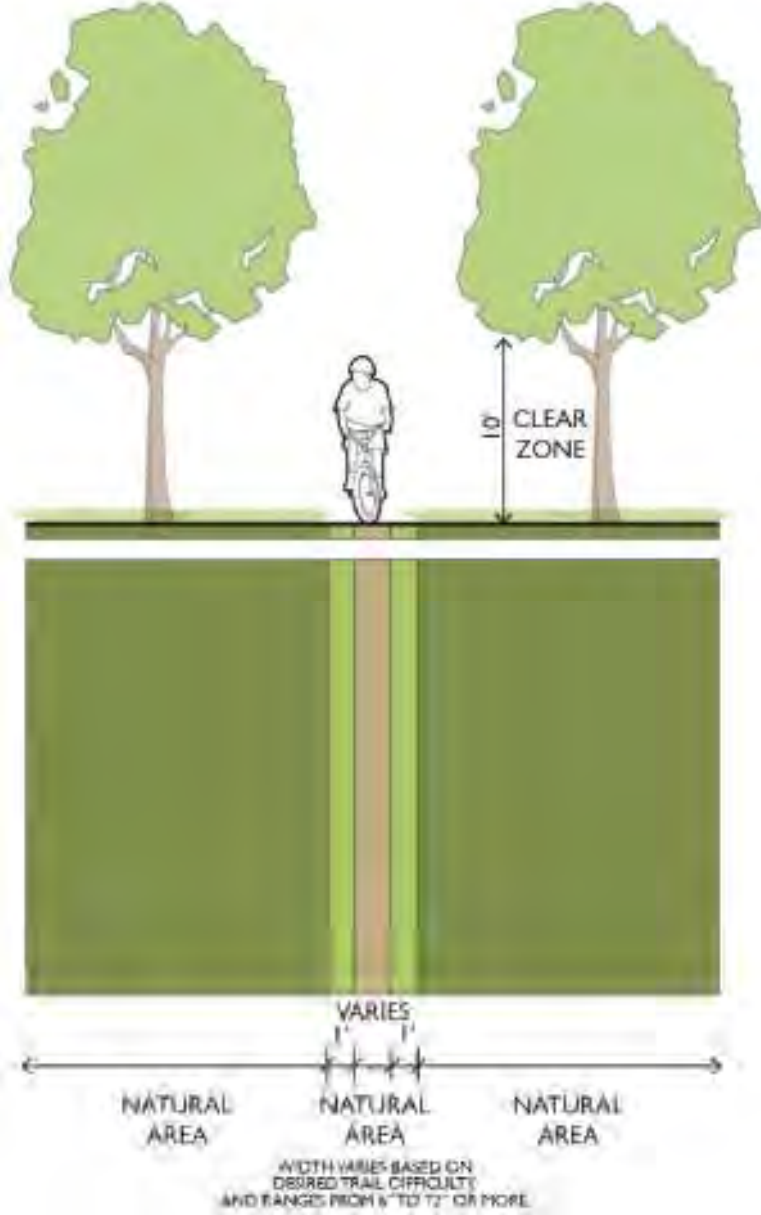
MOUNTAIN BIKERS

CLEAR ZONE

VARIES

NATURAL AREA   NATURAL AREA   NATURAL AREA

WIDTH VARIES BASED ON DESIRED TRAIL DIFFICULTY AND RANGES FROM 6" TO 72" OR MORE.

TOOLE DESIGN   dcr

Draft Trail Typology

Natural Surface – Mountain-bike Optimized Trail

Draft Trail Typology

Paved/Stabilized – Shared Use Path

- All types of non-motorized users

- Refer also to ADA Accessible Trails and Administrative Roads

DESIGN PARAMETERS	
Tread Width	Minimum recommended 11', 12' preferred
Surface Material (Typical)	Asphalt or other stabilized material that will be sustainable with conditions
Running Grade	• Less than 5% • Or must follow and maintain roadway grade
Cross Slope	2-5% maximum
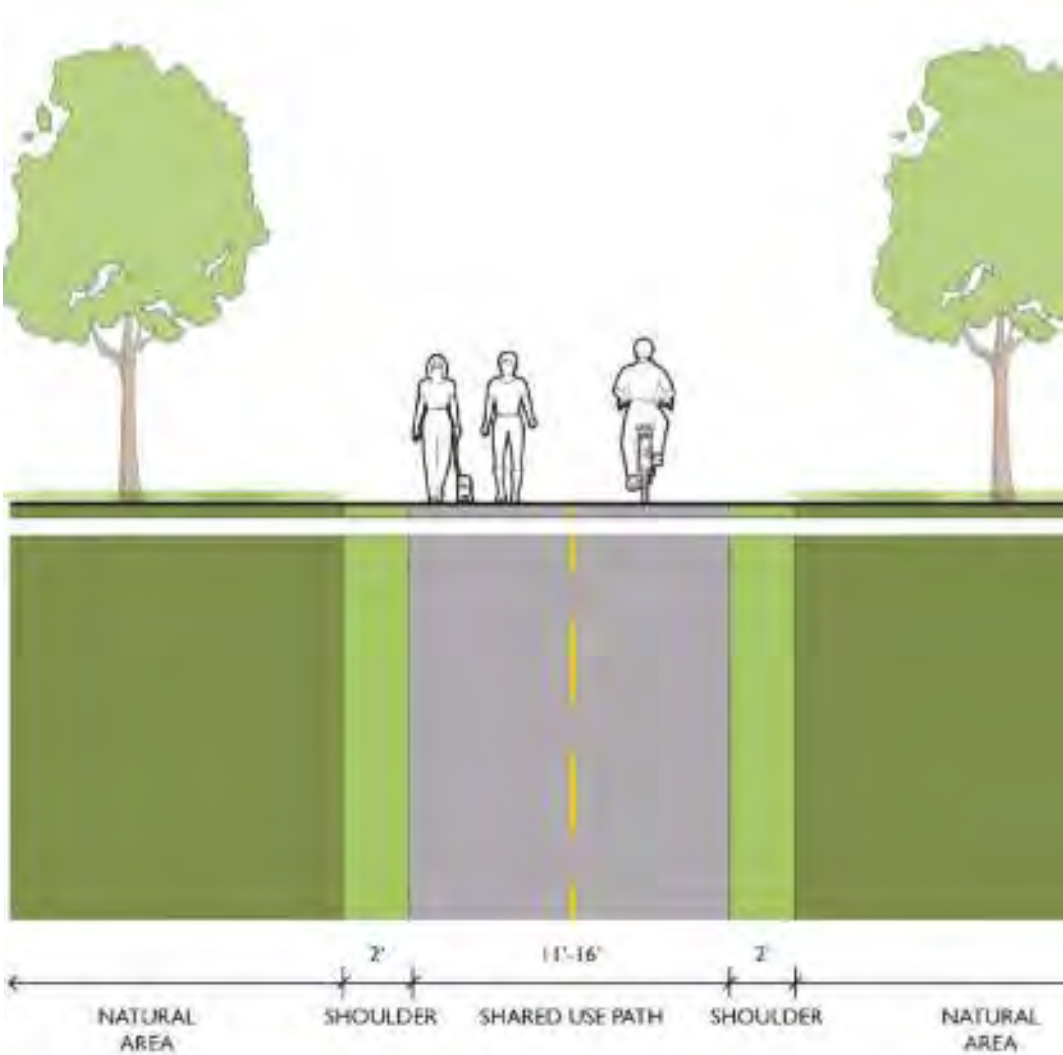
User Groups

HIKERS, WALKERS & JOGGERS

BICYCLISTS

PERSONS WITH DISABILITIES

FIRST RESPONDERS & MAINTENANCE PERSONNEL

ADAPTIVE CYCLISTS

ADAPTIVE HIKERS

CROSS COUNTRY SKIERS

NATURAL AREA | SHOULDER 2' | SHARED USE PATH 11'-16' | SHOULDER 2' | NATURAL AREA

Draft Trail Typology

Paved/Stabilized – Shared Use Path

Draft Trail Typology

Paved/Stabilized – ADA Accessible Trail

- Complies with the ADAAG's regulations for "Accessible Trails"

- Refer also to Shared Use Path and Administrative Roads

DESIGN PARAMETERS	
Tread Width	• 36" minimum, 60" or more preferred
Surface Material (Typical)	Concrete, asphalt, boardwalk, compacted aggregates with stabilizer
Running Grade	• Running slope of 1:20 (any distance) • 1:12 (max 200') • 1:10 (max 30') • 1:8 (max 10')
Cross Slope	2% maximum (concrete, asphalt, boards) 5% maximum (other surfaces)

User Groups

HIKERS, WALKERS & JOGGERS

BICYCLISTS

PERSONS WITH DISABILITIES

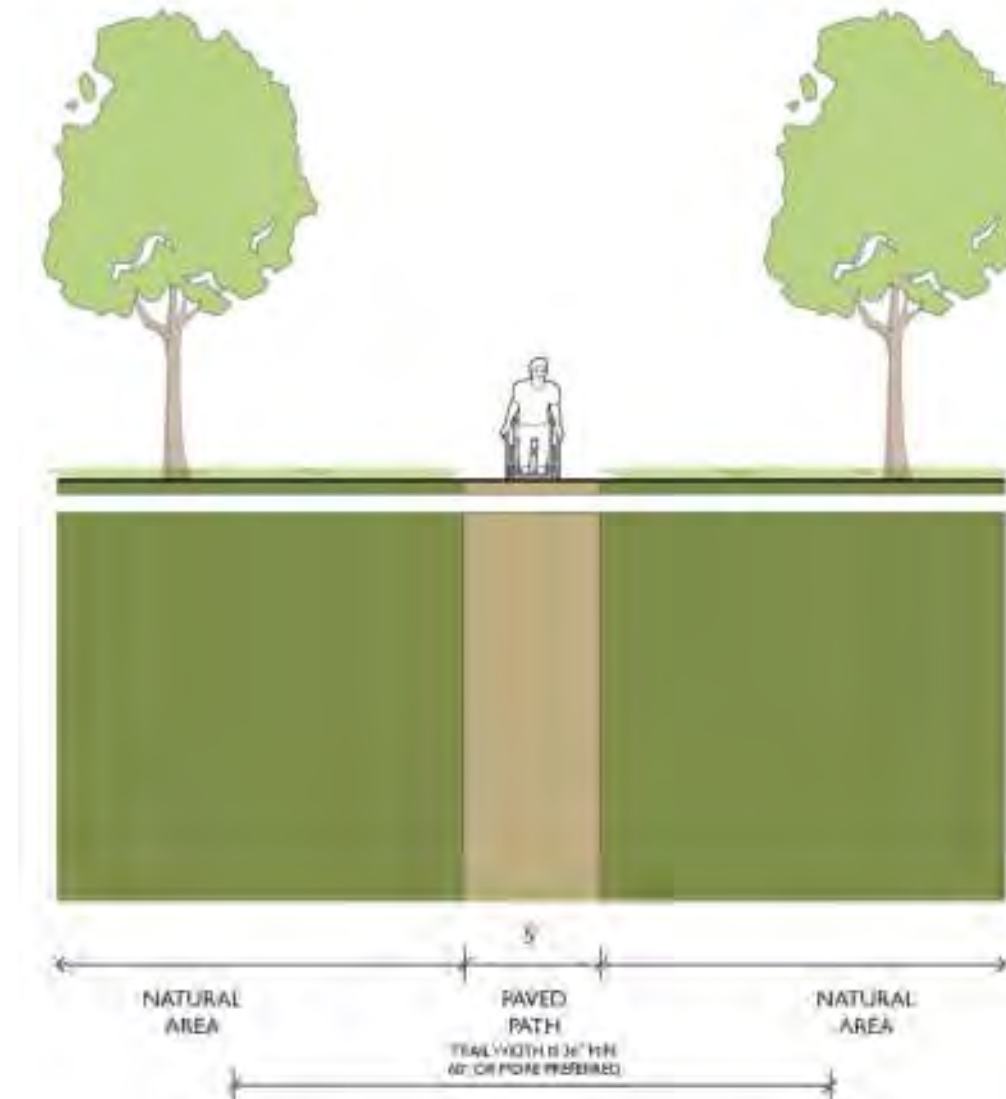FIRST RESPONDERS & MAINTENANCE PERSONNEL

ADAPTIVE CYCLISTS

ADAPTIVE HIKERS

CROSS COUNTRY SKIERS

NATURAL AREA

PAVED PATH
TRAIL WIDTH IS 36" MIN
60" OR MORE PREFERRED

NATURAL AREA

TOOLE DESIGN dcr
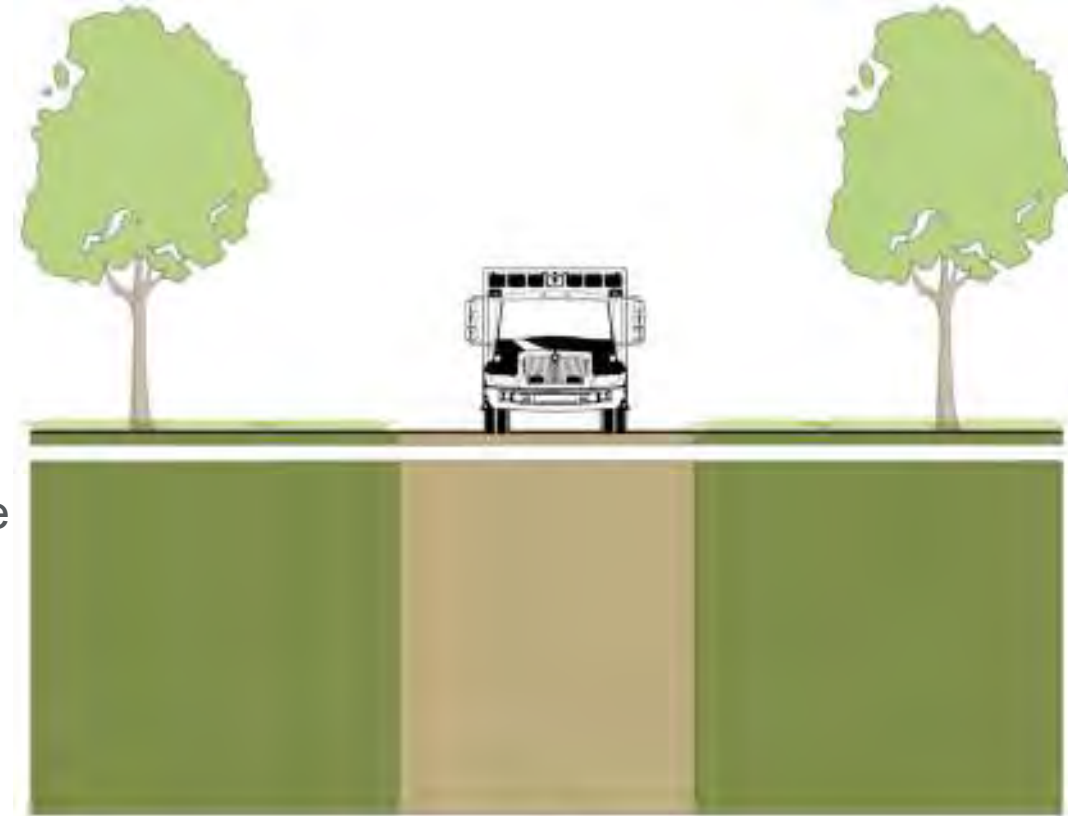
Draft Trail Typology

Paved/Stabilized – Shared Use Path

Draft Trail Typology

Paved/Stabilized – Administrative Road

- Allows motor vehicle access for trail maintenance, landscape management and emergency access

- Can also serve as part of the trail system

- Refer also ADA Accessible Trail and Shared Use Path

DESIGN PARAMETERS	
Tread Width	12'+
Surface Material (Typical)	Natural surface, concrete, or asphalt
Running Grade	Usually predetermined by existing route
Cross Slope	2-5% maximum

User Groups

HIKERS, WALKERS & JOGGERS

BICYCLISTS

CROSS COUNTRY SKIERS

PERSONS WITH DISABILITIES

FIRST RESPONDERS & MAINTENANCE PERSONNEL

ADAPTIVE CYCLISTS

ADAPTIVE HIKERS

NATURAL AREA

SHARED USE PATH NATURAL SURFACE

NATURAL AREA

12'+

Draft Trail Typology

Paved/Stabilized – Shared Use Path

Assessment Findings

- **Trail Capacity**: width, length and perception

  - 16%* of assessed trail were <3' wide (single track)

  - Over 70 miles of trails

  - Perception of many opportunities and options

- **Trail Diversity and Density**

  - Existing: all trail for everyone

  - DCR recommends not more that ± 25% for single use

  - Percentage of trails per acres of the park, Wompatuck falls within the High density that DCR identifies for the park

  * All percentages are approximate

User	Speed	Travel time / 70 miles
Walker or strolling	1-2 mph	35 to 70 hours
General hiker	2-3 mph	23 to 35 hours
Jogger	6-7 mph	10 to 12 hours
Recreational park biker	3-12 mph	6 to 23 hours
Advanced mountain biker	10-12 mph	6 to 7 hours

Trail Capacity per User Type

Assessment Findings

- **Connectivity**

  - Most trail connect to another trail

  - Other connections include to Union Street, administrative roads, formal trailheads, other adjacent **open spaces, the campground, and parking lots**

- **Density at Trail Junctions**

  - 344 trail junctions

  - 8 five-way and 60 four-way junctions

  * All percentages are approximate
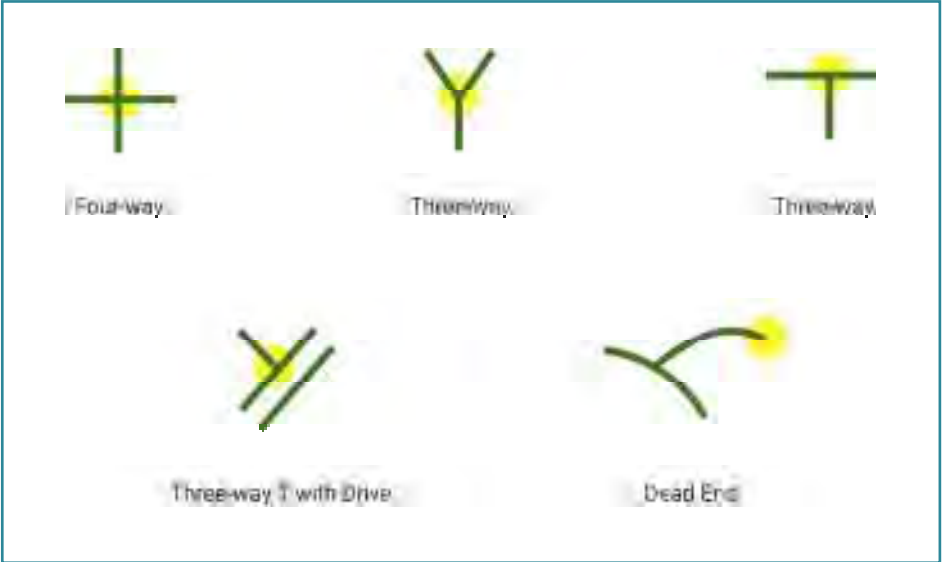
Trail Junctions – Types of "Ways"

Five-way	8 junctions
Four-way	60 junctions
Three-way	238 junctions
Dead end	17
End	14

Quantity / type of "Way"

Assessment Findings

- **Design and Conditions**

  - Materials: 43% natural, 28% paved, 4% gravel

  - Condition: 50% Fair, 16% Good, 8% Poor

  * All percentages are approximate

Good
DCR Examples of a trail conditions

Fair

Poor

Assessment Findings

- **Trails by Slope Class**

  - Over 70% (of the total length of trail) is less than 5% longitudinal slope

- **Slope observations**

  - Over 80% of trails observed had steep terrain pitching towards the trail of steep drop-offs from the trail and/or perceived steep cross-slopes

* All percentages are approximate

SLOPE	IMPLICATIONS	% OF ALL WOMPATUCK TRAILS
≤ 5%	- Considered accessible regardless of length - Supports diverse users with various abilities - Minimizes risk of erosion	72%
5.1 – 9.9%	- Supports most hikers, limits breaking for bikers - 10% is maximum average slope for sustainable trail design	18%
10 – 14.9%	- Appropriate for short segments with erosion control - Provides moderate to difficult hiking experience, and more difficult mountain biking experience	6%
15 – 19.9%	- Occasionally appropriate for short segments with erosions control	2%
≥ 20%	- Potentially appropriate for short segments with significant erosion control - 33% or 3:1 is considered the maximum slope for avoiding most erosion issues - Creates extremely difficult conditions for hiking and mountain biking	2%

Trails by Slope Class

Assessment Findings

- **Water Crossings**

  - 14% crossed water (rivers, streams, wetlands)

  - 50% via boardwalks, others via bridges, stones, culverts

- **Environmental Resources Proximity Observations**

  - 20% near or over potentially sensitive areas

- **Cultural Resources Proximity Observations**

  - 6% near or through potentially sensitive areas

  * All percentages are approximate

Observed potential Vernal Pool

Assessment Findings

- **Obstacles**

  - Potential hazards and maintenance issues

  - Frequency and type impacts Trail Type

  - Almost all trail had some type of obstacle (primarily roots and rocks; also trees, walls, boulders, pole, etc)

  - 40% within the trail tread

- **Erosion**

  - 35% signs of significant erosion

- **Flooding/Ponding**

  - 40% observed standing water/puddles or saturated soils
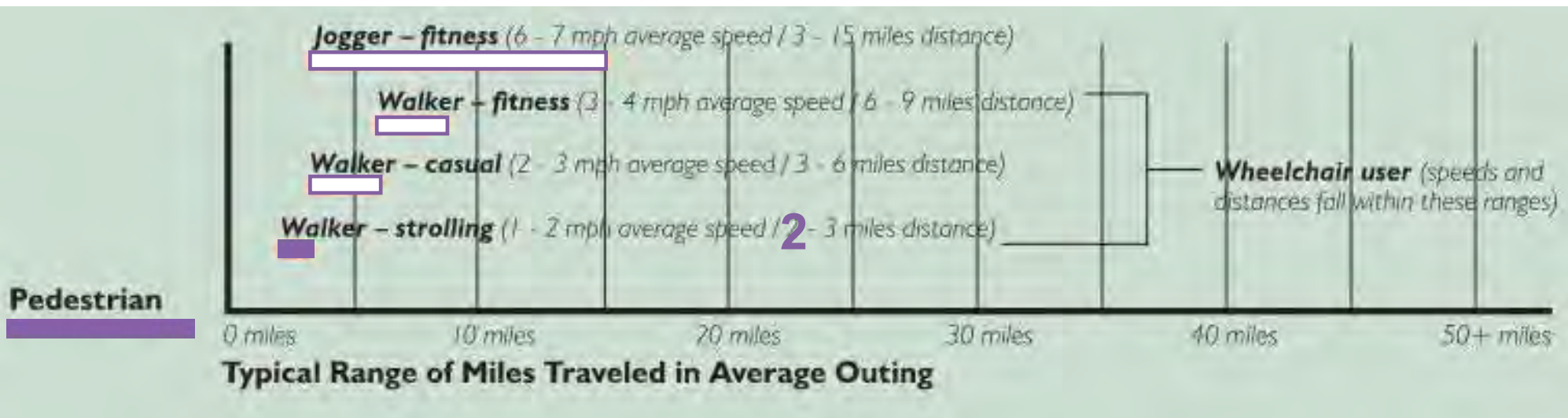
  * All percentages are approximate
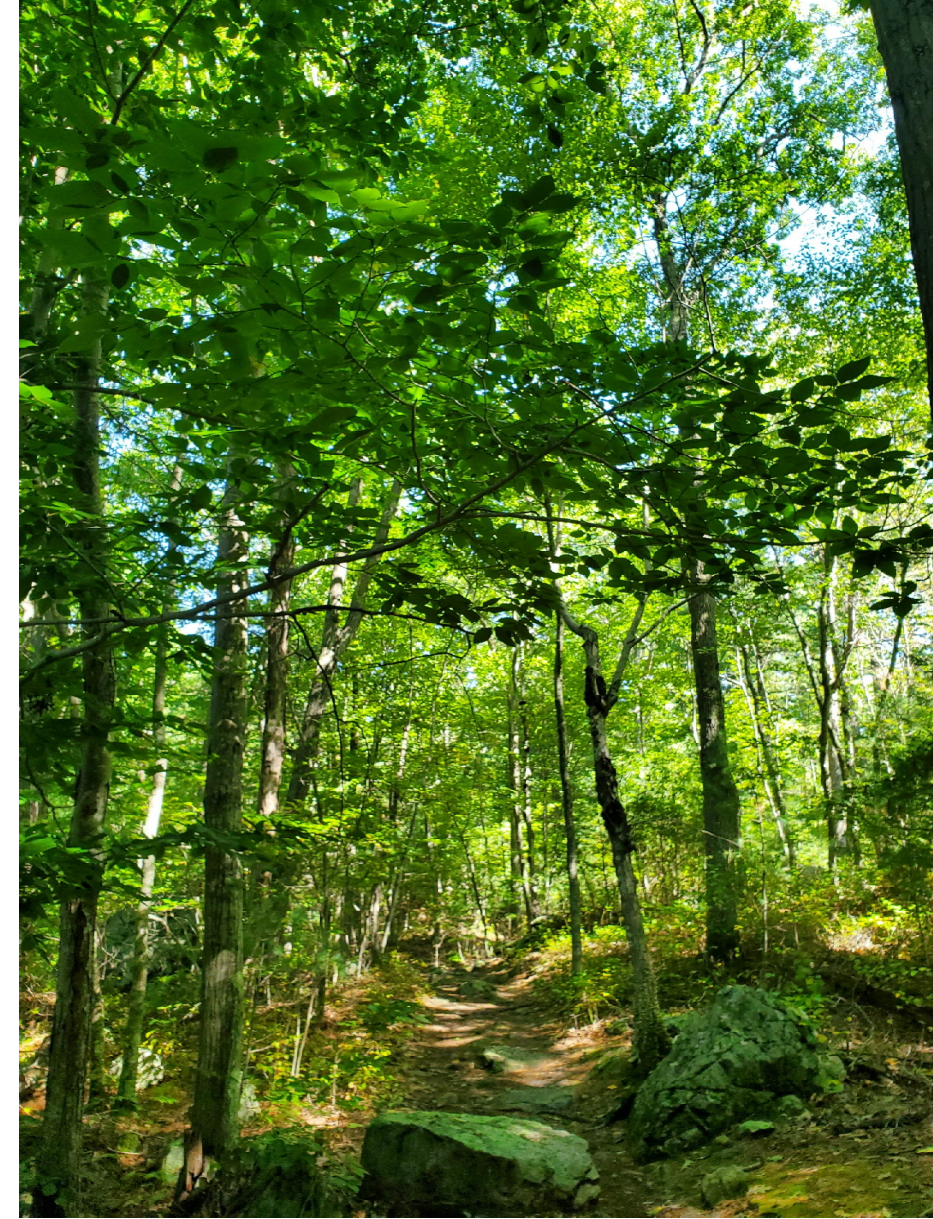
Boulder Obstacle in Trail Tread

LEC   PAL   TOOLE DESIGN   dcr

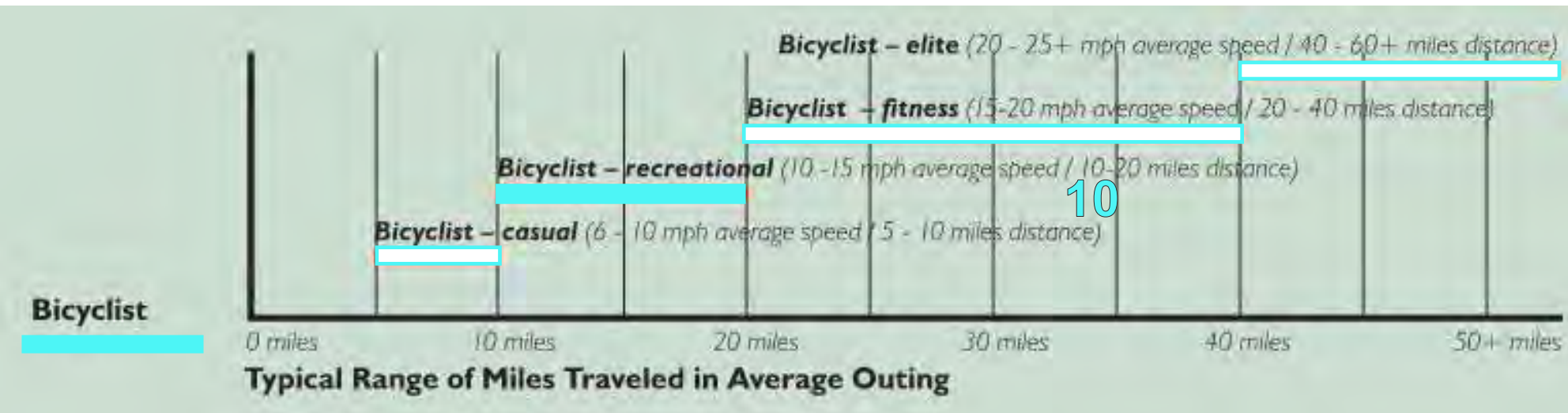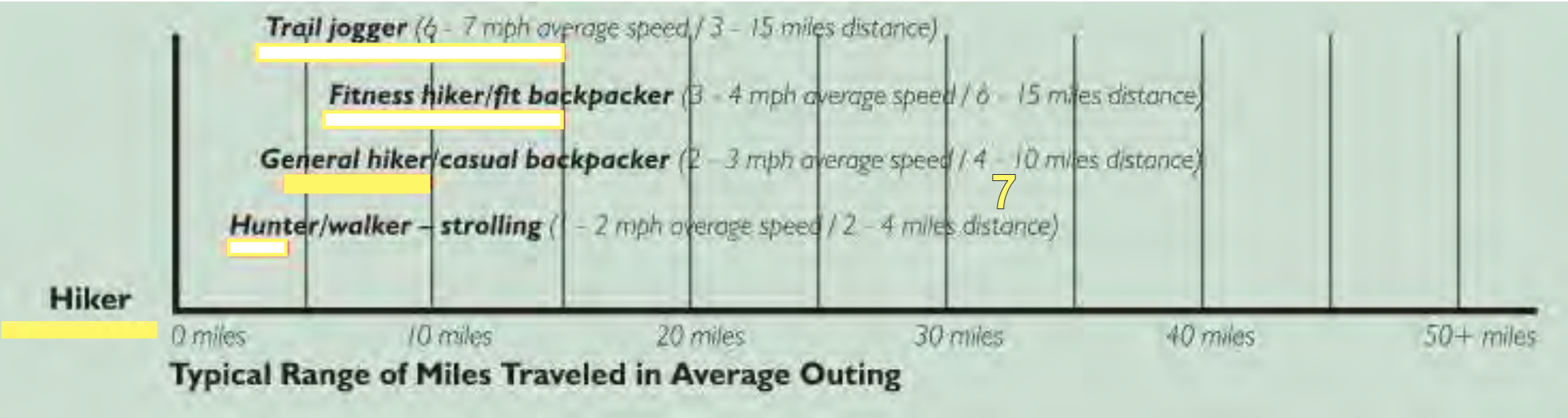# Draft Trail System Design

Who does it serve?

Speed and Distance of users

Draft Trail System Design

Who does it serve?

Speed and Distance of users

Draft Trail System Design

Who does it serve?

Speed and Distance of users

Draft Trail System Design

Who does it serve?

Speed and Distance of users

Advanced – trail network on public lands (10 - 20 mph average speed / 15 - 50 miles distance)

Recreational – trail network on public lands (6 - 15 mph average speed / 10 - 25 miles distance)

Advanced – technical trail in park setting (6 - 18 mph average speed / 6 - 20 miles distance)

Recreational – technical trail in park setting (3 - 12 mph average speed / 3 - 12 miles distance)

Mountain Biker

0 miles   10 miles   20 miles   30 miles   40 miles   50+ miles

Typical Range of Miles Traveled in Average Outing