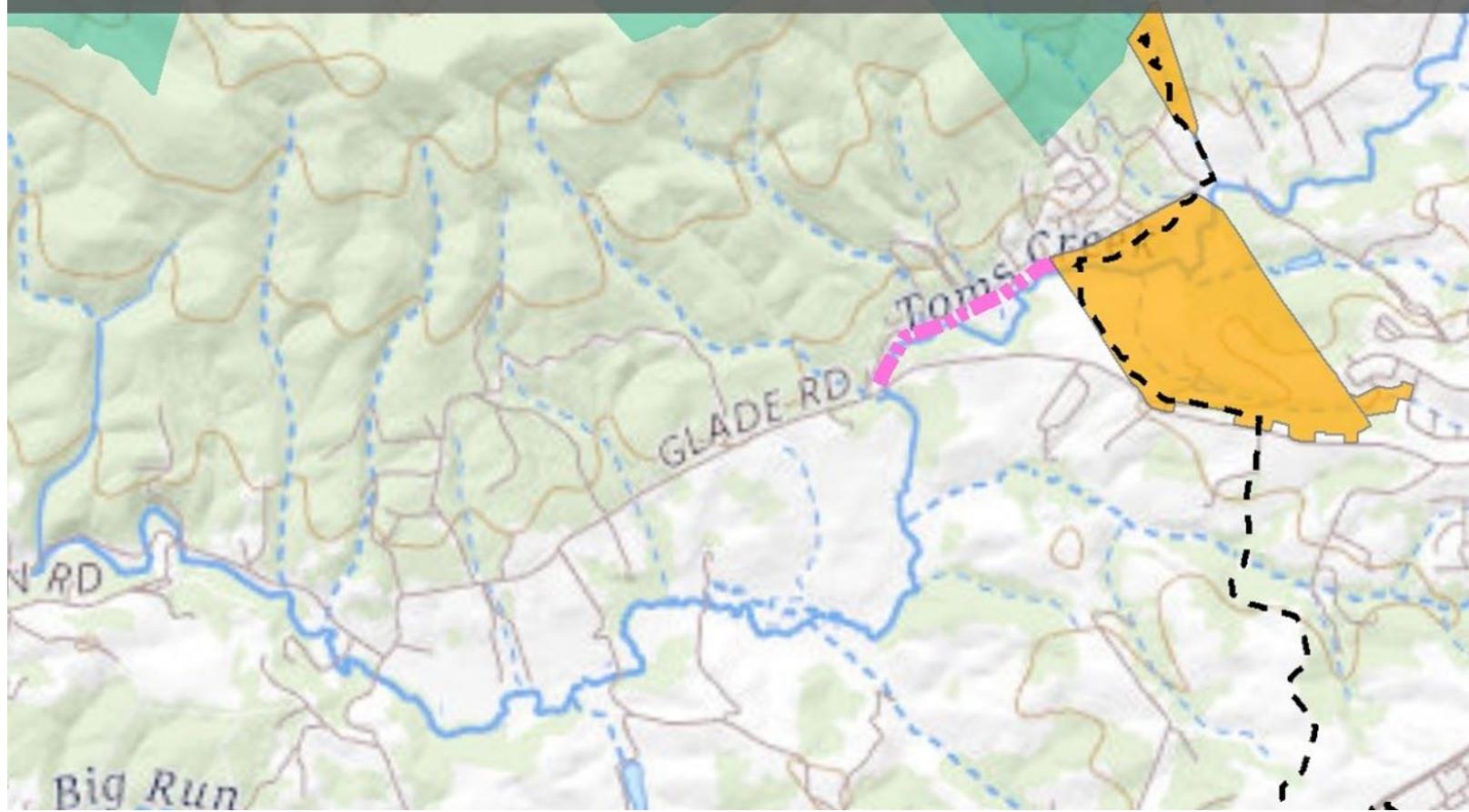


**BRUSH MOUNTAIN PROPERTIES CONCEPT PLAN**  
August 2020



# BRUSH MOUNTAIN PROPERTIES CONCEPT PLAN

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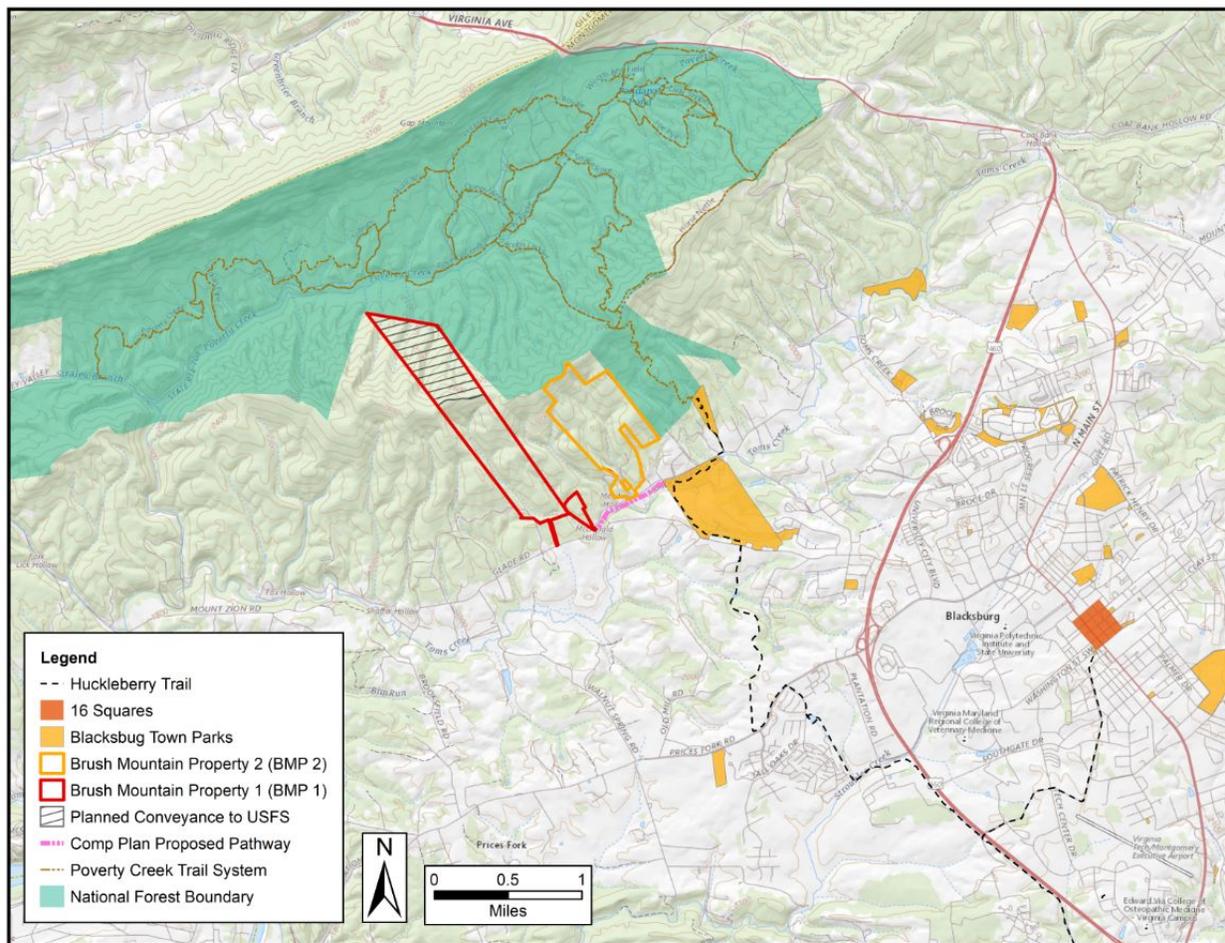
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# EXECUTIVE SUMMARY

In 2019, the New River Land Trust (NRLT) received a \$1.2 million grant award from the Virginia Outdoors Foundation's Forest CORE Fund - a fund established for the purpose of mitigating forest fragmentation resulting from the clearing activities along the Mountain Valley Pipeline's right-of-way through Virginia. These grant funds were used to purchase two, largely undeveloped properties, comprising 552 acres, on the south face of Brush Mountain. (See Figure 1.) These two properties are located north of Meadowbrook Road and are contiguous with the Washington & Jefferson National Forest (National Forest). The NRLT will transfer the Brush Mountain Properties to the Town of Blacksburg (Town) in the near future to be managed as community park lands.



**Figure 1. – Brush Mountain Properties Vicinity Map.** Location of Brush Mountain Property 1 (BMP1) and Brush Mountain Property 2 (BMP2) in relation to the George Washington & Jefferson National Forest, the Poverty Creek Trail System, Heritage Park, the Huckleberry Trail, and core of VT campus/downtown Blacksburg.

With the addition of these two properties, the Town has an opportunity to develop and manage a unique, non-motorized trail system for the benefit of residents and visitors alike. The multi-use trail system will offer diverse recreational opportunities close to where people live and without having to leave town. Convenient trailheads are planned along Meadowbrook Road and will lead visitors to high-quality, purpose-built, natural surface trails and will also create new connections to adjacent and extensive trail networks like the Huckleberry Trail, the Jefferson National Forest Pandapas Pond Day Use Area (Pandapas), and the Poverty Creek Trail System.

The justification, planning, and design recommendations outlined in this Trails Concept Plan (Concept Plan or Plan) provides a wide range of hiking, running, biking, and horseback riding options within a multi-use trail system. This Plan recommends the construction of a number and length of multi-use trails that can be logistically developed on the two Brush Mountain Properties within their respective boundaries and given the topographical constraints. Using a variety of trail specifications, trail types, and sustainable construction methods, the multi-use trails will be developed with the intention to satisfy an array of user groups and interests, while also providing trails and features that hold the attention of users at every age group and skill level.

The implementation of a proposed stacked-loop trail system consisting of multi-use trails has been designed to lead users to terrain compatible with their desired experience and to mitigate potential user conflict. Trail users will have opportunities to experience the types and intensity of recreation they seek without having a significant adverse impact on other users' experiences. Few locations in the New River Valley, if any, have a wide-range of optimized amenities and trail types; therefore, reserving these spaces for varied outdoor activities will be an asset for the Blacksburg community. Any of the proposed trail corridors and amenities can be added in a phased manner, making it possible to update or repurpose trail alignments and features to meet the needs of future recreational users as demand and user preferences shift (and funding becomes available for additional features).

# 1.0 INTRODUCTION

## Project Background

The Town of Blacksburg (Town) is a municipality with an increasing number of residents and a growing population of students at Virginia Tech. People choose to live in and around Blacksburg, come to school here, or visit the area for a variety of reasons – one of which is the Town’s close proximity to public lands. Combined with the ever-increasing popularity of trail running, mountain biking, and horseback riding, people who enjoy the outdoors have found that Blacksburg’s surroundings offer a multitude of outdoor recreational opportunities.

The popular Poverty Creek Trail System lies between the ridgelines of Brush Mountain and Gap Mountain within the Eastern Divide Ranger District of the George Washington & Jefferson National Forest (National Forest) and is the Town’s closest trail network used for natural surface outdoor recreation. (See Figure 1.) As the region’s population grows and the number of visitors to the region increases, the Poverty Creek Trail System will continue to experience increasingly heavy use by hikers, runners, mountain bikers, and horseback riders. At the same time, the popular Huckleberry Trail system, located on the Town side of the Brush Mountain properties, offers access to 10.5 miles of paved multi-use trail linking Blacksburg, Virginia Tech campus, Christiansburg, and Montgomery County.

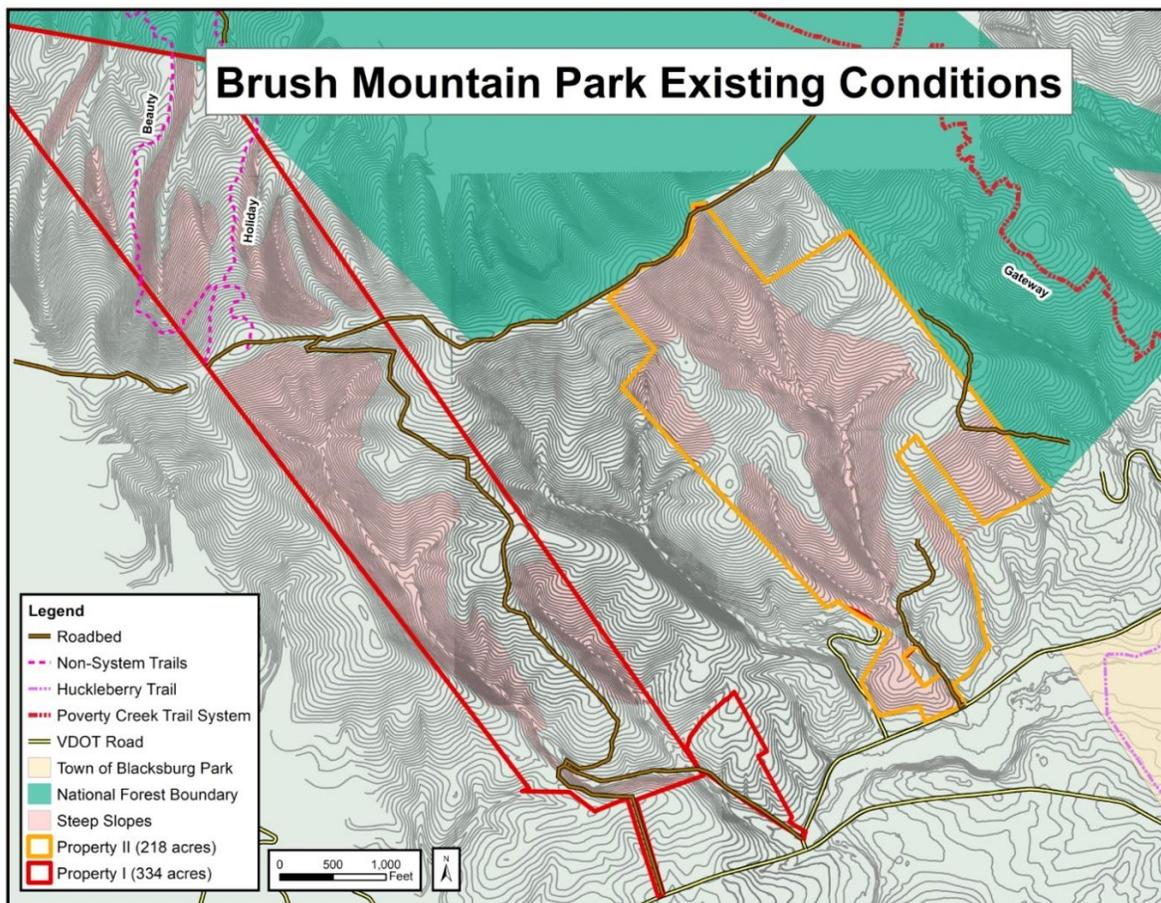
In 2019, the New River Land Trust (NRLT), in partnership with the Poverty Creek Trails Coalition (PCTC,) purchased 552 acres of intact, undeveloped forestland located mostly on the south face of Brush Mountain in an effort to permanently conserve these forestlands and accommodate a growing community that desires outdoor recreation and educational amenities. The location of the two Brush Mountain properties, between the Poverty Creek and Huckleberry trail systems, offers the potential to create a fully connected continuum of outdoor recreation options for a wide variety of users. The NRLT’s stated the goals of this land acquisition include:

- Preservation of scenic and forest values; preservation and enhancement of the existing, natural vegetation; and, prevention or minimizing changes that would have broad negative ecological impacts.
- Increasing public access to the forest environment on Brush Mountain and building an outdoor recreation and nature-based educational asset base.

The 552 acres consist of two properties referred to in this document as Brush Mountain Property 1 (BMP1) and Brush Mountain Property 2 (BMP2). BMP1 contains 334 acres, and BMP2 contains 218 acres. Both properties extend north from Meadowbrook Road to a boundary with the National Forest. (See Figure 2.)

The NRLT plans to transfer 97 acres of BMP1 located north of the ridgeline road to the U.S. Forest Service resulting in a boundary adjustment for the National Forest. Following the boundary

adjustment, the NRTL plans to transfer the remaining 238 acres of BMP1 and all of BMP2 to the This will result in 456 acres of land being added to the Town of Blacksburg's park system.



**Figure 2. – Brush Mountain Properties Existing Conditions Map.** Topography including steeply sloped areas, existing roadbeds and trails, proximity of other trail systems, and adjacent private and public lands

Per the conditions of the agreements and in conjunction with the Virginia Outdoors Foundation (VOF), the BMP1 and BMP2 are to remain under conservation easements and will be subject to deed restrictions, which will prohibit further division of the properties, protect natural heritage resources<sup>1</sup>, minimize future expansion of impervious surfaces<sup>2</sup>, require buffers for drainages and karst features<sup>3</sup>,

<sup>1</sup> Natural heritage resources are defined by the Virginia Department of Conservation and Recreation - Division of Natural Heritage (DCR) as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations such as caves and karst terrain.

<sup>2</sup> Impervious surfaces are defined by the Virginia Department of Environmental Quality as surfaces composed of any material that significantly impedes or prevents natural infiltration of water into soil. Impervious surfaces include, but are not limited to, roofs, buildings, streets, parking areas, and any concrete, asphalt, or compacted gravel surface.

<sup>3</sup> Karst features and topography are defined by the Virginia Department of Environmental Quality as geologic formations typified by the presence of limestone caverns and sinkholes. These areas present challenges for the

and stipulate that management of the forest be according to what is outlined in NRLT's Forest Management Provisions. Additional detail on plans for environmental stewardship, forest management, and nature-based education/research is provided in Section 3 of this Concept Plan.

The Town of Blacksburg recognizes that preserving and expanding trail access throughout the Town and up to the border with the National Forest is critical to creating and enhancing quality of life attributes for the surrounding community. The Concept Plan, along with the associated maps, contains proposed trail systems for BMP1 and BMP2, which will become part of the region's interconnected trail network. This Concept Plan provides guidance to Town staff, PCTC, and other stakeholders for future trail-related priorities and decisions.

This Plan is intended to promote the development of a meaningful, well-conceived trail network to preserve and enhance a community amenity for both residents and visitors. The Plan also recognizes that while Blacksburg is a growing community, a balance must be achieved between development and conservation efforts. To those ends, the Plan seeks to create opportunities to enhance quality of life and connect residents to natural spaces while also striving to protect ecologically sensitive areas. This Plan for an interconnected recreational trail network helps to advance these objectives while also aligning with the mission of Virginia's newly initiated Office of Outdoor Recreation and the priority objectives of the Virginia Outdoor Foundation's Forest CORE (Community Opportunities for Restoration and Enhancement) Fund.

## How this Plan Was Developed

The Concept Plan was developed by the combined volunteer efforts of the members of the Brush Mountain Stakeholder Group organized by the NRLT and the Town of Blacksburg. The stakeholder group includes representatives from:

- Blacksburg Striders
- Blue Ridge Gravity ([BRG](#))
- Blue Ridge Off-Road Cyclists ([BROC](#))
- East Coasters Bike Shop
- Back Country Horsemen of America - Eastern Divide Chapter ([BCHA](#))
- New River Land Trust (NRLT)
- New River Valley Bicycle Association (NRVBA)
- Poverty Creek Trail Coalition (PCTC)
- Town of Blacksburg
- U.S. Forest Service - Eastern Divide Ranger District
- Virginia Outdoors Foundation (VOF)
- Virginia Tech (Biology, Natural Resources)

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built environment as they can allow caverns or sinkholes to expand and open at the surface. Karst features may also allow a direct path for the stormwater runoff to enter the water table with little or no filtering of pollutants.

## Plan Philosophy and Core Values

Trails that are designed and constructed for sustainability is the main guiding philosophy in this Concept Plan. A trail or a trail system is considered "sustainable" when it allows users to enjoy an area with minimal impact to natural and cultural resources and requires only modest maintenance. When a trail fails to provide desired outcomes, the resulting impacts can be crowding, conflict, and the creation of unauthorized trails, therefore a truly sustainable trail must also align with desired user experiences."<sup>4</sup>

Achieving a sustainable trail network begins with designing and constructing trails that are sited to minimize negative environmental or social impacts, are erosion-resistant, and are purpose-built for the experiences that users are seeking. Second, a successful trail system must be designed so it can be developed and maintained without outstripping available financial and volunteer resources. Lastly, a sustainable trail network should be periodically monitored and evaluated to ensure the trail sections and features are functioning as intended, with a plan for responsible decommissioning and/or re-routing if user experiences are not met or maintenance requirements become too onerous. For the Brush Mountain properties, these objectives can be primarily advanced by utilizing existing roadbeds and foot trails to form the backbone of the trail system. Additional means to keep costs low include the pursuit of grant opportunities, joint trails projects with other agencies or entities, and the institution of impact fees to event organizers that utilize Town trails.

Below are a set of Core Values, which were developed by the Brush Mountain Trails Stakeholder Team. These represent the principles that have guided the creation of this Plan to-date, and will provide the framework for implementation . The Core Values include:

- Engage partners and the public meaningfully and transparently to foster collaboration around common goals.
- Work to develop a range of recreational and nature-based opportunities for a diverse and active user community.
- Be responsive to the priorities of various user groups and skill-advancement opportunities within those user groups.
- Seek ways to minimize user conflicts through design elements and community building efforts across user groups.
- Prioritize options during design and plan development that can be sustained long-term in terms of anticipated funding and human effort required.
- Seek to complement recreational opportunities in the region.
- Consider other community and regional assets and work to connect and create a continuum of structured recreational space with increasingly less structured recreational spaces.

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<sup>4</sup> Bureau of Land Management and the International Mountain Bike Association. *Guidelines for a Quality Trail Experience*. 2017.

## Plan Goals and Objectives

This Concept Plan attempts to provide a coherent and well thought-out framework for the future of the forestland trails on BMP1 and BMP2. More specifically, this document is intended to:

- Describe two trail systems (one for each property) for multiple uses including hiking, running, mountain biking, and horseback riding.
- Create property-specific trail systems: One trail system will consist of similarly constructed, multi-use trails that prioritize foot/hoof travel with relatively few technical aspects; the other will consist of trails with a diverse and wider-range of challenges and terrain features optimized for wheeled-travel.
- Outline functioning access to the trail systems that connects efficiently with other pre-existing trails systems and transportation corridors.
- Identify important trailhead and access locations, amenities, and signage to facilitate recreational uses.
- Offer trail opportunities to locals and visitors at all ability levels, from novices through more advanced trails users.
- Use a phased-approach to implement and construct the trails systems.
- Offer recommendations to accomplish the specific trail and access projects outlined within the Plan.

## Plan Prioritization

Implementation of the BMP1 and BMP2 trails program will follow the priorities listed below:

- 1) Improve and maintain existing core trails/roadbeds or “hubs” on each property, as these will be critical to the construction and access of system trails.
- 2) When it comes to new trail construction, focus on new loop trails and connector trails emanating from a core hub. By developing trails along these lines, locals and visitors alike can access a linked trail system that will lead them away from the hub.
- 3) Construct or enhance trails on the more remote portions of the Brush Mountain Properties to enhance connectivity to existing Poverty Creek Trail System trails, specifically the Gateway Trail.
- 4) Construct new trails and enhance existing trails within the Poverty Creek Trail System in cooperation with the U.S. Forest Service to ultimately improve the community-wide trail network.
- 5) Design and construct new parking and access points along Meadowbrook Road that connect to the Huckleberry Trail system.
- 6) Work cooperatively with area private landowners to secure additional properties or ROW/easements to accomplish the vision set forth in this Plan and also to minimize anticipated impacts and/or seek to address challenges or concerns that arise over time.
- 7) Update and amend the Plan in the event additional key properties or ROW located on Brush Mountain are acquired.

## **Role of the Plan**

The purpose of this Plan is to propose a comprehensive trail network design and implementation plan that serves multiple users. The planning area is focused on the Brush Mountain Properties, but does consider improved connections to the existing Poverty Creek and Huckleberry Trail Systems. This Plan is a volunteer-generated document with buy-in from various volunteers representing several potential user groups and stakeholders.

## **Plan Assumptions**

This Plan is a master plan for the design and construction of idealized multi-use trail systems on two separate properties that are themselves contiguous to the public lands managed by the U.S. Forest Service, Town of Blacksburg parks and trails, and to privately owned lands. Though the proposed trail systems can exist independently (i.e., they can be used individually and without leaving the respective property boundaries), overall connectivity to the greater Poverty Creek and Huckleberry trail networks is an objective. The Plan recognizes that the NRLT and Town will need to work closely with these adjacent property owners and managers to create a connected multi-surface trail network.

Many of the trails identified in this Plan connect to the Poverty Creek Trail System managed by the U.S. Forest Service (USFS). The Town and the NRLT each have strong working relationships with the USFS and will continue to collaborate and coordinate with the USFS on the National Environmental Policy Act (NEPA) regulations and review process to complete the proposed trail systems to provide a framework for regional trail network connectivity.

Additionally, the adjacent, privately owned properties have unmarked boundaries that are not readily discernible from BMP1 and BMP2. To ensure private property rights are respected and recognized by future trail users, BMP 1 and BMP2 will be developed in ways that clearly delineate boundaries and/or include buffer areas. Achieving the vision set forth in this Plan will require collaboration with a few private landowners. The Town has a long history of successful collaborations with property owners where municipal parks and trails run adjacent to private lands and will work in good faith with these owners to minimize anticipated impacts and address challenges or concerns that arise over time.

To provide high-quality user experiences, the Plan further encourages the use of a wide array of physical and management options such as trail design, information and education, user involvement, and regulations and enforcement to mitigate user conflicts. Trail conflicts occur among different user groups, among different users within the same user group, and as a result of factors not related to users' trail activities at all. These conflicts often center around speed, failure to yield, parking-related issues or perceived impacts to trails. This Plan encourages positive interaction among and between user groups,

increased understanding and adherence to norms of trail etiquette, as well as opportunities for community-building through volunteer trail building days.

## **Plan Organization**

This Plan offers a template for the creation of two, distinct trails systems on two, separate properties. The following chapters describe the trail concepts and the intended user experience. The plan identifies opportunities for environmental stewardship and management and nature-based research and education. The plan describes the existing conditions on each parcel and then outlines the trail design principles. Next, the plan outlines trail access and signage and wraps up with an implementation plan and recommendations.

## **Plan Implementation**

The recommendations outlined in this Plan are intended to provide guidance for future trail design, construction, operation and maintenance, and funding opportunities.

## 2.0 CONCEPT PLAN ELEMENTS

### Recreational Experiences

This Concept Plan explores the idea of creating a unique recreation experience as compared to what is currently available within the Poverty Creek Trail System located within the National Forest. Generally speaking, this trail system contains the following challenges/limitations as identified by the Stakeholder group:

- Trails within the Poverty Creek Trail System can be accessed from many variable locations; however, there are few established parking lots close to the trails; resulting in overuse in some areas (e.g. the first mile or two of the Poverty Creek Trails) and underuse in others (e.g. Indian Pipe).
- Trails are commonly adopted from old trails, historical corridors, or roadbeds (i.e., old logging roads) or user-built (rather than sustainably designed with users in mind and proper permissions secured).
- Many trails are steep, eroded, fall-line trails that are perceived as difficult to both use and maintain.
- Wayfinding is sometimes perceived as difficult due to varying access points, start/ends, and intersections.
- Congestion occurs on easier and more accessible trails (i.e., Poverty Creek Trail) due to multiple user groups (hikers, runners, dog walkers, mountain bikers, horseback riders).
- User conflict between user groups occurs on congested trails and trails with potential for high speeds.
- Many trails require significant maintenance or re-routing (many are seriously degraded).
- The overall trail system mileage has not been allowed to grow with evolving user preferences; or along with the growth of the surrounding population.

This Concept Plan aims to provide a basis to develop BMP1 and BMP2 in ways to avoid the challenges identified within the Poverty Creek Trail System by creating thoughtfully designed trail networks specific to each property with respect to quality, sustainability, and anticipated users. The following design criteria have been incorporated into the proposed trails:

- Appropriate to the particular setting.
- Environmentally and socially sustainable.
- Economically responsible, taking into account long-term costs associated with maintenance and administration.
- Outcome-focused, able to provide the targeted experience and benefits for the identified user groups and skill levels within user groups, with an eye toward offering opportunities for skill progression.

## User Conflict Mitigation

User conflict is defined as “goal interference due to another user’s behavior.” The key to mitigating user conflict and maintaining user safety will be accomplished by the use of following trail design strategies:

1. Follow best management practices for trail design and construction for all user types, e.g., hikers, mountain bikers, and horseback riders that mitigate erosion, damage to vegetation and/or degradation of water quality.
2. Use a stacked-loop trail system design to mitigate congestion and crowding on any one trail. Stacked loops enable users to share many different levels of trail where the closest loops to the trailhead are the easiest and most beginner-friendly; thereby allowing users of all levels to enjoy the natural setting offered by the park.
3. Use bi-directional loops, which double the trail options and allow users to complete a loop rather than an out-and-back.
4. Allow users to choose between two different and separate trail systems (i.e., BMP1 or BMP2) with trail treads designed for differing intended uses or user experiences that are communicated to users by signage.
5. Design and construct trail tread that prioritizes foot and horse travel on BMP1; optimize the trail tread design for BMP2 for wheeled-travel.
6. Where appropriate, implement traffic-flow strategies such as suggested single-direction where user experience or safety could be compromised.
7. Promote trail advocacy campaigns and programs to educate the public about user conflict avoidance and safety.
8. Promote awareness of trail etiquette and work to encourage a culture of respect, sharing, and safety within and across user groups around common conflict points (parking, speed, yielding norms, and patterns of use that can damage trails and/or surrounding natural areas)
9. Encourage all user groups to participate in trail building activities and/or fundraising efforts.

## User Experience

This Concept Plan intends to provide a quality experience to all users of the Brush Mountain Properties. To do so, this Plan proposes to design the trail systems for each of the Brush Mountain Properties separately with the user experience in mind.

In general, the experiences sought by the intended trail users of the Brush Mountain properties can be defined as:

- **Hikers:** More focused on setting and destination rather than the trail itself, these users are the least constrained by formal trails and are capable of cross-country travel.
- **Trail Runners:** More focused on goals and exercise, though the trail itself is an important factor; For valued experience, connectivity to additional trail networks for longer distances.
- **Equestrians:** Prefer loops. Less affected by trail conditions but do require the largest corridor in terms of width and clearance height. May require longer distances for valued experience. Do not benefit from trails with excessive twists, turns, or features. Destination and setting are important.
- **Mountain Bikers:** Wide range of desired experiences and outcomes; however, the trail itself is generally the primary attraction, rather than the setting or destination. Mountain bikers may often choose to repeat trails multiple times since the trail itself is important.

Factors that are common to all trail users include natural setting, singletrack, exercise, loops, connectivity, and variety. Factors that are more specific to mountain bikers include play, technical challenges, skills progression, and rhythm.

The trails on BMP1 have been designed for all trail users by incorporating natural settings, exercise, loops, connectivity and variety into the system. Specifically, the tread of the trail on BMP1 has a consistent design across the system, with regard to distance, elevation, and destinations. BMP1 trails will contain good sight lines to further aid in user conflict mitigation. The stacked-loop system on BMP1 will allow users to select from an array of distances and elevation changes to accommodate users' abilities and timeframes.

To create something unique to the New River Valley that complements mountain biking, this Plan proposes to construct a trail network on BMP2 with certain trails optimized for mountain biking. This does not mean that hikers, runners, or horseback riders are restricted from using BMP2 trails; however, specific zones of BMP2 would contain bike-optimized trails designed to move through the terrain in a such a way as to provide challenges and skills progression utilizing the natural features provided by the terrain. Features particularly preferred by mountain bikers include twists and turns, banked or bermed turns, obstacles such as rock gardens or boulders, logs, or short sections of steep inclines and declines; and flow trails.

The intent of differentiating some of the user experience between BMP1 and BMP2 is to increase the quality of the experience of all users by providing means to obtain each users' desired outcomes while also mitigating user conflict by attracting different users to different properties. This aspect of the Brush Mountain Properties trails systems differentiates it from the Poverty Creek Trail System to provide a more targeted user experience.

## Concept Design Trail Design for Brush Mountain Properties

Natural-surface trails constructed on the Brush Mountain Properties are expected to be used for foot travel, mountain biking, and horseback riding; with preferences or limitations specific to each property. Motorized vehicle use, camping, and hunting will not be permitted on either property.

This Concept Plan proposes two trail systems – one specific to each of the Brush Mountain Properties:

**Brush Mountain Property 1:** A multi-use, stacked-loop, trail network with relatively homogenous trail tread construction with an overall trail grade below 10%.

- The intended use of this trail system is for bi-directional foot travel (e.g., hiking and running), mountain biking, and horseback riding on all trails. A kiosk at the entrance of this trail system will describe this intended usage.
- Except for existing roadbeds, new trail tread design will prioritize foot/hoof travel and will be a typical “full bench cut,”<sup>5</sup> singletrack tread<sup>6</sup> approximately 36 inches in width or narrower, that is consistently graded given the terrain and slopes. These trails will not have excessive twists and turns or obstacles and are not intended to be particularly challenging to any single user group; and,
- These trails will be more focused on setting and destination to accommodate and be attractive to the widest range of abilities capable of cross-country travel.

**Brush Mountain Property 2:** A multi-use, singletrack trail network with varied tread construction that includes intentional grade changes, features, challenges, and obstacles (e.g. rocks, boulders, logs, inclines/declines, etc).

- Intended as a multi-use trail system with trail tread optimized for mountain biking. A kiosk at the entrance of this trail system will describe each trail and its intended usage.
- Singletrack tread could be limited to 24 inches wide or narrower and may be rough or technical in many sections.
- The intent of this trail system is to have many twists and turns, grade reversals, and other natural or man-made features that make the trails intentionally playful and challenging.
- The intended user experience will focus on the trail itself is the primary factor for usage, rather than connectivity or setting.

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<sup>5</sup> A full bench cut is constructed by cutting the full width of the tread into the hillside and casting the excavated soil as far from the trail as possible. Full-bench construction requires more excavation and leaves a larger backslope than partial-bench construction, but the trailbed will be more durable and require less maintenance. Trail professionals almost always prefer full-bench construction.

<sup>6</sup> Singletrack describes a type of trail that is generally wide enough for one user (hiker, runner, biker, horseback rider) at a time. It contrasts with double-track or fire roads which are wide enough for four-wheeled off-road vehicles. Singletrack trails are often smooth and flowing, but may also feature technical rocky sections, go over tree roots, and include berms, banked turns, switch-backs, and so forth.

## **Trail Kiosks, Identifiers/Signage, and Boundaries**

An important purpose of the Brush Mountain Properties is to educate the public about safety and ethical recreational use of Town-owned public lands. As a multiple-use recreation area, visitors will also need to be educated about sharing the area and respecting the area boundaries. To meet this goal, the trail entrances will feature trail signs and information kiosks to convey these messages.

### **Trail Kiosks**

Trail kiosks are proposed at the entrance of each property, near Meadowbrook Road. Trail kiosks will provide visitors and users with information on the overall trail networks, user etiquette and will advise users to protect natural, cultural and historic resources in the area. The Recreation Area's natural resources, history, management, and design features can be interpreted to convey messages and interesting information.

Trail kiosks will also communicate to trail users which trails may present challenging terrain, identify which trails may have preferred single-direction travel, and to mitigate potential user conflict by advocating yielding norms and expectations for friendly, respectful communication among users such as:

- Easily remembered phrases like "10 seconds of kindness" and "Be Nice, Say Hi," which encourage users to slow down, recognize that others are on the same trails, and simply be courteous to them.
- Be aware of basic rules of the trail that hikers/runners yield to horses, and mountain bikers yield to everyone;
- "Be Alert" awareness campaign on trails with potential speed differentials.

Trail kiosks will also describe the property, its history and its ownership. Trails kiosks will have a map of trails, trail lengths, elevation change, user difficulty rating, and optimized use, if any. Trail kiosks should also recommend users observe and photograph as part of "Leave No Trace" behavior and inform the user to stay on trails and illustrate any sensitive species.

### **Trail Identifiers/Signage**

As signs are the most important communication tool between land managers and trail users, the development of any new trail system requires a system of signage and trail markers. A well-made and maintained signage system has the potential to enhance a user's experience while they navigate through the trail system. Signage also plays a critical role in managing risk and effective response and deployment of emergency services.

Trail identifiers within the Poverty Creek Trail System consist of plastic/aluminum diamonds of various colors (e.g., gold, blue, red, etc) that identify individual trails as marked on maps at trail kiosks. To differentiate Brush Mountain Property Trails from Poverty Creek Trail System trails, it is recommended that the trail identifiers be 4-inch in diameter, circular markers of varying color. Trail names will be identified at a later time.

## **Property Boundary Markings**

The borders of both Brush Mountain properties are difficult to discern as there are no natural or man-made features that identify the boundaries of the properties; therefore, it will be important to identify areas where proposed trail alignments will come close to the boundaries, to ensure trail users do not inadvertently leave the Brush Mountain properties and trespass on surrounding private property or that surrounding private landowners/users do not enter the property for illegal purposes such as hunting or motorized vehicle usage.

The Plan recommends trees along the boundaries of the Brush Mountain Properties be marked following demarcation standards recommended by the Virginia Department of Recreation & Conservation (DCR) or the U.S. Forest Service. In addition, the Plan recommends that “No Hunting, No Camping, and No Motorized Use” signage be installed at appropriate intervals and/or near private property trails/roadbeds that run adjacent to the Brush Mountain Properties.

## 3.0 ENVIRONMENTAL STEWARDSHIP, ENVIRONMENTAL MANAGEMENT, AND NATURE-BASED EDUCATION & RESEARCH

### Environmental Stewardship & Management

The New River Land Trust (NRLT) acquired the 552 acres of intact, largely undeveloped forestland in an effort to permanently conserve these forestlands and “accommodate a growing community that desires outdoor recreation and educational amenities.” To balance an ethic of conservation with opening these spaces to the public for outdoor recreation and other uses, both environmental stewardship and environmental management will be of paramount importance.

- Environmental stewardship can be defined as “the responsible use (including conservation) of natural resources in a way that takes full and balanced account of the interests of society, future generations, and other species, as well as of private needs, and accepts significant answerability to society” (Worrell & Appleby, 2000, p. 263)<sup>7</sup>.
- A related concept is environmental management, where the natural resources of the environment are managed through policies designed to protect natural values while providing a framework for use. In tourism, this management may be the responsibility of many groups including individual operators, tourism industry organizations, non-governmental organizations, or government agencies (Mercer, 2004; Williams & Ponsford, 2008).<sup>8</sup>

Both environmental stewardship and management can be supported through the development of a forest management plan that encompasses but is not limited to the following environmental impact mitigation strategies:

- Establish and promote the principles of the “Leave No Trace” framework, including: plan and prepare ahead, travel on durable surfaces, dispose of waste properly, leave what you find, respect wildlife, and be considerate of other visitors.
- Protect and conserve the natural heritage resources identified in Virginia Department of Conservation and Recreation Biotic’s Data System.
- Work with local naturalist groups to help identify and remove non-native and invasive species and create effective mechanisms to prevent their introduction.
- Improve and enhance water quality by stabilizing the forest access road and improving stormwater management systems, along both access roads and trails.
- Employ sustainable trail building practices, which are described throughout this document, to limit erosion and sedimentation, and minimize disturbance of natural areas.

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<sup>7</sup> Worrell, R., Appleby, M.C. Stewardship of Natural Resources: Definition, Ethical and Practical Aspects. *Journal of Agricultural and Environmental Ethics* 12, 263–277 (2000). <https://doi.org/10.1023/A:1009534214698>

<sup>8</sup> Mercer, D. (2004). Tourism and resource management. In C. Hall, A. Lew & A. Williams (Eds.) *A Companion to tourism* (pp. 462 – 472). Oxford, UK: Blackwell Publishing.

- Encourage users to limit use of trails in wet weather conditions where such use could contribute to damage to the trail system.
- Remove legacy solid waste, such as glass piles, tires, and other trash and debris abandoned at various locations across the properties.
- Work with the Department of Mines, Minerals, and Energy (DMME) to evaluate historical coal mining operations and identify strategies to mitigate safety and environmental concerns.
- Develop a fire management plan in coordination with state and federal forest services to assess fire risk and conduct prescribed burns to reduce the amount of fuel in the forest understory.
- Develop a forest management plan in coordination with Virginia Tech Department of Forest Resources and Environmental Conservation.
- Promote consistency of Town of Blacksburg Parks policies re: camping and use after dark.

## Nature-Based Education & Research

In addition to Environmental Stewardship and Environmental management, there is keen interest in ensuring the Brush Mountain Properties provide space and opportunities for nature-based education as well as research activities.

- Nature-Based Education can be defined as: a class, camp or other facilitated learning that takes place out of doors with nature as the driving theme behind learning objectives and activities. Nature-based education uses the natural world to support dual goals of student development and conservation values. These include the development of the student/learner (in multiple domains – cognitive, physical, social, emotional, aesthetic, and sometimes spiritual) paired with the development of an ecological identity or environmental ethic. (Larimore, 2016 pg. 32)<sup>9</sup>
- While there is not a single definition for “Nature-Based Research” this can span a range of activities from citizen/community science initiatives to formal academic research.

Responsible use of the Brush Mountain properties for nature-based education and research is encouraged. In fact, Virginia Tech researchers plan to evaluate the environmental impacts of trail construction on the forest system. The research will focus on measuring soil compaction and impacts to surrounding vegetation and on soil loss and impacts to water quality impacts. The research will apply scientific methodologies such as LiDAR data to measure changes to trails over time. This type of research will fill an information gap in national conversations on trail building. To facilitate future education and research uses such as these, it is desirable to define different types and intensities of activities and develop a protocol for managing more active or impactful nature-based education and research.

- In general, the following types of nature-based education & research activities are encouraged and permissible without seeking prior authorization:

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<sup>9</sup> Larimore, R. Defining Nature-Based Preschools. *The International Journal of Early Childhood Environmental Education*, 4(1), p. 32 (2016) <https://files.eric.ed.gov/fulltext/EJ1120149.pdf>

- Passive nature observation; identification & appreciation (flora and fauna)
  - Guided tours and classes
  - Minimally impactful collection, sampling and/or testing (e.g. soil or water)
  - Careful/responsible/legal catch and release (e.g. aquatic macroinvertebrates, insects)
- In general, the following types of nature-based education and research activities are permissible, but will require prior permission.
    - Significant collection, sampling or disturbance of flora and/or fauna
    - Research test areas that require boundary markings, physical alteration of the land, or erection of temporary or permanent structures.
    - Use of chemical agents
    - Temporary or permanent signage or other markers

## 4.0 PROJECT AREA AND EXISTING CONDITIONS

### Resource Locations and Existing Conditions

According to the U.S. Forest Service, the Brush Mountain area which encompasses both the Poverty Creek Trail system and the two properties described in this concept plan, “displays the typical characteristics of the Ridge and Valley physiographic province. The mountain is capped by a resistant layer of Devonian sandstone, with the underlying shales giving rise to a series of steep ridges and deep coves along the northern slope. The lower slopes are well forested with a great variety of species: tulip tree, sugar maple, northern red oak, white oak, basswood, red maple, cucumber tree, white ash, and white pine. On the higher parallel ridge slopes, Virginia pine and Table Mountain pine predominate on the southwestern sides, while chestnut oak and scarlet oak are found on the northeastern sides. The area is one of the few sites in Virginia with table mountain pine and box huckleberry, species requiring fire to reproduce, and therefore becoming uncommon because of fire exclusion. The area was largely cut over about 100 years ago, but the forest is rapidly maturing.”<sup>10</sup>

The south face of Brush Mountain is generally a rough and steep forested landscape with numerous steep drainages and a few intermittent or ephemeral streams. Historic mining and logging activities in the lower-elevation areas of Brush Mountain have led to some changes in the landscape including roadbeds, former mine entrances or prospecting excavations, and a few small tailings and/or overburden areas. While these activities have modified the terrain in some areas, the south face of Brush Mountain remains primarily a natural, forested landscape.

The elevation differential between Meadowbrook Drive and the apex of Brush Mountain is approximately 800-900 feet; the horizontal distance from Meadowbrook Road to the apex of Brush Mountain is approximately 5,000 feet. Therefore, the average gradient from the bottom of the mountain to the top of the mountain is roughly 16%. Clearly, any trail system established on the south face of Brush Mountain will have to overcome challenges presented by steep slopes but can do so by implementing sustainable trail design.

The Virginia Department of Conservation and Recreation’s (DCR’s) Natural Heritage Resources Database<sup>11</sup> was used to search for natural heritage resources in proximity to BMP1 and BMP2. According to the database information, natural heritage resources have been documented within two miles of the indicated project boundaries and/or potential habitat for natural heritage resources intersect with the project area. These include the heritage areas of Toms Creek Marshes and Poverty

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<sup>10</sup> United States Department of Agriculture, Forest Service, George Washington & Jefferson National Forests, Brush Mountain Wilderness Area; Wilderness Connect, Brush Mountain Wilderness, description, <https://wilderness.net/visit-wilderness/?ID=713>

<sup>11</sup> The Natural Heritage Resources Database is a searchable database that allows users to identify what kinds of resources occur in specific counties, watersheds or physiographic regions. Information about specific natural heritage resources include scientific and common names, rarity ranks, and federal and state protected status information. These reports are not site specific. For more information, see <https://www.dcr.virginia.gov/natural-heritage/infoservices#tool>.

Hollow. Further evaluation and conservation of these resources should be addressed in a future forest management plan.

The entrances to BMP1 and BMP2 are located along Meadowbrook Road. The two properties are approximately one-quarter-mile apart and are separated by private property.

## **Brush Mountain Property 1**

BMP1 is a long, rectangular-shaped property running north-south that is characterized by steep slopes and drainages. It consists of three parcels totaling approximately 334 acres. With the exception of four acres within the Town of Blacksburg, BMP1 is almost entirely located in Montgomery County. BMP1 is bounded by private property to the east and to the west. BMP1 is directly accessed from Meadowbrook Road; however, it can also be accessed from Glade Road and via the National Forest. BMP1 is approximately ½ a mile from the Town's Heritage Park and Natural Area (Heritage Park) which is the terminus for the popular Huckleberry Trail greenway trail system that runs between the towns of Blacksburg and Christiansburg. BMP1 extends beyond the apex of Brush Mountain and contains significant acreage on the north face of Brush Mountain.

The Town recently purchased a parcel (approximately one acre) at the intersection of Meadowbrook Road and Glade Road. The Town plans to develop this parcel as a gravel parking lot for users to have direct access to the proposed BMP1 trailhead.

BMP1 is completely forested and contains one, natural-surface roadbed approximately 10 feet wide that climbs from Meadowbrook Road to the apex of Brush Mountain. The roadbed is 1.7 miles long and is located near the eastern property boundary. A portion of roadbed approximately 0.2 miles long also connects to Glade Road. The roadbed is easily traveled by foot, mountain bike, on horseback, or if need be, by 4WD vehicle. BMP1 extends beyond the apex of Brush Mountain approximately 0.4 miles north and contains a significant amount of existing trails locally known as "Beauty" and "Holiday" which run from the top of Brush Mountain to Poverty Creek. There is a small hunting cabin on BMP1 that is in poor condition and will need to be removed. Evidence of small-scale coal mining that took place in the early 20th century is also present on the property.

## **Brush Mountain Property 2**

BMP2 is an irregularly-shaped property. BMP2 consists of 218 acres and is located entirely within the Town of Blacksburg. BMP2 is directly accessed from Meadowbrook Road approximately ½ mile west of the lower Heritage Park parking area; however it can also be accessed from the National Forest along its northern and eastern boundaries.

BMP2 is almost completely forested excluding approximately one or two acres of cleared land. BMP2 has one, natural-surface roadbed (~0.4 miles long) that steeply climbs from Meadowbrook Road approximately one-quarter up Brush Mountain. The roadbed terminates at a clearing. There are several

old paths and trails that exist on BMP2, some of which cross property boundaries into the National Forest. Further north on the property is an area of outcropped rocks and boulders that are considered an asset from the perspective of building interesting and challenging trails.

## 5.0 TRAIL SYSTEM DESIGN

If the guiding philosophy of this Concept Plan is sustainability, then the doctrine for the design and construction of trails within the Brush Mountain properties is “Get the Water Off the Trail.” Staying true to this doctrine will ensure the creation and longevity of natural-surface trails that are erosion resistant. The International Mountain Biking Association’s (IMBA) Five Essential Elements of Sustainable Trails are:

- 1) The Half-Rule: a trail’s grade should not exceed half the grade of the hillside or side slope the trail traverses.
- 2) 10% Average Guideline: an average grade of 10% or less is the most sustainable.
- 3) Maximum Sustainable Grades: for steeper sections of trail to be sustainable, consider the following: soil type, rock, grade reversals, types of users, difficulty level, and enhanced drainage features.
- 4) Grade reversals: no matter how shallow the grade, incorporate grade reversals to promote water to drain off of the trail as soon as possible.
- 5) Outslope: trail tread should be outsloped as often as possible to promote the drainage of water off of the trail surface.

### Proposed Trail Alignment Descriptions

The Brush Mountain properties are separated by private property; therefore, there is no direct connectivity proposed between the two properties at this time. Any connection between the two properties will be limited to Meadowbrook Road (or future extensions to the Huckleberry Trail) and connections made on existing or future trails located within the adjoining National Forest and Poverty Creek Trail System. As such, proposed trail networks and alignments will be described for each property with these factors in mind.

#### Brush Mountain Property 1 (BMP1)

BMP1 contains an existing trail (i.e., the existing roadbed) and five new proposed trails. Colors associated with each new trail reference the color of the flagging used to mark the proposed alignments. Trails 1 through 5 are anticipated to be constructed in Phase 1. Trails 6 and 7 are still in the planning phase. Each of the proposed trails is described as follows:

- **Trail 1 (Existing Roadbed):** This existing roadbed is the hub trail of BMP1. It begins at the entrance to the property at Meadowbrook Road and, after a ¼-mile flat section, climbs Brush Mountain to its apex where it intersects the existing Brush Mountain roadbed that traverses the ridgeline. Trail 1 is approximately 1.7 miles long, 10 feet wide, and has a relatively smooth

surface that can be traveled easily. It has occasional sections that exceed 10% grade that will require maintenance to prevent erosion. Trail 1 provides users access to Trails 2, 3, and 4.

- **Trail 2 (Blue Trail):** Trail 2 is a horseshoe-shaped loop trail accessed from Trail 1 almost immediately after entering BMP1 from Meadowbrook Road. Trail 2 places users upon the 12-acre lower tract portion of BMP1 and meanders through gently-sloped terrain for approximately 0.5 miles before returning to Trail 1 further up from the start of Trail 2. The alignment of Trail 2 is constrained by property boundaries and historical, man-made changes to the land. Trail 2 is the most accessible trail from Trail 1 and is also the shortest and requires the least amount of exertion and skill.
- **Trail 3 (Red Trail):** Trail 3 is accessed from Trail 1 halfway between the end of Trail 2 and the switchback of Trail 1. Trail 3 climbs a short, steep section of Brush Mountain where it crosses the roadbed after which it meanders and switchbacks up Brush Mountain for approximately 0.7 miles at a gentle grade to an intersection with a short connector that allows users to return to Trail 1 or to begin Trail 4.
- **Trail 4 (Orange Trail):** Trail 4 begins near the end of Trail 3 just below the old cabin and begins to traverse steeper slopes of Brush Mountain. Trail 4 is approximately 0.6 miles long and is only slightly more challenging than Trail 3. Trail 4 ends at an intersection with Trail 5 and a ~500-foot connector trail that returns users to Trail 1 approximately halfway up the mountain. This connector trail offers views to the south and to the northwest.
- **Trail 5 (Pink Trail):** Trail 5 begins at the intersection of Trail 4 and the connector trails to Trail 1. It is approximately 0.7 miles long. Trail 5 traverses steep slopes and rugged terrain. Overall, Trail 5 traverses the steep terrain at a lower grade but at times the trail will have grades of 10%-20% for short distances. Grade reversals and water diversion features will be designed into the layout shed water of the trail in the steeper grade sections. Trail 5 feels quite remote in several areas and offers users several interesting views and perspectives.
- **Trails 6 (Yellow Trail):** Trail 6 begins on Trail 1 very close to the ridgeline, following that topography to the western boundary. The trail then doubles back east, running parallel to the same ravine as Trail 1. From that point, Trail 6 will drop down to meet Trail 5 for a total length of approximately 0.7 miles. The final alignment and design are still to be determined; this trail is anticipated to be built across challenging, steep terrain, therefore it will be constructed with traditional hand-built single-track methods.
- **Trail 7 (Green Trail):** Trail 7 begins off of Trail 1 and has a short climb to the eastern boundary of the property before dropping down in elevation crossing Trail 1 and ending at an intersection with Trail 5. The lower section of trail between the road and Trail 5 will have grades between 15%-25%. The combined length of the upper and lower sections is approximately 0.5 miles long.

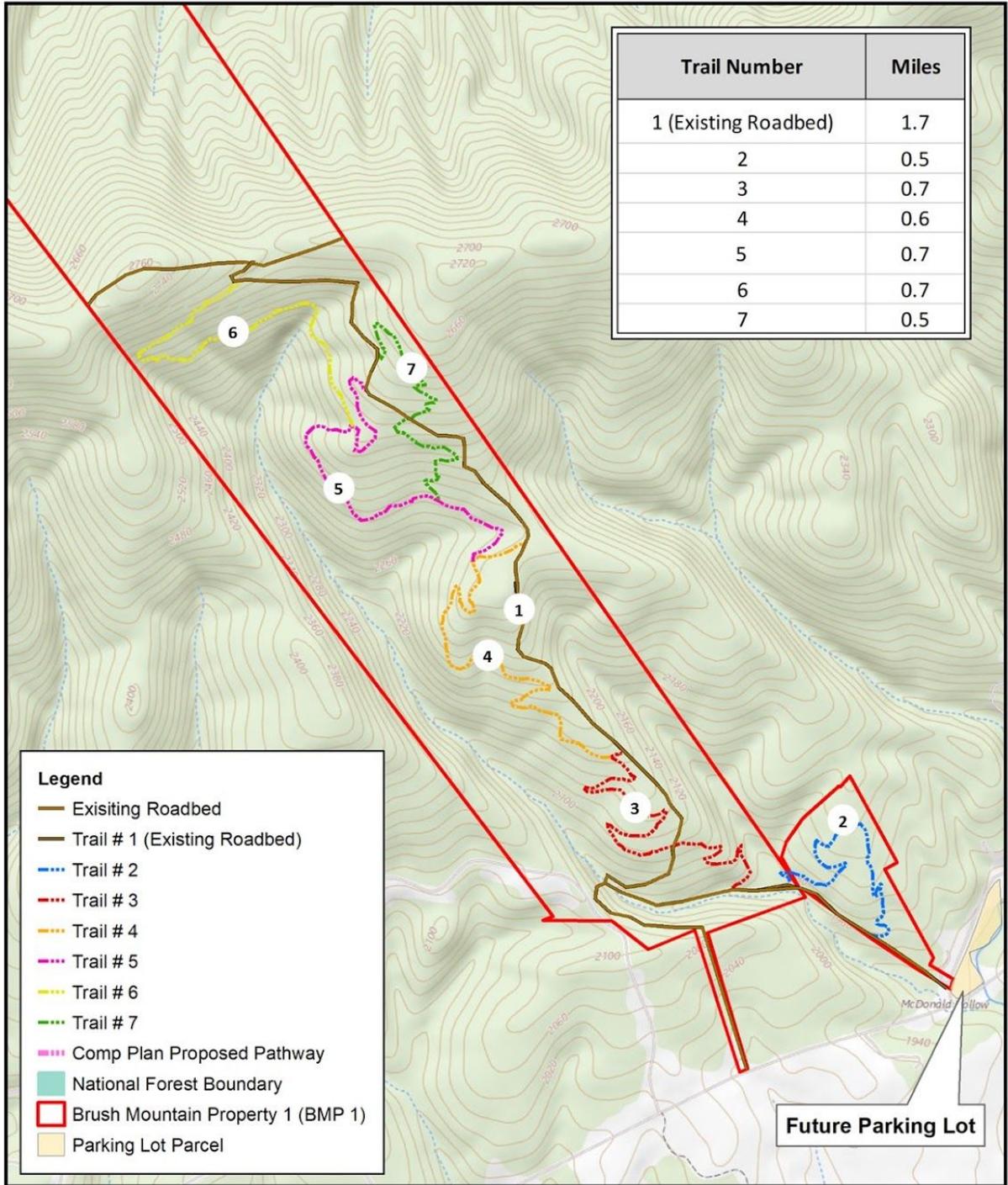
**Table 1. – Summary of Brush Mountain Property 1 Proposed Trails**

Trail ID	Flag Color	Length (mi.)	Tread Width (feet)	Construction Complexity Factor
Trail 1 (Existing Roadbed)	None	1.7	10	0
Trail 2	Blue	~0.5	3 to 4	1
Trail 3	Red	~0.7	3 to 4	1
Trail 4	Orange	~0.6	2 to 3	2
Trail 5	Pink	~0.7	2	3
Trail 6	Yellow	~0.7	tbd*	tbd*
Trail 7	Green	~0.5	tbd*	tbd*

**Notes: Construction Complexity Factor refers to the difficulty to construct the trail. The greater the number, the more difficult to construct the trail. Difficulty increases with distance from trailhead and hub trails; and increases with the steepness of the terrain. In this case, both distance and steepness are related.**

**\*Trails 6 and 7 are still in the planning stage, therefore elements like tread width and construction complexity factors cannot be determined at this time.**

Though Trails 3, 4, and 5 are described as separate trails, the three trails can be connected by users to create a continuous, top-to-bottom, singletrack experience approximately 2.5 miles long.



Projection: Lambert Conformal Conic  
 GCS North America 1983  
 Datum: D North America 1983

Map created 07/29/2019 by Tommy Oravetz.  
 Source data provided by USGS Topo, USDA, Town of  
 Blacksburg, New River Land Trust.  
 This map is for general reference and display purposes only.

# Figure 3

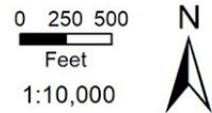


Figure 3. – Brush Mountain Property 1 Proposed Trail Alignments

## Brush Mountain Property 2 (BMP2)

BMP2 contains an existing roadbed and proposes 9 new multi-use, singletrack trails. The trails will be constructed with varied tread construction that includes intentional grade changes, features, challenges, and obstacles (e.g. rocks, boulders, logs, inclines/declines, etc). While the property has been flagged with general trail alignments, additional site reconnaissance and design work are required to finalize them. Once this on-site design work is complete, the trail descriptions below may be amended. Each of the proposed trails is described as follows:

- **Trail 1 (Green Trail):** Multi-user feature-rich flow trail; natural features to include rock and raised earthen features; preferred direction downhill. (varied tread width, 4' - 8')
- **Trail 2 (Blue Trail):** Multi-user trail with classic single track and modern flow design. Follows eastern boundary and provides classic cross country experience; provides connectivity to National Forest property. (4' tread). Trail #2 will cross through an approximately 250' long deeded ROW through private property.
- **Trail 3 (Red Trail):** Multi-use trail connecting lower east and west portions of trail network, connecting Trails 4 and 6. This trail utilizes the upper ravine for most of its length. (2' - 4' trail tread)
- **Trail 4 (Pink Trail):** Multi-user flow trail, with downhill direction preferred; elements of classic single track design incorporated. Trail 4 provides a continuous connection between entrance to property on Meadowbrook Drive to the top of ridgeline/contiguous with National Forest. Connections with Trails 3 and 6 provide opportunities to loop within the upper trail system. (2' - 4' trail tread with some wider stretches in the lower section)
- **Trail 5 (Purple Trail):** Multi-user trail with heavy incorporation of natural features, primarily boulders and rocks, providing a back-country experience with scenic views of surrounding mountains and Tom's Creek Valley below. (2' - 4' trail tread)
- **Trail 6 (Orange Trail):** Multi-user trail providing many connections between the upper western and eastern portions of the trail network (connects Trail 4 to Trails 8, 5, 3, 2, and also to the National Forest/Gateway Trail). Multi-user trail design. (~2'-3' trail tread for most portions)
- **Trail 7 (Yellow Trail):** Primarily a climbing trail that will provide a strategic loop with Trail 1. In addition, on-site evaluation may reveal opportunities to provide easier access to the rest of the eastern trail network, the National Forest/Gateway Trail. (2' - 4' trail tread)
- **Trail 8 (Turquoise Trail):** Multi-user trail with short sections of rocky, challenging terrain; highly appealing to bike gravity-oriented users; preferred downhill direction. (2' - 4' trail tread)
- **Trail 9 (Black Trail):** - Multi-user trail design. Trail 9 provides a lower mountain trail contouring through adjacent National Forest property to Gateway Trail via Trail 2; also providing access to the Mountain Bike Skills Park, Heritage Park and the Huckleberry Trail. (average 2'-3' trail tread)
- **Access Road:** Existing Roadbed along creek starting from Meadowbrook up to trails. (average 10' trail tread with some narrower portions)

**Table 2. – Summary of Brush Mountain Property 2 Proposed Trails**

Trail ID	Flag Color	Length (mi.)	Tread Width (feet)	Construction Complexity Factor
Trail 1	Green	~1.1	4' - 8'	tbd*
Trail 2	Blue	~1.3	4'	tbd*
Trail 3	Red	~0.7	2' - 4'	tbd*
Trail 4	Pink	~1.5	2' - 4'	tbd*
Trail 5	Purple	~0.4	2' - 4'	tbd*
Trail 6	Orange	~1.1	2'	tbd*
Trail 7	Yellow	~0.2	2' - 4'	tbd*
Trail 8	Turquoise	~0.1	2' - 4'	tbd*
Trail 9	Black	~0.5	2'	tbd*
Existing Roadbed	None	0.2	10'	0
<p><b>Notes: Construction Complexity Factor refers to the difficulty to construct the trail. The greater the number, the more difficult to construct the trail. Difficulty increases with distance from trailhead and hub trails; and increases with the steepness of the terrain.</b></p> <p><b>*Because these proposed trail alignments may still require adjustment to optimize user experience(s), mitigate potential conflicts, and enhance sustainability, construction complexity factors cannot be determined for any of the proposed trails on BMP2 at this time.</b></p>				

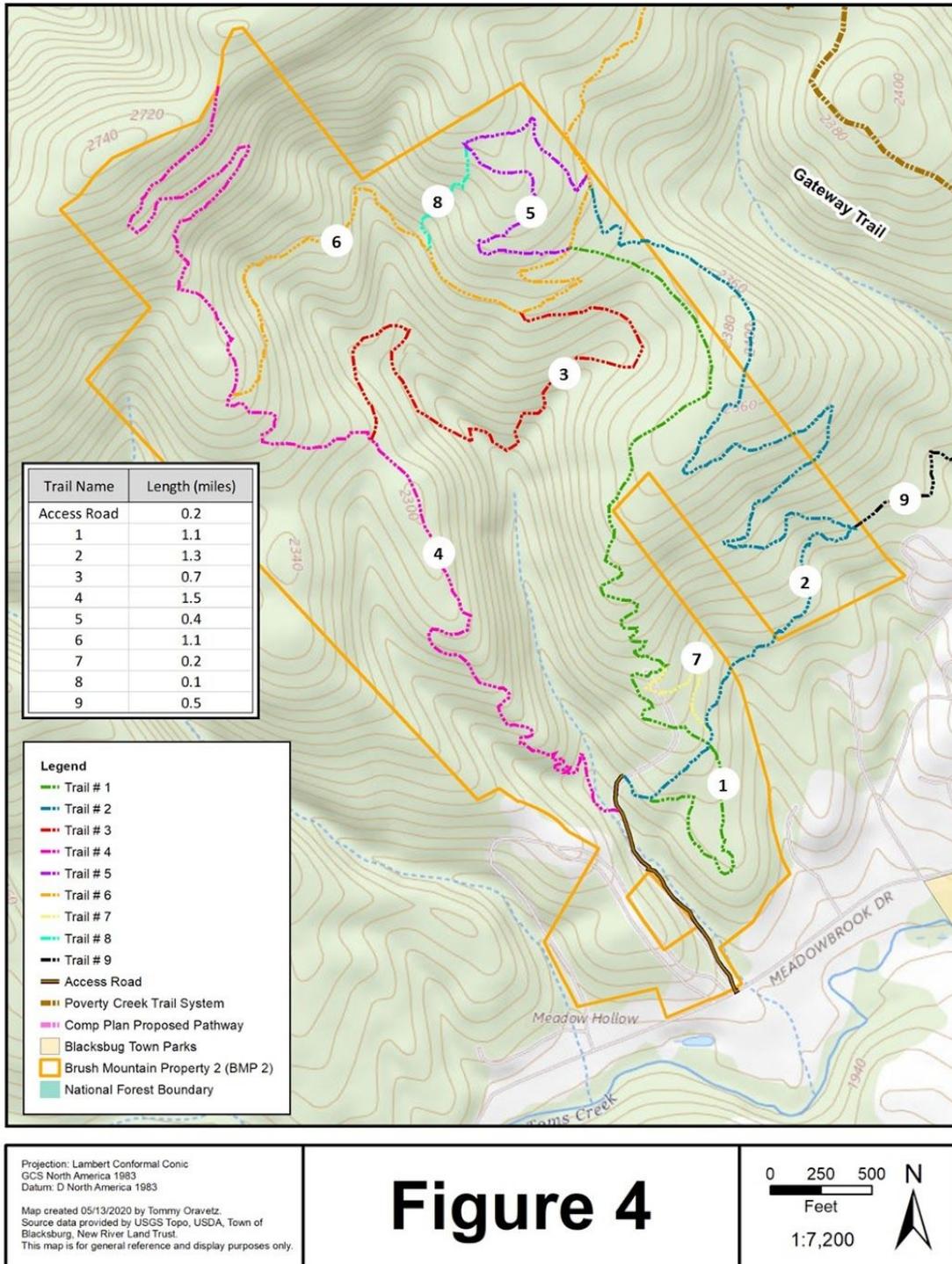


Figure 4. – Brush Mountain Property 2 Proposed Trail Alignments

## **6.0 ACCESS, CONNECTIONS & PARKING**

The trailheads for BMP1 and BMP2 are located along Meadowbrook Road. Users will be able to access the trailheads by driving to designated parking areas or by walking and biking to the trailheads. Meadowbrook Road is currently a rural, winding road with no bike lanes, sidewalks, or shoulder to facilitate convenient and safe access to the Brush Mountain properties for pedestrians or cyclists. To improve user access to the trailheads, the Town of Blacksburg plans to construct additional parking facilities and create a new multi-use trail parallel to Meadowbrook Drive for future users.

### **Parking**

The Town of Blacksburg has purchased property at the intersection of Meadowbrook Road of Glade Road to provide parking access to BMP1. Under the *Town of Blacksburg's Recommended Capital Improvement Program (CIP) Plan (FY20/21 - 24/25)*, the Town plans to construct a parking lot here in FY22/23. The lot will be designed for both trucks and cars as well as horse trailer parking.

Parking and access to BMP 2 will be provided via the Gateway Park parking area and a future connecting trail that runs between the Gateway Park parking area and the new parking area for BMP1. Before the connector trail is complete, bicyclists may access BMP 2 via Meadowbrook Road.

### **Additional Trail Connections**

The Huckleberry Trail - North Section was recently extended to connect the trail from Prices Fork Road to Glade Road and Heritage and Gateway Parks. Under the *CIP Plan (FY20/21 - 24/25)*, the Town plans to design and construct a trail adjacent to Meadowbrook Drive that will connect the Gateway Park parking area to the proposed parking lot at the corner of Meadowbrook Road and Glade Road in FY23/25 - FY24/25. This project will extend the Huckleberry Trail and provide connections to BMP1 and BMP2. The necessary greenway easements to create a separated trail along Meadowbrook Road have been obtained from the private property owners. This trail is proposed to consist of a ten-foot wide asphalt path and boardwalk sections over known wetlands along this corridor.

### **Bicycle and Pedestrian Safety**

While Meadowbrook Road has been and remains a popular road for cyclists, the community has expressed concerns about whether the Brush Mountain trail system will generate increased vehicle traffic and increase safety concerns for pedestrians and cyclists accessing the trailheads. The Town's Greenway/Bikeway/Sidewalk/Corridor Committee (Corridor Committee) periodically reviews future

bicycle and pedestrian related plans and policies and makes recommendations to Town staff on actions to address current and future needs. Specifically, the Corridor Committee works with Town staff on the development and implementation of the Town's *Bicycle Master Plan (2015)* and a *sidewalk priority matrix*.

Currently, the *Bicycle Master Plan* identifies Tom's Creek, Meadowbrook Road and Glade Road as proposed bicycle routes with recommended improvements such as bicycle lanes and/or multi-purpose paths running adjacent to the roads. Additionally, the current sidewalk priority matrix identifies the need for multipurpose paths adjacent to both Shadowlake Road and Glade Road.

The stakeholder group supports the bicycle and pedestrian accommodations identified in the Bicycle Master Plan and the sidewalk priority matrix and recommends the Corridor Committee and Town staff elevate these projects as high priorities to improve bicycle and pedestrian safety and access to the Brush Mountain Trails.

## 7.0 PROJECT IMPLEMENTATION

The demand for outdoor recreational opportunities is growing rapidly, and among the most popular are trail-based activities such as hiking, running, bicycling and horseback riding. Given the high public interest and demand for such opportunities, the NRLT is already working in partnership with the Town of Blacksburg and the Poverty Creek Trail Coalition (PCTC) on trail design, site plans for erosion and sediment control during construction, and fundraising to begin construction of the trails in 2020. Through these collaborative partnerships, the NRLT is working toward plan implementation in the early spring of 2020.

### Site Reconnaissance and Trail Design

In general , the NRLT and PCTC used topographic maps of BMP1 and BMP2 to begin flagging possible trail corridors based on the contours of the land and the scenic overlooks and features users may enjoy. Once a corridor has been determined, PCTC volunteers will walk the corridor to field-verify the alignment and mark it with brightly colored survey flags, adding switchbacks along the way to ensure trails do not exceed erosion friendly grades. The NRLT and PCTC conceptual trail alignments have been and continue to be flagged, field-verified, and surveyed by PCTC volunteers for feasibility. The surveying and layout of new trails will be performed in accordance with the guiding design principles and values framed by this Plan.

Once trails have been flagged, the specific alignments and distances will be mapped and measured using GPS. This information will be used to develop site plans for the combined purposes of permitting, cost estimates, and construction/bid documents as well as the development of future way-finding signage.

Development of this Concept Plan and the networks of proposed trail alignments for each property was guided by the Brush Mountain Trails stakeholder workgroup. Within the group, different types of trail users: (mountain bikers, horseback riders, hikers, and trail runners) represented and advocated for the range of experiences they believed would be sought within their respective user groups. The stakeholder workgroup explored a range of strategies that could reduce conflict across user groups - a common occurrence when users encounter one another at different speeds or where yielding norms are not well-understood or consistently adopted. This was primarily accomplished by prioritizing design features for foot and hoof travel on BMP1 and wheeled travel on BMP2, while acknowledging that all user groups are welcome to actively engage with both properties. To those ends, the stakeholder workgroup reviewed and evaluated the proposed trail alignments for each property with these goals in mind. While the proposed trail alignments in this Concept Plan represent a consensus vision, the stakeholder workgroup also acknowledges that as construction proceeds, some field adjustments will need to be made to address site constraints (e.g. large rock formations or extensive root systems) or to improve sustainability and durability of the trails (e.g. minimizing impact on mature trees or improving slope stability). The stakeholder workgroup recognizes that such small adjustments are minor and necessary. However, if the land owner intends to make large-scale changes to the proposed trail

alignments, e.g., elimination or addition of a trail, significant re-routing of a trail's alignment and/or grades, it is recommended that the stakeholder workgroup have an opportunity to review and provide input to the proposed changes to ensure they do not significantly alter intended user experiences or other priorities as otherwise defined in this plan.

## **Permitting & Construction**

Acknowledging the high public interest and demand for new trails, the new trail networks will consist of machine built trail and hand built trail. All construction will be done in accordance with state and local erosion and sediment control regulations.

Mechanized equipment can speed up the construction process of a new trail. For example, a skilled equipment operator under ideal conditions in varying slopes can construct between 300 and 1,000 feet of trail a day. Hand built trails average about 10 linear feet per man hour. A good operator can also create a more consistent trail tread than volunteers using hand tools, and mechanized tools have the power to easily move large and heavy obstacles. The benefit to using trail building machines besides building trails faster includes exciting the volunteer base, by giving volunteers quicker gratification for all their hard work.

Volunteers trail builders and maintainers also vitally important to the creation and maintenance of a successful trail system. They can reduce costs and complement mechanized trail building by doing the corridor clearing and finishing work or working in areas that machines cannot be used. The PCTC maintains an inventory of trail-building tool assets such as hard hats, saws, Pulaski axes, mattocks, Macleods, fire rakes, wheelbarrows, flagging tape, and clinometers. The PCTC organizes volunteer labor to support construction projects. Volunteers mainly come from the mountain bike community, the youth mountain bike teams and outside service organizations seeking volunteer opportunities. To build a sense of community and mutual respect among and across user groups and to foster a greater spirit of collaboration, it is recommended that other user groups (runners, hikers, and horseback riders) become more actively involved in trail building and maintenance.

## **Funding**

Designing and building this network of trails will require significant investment. The NRLT and various community partners are working together on fundraising efforts in support of future trail construction. For instance, the New River Valley Bicycle Association in partnership with Blacksburg Striders, Blue Ridge Off-Road Cyclists and Back Country Horsemen Association raised tens of thousands of dollars in late fall of 2019. The NRLT is undertaking a corporate fundraising campaign. These combined funds will be used to construct approximately four miles of trail on BMP1 and BMP2.

Additionally, the Town of Blacksburg has approved the proposed budget for its five-year capital improvement projects (FY2020-FY2025), which contains proposed funding for the construction of a

parking lot for BMP1 at the corner of Meadowbrook and Glade Roads, the construction of a Huckleberry Trail extension to connect the parking lots at Gateway Park and BMP1, and for the construction of trails over the next five years.

The NRLT, Town of Blacksburg and community partners will continue to work together on fundraising efforts, pursuit of public and private grant funding, and allocating funding for the continued construction of the trail networks as proposed in this plan.

## 8.0 General Recommendations

The following general recommendations can be considered as part of additional planning, design, development, implementation and management of the Brush Mountain properties.

- Focus on design and construction of quality trails and facilities.
- Pursue a phased implementation approach to spread out cost, learn lessons along the way, and build flexibility into solutions.
- Commit to allocate funds to fulfill the vision of the concept plan and project.
- Create a strong education and information program to manage expectations and prevent issues.
- Provide high quality maps across a variety of media (printed, digital, interactive) to promote the trail network and inform the public; create a web page to supplement maps and support other objectives (user conflict mitigation, environmental conservation, etc.)
- Continue to work with USFS to create legal connections to the National Forest on BMP1 and BMP2 and address any outstanding private property issues; continue to work with USFS and private landowners to create a connection *between* BMP1 and BMP2 along the ridgeline and to mitigate trespassing.
- Collaborate and seek to address concerns or issues that may arise with adjacent landowners.
- BMP1: Emphasis on family and beginner experiences. BMP1 is not large enough to be a destination based just on the miles of trails. Providing unique facilities and experiences will create interest.
- BMP2: Opportunities for challenges, interesting and variable terrain, and skills practice; focus on the trail not just the setting.
- Create a parking area at the Town-owned property at the intersection of Meadowbrook Drive and Glade Road.
- Develop a forest management plan that encompasses, but is not limited to, plant species management (including removal of non-native and invasive species), stormwater management, water quality improvements, trail building, public access, and fire management.
- Identify targeted tourism development strategies that promote recreational opportunities and to attract visitors and future residents.
- Develop a trail naming convention and way-finding signage that guides users through the trail/route network to their destinations with ease and to promote and raise visibility of the network.
- Grow diverse support to increase funding opportunities through community engagement and grant applications.
- Work with organized volunteer groups such as the Poverty Creek Trails Coalition (PCTC) to implement design, construct and maintain trails.
- Identify long-term solutions for management and maintenance.
- Communicate a culture of sharing and cooperation.
- Periodically evaluate the trail system to provide new experiences over time, and to be responsive to feedback from user groups.

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