Standing Boy Creek State Park
Mountain Bike Trails Master Plan

Prepared For:
CVA-SORBA
Chattahoochee Valley Area
Southern Off-Road Bicycle Association

June 2019

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Columbus, Georgia
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GEORGIA DEPARTMENT OF NATURAL RESOURCES

Prepared By:

TRAIL SOLUTIONS IMBA

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About IMBA

The International Mountain Bicycling Association (IMBA) is a 501(c)(3) nonprofit educational association whose mission is to create, enhance, and protect great places to ride mountain bikes. Since 1988, IMBA has been bringing out the best in mountain bicyclists by encouraging conservation-minded riding, volunteer trail work, cooperation among different trail user groups, and grassroots advocacy. We join forces with land managers, trail advocates, and community members to implement innovative trail management solutions.

Based in Boulder, Colorado, and with staff distributed across the country and the world, IMBA meets its goal to create great mountain bike experiences through its Trail Solutions program. Trail Solutions is the international leader in singletrack development. Our wealth of expertise has allowed us to develop guidelines for the creation of sustainable, enjoyable trails and bike parks that have influenced land management agencies around the world and have frequently been adopted as best practices.

Approach

Through collaborative planning and design with Chattahoochee Valley Area chapter of the Southern Off-Road Bicyclists Association and Georgia Department of Natural Resources this master plan was crafted to provide high quality trail experiences to wide variety of visitors. IMBA Trail Solutions visited the site multiple times over various years and seasons to assess, plan, and design the trails within this plan. This master plan defines the opportunities and constraints in developing trails at the GA DNR Standing Boy WMA. To gain a comprehensive understanding of the area and the potential of the trail system, Trail Solutions assesses terrain, slopes, existing infrastructure, and ecology. Every detail is examined, from soil types, which can affect trail tread compaction and erosion potential, to anticipated user numbers and trailhead needs. Familiar with trail systems within the region and throughout the world, trail specialists gage which established practices they will use and which of the latest innovations they can employ. Trail specialists ride similar trails in the region and understand the area's outdoor culture. Lastly, interviews with local stakeholders help to IMBA TS learn from their expertise, balancing the interests of community members and land managers in designing the system.

1. Project Background

In 2014 the Chattahoochee Valley Area chapter of the Southern Off-Road Bicyclists Association (CVA-SORBA) and SORBA leadership began conversations with the Georgia Department of Natural Resources (GA DNR) about trail development on the Standing Boy Creek Wildlife Management Area (Standing Boy). CVA-SORBA recognized the lack of large trail systems in the greater Columbus area and wished to assist in creating one. As the third largest city in Georgia Columbus has a lack of natural surface trails for pedestrians and mountain bikers.

Conversations with Georgia State Parks indicated an interest in possible development of a state park at Standing Boy. During this time IMBA Trail Solutions (IMBA TS) was enlisted as consultant to provide recommendation on the implantation of a trails plan. In 2017 IMBA TS developed a concept plan for trails around a proposed state park. In 2016 IMBA TS was asked to return to Standing Boy to provide a new master plan for trails within the WMA and not a proposed state park. During 2018 CVA-SORBA worked with GA DNR to develop a first-of-its-kind Land Use Agreement (LUA) that would allow CVA-SORBA to develop a 25-mile trail network on the property as well as assist with maintenance after construction. In late 2018 and early 2019 IMBA TS visited the Standing Boy site twice, to update planning concepts and design flag the proposed trail corridors for resource specialist review.

This master plan is a result of the entirety of IMBA TS site visits, with greater importance placed on those 2018 and 2019 planning and design site visits. The master plan represents industry best practices, professional expertise and experience, modern trail theory, and insights gained from numerous conversations with GA DNR, CVA-SORBA, and many others.

About Columbus, Georgia

The city of Columbus is home to almost 200,000 residents. The community is located on the banks of the Chattahoochee River, where it becomes the state border between Georgia and Alabama. Columbus is the seat of Muscogee County and the third largest city in Georgia. It is under two hours southeast of Atlanta by I-85 and I-185, the state capital and largest city with a metropolitan population of 5,880,000. Columbus is located on the geographic boundary between the piedmont and the sandhills, along the fall line. This unique position creates varied terrain, as well as flora and fauna.

Columbus is home to Fort Benning, a 110-year old military base, the long standing home of the US Army Infantry. Fort Benning supports over 120,00 active duty personnel, their families, veterans, and civilians every year. An active mountain bike trail can be accessed on the property with proper identification and authorization. Additionally, the trails at Flat Rock Park in the city of Columbus is actively maintained and updated by CVA-SORBA.

In recent years Columbus has made waves with the addition of an urban whitewater run, developed by a group of community leaders and fundraisers, with the removal of the Eagle and Phenix Dam in 2012. The resulting natural rapids from the exposed bedrock of the geologic change and the man-made wave features have spurred new outdoor recreation experiences and their resulting impacts. The RiverWalk is a 22-mile linear pathway stretching from Fort Benning, along the Chattahoochee River, north to Lake Oliver. The 11-mile Fall Line Trace path runs from Columbus out past Flat Rock Park. These combined with connector trails and other planned paths form the Dragonfly Trails program, hoping to total over 60 miles of pathways throughout area. Columbus is actively creating an outdoor recreation community.

2. Goals and Objectives

The goal of the following plan is to develop a progressive trail network that offers beginner to advanced level mountain biking as well as pedestrian opportunities, including multiuse trails, and bike skills features. The majority of new trails will be designed and constructed with mountain bikes as the primary visitor, with careful consideration for hikers and runners to be sure their needs and wants will also be met. A few trails will be highly developed for mountain bike use. As trails are developed and mileage increases, visitation from residents, visitors, and regional trail users will increase.

This master plan is crafted to ensure trails and features will be designed and built in a sustainable manner and meet conservation, recreation, and education objectives. The trail system will provide a progression of experiences and challenges as trail users explore the network in more depth with each visit. Individual segments will provide consistent and expected experiences. For example, easiest trails will consist of gentle grades with few obstacles, while difficult trails may include steeper grades, jumps, and drops. The design of the system will have similar skills progression to that of a well-planned ski trail system, with a collection of easiest/green, more challenging/blue, and most challenging/black trails, appealing to a broad cross section of off-road bicyclists, from family-oriented entry-level riders to highly skilled enthusiasts. Providing progressive riding opportunities will help showcase modern trail design and construction, provide a wider variety of trail types within the region, and allow for responsible recreational use with minimal impacts to natural and historical resources. The network will be enhanced by efficient way-finding signage and associated trailhead amenities.

The objectives of the high-quality trails master plan are:

- Increase the availability of natural surface trails to the large metropolitan Columbus community.
- Provide high quality mountain bike-optimized trails in the region.
- Ensure a wide variety of difficulty levels are represented (easiest/green, more difficult/blue, and most difficult/black) in the trail system.
- Lay the groundwork of a successful trail system that appeals to a wide spectrum of visitors.
- Develop amenities that help riders build mountain bike skills and provide opportunities for progressive challenge and growth.
- Provide quality and quantity experiences in the system to create a regionally significant trail destination.
- Create a trail system that is environmentally and socially sustainable, and that best highlights the natural beauty of the wildlife management area.
- Add to the growing recreation opportunities in the Columbus area and support healthy and active community connection.

CVA-SORBA

CVA-SORBA was formed in 2005 to "*promote land access, trail preservation, and new trail development through advocacy, education, and recreation.*" CVA-SORBA assists with trail maintenance and construction at Flat Rock Park, a Columbus Consolidated Government park. The park is in an urban setting and contains approximately nine miles of trails. CVA-SORBA provides many volunteers for work days at Flat Rock Park and other area parks. The organization meets regularly and hosts other programs such as Take a Kid Mountain Biking Day, group riding trips, and skills clinics.

CVA-SORBA's primary goal is the development of high quality bike optimized and multiuse trails for the recreating public. They hope to increase the difficulty and style of easily available trail in the region. The club specifically wants to increase the amount of beginner and most advanced trails around Columbus, broadening the spectrum of riding opportunities. Furthermore, CVA-SORBA realizes the opportunity to provide greater Atlanta, especially south of the city, residents with more trail opportunities for daily and weekend riding. Lastly, they hope the trail development at Standing Boy will attract regional riders, including those from Florida, southern Alabama, and visiting the region from elsewhere.

GA DNR

"The Department of Natural Resources has statewide responsibilities for the management and conservation of Georgia's natural and cultural resources." GA DNR has six divisions for the management and protection of Georgia's natural and cultural resources, the Wildlife Resources Division (WRD) manages Standing Boy Creek WMA. WRD along with the Historic Preservation Division (HPD) are responsible for the management of threatened and endangered species as well as historically significant sites, and provided trail corridor review during the design phases.

GA DNR has expressed interest in maintaining the hunting and fishing opportunities at Standing Boy. In addition, GA DNR has begun developing active forestry and controlled burn plans, to restore some of the ecosystems and maintain others at the property. Notably the savanna habitat is highly desirable, and is found in limited areas of the property currently. They have a high interest in ensuring native game and non-game species are able to flourish within Standing Boy. Some areas of the property are old pine plantations while others represent savanna, field, hardwood forest, or wetlands.

Active dove fields are managed in the central part of the site, and total 33 acres. These fields attract migrating doves, which provide hunters with unique opportunities and help support events like youth hunts. There are old forest roads and skid trails from past timber harvests which DNR gates but allows public access. Public access requires a current hunting or fishing license, or land use pass. During non-hunting months the gates are typically locked. A hunting safety buffer exists on the south property line, close to a neighboring development.

3. Actively Managed Land and Mountain Bike Trails

Great riding happens all over the world in a multitude of landscapes. Some of those lands are actively managed forests that use fire and timber harvest to meet goals for wildlife, ecology, and resource management. Well planned and managed trails can happily coexist and complement actively managed forestland. A key to developing trail systems on actively managed forestland is to understand the objectives of the land use. Aligning your trail system with the land managers' objectives is a proven way to ensure a successful project.

Active Forestry and Trails

Recreational trail use and timber production can coincide with a little mutual respect from both parties. Trail users should respect foresters' right to harvest wood, managing an essential, renewable resource. Foresters are often happy to allow trail use in timber harvesting areas when trail users follow safety guidelines and trails help gain public support for active forestry management.

We encourage the following practices to attenuate trail building and use on timber harvesting lands:

- Identify active timber management plots and avoid those until post management.
- When possible, build trails after timber is harvested.
- If harvested areas will be burned or be subjected to other kinds of vegetation management, when possible, arrange the trail network so that some segments can be temporarily closed, and alternate routes will circumvent active burn plots. Possible burn plots can be identified by analyzing existing roads since the roads often work as firebreaks for sections of forest.
- Forest roads often serve vital purposes as firebreaks and service routes. While locating a trail on a road may be desirable for connectivity through expensive trail building terrain, consider that the road may be closed to recreational use during active forestry activities. Troads (trails on roads) are first and foremost roads and shouldn't be converted into trails if the road is required for vehicle access.
- Protect the trail tread and corridor by providing a 50-foot to 100-foot corridor on each side, except at designated equipment crossings. This maintains the canopy cover over the trail to increase shade, reduce erosion, and limit the growth of early successional species that require more frequent mowing or brushing.
- Equipment crossings should mimic stream or wet terrain crossings, cross on the perpendicular in only a few locations. For timber harvest one crossing per 2,500 linear feet of trail is typical.
- Provide signage at trailheads explaining safety guidelines and informing trail users that active forestry takes place on the land.
- Trailside interpretive signage can be highly effective in educating the public about the forestry techniques, challenges, and benefits.

Fire Management and Trails

Controlled fires can be used to improve the health of natural environments by clearing invasive species, reducing the risk of wildfires, restoring plant diversity, and rejuvenating native growth. Fires can be great for trails too. For instance, an understory fire in a hardwood and pine forest can be great for a future or existing trail. Overgrowth is cleared out, while large trees remain, making designing, building, and maintaining trails easier. In thick, dense forests that may be green nearly all year, the best time *ever* to do planning and design is right after a burn. For trail construction, the first month after the burn is best. If not completed after a burn, it could be another decade until conditions are optimal.

We encourage the following practices to attenuate trail building and use on lands affected by controlled fire or wildfire:

- Identify active fire plots and avoid those until after the fire is out, obviously.
- When possible, design and build trails soon after a fire.
- Fires burn up flagging tape. Consider burn schedules when scheduling flagging and resource review.
- As with timber harvesting, when possible, arrange the trail network so that some segments can be temporarily closed, and alternate routes will circumvent active burn plots. Possible burn plots can be identified by analyzing existing roads, since the roads often work as firebreaks for sections of forest.
- Troads (trails on roads) can be useful as firebreaks and service routes. Troads are first and foremost roads and shouldn't be converted into trails if the road is needed. Do not convert existing fire safety roads into trails but keep them as roads allowing access for emergency vehicles.
- Singletrack trails may be useful as access routes or for a back-burn line. They generally do not provide ideal fire breaks.
- Avoid using plastic (HDPE) culverts because they can burn even in low temperature fires from the pipe acting as a chimney.
- Provide signage at trailheads explaining safety guidelines and informing trail users that controlled fires take place on the land.
- Trail signage should be able to withstand controlled burns.

4. Existing Conditions Standing Boy Creek WMA

Standing Boy is nearly 1600 acres of conserved land to the north of Columbus. The property is bordered by Standing Boy Creek to the east and Lake Oliver (the impounded Chattahoochee River) to the west. Across the river is the state of Alabama. GA DNR manages the property for ecosystem health, wildlife, and hunting and fishing. Standing Boy features important habitats and rare species. The location, at the northern edge of Georgia's coastal plain, as the piedmont descends into the fall line, is one reason the area is unique. Steep north-facing slopes shelter hardwood forests that have sensitive plant species from across all ecoregions of Georgia, from the mountains to the piedmont and to the coastal plain. Unusual calcium-rich soils also select for unique plant species assemblages. The hardwood tree diversity is exceptional and logging impacts to the slope forest have been minimal. Similarly, dry sandy ridgetops feature both granite outcrops typical of the piedmont and sandy soils which share features of the fall line riverine sandhills to the south, with wide swaths of remnant shortleaf pine-oak savanna, rich in grasses and scattered wildflowers. Standing Boy also provides a significant refuge for two rare plant species. Federally endangered relict trillium occurs in two populations on the property. A second trillium, Chattahoochee trillium (Trillium decipiens), with state-conservation rank Vulnerable, occurs across the site in one large, stable population.

There is 33 acres of actively managed dove fields, which represent the most open ecosystems within the property. There are nearly 200 acres of wetlands on the site as identified by a wetland survey provided to GA DNR. The same survey found over 20,000 linear feet of stream corridor, which resulted in 24 acres of stream buffer. These all combined with 90 acres of neighborhood buffer, meant almost 25% of the site was constrained from trail development.

Standing Boy WMA has about 7.75 miles of discontinued forest road and skid trail from past use prior to GA DNR management. There are also 5.6 miles of improved roads, generally graveled and maintained for vehicular access, on the property. The property is generally gated and accessed only by foot, except during specific hunting seasons. Currently controlled burn zones have been identified for future management, these include the small peninsula Segment 1 is on, as well as portions of Segments 4, 10, and 13 as shown in the images below.

To the north of Segment 3 is a large 200-acre old pine plantation which will likely require thinning and management. This area is briefly crossed by Segment 3. The property's existing road network make use of culverts to cross wet areas. These crossings were utilized for trail connectivity in some cases to prevent multiple impacts to sensitive areas.

The existing road network is currently used by hunters and some trail runners. The roads, especially the old forest management roads, will make excellent skid routes and firebreaks during management activities. Trails are not recommended for construction on these roads, instead crossing them at select locations but mainly sticking to the sideslopes and traversing parallel or near-parallel to them.

In February of 2019, shortly after the first design a F4 tornado touched down in Alabama and crossing into the site. The tornado caused the most significant damage to sections of Segments 4. Segments 18, 19, 20, and 21 were significantly affected in some areas, and moderately in others. Segments 9, 10, 11, 12, 13, and 16 sustained mostly moderate to light damage. GA DNR is in the planning stages of timber salvage, and is coordinating with the anticipated construction of Phase 1.

5. Permitting

There are a wide variety of regulatory requirements for construction projects, including trail construction. Obtaining construction permits ensures we follow the local, state, and federal laws; and that we are good stewards of the land. People seek trails for all kinds of reasons, but chief amongst the majority of visitors is the desire to enjoy nature. Mass disturbance, erosion, and sedimentation not only impact our environment, water quality, and flora and fauna; they are unsightly and if not mitigated, will create an area which visitors no longer want to visit. This section provides a brief breakdown of anticipated permitting needs for the Standing Boy trails project. It is important to note, some permits require the entire project to be evaluated and not simply the phase that will be immediately implemented.

Clean Water Act, Sections 401 and 404

Section 404 of the Clean Water Act (CWA) establishes a program to regulate the discharge of dredged or fill material into waters of the United States, such as streams, rivers, and wetlands.

The general conditions for issuance of a Section 404 Permit include:

- Water Quality Certification; a 401 water quality certification must be obtained prior to obtaining a 404 permit and beginning construction.
- Maintenance; any authorized fill shall be of correct material, properly maintained, including maintenance to ensure public safety.
- Erosion and Sedimentation Controls; appropriate erosion and sedimentation controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills must be permanently stabilized at the earliest practicable date.

The trail alignments have avoided all stream and wetland crossings. Careful planning and design ensured a trail layout which utilized the slopes of the ridges and crossed drainages high where any flow is ephemeral. Where streams had to be crossed, existing improved GA DNR roads with culverts were used.

Stream Buffers

The Georgia Erosion and Sedimentation Act of 1975 (O.C.G.A. 12-7) and its subsequent amendments require that primary and secondary trout streams maintain an undisturbed riparian buffer of 50-feet, and all other streams maintain a minimum buffer of 25-feet. No known primary or secondary trout streams are on the Standing Boy property. All other perennial streams were given a 50 to 75-foot buffer during trail design and layout.

Clean Water Act, Sections 402

Construction stormwater management is managed through the National Pollutant Discharge Elimination System (NPDES) permit program, authorized by Section 402 of the Clean Water Act. The purpose of NPDES permits in light of construction is to control the discharge of unmanaged stormwater associated with earth disturbance into streams, rivers, and other waterways. Disturbance of more than 1 acre triggers NPDES construction permitting. Trail construction will occur under the GA DNR applicable stormwater permit. Trail should be stabilized as it is built, with no more than 0.99 acres of disturbance at one time.

Utility Location

It is against state law to excavate or grade without a utility location. It is extremely important that contractors notify the applicable organizations in a timely fashion for utility location services prior to construction. No construction should occur without utility clearances.

6. Design Development Recommendations

General Planning Guidelines

IMBA TS visited the site multiple times, during the leaf off seasons of 2018 and 2019. Industry best practices and professional expertise combined with partner meetings led to the recommendations within this master plan. In general, IMBA TS strived to provide high quality mountain bike and hiking experiences, while maintaining the WMA's primary use as habitat, ecological restoration, and forest and wildlife management. The modern trail planning process relies on many tools and principles, these can be found in Appendix E. Multiple trail planning concepts were used to design the trails and develop this report. These include:

- Provide trail experiences for new mountain bikers, while ensuring an easy pedestrian experience.
- Create a long-distance loop of traditional singletrack optimized for mountain bikers and enjoyable by hikers and runners.
- Construct steady climbs of differing style for riders and pedestrians.
- Incorporate, where able to, relevant views and experiences related to the natural and cultural history of the site.
- Offer skills progression both in difficulty and style for riders, as well as various distances.
- Make loops of trails that work cohesively with active forest management goals and trail users' expectations.
- Develop unique modern bike optimized trails to build local skill and support, as well as attract riders regionally.
- Ensure intersections and trails are well marked and signed, and flow seamlessly to create consistent positive trail experiences.

Environmental and Cultural Review

GA DNR is currently reviewing the designed flag lines for both environmental and cultural resource impacts. The WRD and HPD divisions are preparing their findings and recommendations as they review the designed trail corridors. Corridor review has been established at 100-feet, or 50-feet from center line on each side. This allows the construction team to work with the review team to ensure minimal impacts to the site's important resources. Pending the final review, the trails described within this document are the February designed trails.

Recent conversations with GA DNR and the review team do not indicate any large re-alignment needs. The design and construction of the trails should incorporate the review team's recommendations per GA DNR guidance as trail development moves forward.

Parking and Trailhead

GA DNR has formalized plans to develop an approximate 30-car parking lot off of the Jordan Company Pond access road. This is separate from the main access road and sign-in kiosk. The site sits at the top of a small rise, after leaving Old River Road and prior to arriving at Jordan Company Pond. The existing gate at Old River Road should be moved back, to allow access and prevent vehicles from driving the fire protection road out onto the Jordan Company Pond dam. IMBA TS recommends the parking lot be a pull through lot if possible, or that planning and design be developed such that a single entrance and exit could easily be implemented in the future. Additionally, the retention and protection of native vegetation, especially large hardwood trees for shading, will help make the trailhead more inviting and useful for rail visitors.

Construction of the trailhead should be prior to trail construction. This is twofold, it will reduce the wait time for the public once trail construction is finished and will allow the trail construction to tie into the parking lot in the best way possible. The trailhead should contain easily identifiable signage and trail entrances and exits. If trails are directional signage should be clear and concise to indicate so. Restroom facilities should be provided; portable toilets are acceptable but shading structures may be necessary to create better summer conditions. Potable water is often a benefit, and may be considered in the long term. A bike repair stand is a useful amenity and often something a club or local company can provide funding for.

Trail Type and Difficulty

The trails at Standing Boy have been designed to provide a wide variety of experiences in a range of difficulties. In general, trails meet types and difficulties and should be developed and managed for those conditions. Specific Trail Management Objectives are detailed in Section 6. Table 1.1 and 1.2 provide guidelines for trail construction based upon trail difficulty and type.

Standing Boy Trail Construction Guidelines by Difficulty Level

All values are approximate and should be used in aggregate to determine the appropriate skill level.
Values do not apply to technical trail features (TTFs) such as jumps, rollers, drops, whoopdees, etc.

	Easiest (Green Circle)	More Difficult (Blue Square)	Most Difficult (Black Diamond)
Riding Surface (under typical conditions)	Firm tread, highly predictable traction	Mostly firm tread, predictable traction	Variably firm tread, mostly predictable traction
Average Trail Grade			
Ascent	1% to 5%	1% to 7%	1% to 10%
Descent	-1% to -7%	-1% to -12%	-1% to -20%
Maximum Segment Grade			
Climbing (segment cannot exceed 50' in length)	+10%	+15%	+25%
Descending (segment cannot exceed 150')	-10%	-20%	-40%
Turn diameter (min., >90 degrees)	16'	12'	8'
Height of unavoidable obstacles (max.)	2"	10"	20"
Tread cambering (excludes turns, TTFs)			
Outslope (avg.)	0% - 5%	0% - 5%	0% - 10%
Outslope (max.)	5%	10%	20%
Inslope (avg)	0% - 5%	0% - 5%	0% - 10%
Inslope (max)	10%	15%	20%
Clearing limits from constructed tread (greater above jumps)	3' horz., 8' vert.	2' horz., 10' vert.	1' horz., 12' vert.
Constructed Tread Width			
0% - 5% sideslope	12" - 24"	8" - 24"	6" - 18"
6% - 25% sideslope	16" - 36"	12" - 30"	8" - 24"
26% - 50% sideslope	24" - 42"	16" - 36"	12" - 30"
51% - 75% sideslope	Not recommended	30" - 48"	18" - 42"
75+% sideslope	Not recommended	Not recommended	36" - 48"

Standing Boy Trail Construction Guidelines by Trail Type

	Cross-country (Multiuse)	Gravity (Bike optimized)
Intended Trail Users	Pedestrians, mountain bikers	Mountain bikers
Intended Travel Direction	Two-way	One-way, descending
Intended Experience Goals		
Pedestrians	Enjoying nature, solitude, aerobic fitness, relaxation, connectivity	N/A
Mountain Bikers	Enjoying nature, solitude, aerobic fitness, relaxation, connectivity	Challenge, progression in mountain bike specific skills, specialized features for mountain bikes, sense of speed and flight, technically demanding
Maintenance Needs	General trail upkeep, ~10% of construction costs annually	General trail upkeep and regular specialized trail maintenance, ~20% of construction costs annually
Design Speeds	Low speed	Medium to High speed
Special Construction Considerations		
Intersections	Trails should slow visitors speeds prior to the intersection.	Trails must slow visitors speeds prior to the intersection.
Turns	Turns should be platform in nature with slight inslopes, turns should be adqueate radii to ensure good sightlines.	Turns should be downhill bike optimized, including wider radii and more elevation drop. Berms may be required.
Sightlines	Sightlines should be adequate for quickly moving visitors in both directions.	Sightlines must be adequate for quickly moving visitors in both directions.
Trail Meander	Trails should meander to provide rolling nature and slower speed potential.	Trails do not need to meander and should focus on trail visitor speed for experiencal goals.
Corridor width and height	Corridor width and height should reflect appropriate skill level guidelines.	Corridor width and height should go above appropriate skill level guidelines where necessary, especially around trail features.
Trail corrals and gateways	Trails should be tight in nature, relfecting skill level guidelines. The use of native material and features to corral and slow riders is encourgaed.	Trails may be wider or narrower than skill level guidelines to accommodate desired experiences.

7. Trail Management Objectives

Trail management objectives (TMOs) are provided for all designed trails below. TMOs are specific to trails and help guide the construction, maintenance, and management of the trails throughout development and post-development. During construction the TMOs, trail difficulty guidelines, and trail type guidelines will be used together to ensure the built trail meets the design goals. Post-implementation during maintenance and management of the trails, TMOs should be revisited regularly to guarantee the trail continues to provide the intended experience for visitors.

Segment 1 (Easiest, cross-country)

This segment connects from the proposed trailhead to Hub B, near Jordan Company Pond, and back to the trailhead, forming a short loop. Trail width should be slightly more than typical easiest, cross-country trails within the system. The intended experience for Segment 1 is mountain bike skill development and short, gentle experiences. A wider tread and mellower grade will allow easier passing, more room to wander, chances for adults to use strollers or similar, and a reduced risk of new riders going off trail. Mountain bike skills stations are proposed along the trail, with clearly visible and signed optional entrances and exits. The skills features should be constructed out of native rock material, to mimic the more challenging features found in the Standing Boy trails and throughout many mountain biking trails. These low-risk, high-reward skills features should help riders develop balance, timing, power, and confidence. Features may include rough tread texture, short drops, skinnies, tight corridors, and more.

Segment 2 (Easiest, cross-country)

This segment is the beginning of the easiest loop within the Standing Boy trails. It departs the proposed parking lot and plays along the toe of major slopes, staying above wet areas and stream buffer corridors. The slopes are generally under 30% and provide ideal conditions for easiest, cross-country trail development. Segment 2 will connect the proposed trailhead to Hub I. Hub I is a major intersection, with Segments 2, 3, 5, and 6 coming together there. Due to the nature of Segment 6 being a climb, Segment 2 may see increased two-way traffic, and care should be taken to ensure good sightlines and plenty of speed slowing tactics are integrated and maintained. Segment 2 should be gently rolling contour trail, optimized enough to provide an enjoyable modern mountain biking experience but still retain a traditional singletrack feel for hikers. Drainage crossings should be mellow and rock armored if necessary. Trail texture should be low and meet the above guidelines. Optional, more-difficult lines should be incorporated as the terrain allows. These opportunities will help develop skill progression amongst riders. Together with Segments 3, 4, and 5 this segment should form a continuous trail experience.

Segment 3 (Easiest, cross-country)

Similar to Segment 2, this segment is generally sited along the lower slopes of a ridgeline. The trail should provide a rolling contour experience that is optimized for mountain bikes but enjoyable for hikers and runners. Segment 3 is near the main access road, and care should be taken to provide a few sights of the road along the trail's length. This will give new riders and outdoor visitors visual cues of manmade structures and infrastructure. Drainage crossings should be mellow and rock armored if necessary. Trail texture should be low and meet the above guidelines. Optional, more-difficult lines should be incorporated as the terrain allows. These opportunities will help develop skill progression amongst riders. Where Segment 3 crosses the old pine plantation near the northern end of the segment, coordination with GA DNR regarding thinning and forest management should ensure a viable corridor of trees around the trail.

Segment 4 (Easiest, cross-country)

Segment 4 continues the experience Segments 2 and 3 provide. Segment 4 traverses some of the heaviest tornado damage on the site and construction should be coordinated with salvage operations to prevent excessive damage to the surroundings. Segment 4 has two distinct natural terrain types, nearly half of the segment is on sideslopes above Lake Oliver and the remainder is found on the edges of open fields and in flat pine stands. The section above Lake Oliver should be benchcut and provide similar rolling and gentle experiences to Segments 2 and 3. Maintaining a 30-foot buffer from the lake is critical, and should be done with use or anchor trees and rocks. The remaining section of trail should make playful use of the edges between field and forest. While the majority of the trail should be constructed under forest canopy to provide more protection from precipitation, views and short spurts of open fields help create a more unique experience. In sections where the topography has slopes under 10%, small borrow pits and other methods should be utilized to create microtopography in the trail tread; ensuring positive drainage off the trail. The construction of microtopography should mimic natural surroundings and create a fun bike optimized experience while not distracting from hikers' desired experiences.

Segment 5 (Easiest, cross-country)

Similar to Segments 2 and 3, Segment 4 is generally sited along the lower slopes of a ridgeline. The trail should provide a rolling contour experience that is optimized for mountain bikes but enjoyable for hikers and runners. The trail should incorporate views of drainages and wetlands while maintaining the buffer. Drainage crossings should be mellow and rock armored if necessary. Trail texture should be low and meet the above guidelines. Optional, more-difficult lines should be incorporated as the terrain allows. These opportunities will help develop skill progression amongst riders.

Segment 6 (Easiest, cross-country)

Segment 6 leaves Hub I and climbs steadily to Hub C. Segment 6 should be bike optimized for the ascending direction. Turns should be flat, platform turns, and provide gentle grades for beginner riders. The trail should incorporate rolling contour experiences while climbing. Sightlines should be adequate to account for possible downhill traffic, but downhill traffic is not intended for this segment. Turns should be constructed and maintained to prevent obvious shortcutting, especially by hikers.

Segment 7 (Easiest, gravity)

Segment 7 exits Hub C and descends to the proposed trailhead. It is intended to be the easiest gravity trail within the system. This trail should be highly optimized for bicycle traffic downhill. Management and maintenance should reflect this priority in visitor type and directionality as it will create a unique experience both locally and regionally as of this Master Plan. Increased grade per the skill and trail type guidelines may be incorporated where relevant to experience. Additionally, trail features should be more developed, including rollers and turns. Greater insloping and sclutping of trail tread to create a roller-coaster type feeling is required. This experience should be maintained, to ensure proper trail visitor dispersion, trail use, and consistent visitor experiences.

Segment 8 (More-difficult, cross-country)

Segment 8 connects the proposed trailhead to Hub B and Hub C. Hub B is the lowest elevation on the east side of the property, near the existing Jordan Company Pond. Hub B connects to the short easiest loop, Segment 1. It is expected most intermediate to advanced riders will begin their rides on Segment 8, with others using 11 and 16. This pattern of trail experiences from the proposed trailhead helps disperse riders. Segment 8 should climb easily from Hub B to C. It follows the southern edge of the most northern rim of Jordan Valley, roughly paralleling an old forest road. The road should remain for active forest management and emergency access. Segment 8 should be traditional singletrack. It is intended mainly for uphill bicycle traffic and two-way pedestrian traffic. Meander, medium grades, tight corridor, and narrower tread should be used at times to check users' speeds and create a more natural feeling experience. Where possible optional bike optimized features should be created to challenge riders and create a variety of opportunities.

Segment 9 (More-difficult, cross-country)

A connector trail along the top of the Jordan Valley rim, this segment joins Hub C to Hub F and onto Hub D on the improved ridge road. This trail should be continuous in experience with Segments 8 and 10. It is intended for two-way traffic and should have adequate sightlines and speed checks as necessary. Rolling grade dips along the contour should be utilized as with every benchcut trail. The trail should incorporate optional trail obstacles as the terrain permits. Where the trail goes between Hub F and Hub D care should be taken to not overly impact the open savanna and ensure the trail is moderately protected from precipitation. The viewpoint should be incorporated as desired.

Segment 10 (More-difficult, cross-country)

Similar to Segment 9, Segment 10 continues wrapping the eastern edge of the highest rim on the property. Leaving Hub D and heading generally south, Segment 10 should provide good visual and audible separation from the ridgetop road. The tread should continue to be narrower, traditional singletrack. Incorporating roots and rocks as texture guidelines detail. Optional advanced or beginner lines are strongly encouraged. The trail traverses a number of rocky sideslopes, and native stones found during construction should be incorporated back into the trail tread as suggested by the guidelines.

Segment 11 (More-difficult, cross-country)

Analogous to Segment 8, this segment will likely serve mainly as a climb for riders and bidirectional for pedestrians. Together with 8, 9 , and 10 a short loop adequate for intermediate hikers and runners is formed with good elevation gain for the area. Segment 11 plays along a rocky exposed nose of terrain and construction should create a trail with more direct climbing at the start than Segment 8. Additionally Segment 11 should be narrower in places, with more added texture than Segment 8 to provide a different ascending experience. Like Segment 8, this segment rolls along the contour to the south of an old ridge road, care should be taken to provide visual separation between the trail and road. Due to higher anticipated rock content, optional challenging lines should be developed sufficiently.

Segment 12 (More-difficult, cross-country)

Segment 12 connects Hub F to Hub E. Due to the elevation difference between the hubs this trail will require longer sightlines and more speed checks throughout. The segment traverses multiple rock outcroppings and these should be utilized to create a natural traditional singletrack with trail texture. Turns should be developed as platform turns, without excessive insloping. Together with Segments 13, 14, 15, and 16 this segment creates a larger loop for more extended and remote experiences.

Segment 13 (More-difficult, cross-country)

The longest segment at Standing Boy. This trail departs Hub E and loops down to Lake Oliver along two ridges, avoiding streams and wetlands and their associated buffers, through Hub O to Hub P. The segment should be a very traditional singletrack experience. Tread texture should be in the form of native rocks and roots, the corridor should be maintained tight enough to feel natural but still meeting the difficulty and type guidelines. Views of Lake Oliver should be incorporated tastefully, with attention to creating too many shortcuts or paths to the water's edge. Where crossing drainages, exposed bedrock is preferred as it is stable and will not impact stream bottom habitat or cause erosion. If bedrock is not present rock armoring may be required. Attention to the surrounding homes is needed to ensure the trail remains visually and audibly hidden from the neighboring development. The trail should be rolling contour in nature, never trending up or down for very long.

Segment 14 (More-difficult, cross-country)

Connecting Hub P to Segment 15, this segment forms the larger cross-country loop at Standing Boy. Where the segment traverses natural rocky slopes, native material should be included back in the trail tread to create rugosity and challenge. The segment should feel similar to Segments 8 through 16, and provide a consistent experience from Segment 13 to 15.

Segment 15 (More-difficult, cross-country)

A continuation of Segment 15, this segment should provide the same experience and be continuous with Segments 14 and 16 at Hub L. Where the slopes and native surroundings don't provide ideal settings for intermediate trail experiences, the trail tread should be narrowed, cambered, and meandered to create the same feeling.

Segment 16 (More-difficult, cross-country)

Either the end or the beginning of the larger cross-country loop, Segment 16 connects Hubs M and N to Hub L, Segment 15. Hubs M and N are a short gravel road across the Jorden Company Pond dam road, and therefore Segment 16 in theory connects almost all the way to the proposed trailhead and will likely be used by some as a their starting segment. Where the segment comes near Standing Boy Creek the same standards applied to waterways should be incorporated, keeping good buffer separation and providing short views. The trail should be similar to Segments 13 to 15, offering the intermediate rider, hiker, or runner with a longer experience in a more remote setting. Mimicking backcountry experiences as well as possible at Standing Boy.

Segment 17 (Most-difficult, gravity)

Segment 17 connects the upper Hub J to the lower Hub O, on Segment 13. The terrain between these hubs is characterized by steeper sideslopes, with some exposed rock. To make efficient use of the terrain and provide unique riding experiences, Segment 17 should be developed for advanced descending mountain bikers. A very narrow trail tread, combined with exposure on steep slopes and rougher tread texture will create a special riding experience and not be ideal for two-way traffic or pedestrian use. At the bottom where the slopes mellow out, the many exposed rocks should be incorporated into the trail to develop a technically challenging trail for riders. Bedrock should be utilized for drainage crossings to prevent erosion potential into waterways.

Segment 18 (More-difficult, gravity)

This is intended to be the longest and flowiest gravity experience at Standing Boy. It flows downhill from Hub D to Hub H. This segment may provide wider or narrower tread than recommended by the difficulty guidelines per the trail type guidelines to achieve the intended experience. The trail should feel like a larger, longer, more challenging version of Segment 7. Rollers, doubles, berms, and other earthen features should developed at a medium density and with intermediate size. Rocks should be used as found during construction to create hardened surfaces less prone to erosion, thereby extending the trail experience. Maintenance will be key to ensuring a consistent experience for riders. Where the trail passes through Hub H it should change character as the elevation loss from Hub H to B is negative. From Hub H east Segment 18 should be narrow and rolling, expediting riders to Hub B.

Segment 19 (More-difficult, gravity)

Whereas Segment 18 trends all downhill to Hub H, Segment 19 will incorporate short bursts of climbing to create a different gravity experience. This is evident at the start, where the trail climbs from Hub D to Hub K. Riders, especially those seeking gravity experiences, may opt to use the road to get to Hub K so Segment 19 was designed to allow this circulation. From Hub K it descends through Hub Q to Hub N and essentially the proposed trailhead. There is more rock content on the southern ridge, and Segment 19 should make use of these native opportunities to create a gravity trail with traditional singletrack basics. A narrow tread, along with tight meanders and abundant texture is desired. Due to the tornado damage much of Segment 19 will be without tree canopy, the more rock material and texture incorporated into the tread during construction the less erosion potential created. The trail should simulate the popular enduro style of riding, with a rugged feeling throughout the trail experience.

Segment 20 (Most-difficult, gravity)

Segment 20 departs Hub K, so must be accessed along Segment 19 or the ridgetop road. Like Segment 19 it seeks to mimic enduro riding, with a rugged trail experience and short climbs scattered throughout the downhill trending alignment. There are numerous instances of exposed rocks, and these should be integrated into the trail during construction to provide a technically challenging descent for riders. This will also act to fulfill the desire for unique trail experiences which can help support and grow a greater mountain biking community as well as draw regional riders.

Segment 21 (Most-difficult, gravity)

Like Segments 17 and 20, this trail should be developed to provide a higher end of the spectrum of riding locally. Which in turn, may help to draw regional mountain bikers. Segment 21 connects Hub G along Segment 8 to Hub H on Segment 18. This short downhill trail crosses many large rock outcroppings. The rocks should be used when able to provide a more challenging trail experience. There are multiple opportunities to provide optional lines, which can be increased or decreased in difficulty. This will allow riders to challenge themselves continuously. Where the trail nears Hub H at the bottom turns and meander, as well as tight corridor, should be used to slow riders prior to the intersection.

8. Next Steps

General Construction Notes

Creating the proposed trail network of traditional singletrack, mountain bike-optimized trails, and skills features will guarantee a unique destination drawing riders from afar while giving local residents an exhilarating outdoor activity close to home. Construction should be provided by a combination of professionals and volunteers. A qualified mountain bike trail builder is required to manage the work and ensure a high-quality riding experience. Skilled mountain bike trail builders should work on the mountain bike-optimized trails. A good rule of thumb is: A builder can only build to their riding ability; if you can't ride it, you shouldn't build it.

Volunteers can provide much of the preparation and finishing work between machine operators on the traditional singletrack trails, though volunteer involvement should occur during all construction. A phased plan of action will ensure continued enthusiasm for the Standing Boy trails.

General Trail Maintenance and Management Recommendations

Trails should be managed by the recommended difficulty guidelines, trail type guidelines, and respective TMOs. Maintenance is an on-going cost and should be adequately planned for. As noted in the trail type guidelines, typical annual maintenance budgets are 10% of install cost for cross-country trails and up to 20% of the construction cost for gravity trails. At least 50-80% of the annual maintenance needs for all trails can be performed by adequately managed and trained volunteers. These tasks will include:

- Corridor trimming.
- Downed tree removal.
- General clean up (branches, leaf litter, etc.).
- Minor drainage work (i.e. knicking out drains).

Professional assistance will be required, the frequency will depend upon on-going maintenance as well as weather patterns and use. Typically for cross-country trails professional maintenance will be required every 10-20 years, and will involve reroutes, major drainage work, or other large tasks. Gravity trails can expect needing professional help every 5-10 years. This will typically come in the form of feature rebuilding and upgrades.

The maintenance completed by volunteers will require adequate leadership and coordination. As the trails are developed this role will become increasingly important and time-consuming. CVA-SORBA has the ability to provide much needed assistance in day-to-day upkeep of the trails, however as major work is required (especially on the gravity trails), professional help will be needed. Increasingly destination mountain bike trail systems are funding and hiring part- or full-time staff to provide maintenance to trail systems. Ensuring a quality, consistent, riding experience is key to attracting visitors and keeping a local riding community satisfied and growing.

Tornado Timber Salvage Recommendations

The spring 2019 tornado created a path of destruction 800-1,800 feet wide trending east to west. The tornado likely picked up energy crossing Lake Oliver and significantly damaged Segment 4 along the lake side. Crossing the dove fields the tornado hit the prominent ridge and appears to have scattered a bit before picking back up in the Jordan Company Pond valley and creating more significant damage, mostly on Segments 18, 19, and 20. In total the tornado affected around 6.2 miles of designed trail. Nearly 2.5 miles of that damage was assessed to be significant.

It is recommended the salvage operation begin with the significant damage to Segment 4 along Lake Oliver. The large dove fields provide an ideal landing area, and this would allow construction of Segment 4 quickly after recovery before strong undergrowth has a chance to take hold. The majority of the salvage operation will be in Jordan Valley, and should utilized existing forest roads to the best of its ability. These roads climb the two ridges north and south of Jordan Company Pond and then older roads drop off the ridges to the valley. By using these existing roads the salvage operation will avoid undamaged trail corridor to the maximum extent practical and only cross trail corridors on the perpendicular at large spacing.

Salvage operations should only remove downed timber, as the standing trees will offer the only shade and precipitation catching for the trails and users. In some of the low damage areas as described in Appendix A "Tornado Damage" it may be more cost efficient to allow trail building crews to clear the small blowdowns rather than try to salvage the scattered timber.

Recommended Construction Phasing

Note: Cost opinion tables are for natural surface trail development only. They do not include parking lots, roads, bike paths, trailhead improvements, etc.

To allow for long-term financial health, as well as match the community's growing mountain bike needs, the Standing Boy trails construction should be phased. Phasing allows for long-term financial investment as well as creating more community support as recreational visitors gain excitement knowing more is coming.

Phase 1: Spring 2019

Phase 1 will set the stage for the continued development of a robust mountain bike community at Standing Boy. This first phase should contain Segments 1-5. These segments create fantastic beginning rider opportunities, while balancing multiuse demand. Segment 1 will offer short excursions into the forest, as well as mountain bike skill development; an excellent way to hook young riders and kids. Segments 2-5 will create a "lollipop" loop of nearly 5.7 miles. This loop will offer longer experiences, which will help enthusiast riders excite grow, as well as appeal to hikers and runners. The construction of Segment 4 is dependent on the tornado salvage operation, and if unconstructed due to timing the existing road system can be utilized to provide a full loop experience. Phase 1 will give riders and hikers a taste of various plant communities at Standing Boy, from the low drainages with saw palmetto to the banks of Lake Oliver and the edges between pine planation and dove field.

Standing Boy Phase 1 Construction Opinion								
Segment	**Type**	**Unit**	**Tread (SF)**	**Rock Armor (SF)**	**Turn 1 (EA)**	**Turn 2 (EA)**	**Stabilization (SF)**	**Subtotals**
		Unit Rate	**$1.75**	**$25.00**	**$1,850.00**	**$2,600.00**	**$0.10**	
1	GRN		17960	1796	4	0	39912	**$ 87,723.24**
2	GRN		37168	558	0	0	92919	**$ 88,273.14**
3	GRN		29903	449	2	0	74757	**$ 74,719.04**
4	GRN		22911	344	0	0	57279	**$ 54,414.67**
5	GRN		29835	448	2	0	74587	**$ 74,557.44**
		Totals	137777	3593	8	0	339454	
Construction Subtotal								$379,687.53
Mobilization								$17,000.00
Signage								$15,625.00
SubTotal								
10% Contingency								$37,968.75
Grand Total								**$450,281.28**

Phase 2: Fall/Winter 2019

Phase 2 should build upon the success of Phase 1 by introducing the next level of trails both in difficulty and experience. Phase 2 will include the remaining easiest trails, Segments 7 and 8, to introduce riders to gravity style trails and give beginners more options. To ensure hikers and runners have loop opportunities Segment 8 is a part of Phase 2, this allows visitors to use Segments 2, 6, and 8 to form a loop without using Segment 7, the easiest gravity run.

Segments 9, 12, 13, 14, 15, 16, and 18 should be completed in this phase to complete a larger loop experience for cross-country riders, hikers, and runners. Additionally, Segment 18 would introduce riders to more-difficult gravity trails, and provide a different trail flavor from the previous phase. By developing the larger loop and the gravity run for intermediate riders Standing Boy will have a healthy mix of options both in experience and distance, creating more opportunities for visitors to disperse and find trails that suit their needs and wants.

Standing Boy Phase 2 Construction Opinion

Segment	Type	Unit	Tread (SF)	Rock Armor (SF)	Turn 1 (EA)	Turn 2 (EA)	Stabilization (SF)	Subtotals
		Unit Rate	$1.75	$25.00	$1,850.00	$2,600.00	$0.10	
6	GRN		15191	228	4	0	37978	**$ 43,479.05**
7	GRN		23847	358	4	0	59618	**$ 64,037.51**
8	BLU		18411	276	4	0	61371	**$ 52,661.21**
9	BLU		8994	450	4	0	29980	**$ 37,380.26**
12	BLU		11003	550	3	0	36676	**$ 42,225.68**
13	BLU		58864	2943	11	0	196212	**$ 216,562.03**
14	BLU		12200	610	2	0	40666	**$ 44,366.01**
15	BLU		17313	866	2	0	57710	**$ 61,409.77**
16	BLU		12498	625	0	0	41661	**$ 41,661.02**
16	BLU		3677	184	0	0	12258	**$ 12,257.52**
18	BLU		19207	960	0	4	64024	**$ 74,424.03**
		Totals	201206	7089	34	0	574130	
Construction Subtotal								$690,464.07
Mobilization								$15,000.00
Signage								$14,375.00
SubTotal								
10% Contingency								$69,046.41
Grand Total								**$788,885.47**

Phase 3: Spring/Winter 2020

Phase 3 will finish out the Standing Boy trails development. Segments 10 and 11 will provide further access the ridgetops, both allowing pedestrians more routes with climbing and getting riders to the Phase 3 gravity trails. The gravity trails 17, 19, 20, and 21 will be finished during this phase. By developing the gravity trails near the end of implementation multiple goals are met. One, securing and growing rider support through anticipation and excitement is achieved as they know some of the best trails are coming. Another positive benefit is the community will have been developing skills through Phases 1 and 2, skills necessary to ride the various gravity trails with lower risk and more enjoyment.

Standing Boy Phase 3 Construction Opinion								
Segment	**Type**	**Unit**	**Tread (SF)**	**Rock Armor (SF)**	**Turn 1 (EA)**	**Turn 2 (EA)**	**Stabilization (SF)**	**Subtotals**
		Unit Rate	**$1.75**	**$25.00**	**$1,850.00**	**$2,600.00**	**$0.10**	
10	BLU		17192	860	1	0	57308	**$ 59,158.08**
11	BLU		20808	1040	10	0	69361	**$ 87,861.31**
17	BLK		6316	758	0	4	31578	**$ 43,556.70**
19	BLU		22329	1116	0	4	74431	**$ 84,830.97**
20	BLK		6477	777	0	4	32384	**$ 44,403.24**
21	BLK		3424	411	0	5	17119	**$ 30,974.61**
		Totals	76546	4962	11	17	282181	
Construction Subtotal								$350,784.91
Mobilization								$8,000.00
Signage								$10,000.00
SubTotal								
10% Contingency								$35,078.49
Grand Total								**$403,863.40**

Use of Volunteers

Volunteers are the bedrock of any trail community. The very nature of trail use typically creates and supports volunteerism. Volunteers can be excellent sources of assistance during construction, and afterwards in regards to maintenance. While volunteers are an excellent way to help support trails in times of diminishing public lands budgets, it is important to remember they are only volunteers and that to create high quality trails professionals offer many added benefits and land managers are ultimately responsible for managing their lands and trails.

During construction it is important to involve volunteers to ensure community buy-in and knowledge transfer. Volunteer days help grow excitement in the community and give people a first glimpse of the property and trails. In addition, this is a great way for trail users to learn about what it takes to develop high quality trails and learn some of the skills that will be useful during maintenance efforts. Keys to success while using volunteers during construction include:

- Setting clear and obtainable goals that can be finished during workdays
- Providing risk management discussions, trail building safety talks, and requiring or providing appropriate personal protective equipment
- Having a variety of options on workdays to ensure all skills and volunteer types have activities which suit their needs and wants
- Creating an atmosphere where volunteers feel comfortable asking questions and learning from the process instead of simply working

After implantation and as the trail system is used maintenance will be vital. Volunteers can be an excellent way for land managers to help keep trails running well. CVA-SORBA and GA DNR have a previously signed LUA which outlines maintenance assistance. As noted above volunteers can help provide some of the basic trail maintenance needs, but larger needs may require professionals. Some good points for successful volunteer maintenance assistance include:

- Volunteers assist land managers with maintenance, therefore they should always relay to land managers trail needs and solutions prior to implementing them
- Volunteers should only undertake the maintenance delegated to them by the land manager
- Land managers should empower volunteers and their organizations through trainings, education, and open communication

9. Summary

In summary Standing Boy has the opportunity to be the most complete and quality trail system around Columbus, GA. Through careful and thoughtful implementation of this master plan a successful trail system can be developed which meets the needs of the community and land manager. GA DNR has been effectively managing the property for habitat restoration, wildlife, and is currently beginning active forestry. CVA-SORBA has continued to develop skills and raise funds, working towards developing these trails with GA DNR. The chances present within the site are meaningful to the community and region. Columbus will continue to show itself as an outdoor recreation city and give its residents more ways to play outside, sparking healthier lifestyles and economic growth. Regionally Standing Boy will represent some of the most modern and diverse trails within a two to four-hour drive. This will attract mountain bikers and their families and friends, from as far Tallahassee, to regularly visit the trails to recreate. This regional significance will further help Columbus promote itself to visitors, new residents, and businesses. Lastly, the unique property will largely remain intact and undisturbed, allowing for continued ecological worth and security.

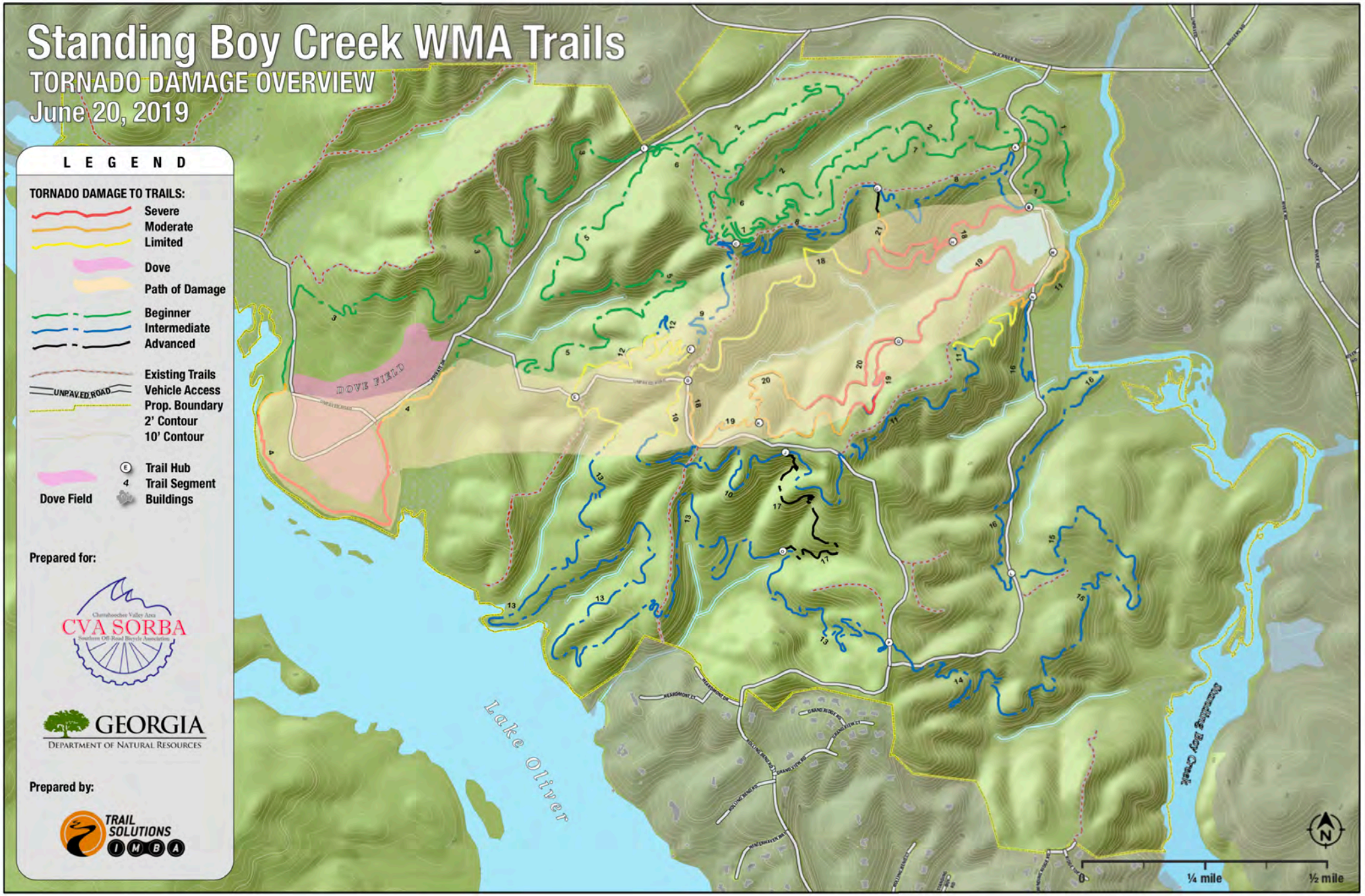
10. Appendixes

Appendix A: Maps

Standing Boy Creek WMA Trails

TORNADO DAMAGE OVERVIEW

June 20, 2019



Appendix B: Tables

Standing Boy Total Construction Opinion								
Segment	Type	Unit	Tread (SF)	Rock Armor (SF)	Turn 1 (EA)	Turn 2 (EA)	Stabilization (SF)	Subtotals
		Unit Rate	$1.75	$25.00	$1,850.00	$2,600.00	$0.10	
1	GRN		17960	1796	4	0	39912	$ 87,723.24
2	GRN		37168	558	0	0	92919	$ 88,273.14
3	GRN		29903	449	2	0	74757	$ 74,719.04
4	GRN		22911	344	0	0	57279	$ 54,414.67
5	GRN		29835	448	2	0	74587	$ 74,557.44
6	GRN		15191	228	4	0	37978	$ 43,479.05
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8	BLU		18411	276	4	0	61371	$ 52,661.21
9	BLU		8994	450	4	0	29980	$ 37,380.26
10	BLU		17192	860	1	0	57308	$ 59,158.08
11	BLU		20808	1040	10	0	69361	$ 87,861.31
12	BLU		11003	550	3	0	36676	$ 42,225.68
13	BLU		58864	2943	11	0	196212	$ 216,562.03
14	BLU		12200	610	2	0	40666	$ 44,366.01
15	BLU		17313	866	2	0	57710	$ 61,409.77
16	BLU		12498	625	0	0	41661	$ 41,661.02
16	BLU		3677	184	0	0	12258	$ 12,257.52
17	BLK		6316	758	0	4	31578	$ 43,556.70
18	BLU		19207	960	0	4	64024	$ 74,424.03
19	BLU		22329	1116	0	4	74431	$ 84,830.97
20	BLK		6477	777	0	4	32384	$ 44,403.24
21	BLK		3424	411	0	5	17119	$ 30,974.61
		Totals	415529	16605	53	21	1259788	
Construction Subtotal								$1,420,936.50
Mobilization								$40,000.00
Signage								$40,000.00
SubTotal								
10% Contingency								$142,093.65
Grand Total								**$1,643,030.15**

Standing Boy Trails Master Plan

Standing Boy Trails Master Plan Table				
Segment	Length (ft)	Phase	Difficulty	Type
1	4169	1	GRN	XC
2	7561	1	GRN	XC
3	7264	1	GRN	XC
4	6061	1	GRN	XC
5	7532	1	GRN	XC
6	3392	2	GRN	XC
7	5216	2	GRN	GRV
8	5743	2	BLU	XC
9	2416	2	BLU	XC
10	4437	3	BLU	XC
11	6974	3	BLU	XC
12	3719	2	BLU	XC
13	20887	2	BLU	XC
14	3564	2	BLU	XC
15	5496	2	BLU	XC
16	4140	2	BLU	XC
16	1000	2	BLU	XC
17	4879	3	BLK	GRV
18	7039	2	BLU	GRV
19	7421	3	BLU	GRV
20	5225	3	BLK	GRV
21	2375	3	BLK	GRV

Grand Total (feet)	**126509.30**
Grand Total (miles)	**23.96**

Trail Analysis (feet)	
Total GRN	41195
% GRN	**33%**
Total BLU	72836
% BLU	**58%**
Total BlK	12478
% BLK	**10%**
Total XC	94354
% XC	**75%**
Total GRV	32155
% GRV	**25%**
Total Phase 1	32587
% Phase 1	**26%**
Total Phase 2	62613
% Phase 2	**49%**
Total Phase 3	31310
% Phase 3	**25%**

Key	
GRN	Green (easiest)
BLU	Blue (more-difficult)
BLK	Black (most-difficult)
XC	Cross-country
GRV	Gravity

Appendix C: Benefits of Mountain Bicycling Trails

Promoting Active and Healthy Lifestyles

The benefits of mountain biking may start on the trails, but they don't end there. Learning to ride a bike is a rite of passage. Bikes and the sport of mountain biking provide a multitude of opportunities to teach children valuable lessons that will carry into adulthood.
Obesity is at a high, while activity levels among Americans are plummeting. With its progressive nature and way of stimulating the senses, mountain biking is appealing, especially to youth, and provides an excellent form of recreation for reversing the trend toward poor health. Since riding a bike provides excellent cardio conditioning, improves strength and coordination, and burns several hundred calories an hour, it is an activity as appealing to parents as it is to kids.

The unstructured play that mountain biking provides inspires people to explore and appreciate the natural world, leading to positive associations with outdoor activities and exercise.
Mountain biking allows individuals to advance at their own pace, so kids looking for a challenge can have just as much fun as children who are more interested in exploring the scenery. Riding in nature provides an environment where children can work on their skills, have fun, and pedal their bikes without parents having to worry. Mountain biking is a cross-generational endeavor, accessible to all ages and levels of physical fitness. Going for a trail ride is an excellent way for parents to do more than support their children's activities, it's a way to share the experience. Every ride is an opportunity to create a healthy lifestyle and pass on lessons that are best learned through experience.
Several studies on physical activity have indicated that proximity to recreational facilities, such as trails, is a predictor for physical activity. Simply put, if there are walking and biking trails nearby then residents are more likely to use them and therefore be healthier. Physical health and exposure to nature also benefit mental health, reducing stress and increasing happiness. In addition, individual and community health translate to economic benefits by decreasing health care costs

Contributing to Economic Growth

A well-designed trail system can stimulate economic growth by increasing activity within the local population as well as attracting visitors from outside. Trails can generate business in retail sales and services, support jobs, provide sustainable growth in rural communities, and produce tax revenue. Access to trails also correlates to a higher quality of life, thus making the community more desirable and capable of attracting new businesses and workers to an area.

IMBA assists local communities in increasing mountain bicycling tourism as a sustainable, renewable source of economic development. A mountain biking destination is one that attracts tourists to an area for the benefits of the mountain biking experience; provides visitors with all of the amenities needed to compliment, ease, and enhance their visit; and in turn creates word of mouth about the community that will draw new and repeat visits.

A case study in Cable, Wisconsin, clearly illustrates how a community can benefit from offering a world-class bicycling experience. Construction of new bicycle trails in Cable resulted in:

- Increased property values.
- Increased spending on bicycle related goods.
- 35 jobs created annually, adding $523,000 to total employee compensation.
- Nearly $1.3 million impact related to spending from mountain bicyclists.

According to the Outdoor Industry Alliance, mountain bicyclists represent approximately 3.4 percent of the US population, or nearly 10.6 million participants. IMBA's own research indicates that enthusiasts, who represent a portion of this overall number, travel extensively within a four-hour range and will typically devote one week per year specifically to travel to reach mountain bicycling destinations. Same-day visitors spend approximately $35 per day in local communities while destination visitors spend closer to $193 per day (due in part to lodging and increased meal purchases).

While mountain bicyclists are certainly willing to travel to ride, they will only do so if their destination contains a key ingredient: high-quality trails. These trails must be of a sufficient length and contain a variety of experiences, such as traditional singletrack, bike-optimized singletrack, bike parks, and shuttle options. The competition for these destination-quality locations is slowly increasing over time

Fostering Community Identity and Involvement

Involving community members in the planning, building, and maintaining of trails fosters community pride. In order to maintain sustainable trails, care of the trail system should be managed by local enthusiasts and rely on an organized membership base. Volunteering to help with trails provides an opportunity for area residents to connect with each other and with the terrain and land that surround them. IMBA members donate nearly one million volunteer hours to trails throughout North America every year, making volunteerism a large part of mountain bike culture.

Trails and parks also provide informal opportunities for people to meet and interact with others in a natural setting. Connection to nature is paramount to maintaining the health of the environment and making the outdoors relevant and accessible to all. Trails serve a diverse population and cultivate unity and stewardship in the community. Trails can even revitalize blighted areas, for example, turning landfills into bike parks or gravel pits into trailheads.

Preserving Open Space

Trails make communities better places to live by preserving and creating open spaces for recreation. Greenways function as hands-on environmental classrooms for people of all ages, providing opportunities to enjoy nature close up. With its abundant plant life, open spaces can decrease pollution, protect water quality, and reduce soil erosion. Economic growth and property values are also tied to open space as buyers are generally willing to pay more for property located close to parks and open space. The recreation, health, economic, and environmental benefits of trails can contribute to an overall enhanced quality of life in nearby communities.

In Georgia, consumer spending on outdoor recreation contributes $27.3 billion annually to the state economy. The Georgia outdoor recreation economy also:

- Supports more than 238,000 direct jobs across the state.
- Generates more than $8.1 billion in wages and salaries.
- Generates $1.8 billion in state and local taxes.

Appendix D: Present Day Mountain Bicycling

The sport of mountain biking has evolved radically since its recognized birth in the mid-1980s. Bicyclists began tinkering with fat tires to hybridize bicycles so that they could leave the paved roads to explore dirt roads and singletrack trails. Lower gearing, powerful brakes, and lightweight frames allowed riders to get further in a single backcountry outing than hikers or runners.

Mountain bikes and riders continue to evolve, with dozens of types of mountain bicycling alternatives. Purpose-built trails, bike parks, and amenities have improved to accommodate any skill level from beginner to expert. Today's riders are sophisticated, desiring every possible choice, from taking young children on gently groomed trails to seeking intense experiences with higher consequences. Not only has the pastime grown in popularity to meet the needs of enthusiast riders, it has widened in diversity to accommodate a wide variety of trail experiences. When the sport began, there was a strong emphasis on advanced riding. Trails were very difficult, and bikes were not kid friendly. Both issues have now been solved with the development of progressive, modern trail systems and bike park facilities.

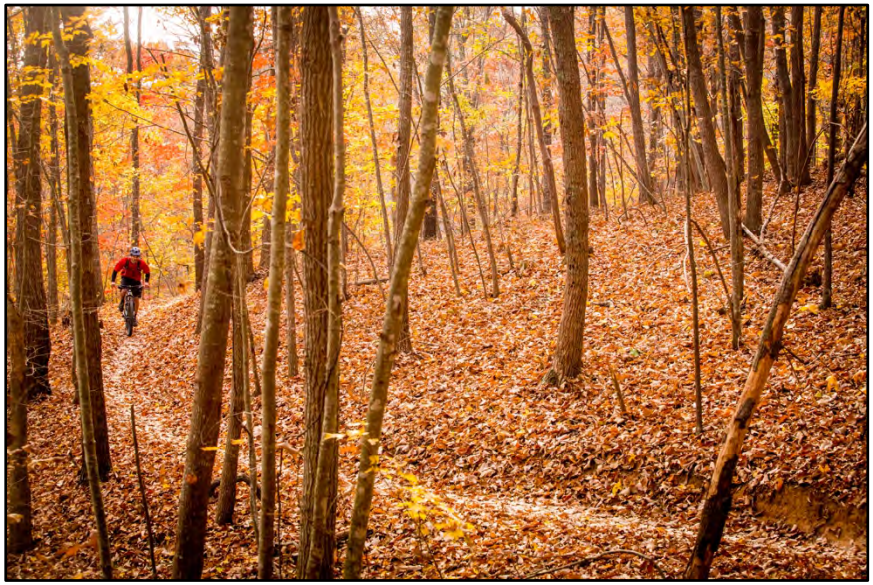
60 million adult Americans ride a bike each year, and bicycling creates major economic growth in the United States:

- **Contributes $133 billion annually to the US economy.**
- **Supports nearly 1.1 million jobs across the US**
- **Produces $53.1 billion annually in retail sales and services.**

A 2018 economic impact study released by the Walton Family Foundation describes in detail the $137 million benefit from trails in Northwest Arkansas to the Arkansas economy in 2017, of which $27 million came from tourism dollars.

Singletrack Trails

Singletrack trails are the bedrock of mountain biking. Singletrack differs from dirt roads and doubletrack mostly by trail width. Whereas the latter two routes allow users to travel side by side, singletrack is narrow enough that users must travel only in single file. Singletrack takes on a wide variety of flavors from smooth and rolling to rough and rowdy. Trails are designed and constructed to meet certain experience goals, with some of the most important factors being intended user groups, directionality, and difficulty level.



Traditional Singletrack

These natural surface trails are most often multiuse and typify what most people envision when they hear the word trail. Traditional singletrack trails should be constructed and maintained using techniques that minimize user conflict and maximize a natural surface texture and trail corridor, the area above and to the sides of the trail. This type of trail should be narrower than a flow trail, to reduce speed. These trails will see both bike and foot traffic, so care should be taken to avoid obstacles or features such as jumps, rollers, or water bars that might exclude some user types. Turns will be constructed sustainably but will not be cambered or bermed to optimize cornering traction for bikes.

Mountain Bike Trails

Mountain bike trails are optimized for mountain bike use while still providing an enjoyable experience for other user groups. Typically, pedestrians are the most common shared visitor type. Entire trails may be optimized for bike use, or particular segments, most often downhill portions, may be geared to riders and limited to travel in one direction. Bike-optimized features enrich the riding experience by adding fun and providing opportunities for riders to build their skills. Obstacles such as berms, rollers, wide turn radii, bridges, rock gardens, jumps, and drops are characteristic bike features. The feature density for mountain bike-optimized trails is higher than traditional singletrack but not quite as high as flow trails.

Flow Trails

Flow trails are purpose-built or modified singletrack trails, the majority of which contain a high density of specific features to enhance the riding experience and provide challenge. They harness gravity so that riders feel as though they are flowing through a succession of exhilarating features from top to bottom. These trails are directional, in order to promote optimal circulation patterns, maximize the visitor experience, and minimize user conflict. Flow trails do not have to compromise their downhill design in consideration of riders traveling in both directions.

These descending trails are designed to provide a "roller coaster" sensation to users by maximizing the efficiencies afforded by a bicycle and by counteracting forces that direct a user off of the trail. Berms and cambered tread surfaces, for example, promote traction, safety, sustainability, and enjoyment. These trails are never extreme, dangerous, or steep; challenge is provided by rewarding progressive skill development and incorporating features that can always be rolled but may be jumped. While a flow trail is singletrack, the tread surface itself should be wider in areas where it is anticipated that less-experienced visitors may need a greater margin of error.
The climbing trails that access flow trails are designed to provide a variety of optional technical climbing challenges while maximizing elevation gain and minimizing user exertion to allow riders to conserve energy for the descent. Typically, the maximum density of bike-optimized singletrack is 1 mile per 10 acres of suitable terrain.

Community Bike Park Facilities

Community bike parks are more intensely designed than singletrack trails. They offer a small area where users can practice their skills, progress, and have fun in a relatively well managed manner. Bike parks are typically located in an existing park or similar area.

Tot Track

A tot track is designed for smaller bicycles and users. It features reduced-sized rollers as well as low-angle bermed turns. It has features that can accommodate balance bicycles as well as regular bikes with short wheelbases. The tot track is designed for the least skilled of riders. These facilities are recommended near existing recreational facilities, such as playgrounds. Tot tracks are essentially smaller versions of pump parks, and like pump parks can be dirt or a hardened surface. Asphalt is the recommended surface material for tot tracks. Asphalt is more expensive to install but greatly reduces maintenance costs and importantly, provides a consistent high-quality experience for the users.

Pump Park

A pump park (also known as a pump track) is designed to help cyclists of all skill levels to improve their riding skills. Pump parks are multidirectional and allow users to create their own routes through the rollers, berms, and jump features. A pump park will foster more organic and creative riding that stimulates both novice and skilled riders. Riding a pump park is an extremely anaerobic activity, so it is recommended that suitable seating and shade structures be installed for users to rest between sessions.

Skills Area

Users looking to practice beginner to intermediate technical riding skills in a low- consequence environment can learn in a skills area. This trail zone can include numerous optional stations where users can practice on features designed to teach specific skills. Features may include skinny bridges, drops, rollers, and more. Typically, features are man-made, sometimes prefabricated. Locating a skills area along the proposed Terrapin Skin bike path could provide over 1,000 linear feet of skills development trail to all riders.

Dirt Jumps

Dirt jumps consist of tabletops ranging in height from 3 to 6 feet, spaced to maximize a rider's ability to flow from one jump to the next without having to pedal. Dirt jump areas are designed so that the start hill is the highest elevation point and provides sufficient gravity to propel riders into the jump lines. Dirt jumps are incredibly fun, a great workout, and an excellent practice area for building solid bike jumping skills. These areas are designed to be ridden in one direction, eliminating potential conflicts. Dirt jumps require soil with a high percentage of clay (60-70%) that compacts very hard, minimizing rolling resistance and standing up to heavy use and high shearing forces. Installing engineered structures for the jump takeoffs substantially minimizes maintenance and improves the consistency of the user experience. Structures, such as ramps with lips, can be fabricated with steel and wood or hardened with asphalt and at times with concrete.

Technical Challenge Loop

Users looking to practice intermediate to advanced level technical riding skills in a low-consequence environment can utilize the technical challenge loop. This type of trail can feature numerous optional skill stations such as drops, jumps, rock gardens, and rollovers that directly challenge technical riding skills. Users can practice on natural and man-made features designed to teach advanced mountain bicycling skills. Typically, these features mimic the skills areas features but to a higher degree of difficulty. Aesthetics can be important, as is matching natural trail conditions, therefore dirt, wood, and rocks are the most commonly used materials.

Lifted and Tilted Tread Type

Traditional rolling contour trails run along the side of a slope, perpendicular to the fall line. They are constructed with an outsloped tread to allow cross-slope drainage of runoff. However, not all proposed trail locations have enough sideslope for drainage, and frequent trail use may eradicate an outslope within a short time.

A new trail construction method, "lift and tilt," is a way of raising the tread above the existing grade while simultaneously lowering the grade of areas off the trail that act as natural drains. This enhances tread drainage while increasing the fun factor for mountain bikers. Borrow basins are dug to harvest suitable mineral soil to lift and tilt the tread. Woody debris is used to replace the soil taken from the borrow basins, which are then masked and blended with organics to create natural-looking low points for drainage. This technique holds the rider on the trail while directing water off the tread into the basins.

This method can be implemented on any scale, using smaller machines to provide a singletrack feel or larger machines to create wide trails with a true bike park flow. Visitor numbers, rainfall, and soil type may require the use of culverts and sumps to keep trails ridable while providing drainage. The trail can have an increased emphasis on fun, flow, and airtime depending on the designated trail user.

For shared-use trails, which generally cater to beginning riders, the dial can be turned down with mellower grades, less undulation, and feature frequency. For advanced trails, the dirt features can be more dynamic with larger rollers and jumps, bigger drops, and steeper banked turns, giving riders play in the vertical plane.

Flatter areas that may have been avoided in the past can now be designed to provide an exciting riding experience. The lift and tilt method is often used for pump tracks, flow trails, jump trails, and other bike-optimized amenities.

Appendix E: Trail Facility Planning and Design Guidelines

The following are guidelines for the construction and maintenance of future trails. The natural environment is dynamic and unpredictable. The nature of recreational trails and roads, the desired user experience, and the constant forces acting on natural surface trails and roads make strict standards untenable and undesirable. As such, the guidelines below are simply that: best management practices that should be followed within environmental constraints.

Traditional Singletrack Trails

These natural surface trails will be built using sustainable trail construction techniques. Routes will be constructed and maintained using techniques that will minimize user conflict and maximize a natural surface texture and trail corridor. This type of trails should be narrower than 24" to reduce speed. All user types will use these routes so care should be taken to avoid obstacles that might exclude an allowed user type such as jumps, rollers, or water-bars. Turns will be constructed sustainably but will not be cambered to optimize cornering traction.

Mountain Bike-Optimized Flow Trails

Mountain bike-optimized singletrack trails are designed and constructed to enhance trail experiences specifically for mountain bikers. Mountain bike-optimized trails might differ from traditional trails in several ways: enhanced tread shaping, directional or one-way travel, and the addition of man-made technical trail features (TTFs). Bicycles move differently along a trail than other modes of transportation. The movement of the wheel, the use of gravity and friction, the transfer of energy from the rider to the wheel – these offer both opportunities and constraints for trails and trail features that may differ from those of other users.

Mountain bike-optimized and one-way trails that harness gravity are a growing area of interest for mountain bikers. These trails can be designed and built at any level, from beginner friendly flow trails to extremely difficult race-oriented downhill trails. Riders cherish the feeling of flight that a bicycle provides while coasting through a succession of bike-optimized features from top to bottom. A consistent trail is not necessarily a boring or easy trail (though it can be), it's one that is designed such that a preceding section of trail prepares users for the subsequent sections. This is a hallmark of flow trails and can be particularly important for beginner trails, as well as for higher speed trails with gravity features, such as jumps and drops.

As trail systems grow and become congested, one-way trails help to take the pressure off popular shared-use trails. Riders looking for speed, thrill, and challenge will have their own designated areas, and users travelling at slower speeds will have their own trails. Well-designed mountain bike-optimized singletrack and gravity singletrack are exciting for mountain bikers but are also designed to help manage risk and minimize user conflict.

Stacked Loops

Stacked loops enable users to share many different levels of trail. In a stacked-loop system, the loops that are closest to the trailheads are more inviting to children, beginners, or families and the loops further out cater to more advanced riders. This creates a progression of experiences and challenges as users explore the trails in more depth. The loop construction also allows users of all levels to ride the trails and improve their fitness and skill while enjoying the natural world.
Bidirectional trails can be ridden in either direction, thereby essentially doubling the trail options and allowing users to complete a loop and avoid an out-and-back route. Loops vastly increase the trail opportunities for beginner to expert mountain bikers, including families and groups.

Progressive Hubs and Clusters

All shared-use trails are created with skill level progression in mind. With progressive trail features, a mountain biker may become a better rider by gradually moving up in trail difficulty. Hubs and clusters give users more trail options for varying skill levels at each hub, allowing for skill level diversity. A trailhead or major trail intersection is usually a hub. A rider may start out on a beginner trail and then graduate on to a more difficult trail at the next hub. At many intersections, there is the option to change the trail difficulty or continue on the same difficulty level.

This practice spreads out visitors and helps reduce trail user conflict. Signage includes difficulty levels at every hub and wherever necessary in the trail system to help users choose trails based on their skill levels and desired experience. A cluster is a concentration of trails with all levels of difficulty.

Providing consistent climbs and extended descents is a design priority. In most cases, the trails contour gently up or down for consistent lengths to maximize climbs and descents. This is known as rolling contour design. All shared-use trails should be of rolling contour design to minimize impact and sedimentation in the watershed.
The most challenging trails and terrain will be further away from the proposed parking hubs, rewarding those willing to travel longer distances. This is also a proven risk management tool. Putting the difficult segments further out of reach of beginners, and giving riders time and distance to warm up before reaching those technical segments, provides a level of safety in the system.

Trailheads

Well-placed trailheads and parking lots contribute to a successful trail system. Trailheads should be located in areas of lower elevation, as most trail users prefer outbound climbs with inbound descents back to the parking area. This also helps mitigate risk by allowing fatigued riders an easier route back to their starting point. This is especially true for mountain bikers, and necessary for families and beginners. Trailheads should offer information useful for the trail users, including trail maps, location information, emergency contact details, and volunteer information.

Trail Design and Construction

It is optimal to flag corridors just before the permitting review team is available to physically tour the flag line, so as not to lose flags from sunlight, wind, animals, humans, and other elements. Design and flagging costs will depend on conditions, accessibility, terrain, time of year, and other factors. It is recommended a professional mountain bike trail designer be contracted to provide design as needed. Flagging should not outpace anticipated construction. Design should include design development documents to ensure the construction team creates the experience intended and does not ruin future opportunities.

Creating the proposed trail network of traditional singletrack trails and mountain bike-optimized trails will guarantee a unique destination drawing riders from afar while giving local residents an exhilarating outdoor activity close to home. Construction should be provided by a combination of professionals and volunteers. Skilled mountain

bike trail builders should perform most work, especially the mountain bike-optimized trails. Volunteers can provide much of the preparation and finishing work between machine operators on the traditional singletrack trails, though volunteer involvement should occur during all construction. A phased plan of action will ensure continued enthusiasm for the Standing Boy trails. Machines applicable to the landscape and style of trails include: mini-excavators, mini-skid steers, tracked haulers, and plate compactors. A qualified mountain bike trail builder is required to manage the work and ensure a high-quality riding experience. A good rule of thumb is: A builder can only build to their riding ability; if you can't ride it, you shouldn't build it.

Sustainability

A sustainable trail balances many elements. It has little impact on the environment; resists erosion through proper design, construction, and maintenance; and blends with the surrounding natural area. A sustainable trail also appeals to and serves a variety of users. It is designed to provide enjoyable and challenging experiences for visitors by managing their expectations effectively. Following sustainable trail design and construction guidelines allows for high-quality trail and education experiences for users while protecting the land's sensitive resources. For additional trail design, construction, and maintenance techniques, refer to *Trail Solutions: IMBA's Guide to Building Sweet Singletrack*. These guidelines are appropriate for any hike, bike, or equestrian trail.

Trail Flow

With good flow, the speed at which a rider travels on the trail should be fairly consistent, and the rider will not have to brake and accelerate frequently. Transitions between faster and slower speeds need to be gradual, with progressively increasing and decreasing turn radii and frequent uphill segments to reduce speed where needed. Steep downhill grades should not come right before tight turns. Adjusting the cross slope of the trail tread to match the flow also helps riders stay on the trail and allows higher speeds. Designing trails with flow in mind not only provides a high quality trail experience, it helps mitigate erosion issues from runoff and use.

Appendix F: Signage

The development of a mountain bike trail network requires the development of a comprehensive system of signs. Signs are the most important communication tool between land managers and trail users. A well-implemented and maintained signage system enhances the user experience by helping visitors navigate the trail network and providing information about the area. Signage also plays a critical role in managing risk and deploying emergency services.
Recommended signage for the trails should be simple, uncluttered, and obvious; with a sign at every major intersection to help users stay on track. Signs should meet the needs of all users, from the daily trail user to someone who is experiencing the trails for the first time. In order to serve the variety of visitors, sign placement should be strategic and frequent. Because signs can intrude on the natural outdoor experience, balancing competing interests is key to developing a successful signage program.

Sign Types

A variety of signs can be created to help users identify trails and their location, select routes, remain confident in their trail choices, guide users to destinations and key points of interest, and provide information on regulations and allowed uses. Signage can also be interpretative; helping visitors learn about responsible recreation and trail etiquette, learn about resource protection, and reduce risk and hazards.
Informational signs: Usually positioned at the trailhead and major intersections. Provide details such as trail length and difficulty. These include trailhead identification signs (from a road); signs at a trailhead kiosk with a complete map and description of all the nearby trails and facilities, local regulations, emergency contact information, and educational messages; trail intersection signs; waymarks; difficulty rating signs; and trail length or elevation gain and loss signs.

Regulatory signs: Delineate rules, such as prohibited activities, direction of travel, or other restrictions.
Directional signs: Provide navigational information.
Warning signs: Warn trail users of upcoming hazards or risks. These include visitor rules and regulations signs, allowed activities, road and trail intersections, and emergency signs.
Educational signs: Provide guidelines for responsible recreation and trail etiquette.
Interpretive signs: Describe natural or cultural resources. These include educational and responsible use signs.