Business of the Village Board
Village of Saranac Lake

SUBJECT: BETA Master Plan Date: 7/28/2025

DEPT OF ORIGIN: Village Manager BILL # 97-2025

DATE SUBMITTED: 7/21/2025 EXHIBITS: _____

APPROVED AS TO FORM:

_____ _____
Village Attorney Village Administration

EXPENDITURE REQUIRED: $0	AMOUNT BUDGETED: $0	APPROPRIATION REQUIRED: $0

SUMMARY STATEMENT

Approve and Sponsor the BETA Mount Pisgah Summer Trails Enhancement and Master Plan

RECOMMENDED ACTION

MOVED BY: Brunette SECONDED BY: Ryan

VOTE ON ROLL CALL:

MAYOR WILLIAMS	yes
TRUSTEE BRUNETTE	yes
TRUSTEE RYAN	yes
TRUSTEE SCOLLIN	yes
TRUSTEE WHITE	absent

Mount Pisgah Summer Trails Enhancements and Master Planning

Overview: BETA's Saranac Lake Local Trails Committee as well as local community mountain bikers have previously identified the need for improvements to the popular biking trails at Mount Pisgah. The desired improvements would provide some beginner/entry level trails, simplify navigation of the trails, and significantly enhance the sustainability of the trails to reduce the impact of erosion.

Mountain Biking Community Demand and Tourism: Participation in mountain biking has been growing quickly across the nation but even more so in the communities of the Adirondacks where relatively recent access to modern and well-designed soft surface trails (as distinct from paved or gravel bike trails) for newer riders has begun to open the sport up to resident families, children, and beginners. Following the motto of "Built for the community and inviting to visitors" BETA has focused its trail development and maintenance on meeting the demands of residents while also recognizing the economic benefits to rural economies that come from mountain bike tourism. Anecdotally, BETA has heard from a number of families that they specifically considered access to appropriate trails in their decision of where to live when moving to the Adirondacks.

The Trust for Public Land released a report this year on the "Economic Benefits of Mountain Biking" which concluded that "Mountain biking offers an incredible opportunity for rural communities to harness their natural assets for sustainable economic growth," according to J.T. Horn, Director of the National Trails Initiative at Trust for Public Land. One key takeaway from the study of 13 communities across the country was that "Mountain biking tourists spend an average of $416 per visit, contributing to local businesses like lodging, restaurants, and retail establishments." Additionally, the report noted that proximity to trails promote physical activity, "improving physical and mental health while fostering social connectedness." The ROOST 2024 Leisure Travel Survey showed that 7% of renting tourists (versus one day visitors) participated in mountain biking in Essex and Hamilton Counties, a greater rate than golf, hunting, rafting, or climbing.

While destinations like the Kingdom Trails in Vermont get plenty of attention because of their sheer size, smaller locations like Bethel, Maine, population 2,500, are gaining prominence with many mountain bike travelers because of the balance of smaller scale, well designed trails, and welcoming community.

Trails Master Plan: Over approximately the last 3-4 years BETA has begun to utilize trail master plans which view the entire planning area holistically to create intentional (versus organic) trail networks which use modern designs to carefully address the needs of the trail-using community and which allow for phased implementation as both time and funds allow. When starting from a landscape with an existing trail network such as Mount Pisgah the assessment process looks at whether there is a set of trail users that are not well served, such as beginner or advanced riders, and what trails may be requiring excessive maintenance due to soil conditions or original construction. The result will generally be a set of trails to retain, some recommended for decommissioning or rerouting (which retains part of a trail but replaces other sections), and new trails recommended for construction. Because the plan is creating an integrated system of trails, it is generally not recommended to pick and choose elements which will be followed and others which will not be implemented but a prioritization of implementation is to be expected.

Process: With financial support from the Village of Saranac Lake, and after completing an RFP and selection process, BETA hired Peduzzi Trails to develop a trails master plan for Mount Pisgah. Luke Peduzzi is an established local trail builder with deep knowledge of the terrain and soils of our region and a commitment to community engagement in order to produce great plans and trails.

A stakeholder group of interested individuals and organizations was created to work with Peduzzi Trails in defining the goals for this trails master plan as well as to provide feedback for drafts of the plan. Representatives included Barkeater Trails Alliance (BETA), Friends of Mount Pisgah, Village of Saranac Lake Ski Area Operations, Saranac Lake Parks and Trails Advisory Board, Saranac Lake Innovative Cycling Kids (SLICK), and other local mountain bikers and trail users.

During April and May of 2025 Peduzzi Trails led three onsite meetings with this stakeholder group to receive input as well as to review the existing trails, terrain and soil conditions including regularly wet areas.

After implementing some revisions which were recommended by stakeholders, the final Mount Pisgah Trails Plan was released by Peduzzi Trails at the end of May, 2025. That plan is attached to this document and is fully supported by the stakeholder committee and BETA.

Safety: This plan carefully considers the safety of all trail users as well as the geologic sensitivity of the terrain of unforested ski runs. High speed descending (trails intended predominantly to travel downhill) will be for downhill bicycles only and will be closed to foot traffic. All other trails will be multi-use with signage emphasizing that foot traffic has priority and cyclists should yield right of way. These efforts along with elements such as signage at intersections greatly reduces the potential for conflict between users.

The area of highest ramp harvesting has been intentionally avoided for new trail development.

Finally, Village staff emphasized the desirability of not disturbing the hydrology of the unforested portion of the mountain and no new trails have been proposed in that area.

Sustainability: BETA and our contractors consider the sustainability of our trails to be critically important, particularly as more extreme weather events release larger water loads and can lead to significant infrastructure damage in a short period of time. All of our trails utilize modern design and construction techniques with climate resilience in mind to minimize environmental impact through erosion and sediment transport as well as reducing long-term maintenance costs. The final trail incorporates erosion control and natural drainage systems which sheet stormwater across the trail and onto the forest floor for infiltration into the soil, ensuring durable surfaces, an enhanced user experience, and ecosystem protection

Estimated Cost: The numbers provided in the plan should be viewed as very preliminary. Actual costs will require more detailed analysis of each phase and will be impacted by elements including: final layout, volunteer commitments, and whether prevailing wage rates are required.

Potential Funding: Grants will be an important source of funds to implement the recommendations in the plan. Possible grants to evaluate include:

- DEC Adirondack Park Community Smart Growth Program
- New York State Parks Recreational Trails Program (RTP, state administered federal grant)
- Environmental Protection Fund Grant Program for Parks, Preservation and Heritage (EPF)
- NBRC Catalyst Grant Program
- ONX Adventure Forever Grant
- T-Mobile Hometown Grant
- Numerous corporate and foundation grant programs

While all of these grants are very competitive there is a compelling case to be made for just this type of trail network implementing a master plan and a partnership with an organization like BETA who has an established track record delivering successful, community supported projects.

Additionally, BETA has been successful in securing private donations to be used as match in grant applications in the past. For example, in 2024 BETA partnered with the Town of Keene in securing a Smart Growth grant of $125,000 for trail

construction with a match commitment by BETA of $63,000. This match would come from small corporate and foundation grants, private donations, and $10,000 of town bed tax and has been successfully raised.

Conclusion: Thank you for your consideration of this plan to modernize the summer trail system at Mount Pisgah. We welcome any questions about the plan or cycling in the community.

CONTACT

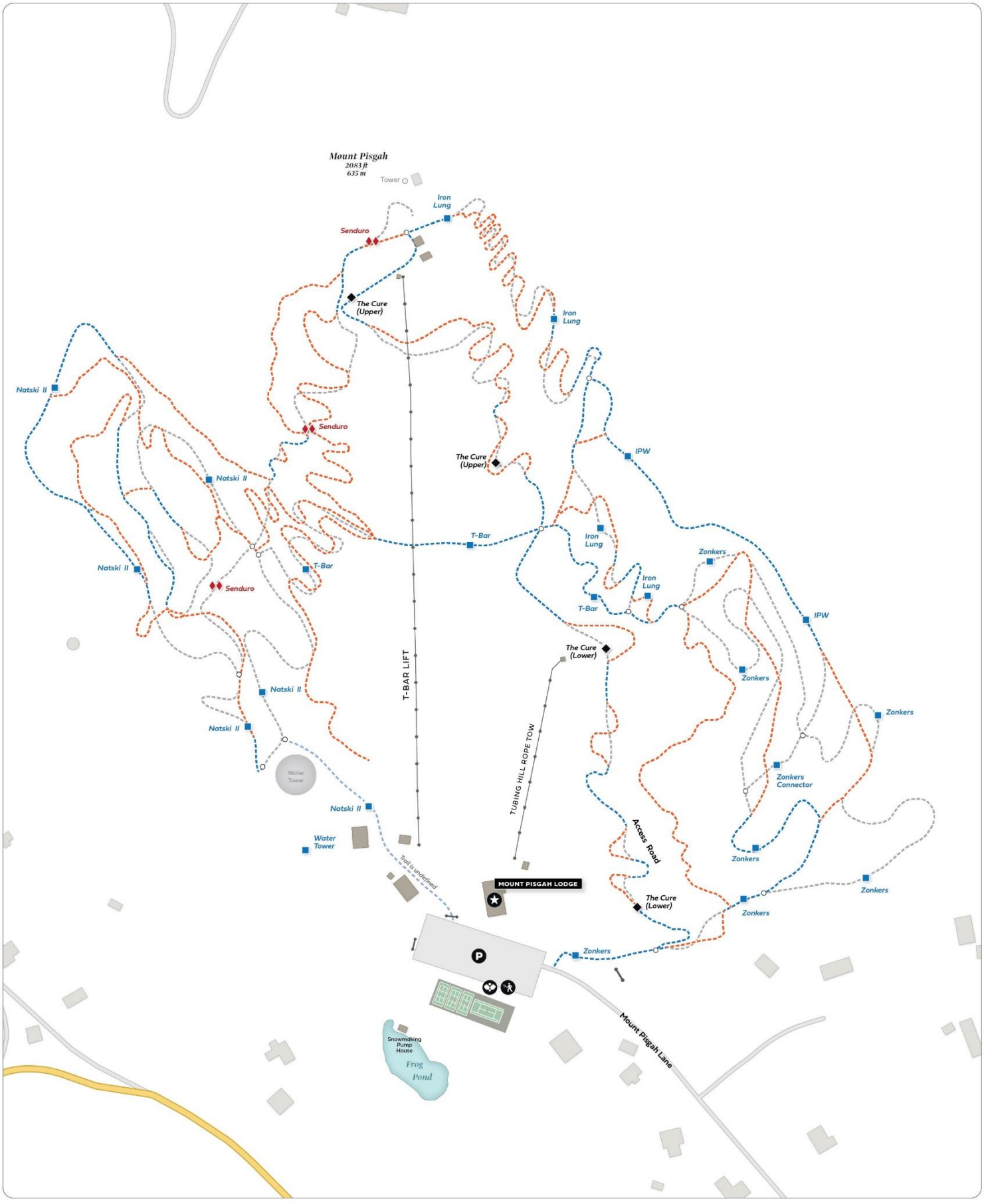
Glenn Glover, Executive Director
Barkeater Trails Alliance glenn@betatrails.org |425.444.6281

MOUNT PISGAH TRAILS MAP

EXISTING AND RECOMENDED (JULY, 2025)

ESSEX COUNTY, NEW YORK

Existing Trails (no change)
Proposed Trail Removal
Proposed New Trails



Mount Pisgah

Final Trail Plan

This trail plan has been prepared for:

Barkeater Trails Alliance

By

Peduzzi Trail Contracting LLC
May 2025

CONTENTS

PROJECT BACKGROUND

Mount Pisgah is a village owned and operated ski hill in Saranac Lake, NY with some of the oldest mountain bike specific trails in the village. Initial trail building efforts were volunteer driven and used existing XC ski trails to create the first ridable loops. With the help of BETA and the support of Friends of Mount Pisgah the trail system has been developed to offer nearly 4 miles of mountain biking and has become a popular riding destination for locals and visitors alike.

Development of these trails has spanned nearly 15 years without a master plan for the trail system. The resulting network can be challenging to navigate and is notably lacking in beginner friendly terrain.

This document proposes a new design of the trail system, taking into consideration goals and feedback from local stakeholders as well as current industry standards for mountain bike trail networks.

Stakeholder Goals

On April 6th, 2025, an introductory meeting was held with stakeholders and Peduzzi Trail Contracting LLC to identify goals for the updated trail system. Interest groups that were represented at this meeting include:

- Barkeater Trails Alliance (BETA)
- Friends of Mount Pisgah
- Village of Saranac Lake Ski Area Operations
- Saranac Lake Parks and Trails Advisory Board
- Saranac Lake Innovative Cycling Kids (SLICK)
- Local mountain bikers and trail users

The following goals were identified at this meeting:

1. Improved Climbing Trail (1st most requested)
2. Trails that are approachable to a wider range of riders (2nd most requested)
3. Better “flow”, more logical navigation (2nd most requested)
4. Variety of trails (3rd most requested)
5. Sustainability (3rd most requested)
6. Signage (3rd most requested)
7. Improvements to Cure (3rd most requested)
8. Jump line
9. More tight and technical without jumps and steep
10. Skills Features

SITE ANALYSIS AND CONCEPTUAL DESIGN

A site analysis was performed to identify the feasibility of improvements, alterations and possible expansion of the trail system. Additionally, a conceptual map and trail design were developed to illustrate the options for trail system improvements.

Existing Trail Conditions

Following are highlights of existing trail conditions during Spring 2025.

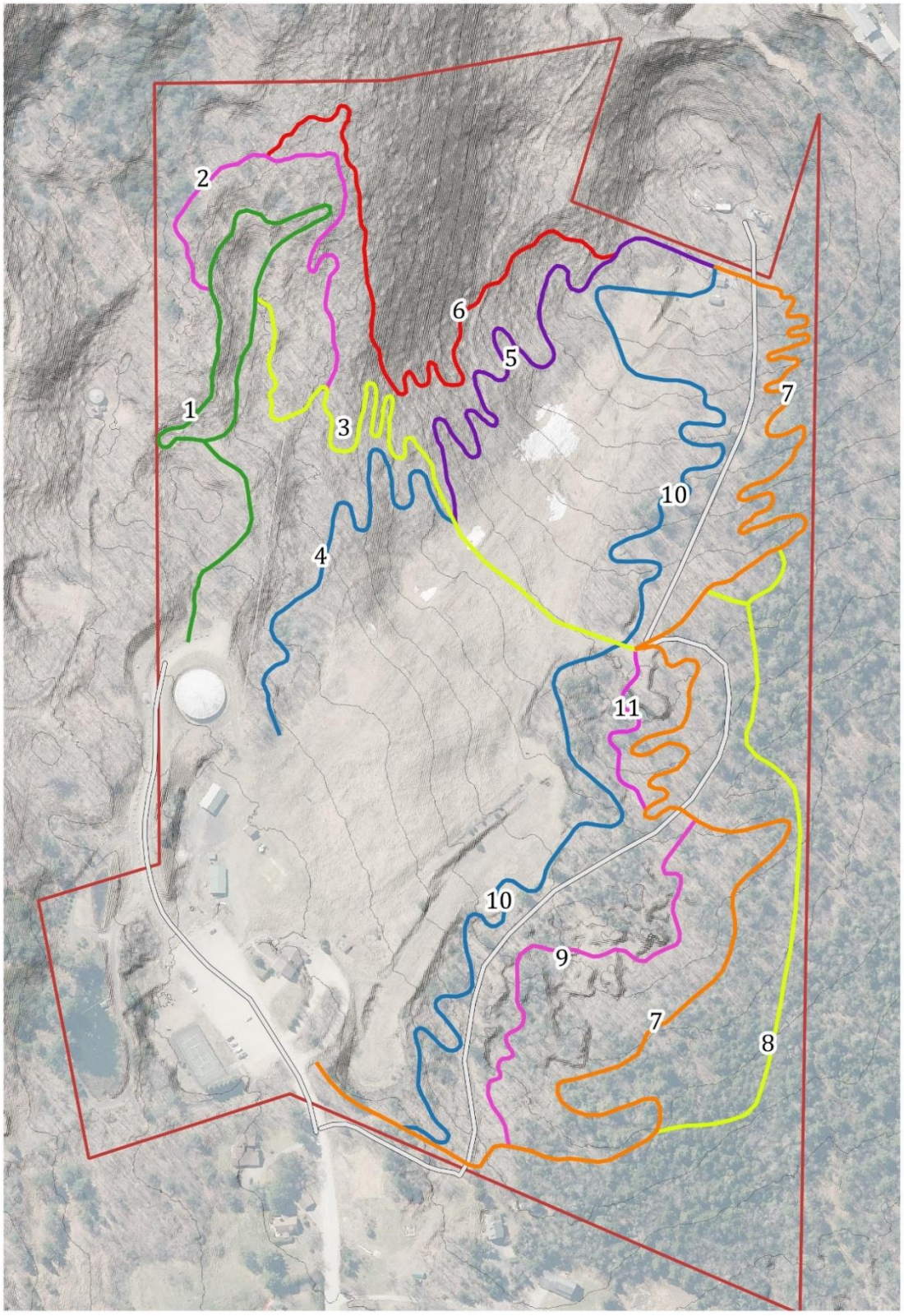
- Notable wet spots:
    - The Cure, especially where the trail is dug deep into to hill side. Bed rock close to the surface may be a contributing factor to this.
    - Large puddle at the middle entrance to Natski II, near the water tower. Regrading may address this issue.
    - Small wet area on Natski II where upper access from ski trail meets the Natski II Loop.
    - The soil in the lower Zonker's area has a higher silt content than other soils. This area will drain more slowly. Exposed soil of this type can be very erosion prone and muddy. Care should be taken when excavating and building in this area.
- Berms on various trails are supported by logs. This method is not sustainable and will lead to failure of the banked turns in the future.
- Berms on the Cure are getting very thin and logs used to hold the backside of the berms are rotting. This combination will lead to failure of the berms in the near future.
- The steepest turns on Senduro have limited drainage and, without improvements, will continue to erode. Drainage can be installed without dramatically changing the character of the trail.
- "Funion" is currently eroding and depositing soil at the bottom of the trail, in the highest concentration of ramps. This trail and others with the same fall-line character will continue to erode and may become un maintainable and unrideable in a short period of time.
- Switchbacks and the close proximity of trails in the Zonkers/ IPW area is leading to many social paths used to short cut switchbacks and connect trails, adding to the confusion in this area.

Feedback from Stakeholders

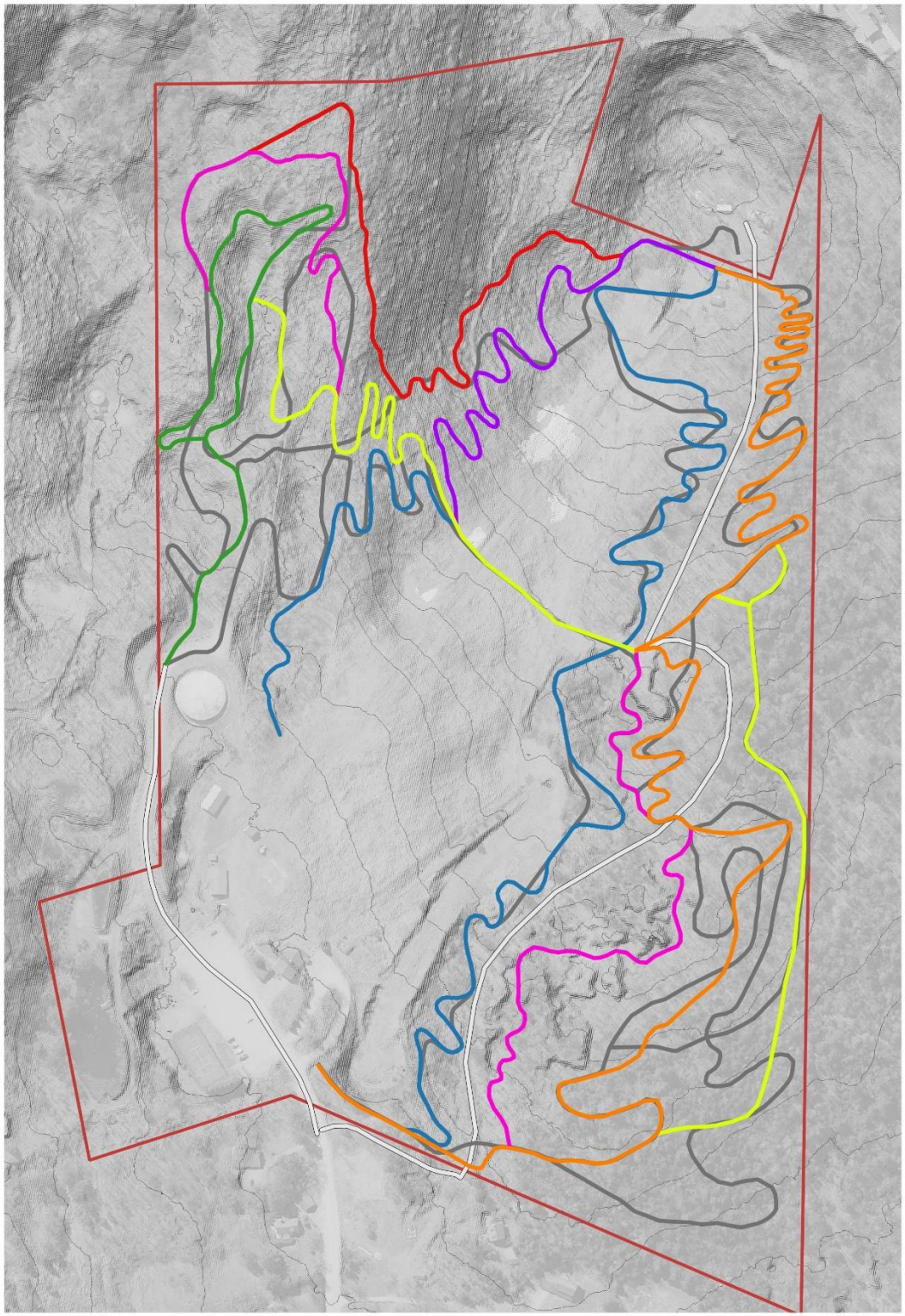
Following are key points highlighted by stakeholders based on Site Analysis and Conceptual Map.

- Improvement of the trail system rather than expansion was recognized as valuable.
- Downhill oriented trails should not be interrupted with pedaling sections. This could lead to riders cutting to other trails or creating their own shortcuts.

MAP: NEW TRAILS



MAP: NEW TRAILS OVER EXISTING TRAILS



TRAIL DESCRIPTIONS AND CONSTRUCTION CONSIDERATIONS

Following are descriptions of trail location, intent and character as well considerations for construction.

1. Beginner Trail (Green)
   This trail uses parts of the existing Natski II trail to create a beginner friendly route near the base of the trail system. This alignment avoids the steeper and more challenging portions of the existing trail to accommodate a wider range of riders.

   Large rocks will need to be moved to create this trail; therefore, a 3 – 5 ton excavator is recommended. Rocks moved from the tread should be used to stabilize the downhill edge of the tread and to create technical trailside features. In the case that suitable soil for the tread surface is not present in some areas of the trail, fill from other areas of the property or from nearby suppliers may be used.

2. New Natski II (Pink)
   This trail uses parts of the existing Natski II trail and will provide a short, low commitment section of intermediate technical riding near the beginner loop. It also provides a more interesting route for more advanced riders to climb from or descend to the AMA connection trail and this part of the trail system.

   There is deep top soil in some portions of this trail. Tread should be elevated with mineral soil to help avoid cupped tread in these areas. This trail should capitalize on trail side rock features and is laid out near bedrock protrusions for this reason.

3. New T Bar (Yellow)
   This trail will be the main connection from the East (Natski II) side of the trail system to the existing T Bar traverse. As a machine-built trail with moderate grades, it will provide intermediate access to and from the mid-mountain area, including the new intermediate flow trail. Combined with the improved climbing trail, a lower intermediate loop of the trail system can be achieved.

   Space between Senduro and the new intermediate flow trail is limited, resulting is a series of tight switchbacks on this trail. Care should be taken during construction to create mellow grades and the widest turns possible within the space available.

4. Blue Flow (Blue)
   This intermediate flow trail should start at the edge of the ski trail, flow through the existing T Bar switchbacks and follow a portion of Natski II toward the water tower. A series of jumps should be included in the straight away along the existing Natski II. A rocky drop in elevation in the woods near the bottom presents a good opportunity for drop or step-down style features.

When possible, all tread should be at or above grade on this trail, including berms. Uphill swales may be used to help protect the berms and generate soil. Specifically, the jumps along the straight away must be elevated. The tread between jumps should be no lower than existing grade. The many rocks in the area should be used to create foundations for the features, covered in a minimum of 12" of soil.

5. Advanced Descent (Purple)
   This advanced descending trail will provide a new option for riders from the top of the mountain. It starts on what is now Senduro before taking its own route down the hill, adjacent to the ski slope. The entrance of the trail should be constructed on village property as flagged and shown on the map. A filter feature should be included here to make this section of trail more interesting and to deter less skilled riders from the steep and advanced trails.

   The trail should include naturally occurring rocks and roots and tight turns to create an engaging descent for skilled riders. Average grades and exposure during switchbacks are noticeably less than near-by Senduro, making this trail more approachable to a wider audience. The combination of lower grades and technical terrain should make this a naturally lower speed trail than Senduro.

   This trail should be primarily hand-built to maintain the natural character of most sections, including natural, off-camber grade reversals that will help prevent erosion and make the trail easier to maintain.

6. New Senduro (Red)
   This new approach to the trail leaves quickly from its original footprint, accessing a new area of the mountain. The new layout is intended to maintain the high-speed character of the original trail in a layout that will be less prone to erosion and easier to maintain.

   The new alignment merges with the original alignment at the steep switchbacks, a characteristic part of the original trail. Drainage improvements and a short reroute for sustainability have been pin flagged in this area.

   The new alignment leaves the switchbacks, traveling downhill across a steep slope before merging with the existing Natski II. The long runout along Natski II will allow riders to slow down naturally before merging with other trails.

   This trail should be primarily hand-built to maintain the natural character of most sections, including natural, off-camber grade reversals that will help prevent erosion and make the trail easier to maintain.

   When crossing steep hillsides, this trail should be benched in sections separated by short, off-camber descents. The interruption of benching will prevent water from traveling down long sections of the trail.

Stone drainage features should be strategically placed in the trail to direct water out of the tread. These features should function like waterbars while feeling like natural obstacles or jumps for riders.

*This trail does not meet industry standards for sustainability and will take considerable maintenance in its current alignment to prevent it from degrading beyond its intended character. The flagged and mapped improvements will help to reduce the maintenance required to sustain its character but will not bring the trail to industry standards for sustainability.

7. Climbing Trail (Orange)
   This trail uses sections of the existing Zonkers trail and the entirety of Iron Lung to create an improved climbing trail to the top of the mountain. Improvements that have been flagged include reroutes and improvements to climbing turns.

   Trail construction should be machine-built to achieve desired grades and improve drainage and tread quality while also providing visual clarity at intersections. Near the top of the climb, space is limited between the service road and the edge of the property. Care should be taken during construction to create mellow grades and the widest turns possible within the space available.

8. New IPW (Yellow)
   This trail should be extended down into the existing Zonkers area, using parts of the abandoned trail where applicable.

   The extension of the trail should be hand built to match the character of the existing IPW trail.

9. Gravel Pit Trail (Pink)
   From the top, this trail leaves the existing intersection of Iron Lung and Zonkers and winds over and around piles adjacent to the road. The trail then crosses directly through the gravel pit and continues to twist and turn through uneven terrain. The bottom of the trail joins the climbing trail near its lowest service road crossing.

   This trail is designed as a low-speed trail with tight turns and short, steep rolls; capitalizing on the unique terrain left near the gravel pit. Because of it's low speed, the trail should be ridden in both directions, presenting a new climbing challenge for intermediate and advanced riders.

   Where the trail crosses the gravel pit, the main riding line should be marked with stable cairns or strategically placed rocks. These markers should not be in blind spots or impede the many possible riding lines in the gravel pit area.

10. The Cure (Blue)
    Improvements to The Cure are all within the immediate area of the existing trail due to the constraints of the service road on one side and the ski slope on the other.

    The most important improvements to be made are rebuilding the upper berms for safety. Some of these are becoming thin and will not support high speed traffic for many more seasons.

    The re-alignments that have been flagged are designed to slow riders down naturally and to create better opportunities for drainage. The primary drainage solution that should be implemented on this trail is uphill swales and culverts to isolate the tread from ground water and runoff from the ski slope.

    Bedrock is present in multiple locations along the trail and in its immediate proximity. This is a contributing factor to persistent wet spots on the trail and may impact the exact location of drainages or reroutes.

11. Old T-Bar (Pink)
    This trail is kept in this plan in its existing alignment. The tight turns and natural tread surface match the intended character of the Gravel Pit Trail (9) and could adopt the same name.

Abandoned Trails

- Upper Ski Run Connector
- Parts of IPW, Zonkers, Natski II
- All unsanctioned trails

TRAIL SPECIFICATIONS

Trail Name/ Number	Flagging/ Map Color	Total Mileage	Mileage of Existing Trail: No Change	Mileage of Existing Trail: Improved	Mileage of New Construction	Recommended Construction Method
Beginner Trail 1	Green & White	0.4 Miles	0	~0.2 Miles	~0.2 Miles	Machine-built
New Natski II 2	Pink	0.25 Miles	~0.1 Miles	0	~0.15 Miles	Hand-built
New T Bar 3	Yellow	0.32 Miles	0	~0.1 Miles	~0.22 Miles	Machine-built
Blue Flow 4	Blue	0.22 Miles	0	~0.15 Miles	~0.07 Miles	Machine-built
Adv. Descent 5	Purple	0.29 Miles	~0.05 Miles	0	0.24 Miles	Hand-built
New Senduro 6	Red	0.29 Miles	~0.05 Miles	~0.05 Miles	~0.19 Miles	Hand-built
Climbing Trail 7	Orange	0.87 Miles	0	~0.57 Miles	~0.3 Miles	Machine-built
New IPW 8	Yellow	0.28 Miles	~0.23 Miles	0	~0.05 Miles	Hand-built
Gravel Pit Trail 9	Pink	0.20 Miles	0	0	~0.20 Miles	Hand-built
The Cure 10	Blue	0.67 Miles	~0.1 Miles	~0.47 Miles	~0.1 Miles	Machine-built
Old T Bar 11	Pink/ Not Flagged	0.1 Miles	~0.1 Miles	0	0	Hand-built
Total Mileage		**3.89 Miles**				
Total Existing Mileage		**3.68 Miles**				

TRAIL SPECIFICATION CONTINUED

Trail Name/ Number	Difficulty	Tread Width	Average Grade	Maximum Grade	Tread Quality	Intended Use
Beginner Trail 1	Beginner	48 – 72”	5%	8%	Groomed (at least 48” wide)	Shared-use
New Natski II 2	Intermediate	24”	8%	15%	Naturally occurring rocks and roots prevalent	Shared-use
New T Bar 3	Intermediate	36 – 48”	8%	12%	Generally groomed, some naturally occurring rocks and roots	Shared-use
Blue Flow 4	Intermediate	60 – 96”	8%	10%	Groomed	MTB, Winter DH only
Adv. Descent 5	Advanced	24”	12%	20%	Naturally occurring roots and rocks prevalent	MTB only DH only
New Senduro 6	Expert	24”	>20%	>20%	Naturally occurring roots and rocks prevalent	MTB only DH only
Climbing Trail 7	Intermediate	36 – 48”	8%	15%	Generally groomed, some naturally occurring rocks and roots	Shared-use
New IPW 8	Intermediate	24”	10%	15%	Naturally occurring roots and rocks prevalent	Shared-use
Gravel Pit Trail 9	Intermediate	24”	8%	15%	Naturally occurring roots and rocks prevalent	Shared-use
The Cure 10	Advanced	60 – 96”	15%	>20%	Groomed	MTB, Winer DH only
Old T Bar 11	Intermediate	24”	10%	15%	Naturally occurring rocks and roots prevalent	Shared-use

ADDITIONAL NOTES

Abbreviations on Flagging

Flagging may have abbreviations for drainage or other tread solutions to clarify the intention.

CTI- Climbing turn improvement

GR- Grade reversal

E- Elevate tread

B- Bench cut

D- Dip drain

WR- Wider radius of turn

Survey of Property

The village property should be surveyed to clearly identify the property boundary before construction on the improved climbing trail or the new entrance to Senduro and the new advanced descending trail.

Consideration for Ramps (plant)

Ramps grow abundantly in some parts of this property and are a popular attraction for foragers. The highest concentration is in the southeast corner of the property around Natski II and on the steep hill side above. Consideration of this was taken during design and no primarily machine built trails are laid out in this area.

"New Natski II" and the exit of Senduro are the only trails laid out in this higher concentration. Both trails are recommended to be primarily hand-built and should require minimal ground disturbance in this area.

During construction, spoils should be consolidated (where they will not impede drainage) rather than dispersed to avoid covering too many ramps. Any borrow pits for soil should be made out side of this concentration.

Skills Park

No location for a permanent skills park was identified at this time.

The best location for a seasonal skills park at Mount Pisgah may be in the out run of the tubing park.

Wood and/or steel features can be constructed in a way that allows them to be moved by the village's front-end loader or other equipment to and from the skills park site.

RECOMMENDED PHASES AND ESTIMATED COST

Ideal phased implementation would include both all components of each of the two phases. If necessary, the two main phases can be split into subphases as listed below. These subphases should not be further divided because the trails within the subphases depend on each other for continuity.

Phase 1- $116,350

Phase 1a $59,350

- Climbing Trail (7) $47,850
- Gravel Pit Trail (9) $8,000
- New IPW (8) $3,500

Phase 1b $67,000

- The Cure (10) $57,000

Phase 2- $89,700

Phase 2a $58,100

- Beginner Trail (1) $30,000
- New T Bar (3) $12,100
- New Natski II (2) $8,000
- New Senduro (6) $8,000

Phase 2b $31,600

- Blue Flow (4) $22,000
- Advanced Descent (5) $9,600

Total Estimated Cost - $206,050

CONSTRUCTION GUIDELINES

Sustainable design and construction- This trail system should be designed and built using the best management practices relevant to the modern trail building industry. Appropriate construction methods, sustainable grades and frequent drainage will prevent trail deterioration and excessive erosion.

Benching- Bench cut trails are aligned across hill sides, rather than straight up and down, and are cut into the sideslopes to create a sustainable tread surface. This technique is accommodating to a wider variety of trails users and allows the trail to maintain sustainable grades as it gains elevation.

Full bench construction- The full width of the tread should be cut into the hillside whenever possible to prevent erosion of the downhill edge.

Outslope- Benched sections of trail should have a 3% - 5% outslope to keep surface water from gathering and running down the trail. Exclusions to this include sections of trail where other drainage solutions apply such as insloped turns, rollers or rock armored sections.

Grade reversals- Grade reversals are short sections of trail that descend while the trail is climbing or vice versa. This creates natural drainage points along the trail and prevents water from running down the trail and gathering speed. The natural terrain should be used to create grade reversals whenever possible. These features add natural "flow" to a trail and are a highlight of modern multiuse and mountain bike trails.

Rolling Dip Drain- When grade reversals cannot be used to break up the flow of water along the trail (ie: a long, straight climb), rolling grade dips can be used to force water off the trail. These drainage features work much like waterbars but have the added benefit of accommodating mountain bikes.

Frequency of tread drainage- In general, the steeper the running grade of the trail, the more frequent drains should be. As a baseline, the following intervals are used. Sections of trail with a running grade between 0% and 8% grades should have a grade reversal or dip drain every 100'. 8% - 10% should have reversals every 75' and 10% - 12% should have them on 50' intervals. Specific soil types may require more or less frequent drainage.

Backslope- Backslopes should be free of loose materials and be cut back to the angle of repose for the specific soils. This will prevent erosion of the backslope into the tread.

Spoils- Excess soils from bench cuts may be used to elevate other sections of trail, create features, fill in borrow pits or be dispersed where it will not be prone to erosion. Spoils that are not used in construction of the tread should be covered in native, organic material (such as duff/ detritus, topsoil, leaves and limbs). This helps to stabilize the spoils and promote revegetation.

Natural anchors- Anchors, especially natural anchors; on the downhill side of the trail, help to support the tread and define grade reversals. Generally, these anchors are trees with undisturbed root system or large rocks that are well bedded in the ground.

Elevated Tread- Some sections of low or flat terrain may require the tread to be elevated with additional soil to stay dry and achieve the desired tread quality.

> **Native materials**- Material for elevated tread should be found on site whenever possible and can come from nearby bench cuts, drainage features or borrow pits.
>
> **Crowned tread-** Elevated tread surface should be crowned, allowing water to sheet off to either side of the trail.
>
> **Swales/ interceptor drains**- These can be installed in areas with perpetual ground water or where the trail tread is vulnerable to large amounts of sheet flow (ie: when crossing logging roads). Often parallel to and uphill of an elevated tread these swales protect the tread by redirecting water to a reinforced drain such as a culvert or armored drain. The bottom of the swales should be at least 1' below the height of the adjacent tread. These features should be at least 3' wide as terrain permits. Wide swales with low angle backslopes are less prone to erosion and look more natural over time.
>
> **Frequency of drainage-** Swales should not extend 100' in length before allowing water to cross the trail to prevent changes in downslope hydrology.
>
> **Support edges-** The edges of elevated tread should be supported by additional material and covered in organic material to prevent the elevated tread from eroding to the sides of the trail.

Compaction- All exposed soils in the tread and on backslopes should be compacted by hand or machine to prevent erosion.

Mechanized impact- Every effort should be taken to limit the impact of mechanized trail building to construction of the desired tread and associated features.

> **Trees-** Trees that are not being removed in the trail building process should not be struck with any equipment during the construction process.
>
> **Access roads-** Any roads or routes that are used to access the construction site should be returned to their original condition when they are done being used. This may include rebuilding berms, check dams or swales that were deformed while accessing the construction sites.
>
> **Borrow pits-** Borrow pits may be used to generate native soils for the purpose of elevating tread or creating features along the trail. Sites for these should be selected in areas that will not cause erosion or seeps into the trail. All pits should be filled in to a reasonable extent and graded to an angle of repose. The end product should not visibly detract from the trail experience or present a new hazard to trail users.

Corridor- Corridor should be cut to the dimensions listed in the Trail Specifications table. Removal of living trees should be limited to those necessary for the construction of the trails and associated features. Standing dead trees within or near the trail corridor may be removed for the safety of workers and trail users. Branches protruding into the tread corridor should be cut at the trunk of the tree and the bark of the surviving tree should not be damaged unnecessarily. Stumps that are not removed during the construction process should be cut flush with the ground.

Crossing wet areas- Numerous structures may be used to harden or bridge wet areas.

Stone armoring- Flat stones found on site can be used in confined areas of wet soil. These armoring sections should take the shape of a drain that allows water to flow across and away from the trail. Stones should be large enough that they will not be moved from their position by trail traffic or freeze thaw cycles.

Culverts- There are many culverts on the property (not in use) that are left over from past activities. These may be used to drain swales, insloped turns, or small seasonal drainages. Culverts should be outsloped at 3%, have stone headwalls on both sides and be covered in at least 6" of soil.

Bridges- Trail bridges should be used to cross drainages that hold water through more than half of the year. These are generally 10' – 16' in length and should have a width that matches the specified width of the trail. Bridges should be as close to the ground as possible to reduce exposure while allowing the bottom of a bridge to be at least 12" above any water. Deck boards should be spaced between ½" and ¾".

Boardwalk- Longer areas of wet ground may require a boardwalk. These should be the same width as the specified trail width and may be as long as necessary. On multi direction trails, boardwalks should not exceed 100' without passing areas. Boardwalks should be elevated just enough to allow airflow under stringers. Deck boards should be spaced between ½" and ¾".

Berms/ Banked Turns- Berms may be appropriate on mountain bike optimized trails to help riders negotiate tight corners and increase the "flow" of the trail.

Size of Berm- The height, duration and steepness of a berm is dependent on the approach speed and the radius of the turn. A tight radius turn with a high approach speed will be steeper and taller than a berm on a wide turn with a lower approach speed.

Complete Turns- Berms should direct riders into the following section of trail and not taper off before the turn is complete.

Drainage- There should be adequate space at the inside of the berms to allow for water to gather and flow without eroding the inside riding line. Water may flow to a down-trail grade reversal if applicable or be crossed under the trail with a culvert. A swale above the berm may be used to protect the feature from sheet flow or ground water if necessary.

Riding Surface- The riding surface should be wide enough to allow for different approach speeds and increase in steepness toward the outside of the turn. The riding surface should be compacted in layers, or lifts, to help with the longevity of the feature.

Outer Edge- Soil on the outsides of berms should be compacted and covered in native, organic material (such as duff/ detritus, topsoil, leaves and limbs). This helps to stabilize the spoils and promote revegetation.

Rollers- Rollers may be added to trails to increase the flow of the trail and help riders maintain speed through flat sections using the motion of pumping. Rollers should have a length to height ratio of 10:1 at the minimum, with larger ratios in higher speed sections of trail. Similar to grade reversals and rolling dip drains, rollers help promote drainage and direct water off the trail.

Jumps- Jumps may be appropriate on mountain bike specific trails to add a fun and challenging element to the trail. The size, shape and style of a jump should be appropriate for the type of trail, surrounding terrain and speed that an average rider would carry on that section of trail.

Tabletops and Doubles- Tabletop and double jumps provide options for riders to roll over the feature without jumping. These jumps are commonly found in intermediate, mountain bike specific trails as they allow riders room to progress their jumping abilities.

Gaps- Gap jumps challenge more advanced riders to clear a distance between the take-off and landing. On an intermediate trail, these jumps may be appropriate as an alternative to a tabletop or double jump if they are on the side of the main trail and do not appear to be the main riding line. Trails that have mandatory gaps in the main riding line should have signs indicating the location of these features and generally be designated as advanced trails.

Safety- Common safety considerations related to jumps include; removing debris from the sides of the landing/ runout; matching the angle of the landing to the angle of the takeoff; provide an open corridor with good sightlines and no overhanging branches; sustainable slopes supporting both the landing and take-off to prevent the feature from deforming over time.

Sensitive areas- The sustainable methods of design and construction that are outlined in this plan will produce long-lasting trails that have minimal impact to the surrounding environment and inherently deter erosion. Additional measures that may be taken when working near sensitive areas (ie: wetlands) include:

Vegetation buffer- Natural vegetation buffers between the trail corridor and sensitive areas should be left undisturbed by the construction process. This will help anchor the tread surface and prevent erosion.

Slope stabilization- Erosion prone slopes adjacent to sensitive areas must be stabilized with measures appropriate to the situation. These measures may include compaction, grading to angle of repose, mulching and seeding slopes with native materials, installation of erosion control netting, installation of rip rap and/ or other retaining structures.

Spoils- Excess soils that are generated during construction near sensitive areas should be moved along the trail to improve the tread surface or hauled away from the sensitive area to be dispersed where they will not erode.

Bridge placement- Bridges or boardwalks built near sensitive areas should not impact the natural flow of water. The bottom of the bridges should be 12” or more above moving water. Deck boards should be spaced at ¾” to allow airflow and sunlight through the bridge without making an unpleasant surface for bikers. Stone cribbing should be used as necessary to support bridge sills and retain earthen access ramps.

Silt fence- Silt fence may be placed between the work site and sensitive areas during the construction window if required.