2023 LOWER BASIN TRAIL DESIGN BRIEF

SANDPOINT, IDAHO
SEPTEMBER 2023

Pend Oreille Pedalers
Sandpoint, Idaho
POP
Build
Ride
Maintain

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ACKNOWLEDGMENTS

PREPARED FOR:

PEND OREILLE PEDALERS

PREPARED BY:

INTERNATIONAL MOUNTAIN BICYCLING ASSOCIATION (IMBA)
TRAIL SOLUTIONS PROGRAM

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INTRODUCTION

IMBA Trail Solutions

IMBA Trail Solutions (TS) is the international leader in developing trails, with experience in over 750 projects in North America, Europe, and Asia. Our staff excels at planning, design, and construction of trail systems that provide high-quality experiences for local riders and destination visitors while simultaneously minimizing environmental impacts.

Trail Solutions is a fee-for-service based arm of the International Mountain Bicycling Association (IMBA), a 501(c)(3) nonprofit organization. IMBA's mission is to create, enhance, and protect great places to ride mountain bikes. 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 employs approximately twenty professional trail planners and builders. In addition to being industry professionals and exceptional mountain bike riders, Trail Solutions staff hold a broad base of applicable skills and knowledge from planning, landscape architecture, and environmental sciences to GIS systems, CAD, and graphic design.

Our wealth of experience has allowed us to develop the gold standard guidelines for the creation of both sustainable and enjoyable singletrack trails. These guidelines have influenced all major federal land management agencies and a large number of state and local parks departments. We pride ourselves on the positive experiences Trail Solutions has provided to the millions of active trail users around the world and on the economic independence that communities have achieved through the development of destination trail systems.

PROJECT BACKGROUND

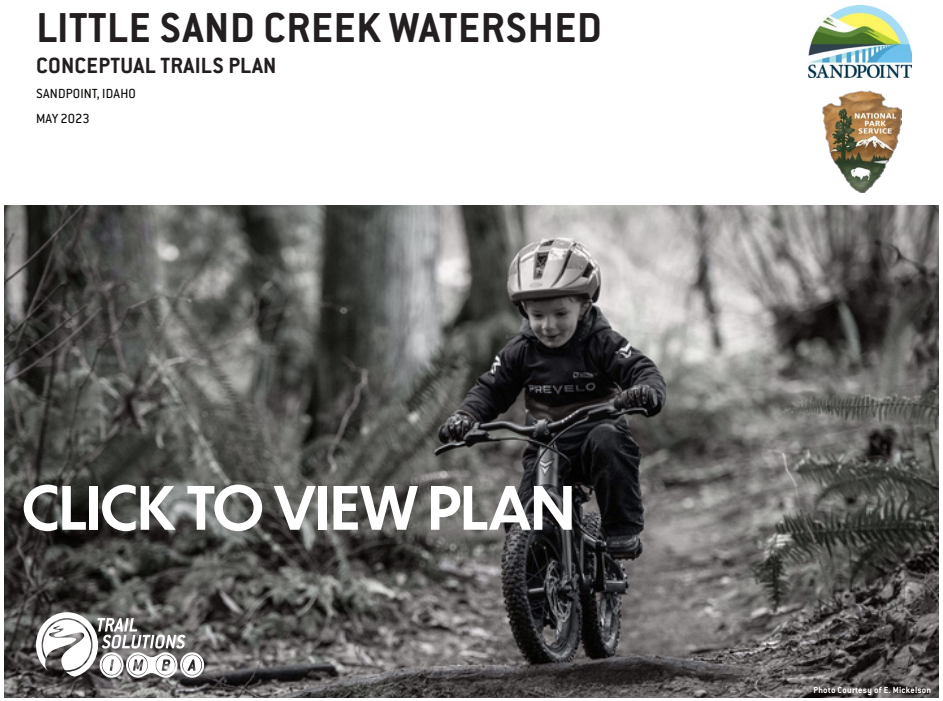
Previous Planning Efforts

Watershed Rec Plan

In August of 2020, the City of Sandpoint published the Parks and Recreation Master Plan. The master plan identified the communities desire for additional walking and biking trails. A recommendation from that plan was to develop a site specific recreation master plan as a component of a broader watershed master plan within the Little Sand Creek Watershed.

Pursuant to the goals outline in the 2020 *Parks and Recreation Master Plan*, The Little Sand Creek Watershed Management Plan was published in January of 2021. The purpose of that document was to provide best management practices for various activities within the watershed. With the management plan in place, the City of Sandpoint is developing the *Little Sand Creek Watershed Recreation Plan*. This plan - the *Little Sand Creek Watershed Conceptual Trail Plan*, provides guidance and recommendations as it relates to trail-based recreational opportunities within the watershed. It is a component of the overall watershed recreation plan, and will be included in that living document as an appendix. Through the aforementioned planning efforts, trails have been identified as a primary recreation goal and opportunity within the watershed, so a closer look at the feasibility and conceptual development of trail infrastructure has been prepared in this document.

This document includes a zone based conceptual trail design with proposed trail corridors to illustrate connectivity, style, and ability level goals. While these trail corridors are drawn accurately and with user experience in mind, in order for these trails to move forward a robust and field-based design process will need to take place before being proposed for construction and implementation per instruction outlined in *The Little Sand Creek Watershed Management Plan.* This document also includes the analysis used to develop the concept, the definition of terms used to describe the concept, an opinion of cost for implementation, recommendations on phasing and implementation, and trail construction best management practices (BMPs).



With the simple charter to "build, ride, and maintain" guiding POP's mission for most of the club's history, the POP board convened in the spring of 2020 to formulate a more complete mission and vision statement. What came of that retreat was a clearer vision statement, a more robust statement of our mission, and an articulation of the underlying core values that form the foundation of their work in the community. POP's vision is for "An interconnected system of cycling routes and bike trails for riders of varying ability levels for the benfit of Sandpoint and surrounding areas." Their mission is to "build community through trails". This design effort is in line with the Strategic Plans first goal - to advocate and provide new places for people to rides bikes.

About The Project Area

The Little Sand Creek (LSC) Watershed is located northwest of Sandpoint and Lake Pend Oreille in Bonner County, Idaho, between Bald Mountain and Schweitzer Mountain. The basin drains to LSC, a tributary to Sand Creek, which empties into Lake Pend Oreille near the Sandpoint City Beach Park. The Watershed is defined in the Little Sand Creek Watershed Management Plan, which includes all the drainage areas above the City of Sandpoint's Drinking Water Treatment Plant located 0.83 miles up Schweitzer Mountain Road from the intersection with N Boyer Rd. The road is the main access point for the Watershed and travels west to the approximate mid-point, then north before leaving the Watershed near the entrance to the Schweitzer Mountain Resort.

A significant portion of the Watershed is very steep, but gentle slopes occur in some areas. Elevation on the City property ranges from approximately 2,320 feet at the lowest point on the eastern boundary to 6,193 feet at the top of Bald Mountain on the western boundary. Most of the property lies between 3,500 to 4,500 feet. The lower elevations occur mostly in the eastern portion of the Watershed, with the highest elevations found mainly on the western side and around the perimeter of the Watershed. Granite slabs and outcroppings were observed on-site, which lend themselves to a multitude of recreational opportunities like a hiking trail destination or a technical trail feature for a more bike-optimized trail.

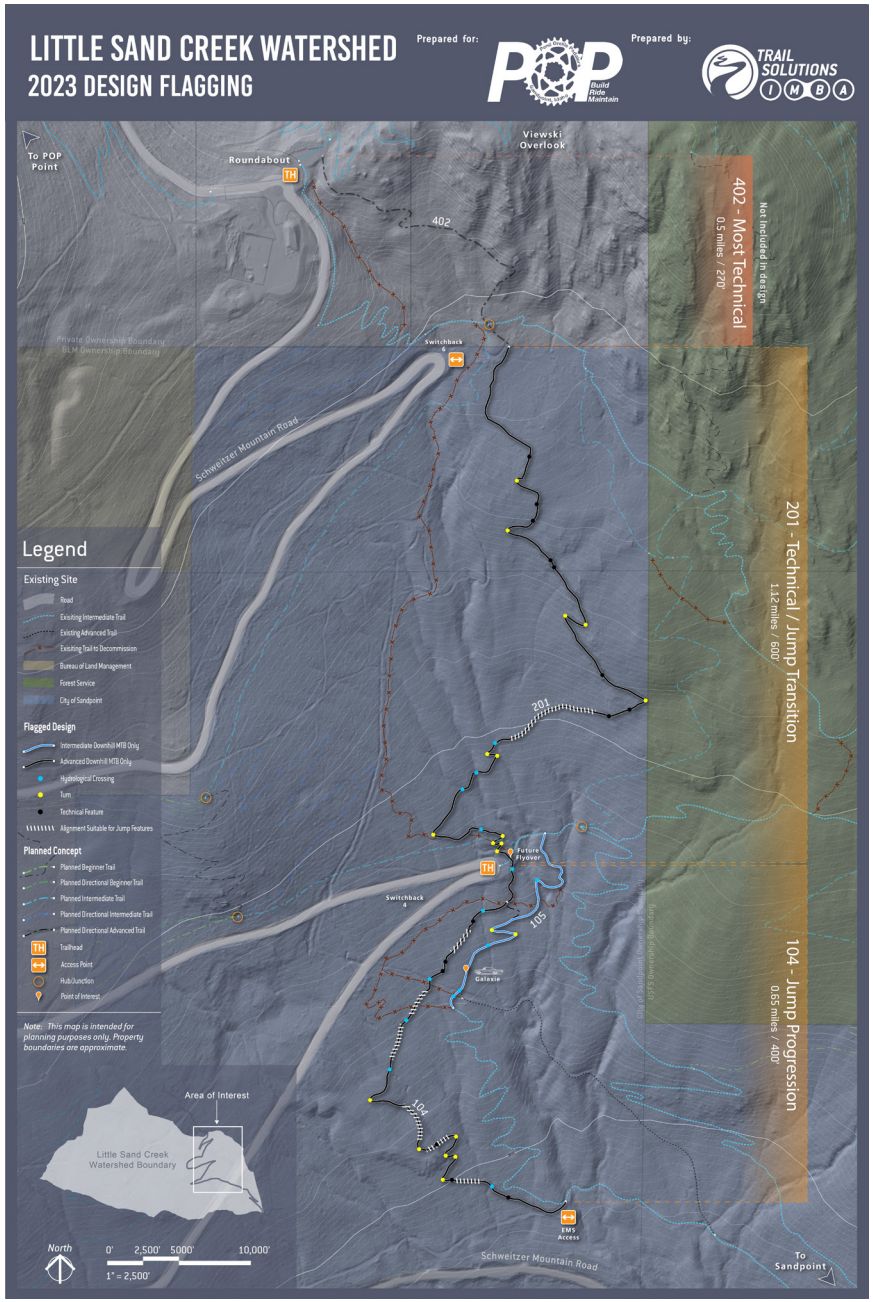
According to the Soil Survey of Bonner County Area, Idaho, there are 13 soil types located on the City of Sandpoint property within the Little Sand Creek Watershed. All of these soils have a granitic component, and the majority formed in glacial till from granite, gneiss, and schist material. All but two are described as having a mantle (top layer) of volcanic ash and loess. These soil types, within the context of trails, can be thought of as moderately erosive. While on-site, we observed that the higher the elevation, the higher the density of decomposed granite (DG) was in the soil matrix. Soil compositions higher in DG are limited in their ability to compact and form the shapes necessary for more bike-optimized trails while also being highly erosive. Near the bottom of the Lower Basin, pockets of clay and more compactable soils were observed

DESIGN DEVELOPMENT

This document describes the design development of trail segments 100, 104, 105, and 201 within the Lower Basin of the Little Sand Creek watershed. For the purpose of continuity and to describe collaborative efforts with project partners, trail segment 402 is also included in narrative descriptions but does not include an inventory of buildable units. These trail segments can be understood as 3 unique efforts. Trail segments 402, 201 and 104 connect to create one black directional trail that utilizes almost all the Lower Basin's elevation change. Trail segment 105 reroutes an existing blue directional trail to improve user experience on that trail as well as the overall system. A short reroute on trail segments 100 will offer an improved entry and exit for the existing Switchback 2 trailhead.

Goals

- Offer the community trail experiences that exceed the quality of existing problematic trails that have been identified for decommissioning. This is an effort to engage the mountain biking community to be active participants in the mitigation of water quality impacts from these existing trails.
- Limit dangerous and confusing trail intersections.
- Diversify and improve trail experiences.
- Improve trail system access and safety.



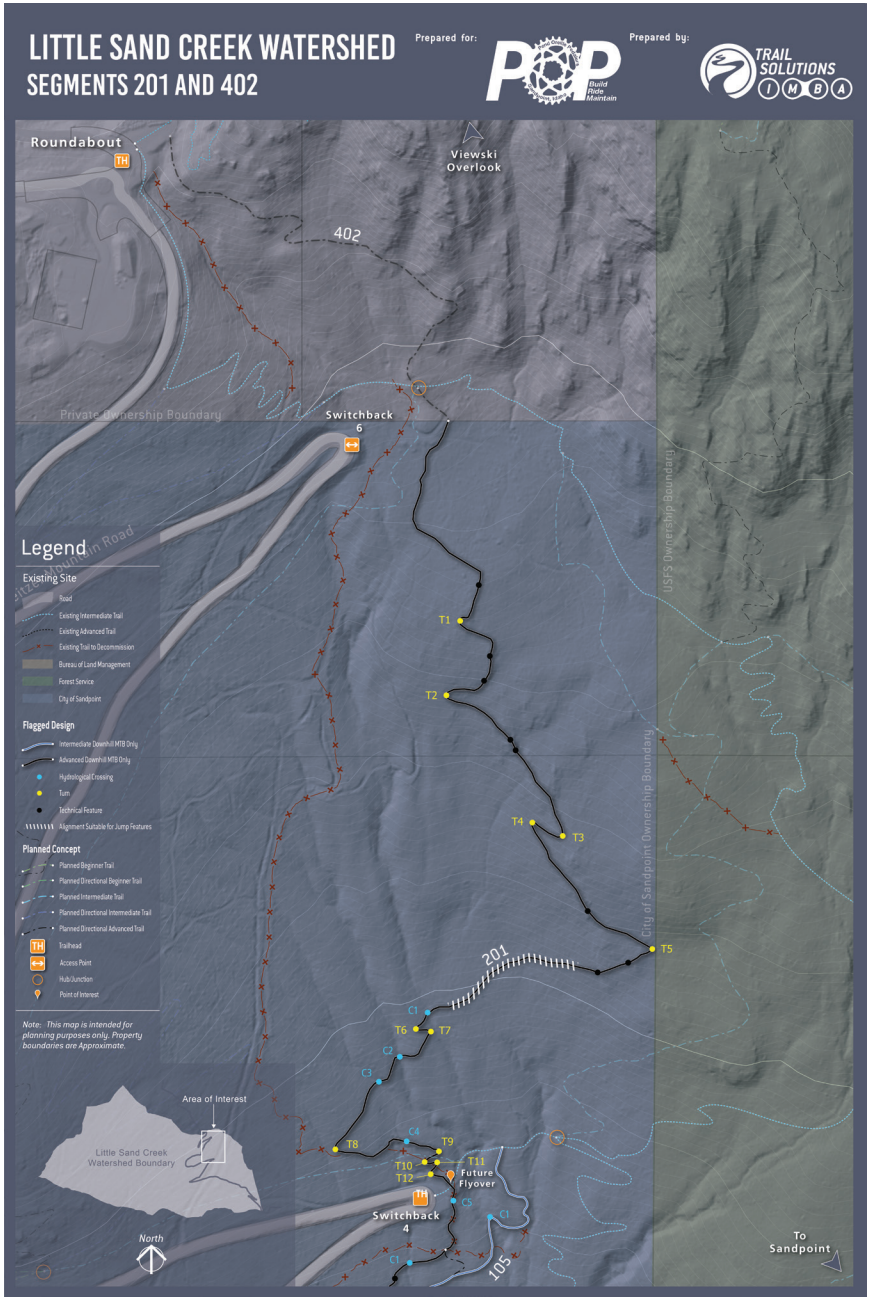
Trail segments 201 and 402

These trail segments make up the section of a designed black directional trail between the Roundabout and Switchback 4. The character of these segments is intentionally transitional from technical bike optimized to traditional bike optimized with jump features to best utilize the terrain while providing a dynamic and challenging trail experience. All trail features should have clear ride around options that allow riders to avoid features if necessary. This will also allow riders to safely pre-ride technically demanding features.

Trail segment 402 is not to be included in construction procurement efforts as it's final design alignment and construction will be conducted by Mike Kirkpatrick with direction from Schweitzer Mountain Resort and Selkirk Rec District. Trail segment 402 is the top portions of what will be a black direction trail from the top of the watershed to the EMS access point near the bottom of the watershed. The character of this segment is technically demanding with the inclusion of steep granite faces to provide expert riders with landscape specific challenges.

Trail segment 402 becomes segment 201 starting at the abandoned service road that extends north and east from Switchback 6. The top of segment 201 can be accessed via an existing abandoned service road from Switchback 6. It initially navigates gentle cross slopes providing a change in pace and reprieve for riders coming from the Roundabout. The reprieve is brief as the segment sends riders into more technical rock slabs that prospective builders are encouraged to use creatively to amplify the trails technical experience.

Segment 201's character transitions from technical up high, to "flow" starting around turn 5 labeled "T5" on the map. The soil composition in the landscape at this elevation begins to contain more organic material, more clay, and less decomposed granite. The soils and the designed alignment



between turn T5 and T6 will facilitate the development of rollable shaped earthen features (roller doubles or side-hits built like a hip jump utilizing the backslope) in the locations marked on the maps with a white cross hatch. The alignment then navigates a series of 3 crossings necessitating bridges of the same built style to the most recently constructed bridges in the Lower Basin. After T8 the segment reuses a short section of an existing trail alignment before deviating again north of the existing segment to be more sustainable in a hydrologically complex area. The segment then approaches a series of stacked turns intended to slow a rider's speed as they approach a complex intersection at Switchback 4.

The intersection at Switchback 4 needs additional coordination with the City of Sandpoint and potentially a structural engineer to prescribe the precise structure appropriate for this location. The design calls for a "fly over" feature that will allow riders to pass over the intersection. This will allow riders to continue the trail experience without stopping at the intersection while also minimizing the potential for conflict with other users.


"The Masterpiece" - Bentonville, Arkansas

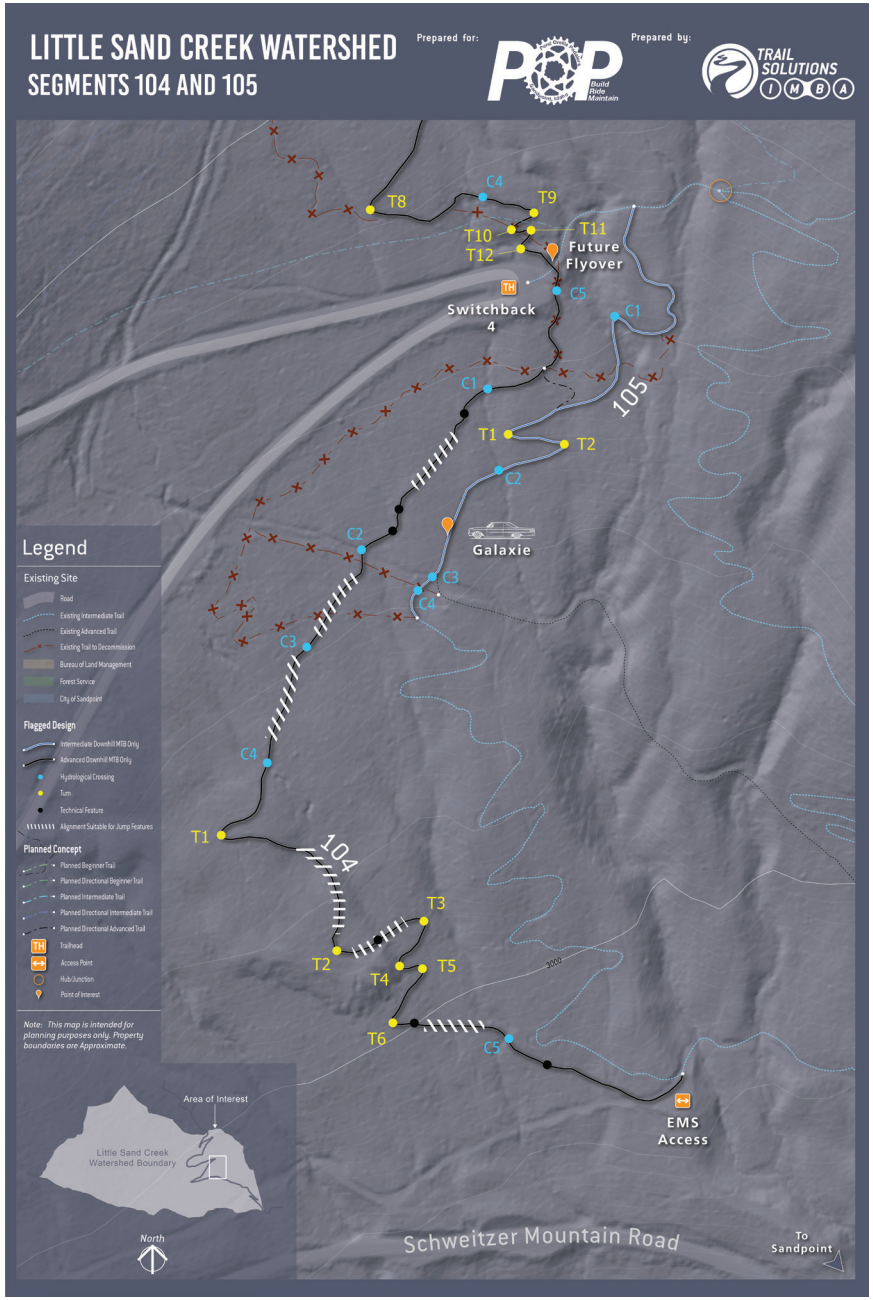

Jesse's Last Stand - Bentonville, Arkansas

The structure also has significant place making potential as it could also be an iconic gateway feature for all recreators entering the watershed from Switchback 4. Below is a sketch to communicate circulation intent in context at Switchback 4. The images to the right are precedent images varying in scale and design rigor. After the fly over feature, the trail reuses an existing trail corridor and stream crossing before it reaches an existing intersection. This intersection is the end of segment 201 and the beginning of segment 104.

Trail segments 104 and 105

Trail segment 104 begins by deviating from the existing alignment south and west in order to decommission the old alignment and dissuade riders from riding down Schweitzer Mountain Rd and dropping in on the downhill trail from the road. The alignment traverses moderate cross slopes in a low-density forest. The character of this segment is to be "flowy" with progressive, optional jump features. The stretches of designed trail between the start of the segment and T1 are highly suitable for the development of shaped earthen features (roller doubles or tabletop jumps) in the locations marked on the maps with a white cross hatch. Since the hydrological crossings along this section have shorter spans and this segment is intended to have a high density of bike optimized trail features, builders are encouraged to be creative in final design of the crossing structure as long as it is approved by the City of Sandpoint before construction.

From T1 to T2 the trail is designed to build significant speed into a natural feature in the landscape that would facilitate the largest and most difficult jump features along the trail without requiring significant earth work and shaping. This is intended to mitigate maintenance needs while also allowing for clear sight lines for roll arounds. From T2 to T3, the design brings riders through a technical rock feature directly into an open clearing. Riders then descend into T4 which is intended to use the outcropping as an optional



wallride feature and a quick transition into a bermed turn at T5. From T6 to the end of the trail at the existing EMS access point, builders are encouraged to utilize the existing rock in the landscape to provide queues to the rider that the trail is coming to an end. This means corralling rider's speed through pinch points and other technical trail moments. The trail finishes on the road to bring riders to a full stop before entering the existing blue trail to ride down to Switchback 2.

The construction of trail segment 105 is nearly complete as of the publishing of this document. The trail was built by Collaborative Trails with the help of

many POP volunteers. A unique feature along trail segment 105 is identified on the map as the "Galaxie". The design intent is to use the abandoned Ford Galaxie as a technical trail feature. Further coordination with the City of Sandpoint is necessary to finalize feature construction. The alignment currently navigates around the vehicle, and once the feature is built the current trail will serve as the ride around option.

The construction of trail segment 105 includes an 80' boardwalk and bridge over a complex crossing near Switchback 4. This was possible thanks to generous donations of time and reduced costs of materials. Utilizing volunteer labor and relatively affordable construction material should be a strategy explored in the construction plan for the remaining trail segments, specifically for crossings.

Trail Segments 100

The supporting map to the right communicates the designed alternative to the existing entry and exit of the trail system at the Switchback 2 trailhead. Trail segment 100 is a proposed extension of the existing trail to eliminate a steep, fall line section that currently is difficult and dangerous to ride as a bidirectional trail. This reroute will create an improved entry and exit for riders to create a more beginner friendly initial climb to the trail system's lowest entry point.

The map also communicates suggested traffic calming measures to increase pedestrian safety entering and exiting the trail system on Schweitzer Mountain Rd. This is added to the map in order to better communicate with stakeholders what the ideal conditions would be at the Switchback 2 trailhead. Any interventions to Schweitzer Mountain Rd will not be included in the scope of work for trail construction.

Trail Chart

The below Trail Chart is intended to provide the necessary trail specifications, dimensions, and buildable units for a trail contractor to provide as accurate a proposed cost for construction as possible. These numbers are as accurate as possible given what the designers know about the landscape and could observe and measure in the field.

Segment Number	User	Difficulty	Status	Direction	Tread Width	Style	Turns (EA)	Crossings (EA)	Bridging Distance (FT)	Linear Feet	Mileage
100	Shared Use	Green	Flagged	Uphill Bike/ Bidirectional Hike	36"	Traditional Shared Use Singletrack	1	1	0	507	0.10
104	Bike Only	Black	Flagged	Downhill	48"	Gravity	6	5	41	3438	0.65
105	Bike Only	Blue	Built	Downhill	36"	Gravity	2	4	25	1379	0.26
201	Bike Only	Black	Flagged	Downhill	24'-36"	Gravity	12	5	80	5860	1.11
						Totals	*21*	*15*	*146*	*11184*	*2.12*

Buildable Units Summary

All of the units provided in the Trail Chart are included to help support the development of a well informed RFP document. These units help trail contractors provide the most accurate response to an RFP's as possible. They also help to better illustrate the design intent and call out specific treatments in the trail that need to be considered while building.

Linear Feet and Mileage - (11,430 ft) and (2.17 mi) Total

These two metric are provided as the primary unit to help builders understand the time and therefore cost for trail construction. They describe the length of the trails segments across the landscape as measured digitally by mapping software. Note that trail segment 105 is already built and should not be included in bid documents to procure a trail contractor.

Turns - (23) Total

A turn describes the condition when a trail moves a user from one direction of travel to another, often to accommodate ascending or descending grades within certain boundaries. Because of the variable cross slopes and trail styles, there are three different types of turns being proposed. These different turn types when constructed help the trail achieve different experience goals.

Turn Type 1 - Non-elevated Turn

Applicable when a sustainable turn can be constructed without the need for a platform or retaining wall. Typically suitable when side slopes are under 20%. The turn climbs or descends without the need for an elevated platform. The turn width will vary depending on the difficulty rating of the trail. Careful attention is required to ensure the tread properly drains and the grades follow the half-rule. Exceeding the half-rule may result in the trail following a fall-line configuration, leading to a rutted trail, increased maintenance, and decreased quality of the user experience.

Designed Turns Inventory

Segment Number	Turns (#)	Turn Type 1	Turn Type 2	Turn Type 3
100	1	1	0	0
	T1	X		
104	6	0	3	3
	T1		X	
	T2			X
	T3		X	
	T4		X	
	T5			X
	T6			
105	2	0	0	2
	T1			X
	T2			X
201	12	0	9	3
	T1		X	
	T2		X	
	T3			X
	T4			X
	T5			X
	T6		X	
	T7		X	
	T8		X	
	T9		X	
	T10		X	
	T11		X	
	T12		X	
Totals	21	1	12	8

Turns are numbered starting at "T1" from the top of the designed trail segment to the bottom. The number restarts at "T1" for each new trail segment.

Designed Crossings Inventory

Segment Number	Crossings (#)	Bridge Length (FT)	Culvert (EA)
100	1	0	1
	C1		X
104	5	41	1
	C1	20	
	C2		X
	C3	5	
	C4	10	
	C5	6	
105	4	25	2
	C1	15	
	C2	10	
	C3		X
	C4		X
201	5	80	0
	C1	15	
	C2	20	
	C3	30	
	C4	15	
	C5	0	
Totals	15	146	4

Turn Type 2 - Non-elevated Berm Turn

Similar to Turn Type 1 this turn type includes the construction of a cambered berm with the intention facilitating a faster, more bike opitmized trail expereince. Commonly used on mountain bike optimized trails for beginner to advanced ability levels. Generally these are climbing or decending turns on mellow to moderate sideslopes. In combination with good sight lines, these turns work well for shared-use trails.

Turn Type 3 - Elevated Berm Turn

Similar to Turn Type 2 this turn type includes the construction of a cambered berm with the intention facilitating a faster, more bike opitmized trail expereince. The difference in construction is the need to elevate the lower leg of the turn as a result of being located in cross slopes great than 20%.

Crossings - (15) Total

A crossing describes a location where the trail crosses a perennial or intermittent stream, or a drainage that moves high volumes of water during rain events. Two different crossings are proposed in the design of these trails, bridges and culverts.

Bridges - (146 ft) Total

All bridge, boardwalk, and wooden feature construction should adhere to agreed upon specifications between POP and the City of Sandpoint. Existing bridges conform to USFS Multiple Log Stringer Trail Bridge construction guidelines.

Culverts - (4) Total

Culvert Crossings are identified only where the trail crosses decommissioned skid roads from previous logging operations. In these instances, water is channelized in narrow ditches parallel to the old roadbed such that culverts are the best solutions to mitigate impacts to the landscapes existing hydrology. Culverts are also the method present in the landscape in these locations to manage water. Builders should reference and match adjacent existing culverts before installing new ones.

TRAIL STLYES

Trail Styles

Modern trail systems use specific trail types as a way of managing users and providing them with the best possible visitor experience. Visitors desired experiences have evolved significantly in the last two decades with the advancement of mountain bike technology. One major trend observed in the industry suggest that some riders are looking for climbs that are efficient yet tolerable. Other trends include the preference of flow style descending trails that maximize the amount of fun descending for the price of the climb vs. old school fall line trails. One thing will always remain is that mountain bikers will demand a variety of trail types and difficulties. A modern trail system that has the goal of best serving the community will need to check all the boxes in appropriate quantities and proportions.

Various types of trails and trail planning strategies are explained below. These narratives are meant to provide a brief description of the experience created by each type of amenity, the intended user, and general construction considerations.

Traditional Shared Use Singletrack

These trails can serve walkers, hikers, runners, cyclists, and equestrians. They are constructed and maintained according to sustainable trail construction practices and employ techniques that minimize user conflict. As all user types travel these routes, care should be taken to avoid obstacles such as jumps, rollers, or water bars which may lead to an undesirable trail experience for an allowed user type, particularly in areas with limited sight lines. Turns are constructed sustainably but are not highly cambered like bike-optimized turns that dramatically improve cornering traction. Keeping trail grades within certain ranges ensures both a positive trail experience for users and proper stormwater drainage with minimized erosion. Depending on soil conditions, these trails may need surface hardening techniques to provide a durable four-season trail.

Mountain Bike Optimized Singletrack / Flow Trails

These trails are purpose-built to optimize the experience of riding a mountain bike, but are still considered share use trails, allowing hikers and equestrians particularly when they occur on USFS lands. The trails can either be unidirectional or bidirectional depending on the type of trail, preferred circulation of users, and management decisions. This type of trail is constructed with features such as rock gardens, berms, grade reversals, cambered turns (typically wider than turns on traditional singletrack trails), and modest jumps. These trails should make use of gravitational forces and, where possible, be managed to enhance trail flow for descending riders. These trails may need surface hardening to provide a durable four-season trail. They should be designed for a range of users from beginner to advanced skill levels. Optional advanced features can be located along the side of the trail to provide challenges for intermediate and advanced riders. This allows many skill levels to experience the full trail mileage, while providing for skill progression within a smaller trail footprint. These trails are typically machine built.

Gravity Trails

Gravity singletrack is purpose-built for mountain bike users only. These natural surface trails are built using sustainable trail construction techniques. These trails are usually steeper than MBO trails and have features that require more developed skills such as jumps, drops, rocks, and technical sections are a key feature of these gravity-powered trails.. This type of trail should be wider, up to 80 inches, in segments that have jumps or technical features but can be narrower, as little as 12 inches, in other segments. Bikes geared to this type of trail can handle more abuse. These trails are typically machine built, often requiring extensive soil import or implementation of borrow pits, or basins.

Trail Difficulty

The IMBA Trail Difficulty Rating System is a basic method used to categorize the relative technical difficulty of recreation trails.

The IMBA Trail Difficulty Rating System can:

- Help trail users make informed decisions
- Encourage visitors to use trails that match their skill level
- Manage risk and minimize injuries
- Improve the outdoor experience for a wide variety of visitors
- Aid in the planning of trails and trail systems

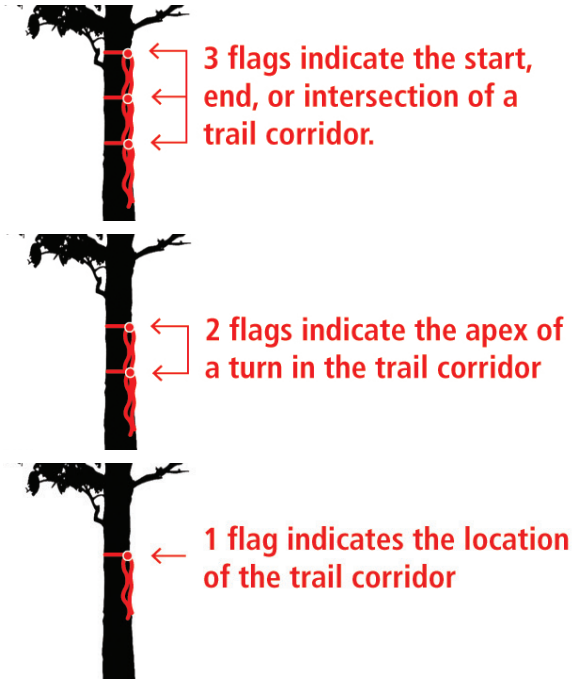
This system was adapted from the International Trail Marking System used at ski areas throughout the world. Many trail networks use this type of system, most notably resort-based mountain biking trail networks. The system applies to mountain bikers best, but also is applicable to other visitors such as hikers and equestrians.

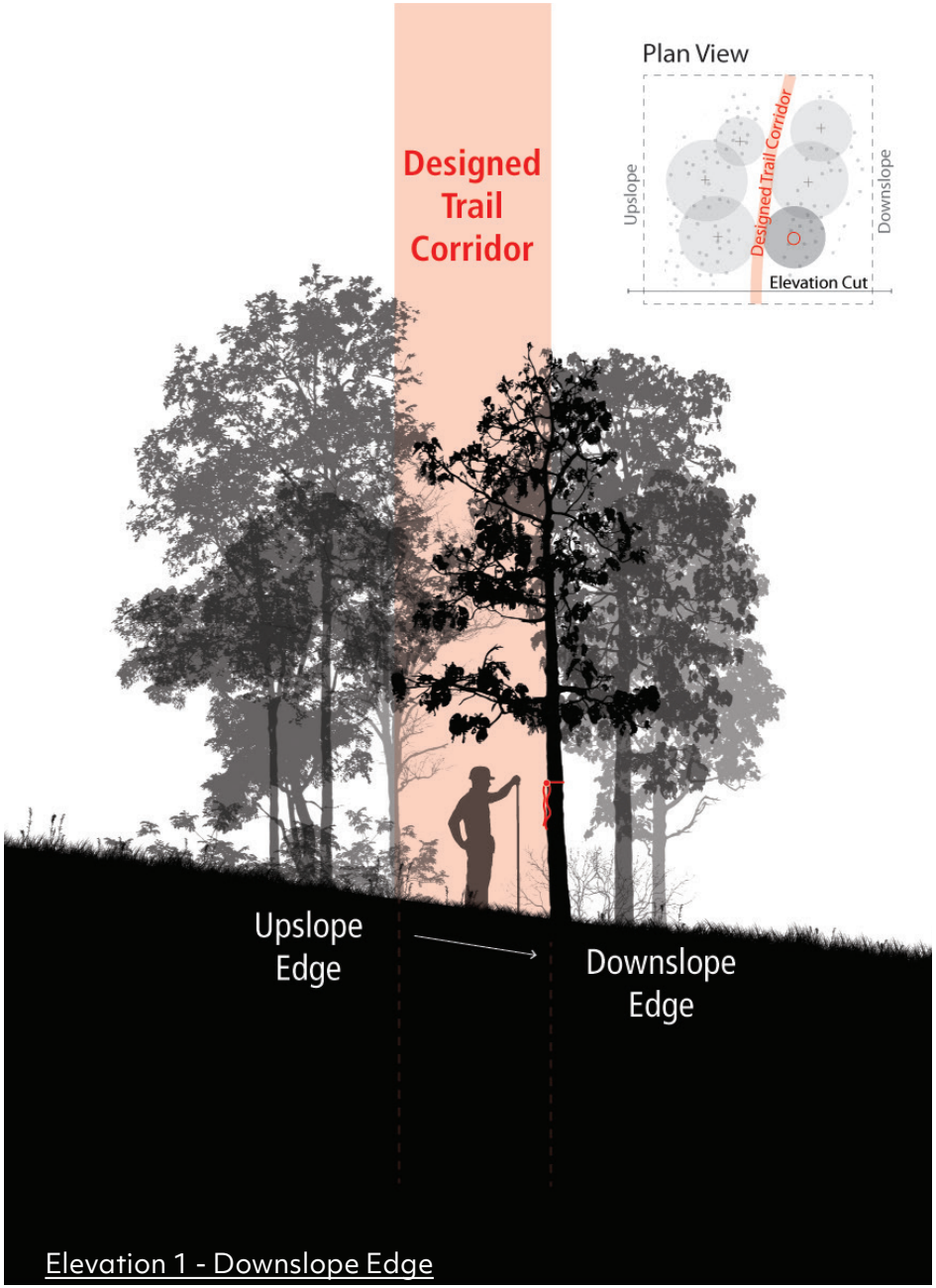
IMBA Trail Difficulty Rating System

	EASIEST WHITE CIRCLE	EASY GREEN CIRCLE	MORE DIFFICULT BLUE SQUARE	VERY DIFFICULT BLACK DIAMOND	EXTREMELY DIFFICULT DBL. BLACK DIAMOND
TRAIL WIDTH	72" or more	36" or more	24" or more	12" or more	6" or more
TREAD SURFACE	Hardened or surfaced	Firm and stable	Mostly stable with some variability	Widely variable	Widely variable and unpredictable
AVERAGE TRAIL GRADE	Less than 5%	5% or less	10% or less	15% or less	20% or more
MAXIMUM TRAIL GRADE	Max 10%	Max 15%	Max 15% or greater	Max 15% or greater	Max 15% or greater
NATURAL OBSTACLES AND TECHNICAL TRAIL FEATURES (TTF)	None	Unavoidable obstacles 2" tall or less Avoidable obstacles may be present Unavoidable bridges 36" or wider	Unavoidable obstacles 8" tall or less Avoidable obstacles may be present Unavoidable bridges 24" or wider TTF's 2' high or less, width of deck is greater than 1/2 the height	Unavoidable obstacles 15" tall or less Avoidable obstacles may be present May include loose rocks Unavoidable bridges 24" or wider TTF's 4' high or less, width of deck is less than 1/2 the height Short sections may exceed criteria	Unavoidable obstacles 15" tall or greater Avoidable obstacles may be present May include loose rocks Unavoidable bridges 24" or narrower TTF's 4' high or greater, width of deck is unpredictable Many sections may exceed criteria

Flagging Methodology and Design Interpretation

The design of the trail corridors is marked in the field using pink and blue flagging. The flags used in the field are biodegradable. Approximately 80% of the flags should remain intact 24 months after the execution of work. Three flags tied to the same tree indicates the start, end, or intersection of a trail corridor. Two flags indicate the apex of the turn in the trail corridor. One flag indicates the location of the downslope edge of the proposed trail corridor where the direction of the knot faces the side of the tree the tread is designed on. These are best practices where vegetation and landscape permit. There are instances in the field where these conventions were not able to be followed, so extra care was taken to tie additional flags to help communicate the designed trail corridor to the trail contractor.





Elevation 1 - Downslope Edge

NEXT STEPS

Permitting and Compliance

All construction projects are subject to regulatory requirements. This section provides a brief breakdown of anticipated permitting needs to implement this plan. The list is general in nature and is intended only to provide high-level planning for future trail development phases.

Obtaining proper permits can ensure that work follows local, state, and federal laws as this trails concept plan is implemented. At least as important, working under permits can help trail builders – and visitors – to be good stewards of the land. Permitting needs can be affected equally by landscape features and funding sources. Both should be identified during the design phases to ensure relevant permitting is completed.

Ground disturbance and uncontrolled erosion and sedimentation can negatively impact our environment, water quality, and flora and fauna. These impacts are also unsightly and, if not quickly mitigated, can rapidly increase maintenance costs and ultimately create trails that visitors no longer want to visit. This list is not exhaustive but represents typical permitting requirements at a federal level. Coordinating with appropriate local and state agencies will be necessary to assure compliance.

Stormwater Pollution Prevention Plan (SWPPP)

National Pollutant Discharge Elimination System (NPDES)

Construction General Permit (CGP)

Clean Water Act 404 and 401

GUIDANCE FOR CONSTRUCTION

Establishing a Construction contract

There are three broad classes of contracts with professional design and construction firms:

- A contract based on hourly fees and the cost of materials, often referred to as a "Time and Materials" arrangement. Because of the complexity of this build, this may be the preferred contract style from a bidders perspective
- A contract that incorporates both designing and building the project in an integrated fashion by a single firm, known as a "Design-Build" approach.
- A contract that requires a design phase and a build phase, with the possibility that separate firms could be assigned to either phase—often referred to as a "Design-Bid-Build" arrangement. In some cases, the contract may stipulate that the design firm can not serve as the construction firm.

A time and materials (T&M) approach offers the most flexibility. A client identifies a builder and agrees on a rate for the work performed and for required materials (plus builder's markup). This provides great flexibility for the builder and client to adjust and tweak the project midstream to create the perfect trail, but it does come at the expense of cost control. It is for this very reason, and the corrupt business practices it may engender, that many public funding sources do not allow T&M contracts.

The use of public funds often demands a form of fixed-cost contracting. One approach is a Design-Build arrangement. A Request For Proposal (RFP) details the project vision and solicits responses from potential builders on how they would realize the client's requests, and a fixed budget for how much it will cost. Successful Design-Build arrangements depend on a high level of trust from the client that the builder will ultimately provide a great product, even if the details of the project evolve during construction. For example, the original design may have called for three jump lines to be built, but once construction is underway the builder may see an opportunity to add a fourth line. Because the builder is charged with both the design and the build phases this adjustment is easy to make, though it may also expand the timeline.

Another form of fixed-price contracting is known as Design-Bid-Build. In this arrangement, the design portion is separated from construction, potentially via a separate bid process, in order to produce a detailed construction plan. Once this detailed plan has been settled, potential builders are invited to review it and respond to a Request For Quotation (RFQ). A client's representative familiar with the design verifies that responding builders have the ability to implement the plan, and then selects the winning bid. A Design-Bid-Build approach provides ultimate cost control to the client. But, it also limits the builder's ability to make in-field adjustments to the construction plan. Frequently, a Design-Bid-Build arrangement is a mandated procedure for large construction projects when a government agency is involved.

Which of these approaches to a fixed-cost contract is best? For a traditional trail project, the Design-Bid-Build process often works very well, since most clients have a good understanding of exactly what they need and have the ability to describe it in words for contract documents. With bike parks and bicycle-specific trails, the client may have a less clear idea of what the finished product will be. In this case, the Design-Build arrangement has advantages because it allows a client to identify a skilled firm and give them maximum flexibility to implement design changes and alter the construction techniques in ways that will ultimately produce the best facility possible.

Qualifying a Trail Contractor

In addition to the performance specifications, the selected trail builder/contractor shall demonstrate a minimum level of specific trails construction experience to ensure the final product is satisfactory.

1. Contractor must have a minimum of five (5) years professional experience building dynamic bike-optimized trails utilizing "lift and tilt" construction methods using on-site materials and/or material import builds. Years of experience must be verifiable and properly demonstrated in the "Project Reference Sheet". Contractor must also demonstrate extensive experience related to Public Works Projects or work performed for Public Agencies. Volunteer or Private project experience will not be considered.

2. Contractor must have completed a minimum of five (5) bike-optimized linear trail projects for in the last five (5) years. Three (3) of which must include installation of skills development features (prefabricated and/or custom) and aspects of alternative trail surfacing (asphalt, chip seal, crushed limestone, rock armoring). Volunteer or Private project experience will not be considered.

3. Project references should also include projects of 5,000 linear feet or more in size, project budget over $150,000, and where trail drainage (surface or piped) connected to existing swales and infrastructure.

4. Contractor shall be a current "Contractor Member" of the Professional Trail Builders Association (PTBA) or demonstrate equivalent certification and experience.

Contracting Procedures

Regardless of contract format, be sure to investigate local regulations before considering hiring a contractor. Some jurisdictions require that builders be locally licensed in order to work. Depending on the locale, the burden of proof (and penalties) may be on either the contractor or the client.

Prevailing wage requirements have been established in some jurisdictions that mandate minimum compensation for select tasks and trades. Knowledge of such requirements are key to developing realistic expectations of how far your money will go: Is trail building considered a $15- or $50-per-hour trade? Like with licensing, the burden of proof for paying prevailing wages may be on the contractor or on the client.

Some bids refer to "fixed units," which can be thought of as agreed-on definitions for various elements of the project. Defining these units ensures fair competition amongst bidders. For example, a unit for "singletrack trail" might define all the primary characteristics (like full bench or back slope) general characteristics, acceptable construction techniques (corridor clearing, distribution of spoils) and the measure for billing (linear feet).

Another suggestion to ease direct comparison is separating mobilization costs into their own unit. Again, it is likely for bike park bidders to come from outside the local region. While it doesn't change the total cost, it can be easier to compare bids when not having to guess what percentage of the cost of each berm is the difference in travel cost between builders coming from Boston and Boise.

Local regulations and conditions on funds may impact the bid award criteria. In the ideal case, a client will have the flexibility to weigh cost and qualifications when reviewing proposals. The best value is not always the lowest bid. However, some jurisdictions and funding sources dictate that only the lowest bid be chosen when working on public works projects. In these instances it is important to have the jurisdiction recognize the value of getting an experienced bike park builder by pre-qualifying only desirable firms to offer bids. For example, this can be based on mandating that bidders have completed at least three similar projects. If there is no pre-qualification standard, it is possible that Bubba's Backhoe Services will submit a lowball bid and you will be stuck with a substandard builder.

The Bid Process Timeline

Once the RFP/RFQ documents are available, it might be understandable to think that awarding a contract and getting started on construction is just around the corner. Think again! Two months, from announcement to award, is usually an aggressive timeline for the bid process alone.

The bidding process is designed to offer free-market competition for a specified amount of work, providing the client with several options for getting the best product at a fair price. However, the number of skilled builders with specific bike park experience is fairly limited. For this reason, it is a big advantage to announce the bidding procedure well ahead of time, preferably in the winter, where you have the best chance of getting the attention of qualified builders. Also, if your locality has restrictive rules for out-of-state contractors, a long lead-time will allow distant contractors to obtain needed licenses to do business in your state.

A rushed bid process or a bid announcement during the high building season may eliminate many trail contractors from even considering the project just because they are too busy building to stop and work up the bid. On the other hand, if your location has a milder climate with a long build season, consider specifying a shoulder season build that will potentially allow for more bids from desired contractors that are booked through the peak season.

Five Steps for Bidding

The five steps in the bid process are: Announcement, Pre-Bid Meeting, Bidding Interval, Review of Bids, and the Award.

1. Announcement: Depending on local regulations, there may be specific requirements on how you announce the bidding opportunity. Potential venues include a recognized agency procurement webpage, announcement in a recognized newspaper or inclusion in a regularly distributed bid book. An element of the announcement is the declaration of the bid process timeline. Local regulations may specify minimum intervals between steps. A digital bid package will help streamline the process and make it easily available to more potential builders.
2. Pre-Bid Meeting: A pre-bid meeting, preferably held on the selected site, is strongly recommended for bike-related projects. This helps ensure that bidders understand the vision for the bike park. Plus, the details of many projects are so complex that accurate bids are only possible when potential builders have physically examined the landscape. The pre-bid meeting should be held a minimum of three weeks after the bid process announcement so out-of-state builders can plan to attend. Even for a modest project, set aside a large time block for the pre-bid meeting. For backcountry projects, even a full day may not be sufficient. Be sure the RFP/RFQ package contains sufficient detail so bidders can find and fully explore the site on their own. Make sure the appropriate mix of client members attend the pre-bid meeting. This is your single best time to meet the prospective builders and answer their questions.

3. Bidding Interval: After the pre-bid meeting comes the bidding interval, when prospective builders assemble their proposals, price quotes, and overall budgets. The bidding interval is recommended to be at least two weeks, potentially longer for complex projects. A defined questioning period should be included in the bid interval: the client defines a time period when questions from bidders are accepted, and provides an exact mechanism for replies. It is important that the replies be made to the whole community of bidders, perhaps through an Internet portal or a group e-mail list. The bidding interval ends at a fixed date along the timeline that was established when the announcement describing how bids will be accepted was made. In some jurisdictions, there may be a requirement that all biding materials be submitted in print form.
4. Review of Bids: Bids are often opened the same day they are due. Depending on regulations, the opening may be public. If requirements demand that the low bid be chosen, this task is straightforward. If factors besides cost may be considered, be sure to set aside sufficient time to investigate not only the bids but also the bidders. Be systematic and thorough. The low bid format requires that the project provide more detailed specifications in design and performance expectations up front to protect the client and ensure a level of quality. In addition to cost and qualification, consider the proposed construction timeline with a critical eye. A small team of builders is not going to build 5 miles of heavily manipulated flow trail in two weeks. Obviously, this kind of evaluation requires a degree of expertise, but there is no harm in asking the builder about any assumptions that seem unrealistic.

5. Award: In the final phase, the winning builder learns that their bid has been chosen. Consider following up with the other builders to provide feedback on why their proposals were not chosen. The community of bike park builders is small and still maturing, so your feedback will be very valuable (and, simply, a polite gesture). An evolving firm might successfully bid on your park in a few years when you are looking to do a refresh. For the winning bidder, the award process includes ratifying a contract and implementing conditions for the contract, including submitting insurance documentation. Be sure all conditions are satisfied before any on-the-ground construction commences.

Erosion Control and Permitting

If you've worked on traditional trail projects in the United States, you are probably familiar with the processes needed to complete an Environmental Assessment. If you have done a project in partnership with a federal agency, you likely know the ins and outs of compliance with the National Environmental Policy Act. Other countries likely have similar regulations and programs.

For bike parks, and even on backcountry, bicycle-specific flow trails, the volumes of dirt manipulated reach levels that builders and agencies need to learn a whole new set of regulations and acronyms associated with erosion control. Most jurisdictions have disturbance limits, beneath which specific erosion control is not required. And in many cases, traditional trail and especially narrow singletrack do not cross these thresholds. Bike parks, where one good-sized jump or berm could require multiple truckloads of raw soil, are a different story.

Erosion control on construction projects is all about limiting the effects of stormwater pollution. Polluted stormwater runoff is the leading cause why approximately 40 percent of water bodies do not meet water quality standards in the U.S. Left uncontrolled, stormwater can damage aquatic habitats and threaten public health. Soil sediment is a pollutant and a carrier for other more dangerous pollutants. For example, once in suspension, clay particles can travel long distances, negatively impacting aquatic habitats via clouded waters and sediment deposits.

Current erosion control regulation in the U.S. grew out of the 1972 federal Clean Water Act. Mandated by the Clean Water Act, the National Pollutant Discharge Elimination System Storm Water Program's permitting mechanism requires controls that limit discharge from construction sites. While managed nationally by the Environmental Protection Agency (EPA), the EPA has delegated authority to state and local agencies as long as their policies satisfy or exceed federal requirements.

As a result, it is critical that any project verify local requirements before proceeding. The typical disturbance threshold mandated in an Eastern U.S. county may only be 5,000 square feet, where a rural Western state may not require erosion control plans and permits for build footprints of less than an acre.

Permitting and Stormwater Pollution Prevention Plans

So the job requires a permit. Who has to get it? As with disturbance thresholds, check with local procedures. U.S. federal regulations say the "operator" must hold the permit, where operator is defined as "The person who has operational control over construction plans and specifications, and/or the person who has day-to-day supervision and control of activities occurring at a construction site." Jurisdictions have interpreted this to be the landowner, developer, or general contractor. Verify what is the policy in your locale.

Typically, a Storm Water Pollution Prevention Plan (SWPPP) or Erosion and Sediment (ENS) is site specific, identifying potential point sources of pollution on the job site, and specific and detailed measures to control their effects. A SWPPP also states industry best practices applicable to the job and outlines expectations to reduce the effects of stormwater runoff and to promote natural infiltration. A SWPPP should be handled by an experienced professional—the average trail advocate is not going to be able to roll up their sleeves and create a SWPPP.

While under construction, a bike park job site may look more likely to house a future trip mall than a place to ride bicycles. Expect the SWPPP and its implementation to be held to the same standards as any other construction zone in your location. Here are some tips to help produce a professional plan.

Rely on Agency Staff: Although your agency partners may not know the difference between a camelback and a pump track, they probably know a lot more than the bike advocates do about the world of NPDES, SWPPP, and BMP requirements. Leverage respective strengths and ask your agency partner to develop the SWPPP. They may be able to reuse prior work in the park to create economies of scale. Efforts to create the SWPPP can also qualify as "match" for grant programs.

Piggyback on Another Project: If possible, combine bike park development with another project to leverage its SWPPP. At a municipal park, perhaps construct the bike park in parallel with a ballfield expansion.

Be Ready to Write a Big Check: These are serious documents that require professional expertise. When raising funds, include an allocation for erosion control and permitting. A good rule of thumb is that a quarter of total project costs will be used to create and implement a SWPPP. That's right—you may see 25 percent of your budget used for this work. Keep in mind that a SWPPP is essential for protecting public health and handling this aspect of construction responsibly is key to playing a positive role in your community.

SWPPPs For Flow Trails: Although building traditional singletrack seldom requires a SWPPP, it is not unusual for a flow trail to require one. Do your homework—check your limits and get ahead of the local inspector. Do not plan on building first and asking for forgiveness later, as it's more likely that you will receive a stop work order and a hefty fine. Creating a SWPPP appropriate for the backcountry is more challenging than for bike parks. Installing sedimentation fencing in the forest is likely more impactful than creating the trail itself.

Tips For Involving Volunteers

Here are some tips for planning successful volunteer efforts for a construction effort that is being led by a professional builder:

- Safety first! Carefully consider what equipment will be provided, what limitations will be put on the areas volunteers can access, instruction on handling tools, and other safety related concerns.
- Scheduling and coordination with the pro builder is vital. Having volunteers on the job site can create a sense of camaraderie and connection with the
- builders if all the details for a workday are well sorted, but a poorly planned volunteer workday can create serious frustration and tension for all parties.
- Encourage the pro builders and volunteers to think of workdays as educational opportunities. Once the facility has been built, volunteers may take on tasks like lip shaping and hand finishing during regular maintenance efforts. Workdays provide an opportunity to learn these skills from the pros.
- Treat volunteers with respect and give them meaningful work to perform. Poorly planned workdays often default to meaningless tasks like sweeping a half-built pump track or raking rocks from an area that will soon be graded. Keep the hours reasonable, generally a few hours to a half-day and make sure adequate water and snacks are available.
- Celebrate your volunteers and make them feel good about putting sweat equity into their facility. Tracking volunteer hours helps quantify people's efforts and makes them feel good about their contributions. Invite journalists to attend workdays and play up the community's involvement in the project.

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