Gravity Logic

INNOVATIONS IN **BIKE PARK DESIGN + DEVELOPMENT**
WHISTLER, BC

Initial Consultation & Feasibility Analysis Prepared For:

Tehachapi, California

- -

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OUR COMPANY

Gravity Logic is the world leader in the design of safe, sustainable progressive mountain bike trails for summer resort operations. The company was founded to utilize the expertise gained in building the Whistler Mountain Bike Park – the World's #1 Bike Park – to assist other businesses in the design, development, and construction of unparalleled park riding experiences by creating trails and facilities that thrill riders of a wide variety of ages, skill, and interests.

OUR SERVICES

Gravity Logic provides a wide range of services to clients who are interested in developing their mountain biking products, including:

- Feasibility Studies / Operational Assessments
- Design and Planning
- Development and Construction
- Custom Training Packages and Instructor Development Programs
- Rental / Retail Consulting / Sponsorship Strategies
- Safety and Risk Management

OUR TEAM

Gravity Logic was founded by the team behind the Whistler Mountain Bike Park's success. In fact, Gravity Logic is still actively involved in the continuing development of the Whistler Bike Park.

Dave Kelly is the true genius behind A-Line, Dirt Merchant and Whistler's legendary "flow". He has been involved with the Whistler Mountain Bike Park since it's opening in 1996. Dave was among the first to officially establish downhill mountain bike trails on Whistler Mountain and continued to work as part of a small trail crew / summer patrol for the following 4 years. As the mountain bike park grew, Dave worked his way up from lead hand, to crew supervisor, to co-manager of the Whistler Mountain Bike Park. Dave also has 11 years experience with the Whistler Mountain Ski Patrol. Because of Dave's extensive experience in the field of risk management, he has been called upon to offer expert advice on the safety, risk management and construction practices of mountain bike parks around the world. More recently, Dave has been instrumental in the design and construction of the Trestle Mountain Bike Park, which is currently the most successful mountain bike park in the United States.

Tom "Pro" Prochazka managed the Whistler Mountain Bike Park from 2001 to 2007. His ability to visualize trails and trail features that are both progressive and safe has earned him international respect from casual park visitors and professional riders alike. Tom's 20 years of experience as a carpenter and sawyer are an incredibly valuable asset in terms of designing trail features that are structurally sound, safe, and fun to ride. Tom, also our resident jet-setter, is racking up the air miles travelling to such far flung places as Ukraine, Russia, and Sweden, and continues to travel the globe offering advice to resorts hoping to emulate Whistler's success.

Rob Cocquyt worked on design and construction of the first trails on Whistler Mountain in 1995. In 1996, he established his own trail design and construction company and, over the following years, secured government funding and hired crews to build some of the West Coast's most highly regarded trails. Rob worked full time with the Whistler Mountain Bike Park from 2005-2008 as lead hand, carpenter, and finally as trail crew supervisor. Rob is Gravity Logic's go-to guy for mapping and GPS work, occasionally finds himself running a mini-ex, and spends an inordinate amount of time laying out and designing trail in the thickest, thorniest forests to be found in the world. Rob has recently finished the final phases of designing and constructing a 63 kilometer downhill and cross-country trail network in West Virginia.

The Gravity Logic core is assisted by a variety of consultants and contractors on an "as needed" basis. We have direct access to experts in Risk Management, Mapping, Environmental Planning, Rental/Retail, Event Planning and many other areas.

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INNOVATIONS IN BIKE PARK DESIGN + DEVELOPMENT
WHISTLER, BC

INITIAL CONSULTATION & FEASIBILITY ANALYSIS

PREPARED FOR:

THE CITY OF TEHACHAPI

TEHACHAPI, CALIFORNIA

AIMS AND OBJECTIVES

This report serves to provide a broad overview of the work carried out by Gravity Logic at Tehachapi, California on November 20 and 21, 2013. The aims and objectives of the visit and follow up work were as follows:

1. To examine and provide a summary of the quality and suitability of the Tehachapi property as it pertains to the development of mountain bike trail network.

2. To examine, through on-the-ground proofing, the potential (in terms of capacity, scale, and scope) of Tehachapi as the site of a commercial mountain bike park.

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1.0 MARKET ANALYSIS:

1.1 - ACCESS

Located near the densely populated region of southern California, the city of Tehachapi is in an enviable position of enjoying easy access from Bakersfield, good day trip access from the Los Angeles metro area and reasonable multi-day trip access from the Las Vegas metropolitan areas. Access from the city of Tehachapi itself couldn't be any easier and it is likely that most locals will be able to simply leave the car at home and ride to their new favorite playground.

Approximate driving times:

- Bakersfield / 40 miles / 45 minutes
- Los Angeles / 120 miles / 2 hours
- Las Vegas / 240 miles / 3.5 hours

For reference, Seattle to Whistler is 4 hours, plus border times. See stats in "1.2-Population" to understand the willingness of mountain bikers to travel.

While the bulk of bike park visitors are likely to come from within a day's drive, Tehachapi is also easily accessed to international and domestic visitors on good highways via the Los Angeles and Las Vegas International Airports.

1.2-POPULATION:

Tehachapi has a relatively modest population of approximately 37000. While small in numbers, the town is huge in spirit. The support evident from the residents, landowners, small business, city staff and corporate citizens is unlike anything we have witnessed before. There appears to be a strong pent up demand for mountain bike trails, but presently very few areas that locals can ride. The proposed bike park and additional trail networks sure to follow are likely to attract a not insignificant number of new residents from nearby cities like Bakersfield and beyond. It has also been our experience that quality mountain bike facilities have the power to transform populations. While the number of dedicated mountain bikers residing in the city at present is relatively low, we would expect that such easy access to a world-class trail system will likely convert skeptics in believers, casual cyclists into passionate riders, and seasoned mountain bikers into the envy of all their friends who might not live as close by.

With southern California riders having few gravity fed and purpose built mountain bike options to choose from, it is clear that Tehachapi will be able to draw riders from the Los Angeles metropolitan area and Bakersfield, but certainly has the potential to attract loyal riders from the smaller surrounding communities as well.

The permanent population of Los Angeles metro (approximately 18 million) represents an incredible opportunity to capture a loyal following of guests likely to become **repeat** and **consistent** visitors. It is important to bear this in mind when it comes to Tehachapi's potential to draw a significant number of visitors away from the city and into the mountains. Tehachapi needs to position itself not as an **option**, but rather as a **destination**.

The quality and variety of the product will be a major factor in determining how far riders will travel to visit the mountain, and how much of the market share that Tehachapi will be able to attract. A significant population within reasonable driving distance to the trail network is one of the critical variables in the potential success of any mountain bike park. In this respect, Tehachapi is located ideally in terms of day trip population densities.

A 2006 British Columbia Mountain Bike Tourism Association study showed that **56% of Whistler's riders were overnight visitors**, with **60% of riders arriving from outside of British Columbia**. International visitors alone made up 21% of Whistler's visits. Riders in the bike park stayed in Whistler an average of 5 days compared to the overall resort average of 3 days. More anecdotally, an excellent example of the travel-willing ways of bike park guests is Sugarloaf Bike Park, located in northern New Brunswick, Canada. This small bike park (less than 500 vertical feet) has season's pass holders from as far away as Montreal (a 10 hour drive) who make regular 2-4 day trips to ride the park. It is worth noting that these same riders are bypassing other larger bike parks such as Bromont and Mount Saint Anne along the way. With the help of Gravity Logic, the trail network at Sugarloaf has become renowned in Eastern Canada, and it enjoys a significant following both locally and regionally.

Tehachapi's biggest challenge (and opportunity) will be to create a park (and additional trail networks) that riders are willing to visit for more than one day.

It is not unreasonable to assume that the addition of Tehachapi as a quality bike park destination will encourage riders to travel significant distances. That being said, it will be important to develop a core local ridership from the immediate area and act as Tehachapi's army of bike park ambassadors (through social media and word-of-mouth). Riders that are considering driving to visit Tehachapi will need to have their plans initiated by Tehachapi's marketing efforts, validated by the riding community, and further encouraged by an easy and attractively priced booking process that includes stay and ride packaging and an incredible product.

2.0 PRODUCT ATTRIBUTES:

2.1-TERRAIN FEATURES:

The mountains that form the study area are deceivingly complex and need to be explored on foot to reveal their challenges and opportunities. Our exploratory hikes led to the discovery of numerous gullies, benches and knolls that are a critical component of a bike park that feels more organically designed and with natural flow being more the result of interesting micro topography rather than the result of moving mountains of dirt. We believe that the unique flora (the gnarly twisted oaks on the southern aspect, the thick juniper of the northern aspect) will help define and brand Tehachapi. Creative trail design will still be required, but we feel that ample doses of art and science will lead to the development of memorable story-creating trails.

2.2-GROUND CLASSIFICATION (SHALE, SOIL, ROCK, CLAY, ETC):

The soils that make up the bulk of Tehachapi Bike Park (TBP) are predominantly decomposed granite, with small amounts of clay and sand. The soil is neither too fine nor too coarse. The soil appears to bind fairly well when wet, and will likely pack reasonably well if worked in the wetter months. The very dry climate of Tehachapi for most of the year, however, will mean that maintenance or construction during the driest periods will be difficult. Based on our observations of existing 4wd tracks the soil shows no signs of excessive erosion or scouring on even the steepest slopes. The soils generally appear to have enough broken rock / aggregate to allow for great traction when wet. We would expect that trails will be able to be used without damage during moderate rain events although close monitoring of trail conditions will be required to determine if closures are necessary during heavy downpours or after heavy snowfall / snowmelt.

2.3-TRAIL LIMITATIONS

The greatest challenge will be to design the trails in such a way to avoid corridors feeling or appearing stacked through the open slopes. By limiting the number of trails in any given drainage we hope to be able to create network that doesn't overpower the natural aesthetics of the mountain.

Depending on the cohesive attributes of the soil, some trail features (i.e the take-offs of jumps) may need to be built of wood, stone, or formed and maintained with the addition of soil amendments.

2.4-EXISTING TRAIL SYSTEM:

There are presently no trails in the study area. A limited network of natural surface 4wd tracks reach into most corners of the property and will allow for good construction and risk management access. Many of the tracks have been built at grades that may not be suitable for heavy traffic, but will be perfectly suitable for temporary construction access and ongoing emergency access.

3.0- OPERATIONS AND INFRASTRUCTURE

3.1 LIFT

The following four options were considered. The chairlift options were presented to both Doppelmayr USA and to Ligntner-Poma for consideration and input.

1. A fixed grip lift from the Southern Loading Station (SLS) to the Top Unloading Station (TUS) and back down the north side to an additional loading station (NLS)

2. A high speed detachable lift from SLS to TUS

3. A shuttle access road from the base to the top.

Option 1 (Fixed grip chairlift) was deemed **inappropriate** for the following reasons.:

a) the maximum rope speed at which passengers can safely load a fixed grip lift is 200 feet per minute. With a line length of approximately 7500 feet the travel time from bottom to top would be almost 45 minutes. We feel this is far too long to be sitting on a chair and will very negatively affect guest experience.

b) While fixed grip lifts can often be considerably cheaper (sometimes by up to 50%), the lift companies we consulted both agreed that this particular length and alignment would only reduce the overall cost by approximately 20-25%.

Option 3 (Shuttle from bottom to top) was deemed **inappropriate** for the following reasons:

a) The cost and length of a shuttle road built at sustainable grade would be significant.

b) The guest capacity required to support the type of development envisioned by Tehachapi (rentals / retail / zip-lines / etc) would be inadequate.

c) The turnaround time from the bottom to the top would be significant, and would therefore require a large fleet of vehicles to ensure guests did not have to wait for excessively long periods between shuttles.

Option 2 (High speed detachable lift) was deemed **most appropriate** for our vision and TBP's goals. Gravity Logic contacted the two primary lift manufacturers (Doppelmayr USA and Leitner-Poma) to develop estimates based on our proposed alignment and capacity requirements. At this time, Doppelmayr USA has created a detailed estimate for the provision and installation of a suitable lift, while Leitner-Poma provided information with regards to yearly operational and maintenance costs. We have used this information in our attached pro forma. Please note, however, both the capital cost and operational costs are **ESTIMATES ONLY** and will need to be more carefully revised by the lift manufacturers and City Staff. Gravity Logic would be pleased to help liaise with the manufacturers and City Staff with regards to final lift alignments, bike carrier types, rider capacity etc. Details about the proposed lift can be found in the estimate attached to the end of this report.

3.2-PATROL:

Tehachapi will need to establish a full time bike patrol. Ideally, Tehachapi's bike park patrol will consist of individuals who already possess a background in mountain biking as well as first aid. Bike patrollers should all be advanced or expert level riders. This will reduce workplace injuries, and will allow for quicker responses to injured guests. Additionally, patrollers who have a background in mountain biking will be better able to recognize safety concerns and trail maintenance requirements. This will be especially important in the initial phases of development when the bike patrol is likely to be smaller.

In general, the procedures, paperwork, training methods and equipment used for winter ski resort operations can all be adapted to the summer bike park operation. Given that Tehachapi is not a ski resort, SOP's will need to be developed from scratch or adapted from a ski hill. The minimum first aid and CPR certifications for patrollers are the same as for winter ski hill operations.

We recommended a minimum of three patrollers per day. Our pro forma numbers are based on a minimum of 3 patrollers plus an additional patroller for each 200 riders/day. This will allow for the patrol team to potentially respond to multiple incidents at the same time. Additional patrollers can be added based on increases in rider visits and the expansion of the trail network. Other considerations (overall acreage accessible, events, etc.) to staffing levels will also have to be taken into consideration and adjusted accordingly. Gravity Logic has in-house expertise available to assist in the initial setup and training of the bike patrol at Tehachapi.

Although cooperation between departments is an integral part of any successful operation, Gravity Logic does not recommend "job sharing" between patrol and other departments such as lift operations or trail crew. The responsibilities of a patroller in a downhill bike park are quite extensive, especially when the crew is small. Between morning trail checks, responding to injured guests, maintaining fencing and signage, end of day sweeps and the inevitable "things to do" list, patrollers will have no shortage of tasks requiring their full attention.

3.3-TICKET SALES:

Ticket sales should be based out of the same area as for zip-lining, rentals and F&B. Cross-exposure to the various activities will allow the maximum number of TBP's guests to be made aware of all of the activities located on the property.

3.4-FOOD & BEVERAGE:

We would highly recommend opening a TBP-operated F&B facility – ideally with a patio - for year-round operations. As the operation grows, so should the F&B. While specific F&B opportunities are not addressed in this report, there exists a significant potential for additional revenue gains through even the simplest F&B offerings. Take the Whistler Bike Park as an example: Before the bike park was open, the resort-owned restaurant located at the base of the mountain (the GLC) was closed during the quiet summer months. Now, the busiest day and (and the busiest week of the whole year) at the GLC occur in the summer and can be directly attributed to the throngs of thirsty and hungry riders lined up for a seat on the patio. In addition to offering season pass holders a modest discount at the resort restaurants, both the weekly downhill race series and the women's night programs both drive very significant business to the bar and restaurant at the base of the mountain.

3.5-HOSPITAL INTERFACE:

The summer patrol will need to establish procedures with the local health care facilities. Trail design would include emergency access locations some of which may be accessible by 4wd ambulance. As part of its SOP's, Tehachapi would need to coordinate with the appropriate emergency services to communicate the locations of these access points.

3.6-SUMMARY OF EXISTING SUMMER OPERATIONS:

There are currently no operations on the site. Ziplines are presently being considered and will complement bike park operations.

4.0 STAKEHOLDER CONSIDERATIONS

4.1-POTENTIAL BARRIERS:

As with any new operation or capital improvement, the willingness to invest the amount of capital required can represent a significant barrier. In terms of bike park operations it is important to understand that operators which “dabble” or fail to treat their bike parks as legitimate operations have a difficult time realizing a return on investment conducive to long term success. Conversely, operators that understand that bike parks are a real (albeit smaller) business every bit as important as their ancillary operations are seeing impressive growth from year to year. While Tehachapi has the very real potential to attract guests from great distances, it also has a great deal of work to be done (and capital invested) in order to build the type of infrastructure that will convert its significant permanent and tourist population into year-round Tehachapi advocates. Developing and maintaining open communications with property neighbors will be important to avoid conflicts throughout the permitting process.

The process of environmental permitting is often the single most important factor to consider with regards to developing realistic project timelines. As this project crosses numerous jurisdictional lines (county / city / private) it is difficulty estimate how long the permitting process might take. The actual construction of trail infrastructure can occur relatively quickly (we could have Year 1 trails completed in 3-4 months)

5.0-PRODUCT VISION/OVERVIEW:

Many bike parks around the world have achieved varying degrees of success not because of what they do, but in spite of what they do and have been unable to fully capitalize on the growth of the sport. They have found and retain existing riders but have done little to foster new loyalty from new riders. They have built their brand on being exclusive rather than inclusive and with trails catering more to advanced riders than to the unmet needs of beginners and intermediates.

Recognizing that (just like a ski area) a bike park's offerings need to cater to the beginner, the advanced, and everyone in between we envision Tehachapi as truly a trail network for all riders - where 16 year old rippers can ride with their parents and where girlfriends can bring boyfriends, husbands can bring wives. Most importantly we see a bike park where someone can learn how to ride a Green DH trail for the first time, where they can safely progress to riding every challenge the mountain has to offer, and where they can still enjoy the rush, predictability, and easy-on-the-body joy of a flowy blue trail as their tired old bones carry them down the mountain many years later. We want riders to dream, to plan, to validate, book, experience, and then advocate for other riders to join the cycle. Tehachapi has the potential to offer the complete package: A high speed lift, great trails, amazing weather, and planned complimentary family activities (i.e. zip lines). Properly executed, why would anyone ride anywhere else?

We are excited about the potential that Tehachapi holds to not only increase purpose-built mountain bike specific offerings in southern California considerably, but also to fill the unmet needs of both dedicated mountain bike riders and adventurous families. The Tehachapi Bike Park has the potential to become a source of pride to the community, an iconic image for the city, and a destination for road tripping mountain bikers searching for great trails in a bike friendly locale.

We see a tremendous opportunity for Tehachapi to showcase the pent up demand for purpose built trails through a carefully planned process. The vastly underserved market for beginner and intermediate riding terrain cannot be ignored. Beginner and intermediate riders are more likely to rent bikes and sign up for lessons, increasing the opportunities for the bike park to prosper.

The trails will be professionally designed and constructed, and they will be in keeping to the highest industry standards. This will ensure that safety and risk management are a key component of the master plan.

Our construction plan has the bulk of trails being built over a period of three years. We have described trails as not just Green, Blue, and Black, but rather Light Green and Dark Green…Light Blue and Dark Blue…Black and Double Black. We feel that a properly planned trail system allows Green riders to safely progress to the Blue trails and allowis instructors to teach Blue skills in a controlled environment. We want Blue trails that offer progression into Black trails.

While this report focuses for the most part on the potential for downhill mountain biking at Tehachapi, it cannot be ignored that there is always a substantial demand for a cross country trail network. Having an XC network to complement the DH park will attract riders from the XC culture that might otherwise never visit Tehachapi for the DH park alone. Exposure of XC riders to a well-designed DH trail network is sure to create a large amount of curiosity and will provide an incredible opportunity to market lessons and rentals to an already active, athletic and somewhat captive audience. While there are certainly some XC riders that will never even consider the idea of lift assisted mountain biking, the vast majority of XC riders will also enjoy riding downhill if the initial experience is a positive one. It will be important for Tehachapi to facilitate exposure of lift assisted mountain biking and to make the process as inviting as possible. Guided XC tours might begin with a free chairlift ride and a ride down one of the easiest (or most suitable given the riders skill-set) DH

trails within the bike park. XC riders should then have the opportunity to upgrade their rental / lesson for a DH package. Riders crossing over from XC to DH represent an untapped market not to be underestimated. Our conceptual map includes a XC trail that circumnavigates the Bike Park, but also climbs above the high point of the chairlift. Gravity Logic would propose to assist the local trails association with the design and development of any XC trails. Ideally, the DH Bike Park would serve as a catalyst towards the development of XC trails not only in the immediate area but on the surround hills as well. We would hope that the development of the Bike Park on a mix of public and private land would set an example to be emulated throughout the county. There is no good reason that Tehachapi cannot become a mecca for XC and DH riders alike. Because of the recent and considerable gain in popularity of the culture and use of mountain bike parks (even the most popular mountain bike parks in the world have not been popular or well known for much longer than 10 years) as a regular recreational venture, there is ample opportunity for Tehachapi to develop a facility that is exciting to a range of users.

While this project remains a concept and this document outlines the basic execution of the potential next steps over the next 8 years, it is important to keep in mind the potential Tehachapi holds as a very successful Bike Park to help drive business beyond the mountain. The local communities adjacent to the area are likely to become long term users of the facility should the design and construction of the project be executed as thoughtfully and effectively as possible.

Research has shown that exposure to free ride mountain biking in advertising and pop culture sources has allowed for a broadened market of consumers who are compelled to purchase freeride mountain bikes and to pay to use bike parks. In the short term, Tehachapi is capable of housing a bike park that generates revenues that rationalize the bike park's existence and beyond, while in the long term, the potential Tehachapi has in playing a key role in the long term development and sustainability of bike parks and their role in recreational and mountain bike culture in California is limitless. Tehachapi also sits on the cusp of an exciting opportunity to harness that potential into a dynamic marketing campaign to attract users to visit the bike park in the immediate future.

6.0 DESIGN AND CONSTRUCTION PLAN

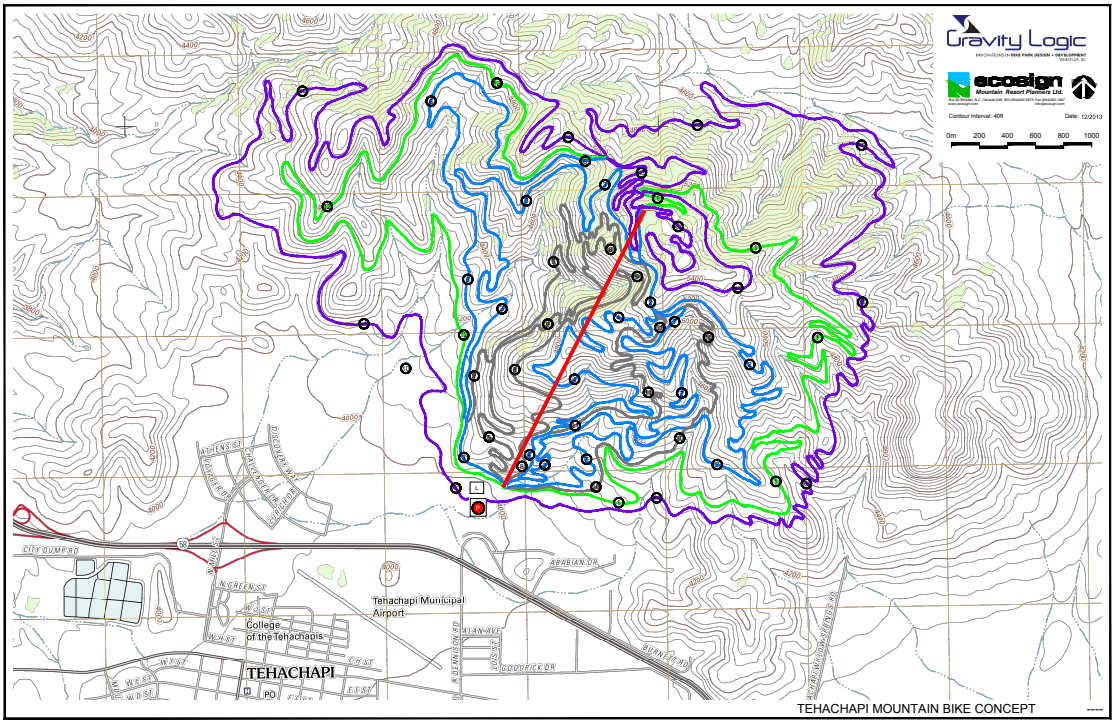
6.1-THE DEVELOPMENT OF A TRAIL PLAN

A well-designed downhill mountain bike facility must be able cater to the full spectrum of visitor's abilities while having minimal environmental impacts and low maintenance costs. A balanced approach to the development of a trail network is key to the success of the bike park.

In an effort to identify the proper terrain for any given trail, the Gravity Logic team spent two days on the ground walking as much of Tehachapi as practical.

6.2-THE TRAIL PLAN

Any successful mountain bike facility must pay careful attention to the layout and design of the trail network. Some of the trails, designed to accommodate the wide spectrum of riders that the park will attract, will need to be built by machine. Other trails might also have Technical Trail Features (TTF's) built into them, at a degree of difficulty appropriate to the overall trail rating.



All mountain bike trails on the conceptual plan have been designed with approximately 5%-10% average grade over the length of the trail. A 10% grade is generally considered sustainable in terms of resistance to erosion and damage. Moderately graded trails (<10%) work with most soil types, minimize erosion, and allow for flexibility of design. As it is the average grade, some trail segments would understandably be greater or less than 10% based on detailed design.

The proposed but conceptual trail corridors have been identified on the attached maps. Further field studies (ground-proofing) will identify positive and negative control points in order to refine exact trail locations and incorporate positive flow and transition between trail segments. Control points identify specific areas along the trail that should be connected (positive-viewpoints, terrain benches, unique geography etc.) or avoided (negative-watercourses, user conflict, extremely difficult construction challenges, wildlife habitat etc).

6.3-DEVELOPMENT SCENARIO

Gravity Logic`s preliminary investigation indicaee attached xls for costs.)

Yr 1

Trails	Description	Quantity		Unit Cost	Total Cost
1.Light Green	72" Beginner Excavated	6.83	km	$25,000	$170,833
2.Light Blue	36" Intermediate Excavated Singletrack 3'	5.13	km	$30,000	$153,750
3.Dark Blue	72" Intermediate Excavted Jump	4.56	km	$35,000	$159,444
4. Dark Blue	12" Intermedite Handbuilt Singletrack	4.56	km	$25,000	$113,889
5. Black	72" Advanced Excavated Jump	4.10	km	$35,000	$143,500
Chair Lift		1			$6,500,000
Total Capital Cost					**$7,241,417**

Yr 2

Trails	Description	Quantity		Unit Cost	Total Cost
6. Dark Green	36" Beginner Excavated Singletrack	5.86	km	$25,000	$146,429
7. Dark Blue	12" Intermediate Handbuilt Singletrack	4.56	km	$25,000	$113,889
8. Light Blue	18" Intermediate Handbuilt Singletrack	5.13	km	$25,000	$128,125
9. Double Black	12" Expert Handbuilt Singletrack	2.73	km	$20,000	$54,667
10. Black	12" Advanced Handbuilt Singletrack	4.10	km	$25,000	$102,500
ETC					
Total Capital Cost					**$545,609**

Yr 3

Trails	Description	Quantity		Unit Cost	Total Cost
11. Double Black	Expert Handbuilt Singletrack	2.73	km	$20,000	$54,667
12. Black	Advanced Handbuilt Singletrack	4.10	km	$25,000	$102,500
ETC					
Total Capital Cost					**$157,167**

6.4-TRAIL PHASING

The phasing of trail construction is important for a number of reasons. First and foremost, it allows revenue and expenses to follow each other more closely, without overwhelming expenditures in early development. Secondly, it allocates a reasonable amount of construction resources over a longer period. To attempt to complete a project of this scale in a shorter timeframe risks stretching resources too thinly and, potentially, burning out a dedicated trail crew before the work is finished. Thirdly, it allows the master plan the flexibility to evolve to accommodate a changing market, changing technology and, in fact, changing riding styles. And, finally, each year's new construction creates a visitor buzz. Out-of-area visitors will return to sample the parks new offerings while locals will not become bored of the same old trails

Other successful bike parks have used an online survey system to poll seasons pass holders and day ticket users to assess the needs for updates or new trails. Bike park management need to be aware of current trends in social media. It is important to recognize the potential benefit as well as potential pitfalls of engaging the public via social media such as Facebook, Twitter, Instagram, and others. It is prudent to create a concrete policy with regards to social media, and then to communicated this policy to the staff. Assessing rider feedback and trends should be relatively simple in the early stages of a bike park. What can be more challenging is finding a balance between the appetite from riders for ample varied terrain while respecting and staying within reasonable capital improvement budgets.

Bike parks are dependent on the interests of both their clientele and stakeholders and it is critical that there is a healthy balance between meeting the needs of both parties if a bike park operation is to be successful in the long term.

The phased design of trails should reflect the growth in numbers that are anticipated with adequate construction and application of the range of the business. Changes to trail design from the draft to actual implementation process are often a factor in building mountain bike trails and while these changes should be minimized with respect to the concerns of the land managers, it is helpful if it is understood that some flexibility must be in place to adapt to a range of variables (soil, terrain changes, vegetation concerns, trail "flow" and layout throughout, etc.). Simply put: considerable effort should be made to find a communicative balance between trail design and trail construction and the expectations of stakeholders.

6.5-CONSTRUCTION PLAN

Trail Design and Construction

There are a number of resources available that outline and diagram specific trail construction techniques (i.e http://imba-au.com/imba-trails/resources/design-and-construction-guidelines). In presenting its case for permitting, it will be important that Tehachapi proponents present any construction documentation as guidelines rather than standards. Flow trail design and construction is unique in that the goal is to create a sustainable surface with minimal impact. The goal is to use the microtopography of the land rather than excavating or importing large amounts of material. Most resources (like the link above) quote the size of the material to be used, the degree of compaction required, the minimum turn radius and slope angle. Not only is this not practical for light-on-the-land trail construction but it can work against the natural flow of the land.

While Gravity Logic follows the generally accepted sustainable methods of construction, downhill mountain biking is a relatively new pursuit compared to cross country mountain biking and trail construction techniques are quickly evolving to accommodate the different types of bikes, riding styles, and sheer volume of riders that are likely do laps on a well-designed and well-built mountain bike trail. While many of the fundamentals of trail construction are similar to trail building techniques used since the beginning of time, there are a few key differences, particularly in the insloping of trails and water management.

As a general rule, Gravity Logic built downhill trails are insloped (the bench of the trail is canted back towards the hill). This forces water to run to the inside of the trail bench and into frequently placed culverts. The water flows into a small sediment trap and only flows through the culvert if the volume exceeds the ability of the sump to naturally drain. The added retention time created by the sump allows sediment to fall out of suspension. When sediment fills the sump, it can be removed and used to maintain the trail surface. Sumps are generally cleaned as part of regular trail maintenance on an as-needed basis. Aggressively insloped turns (berms) allow riders to maintain their speed without the need for aggressive braking and the erosional effects associated with it.

Frequent grade reversals are another key component to minimize erosion. Based on observations made during our visit, the soils at the Tambo site appear to be inherently stable. Existing 4wd tracks through the property have been built at extremely steep grades (greater than 30%) and yet exhibit very little scouring or trenching. The only excessive erosion we observed was on long sections of steep road (with no grade reversals) where the volume and velocity of water was left unchecked. Even the most stable soils can quickly erode due to sediment recruitment caused by a combination of an excessive volume and velocity of water. Long uninterrupted downhill trail segments can quickly channel an amount of water that will invariably lead to scouring and trenching. A fundamental part of our design process is to incorporate very frequent grade reversals to minimize the volume and velocity of water captured by any individual trail segment. Grade reversals have the added benefit of creating a roller-coaster effect for riders.

Gravity Logic does not provide blueprints or detailed design diagrams for trails that it designs / builds.

Figure 1 - Frequent Grade reversals (short downhill, short uphill, short downhill) minimize the amount of water able to "follow" a trail.

- Forest clearing in the proposed trail corridors would be reduced to the extent practical through careful trail layout and design.
- All trails will be designed to avoid the unnecessary removal of trees.
- Trails corridors will be grubbed (cleared of organic materials) in order for the trail surface to consist solely of quality mineral soil. Grubbed organics may be used to re-vegetate off-trail disturbed areas.

Figure 2 - Organics removed and backslope shaped. John Deere 35D excavator shown (2m tread width).

- All watercourses will be avoided or spanned with bridges. Bridges would be built using a combination of treated and untreated wood. Galvanized fasteners will be used throughout. Wet and/or boggy areas will be crossed, if necessary, using a combination of raised mineral soil causeways, ditching, and/or raised wooden boardwalks. In watercourses where seasonal flow is expected, but permanent water is not present culverts (min 30cm) or bridges (site specific) will be used. In any areas where water is not expected, but possible, culverts (min 15cm) will be used.

Figure 3 - Armored culvert (2 x 15cm). Note bottom of retention sump is below inflow level.
This allows sediment to settle before passing through.

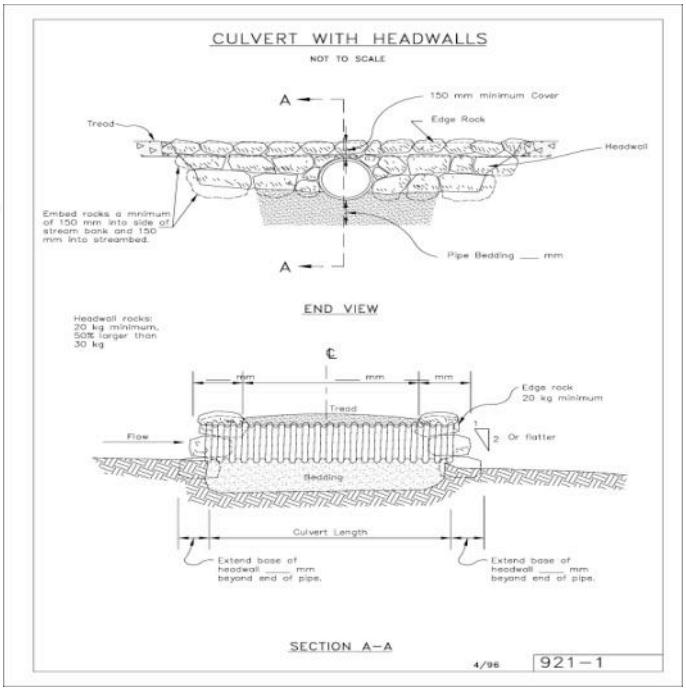


Figure 4 -Typical Forest Service culvert installation diagram. Gravity Logic follows basic installation guidelines but adds a sediment retention sump on the inflow side in all applications.

- Re-vegetation may include topsoil / organic replacement, planting, seeding and fertilization where appropriate.

Figure 5 - Machine built insloped trail with salvaged organics replaced on backslope.

6.6-TRAIL MAINTENANCE

The importance of incorporating and planning for adequate maintenance resources is often overlooked. Neither riders, nor media, nor trail crew will speak as excitedly about a well maintained trail as compared to entirely new trails being unveiled or, for that matter, trails simply under construction. Trail maintenance is not glamorous. On a less obvious, almost subliminal level, however, the difference between a well-maintained park and a poorly maintained park can mean the difference between success and failure. Trail maintenance is, quite likely, the single most important component of the bike park machine.

A well maintained park:

- Reduces damage to the rental fleet
- Reduces rider injuries
- Reduces erosion
- Encourages repeat and increased multi-day visits

We generally suggest park managers to budget 10% of the previous year's capital expenses to be dedicated to trail maintenance. This number might vary, however, based on terrain, trail type, and expected rider numbers.

Maintenance might include any or all of the following:

- Spot maintenance. Identifying and dealing with a fallen tree, or a large hole, or a collapsed turn.
- Safety maintenance. Identifying a section of trail that is producing an abnormal amount of injuries. Determining the root cause (i.e too much speed leading into a small jump). Fixing the problem (i.e rerouting the trail to reduce speed or adjusting the size / angle / landing of the jump)
- Routine maintenance. Closing a trail for a day or days to give it a minor overhaul (i.e filling holes, repairing berms, removing loose rocks, trimming branches, cleaning ditches, inspecting / repairing wooden structures)
- Overhaul. After a few years a trail might require a partial or complete overhaul. At a significantly lesser expense than new trail construction, a trail overhaul (elimination / addition of features / jumps, rerouting, resurfacing) can breathe new life into an old trail.

7.0-RENTAL/RETAIL/PROGRAMS

The value of rental / retail should not be underestimated in their ability to generate significant revenue. Properly executed, revenues from retail and rental can far exceed ticket sales. Most rental programs operate primarily on a cost recovery basis through year-end bike sales and are able to further recuperate revenues through daily use and rentals to clientele. Opportunities for revenue generation exist even further with the addition of damage insurance and protective equipment as a part of a package deal to new bike park users. Gravity Logic`s rental and retail expert is available to consult and provide detailed advice with respect to the potential for a revenue generating retail and rental operation at Tehachapi.

Trestle Bike Park Quick Facts:

- Open 82 days
- 2007 $70,000 in rental revenue, no retail
- 2010 $300,000 in rental revenue, $200,000 in retail
- 2012 $80 000 in damage waiver revenue alone
- 160 Bike Park Bikes, 35 XC Bikes
- 8000 Rental Days
- 1000 Jerseys sold, 200 DH helmets, 500 pairs of gloves, 120 pairs of Five Ten shoes

The overall approach to rentals should reflect the revenue opportunity. A typical bike park lift ticket sale generates around $30; when it is sold with a rental the revenue generated is over $100. The Tehachapi website, the sales culture and messaging of the bike park experience should reflect the revenue opportunity that rentals provide. Opportunities should be identified to “get the rental message out” with every mention and impression of the bike park.

7.1-REVENUE OPPORTUNITIES – MAXIMIZING BUSINESS.

Consider variable pricing options to maximize bike fleet utilization and yield. Some opportunities could be:

- Higher pricing for peak times such as weekends and peak vacation weeks. It is important not to market this as “pay more on weekends” but rather as “visit us midweek for some serious discounts on lift tickets and rentals!”
- Highlight pricing such as 6pm to 8pm or 3pm to 5pm (2 for 1 or $49 package including ticket)
- Consider including armor in all packages to increase yield. Pricing could be moved up due to a better combination of items in the DH rental package. **All** guests would pay a higher rate instead of **some** paying a higher rate when they choose to rent armor.
- Market share maybe increased by packaging bike park tickets with rentals. A small hit on lift ticket yield may increase the overall revenue achieved from increased rental revenues that may be going to competitor shops. Competitors will not be able to match a rental/ticket combo.

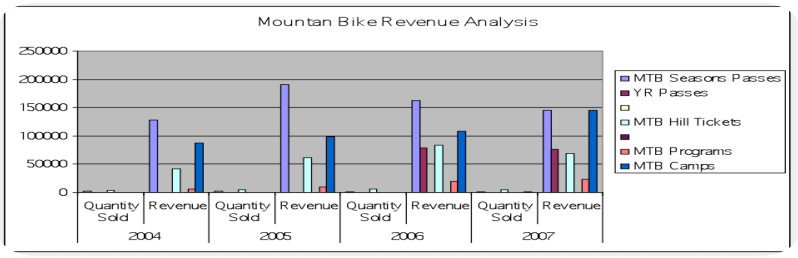
- Consider charging $20 or $25 for damage waiver. A target of 50% penetration could be set with a small incentive going to the rental team for each damage waiver sold ahead of target (perhaps $2 per incremental DW sale) Signage and an engaged rental team is critical (Trestle achieved $80,000 in Damage Waiver revenue for 2012)

7.2-REVENUE OPPORTUNITIES – *NEW BUSINESS*

- Additional items should be considered for rental such as Five Ten riding shoes, goggles, Leatt neck braces, gloves. Generally extra discounts on these items are available from suppliers for rental programs, some free product is also available in turn for brand promotion and cross over retail sales
- Adding Demo rentals increases yield (can charge more than a regular rental) and grows overall rental days. Mirroring a winter ski rental/demo program, demo bikes appeal to experienced and expert riders who would not normally rent. They have a chance to experience the latest gear and have an improved on hill experience. The cost of demo bikes can generally be recovered by selling them off at the end of the season.
- A multi branded Demo bike fleet can differentiate Tehachapi from competing parks through the equipment offering. Bike parks that have offered dynamic demo programs see more visitors choose their park because of the equipment selection compared to bike parks that do not offer this option
- Demo programs offer the opportunity for partner bike shops to send their customers to "try before they buy" bikes (assuming Tehachapi does not want to sell DH bikes at retail – retailing DH bikes is not recommended). By offering bikes for demo that retailers generally do not carry, bike shops become ambassadors for the park and promote the opportunity heavily. As sales are generated, owners of newly purchased DH bikes will likely return to Tehachapi to ride and enjoy their bike. The best traction for the demo program amongst bike shops happens where there is a discounted rate offered via their shop to their customers to demo. Manufactures are very supportive of bike park demo programs as well. Use this program as a marketing tool. "*Tehachapi has the best, biggest demo fleet in California!*"

7.3-PROGRAMS - IMPROVING GUEST EXPERIENCE, DRIVING INCREMENTAL DOLLARS

The following chart outlines the revenue analysis of a bike park based in western Canada. While the overall decline in numbers shown in the chart was why Gravity Logic became involved with the organization (note that overall revenues increased again after a trail reconstruction program was in place in 2008), the mountain bike park's programming ("MTB Camps") maintained a significant source of revenue and furthered the vested interest the park's management had in maintaining and improving the existing trail network:



- Consider a presenting sponsor for all programs such as Dakine/Fox in order to be able to include a souvenir co-branded bike jersey (FOX/Tehachapi Mountain Bike Park) at no charge for each participant. Cost should be negotiated to between $0 and $15 for the jersey but represent $49.99 value.
- Tehachapi Bike Park 101 includes a 2 ½ hour lesson, ticket and bike rental. In order to maximize bike turnover the program could be run 2 times a day. Tehachapi Bike Park 101 may require a specific fleet of bikes to support the program; these can be 1 year old DH bikes or slightly lower spec new bikes as they will not be ridden as hard.
- Steer each guest who walks through the rental shop door to take entry level downhill lesson. Consider a deeply discounted offer for slow times, even 1 run option from 4pm or 7pm.
- If guests insist on taking an xc tour with guide, include a single lift ticket so the guide can take them up once under the pretence of checking out the view and assuring the guest that they will be on an xc- like trail coming down (i.e new beginner trail).
- Work with local bike clubs to host a weekly race series. Ensure that the series is both competitive for those who want to race and social for those who want to just have fun. Make use of easy trails at first so everyone can do it without being intimidated. Local clubs need to be involved to sanction and insure race through their governing body.
- Start a women's only group on a weekend day or weeknight evening
- Have Tehachapi Bike Park 201 and 301 lessons. Ensure product content and coaches can all effectively deliver the product. Price these as lessons only as primary product but have package options.
- Offer a family package which includes 2 adults and two children to all go out with a guide for the Tehachapi Bike Park 101 package. Price additional children according to desired yield.

7.4-EVENTS:

- Focus on regional XC and DH races. Schedule XC races early in the morning in order to be able to include and showcase DH park trails without impacting bike park visitation. Offer XC racers a discounted ticket to access and experience the DH park.
- Regional races can and should include spectator friendly events such as dual slalom or amateur slopestyle. These courses are relatively inexpensive to build and have proven to be quite popular.

8.0-MARKETING OVERVIEW

8.1-OVERVIEW OF MARKETS

Mountain bikers are characteristically a very passionate audience. If you communicate with them in the right way you will find them to be much more engaged than an average ski/snowboard visitor and you will be rewarded by their support and loyalty.

The trend of “all-mountain” bikes has opened park-riding up to a whole new audience. This has resulted in the development of three main audience profiles:

1. Family Riders

Aged between 35-55, with children aged 8-16, this audience sees mountain biking as a fun family adventure activity, similar to white water rafting or snowmobiling. Their preference is for un-intimidating entry level to mid level trails that can accommodate a wide range of riding abilities. Their focus is on family, fun and safety. This market segment is likely to have more disposable income than Core Riders, and is profitable due to the increased revenue from rentals and food and beverage purchases.

2. Core Riders

Aged between 18-44, this is an audience for whom riding is not just a past-time. It is core to their identity, defining their lifestyle and creating their community. Riding drives all of their decisions – from the magazines, blogs, and product reviews they read, to where they travel to, what movies they watch, and which athletes they are inspired by. They have a high sense of adventure and desire the best and newest experiences that their chosen lifestyle can bring.

3. Mainstream All-mountain Riders

Aged between 25-44, this rider is competent and comfortable on most cross-country trails. They have recently spent a portion of their sizable disposable income on a new 6-and-6 all-mountain bike to improve their riding, and they now have the option of venturing into downhill. They are looking to accomplish something from their riding, to see new sights and tick some ‘adventures’ off their list. The main barriers to park trial for this demographic are: their false perception of the difficulty of terrain (fear of the unknown), a fear of looking and feeling out of place and the risk of injury. (Their jobs and families are too important to risk injury)

It is important to note that additional emerging markets may exist, but are best targeted through tactical marketing around programming than through the overarching marketing strategies.

8.2-MARKETING STRATEGIES AND CHANNELS

To ensure a successful launch and first year, the most important tool is a fully integrated marketing plan based around a central concept, with supportive key messages developed specifically for the new facility.

The mixture of channels used to communicate those key messages will vary by situation, budget and location but should address all key parts of the purchasing cycle as people discover, transact, express and share the product.

Channels may include:

- *Collateral* – including trail maps, rack cards and posters. Consider how and when your visitors will require information they can carry with them. Stay visible in key locations without being wasteful or environmentally irresponsible.
- *Website* – developing a user-focused and scalable web site that allows you to add regular new content will be key if your objective is to build a loyal online following. Consider your visitors and your content in terms of mobile: what content do they want to access “on the go” and “on the couch”?
- *Social Media & Blogs* – before starting up an online community, develop a plan to ensure you have the resources in place to meet the content demand of your customers, and can regularly create the type of content they value and can engage in online conversation with them. Social media can definitely be a double edged sword. A well thought out plan to engage the public through these channels can result in a positive online presence for the bike park. Poorly executed, these same channels can turn into an avalanche of negativity that can be very difficult to overcome.
- *Events* – creating reasons for people to visit and sample the park in Year 1 will help spread word of mouth and provide stories for PR. Consider they type of event that will position your product in its ideal way and provide strong appeal to your primary audience. Prior research to ensure that the most active online mountain bike community contributors are included on your invite list will help the benefits of your events reach further.
- *Advertising* – traditional advertising can get expensive so critically evaluate where you can get the most impact for your budget. Online ads, paid search, outdoor and broadcast can all be used to increase awareness and drive traffic both to your website (for more information) and to the ticket window.
- *PR* – 3rd party endorsements and editorial coverage adds credibility to all of your efforts. Establishing a media and blogger relations strategy and team from the outset is important. Remember the people you put in these roles will also be the front line for dealing with any difficult situations.

8.3-MARKETING SUMMARY

Creating a good product mix and delivering great service are important but if no one knows about the product, you don’t have the customers for your business. Marketing is one of the most important factors in establishing your new enterprise. While overarching industry standards and trends exist, as outlined above, all marketing activities must be planned carefully, in the context of the unique opportunities and specific challenges facing your operation.

9.0-NEXT STEPS

The Gravity Logic team recommends a follow up discussion to outline any possible questions or concerns regarding this document and to further assess the timing of this project. The next logical step is the completion of a master plan that would include the specific design and location of all potential mountain bike trails, chairlift, rental/retail space footprint and offer a detailed breakdown of the phases of the construction process. Also, a comprehensive review of the retail and rental opportunities available to Tehachapi should be undertaken. Gravity Logic has expert resources available to assist with these opportunities and more.

Tehachapi is in a good position to move forward and develop a sustainable, relevant, revenue generating facility and has potential to tap into more exciting opportunities in the long term.