Algoma Trail Network Mountain Bike Master Plan

City of Sault Ste. Marie Economic Development Corporation

December 18, 2020 | Our File: 2531-513-00

Photo by Colin Field

McElhanney Ltd.
203 – 502 Bow Valley Trail Canmore, AB, T1W 1N9

Contact: Matt Hadley, Project Manager 403-621-4074
mhadley@mcelhanney.com

TABLE OF CONTENTS

GLOSSARY

Bureau of Land Management	BLM
Sault Ste. Marie Ontario	the City or SSM
International Mountain Bike Association	IMBA
McElhanney Ltd.	McElhanney
Official Plan	OP
Sault Ste. Marie Economic Development Corporation	SSMEDC
Sault Ste. Marie Region Conservation Authority	SSMRCA
Trail Management Objectives	TMOs
Mountain Bike Trail Master Plan	TMP
Technical Trail Features	TTFs
Trail User Objectives	TUOs

1. INTRODUCTION

McElhanney Ltd. (McElhanney) and Sustainable Trails Inc. are pleased to submit this Mountain Bike Trail Master Plan (TMP) for the Algoma Trail Network to the City of Sault Ste. Marie Ontario (the City). This report includes information regarding the value of recreation trails to local communities, an overview of the existing trails in the area, recommendations for detailed design of the trail network, recommendations for implementation of the plan, and commentary surrounding the operations and management of the proposed trail network.

1.1. BACKGROUND

The City of Sault Ste. Marie's goal is to attract and retain residents and increase destination-based tourism though development of a world class mountain bike trail network. The City has identified that the existing trail network does not provide a sufficient diversity of experiences nor a sufficient quality experience to create a destination with the current trails. The existing mountain bike experiences in the City are primarily the style of riding from 1990's to early 2000's and are out of date with the trail experiences expected by current day mountain bikers.

At a regional level, mountain biking is booming just south of the border, with trail centers such as Marquette and Copper Harbor Michigan delivering purpose built modern mountain bike trails with more than 20,000 users per year. Canadian mountain bikers are spending their vacation money in the states at these riding areas, and the City recognizes the benefits of redirecting a portion of this tourist spending to Sault Ste. Marie.

The City desires to diversify the trail experiences available in Sault Ste. Marie. To provide this, the area between Kinsmen Park and Crystal Lake is planned for a long-distance loop, with additional quality mountain bike experiences near the Kinsmen Park Lodge and the Crystal trail system.

1.1.1. Identification of User Groups

Although purpose-built for mountain biking, this trail network will be a multi-use trail system open to all human-powered users. Besides mountain bikers, trail users could include runners, hikers, and dog walkers in the summer months, and fat tire biking, snowshoeing, and backcountry skiing in the winter months.

The proposed trails, named the Algoma Trail Network Trail Network, would be located on Sault Ste. Marie Region Conservation Authority (SSMRCA) land within the Hiawatha Highlands. The City of Sault Ste. Marie worked with a number of land users to discuss development of the trail, including Kinsmen Club, Soo Finnish Nordic Ski Club, Voyager Trails Association and Saulteaux Voyager Trail Club, and Sault Trailblazers Snowmachine Club.

1.2. PURPOSE

The purpose of this Mountain Bike Trail Master Plan is to provide guidance to the City to assist with development of a mountain bike-primary non-motorized trail network that provides a diverse range of trail user experiences to enhance the quality of recreation opportunities for residents and to help Sault Ste. Marie become a regional destination for trail recreation.

Based on discussions with the City, the main goals and objectives of this TMP are as follows:

- Develop a plan for quality and memorable trail experiences with a focus on mountain bike primary use;
- Make Sault Ste. Marie a regional destination for mountain biking;
- Consistently draw tourists from Southern Ontario and specifically Toronto and Michigan;
- Attract and retain residents;
- Diversify the local economy from a dependence on the 'boom-bust' economy to include more tourism;
- Provide a trail network sufficient to host a variety of mountain bike events; and,
- Develop a staged development plan for a 10-year horizon.

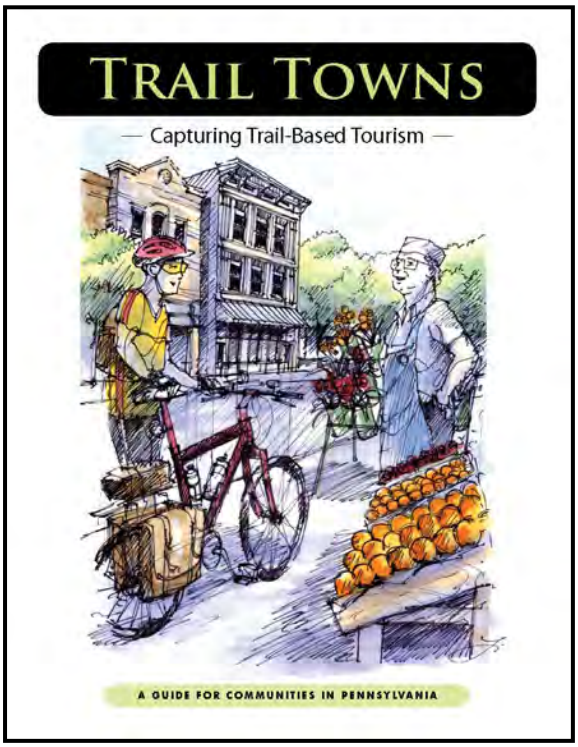


Figure 1. Trail Towns – Capturing Trails Based Tourism

The trails in Sault Ste. Marie have potential to increase opportunities for social interactions and facilitate better connection to other trail users, community space, and nature. These opportunities foster social relationships and shared responsibility. According to Canada's Go for Green, improved self-image and social relationships, reduced crime rates, and a lifestyle encouraging youth to find their entertainment in healthy, wholesome pursuits, are all found to be by-products of local trail systems.

While built for moutain biking, the trails are not limited to mountain bikers and will be accessible to all the non-motorized users, residents, and visitors of Sault Ste. Marie. Other users will benefit year-round from the multi-use trails including hikers, dog walkers, runners, and snowshoers.

The document, *Trail Towns – Capturing Trails Based Tourism,* captures the essence of what it takes for a town to become a trails destination. The following text from the document provides that description. The descriptions congers up a charming image and is what Sault Ste. Marie could strive to become:

"A 'Trail Town' is a destination along a long-distance trail. Whether on a rail trail, towpath, water trail, or hiking trail—trail users can venture off the trail to enjoy the scenery, services, and heritage of the nearby community with its own character and charm. It is a safe place where both town residents and trail users can walk, find the goods and services they need, and easily access both trail and town by foot or vehicle. In such a town, the trail is an integral and important part of the community.

A Trail Town is a vibrant place where people come together. It may have a bike shop, an ice cream parlor, casual restaurants, a grocery store, and quaint local shops. It has wide sidewalks, clean streets, bike racks, and benches at convenient locations. It has places to rest for the night. It generously meets the needs of both the trail users and the town residents. A Trail Town is a friendly place that encourages trail users to visit and welcomes them with warm hospitality."

This report is intended to be used as a tool for the City to leverage support from council, the community, interest groups, and adjacent land owners/managers and as a guidance document for the detailed design and construction of the proposed trail network.

1.3. STUDY AREA

The study area for the project is located on a variety of land bases including; Sault Ste. Marie Regional Conservation Authority, land owned by the Kinsmen Club of Sault Ste. Marie, Crown Land, and City-owned land. The focus of the study area is between Kinsmen Park to Crystal Lake.

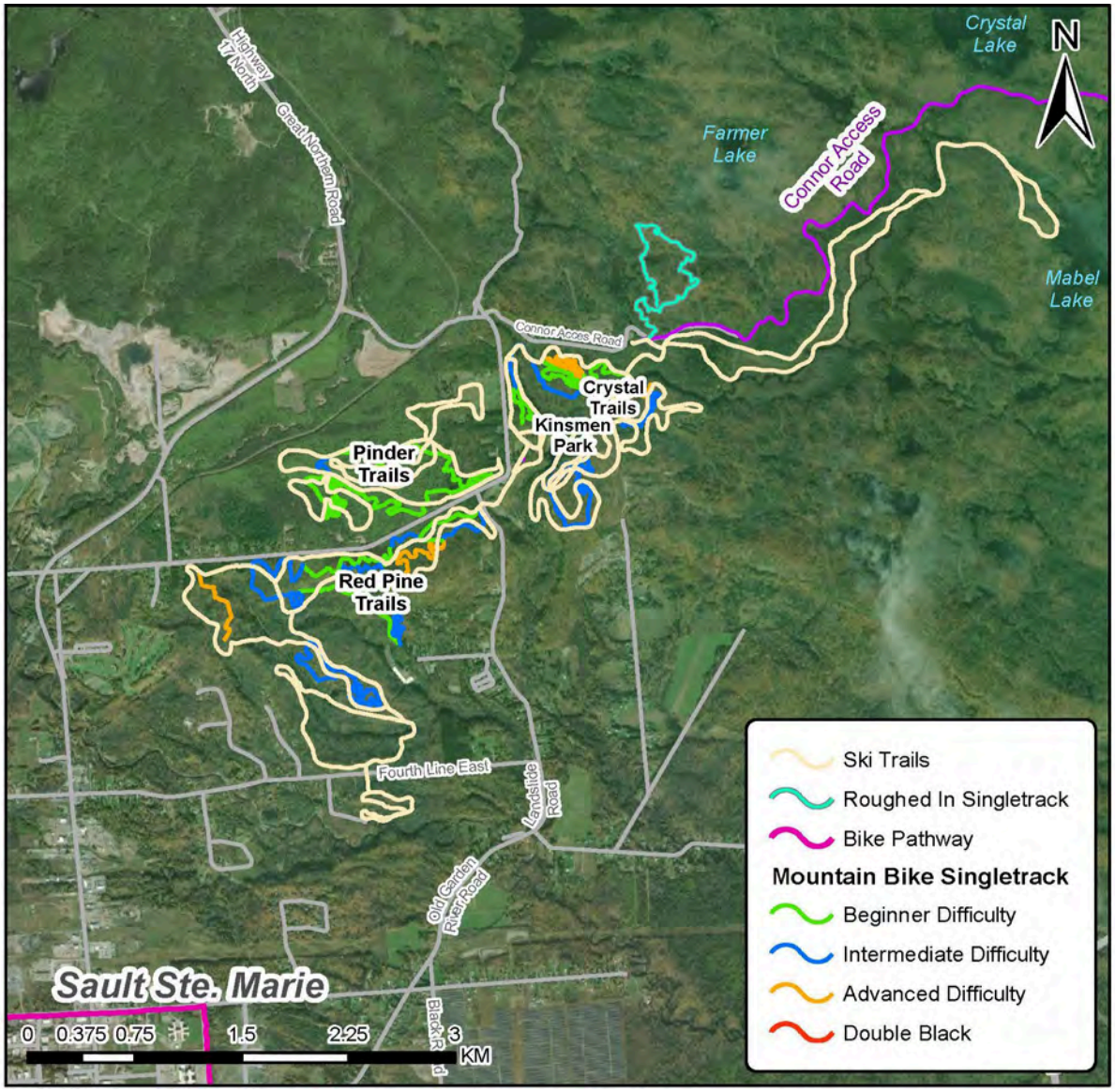


Figure 2. Study Area

1.4. LIMITATIONS OF THE PLAN

It must be understood by the users of this TMP that proposed trail alignments are not to be viewed as detailed designs. All proposed trails are conceptual in nature and will require additional fieldwork, design, stakeholder engagement, and refinement prior to any construction.

A Trails Master Plan is never perfect. It does not contain all the answers or all the solutions. That should never be the intent of this, or any other master plan. This TMP should be a “living” document that can adapt to changing goals. The intent is to chart a course for a singular vision that will create a better, stronger, and more varied trails experience for locals and tourists.

The TMP provides a collective set of goals and objectives for the direction that trail development should take over the course of the next 10 years. By having the City of Sault Ste. Marie and local interest groups like the Sault Cycling Club and Kinsmen Club of SSM working together toward long-term goals in a strategic manner, the trail system will be developed to provide the best value for the community it serves.

Photo by Colin Field

2. BENEFITS OF TRAILS

Recreation trails are analogous to other civic recreation facilities, such as parks, playgrounds, and sports fields, as they provide many positive social, economic, and environmental benefits for local communities and regions. Recreation is becoming an increasingly valued aspect of life for many Canadians. Through implementation of this TMP, the City of Sault Ste. Marie has an opportunity to reap the many positive outcomes of trail development. The following sections outline some of the potential benefits of trail development applicable to the Sault Ste. Marie area.

2.1. HEALTH BENEFITS

An interesting way to look at the added value economics of trail development is to consider the increased health benefits of trail users within the context of reduced health care costs. In the Wang, G. Et. al., 2004 study *A Cost-Benefit Analysis of Physical Activity Using Bike/Pedestrian Trails* (2004), it was estimated that for each dollar spent on building, maintaining, and using trails, nearly three dollars were realized in reduced health care costs by the trail users due to improvements in their health.

2.2. SAFETY AND MANAGEMENT BENEFITS

Experience in most “Trail Towns” has shown that a purposefully planned and constructed trail network that is actively managed by the landowner reduces safety and management issues. Where trail user objectives are not met by the existing trail network or where trail quality or quantity is below the levels desired by the users, some users or groups will turn to the creation of unauthorized trails on public lands. Unauthorized trails typically are not constructed to standard and pose a safety and management issue for the landowner. When trails are planned and constructed in accordance with accepted guidelines and standards with strong support from the land manager, user desires can be met and the risks associated with user-developed trails can nearly be eliminated.

Figure 3. Unauthorized trails in Sault Ste. Marie

2.3. ATTRACT AND RETAIN RESIDENTS

The ability of small cities and rural areas to attract and retain residents, particularly highly trained and professional workers, is a perpetual challenge. As demonstrated through several case studies, residents in trail towns strongly value the recreation assets and these assets play a significant role in their decision to reside in a certain area. In the 2016 Squamish Mountain Biking Economic Study (Mountain Bike Tourism Association, 2017), local riders were asked to rate the importance of the trail system in their decision to live in Squamish. Over 80% of respondents indicated that the mountain bike trail networks were a “very important to important” part of their decision to live in the area.

2.4. EDUCATION BENEFITS

Trails can provide excellent opportunities for users to experience nature, history, and culture in an “outdoor” classroom. Trails are a way to entice the population to spend time outdoors, providing benefits such as improving mood, attention, and combating “nature-deficit disorder” (Louv, 2016). To foster an even deeper connection and understanding of nature, interpretive signage, guided tours, or programming result in educational benefits when trail development is sensitive to the opportunities presented by the environment, historical context, and location of the trail.

Identification of these opportunities is part of the trail planning process to ensure that routing and interpretive signage at points of interest, trailheads, rest areas, and other strategic locations can help tell Sault Ste. Marie’s story to trail users and provide a deeper experience for those interested in learning more about their surroundings.

2.5. ENVIRONMENTAL SUSTAINABILITY BENEFITS

Trails also provide an opportunity for people to interact and experience the environment in an immersive way. Paired with interpretive signage and other educational information, trail users become more aware of the value they place on protecting the wilderness areas around their communities. The existence and use of trails are both catalysts for this heightened sense of environmental awareness.

Current research looking at non-motorized trail usage suggests that, when properly built, shared use trails can be constructed and maintained with minimal environmental impacts. Protection of the environment typically has more to do with the location, alignment, construction, and maintenance of the trail rather than the actual trail usage itself. Another by-product of a great trail network that meets the needs of users is that it should be so enthusiastically received by users that will naturally reduce the amount of unauthorized trails (*Managing Mountain Biking, IMBA’s Guide to Providing Great Riding*, 2007).

Figure 4. The study area offers excellent landscape views.

2.6. ECONOMIC BENEFITS

Wellness tourism, recreational tourism, and other forms of eco-tourism are popular and growing around the world. These trends show that sports and adventure tourism are often combined with wellness tourism and developing facilities to cater to these trends can have significant economic benefit.

Trail systems are a key attraction for visitors to a region and a properly planned recreational trail system will help attract tourism to the area. Visitors are drawn not only to the quality and array of trails available but also because of the experience they have in an area. According to research conducted by Tourism Northern Ontario in 2015, Nature-based tourists in Northern Ontario spent $208 million in the region.

In the province of Ontario, the Official Plan (OP) is a legal policy document that guides decisions on development and land-use in the province. The benefits of trails relate directly to one of the 'Goals' outlined in the City of Sault Ste. Marie OP (1996) which is "*to maximize the environmental, social and economic benefits derived from protecting, maintaining, enhancing and developing natural environmental features and resources.*" One policy statement under the Sault Ste. Marie OP (1996) says that: "*A Recreational Transportation System shall be developed by a comprehensive system of multi-use, shared trails throughout the City. The trail system will enhance recreational and economic opportunities.*" From this policy statement it is evident that the City of Sault Ste. Marie understands how important recreational trails are from an economic perspective.

The economic benefits of catering to mountain bikers in both trail system development and community facilities is well documented. The document, Mountain Bike Tourism – The essential guide to developing, managing, and marketing mountain bike tourism product in BC, was prepared by Destination British Columbia in June 2015. In relation to "traveler motivation studies" and "economic impact research", the following conclusions are provided in the document:

- "Mountain biking IS a travel motivator and people WILL travel to destinations specifically to go mountain biking; and
- Mountain bikers ARE well educated, affluent and the majority of them are over 30 years of age."

Other recent literature speaks to the benefits - "It turns out that mountain bikers who destination travel spend comparable amounts per day, as much time and are willing to travel as far as other groups, such as golfers." quoted a 2014 study released by Pinkbike on the Economic Impacts of Mountain Biking Tourism. To give some context to this finding, the following table provides some examples of the economic impacts of trails:

Table 1. Summary of Economic Impact Studies

SUMMARY OF ECONOMIC IMPACT STUDIES
Mountain Biking Economic Impact Study – Squamish, BC, 2017
• 22,820 out-of-town riders for 99,000 rides; • $9.9 million is visitor spending directly attributable to mountain biking; • $156/day average spending per visitor, primarily on restaurants and accommodations; $3.4 million of wages and salaries and 71 jobs supported; $7.3 million boost to provincial Gross Domestic Product and $1.1 million in provincial taxes.
Copper Harbor Trails Survey: From the Market Impact Perspective, 2016
"When asked mountain biking riders' total spending during their most recent visit/ride on Copper Harbor Trails. In 2016, they spent $497 USD per visit."
Population, Housing and Employment Projections – Commercial and Industrial Land Needs Analysis, 2018
"Economic base (EB) industries are considered to be those that drive overall growth: Agriculture, mining, and manufacturing; Exportable services (higher order education, health care, business services); and, **Tourism services** (retail sales, accommodation, food, **recreation**, entertainment)."
Economic Impact Analysis Trans Canada Trail in Ontario, 2004
"Many cyclists are now preferring **'spoke and hub'** tours, where they establish a 'home base' at a bed and breakfast or hotel, taking day trips out on the surrounding trails." "The 'spoke and hub' tours offer an opportunity for the towns and local communities to **cater their accommodations** to this type of tourism and activity usage."
Ontario Trails Strategy, 2005
"Trails attract tourists to Ontario communities. Tourism creates jobs and puts money into local economies. Many trail users buy goods such as snowmobiles, mountain bicycles, equestrian equipment, and hiking boots. Canadians are taking shorter vacations, closer to home. Vacations dollars are being spent on local restaurants, accommodations retail purchases and day trips. The Ontario Trails Council estimates that trails contribute at least $2 billion a year to the provincial economy."
Economic Benefits of Rural Recreation and Leisure Services, 2015
"One of the **key ingredients** to creating healthy active communities are well designed, safe, functional, inviting (recreation and sport) facilities, parks and **trails**." "**Outdoor recreation** is no longer a 'nice to have,' it is now a **'must have'** as leaders recognize the **undeniable economic**, social and health **benefits of outdoor recreation**."

SUMMARY OF ECONOMIC IMPACT STUDIES

Northern Ontario Nature & Adventure Tourism Plan, 2017

Strengths

- "Northern Ontario has the physical, cultural and historical attributes to create experiences that create excitement that can blow visitors away through involvement."
- "Access to nature from urban/gateway cities."

Weaknesses

- "Lack of maintenance, wayfinding and signage on trails."
- "Lack of community involvement in the identification, ownership and development of nature and adventure experiences."

Trekking Our Trails, The Benefits and Significance of Canada's Trail System, 2020

"Trails attract local users, visitors from across the country, and international tourists. They generate significant economic, health, and environmental benefits."

"Worldwide trends show that nature-based activities will play a role in reviving tourism. Organizations could take advantage of this, and collaborate to get more Canadians and tourists using trails."

Economic Impact of Recreational Trail Use in Different Regions of Minnesota, 2009

"Statewide trail spending of $2.422 million was estimated to produce $2.953 million in gross output (total sales of local businesses including indirect and induced effects but subtracting imports). This contributed $1.542 million to gross state product (GSP). Some 30,900 full-time and part-time jobs were supported by trail spending in various regions."

The Economic and Fiscal Impact of the Hatfield- McCoy motorized Trail System in West Virginia, 2014

"The analysis indicates that the nearly $1.7 million in spending conducted by the Hatfield-McCoy Trails for **day-to-day operations generated an additional $1.6 million** in economic activity within the State, for a total operational impact of $3.3 million. Even more notably, the Hatfield-McCoy Trails bring non-local visitors to the area whose spending is estimated to generate an additional $19 million in economic activity in West Virginia. **Together, the total estimated economic impact of the Hatfield-McCoy Trails is more than $22 million**."

Economic Benefit of Trails and Greenways, Rails to Trails Conservancy

"Realizing the selling power of greenways, developers of the Shepherd's Vineyard housing development in Apex, North Carolina added $5000 to the price of 40 homes adjacent to the regional greenway. Those homes were still the first to sell."

Economic Impacts of MVSTA Trails and Land Resources in the Methow Valley, 2005

"The MVSTA trail network plays strongly into respondent's real estate purchasing decisions. 81.3% of the 337 respondents who addressed the question, had considered buying real estate in the Methow Valley. Of this, an astounding 92.6% indicated that the trails network was either "most important" (65%) or "important" (27.6%) in their purchasing deliberations."

In 2016, the Association of Students Marketing Researcher at the Michigan Technological University conducted market research to determine the economic impact on Copper Harbor's mountain bike trails. As seen below, the food and eating out category were the largest portion of spending at 30%, followed by hotel/motel/resort category, and then transportation. Each group visited the trail system 3.4 times on average staying 3.5 nights in 2016, each night increasing their spending by $146. Further analysis from their study is found in section 4.1 Destination Attractiveness.

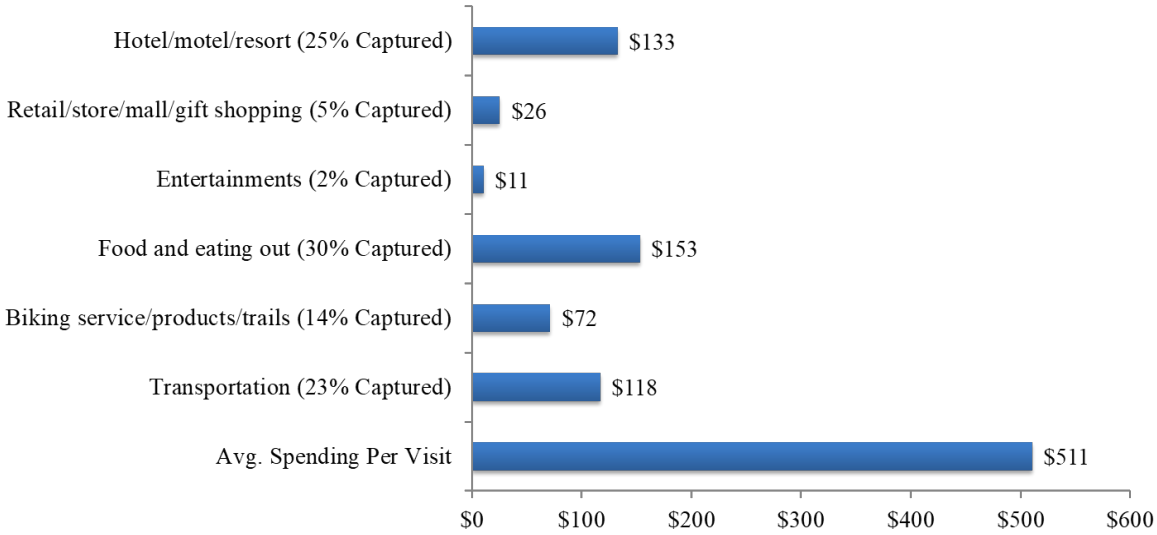


Figure 5. Where visitor money was spent on average
(Chart from the Association of Students Marketing Researcher at the Michigan Technological University).

2.7. COMPARATIVE SPENDING

In 2020 the City of Sault Ste. Marie spent approximately $10.7 million on community services (recreation & culture, community centers, memorial gardens, park & sporting field maintenance) (excluding revenue from these facilities). Fortunately, the City is recognizing the value of mountain bike trails to attract and retain residents and for economic impact of tourism, and sought out one-time grants from FedNor, and provided additional funding to initiate the trail planning and construction process for 2020 – 2021. Following this timeframe, additional funds will be required for ongoing trail development and maintenance as funding for mountain bike trails is not currently included in the City budget.

3. METHODOLOGY & ENGAGEMENT

3.1. FIELD REVIEW & IN PERSON MEETINGS

Field reviews of the study area were conducted by Matt Hadley and Pate Neumann of McElhanney, Bill Goulding of Sustainable Trails, and Travis Anderson of the City of Sault Ste. Marie between May 25th and June 2nd, 2020. The field review included sampling of the trails in the Pinder, Red Pine, Crystal, Farmer Lake, and Stokely Creek area and a drive-by of Searchmont.

Figure 6. Field review with McElhanney staff, Sustainable Trails staff, and City of Sault Ste. Marie staff

Due to COVID-19 and the excessive black flies, a short parking lot engagement session was held in late May with representatives from the Sault Cycling Club, Kinsmen Club of SSM, the Soo Finnish Nordic Ski Club, and Sault College. Feedback regarding the existing trails and potential changes were collected from all parties and the goals and objectives of the project were discussed during this. This discussion formed the general directive for the preparation of this TMP.

3.2. PUBLIC ENGAGEMENT

Online engagement was conducted though a survey and location-based comments collected on the Vertisee Crowdsource website The engagement survey for the Algoma Trail Network was available from May 27 to June 15, 2020. In total, 370 participant responded. Of the respondents, 30% are members of the Sault Cycling Club, 65% Male and 32% Female.

Of the respondents that completed the survey the largest represented group was ages 25-40. The remaning proportions are as follows:

- 2% Under age 16
- 11% Age 16-24
- 41% Age 25-40
- 30% Age 41-55
- 16% Age 56+

Over 50% of the survey respondents identified as being Intermediate level riders, followed by advanced riders (30%) and beginner riders (20%) being the least represented in the respondents. 25% of respondents indicated that they currently participate in organized events such as mountain bike races.

Mountain bikers tend to participate in various other winter sport, Here are some examples of sports that are of interest to survey riders: Nordic Skiing, Alpine Skiing, Snowshoeing, Hiking, Trail Running, Off Road Riding, Snowmobiling.

When asked if respondents would assist in the maintenance of the trail network, 22% of respondents indicated that they currently do volunteer while 70% indicated that if an increased trail network was established they would be willing to assist.

Over 50% of respondents indicated that they would support of the use of a skills area, pump track and dirt jump park.

Of the 30% of respondents that actively travel to ride mountain bikes outside of Sault Ste. Marie, the most common motivation for travel was listed as:

- Quality of Trails
- Camping
- After riding activities (breweries, festivals etc.)
- Variety of trails
- Welcoming bike friendly communities that want us there

Figure 7. Mountain Biker's User Objectives

When asked what style of trail would you most want to see developed in Sault Ste. Marie, the top three choices in order were:

1. Smooth machine built
2. Machine built flow
3. Flowy technical

When asked if there are any interesting features that riders would like to see incorporated into the trail network the following answers were most identified:

- Scenic lookouts/ viewpoints/ ridges with views
- Waterfalls
- Long flowy downhills/ more singletrack
- Jumps and rock gardens
- Pet friendly- places for dogs to drink

3.3. INDIGENOUS COMMUNITY ENGAGEMENT

City Staff have engaged with Batchewana First Nation (BFN) & Garden River First Nations (GRFN) regarding the long-term development of the Algoma Trail Network and have expressed a desire to work with both groups over the course of the development and construction of the network. Unfortunately, Covid-19 presented a challenge for all parties in 2020 and engagement was limited over this period. The City remains committed to working with both groups on the future trail development, should they be interested in doing so. Indigenous community engagement is being facilitated through the following organizations:

- Spirit North: There is opportunity to work together with Spirit North, a national not for profit organization that uses land based activities (including mountain biking) to improve the well being of Indigenous youth. Staff have reached out to Spirit North to explore the concept of administering programming with surrounding Indigenous communities in the area.

- Indigenous Sport and Wellness Ontario: The organizing body for Indigenous Sport in Ontario. Staff have reached out to the High Performance program director to initiate early conversation regarding sport training in the newly developed trail network.

- Ontario Cycling Association: Although not confirmed, preliminary conversations are underway to explore the feasibility of developing enhanced coach training and high performance training opportunities in the Algoma Trail Network area. Included in the coach training will be a cultural competency training element which will help coaches working with Indigenous youth.

4. EXISTING TRAIL AND DESTINATION INVENTORY

This section of the report outlines a cursory-level review of Sault Ste. Marie's destination attractiveness and provides a comparison to similar nearby trail towns in Michigan and examples of success from western Canada. It also summarizes the existing trails within the study area and provides commentary on their condition and uses.

4.1. DESTINATION ATTRACTIVENESS

Trail systems are a key attraction for visitors. Visitors are drawn not only to the quality and array of trails available but also because of the experience they have on the trails. In addition, the amenities provided are key. At the 2015 Western Canada Mountain Bike Tourism Symposium in Williams Lake, BC, Zachary Cole, from the University of North Carolina Greensboro, Bryan School of Business and Economics, presented the adjacent slide when discussing the "ideal mix of attributes" that make for a mountain biking destination. Based on his research, the larger the letters, the more important was the attribute to having an economically viable mountain bike experience. In looking at other mountain bike destinations and data from other studies, there is some commonality in the research.

Further to the destination attractiveness, Cole (2015) also presented the results of research regarding the characterization of mountain bike travelers in North America. These factors can be utilized to further assess the destination attractiveness of an area by comparing existing amenities for the typical target audience. Some key findings of the mountain bike tourist as characterization by Cole include:

- Gender – 9:1 male to female;
- Average age – 44;
- 4.53 trips per year for an average of 3 days with an average travel distance of 676 km and time travel 6 to 8 hours);
- Typical accommodations are camping or hotel;
- Expenditures of average $494/trip; and,
- 4.8 hours per day riding, 81.5 km total per trip, and 30.2 km per day.

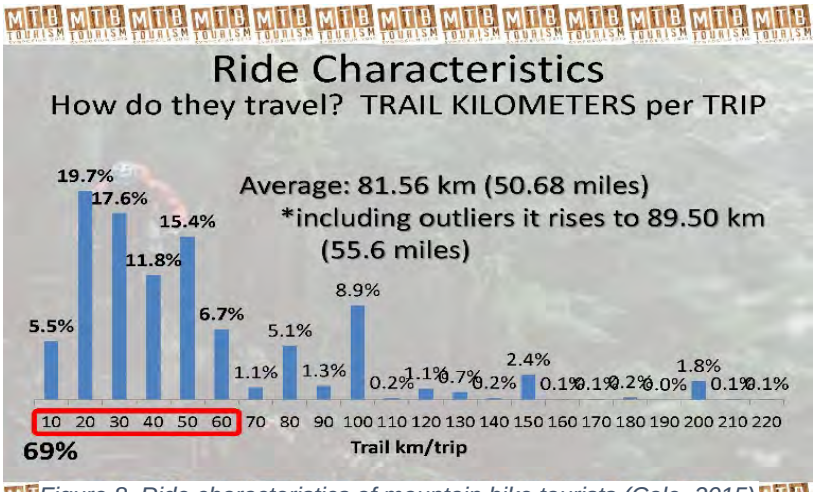


Figure 8. Ride characteristics of mountain bike tourists (Cole, 2015)

Table 2. Sault Ste. Marie Destination Attractiveness Summary

Attributes	Pros	Cons
Trails and Reputation	The proposed trail network includes a total of 31 km of existing trail and 43 km of proposed trail with the current funding in place. The long-term goal is to add up to 75 km of new modern purpouse built mounatin bike trails. When combined on a regional level with potential upgrades at Stokely Creek and Bellevue Valley, the region will have an adequate supply of quality trails to meet the desires of residents and mountain bike travelers.	Trail development in the region may occur over several years and it may take even longer to develop the region's reputation as a trail destination.
Restaurants and Beer	145 places to eat (Trip Advisor, Sept 18, 2020) and the Outspoken Brewery and Northern Superior Brewing Co.	-
Climate	The heavy snow makes for good fat biking and provides moisture to reduce dust.	The riding season is quite short, with snow melting out in May and returning by November. The blackflies and mosquitoes are a strong deterrent for any tourism prior to mid-July. Winter Fat bike season is viewed as an opportunity. Sault Ste. Marie will have 40 km of groomed fat bike trails in winter 2020/2021 with plans to grow the network based on demand.
Scenery	The Canadian Shield rock creates beautiful lakes and waterfalls. The proposed trail network connects these scenic points with a flagship trail. The fall colors are phenomenal with hardwood trees covering the hillsides. Mountain biking in Sault Ste Marie in the fall will be the time to market for world-class tourism.	The current network bypasses all the rivers, lakes, and viewpoints.
Accommodations	The trail network is 5km from the KOA campground and 7 to 15km from 63 hotels. (Trip Advisor, Sept 18, 2020).	Camping is not currently available directly at the trail head.
Amenities/Attractions	Kinsmen Park features a sand beach and swimming in the reservoir. Kinsmen Park features a walking trail to the waterfalls. The waterfront trail along St. Marys river has been revitalized to offer excellent scenery and a mix of history and amenities, including the option for brewery tours by bike. The 25 km paved off-road Hub Trail provides a link through the City and provides an opportunity for visitors to experience the City by Bike. Furthermore, the City's asphalt pump track is another exciting attraction for visitors.	-
Elevation/Shuttles/ Descents/Lifts	Shuttle access mountain biking is available at Bellevue Valley. Significant elevation is available at Stokely and Searchmont providing further trail and service developments were to occur at these areas. Small shuttle runs may be possible near Landslide Hill.	Minimal shuttle opportunities at Hiawatha
Shops/Facilities/Groceries	Three bike shops exist in Sault Ste. Marie to service cyclists. Facilities and refreshments are provided at the current Kinsmen Lodge with lodge upgrades are planned. Sault Ste. Marie is a full-service city with multiple options for travelers and residents available.	-

Given the results of the research described above, trails-based tourism is a strong opportunity for the City and the region given the ample population base and accessibility to provincial markets. Sault Ste. Marie is well-situated with Sudbury, North Bay, and numerous close cities south of the border. Detroit, Michigan (population 3.5 million) and Toronto, Ontario (population 6million for the GTA) are within a 7hr drive distance (population data Macrotrends.net 2020). Sault Ste. Marie is located near Stokely Creek and Bellevue Valley, which, combining these three areas has a potential regional destination attractiveness that could have an adequate supply of trails to meet the needs of mountain bike travelers. The international success of Stokely Creek for cross country skiing is a clear demonstration that if a quality tourism product is developed in Sault Ste. Marie for mountain biking, visitors will travel to the area.

One of the objectives of the Copper Harbor market research was to understand mountain biking riders and what factors lead to visiting again and had the following result:

> *"It is important to understand the mountain biking riders' lifestyle as following; they tend to ride on about 9 other mountain trails in addition to the Copper Harbor Trails and they often choose the biking destination based on how unique the mountain biking trails are."*

The other most important factors for choosing a mountain biking location were visually appealing surroundings and reputation of the trails. Likewise, most riders at the Copper Harbor Trails heard about them through recommendations from friends. Trail satisfaction was also associated with the rider's ability. Most of the riders classified themselves as intermediate (46.9%), and the advanced riders (40.3%) were more satisfied with the trails as seen in Figure 6.

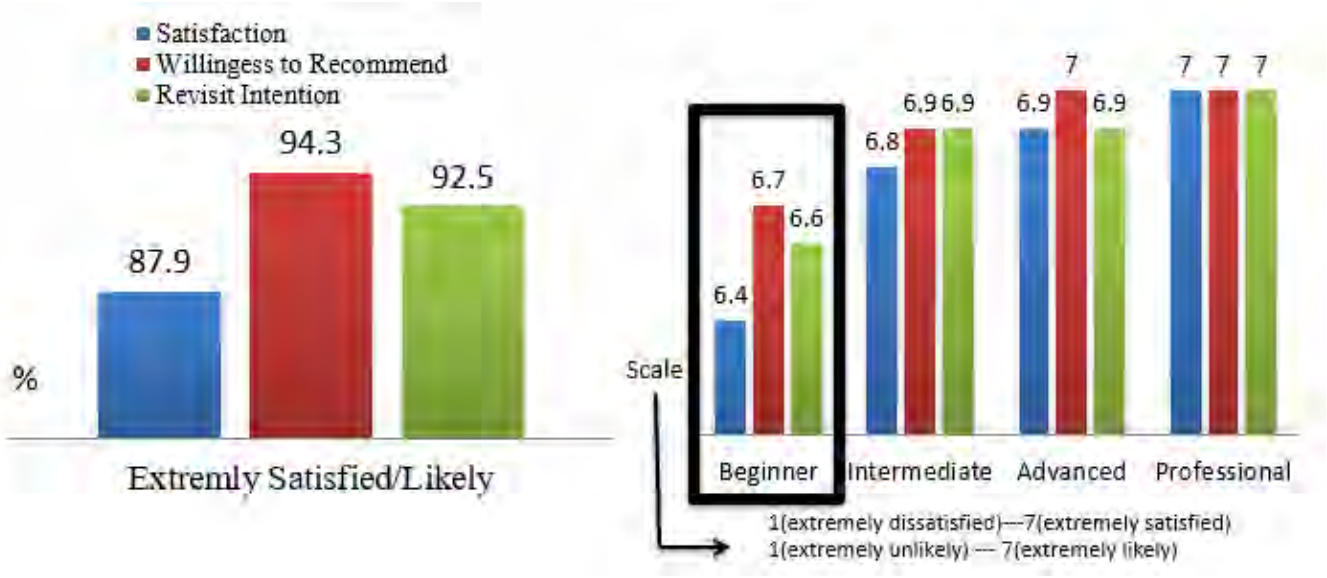


Figure 9. Biker ability and overall satisfaction (Chart from the Association of Students Marketing Researcher at the Michigan Technological University).

Other key findings from Copper Harbour include:

- Most people (46%) stayed at the campground, followed by Hotel/Motel/Resort/B&B (30%), and Friends/Relatives/Family Home (10%).
- Most of the spending occurred with a 25-mile radius of Copper Harbor and the group that spent the most was families with children under the age of 18.
- Female riders spent more than male riders.
- Highest spending was found in the age group between 41 and 50.
- In addition to mountain biking, activities that had an economic impact were also investigated with 57.1% visiting museums/historical sites/art galleries, 49.8% participating in concert/musical activities/local events, and 38.3% going canoeing/kayaking/boating.

4.2. REGIONAL TRAIL INVENTORY AND COMPARISON

One goal of trail development in Sault Ste. Marie is to create a destination for trails tourism. Table 3 summarizes a query of Trailforks.com on September 22, 2020 showing the inventory of mountain bike trails at Sault Ste. Marie, the regional area, and other comparable and well-renowned trail towns.

Table 3. Mountain bike trail inventory for Sault Ste. Marie region and comparable trail towns based on trail difficulty.

Area	Green (km)	Blue (km)	Black (km)	Total Distance (km)
Sault Ste. Marie, ON Hiawatha Highlands	11	16	5	32
Sault Ste. Marie, ON Bellevue Valley, Searchmont, & Stokely Creek	0	14	8	22
Marquette. MI North, South, & Harlow Lake	24	66	44	134
Copper Harbor, MI	7	47	7	61
Collingwood, ON Kolapore Uplands, Three Stage, Blue Mountain, & Loree Forest	21	48	42	111
Mont-Sainte-Anne, QC	14	74	74	162
Fernie, BC	78	266	111	455
Kamloops, BC	126	168	93	389

Data from Trailforks.com accessed September 22, 2020

The purpose of presenting the data in Table 3 is to demonstrate the quantity and variety of trails in logistically and demographically similar trail towns. It is unrealistic to expect that trail development in Sault Ste. Marie would increase the quantity of trails to those of the comparison towns in a short time period; however, it is valuable to demonstrate that there is certainly an opportunity to significantly grow the trail opportunities and trail community in Sault Ste. Marie over the long term. The comparable cities presented support significantly larger trail networks than exist in the Sault Ste. Marie region and reap the benefits described in Section 2. For example, the *Economic Impact & Sustainability Analysis* conducted by Tourism Kamloops determined that mountain biking generated $3.5 million for the local economy in Kamloops during the 2015 riding season.

The data also demonstrates the lack of challenge, variety, and quantity in Sault Ste. Marie's existing mountain bike trails. The trails available are green or blue, with minimal advanced difficulty (black diamond) trails. Based on field review, the trails are considered "old school technical" style of trails, with very few of the newer school machine built "flow trails" that are key for ridership development and the mass of tourists. According to Cole (2015), the mountain bike traveler in North American rides an average of 30 km per day and 81 km per trip. To become an attractive destination for these travelers, Sault Ste. Marie and the surrounding region should attempt to create at least this amount of QUALITY trail to attract mountain bike tourists and provide a quality trail experience.

The heatmap below shows that mountain biking has a strong population base and ridership within a 7hr drive. Creating a unique product will be key to differentiate from the other ride centers. If Algoma and Stokely Creek both can provide excellent riding, and Stokely Creek can also provide hut-to-hut catered and self catered overnight stays at their remote huts, then the Sault Ste Marie region will be able to draw riders from the surrounding ride centers and population centers and increase the color of their own heat map.

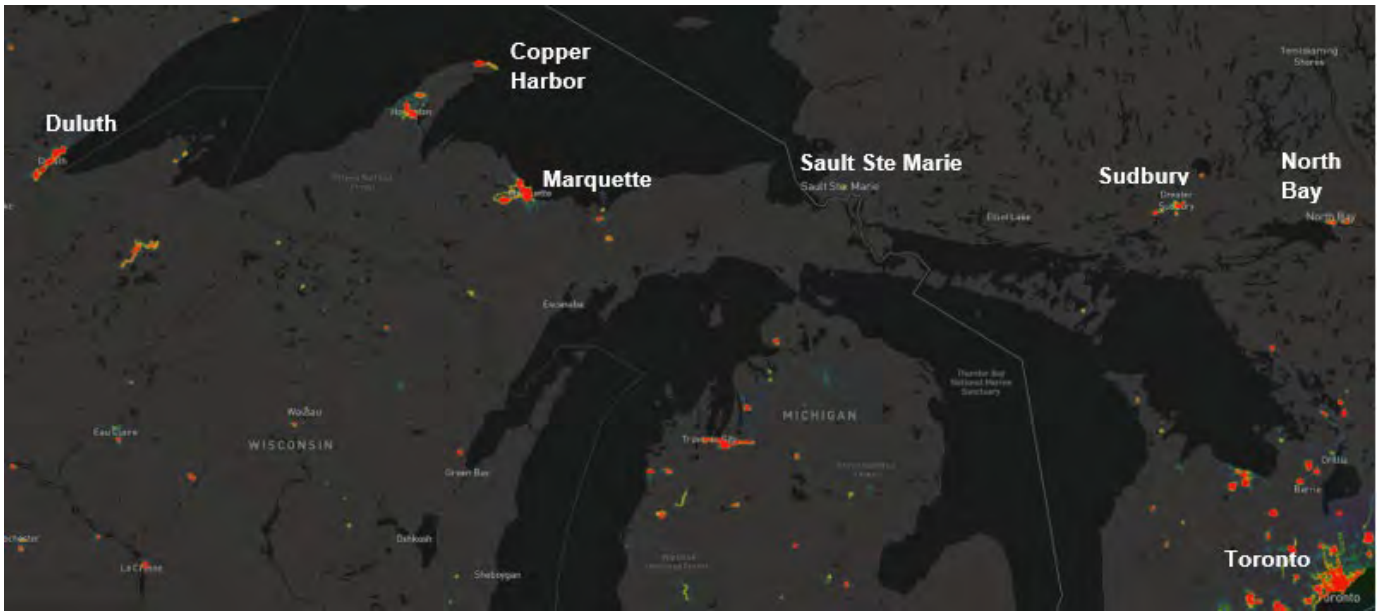
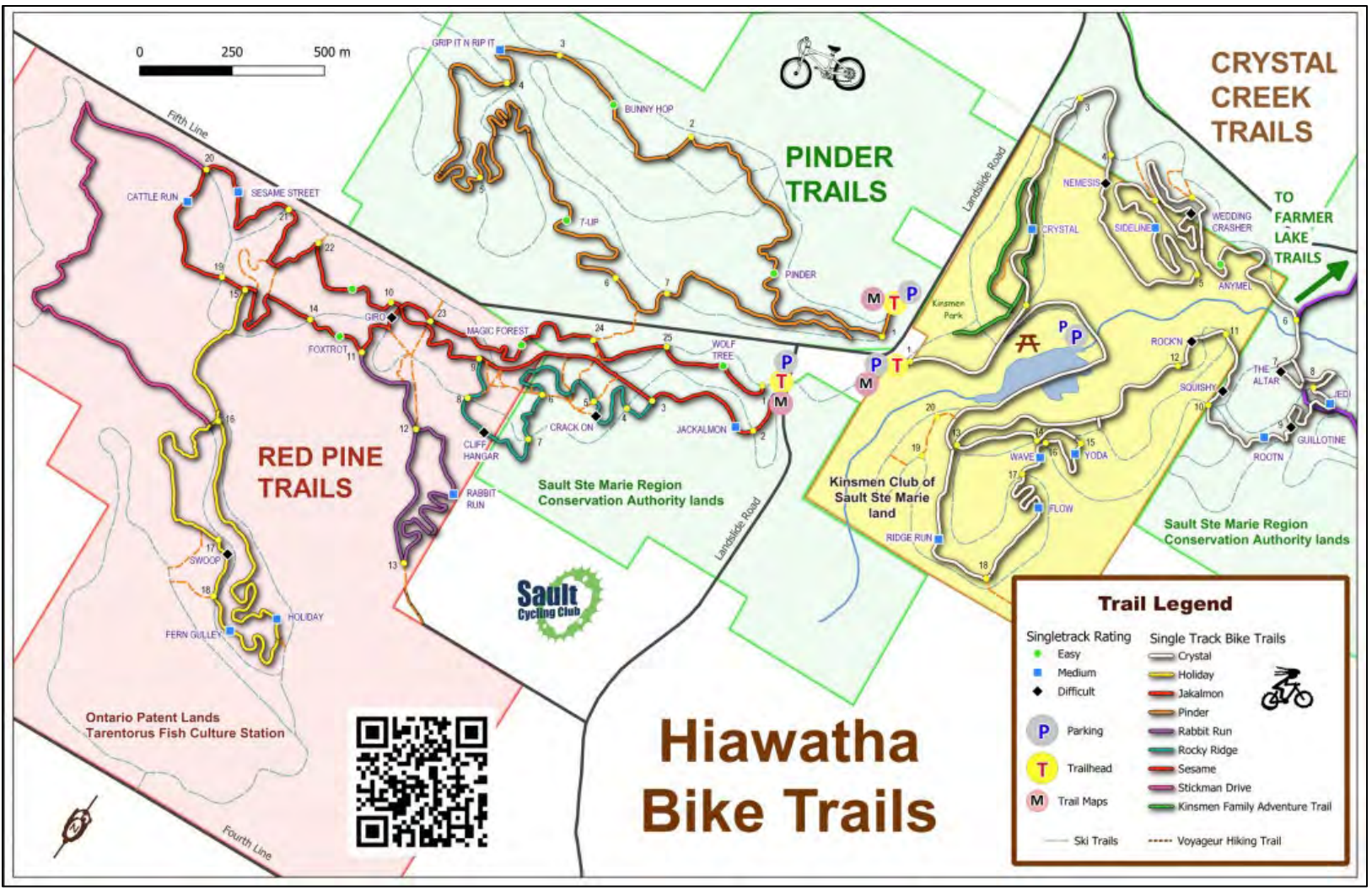


Figure 10. Trailforks.com's heatmap displaying the major ride centers surrounding Sault Ste Marie. The color based heatmap shows trail popularity in green to red, from least to most ridden, respectively. The popularity data is based on rideloq data relative to trails within the same region in the past year.

4.3. EXISTING TRAILS IN STUDY AREA

The existing mountain bike trail network at Hiawatha is intertwined with the cross-country ski trail system. This is a good fit due to the seasonality of use, and ease of access for trail maintenance and first aid incident response. The network is well set up with a central hub at the Kinsmen Center, parking available there, and a potential lodge expansion and upgrade in the plans. The three trail networks branching out from the Kinsmen Club of SSM are shown in the exisiting trail map on the following page, these are the; Pinder, Red Pine, and Crystal Creek Trails.


0
250
500 m
PINDER TRAILS
CRYSTAL CREEK TRAILS
RED PINE TRAILS
Hiawatha Bike Trails
Sault Ste Marie Region Conservation Authority lands
Kinsmen Club of Sault Ste Marie land
Ontario Patent Lands
Tarentorus Fish Culture Station
Sault Cycling Club
TO FARMER LAKE TRAILS
Trail Legend
Singletrack Rating
Easy
Medium
Difficult
Parking
Trailhead
Trail Maps
Single Track Bike Trails
Crystal
Holiday
Jakalmon
Pinder
Rabbit Run
Rocky Ridge
Sesame
Stickman Drive
Kinsmen Family Adventure Trail
Ski Trails
Voyageur Hiking Trail

PINDER

The Pinder loop is generally a very easy trail. It is built on quite flat terrain with minimal elevation change. The trail is mostly “old school rake-and-ride” as shown in Figure 11, where volunteers raked the leaves off and rode the trail in. This means that all the challenge is created by natural shapes of the terrain and the tree roots, meaning that transitions can be abrupt and challenging or frustrating for some riders.

One issue with the Pinder is that it is quite long at 5.1km. For young kids this is a lot of trail, often leading to a meltdown part way along the trail. Two shortcuts are proposed to create smaller stacked loops within the network to prevent this issue. Also, a new entrance and exit are proposed to avoid the need to cross Landslide hill road at an unsafe blind corner. Additionally, adding bermed turns, roller features, and optional Technical Trail Features like log skinnies on the side of the trail would add interest to maintain engagement by riders.

Figure 11. Rake-and-ride trails typical of the three trail networks.

RED PINE

The Red Pine network has excellent terrain with roughly 35m of vertical to work with to create interesting trails. Again, these are “rake-and-ride” trails and could benefit from features (berms and rollers) which enhance flow and rider enjoyment. A few of the trails here provide more challenge with native rocky landscape to create technical features of trails rated advanced (black diamond) difficulty. A key improvement heard during the engagement process would be to enhance connections between stand-alone sections of singletrack in this network. Currently they are connected by using ski trails, which means more signs are required for navigation, more stops to re-group during a ride, and less high-quality riding. These trails are located within a watershed above a fish culture station and no new trail development is permitted at this time.

CRYSTAL

The start of the Crystal Trail system is difficult for visitors to find though the wide-open cross-country ski stadium. All riders accessing the network must then descend a cross country ski trail which is steep and covered in 10-15cm deep loose sand. This is the site of many crashes and is essentially an advanced feature on a mostly beginner network. A key element of providing positive experiences is to keep an entire loop of the same difficulty – not to have an advanced section on an intermediate difficulty trail without a bypass. A new bypass for this sand hill is proposed – which would also make the trail rideable in both directions. Most of the Crystal trail network is rake-and-ride and twists and turns back on itself to maximize the amount of trail within a small area. With the current signage it is a confusing network with many similar trails. A few more direct trails with modern features are planned to take riders through the Crystal network and provide more variety and fun.

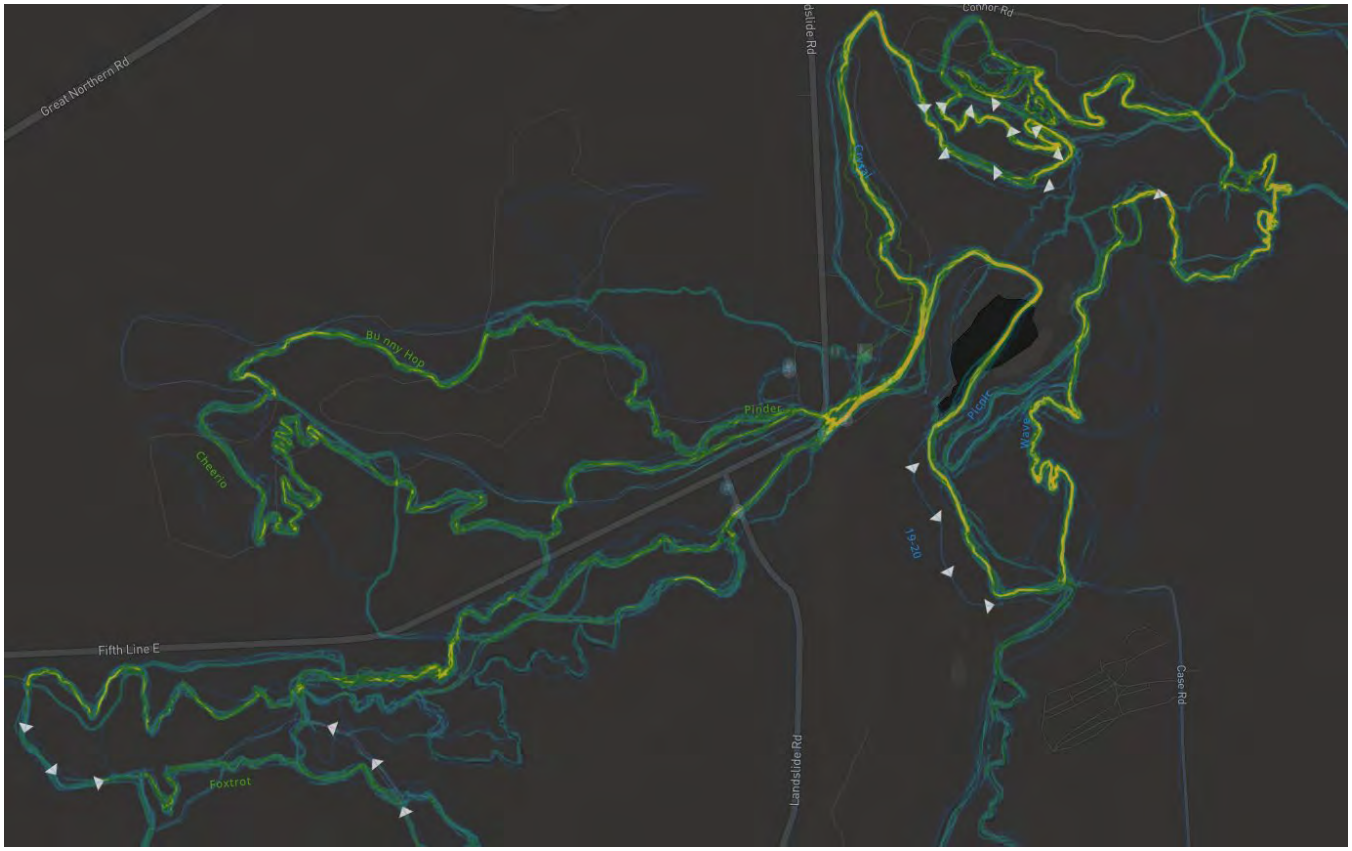


Figure 12. This heatmap shows the existing use of the three trail networks. The brightest color shows that a clockwise loop within the Crystal trail network (on the right) is the most popular.

5. PROPOSED TRAIL NETWORK

The proposed trail network includes 43 km of new trail, a pump track and bike skills area, and trail amenities. The conceptual design was developed with the following in mind:

> ***Quality trail experiences*** *are realized when a trail design merges with the desired outcomes and difficulty that a user seeks in the setting in which the outcomes are realized. These variables ultimately equate to an overall level of sustainability that protect resources while simultaneously providing a user with the outcomes they seek. – Bureau of Land Management, 2017.*

The following sections outline the rationale used to develop the proposed trail network and provides recommendations for the design criteria and a description of the proposed trail network with the goal of creating quality trail experiences for Sault Ste. Marie.

5.1. TRAIL DESIGN CRITERIA

The trail design criteria for the proposed trail network shall be trail-specific based on the individual Trail User Objectives (TUOs), Trail Management Objectives (TMOs), and trail difficulty. By providing a variety of trail types that meet the varying objectives and difficulty levels, a progressive trail network can be created to develop an accessible and quality trail experience for a variety of user groups and skill levels. The current network mostly offers intermediate difficulty technical riding.

The following sections outline the considerations made in determining the proposed trail design criteria and provide recommendations for the types of trails for the proposed trail network.

5.1.1. Trail User Objectives

In designing a trail plan for Sault Ste. Marie, the desires of the trail user weigh heavily into the decision making of the style, width, feel, and location of the trail placement. To quantify these desires, the Bureau of Land Management (BLM) in the USA has developed a list of Trail User Objectives. For each new trail, the TUOs from Figure 13 have been identified. An example of play is shown in Figure 14.

Trail User Objectives	Description
Nature	Connection to nature. This can be anything from being among a few trees in the middle of the city to remote backcountry. Nature is an important factor for many riders.
Escape	Something that takes you away from your daily grind, allows you to get lost in the experience of riding. Often means getting away from the urban environment, but a bike park, even indoors, can provide this as well.
Solitude	Getting away from the urban environment and people; being active, alone, and quiet in the outdoors.
Challenge	Seeking to improve technical abilities, to solve a difficult problem, "clean" a trail feature or segment; sense of accomplishment.
Risk	Exposure to danger, harm, or loss; intentional interaction with uncertainty. The perception of risk creates a thrill for many trail users. It can be a positive or negative part of the trail experience, depending on user expectations and risk tolerance.
Fun	Amusing or enjoyable experience. When you are trying to build fitness and/or skill, you may do many rides without "fun" being a primary objective. Ideally, one doesn't have to sacrifice fun for challenge or exercise.
Play/Playfulness	Engaging in the activity purely for the enjoyment, bringing a childlike wonder to the pursuit, no destination. On a trail, this often means seeking features to enhance, alter the experience, rather than simply riding from point to point. Playfulness is a hugely important characteristic in mountain bike trails, and distinguishes trail experiences from many other trail user goals (hikers, equestrians).
Exercise	Health and fitness are part of the sport. For some this is a primary goal, for others a bonus, for some an obstacle. Defining the physical fitness needed for a particular ride is important in setting user expectations appropriately. Recognition that some riders have high skill and low fitness (and vice versa) plays a role in trail planning.
Variety	Multiple trail options, diversity of experience within a trail or trail system. Variety should be in several forms, where possible: skill, features, surface, setting, grade, etc. While all the trails within a system may have a particular feel based on its environmental factors, it can still have variety within those constraints. Also possible at the regional level to provide variety of experiences if limited opportunities exist within a particular system.
Connectivity	Series of loops and/or trail segments linked by other trails or transportation routes. Allows for a customized experience, change of plans, adding on to a ride. Also allows for riders of different fitness or skill level to begin rides together.
Socializing	Provides a shared experience and enhances safety for riders. Mountain biking is often a social activity.
Safety/Security	This could range from trailhead security for parking to personal safety unrelated to recreational use.
Efficiency	Getting to a destination or accomplishing a task with the least amount of time or effort expended. Road climbs are very efficient, as are trails that ascend directly to a destination. Efficiency sometimes means compromising sustainability and fun/play. Hiking trails tend to be much more efficient than biking trails.

Figure 13. Trail User Objectives (source BLM, 2017)

Figure 14. Example of Play, from Guidelines for a Quality Trail Experience (source: BLM, 2017)

5.1.2. Trail Difficulty Guidelines

Trail difficulty is the intended level of challenge for a trail for the typical user. The challenge level is influenced by many factors, such as terrain, design criteria, and technical trail features (TTFs) included on the trail. Based on International Mountain Bike Association (IMBA) guidelines (IMBA, 2004), there are five trail difficulty categories as shown in Figure 15. Once selected for a specific trail, the degree of challenge then must be reflected in the design of the trail and its challenge features.

The bike industry has now divided trail types up into Flow (Freeride) and Technical (Figure 16 & Table 4). This is to recognize that different skills and experiences are provided by each type of trail. For instance, Flow trails will satisfy the TUO of Fun and Play, whereas Technical trails provide a greater sense of Risk, Challenge, and Variety.

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

Figure 15. IMBA trail difficulty rating system (IMBA, 2004)

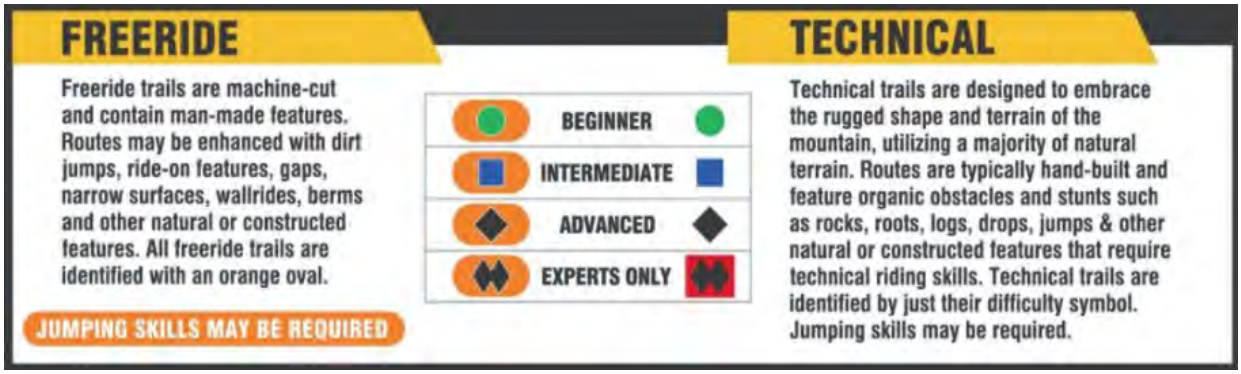


Figure 16. Trail types showing their style and difficulty rating.

5.1.3. Trail Management Objectives

TMOs are documentation of the intended purpose and management strategies for a trail and provide the overall decision-making framework for assessment, management, and design as described in the US Forest Service *Trail Fundamentals and Trail Management Objectives* (2016). They are critical to the successful planning, design, management, operation, and maintenance of any trail and network. TMOs are intended to answer the following three questions, which provide the basis for any trail assessment:

- What is the purpose of the trail?
- What is the intended level of development?
- What are the intended uses of the trail?

Further to the above, TMO documents also specify the physical design criteria for a trail, such as the tread width, surfacing type, grades, turning radii, clearing width, etc., based on the desired management objectives and uses.

At the conceptual level of this TMP, overall TMO development guidance is provided in Table 4 for the various types and trail difficulty levels of trails proposed for the network. Note that the information below does not constitute a complete TMO document, but rather the table is intended to provide guidance for detailed design of the trails.

Table 4. Trail Management Objective Summary

Trail Type	Difficulty Level	Primary Activity	Secondary Activities	Tread Width (m)	Typical Grades (%)	Description
Multi-Use Path	White	Non-motorized pedestrian and cyclist	All non-motorized activities suitable for the trail design	2-3	<7	Hardened or improved surface trails and pathways.
Beginner Flow	Green	Mountain Bike	Pedestrian	1.5	<10	Natural or hardened surfaced smooth trail with beginner level TTFs such as berms and rollers.
Beginner Technical	Green	Mountain Bike	Pedestrian	1.2	<10	Natural or hardened surfaced trail with small tread protrusions and low-height obstacles.
Intermediate Technical	Blue	Mountain Bike	Pedestrian	1	5-15	Natural surfaced trail with occasional tread protrusions and obstacles and TTFs such as tree roots, rock gardens, steep chutes, wood features, and small drops.
Intermediate Flow	Blue	Mountain Bike	n/a	1.2-2	5-10	Natural surfaced trail with smooth tread and TTFs such as medium-sized berms, rollers, and table top jumps.
Advanced Technical	Black	Mountain Bike	Pedestrian	1	8-20	Natural surfaced trail with frequent tread protrusions and obstacles and frequent challenging TTFs such as steep chutes, rock gardens, wood features, and drops.
Advanced Flow	Black	Mountain Bike	n/a	2.5	5-10	Natural surfaced trail with smooth tread and frequent advanced TTFs such as berms, tabletop jumps, and rollers.

5.1.4. Design and Construction Guidelines

Established trail design and construction guidelines that are suitable for the proposed trail network in Sault Ste. Marie are available from many sources in North America. We recommend using IMBA guidelines *Trail*

Solutions: IMBA's Guide to Building Sweet Singletrack (2004). During detailed design, aspects of the standards and guidelines incorporated into a specific trail design should be compiled into a design package for tender.

5.2. LAYOUT OF PROPOSED TRAIL NETWORK

The vision for the trail system at Sault Ste. Marie is to develop a progressive trail network that provides a variety of quality trail experiences for non-motorized users. A few overarching principles of trail layout and design were applied during the process as follows:

Figure 17. Trail junction styles from Great Trails: Providing Quality OHV Trails and Experiences (NOHVCC, 2015)

- Development of the network around one staging area that acts as a central hub;
- Provide variety in the trail type (flow and technical) and difficulty level to meet the desires of all levels of users;
- Create trails that provide a sense of destination and adventure;
- Maximize views and exposure to beauty provided by nature and provide opportunities to encourage pausing and enjoying nature;
- Provide long downhills with flow;
- Develop trails in strategic locations that utilize the natural terrain to create varying types of trail experiences;
- Reduce liability by providing the opportunity for logical progression of skill in a safe and controlled environment through;
    - a skills and progression area;
    - incorporating a "stacked loop" system of varied difficulty and style of trails
- Minimize intersections to minimize decision points and stops during rides;
- Create loops (not out-and-backs) to provide the sense of variety and accomplishment;
- Make use of the varied terrain in the area to provide flow trails where soil is appropriate and technical trails in the Canadian Shield rock;
- Wherever possible, avoid areas with constraints such as visibly active slope movement, environmental, and archeological areas.

As seen in Figure 17, junctions will be grouped together where possible. Typically, trail users stop at intersection to check maps or wait, and combing junctions reduces congestion and constant stopping and starting. Minimizing intersections will minimize the decisions trail users make creating more flow to the network.

For the Algoma Trail Network a complete and diverse trail network is proposed to meet the needs of all riders from local families with beginners to the tourist market and even the advanced riders who would otherwise engage in illegal trail building to create sufficiently challenging trails.

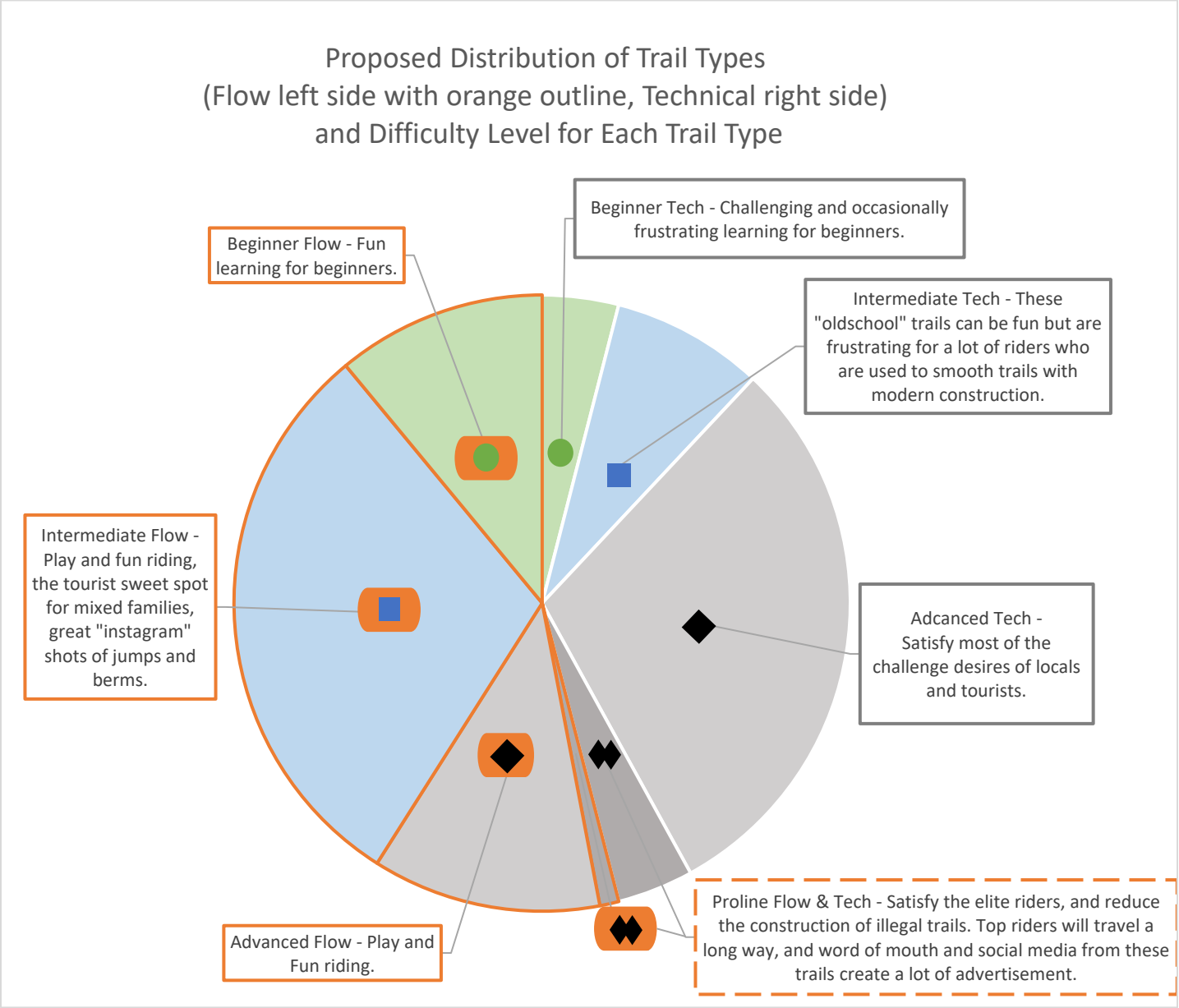


Figure 18. Proposed Distribution of Trail Tread Types (Flow or Technical) and Difficulty Level for Each Trail Type. Existing Distribution overlayed in the following figure.

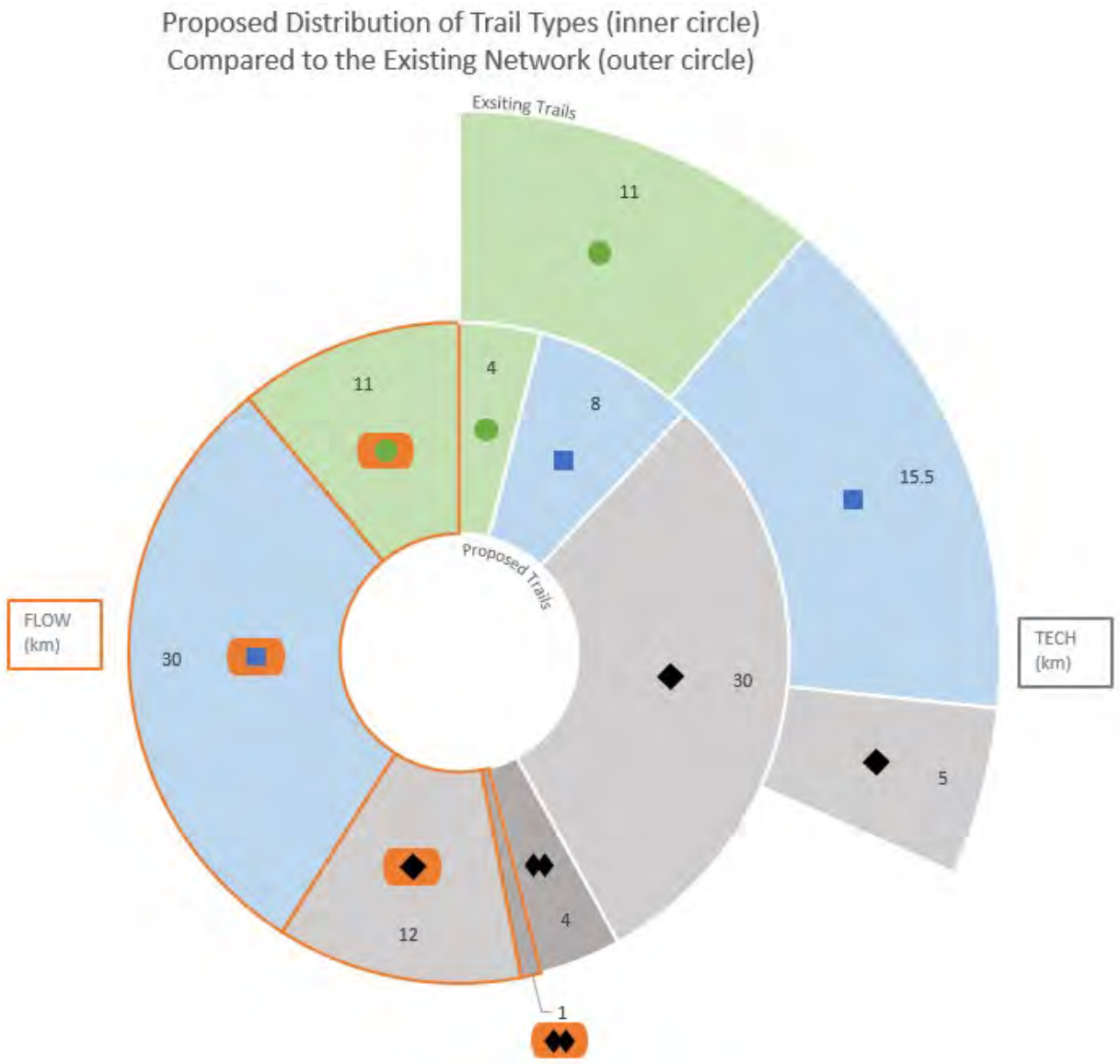


Figure 19. Proposed Distribution of Trail Types (Flow or Technical) and Difficulty Level for Each Trail Type Compared to the Existing Network.

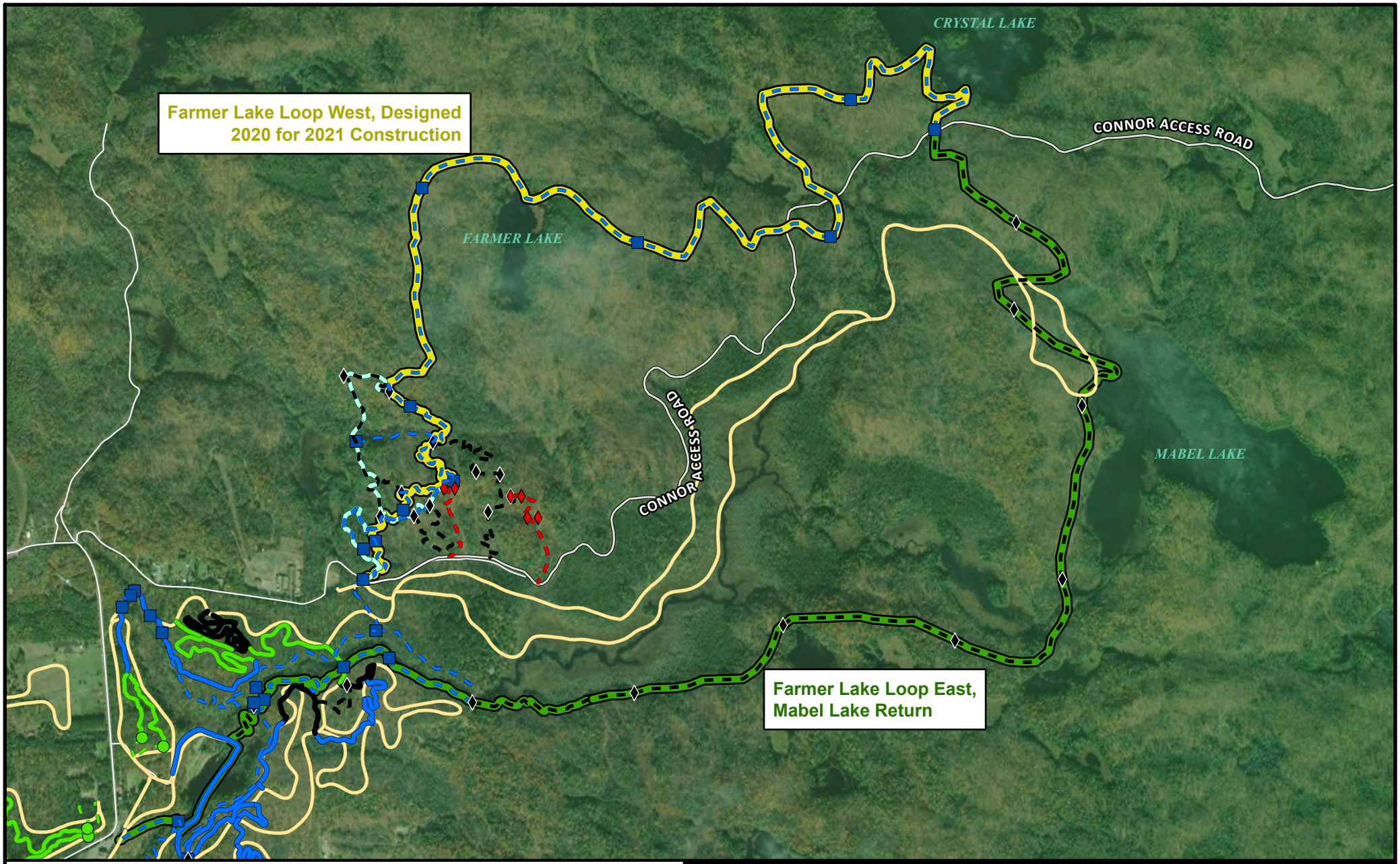
5.2.1. Farmer Lake Network Proposed Trails

LONG LOOP

The grand vision for Sault Ste. Marie is to develop a high-quality trail network that satisfies the diverse Trail User Objectives listed above. To accomplish this a long loop trail is planned to meet many of the TUO's in one trail and create the signature destination trail that Sault Ste. Marie is missing to attract tourists. This trail will connect 4 lakes, multiple high viewpoints, waterfalls, and creeks all together with a flow trail with optional technical features. The trail will provide a sense of adventure, destination, connection with nature, while also providing play, fun, and make use of the native Canadian Shield rock to provide optional challenge features. See Farmer Lake Loop map on following page.

Given the designed trail tread location and style, combined with the potential swimming spots, scenery of the lakes and fall colors, and high vistas, this trail is anticipated to be world class. Detailed design was completed for the west half of this trail in May 2020 and a construction contract awarded for fall of 2020 and spring of 2021.

Figure 20. Farmer Lake lunch and swimming spot for riders, hikers, and trail runners to enjoy the view on the long loop trail.



FARMER LAKE LOOP MAP

SAULT STE MARIE

TRAIL NETWORK DESIGN

N

0 150 300 600 Metres

1:20,000

LEGEND

- Farmer Lake Loop West
- Farmer Lake Loop East
- Ski Trails
- Roughed In Singletrack
- Community Bike Pathway
- Existing Access Road

Mountain Bike Trails

Existing	Proposed
Beginner Difficulty (Green)	
Intermediate Difficulty (Blue)	
Advanced Difficulty (Black)	
Expert Difficulty (Double Black)	

McElhanney

McElhanney Ltd.
Date: 12/11/2020
2115, SP

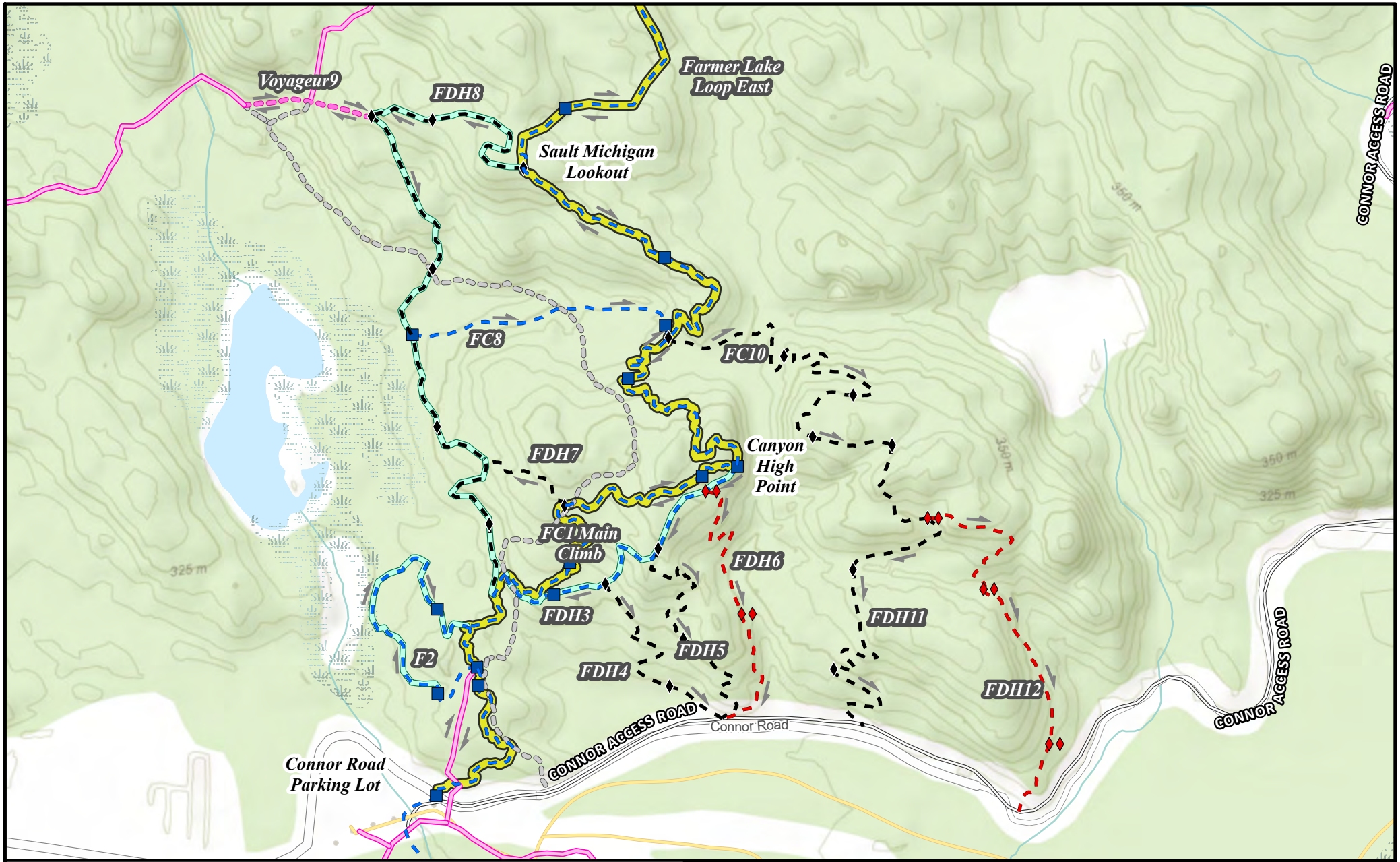
Spatial Reference:
NAD 1983 UTM Zone 16N

Source: USDA FSA, GeoEye, Maxar

FARMER LAKE STACKED LOOP NETWORK

East of the existing Crystal Trail system the terrain changes from sandy to much more interesting rock slab and lakes. The proposed main Farmer Lake West Trail is planned to be used as the spine trail to create a stacked loop network near the trailhead which riders could lap (see Farmer Lake Stacked Loop Map on following page). The overall concept is that riders would climb the Farmer Lake West Trail to the Canyon and could chose out of 5 downhills from this trail. They could also descend to the frog pond and climb to another high point and descend two downhills to the east. Alternatively, riders could continue past the Frog Pond to the Sault Michigan Lookout and descend a technical trail and lap back into the previously mentioned stacked loop trails. These downhills would also serve “to leave riders with big smiles” if they chose to ride out and back to Crystal Lake using the West side trail only, prior to the East side being completed. This network is designed to meet the needs of modern day mountain bikers who have extremely capable mountain bikes (Trail & Enduro style bikes) and who are used to pedaling up with the main purpose to ride down. Specific trail purposes and specifications are found in the TMO summary table in Appendix A.

Figure 21. A rock slab Technical Trail Feature found on the Farmer lake Stacked Loop Trails - on a Blue difficulty trail, all TTF’s will have ride arounds to allow a wide variety of sill leveled users to enjoy the trail.



FARMER LAKE STACKED TRAILS MAP

SAULT STE MARIE

TRAIL NETWORK DESIGN

N

0 45 90 180 Metres

1:6,000

LEGEND

- Farmer Lake Loop West
- Farmer Lake Loop East
- Ski Trails

Hiking Trails

- Existing
- Proposed
- Trail to be Decommissioned
- Roughed In Singletrack

Mountain Bike Trails

Existing	Proposed
Beginner Difficulty (Green)	
Intermediate Difficulty (Blue)	
Advanced Difficulty (Black)	
Expert Difficulty (Double Black)	

McElhanney

McElhanney Ltd.
Date: 12/11/2020
2115, SP

Spatial Reference:
NAD 1983 UTM Zone 16N

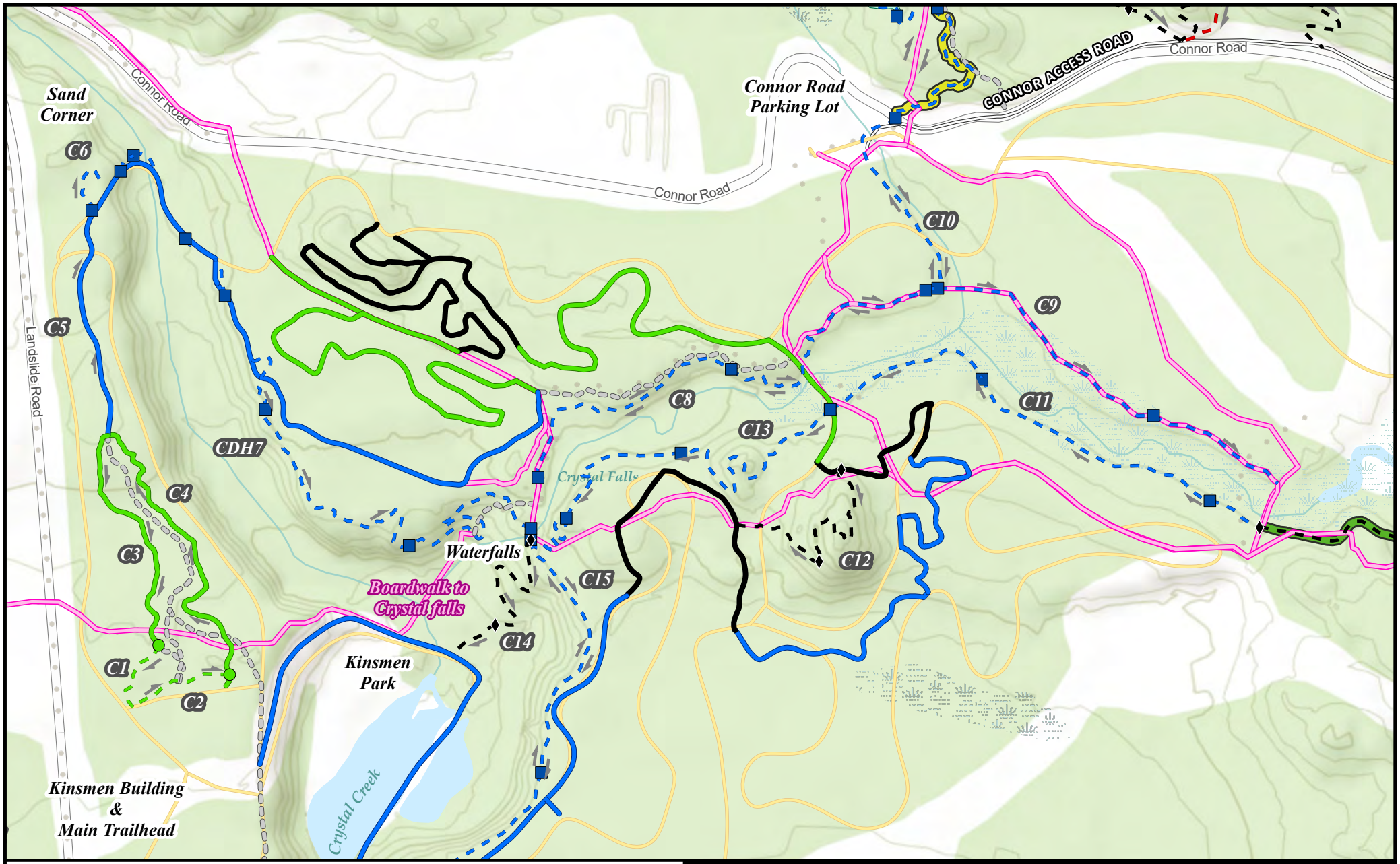
5.2.2. Upgrades to the Crystal Network

The crystal network is the main starting point for the most popular trail system in the network. A full progressive bike park experience is planned here with a pump track, skills area, and progression zone so that riders can learn how to ride and practice those skills in a logical and progressive manner as explained further in section 5.3.1 Pump Track and Skills Area. Showing progression in a trail system is a key method to reducing liability.

The main hub and starting point of trails will be the Kinsmen Building. From this point, a stacked loop system of trails will begin with kids trails labeled C1-4 on the Crytal North Map on the folowing page. These will have the intersections moved to a logical and visible location and the kids trails will be upgraded with frequent berms, rollers, and optional log and rock gardens for progression. A direction of counterclockwise is recommended to optimize use of features and flow on the downhill. All of the confusing intersections and the central Crystal Trail in this area should be decommissioned to simplify route finding with higher quality trail.

Stacked off the kids loop, the Crystal Trail will continue towards the sand corner, which currently is the site of frequent crashes. A re-route is proposed here to reduce the grade to <10% to be user friendly and fun and allow users to enter the main network. This upgrade is critical to the success of bringing intermediate skilled riders into the remaining trails within the Crystal trail system and out to Farmer Lake Trails. The current crystal network is a confusing jumble of trails that go in circles, the new trails are designed to go to destinations like the waterfalls, the river, and out to Farmer Lake. These new trails will be bench cut and optimize flow features to provide TUO of Fun, Play as well as connections with Nature. A loop is proposed up one side of the Crystal Creek and back down the other making use of the existing ski trail and hiking trail bridges to allow for shortcuts to this loop. This loop will also be used for the longer Farmer Lake Loop. A slightly easier descent line (C14) is proposed on the east side of the waterfalls which will allow riders to bypass an extended section of gravel road to finish their ride.

Photo by Colin Field



CRYSTAL NORTH TRAILS MAP

SAULT STE MARIE

TRAIL NETWORK DESIGN

N

0 45 90 180 Metres

1:6,000

LEGEND

- Farmer Lake Loop West
- Farmer Lake Loop East
- Ski Trails

Hiking Trails

- Existing
- Proposed
- Trail to be Decommissioned
- Roughed In Singletrack

Mountain Bike Trails

Existing

- Beginner Difficulty (Green)
- Intermediate Difficulty (Blue)
- Advanced Difficulty (Black)
- Expert Difficulty (Double Black)

Proposed

- Beginner Difficulty (Green)
- Intermediate Difficulty (Blue)
- Advanced Difficulty (Black)
- Expert Difficulty (Double Black)

McElhanney

McElhanney Ltd.
Date: 12/11/2020
2115, SP

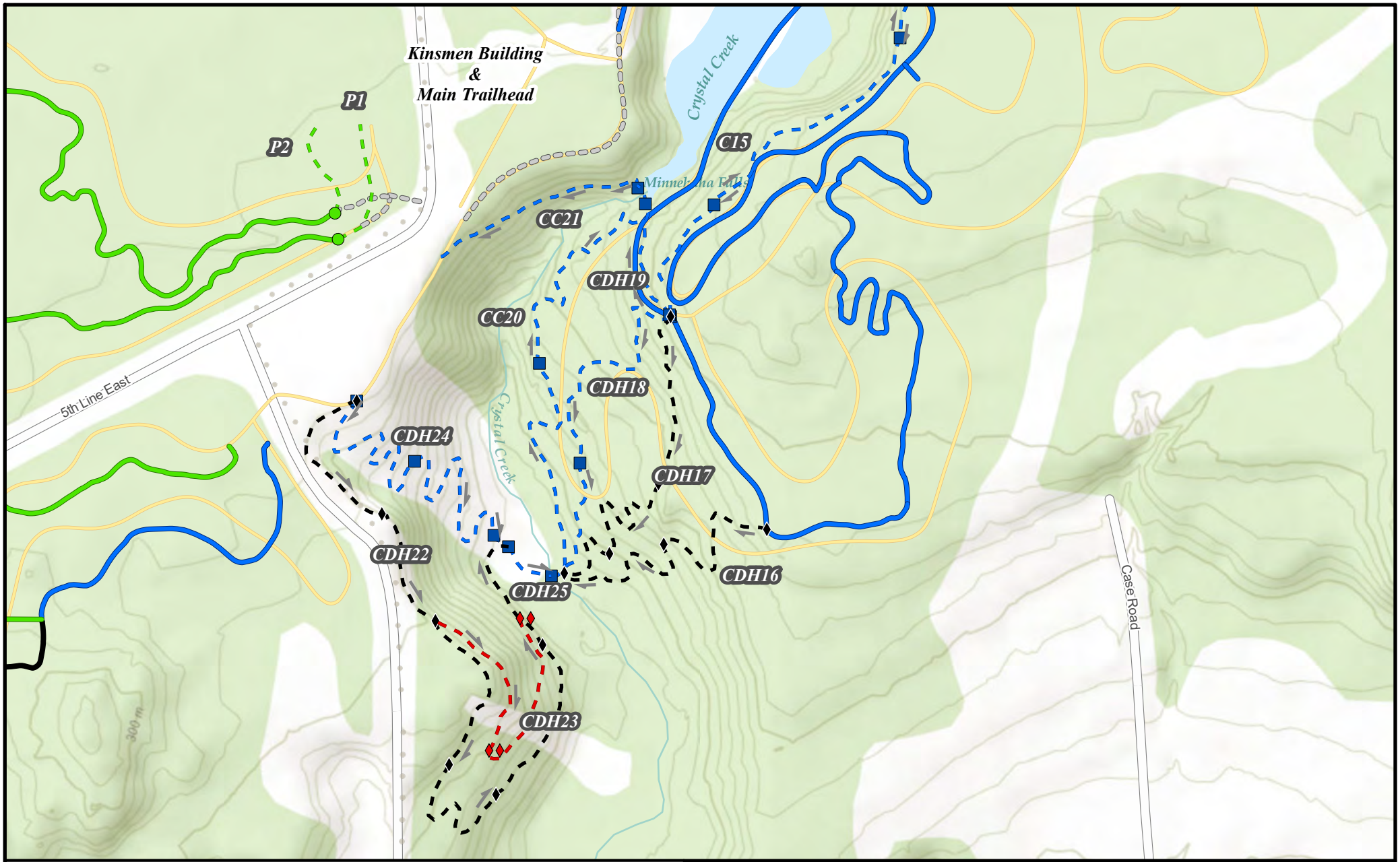
Spatial Reference:
NAD 1983 UTM Zone 16N

For the Crystal South proposed trails (see the Crytal South Map below) this area is proposed for full size flow trails as the terrain has appropriate grades and will shape easily. The sandy soils here are anticipated to require a clay cap to hold together to minimize braking bumps and keep berms well-shaped. Two loop areas are proposed which both use the same climbing trail, and emergency access can be through the ski trail network and the old service road at the bottom of the ski hill. Emergency access should be planned out for this area prior to constructing the trails and signage similar to a bike park should be applied describing which order to ride the trails in for progression.

Adjacent to Landslide road is the old ski hill and a slope with approximately 70m of vertical relief. Three downhill flow trails are planned for this area, CDH22 & 23 will be in the forest, and CDH24 would be on the landslide part of the abandoned ski hill. This ski hill would require geotechnical input regarding stabilization, with the fundamentals being using organics and vegetation to return the hill to its natural state before it was bulldozed as a ski run. The trail tread would be constructed with imported clay and in a manner to always shed water. Revegetating the ski hill should probably take place regardless of trail construction to stabilize the slope back to its natural state and reduce erosion into the creek. Restoration grants could be applied for this project.

The climb out of this area would be CC20 & 21, which would allow riders to lap the flow trails next to landslide hill, or CC20 would allow them to lap three flow trails on the east side. The east side is viewed as a good location for flow trails as the grade of the hillside optimal for this style of trails. CC21 is viewed as an extremely important connection as a way for all riders to exit from the entire Crystal and Farmer Lake trail systems to avoid the paved road climb.

Photo by Colin Field



CRYSTAL SOUTH TRAILS MAP

SAULT STE MARIE

TRAIL NETWORK DESIGN

N

0 45 90 180 Metres

1:6,000

LEGEND

- Farmer Lake Loop West
- Farmer Lake Loop East
- Ski Trails

Hiking Trails

- Existing
- Proposed
- Trail to be Decommissioned
- Roughed In Singletrack

Mountain Bike Trails

Existing	Proposed
Beginner Difficulty (Green)	
Intermediate Difficulty (Blue)	
Advanced Difficulty (Black)	
Expert Difficulty (Double Black)	

McElhanney

McElhanney Ltd.
Date: 12/11/2020
2115, SP

Spatial Reference:
NAD 1983 UTM Zone 16N

5.2.3. Upgrades to Pinder

The Pinder Trail network is viewed as the beginner trail network and will remain so due to the flat terrain. Upgrades that are proposed and shown on the Pinder map consist of realigning the entrance and exit (P1&2) to the parking lot and decommissioning old road crossing. The existing crossing is deemed unsafe as it is located on the corner of the road with poor sight lines. The new crossing would also be directly across from the Kinsmen building where a crosswalk could be considered for safety. Two shortcuts are proposed to break up the length of the Pinder loop, as currently it is too long for most young beginners. The shortcuts should be fun singletrack and could contain optional TTF's like low to the ground log skinnies.

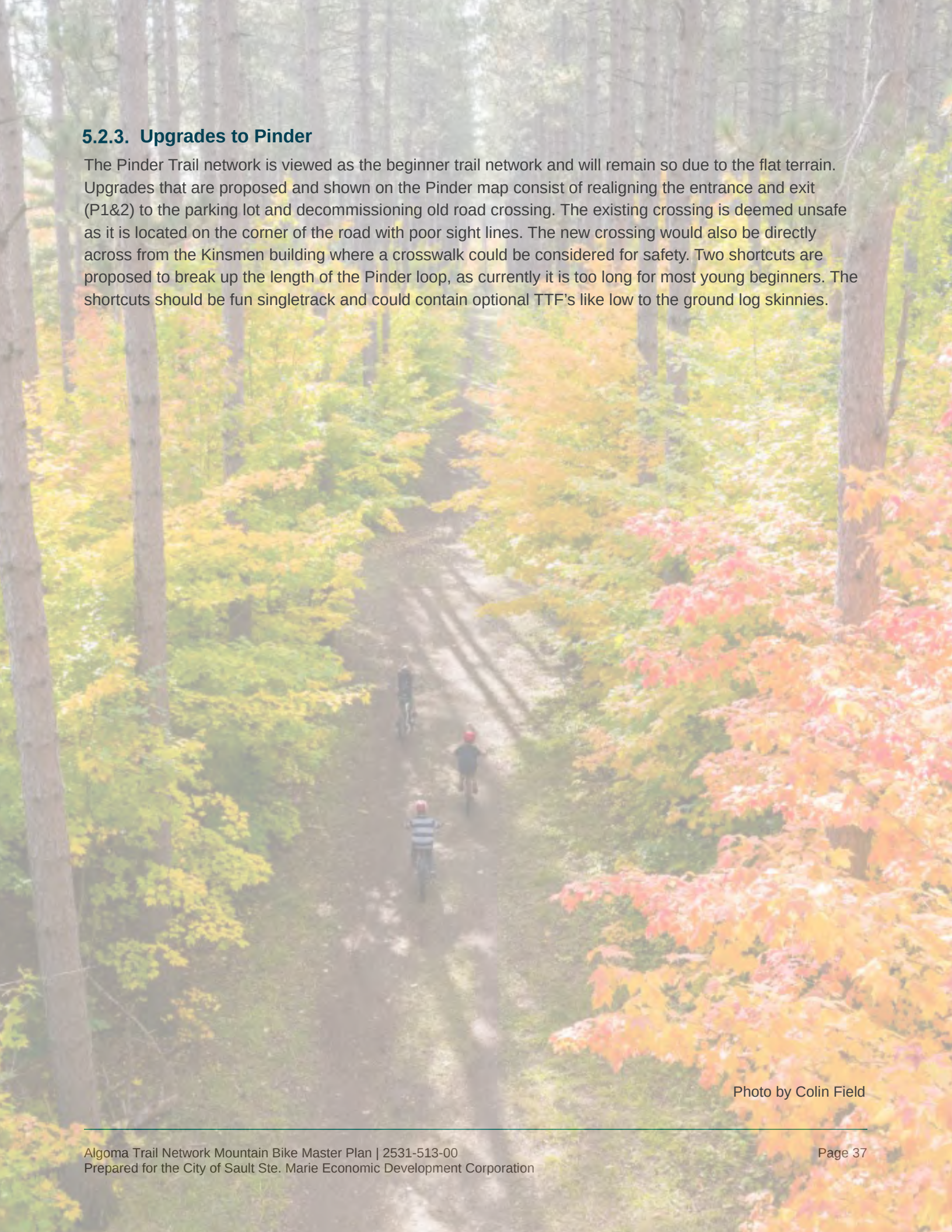
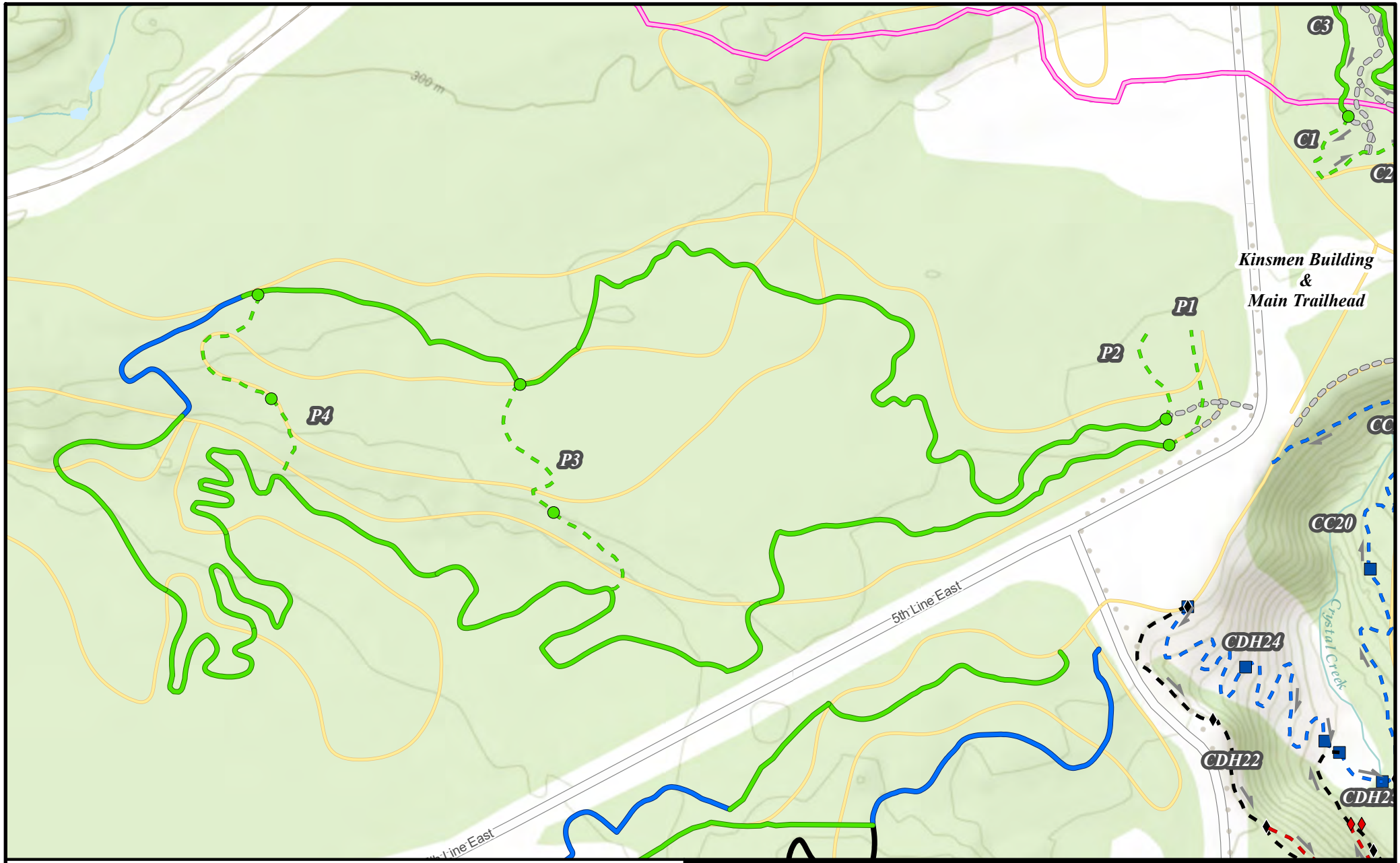


Photo by Colin Field



PINDER TRAILS MAP

SAULT STE MARIE

TRAIL NETWORK DESIGN

N

0 45 90 180 Metres

1:6,000

LEGEND

- Farmer Lake Loop West
- Farmer Lake Loop East
- Ski Trails

Hiking Trails

- Existing
- Proposed
- Trail to be Decommissioned
- Roughed In Singletrack

Mountain Bike Trails

Existing	Proposed
Beginner Difficulty (Green)	
Intermediate Difficulty (Blue)	
Advanced Difficulty (Black)	
Expert Difficulty (Double Black)	

McElhanney

McElhanney Ltd.
Date: 12/11/2020
2115, SP

Spatial Reference:
NAD 1983 UTM Zone 16N

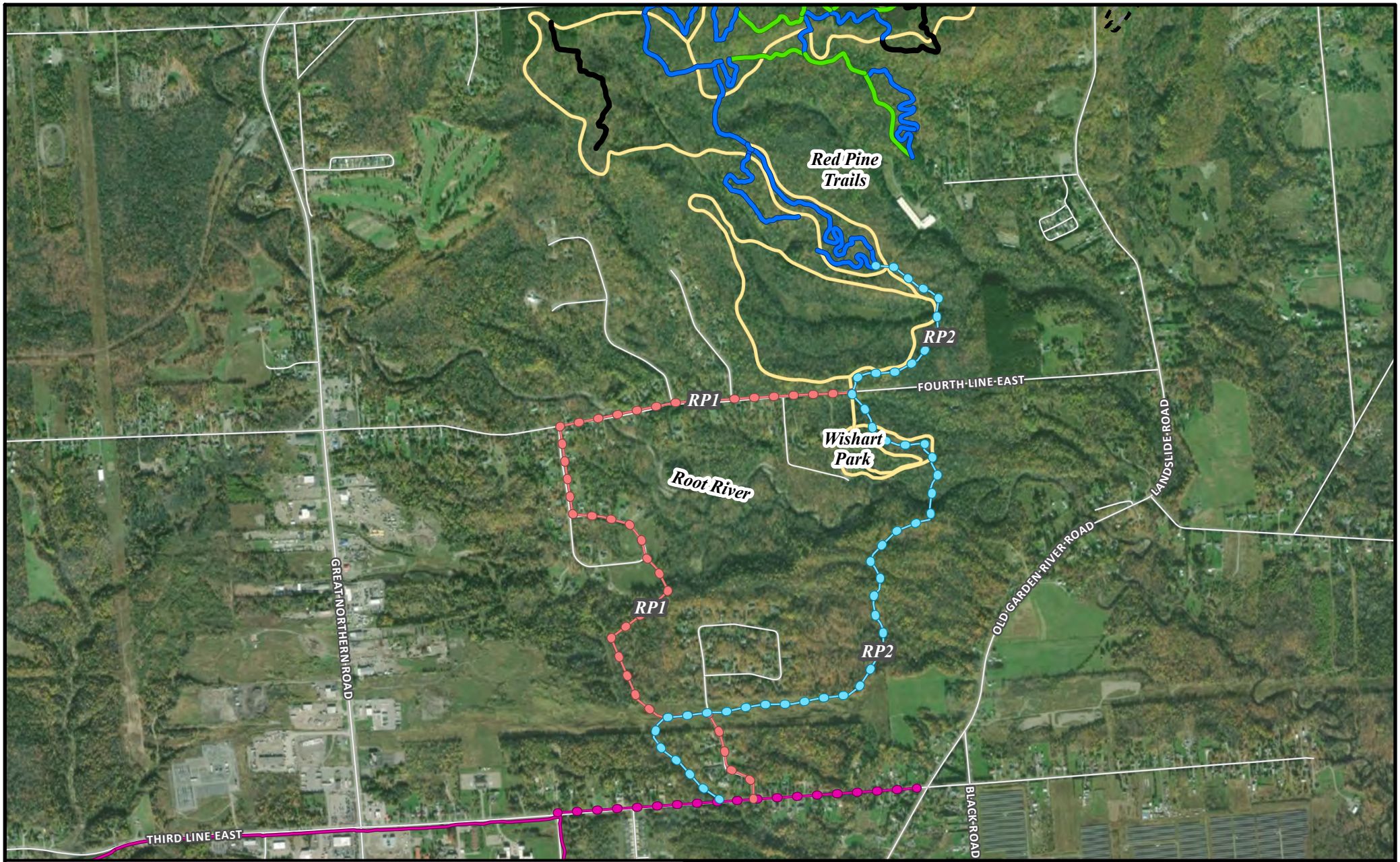
5.2.4. Community Connections & Trail Town Characteristics

A basic element of a 'Trail Town' includes making a strong and safe connection from the town to the trail system. The Community Connections map illustrates two proposed trail options from the existing Red Pine Trail Network to Sault Ste. Marie's Hub Trails. With the future Hub Trail extension, it will be possible to have a protected and consistent route to access the trail system from town.

The partial single-track connection is the simplest option with the shortest segment of new trail as it uses existing roads to make the connection. It requires more time spent on pavement but would function as an interim connection. The neighborhoods it connects would also receive the benefit of a trail experience for evening walks and for youth to ride very close to home.

The full singletrack connection provides a better trail quality experience as it is continuous and separated from vehicle traffic. It also provides more connection with nature and would allow users to experience the Root River and connect the neighborhoods with Wishart Park. This longer option would require a bridge, and if both options were constructed it would create a loop for these neighborhoods for dog walks and rides.

Photo by Colin Field



COMMUNITY CONNECTION OPTIONS MAP

SAULT STE MARIE

TRAIL NETWORK DESIGN

N

0 150 300 600 Metres

1:20,000

McElhanney

McElhanney Ltd.
Date: 11/7/2020
2115, SP

Spatial Reference:
NAD 1983 UTM Zone 16N

Source: USDA FSA, GeoEye, Maxar

LEGEND

- Ski Trails
- Community Bike Pathway

Connection Trails

Proposed

- Full Singletrack Trail
- Partial Singletrack Trail
- Future Hub Trail

Mountain Bike Trails

Existing	Proposed
Beginner Difficulty (Green)	
Intermediate Difficulty (Blue)	
Advanced Difficulty (Black)	
Expert Difficulty (Double Black)	

5.3. FEATURES OF PROPOSED TRAIL NETWORK

5.3.1. Pump Track and Skills Area

Figure 23. Example pump track in a forested area

Figure 22. Example skills area

Pump tracks are a series of banked corners and rollers arranged in such a manner that riders are required to carry momentum and balance using their arms and legs to pump around the track without pedaling. Tracks can be designed to be extremely progressive, as strategic placement and shape of features can be ridden differently by riders of difference skill levels. The same track can be designed and constructed to be challenging for both a 5-year old and a professional mountain biker. Integrating a beginner, intermediate and advanced pump track together, presents numerous riding lines to all levels of rider abilities, thus enabling a great deal of riders to use the feature in a small space. Parents of smaller riders may have a complete view of the entire track, thus easing concerns about safety.

Figure 24. Proposed location for fully built out progressive bike park at Kinsmen Park

Progressive learning is the theory behind a bike skills park. These parks are typically collocated with pump tracks and incorporate structures for beginners through to advanced skill level riders. They are also an excellent venue for organized bike skills learning classes. Practicing and repeating the bike skills builds confidence in all levels of ridership. The skills learned at such facilities may be applied to the conditions found out on the trails. Elevated narrow boardwalks, log “skinnies”, rock gardens and pump rollers test the riders’ abilities in bike skills parks.

The repeated practice by riders in a controlled safe setting builds the skills required to move through a beginner to a more advanced trail system, without the stress of an on-trail learning lesson, with the rider’s perception of holding up trail traffic. The inclusion of pump tracks and/or skills areas in the trail network plan is a legitimate way for a park to lower liability through providing facilities to progress a rider’s skill. Clear progression should be outlined through design, with low risk “filters” preventing an unskilled rider from entering a dangerous situation.

Figure 25. Intermediate Skills Zone as designed in 2020 for construction in 2021 with a series of drops, jumps and skills trails connecting to the pump track and Kids trails with features of progressive difficulty. This area is designed for self-improvement and for instructors to teach new skills.

Figure 26. Details of the intermediate Skills Zone

5.3.2. Technical Trail Features

Trails can be enhanced to meet the varying TUOs of different user groups and skill levels through the incorporation of activity-optimized technical trail features (TTFs). Trails should include features that provide for the objectives user groups are seeking in a way that is consistent with the TMO. Some examples of TTFs that may be suitable for the proposed trail network include:

- Making use of natural rolls or gullies in the terrain to improve flow;
- Constructing grade reversals and rolling grade dips of appropriate spacing and dimensions such that advanced user can achieve air time;
- Rollers, berms, and table-top jumps;
- Rock gardens & Rock Slabs;
- Steep chutes; and,
- Skinny wood features.

Figure 27. Example of trail design making use of natural terrain to create flow

Detailed design and siting of TTFs should be completed during detailed design of the proposed trail network. For purposes of this Trail Master Plan, examples of potentially suitable TTF types have been noted for appropriate trail types in Table 4 in Section 5.1.3.

Figure 28. Example of optional line for skinny wood feature

Figure 29. TTF examples for flow trails (BLM, 2017)

5.3.3. Signage

Trail enthusiasts of all types and abilities have a common need: to be oriented. To be effective, wayfinding and signage systems should be intuitive and attractive, and should be designed to support a safe and memorable visitor experience. Recognizable signage located in strategic locations enables trail users to make informed decisions as they plan their outbound and return routes. Signs should be concentrated at trailheads, parking areas, or other accesses, and should be kept to a safe minimum throughout the network. Interpretive signs that are not site-specific should be located to create natural rest points and take advantage of views, scenic features, and shade or shelter. Signage should be as simple as possible, easy to read and understand, and clearly visible as to allow users to quickly find the information that is relevant to them.

Figure 30. Signage in the current network.

Trailhead signs should be oriented to the landscape, and the current trailhead sign should be turned for this reason. Signage in the current trail network was hard to follow from the parking lot to the start of the singletrack in May of 2020. A complete signage plan with maps at important intersections and loops of a breadcrumb style are recommended.

The “breadcrumb style” is typically the most successful signage system for wayfinding navigation on non-motorized trail networks of this size. This means that a loop or route of consistent style and difficulty is designated by the same image, color marker (for example, an orange square), or some other identifying marker (eg. trail number 15 or name) allowing a rider to put the map away and make instant decisions at intersections. This signage style requires small signs at each trail intersection and throughout the network as appropriate for the trail setting.

Figure 31. Examples of breadcrumb signage for navigation that also include trail difficulty.

5.3.4. Skill Filters and Progression

The conceptual trail network is laid out in a manner as to provide the opportunity for skill progression for riders of all abilities. Additionally, all trails should be designed and constructed in a progressive manner – difficulty of features or TTFs should increase down a trail. To ensure that riders do not enter a trail exceeding their skill level or create a dangerous situation, skill filters should be constructed at the entrance to all trails. A skill filter is a high-skill, low-consequence obstacle that demonstrates the difficulty of the upcoming trail so that users are prepared for the upcoming level of difficulty. Where appropriate, signage can also be used in conjunction with a skill filter to warn users of the upcoming level of difficulty.

Figure 32. Skill filter example (BLM, 2017)

5.3.5. Bike Wash and Repair Stations

Bike-related amenities that are gaining popularity are bike repair and wash stations. Bike repair and wash stations should be located at the Kinsmen Park and within parks throughout the downtown.

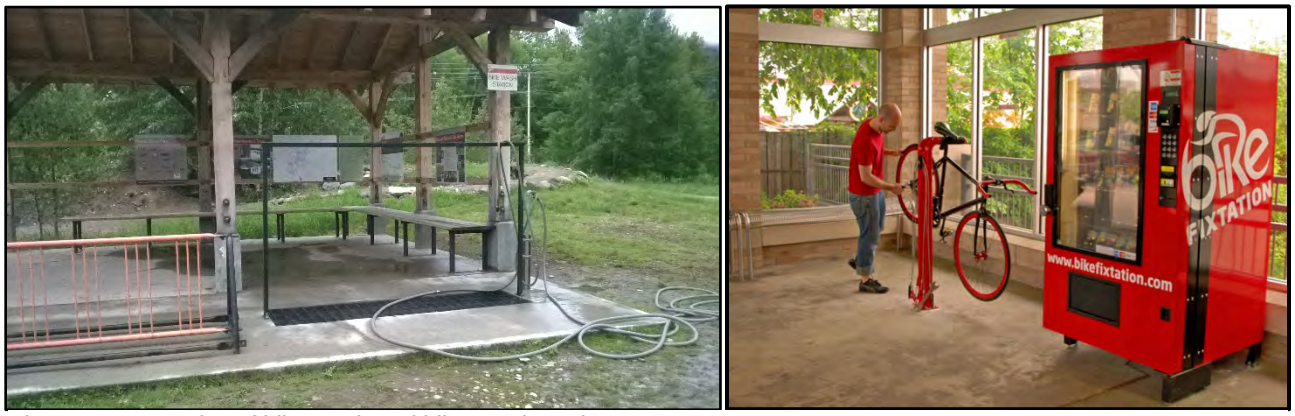


Figure 33. Examples of bike wash and bike repair stations

It is recommended that the City collaborate with other stakeholders and the private sector to ensure that efforts are not duplicated or adversarial if these types of facilities will be implemented. For example, local bike shops may want to provide a bike repair station or access to an air hose as a courtesy to customers to attract business. It is important to provide local businesses opportunities to provide peripheral services which improve the quality of the Sault Ste. Marie trail experience.

6. IMPLEMENTATION OF THE PLAN

The following sections discuss strategies and guidance for implementation of the proposed Trail Master Plan, including phasing strategies and cost estimates, detailed design, and next steps to ensure the success of the Sault Ste. Marie trail system.

6.1. COST ESTIMATES AND PHASING STRATEGY

Class D cost estimates for each trail segment and phasing maps showing the proposed trail layout through each stage are provided in Appendix B. Please note that the cost estimates are based on typical contractor rates based on McElhanney's experience. The unit rate of trail construction can vary significantly based on several factors, including contractor availability and experience, season of construction, trail width, equipment availability, methodology, coordination with regional partners, etc. For purposes of this report, the following unit rates for trail construction and associated tasks and infrastructure were used (in 2020 dollars):

Table 5. Unit Rate Summary

Item	Type	Rate	Units
Green Trail	Flow	$25	$/m
Blue Trail	Flow	$32	$/m
Black Trail	Flow	$35	$/m
Green Trail	Technical	$25	$/m
Blue Trail	Technical	$35	$/m
Black Trail	Technical	$40	$/m
Contingency	-	25	%
Design Fees	-	$1,700	$/km
Signage	First Phase at each area	$2	$/m
Signage	Other Phases	$1	$/m
Repair and Wash Stations	-	$4,000	each

The table in Appendix B also provides prioritization for each trail segment for the order in which they should be developed.

6.2. DETAILED DESIGN AND CONSTRUCTION

Prior to construction, each phase will require detailed design. Detailed design should be performed by a trail professional experienced with the guidelines and standards referenced in this report and in conjunction with City staff. As with any other piece of civic infrastructure, careful planning and monitoring is required for successful construction. The detailed design and construction for each phase should include the following:

- Pin flag layout of each trail and finalization of trail-specific TMOs;
- Signage plan;
- Construction planning, permits, and approvals;
- Tender package and contract preparation and procurement;
- Construction management and reviews;
- As-built mapping and project closeout.

Figure 34. Pin flag trail layout

6.3. OTHER NEXT STEPS

To ensure long-term success of the Sault Ste. Marie trail system, strong community and regional partnerships should be developed and long-term construction and operational funding must be secured. Throughout all stages of implementation of the TMP, various strategies can be employed to strengthen grant applications, increase volunteer turnout, community interest, as well as promoting the trail system itself. The following should be considered by the City:

Figure 35. Volunteer groups and organizations are an invaluable resource to trail network

- Quantify trail users on an ongoing basis - this will allow for hard data to quantify the current economic impact of cycling. Some products include TrafX trail counters, wildlife cameras, and surveys.
- Develop formal partnership agreements with stakeholder and interest groups – volunteer organizations play a vital role in trail development, maintenance, advocacy, and community engagement.
- Consult with regional partners, such as Stokely Creek to develop regional marketing strategies and resource sharing for trail construction.
- Secure capital investment dollars in conjunction with operational budget for ongoing trail operations and maintenance. Seek alternative funding sources, such as grants and partnerships with local industry, to increase funding availability. Other communities have used part of the destination marketing organization or Municipal Accommodation Tax to fund trail development and hire staff for maintenance.
- Train staff and volunteer groups to provide maintenance, inspection, and operations of the trail network to industry standards.

7. OPERATIONS AND MANAGEMENT

As previously noted, a mountain bike trail network can provide many benefits to an area. However, there are also case law precedents that identify that the owner of the trails has some obligation to ensure trails meet a duty of care. Hiring an experienced professional to design the trails is one part, but operations and management is the other part.

Ongoing operations and management by trail operators is important to the long-term success of any trail network. Trail operators must maintain the trails, manage risks and liability, plan for emergencies, respond to user feedback, and potentially manage changing conditions. Trail networks are analogous to other facilities and should be considered to require a similar level of asset management as a sports field or park. The following sections provide commentary around these issues and recommendations for the Sault Cycling Club, City of Sault Ste. Marie, and Kinsmen Club to incorporate into their trail management plans.

7.1. LAND USE

The construction of the Farmer Lake/Crystal Lake portion of the Algoma Trail Network is exclusively on Sault Ste. Marie Regional Conservation Authority property and is currently covered under permit #CYC19-04-30. The City is looking to enter into a longer term memoradum of understanding with the Sault Cycling Club, Sault Ste. Marie Regional Conservation Authority, and Kinsmen Club of Sault Ste. Marie for future trail development and maintenance.

7.2. MANAGEMENT OF LIABILITY

The best way to manage risk for trails is similar to any other infrastructure, by demonstrating a standard duty of care by implementing industry best practices through the planning, design, construction, operation, management, and maintenance phases of trail development. The concepts and recommendations presented in this report are intended to meet or exceed current industry best practices and should be implemented throughout the trail development process.

The following sections provide practical strategies and requirements for managing liability during operation of trail networks from a trail operations perspective.

7.2.1. Level of Service

Level of service is a term used by Parks Canada for management of trails that can be adopted by the trail managers as a liability management strategy. The level of service determines the inspection and maintenance frequency and defines certain activities and requirements for different trails. The idea recognizes that not all trails require the same level of service – for example, a low traffic trail in a remote area needs less intensive management than a skills park near a main staging area.

Element / Trail Type	Level of Service, Visitor Safety and Visitor Experience Tools			
	TYPE 1	TYPE 2	TYPE 3	TYPE 4
Level of Service				
Level of Service	High	Moderate	Low	N/A
Inspection	Weekly/monthly or upon visitor comment	Seasonal or as required upon visitor comment	Yearly or as required upon visitor comment	N/A
Deadfall Clearing	As required	As required / seasonal	Yearly	N/A
Infrastructure	Major (bridge, boardwalk, viewing platform)	Moderate (bridge, boardwalk, viewing platform)	Low or none (bridge, boardwalk)	N/A
Trail Materials and Surface Preparation	Asphalt, concrete or crushed rock • Repair cracks, fill holes, repack surface, create drainage, clear corridor	Crushed rock or natural mineral soil and rock • Fill holes, repack surface, create drainage, clear corridor	Natural mineral soil and rock or natural ground cover • Create drainage, clear corridor	N/A
Equipment	ATV, mechanized equipment, horse, hand or bicycle	ATV, mechanized equipment, horse, hand or bicycle	Non-motorized, horse, hand or bicycle	N/A
Visitor Safety				
Visitors Definition	Visitor may not understand all risks and may not be self-reliant in the event of an incident.	Visitor may have a general understanding of some risks and may be partially self-reliant in the event of an incident	Visitor has an understanding of most risks and may be self-reliant in the event of an incident	Visitor has an understanding of risks and will be self-reliant in the event of an incident
Risk Mitigation	Maximum effort made to mitigate risk.	Moderate effort made to mitigate risk.	Low effort made to mitigate risk.	Low too little effort made to mitigate risk.
Risk Identification *(Cautions and Warnings)*	High detailed explanation of risk – typically provided at trailhead, on maps and at areas of risk along the trail.	Moderate detailed explanation of risk – only significant risks identified. Information typically provided at trailhead and at areas along the trail	Low detailed explanation of risk – only site-specific or unusual risks. Information typically provided at trailhead.	Low detailed explanation of risk – only site-specific or unusual risks. Information typically provided at trailhead.
Risk Inspection	Weekly/monthly or upon visitor comment. *Risk inspection can occur during level of service inspection*	Seasonal or as required upon visitor comment. *Risk inspection can occur during level of service inspection.*	Yearly or as required upon visitor comment. *Risk inspection can occur during level of service inspection.*	N/A
Describing the Trail				
Targeted Visitor	Family-friendly, suitable for all visitors looking for an easy trail experience.	Suitable for most visitors who are generally active and have some basic trail experience.	Suitable for visitors who have trail experience and are active.	Suitable for visitors who have exceptional trail experience and are very active.
Trail Highlights	This section should provide the highlights of the trail, a sense of what the visitors will see. It helps to inform visitors about why they might want to choose to hike this particular trail. The purpose of this section is to give visitors a sense of what they can expect along this trail, but to describe it in a non-technical way.			
	Example: *This trail is an easy walk through a conifer forest and will bring you to a beautiful sand beach along Lake Superior.*	Example: *An enjoyable hike that will allow you to discover the animals of the boreal forest. Observe a beaver lodge, be on the lookout for a wide variety of songbirds and if you are lucky, you might catch a glimpse of some moose.*	Example: *A challenging trail that winds through a variety of terrain from valley bottoms to scenic hill top views. Enjoy lunch while taking in some scenic ocean views, be on the lookout for whales and seals.*	Example: *A challenging and spectacular route that the park recommends for experienced backcountry travelers. Route finding skills are essential since there are no trails or route markers to show the way. Weather in the mountains can also quickly reduce visibility.*

Figure 36. Example table for level of service for various types of trails (Source: Parks Canada)

It is recommended that the trail managers incorporate the level of service concept into trail management plans and create a network-specific classification for trails as they are constructed based on the number of users, trail location, maintenance staff skill/availability, and direction from the trail contractors as to trail-specific maintenance requirements.

7.2.2. Trail Construction and Maintenance

Trails need to be planned, designed, constructed, and maintained to the selected industry standard described in Section 5.1.4. A clear progression in difficulty of trails and TTF's should be present on the landscape. Consistent and responsible trail maintenance may be the most important aspect to keeping trail users safe from injury and protecting trail operators from lawsuits. It is important to note that poor property management is the most common lawsuit due to the trail user's claims of improper design, construction, or maintenance. Therefore, it is essential to develop specific policies that fit to local situations since trail and infrastructure maintenance requirements depend on many unpredictable factors. These policies should include thorough documentation of the inspection and maintenance of trails to provide protection from potential litigation. Included in the maintenance policy should be achievable goals set with reasonable deadlines and complexity and should be flexible to account for the potential growth in user numbers.

For the proposed trail network, the Sault Cycling Club has an aggreement in place with the SSMRCA & Kinsmen Club of SSM for the inspection and maintenance of the current trail network. Additional routine maintenance in the new network is expected to involve:

- Regular raking and reshaping of select high use flow trails due to braking bumps;
- Regular raking and re-shaping of pump track and skills area, particularly during dry and dusty conditions;
- Annual brushing of trail corridors as required.

7.2.3. Trail Inventory Mapping

The trail inventory needs to be updated annually based on inspection results. Included in the initial inventory should be a map of each mountain biking trail assigned with its difficulty rating as well as all main roads and water features. GPS information should accompany the map that includes trail line work, parking lots, roads and the location of features such as bridges, boardwalks, and other structures. An annual inspection of all trails and features should include trail name, difficulty rating, trail condition, the specific maintenance required, any concerns with safety or the environment, and the inspectors name and date. As well, any new trails or features will require the inventory to be updated. Typically trail inventory mapping can be completed by the construction contractor as the as-built conditions following completion and can be maintained over time by the trail operator as changes are made during maintenance.

7.2.4. Reporting and Planning Systems

As with any other piece of infrastructure, ongoing documentation of all inspections, injuries, hazards, risks, and other related aspects of the trail network is essential. Having these records is the best method to prove a duty of care has been provided to trail users and to defend against allegations of negligence. Keeping documents consistent, organized, and routine is a great way to defend and prevent lawsuits but also maintains a good relationship with partnered organizations. Documenting trail inspection and maintenance work will also help prioritize projects and helps with the overall flow of trails operations. Reporting and

planning systems management may be a shared duty between a trail organization, such as the Sault Cycling Club, Kinsmen Club, and the City.

Three main reporting systems should be developed and implemented: an incident reporting system, inspection system, and maintenance system. The incident reporting system should document reported or observed incidents and should include a root-cause analysis to analyze potential patterns in incident occurrence. The inspection system should include a plan for appropriately-timed inspections by a person or persons familiar with trail maintenance and design best practices. The frequency of trail inspections should be determined on a trail-by-trail basis based on a risk analysis and use level. Inspections must be thoroughly documented and should include review of the trail and infrastructure condition in comparison to the TMO and design documents to verify that all objectives are still met. Where deficiencies are noted, a prioritized maintenance plan should be developed and managed on a continuous basis.

It is imperative the reporting and planning systems developed and implemented are followed on a continuous basis. Case law in Canada has shown that land managers are rarely found liable for incidents on recreation trails, except where inspection and maintenance regimes were in place but not followed (Lau, 2018).

7.3. RISK MANAGEMENT

7.3.1. Public Safety

Public safety may be the greatest concern during trail design, construction, and maintenance. A safe trail network maintains popularity and functionality while it is negligence that will cause the network to fail. Keeping the trail design reasonable and the trails well maintained will save time and money in the long-term while also keeping riders and landowners satisfied.

It is important to implement a risk management program to prevent injuries and potential lawsuits. It is always important to plan ahead by identifying and correcting unreasonable hazards before they create injuries and educating the users before and while they are on the trail. In addition, policies need to be established focused on design, construction, maintenance of trails in accordance with industry best practices.

7.3.2. Emergency Planning

Sufficient emergency planning requires strong communication between the trail operators, the users, and emergency responders. Even with a strong risk management plan, injuries do occur, but by planning for emergencies within the design and keeping the trails actively supervised, the network will remain as safe as possible and successful.

The main steps to be considered in emergency planning are as follows:

- Design the network to have clear extraction zones for each trail segment and communicate to emergency responders on access routes to and from such zones. A clear strategy on the best ways to provide this information to emergency responders should be established so that emergency protocols are understood by all parties.
- Support emergency responders with maps, trail information, egress points, and provide them with access to locked areas.

- Educate the users with warning signs at trailheads emergency protocol and have clear signage explaining what to do and where to go in case of an emergency.
- Location identification is a great tool that can connect the user to trail patrol and first responders without confusion. Trail intersection signage that includes trail distance information or junction numbers would allow users to specifically identify which trail segment they were on which would help plan an efficient response. This type of signage is discussed in greater detail in the IMBA resources referenced by the TMP.
- Create an action plan that anticipates emergency and ensures efficient injury response.

7.3.3. Shared Use Trail Hazard Conflict and Impact Reduction Strategies

Some trail users perceive that mountain biking is dangerous and should not be accepted on shared use trails. Although there is always potential for conflict on shared use trails, this perception is often greater than reality. It is important to keep all users safe and comfortable while on the trails. To limit this unfortunate perception, there are four main solutions: education, user involvement, sophisticated trail design, and regulations.

The first step to managing conflict and impact reduction strategies is to properly design the trail layout. Trail users seek different experiences and it is important to guide each rider in a controlled manner. Trails should be designed to control speed, direction, and difficulty. Stacked loop networks provide the users with lots of diverse trail choices and spreading them out keeps them from becoming crowded.

Other important considerations include clear sight lines for trails, make them flow with no abrupt transitions, provide the user with a way out and a fall zone when riding through technical features, give space between such features, and post signs at gates to difficult trails.

Education, negotiation, compromise, and innovative management are the best measures in preventing environmental, safety, and social conflicts.

7.3.4. Fat Biking Trails – Conflict Avoidance, Layout & Grooming

In 2017 Pate Neumann conducted an undergraduate thesis at Thompson Rivers University on winter fat biking and conflict with XC skiing with findings that;

- The perception of conflict existed primarily from xc skiers towards mountain bikers. With the main concerns of safety, trail damage, and goal interference
- 79% of xc skiers had never had a negative encounter with a fat bike
- 78% of xc skiers believed fat biking should be welcomed as long is it does not interfere with the xc skiing.
- 80% of fat bikers were willing to pay between $5-$10 to ride on groomed fat bike trails
- Facility managers recommended proper design, construction, and maintenance of both single and multi-use trails

- Single use trails resolved conflict, which could also be reduced through community consultation and engagement

Figure 37 Fat Biker User Objectives from Neumann of Thompson Rivers University , 2017

Figure 39 shows a summary of the best practices from the survey results and the land mangers interviewed.

For trail choice for winter fat biking, trails that are chosen should prioritize the following guidelines as much as possible;

- Use trails with consistent snow depth
- Avoid areas which constantly refresh due to wind and are hard to keep firm
- Ideally use north facing aspects to reduce ice
- Design trails with gradual corners & gradual climbs
- Cross ski trails with good sight lines

Do Not Ride On The Trails If:

- You are leaving a tire rut deeper than 1–2 cm.
- You are having a hard time riding a straight line.
- Your bike tires are less then 3.7".
- Your tire pressure is greater than 6 psi.

Best Practices

- Fat bikes should yield to all other trail users and ride only on designated trails.
- Ride on firmest section of trail.
- Do NOT ride in or on classic tracks.
- Stay to right around corners.
- Allow snow a minimum of 6 hours to set-up after grooming.
- Use fat tire bikes only.
- Clean muddy tires before riding on snow trails.
- Do not wear headphones while riding.
- Use bright lights and reflective clothing if riding at night.
- Be an ambassador of the sport. Be polite, educate other riders, discourage bad behavior and follow the rules.
- Help out and get involved by joining your local cross-country ski club or volunteering to help maintain the trail system.

Figure 38. Fat Biking best practices from Neumann, Thompson Rivers University, 2017

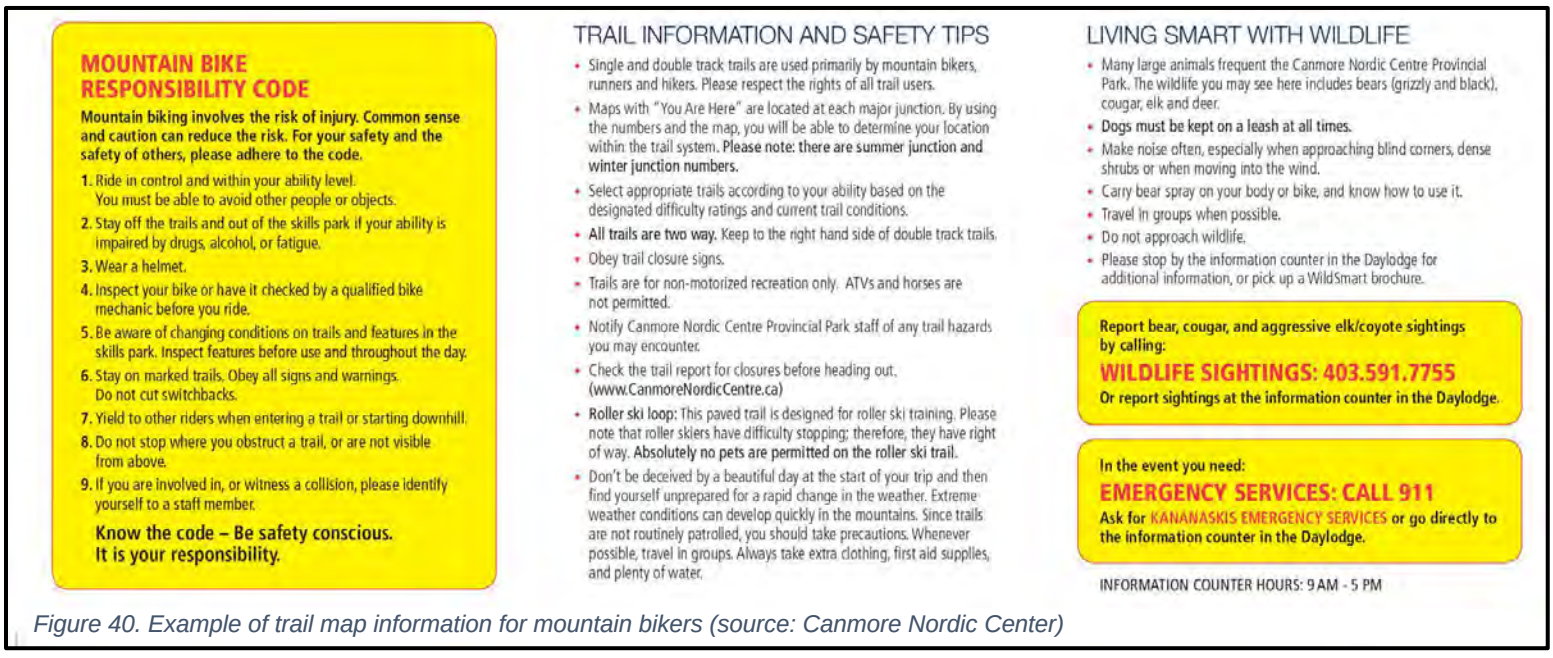
For winter grooming, many options exist and the most appropriate depends on the trail. For a narrow trail, the SnowDog or Rokon are good tools as they are narrow and can turn tight corners. This means trees that act as slalom gates and keep the trail tight and exciting in the summer can remain. The negatives of both of these tools are they do not travel well through deep fresh snow, and do not have enough pulling power in these conditions to haul a drag that can deeply knock the air out of the snow to transform it into a harder surface. A snowmobile has this power but is wider and does not turn tight corners well. A snowmobile is useful on wider trails with wide radius corners. A conventional XC ski drag can be narrowed to roughly the width of the snowmobile skis. Whatever drags are used, ensure they are light enough to be moved by hand as the operator will become stuck multiple times. Operator safety should be considered when selecting a grooming tool and trails that are off camber should be avoided or shoveled flat.

Figure 39. From top left; A SnowDog; Yvon Martel's MTT-136 electric snow machine; and a Rokon, a two wheel drive motor

7.3.5. Trail Etiquette Education

Educating users on proper trail etiquette helps to manage user conflict, preserve the environment, and improve the experience of all users on the trails. Trail etiquette includes educating users on passing etiquette, the rule of leaving no trace, and the hierarchy of the trail between hikers, cyclists, and perhaps other user group.

There are many ways to educate users such as signs, paid staff trail patrols, volunteer trail patrols, peer education, clinics, and handouts. Avid trail users from other trail networks may also help in the education process by simply setting a good example. The information below is an example from the Summer Trail map at the Canmore Nordic Centre.



MOUNTAIN BIKE RESPONSIBILITY CODE

Mountain biking involves the risk of injury. Common sense and caution can reduce the risk. For your safety and the safety of others, please adhere to the code.

1. Ride in control and within your ability level. You must be able to avoid other people or objects.
2. Stay off the trails and out of the skills park if your ability is impaired by drugs, alcohol, or fatigue.
3. Wear a helmet.
4. Inspect your bike or have it checked by a qualified bike mechanic before you ride.
5. Be aware of changing conditions on trails and features in the skills park. Inspect features before use and throughout the day.
6. Stay on marked trails. Obey all signs and warnings. Do not cut switchbacks.
7. Yield to other riders when entering a trail or starting downhill.
8. Do not stop where you obstruct a trail, or are not visible from above.
9. If you are involved in, or witness a collision, please identify yourself to a staff member.

Know the code – Be safety conscious. It is your responsibility.

TRAIL INFORMATION AND SAFETY TIPS

- Single and double track trails are used primarily by mountain bikers, runners and hikers. Please respect the rights of all trail users.
- Maps with "You Are Here" are located at each major junction. By using the numbers and the map, you will be able to determine your location within the trail system. **Please note: there are summer junction and winter junction numbers.**
- Select appropriate trails according to your ability based on the designated difficulty ratings and current trail conditions.
- **All trails are two way.** Keep to the right hand side of double track trails.
- Obey trail closure signs.
- Trails are for non-motorized recreation only. ATVs and horses are not permitted.
- Notify Canmore Nordic Centre Provincial Park staff of any trail hazards you may encounter.
- Check the trail report for closures before heading out. (www.CanmoreNordicCentre.ca)
- **Roller ski loop:** This paved trail is designed for roller ski training. Please note that roller skiers have difficulty stopping; therefore, they have right of way. **Absolutely no pets are permitted on the roller ski trail.**
- Don't be deceived by a beautiful day at the start of your trip and then find yourself unprepared for a rapid change in the weather. Extreme weather conditions can develop quickly in the mountains. Since trails are not routinely patrolled, you should take precautions. Whenever possible, travel in groups. Always take extra clothing, first aid supplies, and plenty of water.

LIVING SMART WITH WILDLIFE

- Many large animals frequent the Canmore Nordic Centre Provincial Park. The wildlife you may see here includes bears (grizzly and black), cougar, elk and deer.
- **Dogs must be kept on a leash at all times.**
- Make noise often, especially when approaching blind corners, dense shrubs or when moving into the wind.
- Carry bear spray on your body or bike, and know how to use it.
- Travel in groups when possible.
- Do not approach wildlife.
- Please stop by the information counter in the Daylodge for additional information, or pick up a WildSmart brochure.

Report bear, cougar, and aggressive elk/coyote sightings by calling:

WILDLIFE SIGHTINGS: 403.591.7755

Or report sightings at the information counter in the Daylodge.

In the event you need:

EMERGENCY SERVICES: CALL 911

Ask for KANANASKIS EMERGENCY SERVICES or go directly to the information counter in the Daylodge.

INFORMATION COUNTER HOURS: 9 AM - 5 PM

Figure 40. Example of trail map information for mountain bikers (source: Canmore Nordic Center)

8. CLOSURE

McElhanney is pleased to submit this report to the City of Sault Ste. Marie Economic Development Corporation. The opportunities in the Algoma Highlands are excellent for a diverse, exciting, and engaging trail network that entices locals and tourists to return time after time. McElhanney appreciates the opportunity to work with SSMEDC, and the stakeholders on this project and we look forward to working on the next steps identified is this report. If you have any questions regarding the information within, please do not hesitate to contact the undersigned.

Respectfully submitted,

Prepared by:
Matt Hadley, BSc.
Project Manager
mhadley@mcelhanney.com
403-621-4074

Reviewed by:
Mark Barsevskis, BES.
Planner
mbarsevskis@mcelhanney.com
604-424-4821

9. REFERENCES

Bureau of Land Management, 2017. *Guidelines for a Quality Trail Experience*.

Center for Business and Economic Research, 2014. *The Economic and Fiscal Impact of the Hatfield-McCoy Trail System in West Virginia*.

City of Sault Ste. Marie Sign Specifications, December 15, 2017

Cole, Zachary, 2015. Demographic and Behavior/ Preference Profile of the MTB Tourist. University of North Carolina.

Dufourd, Dick, National Off-Highway Vehicle Conservation Council 2015. *Great Trails: Providing Quality OHV Trails and Experiences*

Economic Benefit of Trails and Greenways, Rails to Trails Conservancy, Retrieved from: https://www.dep.state.fl.us/gwt/community/PDF/Economic%20Benefits%20of%20Trails%20and%20Greenways.pdf

International Mountain Bike Association, 2004. Trail Solutions: IMBA's Guide to Building Sweet Singletrack.

Lau, Lee, March 26, 2018. *The Liability for Non-Commercial Trailwork in British Columbia (and some parts of Canada)*. Retrieved from: http://www.leelau.net/sharonandlee/liability-for-non-commercial-trailwork-in-british-columbia-and-some-parts-of-canada/

Louv, Richard. *Science Based insights for a Meaningful Life.* Greater Good Magazine, retrieved from: https://greatergood.berkeley.edu/article/item/how_to_protect_kids_from_nature_deficit_disorder

Methow Valley Sport Trails Association, 2005. *Economic Impacts of MVSTA Trails and Land Resources in the Methow Valley*.

Michigan Tech ASMR, 2016. *2016 Copper Harbor Trails Survey: From the Market Impact Perspective*

Neumann, Pate, 2017. *Managing Conflict Among Recreational Trail Users: A Sustainability Study of Cross Country Skiers and Fat Bikers. Thompson Rivers University.*

Peter Larose, Larose Research, 2015. *Mountain Bike Tourism in Kamloops – Economic Impact and Sustainability Analysis*.

Price Waterhouse Coopers, 2000. An Economic Impact Analysis of the Proposed Alignment of the Trans Canada Trail in East-Central Alberta.

Statistics Canada. 2020. *Population and dwelling counts, for Canada, provinces and territories, and census subdivisions (municipalities), 2016 and 2011 censuses – 100% data (Ontario)*. Retrieved September, 2020.

Trailforks Mapping Inc., 2020. Retrieved from: https://www.trailforks.com/

University of Minnesota Tourism Center, 2009. *Economic Impact of Recreational Trail Use in Different Regions of Minnesota*.

US Forest Service, 2016. *Trail Fundamentals and Trail Management Objectives*.

APPENDIX A PHASING PLAN AND COST ESTIMATES

Priority	Area	Segment No.	Trail Description	Trail User Objectives	Difficulty	Trail Style	Length (m)	Construction Cost	Design	Signage	Contingency (25%)	Segment Total Cost
1	Farmer Lake Loop	West	Famer Lake Loop West will connect 3 lakes, multiple high viewpoints, waterfalls, and creeks all together with a flow trail with optional technical features. It will be purpose built to be ridden clockwise, but rideable both ways. Length is of new build. Mostly already designed.	Connectivity, exercise, variety, escape, nature, fun, challenge	Blue with optional black features	Tech & Flow	10000	$330,000	$2,000	$10,000	$85,500	$427,500
15		East	Mable Lake return will be more challenging as intermediate skilled riders could return via Connor Road or the West side. This trail will be purpose built for clockwise only with steeper descents than found on the west side. Construction will be completed as funding allows with a shortcut from Mabel Lake back to Connor road an interim possibility. Minimal intersections should be present to provide a sense of remote exploration.	Connectivity, exercise, variety, escape, nature, fun, challenge.	Black	Tech & Flow	9500	$304,000	$16,150	$9,500	$82,413	$412,063
										Farmer Lake Loop TOTAL		**$839,563**
part of 1	Farmer Lake Stacked Loop Trails	FC1	Main climb to the Canyon High Point, this climbing trail will be lapped by riders looking complete multiple downhills in this area. Parts of this trail will be ridden both ways by riders looking to lap the 3 downhill areas south of the Canyon, from the Sault Michigan High Point, and East of the Canyon. This trail is proposed to replace the existing Voyageur Hiking Trail which is routed through numerous wet areas.	Connectivity, exercise, nature.	Blue	Technical	1850	Part of Farmer Lake West Loop				
45		F2	Previously roughed in small XC loop which features rock rolls and challenging short climbs. A new entrance should be constructed to simplify the network intersections. Minor work required to improve flow.	Challenge, exercise	Blue	Technical	607	$6,069	$1,032	$1,214	$2,079	$10,393
20		FDH7	Downhill technical trail with rock slab TTF's to add to the challenge, part of this trail has already been roughed in.	Variety, challenge, risk.	Black	Technical	339	$5,087	$577	$678	$1,586	$7,928
14		FC8	Climbing trail which will serve as an exit from either FDH7 or 8, this area is wet and will require raised trail tread.	efficiency, exercise	Blue	Technical	349	$11,155	$593	$697	$3,111	$15,556
21		FDH8	Technical downhill extension from the Sault Michigan View Point to FC8. This trail is old-school in nature with tight janky corners and steep rock sections. It was previously roughed in and additional optional TTF features can be added.	Variety, challenge, risk.	Black	Technical	627	$5,015	$1,066	$1,254	$1,834	$9,168
25		Voyageur9	With all the wet and rutted out sections of the Voyageur Hiking trail removed, this would serve as a new, dry connection to the existing Voyageur Hiking trail. This would be hiking only. Includes all the decommissioning of the Voyageur Hiking trail back to the south JCT with F2	Connectivity	Blue	Technical	163	$10,394	$277	$326	$2,749	$13,746
13		FDH3	From the Canyon High Point multiple downhill options will be accessed off of this existing roughed in singletrack. It requires one large "Whales back" TTF to have a short wood ramp added to it as well as a ride around for the more challenging TTF's found along it. This DH will feed 3 additional DH runs that descend to Connor Road, from which riders could return up the FC1 Main Climb to re-lap the area. This trail needs to be constructed to a blue difficulty level as it will be the easiest way out of the network. The bottom of this trail needs to be re-worked to join into the main climb trail at the base of the main hill.	Challenge, variety, fun.	Blue	Technical	352	$3,518	$598	$704	$1,205	$6,024
23		FDH4	Downhill flow trail accessed from FDH3, this area has some soil mixed in with the rock, making it suitable for a flow trail, however extensive drainage will be required as the terrain is wet.	Play, Fun	Black	Flow	301	$11,150	$512	$603	$3,066	$15,331

Priority	Area	Segment No.	Trail Description	Trail User Objectives	Difficulty	Trail Style	Length (m)	Construction Cost	Design	Signage	Contingency (25%)	Segment Total Cost
22	Farmer Lake Stacked Loop Trails	FDH5	Downhill trail accessed from FDH3, Steeper technical trail with natural & added TTF's to contribute to challenge and technical nature of the trail.	Variety, challenge, risk.	Black	Technical	389	$12,432	$660	$777	$3,467	$17,337
24		FDH6	Downhill trail accessed from FDH3, Similar to FDH5 but steeper and more challenging.	Variety, challenge, risk.	Dbl Black	Technical	396	$12,667	$673	$792	$3,533	$17,665
33		FC10	Climb from the 4 way junction of trails at the Frog pond to the East Canyon High Point to access views of the canyon and two downhill runs.	Connectivity, challenge, exercise.	Black	Technical	667	$21,336	$1,133	$1,334	$5,951	$29,754
34		FDH11	Downhill trail from the East Canyon High Point to the access road. Steeper technical trail with natural & added TTF's to contribute to challenge and technical nature of the trail.	Variety, challenge, risk.	Black	Technical	677	$21,672	$1,151	$1,355	$6,044	$30,222
36		FDH12	Downhill trail that forks from FDH11 to the access road. Similar to FDH11 but steeper and more challenging.	Variety, challenge, risk.	Dbl Black	Technical	534	$17,102	$909	$1,069	$4,770	$23,850
										Farmer Lake Stacked Loop TOTAL	**$196,973**	
8	Crystal North Network Upgrades	C1	New exit from the Kids Trails which will line up directly across from the new Intermediate Skills Zone. Where this exits on to a road, it should have a series of chicanes to slow riders down prior to the road crossing and brush cleared for good sight lines. Should be smooth machine built.	Play, Challenge, Progression	Green	Flow	125	$3,374	$212	$250	$959	$4,795
9		C2	New entrance to the Kids Trails and start to the Crystal Network which will line up directly across from the new Intermediate Skills Zone. This trail should also serve as an access point for the advanced skills zone. Should be smooth machine built.	Play, Challenge, Progression	Green	Flow	165	$4,451	$280	$330	$1,265	$6,326
10		C3	The downhill part of the Kids Trail, requires multiple berms and some rollers to add fun to the experience	Fun, Play	Green	Flow	290	$5,000	$493	$580	$1,518	$7,590
11		C4	Slight Climb on the Kids Trail and main access to the Crystal Trails. Optional TTF's are planned to keep the trail engaging. These should be constructed with ample width to allow faster riders to pass.	Exercise, connectivity, variety, challenge	Green	Flow	389	$3,000	$660	$777	$1,109	$5,547
35		C5	The main connection to the Crystal Network, this straight old road has numerous rollers proposed to create a more interesting ride	Connectivity, challenge, fun	Blue	Tech & Flow	294	$2,000	$500	$200	$675	$3,375
2		C6	A bypass to the Sand Corner required to bring riders of a beginner or intermediate skill level into the remainder of the trail network. DH should be < 10% grade. Some retaining wall required on the steep sandy slope.	Connectivity, Fun	Blue	Technical	204	$18,333	$346	$407	$4,772	$23,858
3		CDH7	This will be the first "WOW" factor trail for riders on the Farmer Lake Loop. Large berms, rollers, and jumps are proposed and the trail takes riders directly to the viewing platform of the waterfalls. From there it climbs to the top of the falls where an existing bridge is located. This bridge requires a smoother entrance and then can link together the east and west sides of the trail network. Rock removal work is required near the falls.	Challenge, fun, variety, nature	Blue	Flow	909	$45,465	$1,546	$1,819	$12,207	$61,037

Priority	Area	Segment No.	Trail Description	Trail User Objectives	Difficulty	Trail Style	Length (m)	Construction Cost	Design	Signage	Contingency (25%)	Segment Total Cost
4	Crystal North Network Upgrades	C8	Two way trail from the bridge along the edge of the creek bank to be constructed as a rolling contour bench cut trail. Contains views of the river and a viewpoint of a small falls with a potential seating to allow users to slow down and connect with nature. Many riders exiting from the Farmer Lake Stacked Loop trails will exit using this trail. Small berms are proposed on this trail and the grade reversals should be designed that an advanced rider can use them as jumps. Basically a green trail due to the terrain.	Connectivity, Fun	Blue	Flow	722	$43,344	$1,228	$1,445	$11,504	$57,521
41		C9	A new bridge is required near C10 upgrades to the existing trail in low lying wet areas.	Challenge, escape, variety, nature	Blue	Technical	538	$17,203	$914	$1,075	$4,798	$23,990
37		C10	Serves as a more interesting connection to Connor Road parking lot than the ski trail network. Should undulate up and down the bank, small berms, basically a green trail due to the terrain.	Connectivity, Fun	Blue	Flow	221	$5,513	$375	$441	$1,582	$7,910
31		C11	Trail along the creek to allow users to connect with nature and create grade reversals to create flow and undulations. C8,9,11,&13 form a loop along both sides of the creek. C11 &13 form the fairly direct return trails from the Mabel Lake side of the Farmer Lake Loop. Small berms and rollers	Challenge, escape, variety, nature	Blue	Flow	626	$23,155	$1,064	$1,252	$6,368	$31,838
46		C12	A challenging trail to make use of the elevation in this area. Use any rock features possible to make the trail technical, both as a climb and DH.	Challenge, variety, exercise	Black	Technical	347	$11,088	$589	$693	$3,093	$15,463
5		C13	Connecting all the trails to the bridge at the top of the falls.	Challenge	Blue	Flow	672	$24,864	$1,142	$1,344	$6,838	$34,188
30		C14	Currently a very challenging descent exists next to the falls. This would a slightly easier descent to allow riders to complete their ride in a direct manner back to the Kinsmen Park and the climb out the paved road. Should be light Black or close to Blue.	Variety, challenge,	Black	Technical	288	$9,206	$489	$575	$2,568	$12,839
12			Intermediate Skills Zone & Pump Track	Progression, Fun, Play, Challenge	Green - Blue	Flow & Technical		$60,000	$3,000	$5,000	$17,000	$85,000
										Crystal North Network Upgrades TOTAL		**$381,277**
6	Crystal South Network Upgrades	C15	Two way trail along the ridge connecting the north and south parts of the Crystal Network with a trail that undulates and flows. Berms and grade reversals would make this trail fun.	Fun, connectivity, efficiency	Blue	Flow	851	$29,768	$1,446	$1,701	$8,229	$41,143
16		CDH19	A fun flow trail alternative to descending the road	Fun, Play	Blue	Flow	220	$9,240	$374	$440	$2,514	$12,568
7		CC21	Climbing trail exit out of the Crystal Network back to the trailhead, or to lap the flow trails beside Landslide Hill. Requires the widening of the railing on the existing dam structure	Connectivity, exercise, efficiency	Blue	Technical	289	$43,100	$3,500	$578	$11,794	$58,972
32		CDH16	Downhill flow trail off of existing trail Ridge Run to C25.	Play, fun, challenge	Black	Flow	456	$20,507	$775	$911	$5,548	$27,741
19		CDH17	Downhill slopestyle trail with large berms, rollers, jumps, and optional wooden features.	Play, fun, challenge	Black	Flow	557	$25,043	$946	$1,113	$6,775	$33,877
18		CDH18	Downhill flow trail offering medium sized jumps and berms as a progression to the two more advanced trails beside it.	Play, fun	Blue	Flow	486	$20,418	$826	$972	$5,554	$27,771

Priority	Area	Segment No.	Trail Description	Trail User Objectives	Difficulty	Trail Style	Length (m)	Construction Cost	Design	Signage	Contingency (25%)	Segment Total Cost
17	Crystal South Network Upgrades	CC20	The main climb trail out of this network, should be featureless smooth climbing trail	Connectivity, exercise, efficiency	Blue	Flow	696	$15,315	$1,183	$1,392	$4,473	$22,364
39		CDH22	The easiest build next to Landslide Hill, initial descent will parallel the road slightly rolling off the crest of the slope to create grade reversals. Trail should be packed with features such as jumps and berms. The exit of this trail will need to narrow as the terrain becomes quite steep	Challenge, play, fun	Black	Flow	1480	$74,001	$2,516	$2,960	$19,869	$99,346
40		CDH23	A Proline version of a jump trail with large features. This will attract riders from afar and act as advertisement for the trail system as well as reducing illegal trail construction.	Risk, challenge, play, fun	Dbl black	Flow	241	$18,099	$410	$483	$4,748	$23,740
44		CDH24	Downhill Flow trail on the old ski run, requires slope stabilization prior to construction. The grade on this ski run is excellent for flow trail construction.	Play, challenge, fun	Blue	Flow	688	$34,388	$1,169	$1,376	$9,233	$46,165
38		CDH25	Connecting Landslide Hill Trails with a bridge to the return climb on the east side of the creek. Bridge is cost estimated for a permanent structure, alternatively, a shorter span sacrificial structure that meets Whistler Trail Standards could be constructed which might be washed out in large floods.	Connectivity	Blue	Flow	63	$172,520	$35,000	$126	$51,912	$259,558
										Crystal South Flow Network Upgrades TOTAL		**$653,244**
26	Pinder Upgrades	P1	New end to the existing Homeward trail to eliminate the existing crossing at a blind corner on the vehicle road of Landslide Rd . A crosswalk should be installed between the Kinsmen Club of SSM and this parking lot.	Connectivity	Green	Flow	164	$4,423	$278	$328	$1,257	$6,286
27		P2	New start of existing Homeward trail to eliminate unsafe road crossing.	Connectivity	Green	Flow	130	$3,515	$221	$260	$999	$4,996
28		P3	Shortcut to create a smaller loop within the larger loop to allow for more progression for young riders and fewer family meltdowns. Clear signage required.	Fun, connectivity, efficiency	Green	Flow	366	$9,894	$623	$733	$2,813	$14,063
43		P4	Second shortcut to create a smaller loop within the larger loop to allow for more progression for young riders. Clear signage required.	Connectivity, variety, escape	Green	Flow	335	$9,044	$569	$670	$2,571	$12,854
										Pinder Upgrades TOTAL		**$38,198**
29	Community Connection	RP1	Shorter connection from the future paved Hub Trail to the Red Pine MTB network using small neighborhood streets and some new singletrack	Connectivity, nature, escape, efficiency	Green	Flow	1150	$31,050	$1,955	$2,300	$8,826	$44,131
42		RP2	Longer separated connection from the future paved Hub Trail to the Red Pine Network completely separated from vehicle traffic. A bridge is required over the Root River	Connectivity, nature, escape, efficiency, safety	Green	Flow	3800	$364,000	$50,000	$7,600	$105,400	$527,000
										Community Connection TOTAL		**$571,131**
											Grand Total	**$2,680,386**

Contact
Matt Hadley
403-621-4074
mhadley@mcelhanney.com

McElhanney

CANADA BEST MANAGED COMPANIES