

**Conceptional Trail Alignment
Lake Thunderbird State Park**

Prepared by



Rogue Trails, LLC

Putting Science into the Art of Sustainable Trail Building

Introduction

Rogue was retained by Visit Norman to conduct a field investigation regarding a proposed master trail concept. ("subject property") Lake Thunderbird State Park east of Norman, Cleveland County, Oklahoma. The site investigation took place in June through December.

This report summarizes trail concept designed around slopes and contours of 87 ft of elevation, soils, potential waters of the United State (US) including wetlands observed during the field investigations in preparation for NEPA process.

This assessment utilized trail guidelines from Forest Service (FS), Professional Trail Building Association (PTBA), International Mountain Bike Association (IMBA), and US Corps of Engineers, **1987 Federal Manual for Identifying and Delineating Jurisdictional Wetlands**.

A general walkover and preliminary site investigation were conducted over the subject property. Rogue recorded detailed GPS information throughout the proposed 270+-acre track.

SITE LOCATION AND LAND USE

The investigated property is east of Norman, OK and West of Tecumseh, OK in Cleveland County, Oklahoma

The Clear Bay Recreation Area Trail System, located on the south side of Lake Thunderbird in Norman, offers 18.5 miles of hiking trails for hikers and mountain bikers of all skill levels. Each of the five trails is interconnecting, and they can also be hiked on their own as a loop. Beginners are best suited to the 1.5-mile Green Loop and the 1-mile Yellow Loop, while intermediate hikers will be comfortable on the 1.25 mile Red Loop and 4.75 mile Blue Loop. The Gold Loop, which consists of 10 miles of switchbacks, should be left to expert-level hikers only.

From Highway 9, turn into the Clear Bay area and immediately turn right. Park here and enter the trail on the Green Loop. This trail is well-marked by green posts and can be hiked in a counterclockwise direction or combined with the adjoining Yellow Loop to create a 2.5-mile trek. Outdoor adventurers looking to reach the red or blue hiking trails should begin at the trailhead and follow the green trail until it meets up with the yellow trail. Turn right onto the Yellow Loop and continue north for less than half a mile to the Red Loop. Visitors hiking the Red Loop can complete it in 1.25 miles or remain on it just long enough to meet up with the Blue Loop.

Expert level hikers looking for a challenge on the Gold Loop should enter from Thunderbird Dam Road, just one mile northeast of the Clear Bay entrance on Highway 9. The trailhead for the Gold Loop is located on the left side of the road. This trail is especially tricky and includes several bypasses, a bridge, a rock drop and dozens of switchbacks.

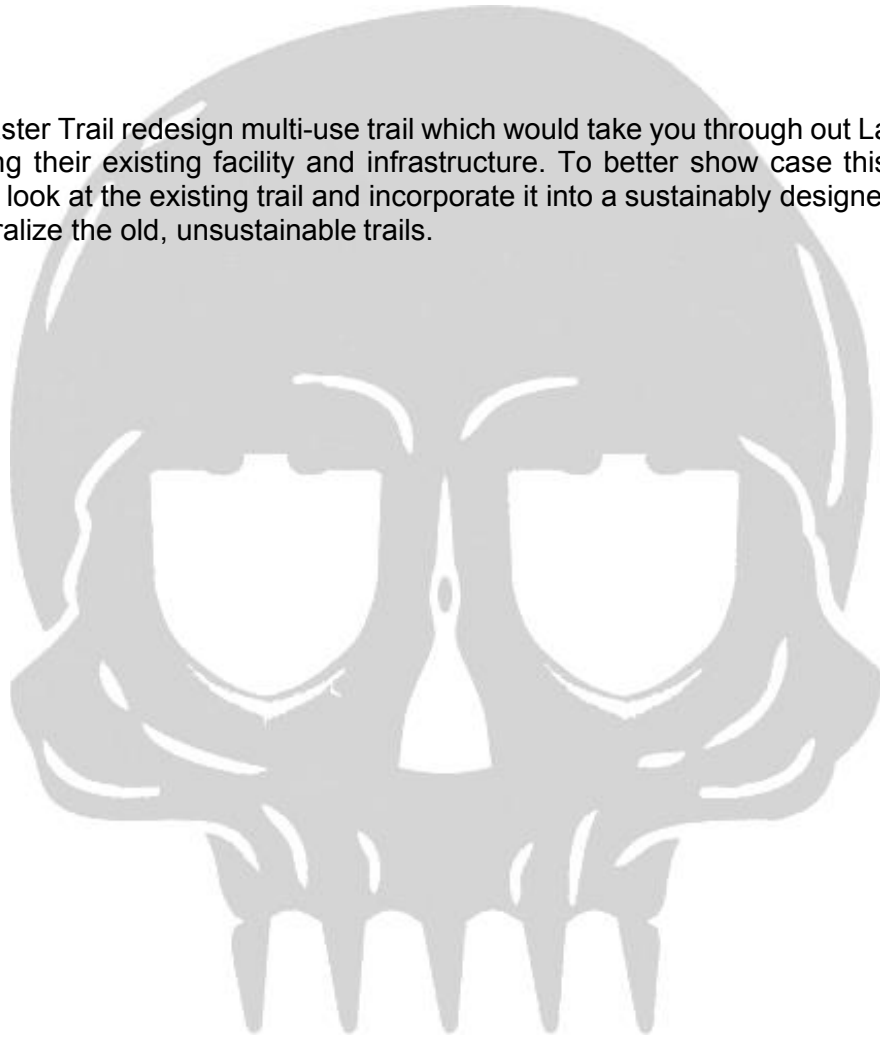
SITE HISTORY

Lake Thunderbird is a reservoir located in Norman, Oklahoma. The lake was constructed between 1962 and 1965 for the purpose of providing municipal water to the nearby communities of Del City, Midwest City and Norman. It is formed by an earthfill embankment (dam) 7,300 feet (2,200 m) long and up to 144 feet (44 m) high on the Little River. In addition to being a source for drinking water, Lake Thunderbird's secondary uses include numerous recreational activities.

The lake is named for the Native American legend of the Thunderbird, a supernatural bird of power and strength.

PROJECT PURPOSE

The proposed plan is a Master Trail redesign multi-use trail which would take you through out Lake Thunderbird State Park 270+/- acres. Utilizing their existing facility and infrastructure. To better show case this park and its natural beauty. This design would look at the existing trail and incorporate it into a sustainably designed contour trail, gravity trails, and rehab and naturalize the old, unsustainable trails.



Lake Thunderbird Trails



Trail Breakdown

Cross-Country Trails System

New Cross Country Flow Trail – 12.92 miles white/green/blue difficulty. Tread nature surface 12 to 24 inches 3-5% average slope. Bridges and boardwalks will be used throughout the cross-country system.

New build, good for families, new rides.

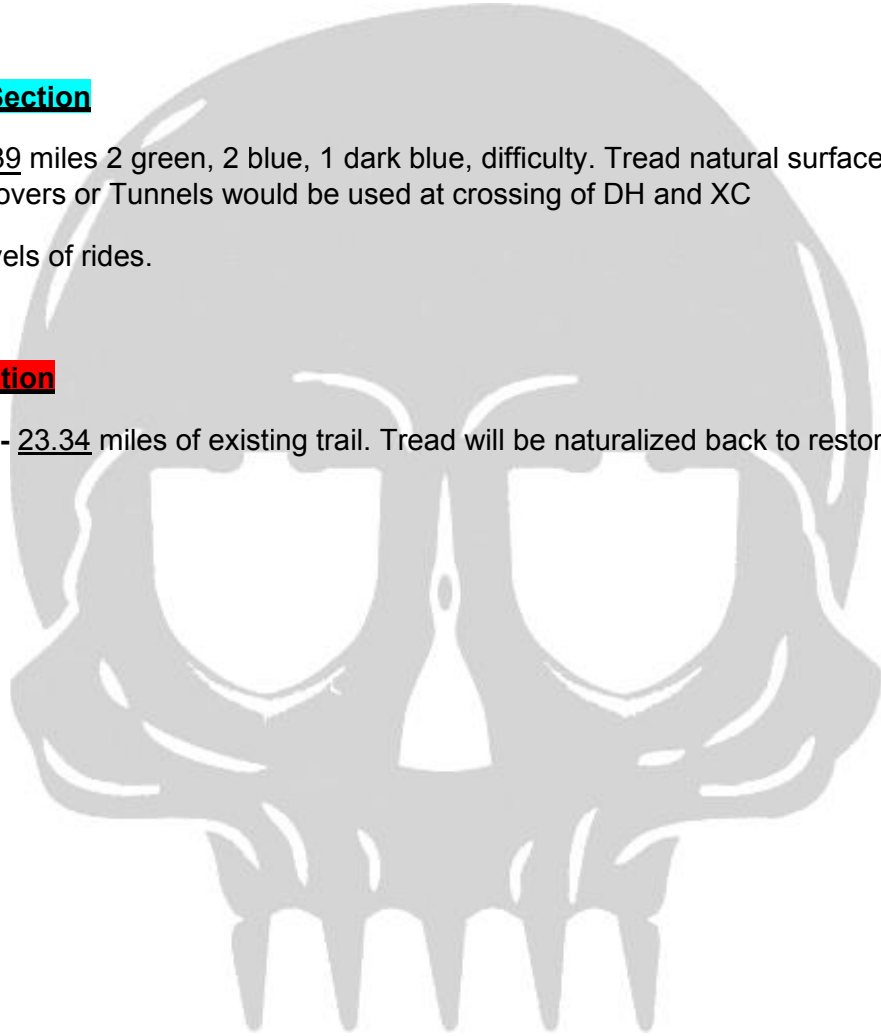
Hub and New Downhill Section

New DH Flow Lines – 1.39 miles 2 green, 2 blue, 1 dark blue, difficulty. Tread natural surface 48 to 60 inches 3-10% average slope. Flyovers or Tunnels would be used at crossing of DH and XC

New build, Good for all levels of rides.

Rehabilitation Trails Section

Old Cross Country Trail - 23.34 miles of existing trail. Tread will be naturalized back to restore to original surface and slope.



New Cross Coutry XC Trails



Cross-Country Flow Trails

This cross-country flow trail would incorporate the old trail and a new contour flow trail to 13 miles. The new single track would connect several trails creating loops. The system would travel through the forested areas traversing the contours of the parks 87 ft. of elevation emerging the user into a cornucopia of lush vegetation, wetlands, springs, and streams. Many of which are unique to the region and central Oklahoma. Cedar tread bridges, flyovers, and boardwalks would be placed throughout the trail.

The full loop could be done in a variety of ways creating new experiences at every turn. This would also get users to many of park's facility and this system would also make it possible to hold large events. In addition, the trail would have green blue and black trail features could be one way or bi-directional trail systems.

Section 1

XC 18,950 ft.

Single Track 3.58 miles

Section 2

XC 20,390 ft.

New Single Track 3.86 miles

Section 3

XC 9,059 ft.

New Single Track 1.71 miles

Section 4

XC 907 ft.

Single Track 0.17 mile

Section 5

XC 16,713 ft.

New Single Track 3.16 miles

Section 6

XC 1,790 ft.

New Single Track 0.33 miles

Section 7

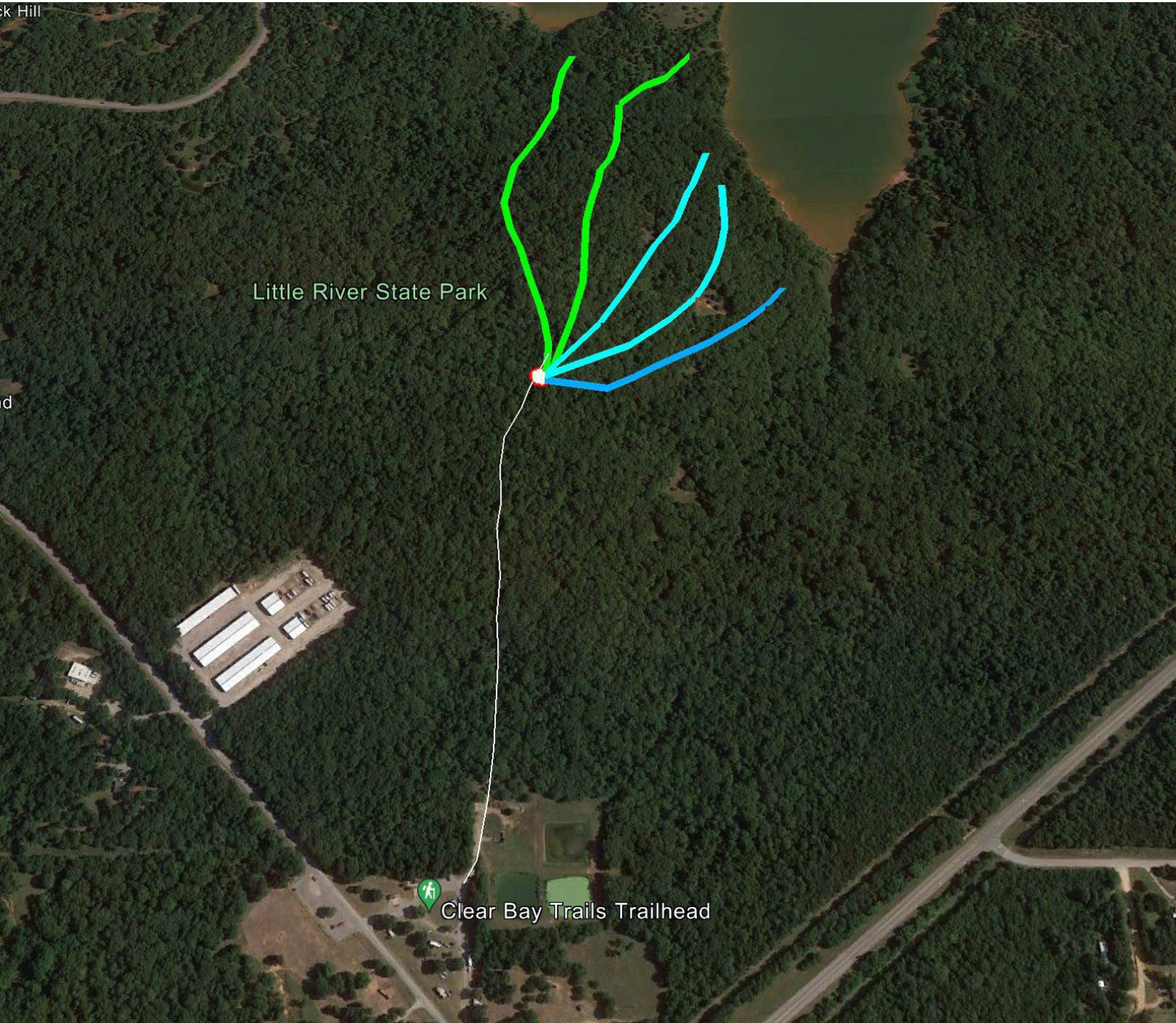
XC 590 ft.

New Single Track 0.11 miles

Totals 12.92 miles



Downhill Flow Trails



This downhill trail system would have a main hub with green, blue, and black trails. Many element/jumps, berms and wooden flyovers would be built throughout these trails creating a progressive system for people to advance their skills. This area would allow riders to session these downhill trails over and over with little effort by using the short return line.

Green DH Flow Trail 1832 ft. – one direction trail systems. 3 to 5% slope

Green DH Flow Trail 1751 ft. – one direction trail systems. 3 to 5% slope

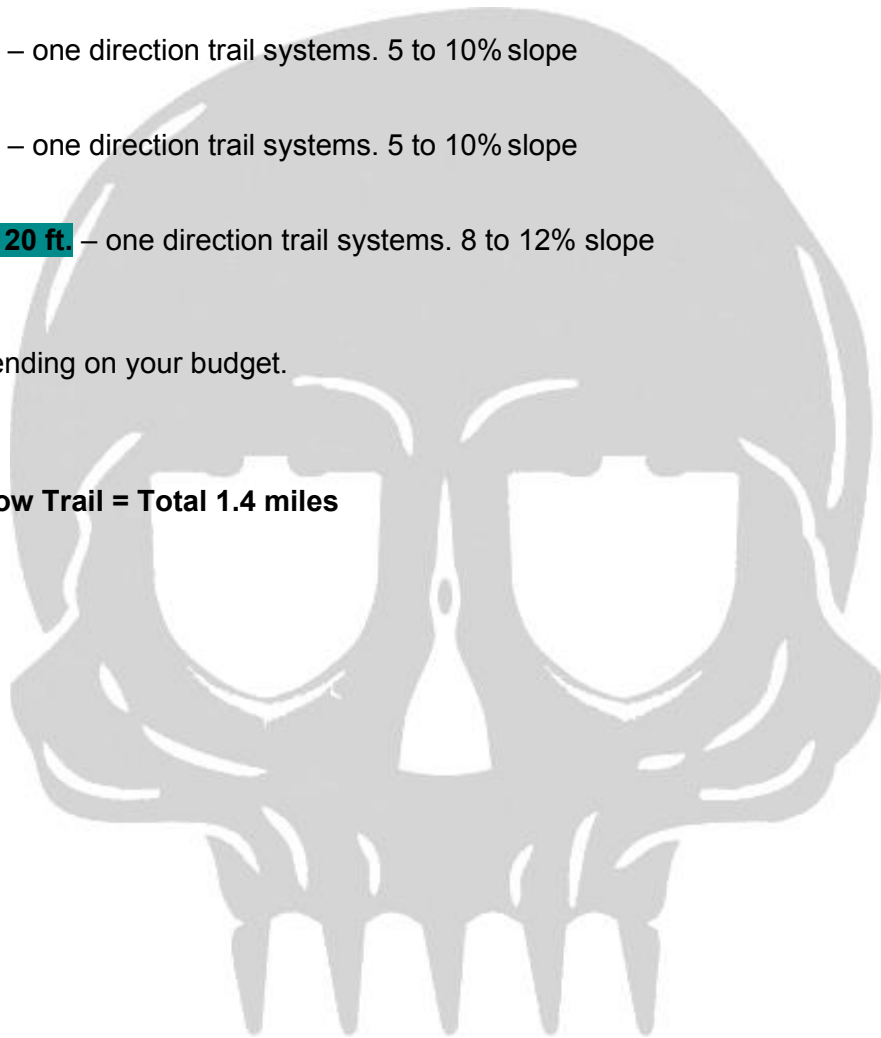
Blue DH Flow Trail 1339 ft. – one direction trail systems. 5 to 10% slope

Blue DH Flow Trail 1333 ft. – one direction trail systems. 5 to 10% slope

Dark Blue DH Flow Trail 1120 ft. – one direction trail systems. 8 to 12% slope

Hub- these vary in cost depending on your budget.

New green and blue DH Flow Trail = Total 1.4 miles



Rehabilitation Trails



Trail breakdown

- Rehab track 24,729 ft. / 4.68 miles
- Rehab track 6,181 ft. / 1.17 miles
- Rehab track 48,499 ft. / 9.18 miles
- Rehab track 3,836 ft. / 0.72 miles
- Rehab track 8,784 ft. / 1.66 miles
- Rehab track 20,248 ft. / 3.83 miles
- Rehab track 11,004 ft. / 2.08 miles

Total 23.3 miles



CONCLUSION

Rogue proposes a new alignment cross-county trail using the suggested green and blue trails map with more contoured layout with a 2-5 percent average slope with a 12-to-24-inch tread width. This will help maintain soils for proposed activities of mountain biking and hiking. Rogue would also propose a hub and green, blue, and black gravity trails. We recommend the bridge be replaced and flyover built.

To comply with the requirements of rehabbing the old, unsustainable trails, land managers have decommissioned many of the old trails and have disconnected the system by clearing cedar trees. This has started the rehabilitation process. This old trail will need to be naturalized back to original surface slopes.

These steps of enhancing the original trail system and adding a wider diversity of trail types to the system will create a world class amenity to the community and attract riders from a wider region.

Trail breakdown

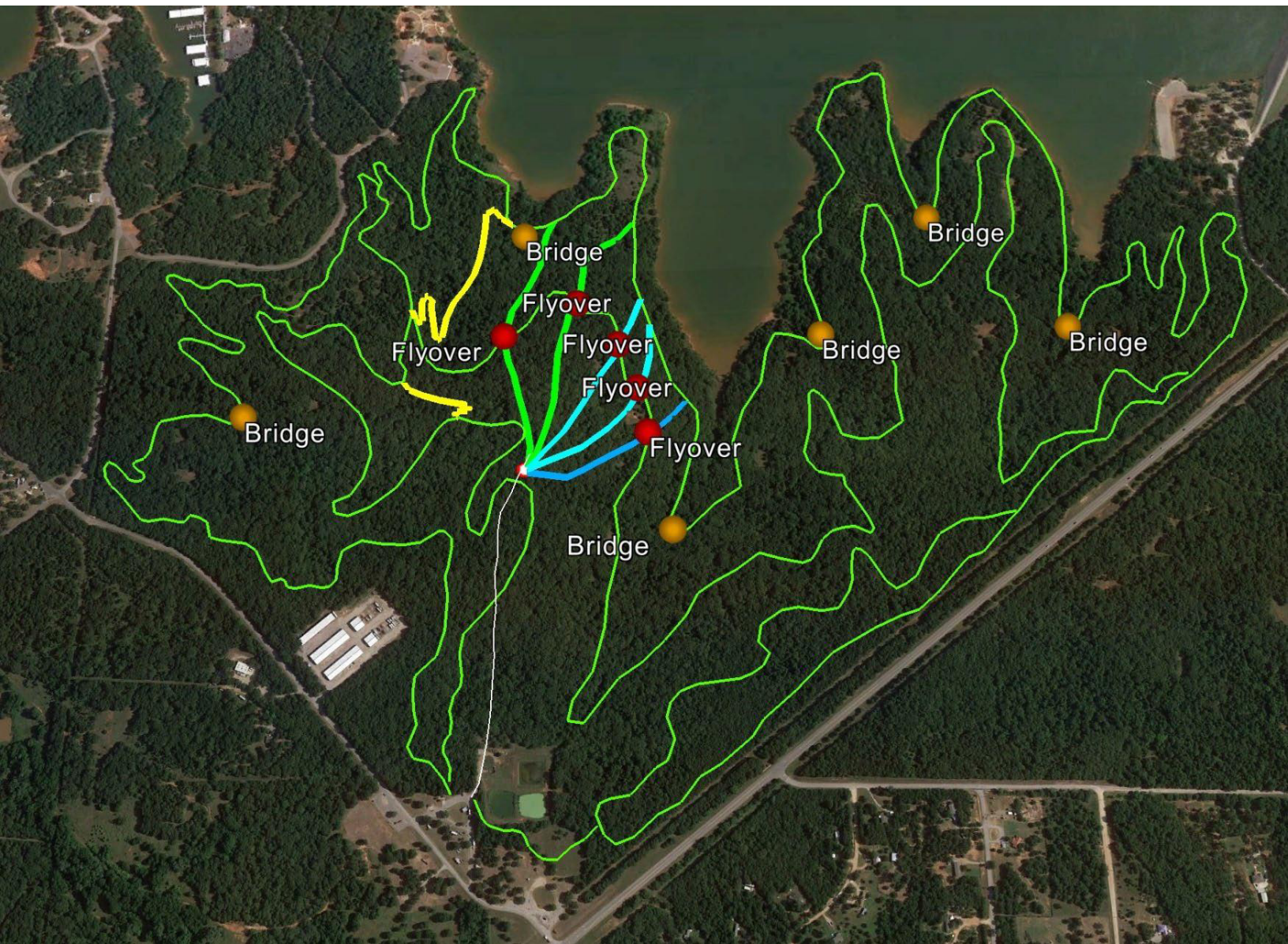
New XC single track 12.92 miles

5 New DH lines 1.4 miles

Rehab Trails used 23.3 miles.

Total miles of XC and DH Trails 14 miles

Wooden Feature Bridges and Flyovers



Thunderbird State Park Trails

TRAIL		UNITS	PRICE	QTY	TOTAL	NOTES
Cross-Country Flow Trail						
New Trail	Hand/Machine	LF	\$7.25	18,950	\$137,387.50	
Berms	Dirt	SFF	\$500.00	100	\$50,000.00	
Rock Work	Rock	Unit	\$40.00	150	\$6,000.00	
Bridges	Wood	Unit	\$110.00	180	\$19,800.00	
Cost					\$213,187.50	
Cross-Country Flow Trail						
New Trail	Hand/Machine	LF	\$7.25	20,390	\$147,827.50	
Berms	Dirt	Unit	\$500.00	2	\$1,000.00	
Rock Work	Rock	SFF	\$40.00	150	\$6,000.00	
Bridges	Wooden	SF	\$110.00	200	\$22,000.00	
Cost					\$176,827.50	
Cross-Country Flow Trail						
New Trail	Hand/Machine	LF	\$7.25	9,059	\$65,677.75	
Berms	Dirt	Unit	\$500.00	10	\$5,000.00	
Rock Work	Rock	SFF	\$40.00	150	\$6,000.00	
Bridge	Wood	SF	\$110.00	180	\$19,800.00	
Cost					\$96,477.75	
Cross-Country Flow Trail						
New Trail	Hand/Machine	LF	\$7.25	907	\$6,575.75	
Berms	Dirt	Unit	\$500	150	\$75,000	
Rock Work	Rock	SFF	\$40.00	12	\$480.00	
Bridge	Wood	SF	\$110	180	19800	
Cost					\$101,855.75	
Cross-Country Flow Trail						
New Trail	Hand/Machine	LF	\$7.25	16,713	\$121,169.25	
Berms	Dirt	Unit	\$500	12	\$6,000	
Rock Work	Rock	SFF	\$40.00	150	\$6,000.00	
Bridge	Wood	SF	\$110	220	\$24,200	
Cost					\$157,369.25	
Cross-Country Flow Trail						
Return Line	Hand/Machine	LF	\$7.25	1790	\$12,977.50	
Berms	Dirt	Unit	\$500	3	\$1,500	
Rock Work	Rock	SFF	\$37.50		\$0.00	
Bridge	Wood	SF	\$110		\$0	
Cost					\$14,477.50	
Cross-Country Flow Trail						
Return Line	Hand/Machine	LF	\$7.25	590	\$4,277.50	
Berms	Dirt	Unit	\$500	1	\$500	
Rock Work	Rock	SFF	\$37.50		0	
Bridge	Wood	SF	\$110		0	
Cost					\$4,777.50	
Total					\$764,972.75	
New Downhill Flow Trail						
		UNITS	PRICE	QTY	TOTAL	NOTES
Green DH Flow Trail 48-60 inch	Machine Built	LF	\$20.00	1751	\$35,020.00	
Berms	Dirt	Unit	\$750.00	10	\$7,500.00	
Jumps	Dirt	Unit	\$750.00	4	\$3,000.00	
Flyover	Wood	SF	\$110.00	420	\$46,200.00	
Cost					\$91,720.00	
Green DH Flow Trail 40-60 inch	Machine Built	LF	\$20.00	1823	\$36,460.00	
Berms	Dirt	Unit	\$750.00	10	\$7,500.00	
Jumps	Dirt	Unit	\$600.00	3	\$1,800.00	
Flyover	Wood	SF	\$110.00	420	\$46,200.00	
Cost					\$91,960.00	
Blue DH Flow trail 48-60 inch	Machine Built	LF	\$20.00	1339	\$26,780.00	
Berms	Dirt	Unit	\$750.00	8	\$6,000.00	
Jumps	Dirt	Unit	\$1,000.00	6	\$6,000.00	
Flyover	Wood	SF	\$110.00	420	\$46,200.00	
Cost					\$84,980.00	

Thunderbird State Park Trails

Blue DH Flow Trail 48-60 inch	Machine Built	LF	\$20.00	1333	\$26,660.00	
Berms	Dirt	Unit	\$750.00	6	\$4,500.00	
Jumps	Dirt	Unit	\$1,000.00	6	\$6,000.00	
Flyover	Wood	SF	\$110.00	420	\$46,200.00	
Cost					\$83,360.00	
Dark Blue Flow Trail 48-60 inches	Machine Built	LF	\$20.00	1120	\$22,400.00	
Berms	Dirt	Unit	\$750.00	1	\$750.00	
Jumps	Dirt	Unit	\$1,000.00	5	\$5,000.00	
Flyovers	Wooden	SF	\$110.00	420	\$46,200.00	
Cost					\$74,350.00	
Hub	Machine				\$75,000	75-250k
	Dirt/Rock					Based on 75k Hub
Cost					\$501,370.00	
Decommission/Rehab	Machine/Hand	LF	\$2.75	24729	\$68,004.75	
Decommission/Rehab	Machine/Hand	LF	\$2.75	6181	\$16,997.75	
Decommission/Rehab	Machine/Hand	LF	\$2.75	48499	\$133,372.25	
Decommission/Rehab	Machine/Hand	LF	\$2.75	3836	\$10,549.00	
Decommission/Rahab	Machine/Hand	LF	\$2.75	8784	\$24,156.00	
Decommission/Rehab	Machine/Hand	LF	\$2.75	20248	\$55,682.00	
Decommission/Rehab	Machine/Hand	LF	\$2.75	11004	\$11,006.75	
Cost					\$319,768.50	
Total Project Cost					\$1,586,111.25	
Mob		15%			\$237,916.68	
Contingency		15%			\$237,916.68	
FINAL PROJECT COST					\$2,061,944.61	