

Appendix A.2.1: OHV Trail Systems Implementation Plan Cost Estimates

26 February 2007

Low range estimates

Total costs					
	IAC grants		County hours		
			County cost		
				Volunteer value	

High range estimates

Total costs					
	IAC grants		County hours		
			County cost		
				Volunteer value	

Start-up tasks

0 Accomplish OHV Feasibility Study (1)	\$56,000	\$40,000	258	\$8,500	\$7,500
7.1 Resolve site/use and operating agreements					
1 Review/accept OHV Feasibility Study	\$600	\$0	18	\$600	\$0
2 Resolve a preferred site (1)	\$6,580	\$0	106	\$3,500	\$3,080
Prepare and submit grants for following tasks (1)	\$3,760	\$0	61	\$2,000	\$1,760
3 Complete master plan/SEPA on preferred site (1)	\$65,000	\$50,000	273	\$9,000	\$6,000
4 Resolve E&E service agreements/grants (1)	\$32,500	\$25,000	136	\$4,500	\$3,000
5 Sign interlocal agreements on preferred site	\$3,000	\$0	91	\$3,000	\$0

Funding sources

	\$56,000	\$40,000	258	\$8,500	\$7,500	IAC grant/BOCC matching funds
	\$600	\$0	18	\$600	\$0	IAC grant/BOCC matching funds
	\$11,280	\$0	182	\$6,000	\$5,280	DNR/BOCC/private
	\$3,760	\$0	61	\$2,000	\$1,760	
	\$97,500	\$75,000	409	\$13,500	\$9,000	IAC grant/BOCC matching funds
	\$65,000	\$50,000	273	\$9,000	\$6,000	NOVA E&E grant
	\$3,000	\$0	91	\$3,000	\$0	BOCC

7.2 Develop OHV trail systems

6 Improve access road (0 to 0.25 miles)	\$0	\$0	0	\$0	\$0
Develop staging area/trailhead (50 to 75 cars) (1)	\$134,980	\$94,486	736	\$24,296	\$16,198
7 Install Camp-Host monitoring option (1)	\$65,000	\$45,500	355	\$11,700	\$7,800
8 Develop OHV trail systems (23 to 26 miles) (2)	\$2,192,071	\$263,049	7,971	\$263,049	\$1,929,022
9 Install trail signage (1)	\$13,000	\$10,000	55	\$1,800	\$1,200
10 Develop non-motorized/other activities (5 miles) (2)	\$330,155	\$39,619	1,201	\$39,619	\$290,536

	\$39,600	\$32,256	216	\$7,128	\$4,752	NOVA ORV grant/DNR/user volunteers
	\$202,470	\$141,729	1,104	\$36,445	\$24,296	
	\$75,000	\$52,500	409	\$13,500	\$9,000	NOVA E&E grant/user volunteers
	\$2,317,448	\$278,094	8,427	\$278,094	\$2,039,354	NOVA ORV grant/DNR/user volunteers
	\$15,000	\$10,000	55	\$1,800	\$1,200	NOVA ORV grant/DNR/user volunteers
	\$330,155	\$39,619	1,201	\$39,619	\$290,536	NOVA NHR/NM grants/user volunteers

Start up cost/value (including IAC reimbursed)
County contribution (not IAC reimbursed)

	\$2,902,646	\$567,653	11,260	\$371,564	\$2,266,096
			2,088	\$68,896	

	\$3,216,813	\$719,197	12,703	\$419,185	\$2,398,679
			3,075	\$101,473	

7.3 Monitor/maintain OHV site

Amortization of timber revenue (10% of value)	\$12,252			\$12,252	
11 Monitor/maintain site/trailhead/trails (2)	\$66,000	\$7,920	240	\$7,920	\$58,080
12 Conduct annual assessments (1)	\$9,400	\$0	152	\$5,000	\$4,400

	\$19,003			\$19,003		amortized loss of income at 10% buffer area
	\$72,000	\$8,640	262	\$8,640	\$63,360	DNR/agencies/user volunteers
	\$14,100	\$0	227	\$7,500	\$6,600	DNR/user volunteers

Annual cost/value (including IAC reimbursed)
County contribution(not IAC reimbursed)

	\$87,652	\$7,920	392	\$25,172	\$62,480
			152	\$17,252	

	\$105,103	\$8,640	489	\$35,143	\$69,960
			227	\$26,503	

Annual revenue projections

Low range estimate - 2005

OHV users within OHV Service Area (Jefferson/Callam/Kitsap/Maso)				
	Number OHV occurrences			
		Number at OHV Trails System sites		
		% at Jefferson County site/yr		33%

High range estimate - 2025

OHV users within OHV Service Area (Jefferson/Callam/Kitsap/Mason)				
	Number OHV occurrences			
		Number at OHV Trails System sites		
		% at Jefferson County site/yr		33%

Number of OHV users who will visit Jefferson County site	52,736	365,048	19,350	6,385
OHV Trails System use/inspection fee			\$10	\$63,853
Annual county net revenue				\$46,601

	72,374	500,986	26,555	8,763
			\$10	\$87,632
Fees collected by Camp-Host				\$61,129

Assumptions

- (1) County provided 18%, volunteers 12% for a combined 30% match for IAC grant.
- (2) Volunteers construct class 2 OHV trails and class 5 and 3 non-motorized trails as self-help providing labor and most materials to match IAC grants. IAC grants provide 12% of the value of the trail construction to county for county (or contracted services) to perform oversight of volunteer workforce and monitor construction compliance by volunteers.
- (3) Page 24 of the OHV Feasibility Study - IAC Estimates of Future Participation in Outdoor Recreation, March 2003 with an estimated Jefferson County site capture of 33%.

Appendix A.2.2: Prototype trail development costs

Trail bike class 1/2 one way - compacted dirt (10 miles w/o services)

	unit	unit cost	qty	qty cost	
a	clear/grade/earthwork along trail corridor - 5.5' wide	sq ft	\$0.75	295,900	\$221,925
b	finish grade compacted dirt trail - 1.5' wide	sq ft	\$0.20	80,700	\$16,140
c	trail directory, 4"x4"cedar pole framed	each	\$350.00	20	\$7,000
Total construction cost per 10 miles				\$245,065	
d	construction sales tax (const)	8.2%		\$20,095	
e	design/engineering fees (const)	12.0%		\$29,408	
f	financing costs (const,tax, design)	8.0%		\$23,565	
g	contingency (const, tax, design, financing)	15.0%		\$47,720	
Total development cost per 10 miles				\$365,854	
Prorated per mile				\$36,585	

Trail bike class 3 one way - compacted dirt (10 miles w/o services)

	unit	unit cost	qty	qty cost	
a	clear/grade/earthwork along trail corridor - 4' wide	sq ft	\$0.75	215,200	\$161,400
b	finish grade compacted dirt trail - 1' wide	sq ft	\$0.20	53,800	\$10,760
c	trail directory, 4"x4"cedar pole framed	each	\$350.00	20	\$7,000
Total construction cost per 10 miles				\$179,160	
d	construction sales tax (const)	8.2%		\$14,691	
e	design/engineering fees (const)	12.0%		\$21,499	
f	financing costs (const,tax, design)	8.0%		\$17,228	
g	contingency (const, tax, design, financing)	15.0%		\$34,887	
Total development cost per 10 miles				\$267,465	
Prorated per mile				\$26,747	

ATV class 1 one way - compacted dirt (10 miles w/o services)

	unit	unit cost	qty	qty cost	
a	clear/grade/earthwork along trail corridor - 9.3' wide	sq ft	\$0.75	500,340	\$375,255
b	finish grade compacted dirt trail - 3.1' wide	sq ft	\$0.20	166,780	\$33,356
c	trail directory, 4"x4"cedar pole framed	each	\$350.00	20	\$7,000
Total construction cost per 10 miles				\$415,611	
d	construction sales tax (const)	8.2%		\$34,080	
e	design/engineering fees (const)	12.0%		\$49,873	
f	financing costs (const,tax, design)	8.0%		\$39,965	
g	contingency (const, tax, design, financing)	15.0%		\$80,929	
Total development cost per 10 miles				\$620,459	
Prorated per mile				\$62,046	

ATV class 2 one way - compacted dirt (10 miles w/o services)

	unit	unit cost	qty	qty cost	
a	clear/grade/earthwork along trail corridor - 7.8' wide	sq ft	\$0.75	419,640	\$314,730
b	finish grade compacted dirt trail - 2.6' wide	sq ft	\$0.20	139,880	\$27,976
c	trail directory, 4"x4"cedar pole framed	each	\$350.00	20	\$7,000
Total construction cost per 10 miles				\$349,706	
d	construction sales tax (const)	8.2%		\$28,676	
e	design/engineering fees (const)	12.0%		\$41,965	
f	financing costs (const,tax, design)	8.0%		\$33,628	
g	contingency (const, tax, design, financing)	15.0%		\$68,096	
Total development cost per 10 miles				\$522,070	
Prorated per mile				\$52,207	

ATV class 3 one way - compacted dirt (10 miles w/o services)

	unit	unit cost	qty	qty cost	
a	clear/grade/earthwork along trail corridor - 7.4' wide	sq ft	\$0.75	398,120	\$298,590
b	finish grade compacted dirt trail - 2.4' wide	sq ft	\$0.20	129,120	\$25,824
c	trail directory, 4"x4"cedar pole framed	each	\$350.00	20	\$7,000
Total construction cost per 10 miles				\$331,414	
d	construction sales tax (const)	8.2%		\$27,176	
e	design/engineering fees (const)	12.0%		\$39,770	
f	financing costs (const,tax, design)	8.0%		\$31,869	
g	contingency (const, tax, design, financing)	15.0%		\$64,534	
Total development cost per 10 miles				\$494,763	
Prorated per mile				\$49,476	

4WD class 1 one way - compacted dirt (10 miles w/o services)

	unit	unit cost	qty	qty cost	
a	clear/grade/earthwork along trail corridor - 40' wide	sq ft	\$0.75	2,152,000	\$1,614,000
b	finish grade compacted dirt trail - 5' wide	sq ft	\$0.20	269,000	\$53,800
c	trail directory, 4"x4"cedar pole framed	each	\$350.00	20	\$7,000
Total construction cost per 10 miles				\$1,674,800	
d	construction sales tax (const)	8.2%		\$137,334	
e	design/engineering fees (const)	12.0%		\$200,976	
f	financing costs (const,tax, design)	8.0%		\$161,049	
g	contingency (const, tax, design, financing)	15.0%		\$326,124	
Total development cost per 10 miles				\$2,500,282	
Prorated per mile				\$250,028	

4WD class 2 one way - compacted dirt (10 miles w/o services)

	unit	unit cost	qty	qty cost	
a	clear/grade/earthwork along trail corridor - 30' wide	sq ft	\$0.75	1,614,000	\$1,210,500
b	finish grade compacted dirt trail - 5' wide	sq ft	\$0.20	269,000	\$53,800
c	trail directory, 4"x4"cedar pole framed	each	\$350.00	20	\$7,000
Total construction cost per 10 miles				\$1,271,300	
d	construction sales tax (const)	8.2%		\$104,247	
e	design/engineering fees (const)	12.0%		\$152,556	
f	financing costs (const,tax, design)	8.0%		\$122,248	
g	contingency (const, tax, design, financing)	15.0%		\$247,553	
Total development cost per 10 miles				\$1,897,903	
Prorated per mile				\$189,790	

4WD class 3 one way - compacted dirt (10 miles w/o services)

	unit	unit cost	qty	qty cost	
a	clear/grade/earthwork along trail corridor - 21' wide	sq ft	\$0.75	1,129,800	\$847,350
b	finish grade compacted dirt trail - 5' wide	sq ft	\$0.20	269,000	\$53,800
c	trail directory, 4"x4"cedar pole framed	each	\$350.00	20	\$7,000
Total construction cost per 10 miles				\$908,150	
d	construction sales tax (const)	8.2%		\$74,468	
e	design/engineering fees (const)	12.0%		\$108,978	
f	financing costs (const,tax, design)	8.0%		\$87,328	
g	contingency (const, tax, design, financing)	15.0%		\$176,839	
Total development cost per 10 miles				\$1,355,763	
Prorated per mile				\$135,576	

Day hiking trail class 5 - compacted dirt (10 miles w/o services)

	unit	unit cost	qty	qty cost	
a	clear/grade/earthwork along trail corridor - 4' wide	sq ft	\$0.75	215,200	\$161,400
b	finish grade compacted dirt trail - 2' wide	sq ft	\$0.20	107,600	\$21,520
c	trail directory, 4"x4"cedar pole framed	each	\$350.00	20	\$7,000
Total construction cost per 10 miles				\$189,920	
d	construction sales tax (const)	8.2%		\$15,573	
e	design/engineering fees (const)	12.0%		\$22,790	
f	financing costs (const,tax, design)	8.0%		\$18,263	
g	contingency (const, tax, design, financing)	15.0%		\$36,982	
Total development cost per 10 miles				\$283,529	
Prorated per mile				\$28,353	

Off-road mountain biking trail class 3 - dirt (25 miles w/o services)

	unit	unit cost	qty	qty cost	
a	clear/grade/earthwork along trail corridor - 4' wide	sq ft	\$0.75	538,000	\$403,500
b	finish grade bike trail - 1' wide	sq ft	\$0.20	134,500	\$26,900
c	trail directory, 4"x4"cedar pole framed	each	\$350.00	25	\$8,750
Total construction cost per 25 miles				\$439,150	
d	construction sales tax (const)	8.2%		\$36,010	
e	design/engineering fees (const)	12.0%		\$52,698	
f	financing costs (const,tax, design)	8.0%		\$42,229	
g	contingency (const, tax, design, financing)	15.0%		\$85,513	
Total development cost per 25 miles				\$655,600	
Prorated per mile				\$26,224	

Horse trail - seperate trail (5 miles w/o services)

	unit	unit cost	qty	qty cost	
a	clear/grade/earthwork along trail corridor - 6' wide	sq ft	\$0.75	32,280	\$24,210
b	finish grade horse trail, compacted dirt - 2' wide	sq ft	\$0.20	10,760	\$2,152
c	trail directory, 4"x4"cedar pole framed	each	\$350.00	20	\$7,000
d	hitching posts, galvanized pipe w/cedar posts	each	\$500.00	10	\$5,000
Total construction cost per 5 miles				\$38,362	
e	construction sales tax (const)	8.2%		\$3,146	
f	design/engineering fees (const)	12.0%		\$4,603	
g	financing costs (const,tax, design)	8.0%		\$3,689	
h	contingency (const, tax, design, financing)	15.0%		\$7,470	
Total development cost per 5 miles				\$57,270	
Prorated per mile				\$11,454	

Trailhead - w/sanican services

	unit	unit cost	qty	qty cost	
a	clear/grade/earthwork for site improvements	sq ft	\$0.75	10,890	\$8,168
b	landscape/bank stabilization plantings about site	sq ft	\$3.25	2,723	\$8,848
c	trail directory, 4"x4"cedar pole framed	each	\$350.00	2	\$700
d	trail bench, 8"x8"x10'wood beams w/conc support	each	\$1,900.00	3	\$5,700
e	trash receptacles w/concrete support	each	\$800.00	2	\$1,600
f	restroom facilities, sani-can w/concrete platform	each	\$1,500.00	2	\$3,000
g	parking, 2"asphalt concrete/4"crushed rock (50 cars)	sq ft	\$3.00	15,000	\$45,000
h	wheel stops, 10"x6"x8'precast concrete	each	\$156.00	50	\$7,800
i	access road, 2"asphalt concrete/4"crushed rock, 24'x200'	sq ft	\$2.00	4,800	\$9,600
Total construction cost				\$90,416	
j	construction sales tax (const)	8.2%		\$7,414	
k	design/engineering fees (const)	12.0%		\$10,850	
l	financing costs (const,tax, design)	8.0%		\$8,694	
m	contingency (const, tax, design, financing)	15.0%		\$17,606	
Total development cost per site				\$134,980	

Source: Beckwith Consulting Group

Appendix A.2.3: Trail design standards

Motorized									
Grade	Trail bike			ATV			4-wheel		
	1	2	3	1	2	3	1	2	3
slope - sustained				15%	25%	35%	20%	20%	30%
length in feet				200'	300'	500'	200'	250'	300'
slope - maximum	15%	30%	50%	20%	30%	50%	20%	30%	50%
length in feet									
cross slope	5%	8%	10%	5%	5%	5%	5%	8%	10%
Clearing - shoulder each side									
shoulder width	2'	2'	1.5'	3.1'	2.6'	2.5'	15'	12.5'	8'
road separation									
height in feet	8'	8'	8'	6'	6'	6'	12'	9'	8'
Path tread - width									
width - two way	1.5'	1.5'	1'	6.2'	5.2'	4.8'	10'	5'	5'
width - one way									
Turns									
radius in feet									
number/1/4 mile	2'	5'	11'	2'	6'	11'			
number/150 feet							0	2	5
Surface									
concrete									
asphalt									
wood planking									
crushed rock									
pea gravel									
bound woodchips									
coarse gravel			yes			yes			yes
sand		yes	yes	yes	yes	yes		yes	yes
compact dirt	yes	yes	yes	yes	yes	yes	yes	yes	yes
mud		yes	yes		yes	yes		yes	yes
water			yes			yes			yes
snow - inches									
obstacles									
small logs - per mile	0	5	5	0	5	5	0	5	5
log diameter inches		6"	16"		8"	8"		6"	10"
water xing - deep				6"	10"	10"			
water xing - long				10'	25'	25'			

Sources:

- Pedestrian Facilities Guidebook WSDOT,/PSRC1997
- WSDOT Design Manual, Chapter 1020 - Bicycle Facilities, May 2001
- US Forest Service Handbook, Washington 1987