



APPENDIX B **TRAIL COST ANALYSIS**



TRAIL COST ANALYSIS

Trail construction costs can vary due to a variety of factors, including local conditions, trail type (use mode), and support services that will be included. This cost analysis, therefore, is a general guideline for the purpose of preliminary estimation of trail costs. More detailed cost estimation should be performed at other points in the trail implementation process, particularly at the time of application for funding, during preliminary design, and prior to bidding for construction.

Because this cost analysis is a general guideline that applies to a wide variety of trails, certain assumptions must be made. These assumptions define what has been considered as part of the cost analysis, and articulate the limitations of this type of exercise.

- All dollar amounts are in Year 2009 dollars, and have been adjusted for inflation from the original Year 2000 dollars from the Iowa DOT. A discussion on the effects of inflation is included after the unit costs.
- Clearing and grubbing of trees and brush includes the width of the trail and associated clear zones. Granular subbase extends one foot beyond the edge of the trail on each side.
- Grading costs assume moderately flat or partially prepared (railroad grade) surfaces. Trails in new corridors in hilly areas may incur higher grading costs.
- None of the costs for trail grading take into account adverse soil conditions, such as contamination or severely wet soils. Such situations will require additional grading and/or excavation and will increase project cost.
- Granular subbase refers to Iowa DOT-approved aggregate placed under a hard surface trail to a depth of four inches.
- Granular surfacing refers to crushed limestone paving (or similar) at a depth of four inches.
- Asphalt surfacing has a depth of four inches.
- Concrete surfacing has a depth of four inches.
- Wood chip surfacing has a depth of two inches.
- Seeding/mulching includes broadcast seeded turn grass with straw laid down to prevent erosion. Additional erosion control on steep slopes is not included.
- Additional costs refer to typical drainage consideration, such as swales, culverts, or waterbars; and support services, including rest areas, signage, and pavement markings. These are based on a typical percentage of trail cost.

- Contingencies are included in all trail costs to account for localized increases in material costs, increases in labor cost due to time of year and contractor availability, and other unforeseen cost increases.
- Costs by trail type (tables 5-3 through 5-12) are for construction only and do not reflect planning, design, administration, or subsequent operations and maintenance.
- Some numbers are rounded for ease of calculation.

Table 1 shows general costs for elements typically included in trail projects. These unit costs are used to develop overall costs for each type of trail.

TABLE 1: UNIT COSTS FOR TRAIL ELEMENTS (INSTALLED)

Trail Element	Unit	Price per unit (year 2009 Construction)
Clearing and grubbing	Acre	\$2,550.00
Grading for hard-surfaced trails	Mile	\$3,800.00
Grading for natural-surfaced trails	Mile	\$3,200.00
Granular surfacing	Sq. ft.	\$.50
Granular subbase	Sq. ft.	\$.50
Asphalt surfacing	Sq. ft.	\$1.30
Concrete	Sq. ft.	\$3.00
Wood chips	Sq. ft.	\$.50
Seeding/mulching	Acre	\$2,040.00
Other costs (drainage, signage, Mile and support services)		10% of trail cost
Planning	Mile	2% of trail cost
Preliminary design	Mile	2% of trail cost
Construction documents	Mile	5% of trail cost
Construction services	Mile	5% of trail cost
Administration	Mile	5% of trail cost



1. Plan Review

Most trail projects will require review by a variety of state and regional agencies. This review, in many cases is required by law. Trail implementers should consider that, while these reviews may not increase the actual project cost, they will require time, which may affect project schedule or result in additional fees for consultants. Many trail projects will have to be reviewed for existing polluted sites, existing cultural/archaeological resource impacts, potential wetland or floodplain impacts, and acceptability of roadway crossings.

2. Right-of-Way Acquisition

In general, representative costs for the purchase of right-of-way will vary drastically from region to region. Local or regional governments will most likely be best equipped to estimate costs for property acquisition in their particular area. The DOT makes right-of-way purchases based on fair market value for the particular county where land is being purchased. In rural counties, fair market value is currently approximately \$2,000 acre. Ranges in price will occur depending on the agricultural potential of the land. In urban areas, acquisition costs will vary more significantly than elsewhere. Statewide, the approximate cost for land in urban areas may range from \$12,000 to \$15,000 per acre. In some cases, however, urban land may be registered on a square foot basis, with costs being even higher than the above figures.

When estimating the cost of land acquisition, local governments should speak with a local real estate appraiser to gain an understanding of actual costs for land in the general area and in specific locations to be acquired for trail use. Many grants require such an appraisal.

3. Inflation Costs

The most recent dollar standard currently available is for 1999. Differences, however, between 1999 dollars and 2000 dollars are minor enough that inflation effects may be estimated based on the 2000 dollar figures included in Table 1.

The “Consumer Price Index (CPI) Conversion Factor to Convert 1999 Dollars” is located at www.orst.edu/Dept/pol_sci/fac/sahr/cv99.pdf and is a useful tool for protecting inflation effects. The chart shown on that website offers projected conversion factors based on 1999 dollars.

4. **Bridges**

The actual cost for bridges will vary depending on existing conditions. As a trail moves into the development stage, the trail developer should consult with a structural engineer to determine a final estimated cost. The following estimated costs for bridges will be applicable in many cases.

- Estimated cost for new pedestrian/bicycle bridges: \$100/square foot.
- Estimated cost for re-decking of existing bridges to accommodate surfaced trails (does not include trail surfacing or fencing): \$50/Square foot.
- Estimated cost for wetland boardwalks: \$50/square foot.

5. **Trail Costs**

Tables 3 through 10 show estimated costs for each type of trail mode considered in *Iowa Trails 2000*. These trail costs are designed to serve as a guide for trail planning and initial cost estimation, and should not be considered a detailed cost analysis.



TABLE 3: ESTIMATED COST FOR NATURAL SURFACE TRAILS: 5-FOOT WIDTH

Trail Element	Unit	Price Per Unit	Element Width	Units Per Mile	Trail Cost Per Mile
Clearing and Grubbing	Acre	\$2,550	9 feet	1	\$2,550
Grading	Mile	\$3,200		1	\$3,200
Seed/mulch	Acre	\$2,040	4 feet	.5	\$1,020
Subtotal					\$6,770
Other Costs	10% of trail cost				\$ 677
Contingency	15% of trail cost				\$1,015
TOTAL COST PER MILE					\$8,462

TABLE 4: ESTIMATED COST FOR WOOD CHIP HIKING TRAILS: 5-FOOT WIDTH

Trail Element	Unit	Price Per Unit	Element Width	Units Per Mile	Trail Cost Per Mile
Clearing and Grubbing	Acre	\$2,550	9 feet	1	\$ 2,550
Grading	Mile	\$3,200		1	\$ 3,200
Wood chips	Sq. ft.	\$.50	5 feet	26,400	\$13,200
Seed/mulch	Acre	\$2,040	4 feet	.5	\$ 1,020
Subtotal					\$19,970
Other Costs	10% of trail cost				\$ 1,997
Contingency	15% of trail cost				\$ 2,995
TOTAL COST PER MILE					\$24,962

TABLE 5: ESTIMATED COST FOR GRANULAR HIKING TRAILS: 5-FOOT WIDTH

Trail Element	Unit	Price Per Unit	Element Width	Units Per Mile	Trail Cost Per Mile
Clearing and Grubbing	Acre	\$2,550	9 feet	1	\$ 2,550
Grading	Mile	\$3,800		1	\$ 3,800
Granular subbase	Sq. ft.	\$.50	7 feet	36,960	\$18,480
Granular surfacing	Sq. ft.	\$.50	5 feet	26,400	\$13,200
Seed/mulch	Acre	\$2,040	4 feet	.5	\$ 1,020
Subtotal					\$39,050
Other Costs	10% of trail cost				\$ 3,905
Contingency	15% of trail cost				\$ 5,857
TOTAL COST PER MILE					\$48,812

TABLE 6: ESTIMATED COST FOR PEDESTRIAN TRAILS: ASPHALT SURFACE: 6-FOOT WIDTH

Trail Element	Unit	Price Per Unit	Element Width	Units Per Mile	Trail Cost Per Mile
Clearing and Grubbing	Acre	\$2,550	10 feet	1.25	\$ 3,187
Grading	Mile	\$3,800		1	\$ 3,800
Granular subbase	Sq. ft.	\$.50	8 feet	42,240	\$21,120
Asphalt	Sq. ft.	\$1.30	6 feet	31,680	\$41,184
Seed/mulch	Acre	\$2,040	4 feet	.5	\$ 1,020
Subtotal					\$70,311
Other Costs	10% of trail cost				\$ 7,031
Contingency	15% of trail cost				\$10,547
TOTAL COST PER MILE					\$87,889



TABLE 7: ESTIMATED COST FOR PEDESTRIAN TRAILS: CONCRETE SURFACE: 5-FOOT WIDTH

Trail Element	Unit	Price Per Unit	Element Width	Units Per Mile	Trail Cost Per Mile
Clearing and Grubbing	Acre	\$2,550	9 feet	1	\$ 2,550
Grading	Mile	\$3,800		1	\$ 3,800
Granular subbase	Sq. ft.	\$.50	7 feet	36,960	\$18,480
Concrete	Sq. ft.	\$3.00	5 feet	26,400	\$79,200
Seed/mulch	Acre	\$2040	4 feet	.5	\$ 1,020
Subtotal					\$105,050
Other Costs	10% of trail cost				\$ 10,505
Contingency	15% of trail cost				\$ 15,757
TOTAL COST PER MILE					\$131,312

TABLE 8: ESTIMATED COST FOR NON-MOTORIZED MULTI-USE TRAILS (SINGLE TREADWAY): GRANULAR SURFACE, 10-FOOT WIDTH

Trail Element	Unit	Price Per Unit	Element Width	Units Per Mile	Trail Cost Per Mile
Clearing and Grubbing	Acre	\$2,550	14 feet	1.7	\$ 4,335
Grading	Mile	\$3,800		1	\$ 3,800
Granular subbase	Sq. ft.	\$.50	12 feet	63,360	\$31,680
Granular surfacing	Sq. ft.	\$.50	10 feet	52,800	\$26,400
Seeding/mulch	Acre	\$2,040	4 feet	.5	\$ 1,020
Subtotal					\$67,415
Other Costs	10% of trail cost				\$ 6,741
Contingency	15% of trail cost				\$ 10,112
TOTAL COST PER MILE					\$84,268

**TABLE 9: ESTIMATED COST FOR NON-MOTORIZED MULTI-USE TRAILS (SINGLE TREADWAY)
ASPHALT SURFACE, 10-FOOT WIDTH**

Trail Element	Unit	Price Per Unit	Element Width	Units Per Mile	Trail Cost Per Mile
Clearing and Grubbing	Acre	\$2,550	14 feet	1.7	\$ 4,335
Grading	Mile	\$3,800		1	\$ 3,800
Granular subbase	Sq. ft.	\$.50	12 feet	63,360	\$31,680
Asphalt	Sq. ft.	\$1.30	10 feet	52,800	\$68,640
Seed/mulch	Acre	\$2,040	4 feet	.5	\$ 1,020
Subtotal					\$109,475
Other Costs	10% of trail cost				\$10,947
Contingency	15% of trail cost				\$16,421
TOTAL COST PER MILE					\$136,843





**TABLE 10: ESTIMATED COST FOR NON-MOTORIZED MULTI-USE TRAILS (SINGLE TREADWAY):
CONCRETE SURFACE, 10-FOOT WIDTH**

Trail Element	Unit	Price Per Unit	Element Width	Units Per Mile	Trail Cost Per Mile
Clearing and Grubbing	Acre	\$2,550	14 feet	1.7	\$ 4,250
Grading	Mile	\$3,800		1	\$ 3,800
Granular subbase	Sq. ft.	\$.50	12 feet	63,360	\$ 31,680
Concrete	Sq. ft.	\$3.00	10 feet	52,800	\$158,400
Seed/mulch	Acre	\$2,040	4 feet	.5	\$ 1,020
Subtotal					\$199,150
Other costs	10% of trail cost				\$ 19,915
Contingency	15% of trail cost				\$ 29,872
TOTAL COST PER MILE					\$248,937

It is important to note that the per-mile costs listed above may vary drastically, depending on the trail's location, the construction schedule, and many other unforeseen issues. Trail cost estimates throughout the project should always be reviewed by a qualified engineer or other design professional. It is not unusual for actual trail costs to exceed initial estimates.

The following items are commonly found in trail projects. Because of their variability of types and, therefore, cost, specific unit cost numbers are not included. Trail implementers should determine to what extent these items will be included in the trail project, and estimate them accordingly.

- Fencing, either for safety or ornamental reasons (or both)
- Walls
- Special drainage considerations, such as fabrics and soil supplements in wet areas
- Interpretive facilities
- Associated parks, trailheads, or other amenities besides basic access points and rest areas
- Other custom design elements, such as bridges, walls, signage, bollards, benches, trash cans, or bicycle racks.

6. Trail Development Checklist

The items noted below are the primary steps that need to be taken in order to get a trail to become a reality in the shortest amount of time. These are relatively simple steps, but ones that are not always undertaken in a formal, well thought out fashion. By abiding by these steps, a project will be able to anticipate and hurdle the common obstacles in developing trails. This list was put together by Ron Carter and Randy Auler of the City of Carmel, Indiana and it is applicable to both public and private entities.

- a. Formally determine who will own the trail.
- b. Formally determine who will build the trail.
- c. Establish a preliminary timetable.
- d. Produce preliminary trail designs.
- e. Determine how much the project will cost.
- f. Determine sources of funding. (Apply for funds - see Chapter 3)
- g. Hire legal counsel.
- h. Establish a legal entity that can accept funding, make offers and eventually purchase the right-of-way.
- i. Identify all parcel owners.
- j. Determine conflicted or disputed ownership of parcels.
- k. Contact all property owners by certified mail, return receipt requested.
- l. Conduct community interest survey of your entire community.
- m. Have the individual parcels which you want to buy surveyed.
- n. Have the individual parcels appraised.
- o. Depending on your location in Indiana, have a sub-class of property owners made separate from any class action lawsuits that might be involved with your parcel.
- p. Determine who will be the land negotiator/buyer. Keep a journal of all dates on which you or your committee takes any action pertaining to the establishment of your trail.
- q. Determine who will maintain the facility once completed.



INDOT has also provided the following costs per mile for both existing and new facilities. These tables, while not as detailed as the Iowa tables, can still be a good general source of information. They break down seven different types of trail projects into the three major phases: Project Development Costs (PE), Right-of-Way Acquisition Costs (RW), and Construction Costs (CN).

Please refer to INDOT's notes for further clarification and explanation of the numbers.

Cost Per Mile (Jan. '10\$) (see notes below)	Existing Facility (preservation or non-routine maintenance required)						
	Separate-Alignment Shared-Use Path	Rail-Trail (RR to path conversion)	Shared-Use Paths (both sides of street)	Sidewalks (both sides of street)	Shoulders (both sides of roadway)	On-Street Bike Lanes (both sides of street)	Wide Curb Lanes (both sides of street)
PE (Project Development Costs)	\$5,000	\$5,000	\$10,000	\$5,000	\$5,000	\$5,000	\$5,000
RW (Right-of-Way Acquisition Costs)	\$0	\$0	\$0	\$0	\$0	\$0	\$0
CN (Construction Costs)	\$110,000	\$110,000	\$170,000	\$70,000	\$140,000	\$80,000	\$40,000
Total Cost	\$115,000	\$115,000	\$180,000	\$75,000	\$145,000	\$85,000	\$45,000

Cost Per Mile (Jan. '10\$) (see notes below)	New/Proposed Facility (construction or reconstruction required)						
	Separate-Alignment Shared-Use Path	Rail-Trail (RR to path conversion)	Shared-Use Paths (both sides of street)	Sidewalks (both sides of street)	Shoulders (both sides of roadway)	On-Street Bike Lanes (both sides of street)	Wide Curb Lanes (both sides of street)
PE (Project Development Costs)	\$55,000	\$55,000	\$85,000	\$60,000	\$70,000	\$40,000	\$20,000
RW (Right-of-Way Acquisition Costs)	\$160,000	\$80,000	\$250,000	\$100,000	\$130,000	\$120,000	\$70,000
CN (Construction Costs)	\$540,000	\$540,000	\$850,000	\$600,000	\$720,000	\$380,000	\$190,000
Total Cost	\$755,000	\$675,000	\$1,185,000	\$760,000	\$920,000	\$540,000	\$280,000

Notes:

- Costs are merely illustrative. Site-specific conditions may significantly affect actual costs.
- Existing Facility includes all work that utilizes the existing footprint such as pavement marking, sidewalk repairs, general maintenance, etc.
- New/Proposed Facility includes all new facilities, reconstruction of existing facilities and widening of existing facilities
- PE costs include all facets of project development such as, environmental, design, etc.
- Assumes one bridge or major small structure every 1.5 miles.
- Assumed these facility widths: trails 12' asphalt paved; shared-use paths 8 ft asphalt paved/side; concrete sidewalks 5 ft/side; paved shoulder widening from 2' to 7'; bike lanes 4 ft/side; wide curb lanes 2 ft/side.
- Assumes PE 10 percent of CN for construction/reconstruction, 5% of CN for preservation or non-routine maintenance.
- PE costs rounded to \$5,000. RW and CN costs rounded to \$10,000.
- RW costs are to be used as a starting point for the estimate due to the wide range of project locations and land costs. Accurate costs should be estimated when project has been designed and the specific amounts of land to be acquired has been calculated.