

Appendix B: Detailed Cost Estimates and Operational Costs

PRELIMINARY COST ESTIMATE



**Town of Markham
Pathways and Trails
Master Plan**

**ORDER OF MAGNITUDE
COST ESTIMATE
- Short Term
0-5 years**



ITEM		UNIT PRICE	UNIT	ITEM	COMMENTS/ASSUMPTIONS	
No.	TRANSITION AREAS (ON-ROAD TO OFF-ROAD)	2006 DOLLARS		TOTAL		
1.0	Trail / Road transition at existing signalized intersection	2.00	each	\$5,000.00	\$10,000.00	(at intersection with pedestrian crosswalk) typically includes 6 bollards, warning signs and minimal restoration
2.0	At grade mid-block crossing	9.00	each	\$5,000.00	\$45,000.00	typically includes pavement markings, 6 bollards, warning signs, curb cuts and minimal restoration (median refuge island extra)
3.0	At grade railway crossing		each	\$100,000.00	\$0.00	flashing lights, motion sensing switch (C.N. estimate)
4.0	At grade railway crossing with gate	1.00	each	\$250,000.00	\$250,000.00	flashing lights, motion sensing switch and automatic gate (C.N. estimate)
5.0	Below grade railway crossing		each	\$500,000.00	\$0.00	3.0m wide, unlit culvert style approx 10 m long for single elevated railway track
6.0	Signalized Pedestrian Mid-Block Crossing	6.00	each	\$75,000.00	\$450,000.00	
OFF ROAD ROUTES						
7.0	Rough grading	23.00	LKM	\$12,000.00	\$276,000.00	includes levelling and packing after levelling (3.0m wide)
8.0	Construct new stone dust limestone trail (Type 4)	1.00	LKM	\$100,000.00	\$100,000.00	normal site conditions (3.0m wide)
9.0	Construct new asphalt trail (Type 1 and Type 2)	18.00	LKM	\$150,000.00	\$2,700,000.00	normal site conditions (3.0m wide)
10.0	Construct new stone dust limestone trail in Valley (Type 4)	1.40	LKM	\$120,000.00	\$168,000.00	
11.0	Construct new asphalt trail in Valley (Type 1 and Type 2)	5.60	LKM	\$180,000.00	\$1,008,000.00	
OTHER ITEMS						
A. Signage						
12.0	Trailhead kiosk	2.00	each	\$3,000.00	\$6,000.00	does not include design and supply of signboards
13.0	Signboards for trailhead kiosk sign	2.00	each	\$2,000.00	\$4,000.00	typical production cost, does not include graphic design
14.0	Trail directional sign	2.00	each	\$150.00	\$300.00	bollard / post / w 100mm x100mm marker
15.0	Trail marker sign	2.00	each	\$75.00	\$150.00	bollard / post / w 100mm x100mm marker
B. Barriers and Access						
16.0	Granular parking lot at staging area (15 car capacity-gravel)	2.00	each	\$25,000.00	\$50,000.00	
C. Accessories						
17.0	Self weathering steel truss pedestrian bridge	500.00	LM	\$2,800.00	\$1,400,000.00	3.5m wide
18.0	Self weathering steel truss pedestrian bridge		LM	\$1,800.00	\$0.00	1.8m wide
19.0	New concrete box culvert (walkthrough)	25.00	LM	\$10,000.00	\$250,000.00	crossing below major roadway
20.0	Metal stairs with hand railing and gutter to roll bicycle		vertical M	\$3,000.00	\$0.00	1.8m wide, galvanized steel stairs
21.0	Construct washroom building		each	\$3,500.00	\$0.00	wood structure with concrete holding unit
				Subtotal	\$6,717,450.00	
				Estimating Contingency 25%	\$1,679,362.50	
				Design and Engineering 10%	\$839,681.25	
				Town Project Management 10%	\$839,681.25	
				Subtotal	\$10,076,175.00	
				GST	\$604,570.50	
				TOTAL	\$10,680,745.50	
				Annual Operations Budget for period (estimated at \$6,000 average per km/yr)	\$812,000.00	
				LIFECYCLE FOR TRAIL FACILITIES	10-15 years	
NOTES:						

- Unit Prices Reflect 2007 Dollars, and do not include the cost of property acquisition, utility relocations, or major roadside drainage works
- LKM = Linear kilometres
- LM = Linear metres
- Operation budget is for proposed trails, and is in addition to existing operational budget for trails and pathways.
- Higher costs assumed for valley construction
- Excludes trails by developers in development areas
- Excludes trails along Little Rouge (implemented by Rouge Park)
- Inflation will apply but is not included.
- All Type 2 trails assumed as asphalt, detailed design may reduce costs if granular is acceptable on site specific basis
- Excludes typical trail signage and furnishings
- Excludes streetscape improvements to sidewalk routes - requires further detailed study

PRELIMINARY COST ESTIMATE



**Town of Markham
Pathways and Trails Master
Plan**

**ORDER OF MAGNITUDE
COST ESTIMATE -
Mid Term
5-10 years**



ITEM		QUANTITY		UNIT PRICE 2006 DOLLARS		ITEM TOTAL	COMMENTS/ASSUMPTIONS
No.	TRANSITION AREAS (ON-ROAD TO OFF-ROAD)		UNIT				
1.0	Trail / Road transition at existing signalized intersection		each	\$5,000.00		\$0.00	(at intersection with pedestrian crosswalk) typically includes 6 bollards, warning signs and minimal restoration
2.0	At grade mid-block crossing	32.00	each	\$5,000.00		\$160,000.00	typically includes pavement markings, 6 bollards, warning signs, curb cuts and minimal restoration (median refuge island extra)
3.0	At grade railway crossing	3.00	each	\$100,000.00		\$300,000.00	flashing lights, motion sensing switch (C.N. estimate)
4.0	At grade railway crossing with gate		each	\$250,000.00		\$0.00	flashing lights, motion sensing switch and automatic gate (C.N. estimate)
5.0	Below grade railway crossing		each	\$500,000.00		\$0.00	3.0m wide, unlit culvert style approx 10 m long for single elevated railway track
6.0	Signalized Pedestrian Mid-Block Crossing	5.00	each	\$75,000.00		\$375,000.00	
OFF ROAD ROUTES							
7.0	Rough grading	62.00	LKM	\$12,000.00		\$744,000.00	includes levelling and packing after levelling (3.0m wide)
8.0	Construct new stone dust limestone trail (Type 4)	4.30	LKM	\$100,000.00		\$430,000.00	normal site conditions (3.0m wide)
9.0	Construct new asphalt trail (Type 1 and Type 2)	35.00	LKM	\$150,000.00		\$5,250,000.00	normal site conditions (3.0m wide)
10.0	Construct new stone dust limestone trail in Valley (Type 4)	6.00	LKM	\$120,000.00		\$720,000.00	
11.0	Construct new asphalt trail in Valley (Type 1 and Type 2)	20.00	LKM	\$180,000.00		\$3,600,000.00	
OTHER ITEMS							
A. Signage							
12.0	Trailhead kiosk	2.00	each	\$3,000.00		\$6,000.00	does not include design and supply of signboards
13.0	Signboards for trailhead kiosk sign	2.00	each	\$2,000.00		\$4,000.00	typical production cost, does not include graphic design
14.0	Trail directional sign	2.00	each	\$150.00		\$300.00	bollard / post / w 100mm x100mm marker
15.0	Trail marker sign	2.00	each	\$75.00		\$150.00	bollard / post / w 100mm x100mm marker
B. Barriers and Access							
16.0	Granular parking lot at staging area (15 car capacity-gravel)	2.00	each	\$25,000.00		\$50,000.00	
C. Accessories							
17.0	Self weathering steel truss pedestrian bridge	200.00	LM	\$2,800.00		\$560,000.00	3.5m wide
18.0	Self weathering steel truss pedestrian bridge		LM	\$1,800.00		\$0.00	1.8m wide
19.0	New concrete box culvert (walkthrough)	0.00	LM	\$10,000.00		\$0.00	crossing below major roadway
20.0	Metal stairs with hand railing and gutter to roll bicycle		vertical M	\$3,000.00		\$0.00	1.8m wide, galvanized steel stairs
21.0	Construct washroom building	3.00	each	\$3,500.00		\$10,500.00	wood structure with concrete holding unit
				Subtotal		\$12,209,950.00	
				Estimating Contingency 25%		\$3,052,487.50	
				Design and Engineering 10%		\$1,526,243.75	
				Town Project Management 10%		\$1,526,243.75	
				Subtotal		\$18,314,925.00	
				GST		\$1,098,895.50	
				TOTAL		\$19,413,820.50	
	Annual Operations Budget for period (estimated at \$6,000 average per km/yr)					\$739,800.00	
				LIFECYCLE FOR TRAIL FACILITIES		10-15 years	
NOTES:							

1. Unit Prices Reflect 2007 Dollars, and do not include the cost of property acquisition, utility relocations, or major roadside drainage works
2. LKM = Linear kilometres
3. LM = Linear metres
4. Operation budget is for proposed trails, and is in addition to existing operational budget for trails and pathways.
5. Higher costs assumed for valley construction
6. Excludes trails by developers in development areas
7. Excludes trails along Little Rouge (implemented by Rouge Park)
8. Inflation will apply but is not included.
9. All Type 2 trails assumed as asphalt, detailed design may reduce costs if granular is acceptable on site specific basis
10. Excludes typical trail signage and furnishings
11. Excludes streetscape improvements to sidewalk routes - requires further detailed study

PRELIMINARY COST ESTIMATE



**Town of Markham
Pathways and Trails Master
Plan**

**ORDER OF MAGNITUDE
COST ESTIMATE -
Long Term
10-20 Years**



ITEM	QUANTITY	UNIT	UNIT PRICE 2006 DOLLARS	ITEM TOTAL	COMMENTS/ASSUMPTIONS	
TRANSITION AREAS (ON-ROAD TO OFF-ROAD)						
1.0	Trail / Road transition at existing signalized intersection		each	\$5,000.00	\$0.00	(at intersection with pedestrian crosswalk) typically includes 6 bollards, warning signs and minimal restoration
2.0	At grade mid-block crossing	16.00	each	\$5,000.00	\$80,000.00	typically includes pavement markings, 6 bollards, warning signs, curb cuts and minimal restoration (median refuge island extra)
3.0	At grade railway crossing		each	\$100,000.00	\$0.00	flashing lights, motion sensing switch (C.N. estimate)
4.0	At grade railway crossing with gate	1.00	each	\$250,000.00	\$250,000.00	flashing lights, motion sensing switch and automatic gate (C.N. estimate)
5.0	Below grade railway crossing		each	\$500,000.00	\$0.00	3.0m wide, unlit culvert style approx 10 m long for single elevated railway track
6.0	Signalized Pedestrian Mid-Block Crossing	8.00	each	\$75,000.00	\$600,000.00	
OFF ROAD ROUTES						
7.0	Rough grading	37.00	LKM	\$12,000.00	\$444,000.00	includes levelling and packing after levelling (3.0m wide)
8.0	Construct new stone dust limestone trail (Type 4)		LKM	\$100,000.00	\$0.00	normal site conditions (3.0m wide)
9.0	Construct new asphalt trail (Type 1 and Type 2)	32.50	LKM	\$150,000.00	\$4,875,000.00	
10.0	Construct single track trail		LKM	\$18,000.00	\$0.00	includes clearing and grubbing with minor regrading to eliminate high and low points (1.5m wide)
11.0	Construct new stone dust limestone trail in Valley (Type 4)	1.00	LKM	\$120,000.00	\$120,000.00	
12.0	Construct new asphalt trail in Valley (Type 1 and Type 2)	7.00	LKM	\$180,000.00	\$1,260,000.00	
OTHER ITEMS						
13.0	Signboards for interpretive sign		each	\$800.00	\$0.00	does not include graphic design
14.0	Trailhead kiosk	8.00	each	\$3,000.00	\$24,000.00	does not include design and supply of signboards
15.0	Major gateway		each	\$15,000.00	\$0.00	based on previously constructed units
16.0	Trail directional sign	8.00	each	\$150.00	\$1,200.00	bollard / post / w 100mm x100mm marker
17.0	Trail marker sign	8.00	each	\$75.00	\$600.00	bollard / post / w 100mm x100mm marker
18.0	Berming/boulders at road crossing		each	\$2,000.00	\$0.00	price indicated for one side of road (2 required per road crossing)
19.0	Chain link fencing		LKM	\$65,000.00	\$0.00	range from \$35,000 to \$65,000 per LKM depending on height, gauge and site location
C. Accessories						
20.0	Self weathering steel truss pedestrian bridge	160.00	LM	\$2,800.00	\$448,000.00	3.5m wide
21.0	New boardwalk (pedestrian light-duty)		LM	\$1,500.00	\$0.00	new construction - includes footings and decking 3.0m wide
22.0	New concrete box culvert (walkthrough)		LM	\$10,000.00	\$0.00	crossing below major roadway
23.0	Garbage container		each	\$2,500.00	\$0.00	as high as \$2,000.00 for below grade, high capacity units
24.0	Crossing of 407	1.00	allowance	\$1,000,000.00	\$1,000,000.00	Minimum (Likely Higher, Costs Determined by More Detailed Feasibility)
25.0	Servicing of port-o-let		each	\$600.00	\$0.00	per season
				Subtotal	\$13,877,300.00	
				Estimating Contingency 25%	\$3,469,325.00	
				Design and Engineering 10%	\$1,734,662.50	
				Town Project Management 10%	\$1,734,662.50	
				Subtotal	\$20,815,950.00	
				GST	\$1,248,957.00	
				TOTAL	\$22,064,907.00	
	Annual Operations Budget for period (estimated at \$6,000 average per km/yr)				\$988,800.00	
	LIFECYCLE FOR TRAIL FACILITIES				10-15 years	
NOTES:						

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- Higher costs assumed for valley construction
- Excludes trails by developers in development areas
- Excludes trails along Little Rouge (implemented by Rouge Park)
- Inflation will apply but is not included.
- All Type 2 trails assumed at asphalt, detailed design may reduce costs if granular is acceptable on site specific basis
- Excludes typical trail signage and furnishings
- Excludes streetscape improvements to sidewalk routes - requires further detailed study

PRELIMINARY COST ESTIMATE



**Town of Markham
Pathways and Trails Master
Plan**

**ORDER OF MAGNITUDE
COST ESTIMATE -
Ultimate Term
20-50+ years**



No.	ITEM	QUANTITY	UNIT	UNIT PRICE		ITEM TOTAL	COMMENTS/ASSUMPTIONS
				2006	DOLLARS		
TRANSITION AREAS (ON-ROAD TO OFF-ROAD)							
1.0	Trail / Road transition at existing signalized intersection		each	\$5,000.00		\$0.00	(at intersection with pedestrian crosswalk) typically includes 6 bollards, warning signs and minimal restoration
2.0	At grade mid-block crossing	30.00	each	\$5,000.00		\$150,000.00	typically includes pavement markings, 6 bollards, warning signs, curb cuts and minimal restoration (median refuge island extra)
3.0	At grade railway crossing	1.00	each	\$100,000.00		\$100,000.00	flashing lights, motion sensing switch (C.N. estimate)
4.0	At grade railway crossing with gate	1.00	each	\$250,000.00		\$250,000.00	flashing lights, motion sensing switch and automatic gate (C.N. estimate)
5.0	Below grade railway crossing	1.00	each	\$500,000.00		\$500,000.00	3.0m wide, unlit culvert style approx 10 m long for single elevated railway track
6.0	Signalized Pedestrian Mid-Block Crossing	6.00	each	\$75,000.00		\$450,000.00	
OFF ROAD ROUTES							
7.0	Rough grading	33.00	LKM	\$12,000.00		\$396,000.00	includes levelling and packing after levelling (3.0m wide)
8.0	Construct new stone dust limestone trail (Type 4)		LKM	\$100,000.00		\$0.00	normal site conditions (3.0m wide)
9.0	Construct new asphalt trail (Type 1 and Type 2)	30.00	LKM	\$150,000.00		\$4,500,000.00	normal site conditions (3.0m wide)
10.0	Construct new stone dust limestone trail in Valley (Type 4)	1.00	LKM	\$120,000.00		\$120,000.00	
11.0	Construct new asphalt trail in Valley (Type 1 and Type 2)	2.00	LKM	\$180,000.00		\$360,000.00	
OTHER ITEMS							
A. Signage							
12.0	Trailhead kiosk		each	\$3,000.00		\$0.00	does not include design and supply of signboards
13.0	Signboards for trailhead kiosk sign		each	\$2,000.00		\$0.00	typical production cost, does not include graphic design
14.0	Trail directional sign		each	\$150.00		\$0.00	bollard / post / w 100mm x100mm marker
15.0	Trail marker sign		each	\$75.00		\$0.00	bollard / post / w 100mm x100mm marker
B. Barriers and Access							
16.0	Granular parking lot at staging area (15 car capacity-gravel)		each	\$25,000.00		\$0.00	
C. Accessories							
17.0	Self weathering steel truss pedestrian bridge	50.00	LM	\$2,800.00		\$140,000.00	3.5m wide
18.0	Self weathering steel truss pedestrian bridge		LM	\$1,800.00		\$0.00	1.8m wide
19.0	New concrete box culvert (walkthrough)	20.00	LM	\$10,000.00		\$200,000.00	crossing below major roadway
20.0	Metal stairs with hand railing and gutter to roll bicycle		vertical M	\$3,000.00		\$0.00	1.8m wide, galvanized steel stairs
21.0	Construct washroom building		each	\$3,500.00		\$0.00	wood structure with concrete holding unit
				Subtotal		\$7,166,000.00	
				Estimating Contingency 25%		\$1,791,500.00	
				Design and Engineering 10%		\$895,750.00	
				Town Project Management 10%		\$895,750.00	
				Subtotal		\$10,749,000.00	
				GST		\$644,940.00	
				TOTAL		\$11,393,940.00	
				Annual Operations Budget for period (estimated at \$6,000 average per km/yr)		\$1,186,800.00	
				LIFECYCLE FOR TRAIL FACILITIES		10-15 years	
NOTES:							

- Unit Prices Reflect 2007 Dollars, and do not include the cost of property acquisition, utility relocations, or major roadside drainage works
- LKM = Linear kilometres
- LM = Linear metres
- Operation budget is for proposed trails, and is in addition to existing operational budget for trails and pathways.
- Higher costs assumed for valley construction
- Excludes trails by developers in development areas
- Excludes trails along Little Rouge (implemented by Rouge Park)
- Inflation will apply but is not included.
- All Type 2 trails assumed as asphalt, detailed design may reduce costs if granular is acceptable on site specific basis
- Excludes typical trail signage and furnishings
- Excludes streetscape improvements to sidewalk routes - requires further detailed study

PRELIMINARY COST ESTIMATE

ITEM		QUANTITY	UNIT	UNIT PRICE	ITEM TOTAL	COMMENTS/ASSUMPTIONS
No.	TRANSITION AREAS (ON-ROAD TO OFF-ROAD)			2006 DOLLARS		
1.0	Trail / Road transition at existing signalized intersection		each	\$5,000.00	\$0.00	(at intersection with pedestrian crosswalk) typically includes 6 bollards, warning signs and minimal restoration
2.0	At grade mid-block crossing	14.00	each	\$5,000.00	\$70,000.00	typically includes pavement markings, 6 bollards, warning signs, curb cuts and minimal restoration (median refuge island extra)
3.0	At grade railway crossing	1.00	each	\$100,000.00	\$100,000.00	flashing lights, motion sensing switch (C.N. estimate)
4.0	At grade railway crossing with gate		each	\$250,000.00	\$0.00	flashing lights, motion sensing switch and automatic gate (C.N. estimate)
5.0	Below grade railway crossing		each	\$500,000.00	\$0.00	3.0m wide, unlit culvert style approx 10 m long for single elevated railway track
6.0	Signalized Pedestrian Mid-Block Crossing	1.00	each	\$75,000.00	\$75,000.00	
OFF ROAD ROUTES						
7.0	Upgrading gravel trail to asphalt (Type 1 and Type 2)	13.00	LKM	\$90,000.00	\$1,170,000.00	price includes some upgrades to the base (3.0m wide)
8.0	Upgrading to asphalt trail in Valley (Type 1 and Type 2)	20.00	LKM	\$110,000.00	\$2,200,000.00	price includes some upgrades to the base (3.0m wide)
OTHER ITEMS						
A. Signage						
9.0	Trailhead kiosk	5.00	each	\$3,000.00	\$15,000.00	does not include design and supply of signboards
10.0	Signboards for trailhead kiosk sign	5.00	each	\$2,000.00	\$10,000.00	typical production cost, does not include graphic design
11.0	Trail directional sign	5.00	each	\$150.00	\$750.00	bollard / post / w 100mm x100mm marker
12.0	Trail marker sign	5.00	each	\$75.00	\$375.00	bollard / post / w 100mm x100mm marker
B. Barriers and Access						
13.0	Granular parking lot at staging area (15 car capacity-gravel)	5.00	each	\$25,000.00	\$125,000.00	
C. Accessories						
14.0	Self weathering steel truss pedestrian bridge		LM	\$2,800.00	\$0.00	3.5m wide
15.0	Self weathering steel truss pedestrian bridge		LM	\$1,800.00	\$0.00	1.8m wide
16.0	New concrete box culvert (walkthrough)		LM	\$10,000.00	\$0.00	crossing below major roadway
17.0	Metal stairs with hand railing and gutter to roll bicycle		vertical M	\$3,000.00	\$0.00	1.8m wide, galvanized steel stairs
18.0	Construct washroom building	5.00	each	\$3,500.00	\$17,500.00	wood structure with concrete holding unit
Subtotal					\$3,783,625.00	
Estimating Contingency 25%					\$945,906.25	
Design and Engineering 10%					\$472,953.13	
Town Project Management 10%					\$472,953.13	
Subtotal					\$5,675,437.50	
GST					\$340,526.25	
TOTAL					\$6,015,963.75	
Annual Operations Budget for period (estimated at \$6,000 average per km/yr)					\$198,000.00	
LIFECYCLE FOR TRAIL FACILITIES					10-15 years	
NOTES:						

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- Higher costs assumed for valley construction
- Excludes trails by developers in development areas
- Excludes trails along Little Rouge (implemented by Rouge Park)
- Inflation will apply but is not included.
- All Type 2 trails assumed at asphalt, detailed design may reduce costs if granular is acceptable on site specific basis
- Excludes typical trail signage and furnishings
- Excludes streetscape improvements to sidewalk routes - requires further detailed study



**Town of Markham
Pathways and Trails Master
Plan**

**ORDER OF MAGNITUDE
COST ESTIMATE -
Existing Improvements
for Existing Trails**

