

Pipeline Methodology

The Ministry's independent contractor supplied the year over year construction cost changes based on the pipe material, the pressure rating, the outside diameter for a 32 km model, as well a 300km model for ANSI 600, and 900. For each category (i.e. ANSI150) the independent contractor supplied a cost change per metre broken down into the component costs for all outside diameters in the study (see attachment pipeline cost with 2006 percentage increase applied).

The median of the year over year cost changes for each category was calculated (i.e. ANSI150 1.122). The next step was to calculate the median cost change of all the pipe categories. This then became the cost change for pipelines properties (10.16%) see attached summary of pipeline chart.

The 10.16% construction cost change was used to calculate the 2006 AYM for pipelines properties.

**OUTLINE OF THE VENDORS PROCESS TO DEVELOP PIPELINE
CONSTRUCTION COST CHANGES**

For AMA Pipelines

July 14, 2006

1.0 History:

Prior to 2001:

- Alberta divided into six (6) Geographical Pipeline Regions
- High Pressure and Low Pressure Designation for all steel Pipelines
- Steel Pipe Sizes 21.3mm OD up to 1524mm OD
- Steel pipe length 32km
- Nonsteel pipe length either 1 or 5 km
- Detailed Estimate

2002:

- Deleted low and high pressure pipelines by Segregating all carbon steel pipelines into five categories:

ANSI 150	0-1895 kpa	Design Pressure=1000 kpa
ANSI 300	1896-4960 kpa	Design Pressure=3430 kpa
ANSI 400	4961-6615 kpa	Design Pressure=5790 kpa
ANSI 600	6616-9922 kpa	Design Pressure=8270 kpa
ANSI 900	9923-14882 kpa	Design Pressure=12400 kpa

- Detailed Estimate

2003:

- Added 300 km length to ANSI 600 & 900 steel pipelines (323.9mm to 1524mm)
- Added SCADA to 300 km pipelines
- Added Leak Detection to 300 km pipelines
- Deleted six (6) Geographical Regions. Use Edmonton to Calgary Corridor.
- Deletion steel pipe sizes 21.3mm to 48.3mm
- Break out crossing costs from installation costs
- Break out service line and meter costs from MDPE & HDPE material costs.
- Deletion of the 1km pipeline segment
- Deletion of the following from the overall cost:
 - Land Acquisition Costs
 - Preliminary Engineering Costs
 - Route Reconnaissance Costs

- Environmental Costs
- Archaeological Costs
- As-Built Drawing Costs
- Commissioning Costs
- Man made Crossing Costs
- Deletion of the following steel pipelines:
 - Sour Service
 - Thru-Kote Systems
 - HDPE Internal Liner
 - Internal Cement Liner
 - Stainless Steel Pipelines
 - Steam Gathering Pipeline Systems
 - Hot Water Sulphur pipeline
- % Increase Estimate Instead of Detailed Estimate

2005:

- Deletion of the aluminum pipeline. Replaced by Fiberglass and HDPE materials
- % Increase Estimate instead of Detailed Estimate

2006:

- % Increase Estimate instead of Detailed Estimate

2.0 Detailed Review (Every Five years)

-Land Use Costs:

- Entry Fee
- Damages Fee
- Acquisition Fee

-Engineering Costs:

- Included in Cost Base
- Excluded in Cost Base

-Miscellaneous Materials:

-Major Materials:

- Pipe
- Valves
- Coating
- Assemblies

- SCADA
- Leak detection

-Installation:

- Crossings
 - Man Made
 - Natural
- Pipe Installation
 - 5 km pipeline
 - 32 km pipeline
 - 300 km pipeline
 - 100 km Edm./Calgary Corridor vs. 50 km from Edmonton
 - Labour Costs
 - Equipment Costs
 - Subcontractors-Electric, Instrumentation
 - Contractors-Mechanical, Civil
 - AFUDC & GST

3. % INCREASE REVIEWS (IN BETWEEN DETAILED REVIEWS)

-Land Use Costs:

- Entry Fee
- Damages Fee
- Acquisition Fee

-Engineering Costs:

- Included in Cost Base
- Excluded in Cost Base

-Miscellaneous Materials:

-Major Materials:

- Pipe
- Valves
- Coating
- Assemblies

-Installation:

- Crossings
 - Man Made

-Natural

-Pipe Installation

-5 km pipeline

-32 km pipeline

-300 km pipeline

-100 km Edm/Calgary Corridor vs. 50 km from Edmonton

-Labour Costs

-Equipment Costs

-Subcontractors

-Contractors

-SCADA

-Leak Detection

-AFUDC & GST

4. CODES/REGULATIONS:

-CSA-Z662

-B31.3

-CPA Review of the Surface Rights Board

-EUB

5. Commodity Price Index's

-Canadian vs. American

-CPI

6. 2007 Proposed Suggestions:

-Weak Areas

-Possible Additions/Deletions

-Current Construction Practices

7. Cost Programs:

- Calgary-Pisces (Program has become very popular with many large Oil and Gas Pipeline Companies, who come to for getting estimates for AFE approvals.)

-Icarus K-Base-has a pipeline program associated with it.

Summary of Pipeline

	Factor	% Increase	ACC
ANSI150	1.122	12.20	PL100
ANSI300	1.122	12.20	PL110
ANSI400	1.122	12.22	PL120
ANSI600	1.103	10.28	PL130
ANSI600 300km	1.079	7.91	PL131
ANSI900	1.076	7.60	PL140
ANSI900 300km	1.060	5.97	PL141
MDPE	1.019	1.93	PL200
HDPE	1.100	10.03	PL200
PVC	1.125	12.55	PL300
Aluminium	1.000	0.00	PL400
Fibreglass	1.103	10.28	PL500
Overall Median Value	1.102	10.16	

Model Used	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km
Material	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel
Wall Thickness	2.8	2.8	2.8	2.8	3.2	4	4.4	4.8	4.8	4.8	5.6	5.6	6.4	7.1	7.1	7.9	8.7	8.7	9.5	11.1	12.7	14.3	15.9	15.9	
Imperial O.D (inches)	2.37	3.5	4.5	6.63	8.63	10.75	12.75	14	16	18	20	22	24	26	28	30	32	34	36	41	48	56	60	60	
Metric O.D (mm)	60.3	88.9	114.3	168.3	219.1	273.1	323.9	355.6	406.4	457	508	559	610	660	711	762	813	864	914	1067	1219	1422	1524	1524	
land - entry fee/m	1.85	1.85	1.85	1.85	2.47	2.47	2.47	3.09	3.09	3.09	3.09	3.09	3.09	3.71	3.71	3.71	3.71	3.71	3.71	4.32	4.32	4.32	4.32	4.32	
land - damages/m	2.82	2.82	2.82	2.82	4.52	4.52	4.52	6.67	6.67	6.67	6.67	6.67	6.67	9.41	9.41	9.41	9.41	9.41	9.41	12.64	12.64	12.64	12.64	12.64	
land - acquisition/m	4.45	4.45	4.45	4.45	6.91	6.91	6.91	9.27	9.27	9.27	9.27	9.27	9.27	11.86	11.86	11.86	11.86	11.86	11.86	14.71	14.71	14.71	14.71	14.71	
Subtotal Land Costs (\$/m)	4.67	4.41	4.41	4.41	6.58	6.58	6.58	9.15	9.15	9.15	9.15	9.15	9.15	12.27	12.27	12.27	12.27	12.27	15.81	15.81	15.81	15.81	15.81		
Preliminary engineering	0.63	0.63	0.63	0.63	0.63	0.63	0.88	0.88	0.88	0.88	0.88	0.88	0.88	1.52	1.52	1.52	1.52	1.52	1.52	2.10	2.10	2.10	2.10	2.10	
Route Reconnaissance	0.13	0.13	0.13	0.13	0.13	0.13	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.22	0.22	0.22	0.22	0.22	0.22	0.35	0.35	0.35	0.35	0.35	
Environmental	0.78	0.78	0.78	0.78	0.78	0.78	0.89	0.89	0.89	0.89	0.89	0.89	0.89	1.05	1.05	1.05	1.05	1.05	1.05	1.44	1.44	1.44	1.44	1.44	
Archeological	0.56	0.56	0.56	0.56	0.56	0.56	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.69	0.69	0.69	0.69	0.69	0.69	1.00	1.00	1.00	1.00	1.00	
Geotechnical	0.47	0.47	0.47	0.47	0.47	0.47	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.93	0.93	0.93	0.93	0.93	0.93	1.44	1.44	1.44	1.44	1.44	
As-Built Drawings	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	
Commissioning	0.16	0.16	0.16	0.16	0.16	0.16	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.38	0.38	0.38	0.38	0.38	0.38	0.56	0.56	0.56	0.56	0.56	
Legal Surveying	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	
Design, Spec's,Procure.	0.70	0.70	0.70	0.70	0.70	0.70	0.86	0.86	0.86	0.86	0.86	0.86	0.86	1.17	1.17	1.17	1.17	1.17	1.17	2.28	2.28	2.28	2.28	2.28	
Drainage Drawings	0.20	0.20	0.20	0.20	0.20	0.20	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.40	0.40	0.40	0.40	0.40	0.40	0.55	0.55	0.55	0.55	0.55	
Drawings	1.37	1.37	1.37	1.37	1.37	1.37	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.37	2.37	2.37	2.37	2.37	2.37	2.87	2.87	2.87	2.87	2.87	
Construction Management	1.17	1.17	1.17	1.17	1.17	1.17	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.95	1.95	1.95	1.95	1.95	1.95	2.37	2.37	2.37	2.37	2.37	
Inspection	2.74	2.74	2.74	2.74	2.74	2.74	3.12	3.12	3.12	3.12	3.12	3.12	3.12	3.49	3.49	3.49	3.49	3.49	3.49	3.87	3.87	3.87	3.87	3.87	
Construction Surveying	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	
Subtotal Eng. Costs (\$/m)	10.45	9.68	9.68	9.68	9.68	9.68	11.16	11.16	11.16	11.16	11.16	11.16	11.16	12.87	12.87	12.87	12.87	12.87	12.87	15.23	15.23	15.23	15.23	15.23	
Man-Made Crossings	3.66	3.66	3.66	3.66	3.66	3.66	5.05	5.05	5.05	5.05	5.05	5.05	5.05	7.48	7.48	7.48	7.48	7.48	7.48	7.48	10.38	10.38	10.38	10.38	
Subtotal Natural Crossings (\$/m)	0.27	0.27	0.27	0.27	0.27	0.27	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.92	0.92	0.92	0.92	0.92	0.92	1.71	1.71	1.71	1.71	1.71	
Radiography	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.39	2.39	2.39	2.39	2.39	2.39	2.83	2.83	2.83	2.83	2.83	2.83	3.08	3.08	3.08	3.08	3.08	
Seeding	0.13	0.13	0.13	0.13	0.19	0.19	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.28	0.28	0.28	0.28	0.28	0.28	0.33	0.35	0.35	0.35	0.35	
100 Swamp Weights (500m wet)	0.15	0.15	0.15	0.15	0.20	0.20	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.30	0.30	0.30	0.30	0.30	0.30	0.35	0.35	0.35	0.35	0.35	
Sack Breakers (1500 Sand Bags)	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	
Posts,Test Leads,Signs	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	
Subtotal Misc. Mat'l Costs (\$/m)	3.26	3.26	3.26	3.26	3.36	3.36	3.36	3.65	3.65	3.65	3.65	3.65	3.65	4.19	4.19	4.19	4.19	4.19	4.44	4.54	4.56	4.56	4.57		
Pipe costs	7.76	10.49	13.40	22.15	36.08	58.42	86.73	95.67	133.42	158.25	197.02	214.49	246.94	268.00	291.84	339.06	367.82	392.30	447.47	568.78	675.31	922.48	1098.85		
External Coating-YJ1 or FBE	2.83	3.67	4.58	7.05	9.24	11.78	13.82	17.15	19.87	23.78	26.41	28.80	31.97	23.89	25.70	27.56	29.39	30.93	33.03	39.02	43.63	50.85	58.79		
Cost of A/G Assemblies	2.94	3.03	3.22	3.92	4.82	5.59	7.98	10.03	11.39	14.16	15.50	17.06	19.68	22.17	25.93	28.66	33.10	38.61	42.56	56.75	68.86	90.70	112.52		
Heavy Wall Pipe for crossings	0.03	0.03	0.04	0.04	0.04	0.04	0.06	0.07	0.07	0.13	0.13	0.13	0.20	0.19	0.25	0.25	0.25	0.33	0.32	0.32	0.37	0.38	0.38		
Sub Total Material Costs (\$/m)	13.55	17.23	21.24	33.16	50.19	75.84	108.59	122.92	164.82	196.32	239.07	260.55	298.79	314.25	343.72	395.53	430.56	462.16	523.38	664.87	788.17	1064.41	1270.54		
Subtotal Installation Costs (\$/m)	24.70	28.88	31.17	40.01	49.22	61.23	75.99	112.96	148.20	193.57	220.08	238.16	252.87	277.15	332.30	351.23	378.19	390.20	438.50	518.81	606.05	725.63	904.48		
Total Assessable Costs per M	\$56.90	\$63.73	\$70.03	\$90.79	\$119.30	\$156.96	\$206.13	\$260.29	\$337.43	\$414.30	\$483.55	\$523.11	\$578.07	\$621.65	\$706.27	\$777.01	\$839.00	\$882.61	\$992.37	\$1,220.19	\$1,431.53	\$1,827.35	\$2,212.34		
AY2005 Total Assessable Cost	50.708	57.883	63.629	82.457	107.304	142.112	187.782	234.076	303.899	364.995	427.751	462.676	513.002	556.118	628.066	694.185	764.111	805.005	905.110	1115.853	1310.236	1681.230	2030.159		
Increase Factor	1.122101	1.100953	1.100555	1.101049	1.111777	1.104473																			
							1.103																		

Model Used	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km
Material	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel
Wall Thickness	4.4	4.8	4.8	4.8	5.6	5.6	6.4	7.1	7.1	7.9	8.7	8.7	9.5	11.1	12.7	14.3	15.9		
Imperial O.D (inches)	12.75	14	16	18	20	22	24	26	28	30	32	34	36	41	48	56	60		
Metric O.D (mm)	323.9	355.6	406.4	457	508	559	610	660	711	762	813	864	914	1067	1219	1422	1524		
land - entry fee/m	2.47	3.09	3.09	3.09	3.09	3.09	3.09	3.09	3.71	3.71	3.71	3.71	3.71	3.71	4.32	4.32	4.32	4.32	4.32
land - damages/m	4.52	6.67	6.67	6.67	6.67	6.67	6.67	6.67	9.41	9.41	9.41	9.41	9.41	9.41	12.64	12.64	12.64	12.64	12.64
land - acquisition/m	6.91	9.27	9.27	9.27	9.27	9.27	9.27	9.27	11.86	11.86	11.86	11.86	11.86	11.86	14.71	14.71	14.71	14.71	14.71
Subtotal Land Costs (\$/m)	6.99	9.76	9.76	9.76	9.76	9.76	9.76	9.76	13.12	13.12	13.12	13.12	13.12	13.12	16.96	16.96	16.96	16.96	16.96
Preliminary engineering	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.91	0.91	0.91	0.91	0.91	0.91	1.26	1.26	1.26	1.26	1.26
Route Reconnaissance	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.13	0.13	0.13	0.13	0.13	0.13	0.21	0.21	0.21	0.21	0.21
Environmental	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.63	0.63	0.63	0.63	0.63	0.63	0.86	0.86	0.86	0.86	0.86
Archeological	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.41	0.41	0.41	0.41	0.41	0.41	0.60	0.60	0.60	0.60	0.60
Geotechnical	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.57	0.57	0.57	0.57	0.57	0.57	1.20	1.20	1.20	1.20	1.20
As-Built Drawings	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Commissioning	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.23	0.23	0.23	0.23	0.23	0.23	0.30	0.30	0.30	0.30	0.30
Legal Surveying	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28
Design, Spec's, Procure.	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.70	0.70	0.70	0.70	0.70	0.70	1.37	1.37	1.37	1.37	1.37
Drainage Drawings	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.24	0.24	0.24	0.24	0.24	0.24	0.32	0.32	0.32	0.32	0.32
Drawings	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.42	1.42	1.42	1.42	1.42	1.42	1.72	1.72	1.72	1.72	1.72
Construction Management	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	1.17	1.17	1.17	1.17	1.17	1.17	1.42	1.42	1.42	1.42	1.42
Inspection	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87	2.12	2.12	2.12	2.12	2.12	2.12	2.37	2.37	2.37	2.37	2.37
Construction Surveying	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Subtotal Eng. Costs (\$/m)	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	8.43	8.43	8.43	8.43	8.43	8.43	9.99	9.99	9.99	9.99	9.99
Man-Made Crossings	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	6.02	6.02	6.02	6.02	6.02	6.02	6.02	6.02	6.02	6.02	6.02
Subtotal Natural Crossings (\$/m)	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57
Radiography	1.94	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.41	2.41	2.41	2.41	2.41	2.41	2.59	2.59	2.59	2.59	2.59
Seeding	0.18	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.27	0.27	0.27	0.27	0.27	0.27	0.30	0.30	0.30	0.30	0.30
100 Swamp Weights (500m wet)	0.21	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.33	0.33	0.33	0.33	0.33	0.33	0.37	0.37	0.37	0.37	0.37
Sack Breakers (1500 Sand Bags)	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Posts, Test Leads, Signs	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Subtotal Misc. Mat'l Costs (\$/m)	3.13	3.34	3.34	3.34	3.34	3.34	3.34	3.34	3.81	3.81	3.81	3.81	3.81	3.81	3.99	4.07	4.07	4.07	4.07
Pipe costs	78.06	86.10	120.08	142.42	177.32	193.04	222.26	241.20	262.66	305.16	331.03	353.07	402.72	511.90	607.77	830.24	988.97		
External Coating-Y11 or FBE	11.94	14.82	17.17	20.95	22.82	24.89	27.62	20.50	22.05	23.65	25.21	26.52	28.34	33.49	37.42	43.60	50.44		
Cost of A/G Assemblies	1.60	1.90	2.17	2.65	2.95	3.46	3.87	4.54	5.21	5.71	6.67	7.65	8.35	10.54	13.30	17.00	18.93		
Heavy Wall Pipe for crossings	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02		
SubTotal Material Costs (\$/m)	91.62	102.85	139.44	166.04	203.11	221.40	253.77	266.25	289.93	334.53	362.93	387.25	439.42	555.95	658.50	890.86	1058.35		
Subtotal Installation Costs (\$/m)	63.93	95.06	124.71	163.32	185.70	200.95	215.05	229.26	274.88	290.55	311.82	321.72	361.54	427.76	499.69	598.29	745.75		
Total Assessable Costs per M	\$174.19	\$219.53	\$285.77	\$350.98	\$410.43	\$443.98	\$490.44	\$523.44	\$592.74	\$653.01	\$702.67	\$736.91	\$829.07	\$1,017.29	\$1,193.84	\$1,524.79	\$1,839.76		
AY2005 Total Assessable Cost per M	162.323	202.870	264.822	318.385	373.749	404.345	447.946	482.201	543.780	601.341	660.979	694.098	780.967	959.939	1127.711	1446.010	1742.058		
Increase Factor	1.0730857	1.0821083	1.0791151	1.102383	1.0981347	1.0980111	1.094854	1.0855314	1.0900434	1.0859291	1.0630825	1.0616758	1.061593	1.0597468	1.05864054	1.05448193	1.05608357	1.079	

Model Used	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	32 km	
Material	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	
Wall Thickness	2.8	2.8	2.8	2.8	3.2	4	4.4	4.8	4.8	4.8	5.6	5.6	6.4	7.1	7.1	7.9	8.7	8.7	9.5	11.1	12.7	14.3	15.9	
Imperial O.D (inches)	2.37	3.5	4.5	6.63	8.63	10.75	12.75	14	16	18	20	22	24	26	28	30	32	34	36	41	48	56	60	
Metric O.D (mm)	60.3	88.9	114.3	168.3	219.1	273.1	323.9	355.6	406.4	457	508	559	610	660	711	762	813	864	914	1067	1219	1422	1524	
land - entry fee/m	1.85	1.85	1.85	1.85	2.47	2.47	2.47	3.09	3.09	3.09	3.09	3.09	3.71	3.71	3.71	3.71	3.71	3.71	3.71	4.32	4.32	4.32	4.32	
land - damages/m	2.82	2.82	2.82	2.82	4.52	4.52	4.52	6.67	6.67	6.67	6.67	6.67	6.67	9.41	9.41	9.41	9.41	9.41	9.41	12.64	12.64	12.64	12.64	
land - acquisition/m	4.45	4.45	4.45	4.45	6.91	6.91	6.91	9.27	9.27	9.27	9.27	9.27	9.27	11.86	11.86	11.86	11.86	11.86	11.86	14.71	14.71	14.71	14.71	
Subtotal Land Costs (\$/m)	4.41	4.41	4.41	4.41	6.58	6.58	6.58	9.15	9.15	9.15	9.15	9.15	9.15	12.27	12.27	12.27	12.27	12.27	12.27	15.81	15.81	15.81	15.81	
Preliminary engineering	0.63	0.63	0.63	0.63	0.63	0.63	0.88	0.88	0.88	0.88	0.88	0.88	0.88	1.52	1.52	1.52	1.52	1.52	1.52	2.10	2.10	2.10	2.10	
Route Reconnaissance	0.13	0.13	0.13	0.13	0.13	0.13	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.22	0.22	0.22	0.22	0.22	0.22	0.35	0.35	0.35	0.35	
Environmental	0.78	0.78	0.78	0.78	0.78	0.78	0.89	0.89	0.89	0.89	0.89	0.89	0.89	1.05	1.05	1.05	1.05	1.05	1.05	1.44	1.44	1.44	1.44	
Archeological	0.56	0.56	0.56	0.56	0.56	0.56	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.69	0.69	0.69	0.69	0.69	0.69	1.00	1.00	1.00	1.00	
Geotechnical	0.47	0.47	0.47	0.47	0.47	0.47	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.93	0.93	0.93	0.93	0.93	0.93	1.44	1.44	1.44	1.44	
As-Built Drawings	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	
Commissioning	0.16	0.16	0.16	0.16	0.16	0.16	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.38	0.38	0.38	0.38	0.38	0.38	0.56	0.56	0.56	0.56	
Legal Surveying	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	
Design, Spec's,Procure.	0.70	0.70	0.70	0.70	0.70	0.70	0.86	0.86	0.86	0.86	0.86	0.86	0.86	1.17	1.17	1.17	1.17	1.17	1.17	1.17	2.28	2.28	2.28	
Drainage Drawings	0.20	0.20	0.20	0.20	0.20	0.20	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.40	0.40	0.40	0.40	0.40	0.40	0.55	0.55	0.55	0.55	
Drawings	1.37	1.37	1.37	1.37	1.37	1.37	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.37	2.37	2.37	2.37	2.37	2.37	2.87	2.87	2.87	2.87	
Construction Management	1.17	1.17	1.17	1.17	1.17	1.17	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.95	1.95	1.95	1.95	1.95	1.95	2.37	2.37	2.37	2.37	
Inspection	2.74	2.74	2.74	2.74	2.74	2.74	3.12	3.12	3.12	3.12	3.12	3.12	3.12	3.49	3.49	3.49	3.49	3.49	3.49	3.87	3.87	3.87	3.87	
Construction Surveying	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	
Subtotal Eng. Costs (\$/m)	9.68	9.68	9.68	9.68	9.68	9.68	11.16	11.16	11.16	11.16	11.16	11.16	11.16	12.87	12.87	12.87	12.87	12.87	12.87	15.23	15.23	15.23	15.23	
Man-Made Crossings	3.66	3.66	3.66	3.66	3.66	3.66	5.05	5.05	5.05	5.05	5.05	5.05	5.05	7.48	7.48	7.48	7.48	7.48	7.48	7.48	7.48	10.38	10.38	10.38
Subtotal Natural Crossings (\$/m)	0.24	0.27	0.27	0.27	0.27	0.27	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.92	0.92	0.92	0.92	0.92	0.92	0.92	1.71	1.71	1.71	
Radiography	2.20	2.20	2.20	2.20	2.20	2.20	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.83	2.83	2.83	2.83	2.83	2.83	3.08	3.08	3.08	3.08	
Seeding	0.13	0.13	0.13	0.13	0.19	0.19	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.28	0.28	0.28	0.28	0.28	0.28	0.33	0.33	0.35	0.35	
100 Swamp Weights (500m wet)	0.15	0.15	0.15	0.15	0.20	0.20	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.30	0.30	0.30	0.30	0.30	0.30	0.35	0.35	0.35	0.36	
Sack Breakers (1500 Sand Bags)	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	
Posts,Test Leads,Signs	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	
Subtotal Misc. Mat'l Costs (\$/m)	2.97	2.97	2.97	2.97	3.07	3.07	3.34	3.34	3.34	3.34	3.34	3.34	3.34	3.82	3.82	3.82	3.82	3.82	3.82	4.04	4.14	4.16	4.17	
Pipe costs	7.76	10.49	14.91	27.79	43.15	71.59	97.64	117.76	155.86	276.64	224.46	251.50	336.45	369.94	395.64	431.10	498.84	513.44	524.55	726.46	886.59	1151.75	1388.33	
External Coating, YJ1 or FBE	2.83	3.67	4.58	7.05	9.24	11.78	13.82	17.15	19.87	23.78	26.41	28.80	31.97	23.89	25.70	27.56	29.39	30.93	33.03	39.02	43.63	50.85	58.79	
Cost of A/G Assemblies	3.43	3.57	3.81	4.89	5.81	6.81	10.16	13.14	15.84	19.28	22.06	25.11	28.69	33.01	37.98	42.99	48.21	55.42	61.07	80.40	99.17	135.23	160.13	
Heavy Wall Pipe for crossings	0.03	0.03	0.04	0.04	0.04	0.06	0.07	0.07	0.14	0.20	0.13	0.20	0.20	0.19	0.25	0.25	0.25	0.32	0.32	0.32	0.38	0.40	0.40	
SubTotal Material Costs (\$/m)	12.89	16.57	21.93	37.72	55.64	86.98	117.59	142.97	185.67	312.63	264.90	296.56	387.18	421.17	452.93	494.49	568.48	591.13	608.84	832.82	1014.37	1317.71	1582.91	
Subtotal Installation Costs (\$/m)	24.70	30.47	31.84	40.65	52.63	73.14	98.85	125.38	169.46	211.54	234.84	257.68	274.58	297.60	353.50	372.88	402.47	420.62	500.64	545.36	701.89	817.40	1007.54	
Total Assessable Costs per M	\$54.90	\$64.37	\$71.10	\$95.71	\$127.87	\$179.72	\$237.69	\$292.45	\$379.22	\$548.26	\$523.83	\$578.34	\$685.85	\$748.65	\$836.31	\$897.25	\$1,000.83	\$1,041.63	\$1,139.58	\$1,414.28	\$1,753.17	\$2,172.01	\$2,627.37	
AY2005 Total Assessable Cost p	\$51.14	\$59.70	\$66.22	\$89.48	\$118.00	\$166.02	\$219.17	\$268.96	\$347.50	\$519.504	\$472.4233	\$521.9306	\$625.7457	\$683.4616	\$758.9001	\$815.5999	\$928.1703	\$965.6978	\$1,049.217	\$1,315.856	\$1,626.442	\$2,024.46	\$2,445.53	
Increase Factor	1.074	1.078	1.074	1.070	1.084	1.083	1.085	1.087	1.091	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	

Model Used	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km	300 km
Material	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel
Wall Thickness	4.4	4.8	4.8	4.8	5.6	5.6	6.4	7.1	7.1	7.9	8.7	8.7	9.5	11.1	12.7	14.3	15.9	
Imperial O.D (inches)	12.75	14	16	18	20	22	24	26	28	30	32	34	36	41	48	56	60	
Metric O.D (mm)	323.9	355.6	406.4	457	508	559	610	660	711	762	813	864	914	1067	1219	1422	1524	
land - entry fee/m	2.47	3.09	3.09	3.09	3.09	3.09	3.09	3.71	3.71	3.71	3.71	3.71	3.71	4.32	4.32	4.32	4.32	
land - damages/m	4.52	6.67	6.67	6.67	6.67	6.67	6.67	9.41	9.41	9.41	9.41	9.41	9.41	12.64	12.64	12.64	12.64	
land - acquisition/m	6.91	9.27	9.27	9.27	9.27	9.27	9.27	11.86	11.86	11.86	11.86	11.86	11.86	14.71	14.71	14.71	14.71	
Subtotal Land Costs (\$/m)	6.58	9.15	9.15	9.15	9.15	9.15	9.15	12.27	12.27	12.27	12.27	12.27	12.27	15.81	15.81	15.81	15.81	
Preliminary engineering	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.91	0.91	0.91	0.91	0.91	0.91	1.26	1.26	1.26	1.26	
Route Reconnaissance	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.13	0.13	0.13	0.13	0.13	0.13	0.21	0.21	0.21	0.21	
Environmental	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.63	0.63	0.63	0.63	0.63	0.63	0.86	0.86	0.86	0.86	
Archaeological	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.41	0.41	0.41	0.41	0.41	0.41	0.60	0.60	0.60	0.60	
Geotechnical	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.57	0.57	0.57	0.57	0.57	0.57	1.20	1.20	1.20	1.20	
As-Built Drawings	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	
Commissioning	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.23	0.23	0.23	0.23	0.23	0.23	0.30	0.30	0.30	0.30	
Legal Surveying	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	
Design, Spec's,Procure.	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.70	0.70	0.70	0.70	0.70	0.70	1.37	1.37	1.37	1.37	
Drainage Drawings	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.24	0.24	0.24	0.24	0.24	0.24	0.32	0.32	0.32	0.32	
Drawings	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.42	1.42	1.42	1.42	1.42	1.42	1.72	1.72	1.72	1.72	
Construction Management	0.94	0.94	0.94	0.94	0.94	0.94	0.94	1.17	1.17	1.17	1.17	1.17	1.17	1.42	1.42	1.42	1.42	
Inspection	1.87	1.87	1.87	1.87	1.87	1.87	1.87	2.12	2.12	2.12	2.12	2.12	2.12	2.37	2.37	2.37	2.37	
Construction Surveying	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	
Subtotal Eng. Costs (\$/m)	6.78	6.78	6.78	6.78	6.78	6.78	6.78	7.81	7.81	7.81	7.81	7.81	7.81	9.25	9.25	9.25	9.25	
Man-Made Crossings	3.80	3.80	3.80	3.80	3.80	3.80	3.80	6.02	6.02	6.02	6.02	6.02	6.02	8.44	8.44	8.44	8.44	
Subtotal Natural Crossings (\$/m)	1.19	1.19	1.19	1.19	1.19	1.19	1.19	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	
Radiography	1.94	2.07	2.07	2.07	2.07	2.07	2.07	2.41	2.41	2.41	2.41	2.41	2.59	2.59	2.59	2.59	2.59	
Seeding	0.18	0.21	0.21	0.21	0.21	0.21	0.21	0.27	0.27	0.27	0.27	0.27	0.27	0.30	0.30	0.30	0.30	
100 Swamp Weights (500m wet)	0.21	0.26	0.26	0.26	0.26	0.26	0.26	0.33	0.33	0.33	0.33	0.33	0.33	0.37	0.37	0.37	0.39	
Sack Breakers (1500 Sand Bags)	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	
Posts,Test Leads,Signs	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	
Subtotal Misc. Mat'l Costs (\$/m)	2.87	3.06	3.06	3.06	3.06	3.06	3.06	3.48	3.48	3.48	3.48	3.48	3.48	3.64	3.72	3.72	3.72	
Pipe costs	87.87	105.98	140.28	265.14	202.01	226.34	303.78	332.95	356.07	387.99	448.96	462.10	472.09	653.81	797.94	1036.57	1249.49	
External Coating-Y11 or FBE	11.94	14.82	17.17	20.55	22.82	24.89	27.62	20.50	22.05	23.65	25.21	26.52	28.34	33.49	37.42	43.60	50.44	
Cost of A/G Assemblies	1.97	2.44	2.97	3.60	4.17	4.98	5.60	6.65	7.55	8.46	9.54	10.76	11.76	15.01	19.41	25.82	27.84	
Heavy Wall Pipe for crossings	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	
Sub-Total Material Costs (\$/m)	99.55	120.47	157.19	285.42	224.67	251.43	331.69	358.84	384.27	418.55	481.98	497.73	510.11	699.40	851.87	1102.21	1323.16	
Subtotal Installation Costs (\$/m)	83.19	105.51	142.59	179.78	197.31	217.43	231.68	246.18	292.42	308.19	331.84	346.80	412.78	449.64	578.71	673.95	830.72	
Total Assessable Cost per M	\$200.16	\$246.17	\$319.97	\$485.19	\$442.17	\$489.05	\$583.56	\$631.15	\$702.82	\$752.86	\$839.95	\$870.66	\$949.18	\$1,180.40	\$1,463.99	\$1,809.58	\$2,187.30	
AY2005 Total Assessable Cost per M	189.202	232.299	301.265	455.321	409.173	452.702	544.836	589.889	653.847	701.262	798.963	827.832	898.252	1124.944	1392.501	1726.389	2084.862	
Increase Factor	1.0579213	1.05971021	1.06209652	1.06604696	1.0806343	1.08028727	1.07107126	1.0699517	1.07489535	1.07357893	1.0512984	1.05172914	1.05669407	1.049293855	1.051339036	1.048185356	1.049134397	

Model Used	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km
Material	Polyethylene	Polyethylene	Polyethylene	Polyethylene	Polyethylene	Polyethylene	Polyethylene	Polyethylene	Polyethylene	Polyethylene
Wall Thickness	W.T. 2.42	W.T. 3.04	W.T. 3.82	W.T. 4.38	W.T. 5.48	W.T. 8.08	W.T. 10.32	W.T. 15.28	W.T. 19.94	
Imperial O.D (inches)	1.05	1.31	1.66	1.9	2.37	3.5	4.5	6.63	8.63	
Metric O.D (mm)	26.7	33.4	42.2	48.3	60.3	88.9	114.3	168.3	219.1	
land - entry fee/m	0.00	0.00	0.00	0.00	0.00	0.00	1.94	1.94	2.59	
land - damages/m	0.78	0.78	0.78	0.78	0.78	0.78	2.57	2.57	4.12	
land - acquisition/m	0.00	0.00	0.00	0.00	0.00	0.00	4.45	4.45	6.91	
Subtotal Land Costs (\$/m)	0.78	0.78	0.78	0.78	0.78	0.78	4.51	4.51	6.71	
Preliminary engineering	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	
Route Reconnaissance	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	
Environmental	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	
Archeological	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Geotechnical	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	
As-Built Drawings	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	
Commissioning	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	
Legal Surveying	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Design, Spec's,Procure.	0.81	0.81	0.81	0.81	0.81	0.81	0.81	1.16	1.16	
Drainage Drawings	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	
Drawings	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	
Construction Management	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Inspection	0.93	0.93	0.93	0.93	0.93	0.93	0.93	1.16	1.16	
Construction Surveying	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	
Subtotal Eng. Costs (\$/m)	3.82	3.82	3.82	3.82	3.82	3.82	3.82	4.40	4.40	
Man-Made Crossings	2.98	2.98	2.98	2.98	2.98	2.98	2.98	3.73	3.73	
Subtotal Natural Crossings (\$/m)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	1.02	1.02	
Radiography	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Seeding	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.21	
20 Swamp Weights (100m wet)	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.26	
Sack Breakers (300 Sand Bags)	0.02	0.02	0.12	0.12	0.76	0.76	0.76	0.76	0.76	
Posts,Test Leads,Signs	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	
Subtotal Misc. Mat'l Costs (\$/m)	0.55	0.55	0.65	0.65	1.29	1.29	1.29	1.29	1.42	
Pipe & Coating Costs	0.79	1.20	2.05	2.34	3.65	7.36	12.34	25.93	46.86	
Fittings/Valves-ANSI 300	0.17	0.17	0.23	0.23	0.23	0.23	0.37	0.39	0.39	
High Energy Joining Kit	0.07	0.07	0.08	0.08	0.08	0.14	0.14	0.23	0.34	
Heavy Wall Pipe for crossings	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	
SubTotal Material Costs (\$/m)	1.14	1.55	2.47	2.76	4.07	7.84	12.97	26.65	47.70	
Subtotal Installation Costs (\$/m)	3.29	3.41	3.46	3.60	3.61	5.76	7.65	14.73	17.19	
Total Assessable Costs per M	\$9.59	\$10.12	\$11.18	\$11.61	\$13.58	\$19.50	\$30.25	\$52.61	\$78.44	
AY2005 Total Assessable Cost per M	8.99	9.48	10.97	11.96	13.77	20.05	32.18	50.94	67.42	
Increase Factor	1.067	1.068	1.019	0.971	0.986	0.972	0.940	1.033	1.163	1.019

Model Used	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km
Material	Polyethylene	Polyethylene	Polyethylene	Polyethylene	Polyethylene	Polyethylene	Polyethylene	Polyethylene	Polyethylene	Polyethylene	Polyethylene	Polyethylene	Polyethylene	Polyethylene	Polyethylene	Polyethylene	Polyethylene	Polyethylene	Polyethylene
Wall Thickness	2.97	3.71	4.67	5.36	6.7	9.88	12.7	18.69	24.33	30.33	35.99	46.93	19.35	46.18	69.27	73.88	61.39		
Imperial O.D (inches)	1.05	1.31	1.66	1.9	2.37	3.5	4.5	6.63	8.63	10.75	12.75	14	16	20	30	32	42		
Metric O.D (mm)	26.7	33.4	42.2	48.3	60.3	88.9	114.3	168.3	219.1	273.1	323.9	355.6	406.4	508	762	813	1067		
land - entry fee/m	0.00	0.00	0.00	0.00	0.00	0.00	1.94	1.94	2.59	2.59	2.59	3.24	3.24	3.24	3.90	3.90	4.54		
land - damages/m	0.78	0.78	0.78	0.78	0.78	0.78	2.57	2.57	4.12	4.12	4.12	6.08	6.08	6.08	8.58	8.58	11.52		
land - acquisition/m	0.00	0.00	0.00	0.00	0.00	0.00	4.45	4.45	6.91	6.91	6.91	9.27	9.27	9.27	11.86	11.86	14.71		
Subtotal Land Costs (\$/m)	0.78	0.78	0.78	0.78	0.78	0.78	4.51	4.51	6.71	6.71	6.71	9.32	9.32	9.32	12.47	12.47	16.05		
Preliminary engineering	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28		
Route Reconnaissance	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15		
Environmental	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06		
Archeological	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Geotechnical	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10		
As-Built Drawings	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26		
Commissioning	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20		
Legal Surveying	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Design, Spec's, Procure.	0.81	0.81	0.81	0.81	0.81	0.81	0.81	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16		
Drainage Drawings	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12		
Drawings	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46		
Construction Management	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93		
Inspection	0.93	0.93	0.93	0.93	0.93	0.93	0.93	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16		
Construction Surveying	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58		
Subtotal Eng. Costs (\$/m)	3.82	3.82	3.82	3.82	3.82	3.82	3.82	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40		
Man-Made Crossings	2.98	2.98	2.98	2.98	2.98	2.98	2.98	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73		
Subtotal Natural Crossings (\$/m)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74		
Radiography	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Seeding	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.21	0.21	0.21	0.26	0.26	0.26	0.30	0.30	0.35		
20 Swamp Weights (100m wet)	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.26	0.26	0.26	0.26	0.30	0.30	0.35	0.42	0.42		
Sack Breakers (300 Sand Bags)	0.12	0.12	0.12	0.12	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76		
Posts, Test Leads, Signs	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.25	0.25	0.25		
Subtotal Misc. Mat'l Costs (\$/m)	0.65	0.65	0.65	0.65	1.29	1.29	1.29	1.29	1.42	1.42	1.42	1.47	1.52	1.57	1.67	1.74	1.78		
Pipe & Coating Costs	1.08	1.83	1.44	1.94	3.00	6.53	10.83	23.34	39.69	61.72	86.90	51.61	67.60	192.24	432.61	596.39	464.94		
Fittings/Valves-ANSI 300	0.84	0.84	0.84	0.84	0.84	1.00	1.37	1.60	2.12	2.77	3.19	3.78	4.62	5.85	7.15	8.58	9.88		
High Energy Joining Kit	0.09	0.09	0.09	0.11	0.11	0.11	0.14	0.21	0.31	0.40	0.45	0.57	0.68	1.82	2.04	2.04	2.16		
Heavy Wall Pipe for crossings	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11		
SubTotal Material Costs (\$/m)	2.12	2.88	2.48	3.01	4.07	7.75	12.46	25.27	42.24	65.00	90.66	56.07	73.02	200.02	441.92	607.14	477.09		
Subtotal Installation Costs (\$/m)	4.77	7.20	7.20	7.51	7.51	9.60	10.55	16.27	18.78	20.03	21.91	35.80	37.70	187.76	225.31	250.35	281.64		
Total Assessable Costs per M	\$12.15	\$15.33	\$14.93	\$15.77	\$17.48	\$23.26	\$32.65	\$53.49	\$75.29	\$99.30	\$126.84	\$108.81	\$127.70	\$404.82	\$687.51	\$877.84	\$782.71		
AY2005 Total Assessable Cost per M	\$11.71	\$13.04	\$13.33	\$14.02	\$15.57	\$21.48	\$30.63	\$50.40	\$71.72	\$95.52	\$122.76	\$99.11	\$116.06	\$360.98	\$619.97	\$700.85	\$703.96		
Increase Factor	1.037	1.176	1.120	1.125	1.123	1.083	1.066	1.061	1.050	1.040	1.033	1.098	1.100	1.121	1.109	1.253	1.112	1.100	

Pipeline costs with 2006 percentage increases applied

Model Used	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km
Material	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
Imperial O.D (inches)	15.9	19.8	25	32.5	19.1	23.7	29.9	38.9	22.2	27.5	34.8	25.3	31.5	
Metric O.D (mm)	750	750	750	750	900	900	900	900	1050	1050	1050	1200	1200	
land - entry fee/m	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	4.54	4.54	4.54	4.54	4.54
land - damages/m	8.58	8.58	8.58	8.58	8.58	8.58	8.58	8.58	8.58	11.52	11.52	11.52	11.52	11.52
land - acquisition/m	11.86	11.86	11.86	11.86	11.86	11.86	11.86	11.86	11.86	14.71	14.71	14.71	14.71	14.71
Subtotal Land Costs (\$/m)	12.47	12.47	12.47	12.47	12.47	12.47	12.47	12.47	12.47	16.05	16.05	16.05	16.05	16.05
Preliminary engineering	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
Route Reconnaissance	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Environmental	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Archeological	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Geotechnical	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
As-Built Drawings	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Commissioning	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Legal Surveying	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Design, Spec's, Procure.	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16
Drainage Drawings	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Drawings	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Construction Management	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Inspection	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16
Construction Surveying	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58
Subtotal Eng. Costs (\$/m)	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40
Man-Made Crossings	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73
Subtotal Natural Crossings (\$/m)	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Radiography	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Seeding	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.35	0.35	0.35	0.35	0.35
20 Swamp Weights (100m wet)	0.35	0.35	0.35	0.35	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
Sack Breakers (300 Sand Bags)	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Posts, Test Leads, Signs	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Subtotal Misc. Mat'l Costs (\$/m)	1.61	1.61	1.61	1.61	1.68	1.68	1.68	1.68	1.68	1.73	1.73	1.73	1.73	1.77
Pipe & Coating Costs	239.32	263.18	356.12	444.25	340.70	378.47	498.51	650.82	454.40	510.47	713.13	595.73	676.53	
Fittings/Valves-ANSI 300	8.52	8.52	8.52	8.52	9.20	9.20	9.20	9.20	9.88	9.88	9.88	10.79	10.79	
High Energy Joining Kit	1.82	1.82	1.82	1.82	2.04	2.04	2.04	2.04	2.16	2.16	2.16	2.38	2.38	
Heavy Wall Pipe for crossings	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	
Sub/Total Material Costs (\$/m)	249.767514	273.631354	366.570673	454.69637	352.057958	389.82307	509.86607	662.17955	466.55435	522.618017	725.278123	609.012128	689.814058	
Subtotal Installation Costs (\$/m)	277.18	277.18	277.18	277.18	296.56	296.56	296.56	296.56	315.95	315.95	315.95	366.50	366.50	
Total Assessable Costs per M	\$546.36	\$570.22	\$663.16	\$751.29	\$668.09	\$705.86	\$825.90	\$978.22	\$805.61	\$861.67	\$1,064.33	\$998.66	\$1,079.46	
AY2005 Total Assessable Cost per M	\$481.28	\$502.97	\$587.46	\$667.58	\$590.81	\$625.14	\$734.27	\$872.74	\$714.86	\$765.83	\$950.06	\$887.32	\$960.78	
Increase Factor	1.135	1.134	1.129	1.125	1.131	1.129	1.125	1.121	1.127	1.125	1.120	1.125	1.124	1.125

Model Used	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km
Material	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum
Wall Thickness	W.T. 2.2	W.T. 2.8	W.T 3.0	W.T. 3.6	W.T 3.18	W.T 6.35	W.T. 6.35	W.T 7.11
Imperial O.D (inches)	1.9	2.37	2.87	3.25	4.5	4.5	6.63	6.63
Metric O.D (mm)	48.3	60.3	73	82.6	114.3	114.3	168.3	168.3

land - entry fee/m
land - damages/m
land - acquisition/m
Subtotal Land Costs (\$/m)
Preliminary engineering
Route Reconnaissance
Environmental
Archeological
Geotechnical
As-Built Drawings
Commissioning
Legal Surveying
Design, Spec's, Procure.
Drainage Drawings
Drawings
Construction Management
Inspection
Construction Surveying
Subtotal Eng. Costs (\$/m)
Man-Made Crossings
Subtotal Natural Crossings (\$/m)
Radiography
Seeding
20 Swamp Weights (100m wet)
Sack Breakers (300 Sand Bags)
Posts, Test Leads, Signs
Subtotal Misc. Mat'l Costs (\$/m)
Pipe & Coating Costs
Fittings/Valves-ANSI 300
High Energy Joining Kit
Heavy Wall Pipe for crossings
SubTotal Material Costs (\$/m)
Subtotal Installation Costs (\$/m)
Total Assessable Costs per M

NO LONGER APPLICABLE - ALUMINUM PIPE IS NO LONGER PRODUCED OR SOLD

AY2004 Total Assessable Cost per M
Increase Factor

Model Used	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km	5 km	
Material	Fiberglass	Fiberglass	Fiberglass	Fiberglass	Fiberglass	Fiberglass	Fiberglass	Fiberglass	Fiberglass	
Wall Thickness	2	2.8	3.6	5.1	8.9	5.1	5.1	16.25	16.25	
Imperial O.D (inches)	2.37	3.5	4.5	6.63	8.63	10.75	12.75	24	36	
Metric O.D (mm)	60.3	88.9	114.3	168.3	219.1	273.1	323.9	609.6	914.4	
land - entry fee/m	1.94	1.94	1.94	1.94	2.59	2.59	2.59	3.24	3.90	
land - damages/m	2.57	2.57	2.57	2.57	4.12	4.12	4.12	6.08	8.58	
land - acquisition/m	4.45	4.45	4.45	4.45	6.91	6.91	6.91	9.27	11.86	
Subtotal Land Costs (\$/m)	4.51	4.51	4.51	4.51	6.71	6.71	6.71	9.32	12.47	
Preliminary engineering	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	
Route Reconnaissance	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	
Environmental	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	
Archeological	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Geotechnical	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	
As-Built Drawings	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	
Commissioning	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	
Legal Surveying	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Design, Spec's,Procure.	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	
Drainage Drawings	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	
Drawings	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	
Construction Management	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Inspection	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	
Construction Surveying	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	
Subtotal Eng. Costs (\$/m)	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	
Man-Made Crossings	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	
Subtotal Natural Crossings (\$/m)	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	
Radiography	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Seeding	0.15	0.15	0.15	0.15	0.21	0.21	0.21	0.26	0.30	
20 Swamp Weights (100m wet)	0.19	0.19	0.19	0.19	0.26	0.26	0.26	0.35	0.42	
Sack Breakers (300 Sand Bags)	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	
Posts,Test Leads,Signs	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	
Subtotal Misc. Mat'l Costs (\$/m)	1.29	1.29	1.29	1.29	1.42	1.42	1.42	1.56	1.68	
Pipe & Coating Costs	10.27	15.54	24.60	46.20	89.53	93.39	119.18	619.57	969.23	
Fittings/Valves-ANSI 300	0.86	1.10	1.41	1.62	1.85	2.08	2.34	2.60	4.34	
High Energy Joining Kit	0.19	0.27	0.36	0.52	0.69	0.87	1.04	1.16	1.16	
Heavy Wall Pipe for crossings	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	
SubTotal Material Costs (\$/m)	11.42	17.02	26.49	48.45	92.19	96.45	122.67	623.45	974.84	
Subtotal Installation Costs (\$/m)	11.34	12.88	14.11	27.00	57.05	68.58	85.78	492.66	615.83	
Total Assessable Costs per M	\$33.85	\$40.99	\$51.69	\$86.54	\$162.66	\$178.45	\$221.87	\$1,132.27	\$1,610.10	
AY2005 Total Assessable Cost per M	\$32.36	\$38.26	\$49.62	\$76.85	\$137.29	\$160.40	\$203.30	\$1,026.73	\$1,457.02	
Increase Factor	1.046	1.072	1.042	1.126	1.185	1.113	1.091	1.103	1.105	1.103