



Canadian Council of Ministers
of the Environment Le Conseil canadien
des ministres de l'environnement

User Guidance for the Wastewater Treatment and Collection System Costing Templates

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This report is based on work completed by CBCL Limited Consulting Engineers. It was modified from its original form by CCME. Many thanks to CBCL for its work in developing the costing templates.

Introduction

Cost templates were developed as a tool to compare the differences in costs between two levels of treatment. Common items such as outfalls, biosolids handling and treatment, inlet pump stations, site access, among other site-specific costs are not included in the outputs. The outputs from the model cannot be compared to project estimates or tender costs. Two separate costing templates, one for wastewater treatment facilities and one for collection systems, have been developed. Each template is set up to allow the user to enter specific project information.

Using the Wastewater Treatment Costing Template

The wastewater treatment plant costing template is contained within an excel spreadsheet. The template is designed to allow a user to enter information for a large group of facilities. The template will allow the user to view a summary for each individual plant as well as a detailed summary for all plants in group. The detailed summary also includes a total of capital cost requirements for the group of plants contained in the list. User instructions are available on the yellow-tabbed Instructions worksheet.

The wastewater treatment costing template allows the user to choose from a comprehensive list of treatment options to represent their existing facility layout if applicable, and future layout. Based on the size (population or flow) and relative location of the plant, the template will provide the user with approximate cost estimates for the construction of their new facilities. The template also provides an approximate annual operation and maintenance (O&M) cost for the proposed plant. The collection system template provides the user with approximate costs related to installing new or replacing existing lengths of gravity sewers. The template also provides some rehabilitation costs for pipe, manholes and service laterals. Instructions and a summary of the contents of the template are found below.

1. Instructions – Wastewater Treatment Cost Template

- *** Please read through instructions carefully**
- *** Full description of template included in Final Report 050839**
- *** Start a NEW template for each new provincial/territorial group of facilities**
- *** Remember to SAVE your work frequently**
- *** All cost estimates are provided in \$CDN**
- *** Cost estimates DO NOT include applicable taxes**

Entering New Group of Facilities

Step

- 1** Go to "New Entry" worksheet (green tab)
- 2** Enter the following information in the blue shaded cells:
 - a** Province/Territory Group Name (i.e. Ontario, NB, NS)
 - b** Facility Name (each entry must have a new name, i.e., no duplicate records)
 - c** Location of Facility (enter name of municipality)
 - d** Type of Location (urban, rural, remote, or far north)
 - e** Type of Project (new or upgrade)
 - f** Units to Define Plant Size (population or m³/day)
 - g** Size of Plant (in units specified in Step 3e)
 - h** Existing Facility Layout (Choose from picklist provided - must be left blank for new facility)
 - i** Type of Disinfection of Existing Layout (None, Chlorination, UV)
 - j** Proposed Facility Layout (Choose from picklist provided) template assumes that proposed facility will have UV disinfection
- 4** "Add Data to List and Clear Cells" button will transfer current plant data and associated cost estimates to Summary List. This button will clear all shaded cells on the "New Entry" worksheet once data is transferred.
- 5** Repeat Step 2 for each facility included in province/territory group
- 6** "View Summary" button will allow the user to view a detailed summary of all facilities included in group

Viewing/Editing Existing Facility Data

Step

- 1** Go to "Summary" worksheet using "View Summary" button
- 2** Type ID# for plant you wish to edit in box next to yellow "View/Edit ID" button
- 3** Press "View/Edit ID" button to be taken to "Edit" worksheet
- 4** Make desired changes
- 5** Press "Return to Summary (WITH Changes)" to update cost estimates to reflect changes
- 6** Press "Return to Summary (NO Changes)" to return to Summary without changes

Deleting Entry in Facility List

Step

- 1** Go to "Summary" worksheet using "View Summary" button
- 2** Type ID# for plant you wish to delete in box next to orange "Delete ID" button
- 3** Press "Delete ID" button to remove facility information from list
- 4** Once facility is deleted, it cannot be retrieved. User must fill out new entry on "New Entry" worksheet to reenter data.

2. Worksheet "New Entry"

The user is advised to read through the instructions outlined in section 1, prior to beginning data entry into the New Entry worksheet.

Province/Territory

The template is set up to provide a costing summary for both individual plants as well as a multiple grouping of plants. For example the province of Ontario could use this template to summarize the costing requirements of all wastewater plants upgrades within the province. The user should enter the group name into this cell (i.e., Ontario).

Facility Name

Enter the facility name (i.e., Summerside Water Pollution Control Plant). The template will not allow the user to enter data for two plants with the same name.

Facility Location

The facility location is the name of the municipality where the facility is located.

Type of Location

User is limited to four choices for plant location: Urban, Rural, Remote or Far North.

Type of Project

User is limited to two choices for the type of project; New or Upgrade.

Plant Size (flow or population)

User should first choose either a flow-based or population-based size range for the facility. To do this, please use picklist in unit column and choose either; population or m³/day. Depending on chosen units, user must enter either the daily average flow in (m³/day) or approximate service population. A default conversion, suggested by CCME, for average production of wastewater per capital is 0.5 m³/day/person. The costing models were developed for flows ranging from 100 to 2,500,000 m³/day. Caution should be taken when using template for plant flows outside this range.

Existing Facility OR Proposed Facility

The template requires the user to select the type of treatment layout for both the existing facility (if applicable) as well as the new facility. A summary of choices are provided in table 1.

Type of Disinfection for Existing Facility

User should choose applicable type of disinfection for the existing layout. Choices include None, Chlorination or Ultra-Violet (UV).

Table 1. Available Process Options.

Process Options	Existing	Proposed
Preliminary	X	
Primary	X	
Enhanced Primary	X	X
Secondary (BOD) – SP	X	X
Secondary (BOD) – LAG	X	X
Secondary (BOD) – SBR	X	X
Secondary (BOD) – CAS	X	X
Secondary (BOD) – RBC	X	X
Secondary (BOD) – TF	X	X
Secondary (NH3) – SBR	X	X
Secondary (NH3) – CAS	X	X
Secondary (NH3) – RBC	X	X
Secondary (NH3) – TF	X	X
Secondary (NH3) – RSF	X	X
Tertiary (BOD & SS) – SBR	X	X
Tertiary (BOD & SS) – CAS	X	X
Tertiary (BOD & SS) – RBC		X
Tertiary (BOD & SS) – TF	X	X
Tertiary (BOD, SS & NH3) – SBR		X
Tertiary (BOD, SS & NH3) – CAS	X	X
Tertiary (BOD, SS & NH3) – RBC		X
Tertiary (BOD, SS & NH3) – TF		X
Tertiary (BNR) – CAS	X	X
Tertiary (BOD, SS & BNR) – CAS		X

Once the user has entered in the required data for a given plant, a summary can be viewed at the bottom of the New Entry worksheet. The user can then pushed one of two buttons.

Button 1 “ADD Data to List AND Clear Cells”

Once this button is pressed, all of the information for the current plant will be transferred to a detailed summary list along with the capital and operation and maintenance cost estimates. Please note the cells will be cleared once this data has been transferred.

Button 2 “View Summary”

Once this button is pressed, the user will be taken to a detailed list that includes all plant information that has previously been entered into database. Each line of the list summarizes summary information and cost estimates for one plant. Please note the detailed list will not include data from the current plant until the “ADD Data to List AND Clear Cells” button has been pressed.

3. Worksheet “Summary”

All of the data added for the group is summarized on this sheet. The user is given the option of viewing/editing information for an individual plant or deleting an entry altogether. Please note, once the entry is deleted, the information cannot be retrieved. The user would have to reenter the information as a new facility in the New Entry worksheet.

The user can edit or view the information for any of the plants by typing the corresponding ID number in the box next to the yellow “View/Edit ID” button. Once the button is pressed, the user will be taken to a worksheet entitled “Edit” identical to the New Entry worksheet which contains the data from the selected ID. The user has the option of making changes to the selected facility and updating the summary list or simply viewing the data and returning to the summary list with no changes.

4. Example

This example, and the following cost computations, are for illustration purposes only and do not represent any current situations in Ontario.

The province of Ontario has 10 municipalities that require either new or upgraded facilities in order to meet the new National Performance Standards and Monitoring Requirements for municipal wastewater effluent proposed by the DC. Table 2 summarizes the plant information. The province would like to know the approximate individual and total costs for this project.

Table 2. Province of Ontario

Facility Name	New or Upgrade	Location	Size of Facility	Existing Layout	Proposed Layout
Plant A	New	Brockville	150,000 people	N/A	Biological Nutrient Removal
Plant B	New	Thunder Bay	15,000 m ³ /day	N/A	Trickling Filter (BOD Removal)
Plant C	Upgrade	Sudbury	38,000 m ³ /day	Preliminary	Aerated Lagoon
Plant D	Upgrade	Alexandria	2,000 people	Septic Tank	Conventional Activated Sludge (BOD and NH ₃ Removal)
Plant E	Upgrade	Windsor	70,000 people	Conventional Primary Treatment	Enhanced Primary
Plant F	New	Nakina	150 m ³ /day	N/A	Recirculating Sand Filter
Plant G	Upgrade	Toronto	500,000 m ³ /day	Enhanced Primary with UV	Biological Nutrient Removal with Tertiary BOD & SS removal
Plant H	Upgrade	St. Catharines	6,000 people	Preliminary	Rotating Biological Contactor (BOD Removal)
Plant I	Upgrade	Hamilton	12,500 m ³ /day	Sequencing Batch Reactor with Chlorination	Nitrifying Sequencing Batch Reactor with Tertiary BOD & SS Removal
Plant J	New	Walkerton	4,000 people	N/A	Stabilization Pond

5. Using the Template to Compute Costs

Once the user has become familiar with the costing template by reading this report as well as the instruction page located within the template, they can begin entering the plant data from table 2 into the New Entry “Worksheet”.

Since this is a new group of facilities, a new copy of the costing template should be started. The user should begin by typing in the name of the group of facilities. In this case an appropriate name would be **Ontario**.

Please Read Through Instruction Sheet First



Province/Territory Group	ONTARIO	
Facility Name	Plant A	
Facility Location	Brockville	
Type of Location	Urban	
Type of Project (new or upgrade)	New	
Size of Plant (population or m ³ /day)	150,000	population
Existing Facility Layout		
Proposed Facility Layout	W Tertiary (BNR) - CAS	

Enter Units First

Enter Type of Disinfection

Size of Facility	Very Large	
	75,000	m ³ /day
Estimated Cost of Existing Facility	\$0.0	million
Estimated Cost of Proposed Facility	\$57.4	million
Contingency	20%	
Location Factor	10%	
Estimated Capital Cost of Project	\$75.8	million
Estimated Annual O&M Cost	\$3,475,000	

ADD Data to List AND Clear Cells

View Summary

Figure 1. New Entry Worksheet.

The user can then enter the information for the first plant in the list in the designated boxes. The city of Brockville would be considered an urban location.

Once the user is satisfied with the data entered for the current plant, the button “ADD Data to List AND Clear Cells” can be pressed to add the current data to the detailed summary list. By pressing this button, all of the blue shaded cells will be cleared for the next entry. At any time, the user can press the “View Summary” button to view the detailed list of all facilities previously added to the group’s database.

The user can then enter in data for Plant B. With a location of Thunder Bay, the user should choose the urban location type from the list. The trickling filter with BOD removal is listed at Secondary (BOD) – TF on the proposed facility list.

Plant C is listed as an upgrade, therefore the user should choose an existing facility layout as well as a proposed facility layout. The city of Sudbury would be considered an urban location. The existing layout is listed as Preliminary on the existing layout pick list. The proposed facility layout would be listed at Secondary (BOD) – LAG.

Plant D is also listed as an upgrade. The Town of Alexandria would most likely be considered a rural location. The existing facility layout is described by a septic tank. It is assumed that septic tanks would offer no value to the project and therefore, this upgrade from a septic tank to a conventional activated sludge process would be modeled as a new project. The user should choose Secondary (NH3) – CAS from the proposed facility list.

Plant E, listed as an upgrade, is located in the City of Windsor (urban area). The existing facility layout should be chosen as Primary with disinfection type chosen as chlorination and the proposed layout should be chosen as Enhanced Primary.

Plant F, listed as a new facility, is located in the remote area of Nakina. The proposed facility layout should be chosen as Secondary (NH3) – RSF.

Plant G, listed as an upgrade, is located in the urban area of Toronto. The existing facility layout should be chosen as Enhanced Primary with UV disinfection and the proposed layout should be chosen as Tertiary (BOD, SS & BNR) – CAS.

Plant H, listed as an upgrade, is located in the urban area of St. Catharines. The existing facility layout should be chosen as Preliminary and the proposed layout should be chosen as Secondary (BOD) – RBC.

Plant I, listed as an upgrade, is located in the urban area of Hamilton. The existing facility layout should be chosen as Secondary (BOD) – SBR with chlorination disinfection and the proposed layout should be chosen as Tertiary (BOD, SS & NH3) – SBR.

Plant J, listed as a new facility, is located in the rural area of Walkerton. The proposed facility layout should be chosen as Secondary (BOD) – SP.

Once all of the facility information has been entered into the database, the complete facility list can be viewed or printed from the Summary worksheet.

Detailed Cost Summary for ONTARIO

Total No of Facilities included in report	10	
Total Capital Cost for Group	\$430	\$ million
No of Upgraded Facilities	4	
No of New Facilities	6	

[Return to Template Sheet](#)

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ID	Facility Name	Project Type	Location		Size of Plant		Type of Facility		Estimated Capital Costs		Contingency	Location Factor	Estimated Project Costs	
			Type		m ³ /day		Existing	Proposed	Existing Facility \$ million	New Facility \$ million			Capital \$ million	Annual O&M \$
0														
1	Plant J	New	Walkerton	Rural	Small	2,000		D Secondary (BOD) - SP	\$0.0	\$4.2	20%	0%	\$5.0	\$63,000
2	Plant I	Upgrade	Hamilton	Urban	Medium	12,500	F Secondary (BOD) - SBR	B Tertiary (BOD, SS & NH3) - SBR	\$5.4	\$15.2	40%	10%	\$15.1	\$817,000
3	Plant H	Upgrade	St. Catharines	Urban	Medium	3,000	A Preliminary	H Secondary (BOD) - RBC	\$5.4	\$5.6	40%	10%	\$3.4	\$187,000
4	Plant G	Upgrade	Toronto	Urban	Very Large	900,000	C Enhanced Primary	X Tertiary (BOD, SS & BNR) - CAS	\$106.0	\$284.9	40%	10%	\$214.0	\$19,521,000
5	Plant F	New	Nakina	Remote	Very Small	150		N Secondary (NH3) - RSF	\$0.0	\$0.6	20%	20%	\$0.8	\$18,000
6	Plant E	Upgrade	Windsor	Urban	Large	85,000	B Primary	C Enhanced Primary	\$1.1	\$19.0	40%	10%	\$28.9	\$1,160,000
7	Plant D	New	Alexandria	Rural	Small	1,000		K Secondary (NH3) - CAS	\$0.0	\$2.5	20%	0%	\$3.0	\$181,000
8	Plant C	Upgrade	Stouffville	Urban	Large	38,000	A Preliminary	E Secondary (BOD) - LAG	\$13.8	\$53.2	40%	10%	\$68.5	\$1,690,000
9	Plant B	New	Thunder Bay	Urban	Medium	15,000		I Secondary (BOD) - TP	\$0.0	\$11.8	20%	10%	\$15.0	\$269,000
10	Plant A	New	Brockville	Urban	Very Large	75,000		W Tertiary (BNR) - CAS	\$0.0	\$17.4	20%	10%	\$25.8	\$1,475,000

Figure 2. Detailed Cost Summary

The detailed summary for this tutorial shows a total capital cost for Ontario of \$430 million. Individual O&M cost estimates are provided in the table.

Using the Collection System Costing Template

The collection system costing template is contained within an excel spreadsheet. The template is designed to allow a user to enter information for a large group of communities. The template will allow the user to view a summary for each individual community as well as a detailed summary for all communities included in the group. The detailed summary also includes a total of capital cost requirements for the group of communities contained in the list. User instructions are available on the yellow-tabbed Instructions worksheet.

The collection system template has been developed to provide a rough estimate of the magnitude of costs required to replace or rehabilitate existing infrastructure. Both templates can be used for a single facility or community or can be used to calculate the total costs related to a group of facilities/communities. Instructions and a summary of the contents of the template are found below.

1. Instructions - Collection System Upgrade Cost Template

- *** Please read through instructions carefully**
- *** Full description of template included in Final Report 050839**
- *** Start a NEW template for each new provincial/territorial group of communities**
- *** Remember to SAVE your work frequently**
- *** All cost estimates are provided in \$CDN**
- *** Cost estimates DO NOT include applicable taxes**

Entering New Group of Communities

Step

- 1** Go to "New Entry" worksheet (green tab)
- 2** Enter the following information in the blue shaded cells
 - a** Province/Territory Group Name (i.e. Ontario, NB, NS)
 - b** Community Name (each entry must have a new community name, i.e., no duplicate records)
 - c** Type of Location (urban, rural, remote, or far north)
 - d** Length of NEW gravity sewer to be installed (cost includes manholes, laterals)
 - e** Length of gravity sewer to be REPLACED (cost includes manholes, laterals)
 - f** Length of gravity sewer to be REPAIRED (cost DOES NOT include manholes, laterals)
 - g** Number of manholes to be REPAIRED
 - h** Number of manholes to be REPLACED
 - i** Number of service laterals to be REPLACED
- 4** "Add Data to Summary List and Clear Cells" button will transfer current data and associated cost estimates to Summary
- 5** Repeat Step 3 for each community included in group
- 6** "View Summary" button will allow the user to view list of all communities included in group along with individual community and total group cost estimates

Viewing/Editing Existing Community Data

Step

- 1** Go to "Summary" worksheet using "View Summary" button
- 2** Type ID# for community you wish to edit in box next to yellow "View/Edit ID" button
- 3** Press "View/Edit ID" button to be taken to "Edit" worksheet
- 4** Make desired changes
- 5** Press "Return to Summary (WITH Changes)" to update cost estimates to reflect changes
- 6** Press "Return to Summary (NO Changes)" to return to Summary without changes

Deleting Entry in Community List

Step

- 1** Go to "Summary" worksheet using "View Summary" button
- 2** Type ID# for community you wish to delete in box next to orange "Delete ID" button
- 3** Press "Delete ID" button to remove community information from list
- 4** Once community data is deleted, it cannot be retrieved. User must fill out new entry on "New Entry" worksheet to reenter data

2. Worksheet "New Entry"

The user is advised to read through the instructions on the yellow-tabbed Instruction worksheet prior to beginning data entry into the New Entry worksheet.

Province/Territory

The template is setup to provide a costing summary for both individual plants as well as a multiple grouping of plants. For example the province of Ontario could use this template to summarize the costing requirements of all wastewater plants upgrades within the province. The user should enter the group name into this cell (i.e., Ontario).

Community Name

Enter the Community name (i.e., Saint John). The template will not allow the user to enter data for two communities with the same name.

Type of Location

User is limited to four choices for location: Urban, Rural, Remote or Far North.

New OR Replacement of Gravity Sewer

User must enter in the applicable lengths of gravity sewer that will be installed or replaced as part of this project. The costs provided include all relevant extras such as manholes.

Rehabilitation

User must enter in the applicable rehabilitation requirements (pipe length, no. of manholes to be repaired or replaced and no. of service laterals to be replaced) for the project.

Once the user has entered in the required data for a given plant, a total cost estimate is provided at the bottom of the sheet for the given community. The user can then pushed one of two buttons.

Button 1 “ADD Data to Summary List AND Clear Cells”

Once this button is pressed, all of the information for the current community will be transferred to a detailed summary list along with the cost estimates. Please note the cells will be cleared once this data has been transferred.

Button 2 “View Summary List”

Once this button is pressed, the user will be taken to a detailed list that includes community information that has previously been entered into database. Each line of the list summarizes the information and cost estimates for one community. Please note the detailed list will not include data from the current facility until the “ADD Data to Summary List AND Clear Cells” button has been pressed.

3. Worksheet “Summary”

All of the data added for the group is summarized on this sheet. The user is given the option of viewing/editing information for an individual community or deleting an entry altogether. Please note, once the entry is deleted, the information cannot be retrieved. The user would have to reenter the information as a new community in the New Entry worksheet.

The user can edit or view the information for any of the entries by typing the corresponding ID number in the box next to the yellow “View/Edit ID” button. Once the button is pressed, the user will be taken to a worksheet entitled “Edit” identical to the New Entry worksheet which contains the data from the selected ID. The user has the option of making changes to the selected community and updating the summary list or simply viewing the data and returning to the summary list with no changes.

4. Example

This example, and the following cost computations, are for illustration purposes only and do not represent any current situations in New Brunswick.

The province of New Brunswick has 5 communities that require work on their collection systems. Table 3 summarizes the community requirements. The province would like to know the approximate individual and total costs for this project.

Table 3. Province of Ontario.

Community Name	Category	New	Replace	Rehabilitation
Saint John	< 400 mm			
	400 – 800 mm	100 m	100 m	
	800 – 1200 mm			
	> 1200 mm			
	Manholes			10 (Repaired)
	Service Laterals			
Musquash	< 400 mm			
	400 – 800 mm			
	800 – 1200 mm			
	> 1200 mm			500 m
	Manholes			5 (Replaced)
	Service Laterals			5
Sussex	< 400 mm			
	400 – 800 mm			
	800 – 1200 mm			
	> 1200 mm			
	Manholes			
	Service Laterals			3
Moncton	< 400 mm			
	400 – 800 mm	50 m		
	800 – 1200 mm	50 m		
	> 1200 mm			
	Manholes			10 (5 Repaired, 5 Replaced)
	Service Laterals			15
Bathurst	< 400 mm		400 m	
	400 – 800 mm			
	800 – 1200 mm			
	> 1200 mm			
	Manholes			
	Service Laterals			

5. Using the Template to Compute Costs

Once the user has become familiar with the costing template by reading this report as well as the instruction page located within the template, they can begin entering the plant data from table 3 into the New Entry “Worksheet”.

Since this is a new group of communities, a new copy of the costing template should be started. The user should begin by typing in the name of the group of facilities. In this case an appropriate name would be **New Brunswick**.

The user can then enter the information for the first community in the list in the designated boxes. The city of Saint John would be considered an urban location.

Once the user is satisfied with the data entered for the current plant, the button “ADD Data to Summary List AND Clear Cells” can be pressed to add the current data to the detailed summary list. By pressing this button, all of the blue shaded cells will be cleared for the next entry. At any time, the user can press the “View Summary List” button to view the detailed list of all facilities previously added to the group’s database.

Saint John, Moncton and Bathurst would all be considered urban location while Musquash would be considered a remote location and Sussex would be considered a rural location.

Once all of the information has been entered into the database, the complete summary list can be viewed or printed from the Summary worksheet.

*****Please Read Through Instruction Sheet First*****



PROJECT DETAILS

Province/Territory Group	NEW BRUNSWICK
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Community Name	Saint John
Location Type	Urban

GRAVITY SEWER

Size of Pipe (mm)	NEW		REPLACE	
	Length of Pipe m	Cost Estimate \$	Length of Pipe m	Cost Estimate \$
< 400		\$0		\$0
400 - 800	100	\$43,069	100	\$211,395
800-1200		\$0		\$0
> 1200		\$0		\$0
Total	100	\$43,069	100	\$211,395

REHABILITATION

			Cost Estimate	
Length of Pipe (m)	< 400 mm		\$0	
	400 - 800 mm		\$0	
	800-1200 mm		\$0	
	> 1200 mm		\$0	
No. of Manholes to be Repaired			10	\$30,000
No. of Manholes to be Replaced				\$0
No. of Service Laterals to be Replaced				\$0
Total				\$30,000

Subtotal	\$284,465	Add Data to Summary List and Clear Cells
Contingency	25%	
Location Adjustment	10%	

Total Cost Estimate	\$391,139	View Summary List
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Figure 3. New Entry Worksheet.

Detailed Summary for NEW BRUNSWICK

Return to Template Sheet

Total No of Communities included in report	5
Total Cost for NEW BRUNSWICK	\$1,964,794

ID	Community Name	Location	Cost Estimates					Subtotal	Contingency	Location Adjustment	Total Cost Estimate
			New Gravity Sewer	Replace Gravity Sewer	Rehabilitation						
					Pipe	Manholes	Service Laterals				
0											
1	Bethel	Urban	\$0	\$678,595	\$0	\$0	\$0	\$678,595	25%	10%	\$943,068
2	Moncton	Urban	\$96,836	\$0	\$0	\$40,000	\$85,000	\$141,336	25%	10%	\$194,317
3	Sussex	Rural	\$0	\$0	\$0	\$0	\$9,000	\$9,000	25%	0%	\$11,250
4	Mosquash	Remote	\$0	\$0	\$250,000	\$25,000	\$15,000	\$290,000	25%	20%	\$445,000
5	Saint John	Urban	\$43,059	\$211,395	\$0	\$30,000	\$0	\$284,465	25%	10%	\$391,139



Figure 3. Detailed Summary Sheet.

The detailed summary for this tutorial shows a total capital cost for New Brunswick of approximately \$2 million.