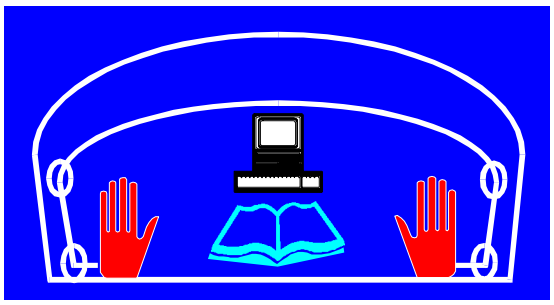

Users Guide: Capital Project Economic Impact Model

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Author: Canada - Parks/environment Canada

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11-55-70

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Model Version: November 1985

1.0 INTRODUCTION

The following user guide explains how to use the Capital Project Economic Impact Model developed by the Socio-Economic Branch, Parks Canada. The theoretical description of the model, its strengths, limitations and applications can be found in the report "Evaluation of the Economic Impact of Capital Projects using the Statistics Canada Inter-Provincial Input-Output Model" Socio-Economic Branch, PHQ.

Briefly, the model calculates the economic impact of a capital development project(s) such as the building of a road, campground, VRC, administration centre, etc. The impacts are estimated for three geographic levels.

1. Province of the project
2. Other provinces
3. Canada

The smallest geographic unit for which impact estimates can be made is the province where the project will take place. However, since the projects considered are all of the construction variety (i.e. roads, buildings, etc.) it is safe to assume that most of the direct impacts will occur mainly in the region of the project.

Three measures of economic impact are used:

1. Person-years of employment that would be created during the development of the project.

2. Labour income (salaries, wages and profits of unincorporated businesses) generated.

3. Gross Domestic Product (GDP) which includes labour income, as well as corporate operating surpluses.

The direct, indirect and induced effects are measured by the model.

Not included in the impact estimates are the additional economic impacts (if any) generated as a result of the additional person-years required to operate and maintain the new facility. The additional park/site visitors and their subsequent expenditures are similarly not included.

The Capital Project Economic Impact Model is based on the 1979 Statistics Canada Interprovincial Input-Output Model. This model uses the most up-to-date and comprehensive data base on inter-industry and inter-provincial trade flows. The interprovincial and national input-output models of Statistics Canada have been used extensively for many years by both the private sector and government. The background report mentioned earlier can be referred to for a more complete discussion of the model.

It is recommended that the model not be used for capital projects whose Total Estimated Costs in constant 1985 dollars less than $250,000.

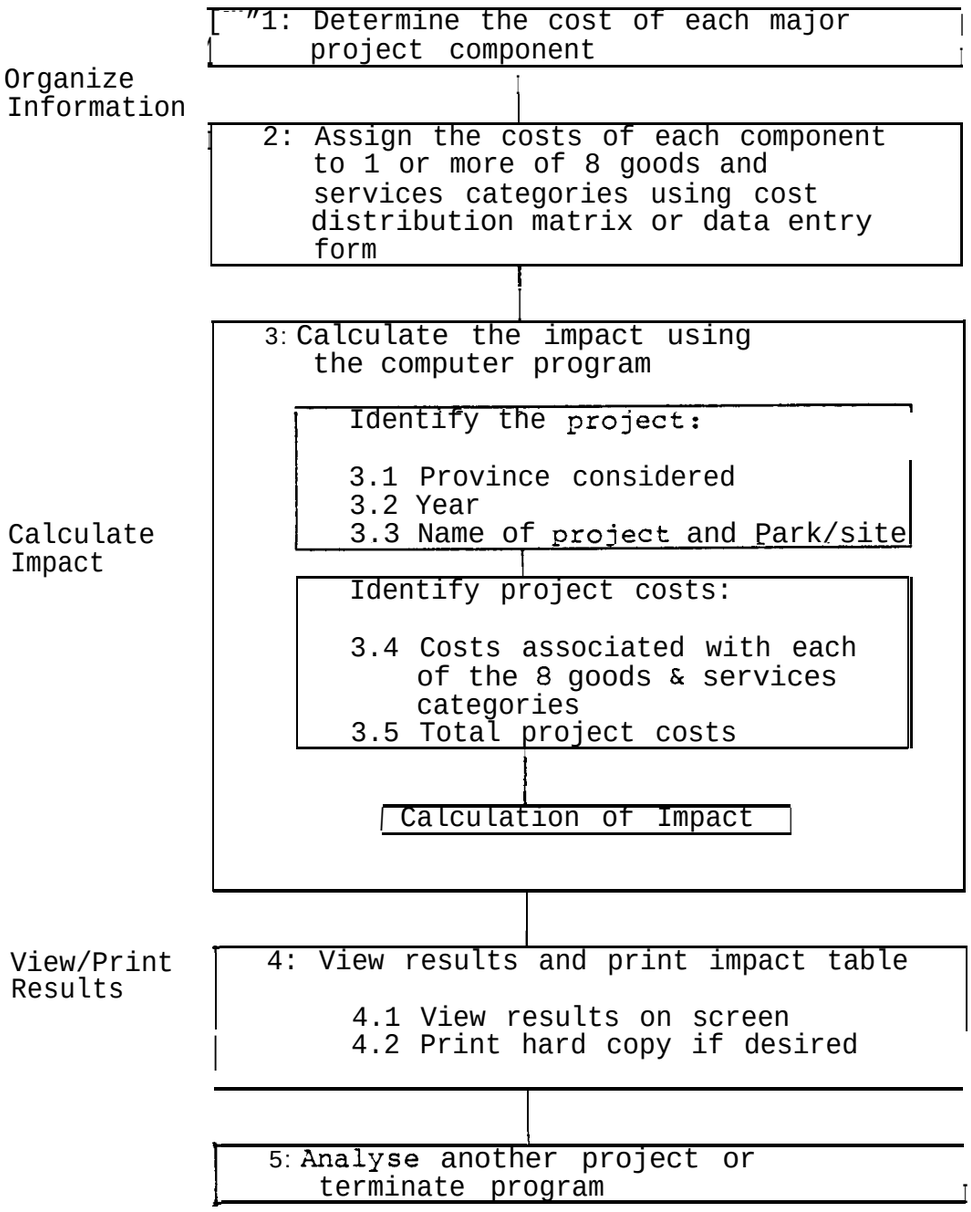
2.0 STEPS INVOLVED IN USING THE MODEL

The program to estimate the economic impacts has been developed for use on an IBM-PC. The program has been written in a “user friendly” interactive mode.

In order to use the program the user must follow four basic

Figure 1

The Different Stages of the Capital Project Economic Impact Model



steps. Figure 1 depicts these steps clearly. An example will be given later in the Guide to further assist in understanding how the program works.

2.1 Determine All Project Costs

All costs associated with the project and which could normally be included in a PIP, are to be itemized. Included are the construction costs, the cost of professional services such as engineering, design and project supervision, costs for providing parking space, access roads, landscaping, as well as furniture and fixtures and interpretation exhibits and displays. Not to be included in the cost estimates for modelling purposes are land acquisition costs and the purchases of used equipment and machinery and existing buildings. All project costs must be in constant dollars.

2.2 Assign Costs to the Goods and Service Categories Used by the Model

The model requires that the estimated costs be assigned to one or more of eight goods and services categories. These categories are defined broadly enough to capture the majority of costs associated with capital projects. The eight categories are:

1. Repair Construction
2. Residential Construction
3. Non-Residential Construction
4. Construction of Roads, Highways
5. Repair and Maintenance of Roads
6. Other Engineering Construction
7. Business Services
8. Furniture and Fixtures

A description of each category can be found in the Appendix. Initially it will be necessary to consult these descriptions frequently in order to complete step 2.

A "Data Entry Form" has been included in the Appendix in order to assist in entering the data into the program.

2.3 Input Cost Data Into The Model

The program, as mentioned, was designed to run on an IBM-PC.

As the program has been written in a "user friendly interactive" mode, no knowledge of computer programming is required of the user. Upon reading this guide and running the model one or two times, the user should be able to use the model with little difficulty.

The model requires the user to input five data items - all of which will have been indicated on the Data Entry Form. They are as follows:

1. The province where the project is to be located.
2. The year when the project will occur.
3. The project name/number and the name of the park/site where it will be located.
4. The costs associated with 1 or more of the eight goods and services categories.
5. The total project cost.

Figure 1 identified the above steps.

The fourth data item - costs associated with the goods and services categories - can be entered into the model in one of

two ways. One way is to have the model ask you the costs associated with each of the eight categories. The user will discover however that often only 1 to 3 goods and services categories for a project will have a cost identified. In this case, entering the cost figures for only those categories selected on the Data Entry Form would be more rapid. The program allows the user to use either method of data entry.

The program allows the user to verify the data entered after each step. The user can also retype an incorrect entry by pressing the backspace key " " to delete a character(s) so long as this is done before the return key is pressed.

3.0 AN EXAMPLE

The following example will serve to better illustrate how the model functions. The example selected consists of a new visitor reception centre for Riding Mountain National Park in Manitoba. The project was scheduled to begin in 1983.

Referring to Figure 1, Step 1 involves the determination of all project costs. These costs are usually obtainable from the PIP document as well as from the project sponsor.

3.1 Step 1: Determining Project Costs

construction of building	$132,000
- parking	72,000
landscaping	38,000
washrooms	**11,000**
interpretation exhibits	**33,000**
engineering, professional services	**34,000**
TOTAL COSTS	**$320,000**

Included in the above figures is a risk factor of 10%. This factor can be divided equally among all costs identified or distributed according to information available.

3.2 Step 2: Assigning Costs

Using the definitions in the Appendix and the Data Entry Form, the project costs are assigned to 1 or more of the eight goods and services categories.

For the Riding Mountain VRC, we can make the following assignment:

Project Item	Goods & Services Category	Category #'s
1. Construction of Building	Non-Residential Construction	#3, #7
2. Parking	Road Construction	#4, #7
3. Landscaping	Other Engineering Construction	#6
4. Washrooms	Non-Residential Construction	#3, #7
5. Interpretation Exhibits	Furniture and Fixtures	#8
6. Consulting, Engineering Fees	Professional Services & Business	#7

3.3 Step 3: Input Cost Data

The dollar amounts that would be assigned to the 5 goods and services categories associated with this project are shown on the following data entry form. The cost figures to be entered into the model appear on the bottom line of the Data Entry Form marked "MODEL TOTAL".

You are now ready to run the model using the program diskette.

Date: October 25 1985

Province of Project: MANITOBA

Year Analyzed: 1983

Project Name/#: Construction of Visitor Reception Centre

Park/Site Name: Riding Mountain National Park

DATA ENTRY FORM

CAPITAL PROJECT ECONOMIC IMPACT MODEL

SOCIO-ECONOMIC BRANCH

Project Elements	1. Renovation/ Repair Constr.	2. Resident. Constr.	3. Non-Res. Constr.	4. Road Constr.	5. Road Repair & Maint.	6. Other Engin. Constr.	7. Other Business Services	8. Furniture & Fixture	TOTAL
Construction of Building			118,800				13,200		132,000
Parking				66,400			5,600		72,000
Landscaping						38,000			38,000
Washrooms			9,900				1,100		11,000
Interpretation								33,000	33,000
Professional Services							34,000		34,000
MODEL TOTAL	0	0	128,700	66,400	0	38,000	53,900	33,000	320,000

Insert the diskette into the disk drive, and turn on the computer, screen and printer. In approximately 50 seconds, the program will be ready to use. A description and example of what you will see on the screen is given below. The information which you must enter is underlined in the example below. The number in the parenthesis do not appear on the screen but are used here to aid in the description of the program.

Example of what Will Appear
on the Screen

programme IMPACT program
version 20/11/1985 version
Pares Canada - Parks Canada

Quelle langue désirez-vous? (what language do you want?)
(F)rançais ou (A)nglaise ((F)rench or (E)nglish) **E**

(1) GOOD DAY. THIS PROGRAM CALCULATES THE ECONOMIC IMPACT OF CAPITAL PROJECTS.

(2) WHAT IS TODAY'S DATE?
TYPE THE DATE AND PRESS RETURN. OCTOBER 25 1985

(3) THE PROVINCES CONSIDERED BY THE PROGRAM ARE:

NEWFOUNDLAND :	1
PRINCE EDWARD ISLAND:	2
NOVA SCOTIA:	3
NEW BRUNSWICK:	4
QUÉBEC :	5
ONTARIO:	6
MANITOBA:	7
SASKATCHEWAN :	8
ALBERTA :	9

BRITISH COLUMBIA: 10
YUKON/N.W.T. : 11

(4) IN WHAT PROVINCE WILL THE PROJECT BE IMPLEMENTED?
INDICATE THE NUMBER OF PROVINCE AND PRESS RETURN. 7

(5) THE PROVINCE CONSIDERED WILL BE MANITOBA
IS THE PROVINCE YOU HAVE CHOSEN CORRECT?
ANSWER Y OR N. Y

(6) THE YEARS CONSIDERED BY THE PROGRAM ARE:

1979: 1
1980: 2
1981: 3
1982: 4
1983: 5
1984: 6
1985: 7

(7) WHAT YEAR DO YOU WANT?
INDICATE THE NUMBER FOR THE YEAR AND PRESS RETURN. 5

(8) THE YEAR CONSIDERED WILL BE 1983.
DID YOU SELECT THE CORRECT YEAR? ANSWER Y OR N. Y

(9) WHAT IS THE PROJECT?
TYPE THE PROJECT NAME AND PRESS RETURN. CONSTRUCTION OF VISITOR RECEPTION CENTRE

(10) IN WHAT NATIONAL PARK OR HISTORIC PARK/SITE WILL THE PROJECT BE UNDERTAKEN?
TYPE THE NAME AND PRESS RETURN. RIDING MOUNTAIN NATIONAL PARK

(11) **You CAN** ENTER THE VALUE OF THE GOOD CATEGORIES TWO WAYS:
- ENTER THEM AS YOU WANT: 1
- ENTER THEM AS THE PROGRAM ASKS YOU: 2

(12) INDICATE THE NUMBER OF THE APPROACH YOU WISH TO USE,
AND PRESS RETURN. 1

(13) THE GOODS CATEGORIES CONSIDERED BY THE PROGRAM ARE:

GOOD CATEGORY # 1	REPAIR CONSTRUCTION
GOOD CATEGORY # 2	HOUSING CONSTRUCTION
GOOD CATEGORY # 3	NON-RESIDENTIAL CONSTRUCTION
GOOD CATEGORY # 4	ROAD CONSTRUCTION
GOOD CATEGORY # 5	ROAD REPAIR AND MAINTENANCE
GOOD CATEGORY # 6	OTHER ENGINEERING CONSTRUCTION
GOOD CATEGORY # 7	PROFESSIONAL SERVICES TO BUSINESS
GOOD CATEGORY # 8	FURNITURE AND FIXTURES

(14) HOW MANY OF THESE CATEGORIES WILL YOUR PROJECT HAVE?
TYPE THE NUMBER AND PRESS RETURN. 5

(15) INDICATE THE NUMBER OF THE FIRST CATEGORY TO BE USED
AND PRESS RETURN. 3

(16) WHAT $ AMOUNT IS ASSOCIATED WITH THE GOOD CATEGORY 3?
TYPE THE AMOUNT AND PRESS RETURN. 128700

(17) THE $ VALUE OF THE GOOD CATEGORY NON-RESIDENTIAL
CONSTRUCTION IS $128,700
HAVE YOU ENTERED THE CORRECT VALUE? ANSWER Y OR N. Y

(18)

GOOD CATEGORY # 1	REPAIR CONSTRUCTION
GOOD CATEGORY # 2	HOUSING CONSTRUCTION

GOOD CATEGORY # 3 NON-RESIDENTIAL CONSTRUCTION
GOOD CATEGORY # 4 ROAD CONSTRUCTION
GOOD CATEGORY # 5 ROAD REPAIR AND MAINTENANCE
GOOD CATEGORY # 6 OTHER ENGINEERING CONSTRUCTION
GOOD CATEGORY # 7 PROFESSIONAL SERVICES TO BUSINESS
GOOD CATEGORY # 8 FURNITURE AND FIXTURES

INDICATE THE NUMBER OF ANOTHER GOOD CATEGORY TO BE USED. 4

(19) WHAT $ AMOUNT IS ASSOCIATED WITH GOOD CATEGORY 4?
TYPE THE AMOUNT AND PRESS RETURN. 66400

(20) THE $ VALUE OF THE GOOD CATEGORY ROAD CONSTRUCTION IS $66,400
HAVE YOU ENTERED THE CORRECT VALUE? ANSWER Y OR N. Y

The sequence from 18 to 20 is repeated for the goods categories 6, 7 and 8 in order to enter all of the information on the Data Entry Form. If you would have responded in Step 12 that you preferred the second approach (i.e. enter the dollar amounts as the program asks you) the following sequence would have occurred.

(21) WHAT $ VALUE IS ASSOCIATED WITH EACH GOOD CATEGORY OF THE PROGRAM?
TYPE THE $ VALUES AS THE PROGRAM ASKS AND PRESS RETURN.

(22) GOOD CATEGORY #1 REPAIR CONSTRUCTION? 0

(23) THE $ VALUE OF THE GOOD CATEGORY ROAD CONSTRUCTION IS $0.
HAVE YOU ENTERED THE CORRECT VALUE? ANSWER Y OR N. Y

The sequence (22) to (23) would appear eight times (once for each of the 8 goods and services categories) if the second approach in step (12) is selected.

After the value for the last goods category has been entered and the user has verified the entry, the program will respond as in (24).

(24) WHAT IS THE TOTAL AMOUNT OF THE PROJECT?
TYPE IT AND PRESS RETURN. 320000

(25) THE TOTAL AMOUNT CONSIDERED IS $320,000.
IS THIS VALUE CORRECT? ANSWER Y OR N. Y

(26) THE RESULTS WILL BE SHOWN IN ONE MOMENT.

The project identification and costs will now appear on the screen along with the command identified in step (27) below.

(27) PRESS F10 TO CONTINUE. F10

A table showing the economic impact of the project will now appear on the screen along with the command identified in step (27).

(28) DO YOU WANT TO PRINT THE RESULTS?
ANSWER Y OR N. Y

If you would like a printed copy of the results, press Y. The results will now be printed. Regardless of whether you press Y or N you will be requested to respond to (29) below.

(29) DO YOU HAVE ANOTHER PROJECT TO EVALUATE?
ANSWER Y OR N. Y

ANSWER Y
If you answer Y you will be returned to step (3) of the program (page 8 in the Guide). You will then be asked to specify the province of the next project you want to evaluate.

ANSWER N
If you answer N the following message will appear:
YOU CAN TURN OFF THE COMPUTER

3.4 Error Messages

Two types of errors can occur; data entry errors and computer errors. Computer error messages are given by the computer to you . They result from problems with either your computer hardware or the floppy diskette you are using. When you obtain computer error messages which you can not resolve yourself, a call should be made to SEB, Parks Canada to obtain assistance.

Data entry errors are errors made by the user when entering data into the program. The program has been written to identify as many of these errors as possible. Some of the errors identified are:

1. entering a character when a number is requested;
2. indicating a character other than Y or N when Y or N is requested;
3. entering a number larger than possible eg. a 7 when a number between 1 and 6 is only possible.

Each time an error is detected, the user must re-do the last step performed. Here are some examples of errors which would be detected.

Step # Command

(4) IN WHAT PROVINCE WILL THE PROJECT BE IMPLEMENTED?
INDICATE THE NUMBER OF THE PROVINCE AND PRESS RETURN.
12

The number 12 was entered. Since only 11 provinces and territories are considered, an error message would appear as follows:

PLEASE USE THE NUMBERS 1 TO 11

The program would then go back to step 4. Here is another example.

(4) IN WHAT PROVINCE WILL THE PROJECT BE IMPLEMENTED?
INDICATE THE NUMBER OF THE PROVINCE AND PRESS RETURN.
N

In this example an N was typed instead of the numbers 1 to 11. The following error message would therefore appear :

PLEASE USE NUMERALS ONLY

The program would go back to step 4 at this point.

(8) THE YEAR CONSIDERED WILL BE 1983.
DID YOU CHOOSE THE CORRECT YEAR? ANSWER Y OR N F

Since the program only accepts a Y or N and an F was typed, the following error message would appear.

YOU MUST REPLY Y OR N.

The program would go back to step 8 under this circumstance.

(18) INDICATE THE NUMBER OF ANOTHER GOOD CATEGORY TO BE USED AND PRESS RETURN. 2

We will pretend that the second category has already been selected. The following error message will therefore occur.

YOU HAVE ALREADY USED THE GOOD CATEGORY 2.
PLEASE CHANGE THE NUMBER OF THE GOOD CATEGORY.

The program would go, back to step 18 in this example.

Another error detected by the program involves step (24). If the total project cost does not equal the sum of the costs associated with each goods category, the following error message appears.

THE AMOUNT YOU HAVE GIVEN DOESN'T EQUAL THE SUM OF
THE GOOD CATEGORIES YOU GAVE EARLIER.
You MUST START OVER BY ENTERING THE VALUES OF THE GOODS CATEGORIES.

The program would start again at step (13) above (pg 10).

4.0 MODEL RESULTS

The user has a choice of viewing the results on the computer screen as well as obtaining a printout table. The printout table would appear as follows:

EXAMPLE OF PRINTOUT TABLE

OCTOBER 25, 1985

CAPITAL PROJECT ECONOMIC IMPACT MODEL
SOCIO-ECONOMIC BRANCH, HQ.
APRIL 1986 VERSION.

PROJECT: CONSTRUCTION OF VISITOR RECEPTION CENTRE
RIDING MOUNTAIN NATIONAL PARK
PROVINCE OF MANITOBA
YEAR 1991

GOOD CATEGORY # 5 NON-RESIDENTIAL CONSTRUCTION : $128,700
GOOD CATEGORY # 4 ROAD CONSTRUCTION : $66,400
GOOD CATEGORY # 6 OTHER ENGINEERING CONSTRUCTION : $38,000
GOOD CATEGORY # 7 PROF. SERVICES TO BUSINESS : $53,900
GOOD CATEGORY # 8 FURNITURE AND FIXTURES : $33,000

TOTAL ALL GOOD CATEGORIES : $320,000

ECONOMIC IMPACT IN MANITOBA AND THE OTHER PROVINCES :

TYPE OF IMPACT	LABOUR INCOME	G.D.P.	PERSONS-YEARS
MANITOBA			
DIRECT	$88,927	$105,393	3.5
INDIRECT AND INDUCED	$63,865	$102,807	3.3
TOTAL	$152,792	$208,200	6.8
OTHER PROVINCES			
TOTAL	$168,024	$243,685	9.9
MANITOBA AND THE OTHER PROVINCES			
TOTAL	$320,816	$451,885	16.7

EXAMPLE FOR
INTERPRETING MODEL RESULTS NARRATIVELY

The construction of the Visitor Reception Centre will have an economic impact on the local and provincial economy. Using the Capital Project Economic Impact model, the following economic impacts were estimated:

Employment

The project will create around 4 person years of direct employment in Manitoba. Assuming that the length of the construction season is 6 months, the project will create about 8 short-term direct employment opportunities. Most of these jobs would occur in the project area.

Including the indirect and induced impacts, a total estimated 17 person-years will be created in Canada of which 7 person-years will occur in Manitoba alone.

Labour Income

Direct labour income (the sum of workers wages, salaries, supplementary labour income and net income of unincorporated businesses) generated in Manitoba is estimated at around **$90,000**. Total labour income (direct, indirect and induced) will amount to around $150,000 for Manitoba and $320,000 Canada wide. Thus for every $1 in construction expenditures, another $1 in labour income is produced.

Gross Domestic Product

G.D.P. (labour income plus the profit of incorporated businesses) generated by the project was estimated at around $208,000 for Manitoba and $450,000 for Canada. The $320,000 in construction expenditures will generate for every $1 of construction expenditures, a $1.40 in gross domestic product in Canada.

The table illustrates in more detail the economic impact of constructing the Visitor Reception Centre. It is worth noting however, that additional economic benefits (if any) resulting from the operation of the facility, increased visitor expenditures or additional private sector activity have not been included in the estimates. The economic impact figures must therefore be considered as minimum estimates.

4.1 Interpretation of Output

The printout table has been designed to enable the user to cut out the table for inclusion in reports or PIP documents. An example of how this table could be interpreted narratively was presented on page 16.

The impact results, it should be recalled, include only the capital project costs. Impacts, if any, resulting from operations and maintenance expenditures, additional visitor spending or private sector activity are not included. Direct operation and maintenance person-years are normally included in PIP documents and can be added to the results when the person-years are dependent on the project being implemented.

The economic impacts are measured in three ways: labour income, G.D.P. and person-years of employment. These three measures were described earlier in the guide.

Economic impacts are evaluated at three geographic levels: (1) the province of the project; (2) other provinces/ territories excluding the province of the project; (3) for Canada.

For each of the three measures, the direct, indirect and induced impacts are estimated. Direct impacts are those which are directly associated with the project. For example the person-years required to design and build a VRC represent the direct person-years.

Indirect impacts result from the increased production by the industries supplying the goods and services required to undertake the project. For example a lumbermill will receive

an order from a lumber retailer to replenish the stock of lumber sold to the contractor building the facility. The impact of this increased production at the lumbermill is defined as the indirect impact.

Finally induced impacts result from the resending by households of the additional income generated by the direct and indirect impacts. For example the salesman at the lumber yard (direct) and the miller at the lumbermill (indirect) will spend a portion of their wage or salary. These expenditures induce additional income and employment.

Questions regarding the model should be directed to the Evaluation and Analysis Division, Socio-Economic Branch, P.H.Q. (819) 997-6623.

APPENDIX

Description of the Goods and Services considered by the Model

#	Type	Definition
1.	Renovation/Repair Construction	Any regular maintenance work aimed at reconditioning a building or another type of construction (excluding road system repairs). Historic buildings restoration. Structures stabilization.
2.	Residential Construction	Single, detached, semi-detached, duplexes, apartments, row housing, etc.
3.	Non-Residential Construction	Industrial buildings: factories, plants, workshops, etc. Commercial buildings: stores, hotels, restaurants, office buildings, garages and service stations, theatres, arenas, recreational buildings etc. Institutional buildings: schools, hospitals, etc. Other building construction: farm buildings, broadcasting stations, passenger terminals, bus boat, laboratories, etc. Registration kiosk and other services building, e.g. water treatment.
4.	Road Construction	Highways, roads and streets (grading, scraping, oiling, filling). Parking lots and resting areas. Sidewalks and paths. Runways, landing fields.
5.	Road Repair and Maintenance	Road, bridge and tunnel maintenance and repair services. Pothole filling. Snow clearing. Tarring roads.

Description of the Goods and Services considered by the Model

#	Type	Definition
6.	Other Engineering Construction	**Marine** constructions: docks , wharves, piers, breakwaters, retaining walls, embankments, canals and waterways, etc. Waterworks and sewage systems: tile drains, storm sewers, water mains, water pumping **stations,** filtration plants, water storage tanks, etc. Other engineering construction: bridges, overpasses, tunnels, parks, landscaping, sodding, swimming pools, tennis courts, golf courses, campgrounds, outdoor recreation facilities, fences, snowsheds, signs, guard rails, etc. Electrical power system. Development of play areas. Trails and signage. Preliminary works on a construction site.
7.	Service to Industries -	Offices of accountants, lawyers and notaries. Offices of architects, engineers, and other scientific and technical services (surveying, archeology, etc.) Construction site coordination and supervision.
8.	**Furniture** and **Fixture** -	Household, **camping** and lawn, furniture. Office, restaurant and institutional furniture. Interpretive and exhibit materials (such as displays, showcases, interpretive stations along a trail, etc.) Lamps and **lightbulbs.** does not include plastic and concrete furniture.

Date: _____

Province of Project: _____

year Analyzed: _____

Project Name/#: _____

Park/Site Name: _____

DATA ENTRY FORM

CAPITAL PROJECT ECONOMIC IMPACT MODEL

SOCIO-ECONOMIC BRANCH

'reject lements	1. Renovation/ Repair Constr.	2. Resident. Constr.	3. Non-Res. Constr.	4. Road Constr.	5. Road Repair & Maint.	6. Other Engin. Constr.	7. Other Business Services	8. Furniture & Fixture	TOTAL
ODEL OTAL									