

AN ECONOMIC EVALUATION OF FISH DOCK AND PROCESSING FACILITIES IN GREATER VANCOUVER

BY

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Various interested parties have, over a period of years, advocated modernization of the fish dock-processor complex at Campbell Avenue, or, alternatively, the erection of a new structure. Overtures were made, both to the then Department of Fisheries, and to the National Harbours Board. In early 1969, after meetings with several parties, and particularly the Vancouver Wholesale Fish Dealers Association, a study was commissioned jointly by the Department of Fisheries and Forestry, Pacific Region, and the National Harbours Board, Port of Vancouver.

Mr. P. A. Meyer of the Economics Branch, Department of Fisheries and Forestry, was assigned to research and write the report, in close consultation with Mr. L. W. Marks of the National Harbours Board. The report is divided into three sections:

PHASE	<u> </u>	Considers the need for processing to 1985, and converts this need to spacial requirements.
PHASE	<u>11</u> -	Determines an optimal design and loca- tion, given the results of Phase I.
PHASE I	<u>II</u> -	Considers the need for public facil- ities to service the fishing industry at Steveston.

Phases I and II, now complete, represent the first more specific section of the report and deal with a fish processing-cold storage complex alone.

Phase III is more general, and will be developed from largely independent data. No completion date has thus far been specified for this complementary study.

Statistical and economic information was not complete and Mr. Meyer, in preparing his recommendations, was required to reach conclusions on the basis of the facts available. With more complete information available, the detail of presentation would possibly have been different, but there is no evidence that the conclusions would have been materially altered.

> Blake A. Campbell, Chief, Economics Branch, Fisheries Service, Department of Fisheries and Forestry Pacific Region.

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FOREWORD

The author would like to acknowledge the co-operation and assistance accorded him by company officers, government officials, and other persons knowledgeable in the industry. Without this assistance the results incorporated herein would be of doubtful utility. The people involved are too numerous to mention individually. However, some few should be singled out.

Among the companies, Mr. W. Widdess, Acting President of Vancouver Wholesale Fish Dealers Association, was particularly helpful in arranging initial meetings.

Further, Mr. L. W. Marks of the National Harbours Board, proved invaluable, both as a source of information, and in a consultive capacity.

Other government officials making particular contributions include:

National Harbours Board

L. Carlyle, Acting Port Engineer.
O. Bendicksen, Superintendent of Fish Docks.

Department of Fisheries and Forestry

- H. Burrow, District Conservation Officer.
  - D. D. Wilson, Assistant Chief, Inspection Branch.
  - R. Garm, District Inspection Supervisor.
    - T. H. F. Carscadden, Conservation Officer.

The author would also like to thank his colleagues in the Economics Branch for their comments and criticism.

Last, but by no means least, the assistance of R. S. Campbell, summer Research Assistant with the Economics Branch, is greatfully acknoweledged.

In noting the debt owed to these people, and many others, the author nevertheless retains the right to regard all errors or omissions as his own.

#### AN ECONOMIC EVALUATION OF FISH DOCK AND PROCESSING FACILITIES IN GREATER VANCOUVER

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#### PHASE I

#### A. INTRODUCTION

This study examines the need for a central fish dock processing facility to service those firms primarily concerned with the fresh and frozen trade, both present and projected, in the Lower Mainland area of British Columbia. The study will encompass two sections:

PHASE	I	-	Present operators will be identified,
			demand for facilities, both present and future derived, this demand translated into spacial requirements and spacial requirements related to present facil- ities.

PHASE II - An optimal design will be specified to provide the space required in Phase I. An optimal location will then be suggested to accommodate this design. An assessment of capital costs and of potential rents will be attempted.

#### B. DEFINITIONS

#### 1. The Lower Mainland

The Lower Mainland is defined by the Lower Mainland Regional Planning Board to include the Burrard Peninsula, both sides of Burrard Inlet, the Fraser River delta, and the Fraser Valley up to and including Hope.

The region includes the following municipalities and areas:

1.	Vancouver	13.	Richmond	25.	Matsqui
2.	Burnaby	14.	Delta	26.	Abbotsford
3.	New Westminster	15.	Surrey	27.	Sumas
4.	Fraser Mills	16.	White Rock	28.	Chilliwack City
5.	Coquitlam	17.	Barnston Island	29.	Chilliwack
6.	Port Coquitlam	18.	Pitt Meadows		Township
7.	Port Moody	19.	Pitt Polder	30.	Cultus Lake
8.	Buntzen	20.	Maple Ridge	31.	Harrison Hot
9.	Endowment Lands	21.	Mission City		Springs
10.	West Vancouver	22.	Mission District	32.	Kent
11.	North Van. City	23.	Langley City	33.	Норе
12.	North Van. District	24.	Langley Township	34.	Indian Reserves

Present metropolitan development of Greater Vancouver encompasses the first thirteen named, together with portions of Delta and Surrey.

2. Fresh and Frozen Processors

A processor that can demonstrate a substantial linkage with the local market and that is not horizontally integrated to such an extent that canning becomes a major part of his operation. Processing detail from the following firms was utilized in the study:

- 1. Albion Fisheries
- 2. Aristocrab
- 3. Billingsgate Fish Co.
- 4. Babcock Fisheries Ltd.
- 5. Canadian Fishing Co. Ltd.
- 6. Carlyle Fisheries Ltd.
- 7. Fjord Packing (N.V.) Ltd.
- 8. Francis Millerd & Co. Ltd.
- 9. Lion's Gate Fisheries Ltd.
- 10. McCallum Sales Ltd.
- 11. J. S. MacMillan
- 12. Murray Fish Co. Ltd.

- National Fishing Co. (purchased by Norpac in 1968)
- 14. Norpac Fisheries Ltd.
- 15. North Van Fish Supply Co.
- 16. Ocean Fisheries Ltd.
- 17. Prince Rupert Fishermen's Co-operative
- 18. Reliance Fish Co.
- 19. Rupert Brand (B. C. Packers)
- 20. Seaport Crown Fish
- 21. Van. Shellfish & Fish Co. Ltd.
- 22. Viking Seafood

Only the fresh fish operations of Canadian Fishing Co. Ltd. and of Francis Millerd & Co. Ltd. were added in. B. C. Packers was not included directly because of its outlet through Rupert Brand. Finally, this information was supplemented by data on landings, distribution and sales supplied by the British Columbia Independent Fishermen's Co-op., Blaine Myers & Co. Ltd., and J. W. Nicholls Co. Ltd.

#### C. TERMS OF REFERENCE

1. The focal point for the study will be the Lower Mainland. Hence, full scale canning operations designed almost totally for nonlocal markets will be excluded.

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2. The study will consider producer locations bordering Burrard Inlet first. It will not be bound, however, by this constraint to the extent of ignoring more attractive sites in the surrounding area.

3. Moorage is to be considered only as it relates to "offloading" at the fish dock, and reasonable "turn-around" time.

4. Restaurant facilities catering to tourism will only be considered if a private operator expresses willingness to both underwrite and operate same.

5. The study will calculate all economic costs and benefits in laying out rental guidelines.

#### D. METHOD

Data was gathered by an intensive surveying and interviewing technique from a variety of sources, private and public, and was cross compared for consistency.

The year 1968 was chosen because of currency and superior availability of data. This year was also considered in terms of British Columbia catch volumes over the past two decades. The following observations were noted.

The 1968 salmon catch of 132 million pounds was significantly above the 145 million pounds average since 1951, and was, in fact, exceeded only three times during that period. For groundfish a specially constructed constant dollar series (See Supply of Fish) again places 1962 as the fourth best year since 1951. Thus, both salmon and groundfish appear to have been caught in better than average quantities during 1963 and introduce a potential bias in the use of this year as characteristic of the last two decades as a whole.

Shellfish production was down slightly in 1968, as compared to the long term average, but not enough to offset the statistics noted above.

Finally, herring production was down drastically in 1968 with closure of the reduction fishery. However, herring reduction operations form an insignificant portion of total operations among the firms considered, and can be disregarded for purposes of the study.

Despite this apparent potential for upward bias, the throughput of the firms concerned has remained remarkably stable, and, for example, the 1968 volume of 25 million pounds is not far above the 1960 volume of 21 million pounds, despite a sharply reduced take of salmon and groundfish in the earlier year. Two possible explanations of this phenomenon are suggested:

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First - it appears that buyer activity outside the large centers is much more directly related to catch volumes than is the case in Vancouver, Victoria or Prince Rupert. Among other factors, this may be the result of the fisherman's increased willingness to stay on the grounds and forego higher main port prices when catch volumes are up.

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<u>Second</u> - most processors argue that their current output is limited by a lack of processing space. If producers are operating at capacity, further increases in supply could be expected to have little effect on levels of output from these firms. Thus, it is probable that this combination of fisherman marketing habits and institutional restraints on production render the operations of those firms surveyed relatively insensitive to all but the broadest swings in catch. In this light, 1968 is acceptable as a year for intensive analysis.

#### E. A FACILITY FOR FRESH, FROZEN AND CUSTOM OPERATIONS

#### 1. Present Demand

(a) Processed Landings - In 1968, the companies under study processed 25,155,520 pounds of salmon, groundfish and shellfish. This includes fresh, frozen, smoked, kippered and otherwise processed, but not canned. (1) Further, this figure was adjusted to omit double counting where a given fish was handled by several companies at different stages of processing. (See Table 1). Of this poundage, 41.9% was salmon, 39.2% groundfish, 11.9% halibut, and 6.4% shellfish. Salmon and halibut are highly seasonal in nature and groundfish moderately so, while shellfish exhibits no clear trend in that direction. (See Table 2). Consequently, total processor throughput exhibits a peak of activity, June through August or early September, moderate activity in March, April, May and late September, and a relative lull, October through February, when groundfish and shellfish provide the bulk of landings. This trend is depicted graphically in Figure 1.

(1) Provision is made for one custom canning establishment at a later date.

THEFT	1 - RORIND	PROCESSING	- 1368 -	VANCOUVER	COMPANIES
Month	Salmon	Groundfish	Halibut	Shellfish	Total
	'000 lb.	'000 lb.	'000 lb.	'000 lb.	'000 1b.
January		220		53	273
February	*	476		96	573
March	4	1 613		107	1 724
April	63	996	141	246	1 446
May	220	766	1 069	179	2 234
June	1 303	1 816	470	121	3 710
July	2 713	1 461	440	81	4 695
August	3 187	907	317	121	4 532
September	1 511	794	250	172	2 727
October	994	467	51	149	1 661
November	546	347	255	195	1 343
December	1	163		74	238
TOTAL **	10 543	10 025	2 993	1 595	25 156

Less than 500 pounds

Slight difference in addition due to rounding of figures.

Intentional deseasonalizing of activity through controlled harvesting, while tenable in groundfish and shellfish, is not feasible with salmon which is responsible for 41.9% of total throughput. Consequently, it is not feasible to construct a meaningful upper limit which will minimize the risk of demand in the peak three months.

TABLE 2 - PERCENTAGE OF ANNUAL CATCH BY MONTH 1968 -VANCOUVER PROCESSORS

Month	Salmon	Groundfish	Halibut	Shellfish	Total
	%	%	%	%	%
January		2.2	and the second	2 4	
February		4.8	1	5.4	2.1
March		16.1		6.7	6.9
April	0.6	9.9	4.7	15.4	5.7
May	2.1	7.6	35.7	11.2	8.9
June	12.5	18.1	15.7	7.6	14.7
July	25.7	14.6	14.7	5.1	18.7
August	30.2	9.0	10.6	7.6	18.0
September	14.3	7.9	8.4	10.8	10.8
October	9.4	4.7	1.7	9.3	6.6
November	5.2	3.5	8.5	12.2	5.3
December		1.6		4.7	1.0
TOTAL	100.0	100.0	100.0	100.0	100.0
	THE OWNER WATER OF THE OWNER	Constant and the second s			

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#### FIGURE 1 - MONTHLY PROCESSING - 1968 VANCOUVER COMPANIES



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Landings - Unprocessed and Potential - In additional (b) to fish actually processed, it is the contention of many firms that some processing volume is lost due to lack of capacity, both offloading and processing. There was no feasible way of estimating the number of boats, or poundage, that turned away because their loads couldn't be handled properly. However, figures were extracted for a portion of the groundfish landed, but shipped elsewhere for processing. (Table 3). These figures which probably underestimate total unprocessed snipments were added to those already presented. Shipments could have gone elsewhere for reasons of price rather than lack of processing capacity. However, any overstatement of demand here may in part be balanced by our inability to measure the poundage of "turnaway" boats at the boat unloading stage.

TABLE 3 - TOTAL POTENTIAL THROUGHPUT - ALL VANCOUVER PROCESSORS - 1968 -

	'000	0 1b.
Total poundage - processed	25	156
Total throughput - potential	26	844 000

Actual throughput at the Campbell Avenue site amounted to 15,544,000 pounds processed during 1968, or 61.8% of the study total. By species, the breakdown was as shown in Table 4.

TABLE 4 - ACTUAL THROUGHPUT - CAMPBELL AVENUE FISH DOCK - 1968 -

Species	Pounds Processed	Per Cent of Total Processing
	'000 lb.	1. A.
Salmon	4 034	38.3
Groundfish	8 836	88.1
Halibut	1 339	44.7
Shellfish	1 335	83.7
TOTAL	15 544	61.8

A further distinction was made between those firms studied who were firmly established elsewhere but might move under the right combination of circumstances, and those who would be likely to move in immediately space became available. If the first category are held apart, this reduces total throughput by 35.6%, to a figure of approximately 17 million pounds annually. This figure represents a lower limit for the industry's present needs. Further, salmon and halibut were reduced more than proportionately by this deletion. Consequently, the seasonal instability exhibited by total throughput is significantly reduced, and the assumption of demand at the lower limit embodies less risk of underutilization during slack seasons.

	1	0.00	UPPER	LI	MITS	1		LOWER	LIN	ITS
	:				% of					% of
	: :	'000	0 of		Annual	:	'000	) of		Annual
Month	:	Por	unds		Total	:	Por	unds		Total
110	:					:		1		
January	:		273		1.1	:		273		1.6
February	:		573		2.3	:		572		3.4
March	:	1	724		6.9	:	1	721		10.3
Apri1	:	1	445		5.7	:	1	339		8.0
May	:	2	234		8.9	:	1	395		8.3
June	:	3	709		14.7	:	2	569		15.3
July	:	4	695		18.7	:	2	715		16.2
August	:	4	532		18.0	:	1	856		11.1
September	:	2	727		10.8	:	1	686		10.0
October	:	1	661		6.6	:	1	327		7.9
November	:	1	343		5.3	:	1	091		6.5
December	:	-	238		1.0	:	1.18	238		1.4
TOTAL	1	25	154		100.0	1	16	782		100.0
		-					-			

#### 2. Operating Implications of Present Throughput

(a) Processing Facilities - The largest concentration among the firms studied exists at the Campbell Avenue Fish Dock, an unloading-processing facility owned by the National Harbours Board and located in the central area of the Port of Vancouver (Figure 2). Here, 12 processing companies exist on a single wharf, together with a fisherman's co-operative, a wholesaler, and a number of fish brokers. These processors are active as raw fish buyers, fish processors, fish wholesalers, and in some cases, retailers. Thus, fish generally passes through several stages of processing on the wharf, and, very often, through several different companies. The activity of these firms located at Campbell Avenue are listed in Table 6. Unless otherwise specified,



salmon, groundfish and shellfish are handled. No attempt has been made to specify the frequency of the various operations.

Billingsgate and Babcock have small canning facilities. In the total picture, however, they are too insignificant to be specifically excluded. National has a larger canning capacity and cans for various other firms on the dock. This facility is considered as a "custom" canner for dock processors and is also included.

CAMPBELL AVENUE

		0.1	No. and					
	Dress,	Fillet, side, fletch, steak,		Peel, shuck,	Smoke,	Pack, package,		
Operation	head	block,	Portion	shell	kipper	etc.	Can	COMMENTS
Billingsgate	x	x	х			x	x	Shellfish & smoking at other plant.
Babcock	x			x			x	Cans clams only.
Carlyle	x	x		x		x		Shipping & cold stor- age at second plant.
Lion's Gate	x	x			x	x		No shellfish.
J. S. MacMillan	x	x	x			x		No shellfish.
Murray	x	x	x	x		x		
Norpac	x			x		x		Shellfish in winter, only.
National	x					x	x	
Reliance	x	x			x	x		No shellfish.
Rupert Brand		x	x		x	x		No shellfish.
Ocean	x			x		x		
Vancouver								
Shellfish	x	x	x			x		

National is owned by Norpac who, in turn, co-operates closely with J. S. MacMillan. Further, Ocean and Vancouver Shellfish are owned by the Safarik brothers who likewise co-operate closely at various times. Finally, B. C. Packers are lessees for a goodly portion of the wharf's premises. Firms trade back and forth to fill orders, and by virtue of their proximity to each other have many common interests and problems, but a lively competition nevertheless exists, particularly at the fish buying level.

PROCESSING OPERATIONS

TABLE 6

The other processors considered are principally distributed adjacent to the south side of Vancouver harbour, with one located at False Creek and a further two in North Vancouver. One leases space from B. C. Ice & Cold Storage and has a working arrangement with them.

#### TABLE 7 - PROCESSOR ACTIVITIES - OUTSIDE CAMPBELL AVENUE

	Dress,	Fillet, side, fletch, steak,		Peel, shuck,	Smoke,	Pack, package,	
Operation	head	block	Portion	shell	kipper	etc.	Can
Albion – Viking Aristocrab		x	x	x x		x	
Babcock						x	
Billingsgate				x	x	x	
Canadian Fishing	x	x	x	x	x	x	N/A
Fjord Packing					x	x	
Francis Millerd	x	х	х			x	N/A
McCallums	x	x	x			x	
North Van. Fish	x			x		x	
Prince Rupert Fishermen	's						
Co-op.	x	x	х			x	

- (b) Non-Processing Activities In addition to processing firms, the aforementioned fisherman's co-operative, a fish wholesaler, and several brokers are located at Campbell Avenue. Brokers are also located at other locations. Only the wholesaler, who packs and ships from his premises, requires other than office space.
- Service Activities The Campbell Avenue dock area is (c) U shaped with over 600 feet of usable unloading length for boats. Six unloading cranes are located around the U, and a seventh on the far side to the west. The effective capacity of these cranes varies from about 10,000 pounds per hour for bottom fish to 15,000 pounds per hour for halibut. Total effective capacity for an eight hour shift can be considered in the area of 600,000 pounds. Unloading capacity is related, among other things, to size of boat hatches, height of tide, and distance from processing area. Trucks also bring in fish for processing, unloading on the dock or adjacent to it. McCallum, P.R.F.C.A. and Canadian Fishing Co. have facilities for unloading from boats. The other firms unload elsewhere and truck in. Shipping is done by truck and rail, with ultimate carriers including air and water.

An industrial restaurant with limited capacity for the general public is located on the second floor of the complex. It can seat 24 at its coffee bar, and 36 at separate tables. Additionally, there is space for government offices (Conservation and Protection and Inspection), an ice plant and washrooms. In sum, the square footage at Campbell Avenue is shown in Table 8.

#### TABLE 8 - SPACE CURRENTLY AVAILABLE - CAMPBELL AVENUE

(d) Parking - There are 49 parking spaces adjoining the processing area. Most of these are double spaces requiring shifting of vehicles if the car first in needs to get out. No ultimate tenant rents more than four spaces, with the average per tenant being three spaces. An additional four spaces are reserved for National Harbours Board personnel. Total parking area, not including roadway, amounts to 11,675 square feet.

Firms not located at Campbell Avenue largely utilize on-street parking with the exception of McCallums and P.R.F.C.A. who have parking off street.

(e) Ice, Freezing and Cold Storage - The two major cold storage operations in Vancouver are B. C. Ice and Cold Storage (Commissioner Street) and Vancouver Cold Storage (Foot of Gore Avenue). B. C. Ice has a capacity to freeze 400,000 pounds of fish per day, with potential storage of 12 million pounds. (3) Vancouver Ice can freeze between 70,000 pounds and 100,000 pounds per day and store 2.5 million pounds. Effective capacity is, however, more difficult to measure. As both plants are not committed exclusively to fish, this product must take its turn with others, and effective capacity must be considered significantly lower. B. C. Ice has, however, offered to make its total capacity available as needed during the fishing season in the event a complex was built adjacent to it. Service is also divergent. B. C. Ice arranges for the dressing of fish, while Vancouver Ice has recently required that this be done in the plant of the processor.

Further, Babcock has its own facility with a daily freezing capacity of 15,000 pounds and cold storage for two million pounds. Prince Rupert Fishermen's Co-op can freeze 50,000 pounds per day and store  $1\frac{1}{2}$  million pounds. Additionally, small freezing and storage facilities are owned or rented by a number of other firms. Canadian Fishing has considerable freezing and storage capacity but this has been excluded by the assumptions of the study.

With regard to ice, the four main suppliers, together with capacities are listed in Table 9.

TABLE	9	-	ICE	MAKING	CAPACITY	4-14	VANCOUVER	PRODUCERS
							Daily	Capacity
								Tons
B. C.	Ice							20
Canadi	an	Fish	ing (	Co. Ltd.				50
Nation	nal	Harb	ours	Board,	Campbell	Avenue	e	120
Prince	Ru	pert	Fish	nermen's	s Co-opera	tive		30

Vancouver Cold Storage does not sell ice from its Gore Avenue Plant.

#### 3. Adequacy of Present Facilities

(a) Processing - After interviews with processors, suppliers and other knowledgeable parties, it was concluded that the maximum efficient production level at Campbell Avenue presently approximates 300,000 pounds per day. This will vary with the species processed, and does not include fish simply landed and shipped off for processing elsewhere. Supply, processing, wholesaling and retailing functions are adjudged to occupy 33,962 square feet on the present dock. This results in a maximum figure of 8.8 pounds processed per square foot of space per day. In 1968. Frederic R. Harris Inc., published a study designed to modernize the Boston Fish Pier which is of considerable use on a comparative basis.<sup>(4)</sup> Like Campbell Avenue, the Boston facility is occupied by smaller, highly competitive processors, and given this assumption of smallness, the study yields a relatively comparable conclusion on the relationship between volume processed and square footage utilized. It is our understanding that the study is currently being held in abeyance pending a favourable money market and resolution of some design questions. Using most conservative assumptions, a figure of 5.15 pounds per square foot per day was derived from their data as representative of an efficient maximum for a small processor operation. This ratio was then applied to Campbell Avenue in Table 10.

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<sup>(4)</sup> Frederic R. Harris, Inc. Economic Feasibility of the Boston Fish Pier, for the Massachusetts Port Authority of the Commonwealth of Massachusetts, 1968.

 TABLE 10
 SPACIAL REQUIREMENTS
 PRESENT CAMPBELL AVENUE

 TENANTS
 AT BOSTON PROCESSING RATIO

	Campbell Avenue	Boston Study
Daily Maximum Throughput	300 000 pounds	700 000 pounds
Square Footage Utilized	34 000 sq. ft.	136 000 sq. ft.
Pounds Processed Per Square	-	*
Foot	3.8 pounds	5.15 pounds
Space Required at Boston	-	
Ratio	58 300 sq. ft.	136 000 sq. ft.

It can be observed that application of the Boston ratio suggests that Campbell Avenue is in immediate need of expansion by about 25,000 square feet. This relationship between area and poundage is a function not only of technology, but also of industrial structure. It is likely that as company size increases, this ratio may move upward. However, given the present situation of numerous smaller firms, the figure of 58,300 square feet seems appropriate as an immediate requirement for Campbell Avenue processors.

Applying this ratio to our figures on likely complex throughput, we reach a final figure of 63,400 square feet required at the minimum, and 96,600 square feet at the maximum to meet the immediate needs of suppliers, processors, wholesalers and retailers at a new complex. (Table 11).

#### 

		Campbell Avenue	Complex Minimum Assumption	Complex Maximum Assumption
(1)	Actual Square Footage	33 962 sq. ft.		
(2)	Required at 5.15 Pounds Per Sq. Foot Per Day	58 300 sq. ft.		
(3)	Throughput Complex Throughput Campbell Avenue x 100%		108,9%	165.9%
(4)	Complex Requirements (2 x 3)		63 400 sq. ft.	96 600 sq. ft

(b) Unloading and Loading Facilities - The 600,000 pound capacity (eight hours per shift) of unloading cranes at dockside is well in excess of processing capacity. Further, for all firms studied it is estimated that in 1968 the peak month figure for boat arrivals failed to exceed 250 boats per month, or about 11 boats per working day (Table 12).

	- ESIT	LOAD	- 1968 -	JNIH AND BY	TYPE OF
				Shell-	
Month	Salmon	Halibut	Groundfish	fish	Total
January			5	5	10
February			20	9	29
March			45	10	55
April	7	6	33	24	70
May	22	25	33	17	97
June	130	16	36	12	194
July	181	18	22	8	229
August	212	8	14	12	246
September	101	12	13	17	143
October	66	6	15	14	101
November	36	5	23	19	83
December			7	7	14

Consequently, while it is obvious that if the whole fleet came in on a given day the facility would be unable to handle it, normal turnaways must be attributed to restrictions on processing capacity, and the boat unloading facilities, both cranes and tieup space adjudged adequate.

While boat unloading facilities are adequate, there is presently no satisfactory area for unloading trucked fish, the present practice being to unload it in the parking lot, in roadways, or anywhere else available. It is estimated a further 6,000 square feet are required to fulfill this function. Further, the present dock is not strong enough to support trailer trucks, thus preventing them from unloading in close proximity to the processor even if there were room.

Likewise, there is no assigned space available to ship fish from, store offal, etc. It is estimated that a minimum of 4,000 square feet should be assigned to this purpose.

Finally, moorage is needed for icing up and cleaning boats. This is currently provided, and while in a poor location, is probably adequate.

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(c) Office and Restaurant Services - The manager of the present restaurant judges it adequate for present dock tenants. Consequently, its square footage requirements need only be increased to accommodate any new tenants that move to an expanded complex. At the upper limit, this would require a two-third increase, or 884 square feet of additional space.

Government office space should also be increased from its present 321 square feet to 750 square feet. This would accommodate personnel from the Department of Fisheries Conservation and Protection and Inspection Branches.

Finally, each 10,000 square feet of processing space should have adequate washroom facilities. This would require about 400 square feet each, for a total, at the maximum of 3,600 square feet.

(d) Parking - The present parking area is adequate for officers of the companies involved and needs to be increased by 67%, or 7,822 square feet to accommodate maximum needs. As noted above, however, it is currently used as a shipping and staging area, both inbound and outbound. Further, it accommodates those retail clients who can find space.

The results obtained in studying the parking question are summarized in Table 13.

Friday, August 8, 1969 Time Period	Employees	Deliveries	Company Vehicle	Customers	Fisheries NHB	Other	Total	Per Cent of Total
8:00 - 9:00	14	2	8	16	3	9	52	10.9
9:00 - 10:00	11	4	3	14	1	10	43	9.0
10:00 - 11:00	10	4	11	26	4	18	73	15.3
11:00 - 12:00	9	2	8	18	1	12	50	10.4
12:00 - 13:00	19	0	10	5	1	18	53	11.1
13:00 - 14:00	12	0	10	8	3	17	50	10.5
14:00 - 15:00	14	6	12	11	2	19	64	13.4
15:00 - 16:00	10	5	11	11	3	8	48	10.0
16:00 - 17:00	6	0	9	8	0	8	31	6.5
17:00 - 18:00	1	1	6	2	0	4	14	2.9
TOTAL	106	24	88	119	18	123	478	100.0
Per Cent of Total	22.2	5.0	18.4	24.9	3.8	25.7	100.0	

#### TABLE 13 - BREAKDOWN OF "IN" TRAFFIC BY CLASSIFICATION -CAMPBELL AVENUE FISH DOCK - 1968

N.B.

Does not include 58 company and employee vehicles present prior to 8:00 A.M.

At 8:00 A.M. 53 company employee vehicles were parked, already overloading the 49 spaces theoretically available. During the day, 478 additional vehicles parked there (and a like number left), up to 6:00 P.M. Of these latter, 22.2% were company employees. A further 23.4% (Columns 2 and 3) can be attributed to deliveries and shipments, already allowed for, as are government visits. A further 50.6% were customers and "unidentifiable," however. There is presently no designated parking for this group. At peak period, and assuming an average visit of 20 minutes, this would suggest the need for approximately ten more parking spaces.

At the present ratio of 220 square feet per space (excluding roadways) this would require a minimum of 2,200 square feet, which, if expanded to conform to a new complex maximum would increase to 3,674 square feet. All spacial requirements are summarized in Table 14.

	:	AC	TUAL	:	R	EQU	IRE	(2) D
	:	(Campb	ell Ave.)	:	Min	imum	Max	imum
	:	Sq.	Ft.	:	Sq.	Ft.	Sq.	Ft.
Processing (including company office space)	: :	33	962		63	400	96	600
Unloading space (boat and truck)	:	27	583	:	37	600	38	600
Restaurant	:	1	319	:	1	400	2	200
Government Offices	:		321	:		800		800
Washrooms	:		250	:	2	400	3	600
Parking - Tenant	:	11	675		12	700	19	500
- Other	:			:	2	400	3	700
TOTALS <sup>(1)</sup>	:	75	110	:	120	700	165	000

TABLE 14 - SUMMARY OF ACTUAL AND REQUIRED SPACE - VANCOUVER FISH DOCK

 Does not include present ice plant and office occupying 5,297 square feet.

(2) Additional space of perhaps 10,000 + square feet would be required for roadways, etc. (e) Ice and Cold Storage - An examination of 1968 invoices suggests that the firms considered for the complex froze a total of about 16 million pounds of fish in 1968. As B. C. Ice, Vancouver Cold Storage and W. Babcock have at least 16.5 million pounds of storage available, this would indicate that storage capacity exists that could more than handle present demand. Further, freezing capacity has advanced apace and could be increased as needed. At present, only Babcock stores fish exclusively, although, as noted, B. C. Ice appears willing to give it first priority. On the other side, freezing and storage techniques can be crucial for fish quality and several producers have indicated that they would want considerable control over this. Their willingness to participate in a cold storage venture, either with one of the existing firms or as part of a new complex, would be a function of this control. Considerable care would, therefore, have to be taken before attaching a final weight to cold storage considerations in the decision making process. At present, enough cold storage capacity exists, although it is technologically inferior to the newer plants such as the one at Bellingham. The adequacy of ice making facilities is difficult to gauge, due to the variability in boat arrivals, processor needs, etc. The present N.H.B. flake ice plant appears adequate for present tenants. Inability to keep up with both boats and processors during peak periods is more a function of inadequate storage space together with (claim the processors) breakdowns. Installation of another 200 T. bin would probably increase capacity of the plant as a whole to a satisfactory level. A second discharge line is also needed so boats and processors can receive ice simultaneously. Building of a complex would perhaps not require any further adjustment at the minimum, but if all firms moved in would call for a further proportionate expansion in machine and storage capacity.

#### 4. Supply Constraints Imposed by the Fishery

(a) Salmon - The salmon fishery is generally adjudged to be at or near its sustained yield optimum, at least for the short term. However, development of fresh fish markets will likely see a shift out of canning into the fresh sales. Consequently, the two million pounds of salmon estimated to be sold fresh in the Lower Mainland was projected at a rate concurrent with the development of demand in that area. The remaining salmon throughput was held constant. (b) Groundfish - Statistics indicate that the same boat with the same gear, fishing the same number of days, is returning less fish over the past three or four years than in the previous decade (Table 15).

1 (1956 = 100) Technology
\$'000
7 100.0 9 427
8 95.3 8 267
8 90.3 8 514
8 85.1 8 893
88.3 9 841
1 88.9 9 034
5 92.2 8 118
2 102.1 7 240
1 114.4 8 445
1 124.0 7 864
4 144.7 6 921
8 147.1 7 375
5 152.2 7 598

TABLE 15 - RETURNS TO GROUNDFISH FISHERMEN - PACIFIC COAST

This results primarily from reduced yield in traditional populations and increased competition from foreign fleets. However, the possibility of exploitation of other groundfish populations is evidently very real, and fishery biologists find it impossible to suggest a meaningful limit to our capacity to harvest groundfish at this time.

In light of this information, it is impossible to impose any constraint on the growth potential in groundfish, although new harvest areas, and with that, possibly larger boats may have to be considered.

- (c) Shellfish Again, incomplete knowledge of populations and their dynamic characteristics makes predictions hazardous. The U. S. Department of the Interior, in 1967, made predictions for the Pacific Northwest, which when weighted by 1968 shellfish volumes for British Columbia, indicate an upper limit of 60% above present levels. This will be the constraint applied here.
- (d) <u>Halibut</u> Halibut is presumed to be at a sustained yield maximum.

#### 5. Future Throughput

It is now possible to consider the question of future throughput for the study firms. From the above sector, we note that a further advance in halibut production is considered unlikely, and that growth in salmon throughput will be projected by a special institutionally prescribed formula. For the remainder, groundfish and shellfish, total shipments by destination were derived. Growth rates were then calculated, by destination, and projections made in Table 16.

	- GR	OUNDFISH	AND	SHELLFISH	-		
						'00	00's
	'0	00's		Growth		Por	unds
	Po	unds		1985/1968		1	985
				%			
(1)							
Lower Mainland	7	364		48.8		10	958
Other Canada	4	105		25.2		5	139
U. S. A.		151		36.1			205
	11	620				16	302

TABLE 16 - TOTAL POUNDAGE SHIPMENTS FROM VANCOUVER PRODUCERS

(1) Estimated from fresh figures and export data.

It was further estimated that two million pounds of salmon were sold fresh in the Lower Mainland. This figure was increased by the appropriate growth rate and added in. Finally, the residual of 1968 salmon production, and 1968 halibut poundage was added to give total 1985 throughput. These calculations are specified in Table 17.

TABLE 17 - ESTIMATED TOTAL THROUGHPUT - 1985 - VANCOUVER PROCESSORS

(1) 1985 poundage - groundfish and shellfish.... 16 302 000 pounds 1963 fresh salmon to Lower Mainland...... 2 000 000 " 1985/1968 growth rate in fish consumption - Lower Mainland -..... 48.8%
(2) 1985 fresh salmon consumption - Lower Mainland -.... 2 976 000 pounds
(3) 1968 residual salmon production..... 8 543 000 " (4) 1968 halibut production..... 2 993 000 " TOTAL PRODUCTION - 1985 - ( (1) + (2) + (3) + (4) ).... 30 814 000 pounds

Thus, by 1985, we would expect a 22.5% increase in throughput by all study processors.

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#### 6. Facility Size - 1985

Again using our minimum and maximum assumptions about which firms participate, it is now possible to apply the growth factor to appropriate functions and derive a future complex size. (Table 18).

TABLE 18 - AREA REQUIREMENTS - VANCOUVER FISH DOCK - 1985

	Minimum	Maximum
	Sq. Ft.	Sq. Ft.
Processing	77 700	118 400
Unloading	37 600	38 600
Restaurant	1 800	2 700
Government Offices	800	800
Washrooms	3 200	4 800
Parking - Tenant	15 600	23 900
- Other (1)	2 900	4 500
TOTALS	139 600	193 600

(1) Again, ice plant and roadway is not included. This could run an additional 20,000 square feet.

Further, there would be similar expansion at the freezing and cold storage end of the business. Using a figure of 20 pounds stored in one cubic foot (Boston Study), and assuming that the present figure of 62.8% of total poundage frozen continues, a final maximum of 967,560 cubic feet of storage could be required.

#### 7. Diseconomies of Small Scale

Finally, it should be noted that the study assumes that the small operator is a fact of life for the complex. It is likely that fewer operators would mean greater economies of scale, and a larger throughput per square foot of complex and space. The study does not ask the question: "What is a most efficiently sized operation?" Rather, it accepts relative smallness as a fact of life in utilizing the data provided by the Boston Study.

#### PHASE II

#### A. INTRODUCTION

Phase I of this study identified and described present fish processing operations in the Vancouver area, established the current demand for facilities and projected this demand forward to 1985. This demand was then translated into the spacial requirements of a new fish processing facility.

The second phase takes these requirements (as summarized on page 20), recommends an optimal facility design, and examines available sites, both in terms of this design and alternatives dictated by availability of space. A series of facilities on various sites are presented as alternatives for the policy maker and potential costs outlined. This section completes consideration of the question of a fish processing facility for producers demonstrating significant linkage with the Greater Vancouver market. The complementary problem of the fisheries' need for public facilities in the Steveston area will be treated as a related, but separate study.

#### B. DESIGN CONSIDERATIONS - VANCOUVER FISH PROCESSING FACILITY

The requirements posed in Table 18 presented minimum and maximum figures on the square footage requirements of a new processing facility. This section will present detailed design and site data on a facility adequate for minimum needs. These conclusions will then be reviewed in terms of maximum needs as well. No constraints were imposed on design except that all processing be carried out on a single floor level. While this assumption was initially based on processor efficiency, it also turned out to be optimal in terms of capital costs. The selected design is presented in Figure 3. The recommended structure is of prestressed concrete and provides a single processing level, aprons, finger wharves, an ice plant and a restaurant. A general description follows:

Processing Sheds - The structure is two storey, with the second level primarily designed for storage, offices, washrooms, etc. While some processing could take place "upstairs", the structure has not been designed with this in mind and the second storey would not support heavy loads such as semi-trailers. The processing shed has been laid out as 100 feet by 800 feet. The 80,000 square feet of single level processing space is just above predicted minimum needs. This would assure each of the 15 assumed processors a minimum width of 50 feet. The upper floor provides space in excess of normal needs for offices, storage and washrooms, and could be reduced in size if necessary. Alternatively, extra office space could be provided for fish brokers, etc. The extra space might also be used for short term processing.



SCALE IN FEET

- Finger Floats Canopied finger floats are provided for the unloading of up to eight large boats at one time. Fish would immediately be moved from the floats, across the apron and into the processing shed.
- Ice Plant-Restaurant Structure The ice plantrestaurant structure is also two storey. Ideally, it would be located at the seaward end of the facility. This would provide maximum protection from wash for boats unloading at interior fingers. In the event of further complex expansion out beyond the end of the present wharf, these services would be provided at no greater distance from any potential user than at present. Moorage facilities are provided on both sides of this structure for ice up, taking on supplies, etc.
- Loading and Unloading Where raw product is supplied to processors by truck or semi-trailer, unloading would take place on the 80 foot wide ramp located on the opposite side of the complex from the finger wharves. This area would also serve trucks receiving shipments from the complex.
  - Parking Parking is provided on shore, adjacent to the project.

In total, this design was adjudged optimal in terms of processor efficiency, flexibility regarding future expansion, and construction cost.

While the above design was suggested, a second, more expensive design is also included. This was necessary because of the impossibility of fitting the best design into the dimensional constraints imposed by two of the locations being considered. This design, shown in Figure 4, is optimal in terms of the unique constraints imposed on it. It was arrived at by dividing the processing area into two equal sheds separated by a shipping out (and for semi-trailers of raw fish, shipping in) area. Berthing is now parallel to the two processing sheds, and for this reason, aprons have been widened. The ice plantrestaurant complex bears much the same relationship to the processing area as it did in Figure 3. Parking is to shoreward of the complex.

#### C. COST CONSIDERATIONS - FISH PROCESSING FACILITY

Only basic structural costs, of wharves and buildings, were included in this analysis. Interior construction, machinery, sewage treatment and/or connections, etc., while important, have not been included for comparative purposes. All structures are assumed to be as indicated by the basic design, unless specifically altered by spacial constraints of the site considered. The rates used in calculation of capital costs are depicted in Table 19 below.





PARKING

HHHH

PARKING 411111111

### FIGURE 4

SUGGESTED LAYOUT FOR NEW FISH DOCK AT SITE Nº 2 & 3

SCALE IN FEET

#### TABLE 19 - RATES USED IN CALCULATING CAPITAL COSTS - VANCOUVER FISH DOCK -

#### Construction Costs

Basic wharf construction (including aprons and finger wharves)	\$12/sq.	ft.
Apron and finger wharf construction alone	\$15/sq.	ft.
Fish Processing Shed construction (2 storeys) (including ice plant and restaurant)	\$20/sq.	ft.
Paving Costs	\$ 3/sq.	yd.

#### Land and Water Lot Costs

#### Land

False	Creek	and South	Shore Vancouver	
Ha	rbour.			\$62,500/acre
North	Shore	Vancouver	Harbour	\$55,000/acre

#### Water Lot

False Creek and South Shore Vancouver	
Harbour	\$20,000/acre
North Shore Vancouver Harbour	\$17,500/acre

(1) Data supplied by National Harbours Board, Port of Vancouver.

#### D. SITE CONSIDERATIONS - FISH PROCESSING FACILITY

This study presents six sites for consideration. They are located, in order of economic attractiveness, in the following areas:

- 1. Model Sand Area
- 2. Giroday Property
- 3. Granville Island Area
- 4. Campbell Avenue Area
- 5. B. C. Ice and Cold Storage Area
- 6. Area West of Prince Rupert Fishermen's Co-operative

These locations are indicated in Figure 5. The large number of sites are presented because acquisition of most of these properties would require purchase or leasehold negotiation and consequently the availability of any one site is far from assured. The sites fall into three general groupings:





#### - 24 -

1. South Shore of Burrard Inlet

This area is the traditional harbour area of Vancouver. It is featured by established waterfront structures, intense commercial activity, and a relatively high level of congestion, both on land and on water.

#### 2. False Creek

This area is currently under intense public scrutiny by recreational and high-rise apartment interests. Traditionally an area of moderate commercial activity, its waters are also somewhat congested although land approaches to the area are less so.

#### 3. Sites Outside the City Core

The Model Sand property typifies this class of site. Unlike the sites presented above, Model Sand gives a representative rather than exhaustive presentation of locational availability. The feature of this type of location is relative lack of commercial activity and congestion, balanced to some degree by greater distance from major centers of population. It is likely that other locations around the city's periphery would yield Model Sand type costs and returns.

#### E. A PRESENTATION OF ALTERNATIVE FACILITIES FOR FISH PROCESSING - GREATER VANCOUVER -

- 1. Model Sand Area
  - (a) Design Variations

The processing shed is built on land but there is no limitation on seaward extension of the complex (Figure 6). Some dredging would be required.

(b) Land Acquisition

The land required is owned by National Harbours Board, and does not appear to pose any complications at this time.

(c) Other Considerations

This site would likely meet with initial disfavour as processors claim outlying areas lack a trained low cost labour force. It is not clear that this



is valid in the Model Sand case, however, as the site is adjacent to the East Seymour Indian Reserve. Further, transportation disadvantages are considered at the conclusion of this section. One valid disadvantage that could not be quantified is the necessity of passing through the currents of Second Narrows to reach the site. While these currents are not an absolute barrier, they nevertheless cause inconvenience and a certain amount of time loss.

#### TABLE 20 - FISH PROCESSING FACILITY - CAPITAL COSTS -MODEL SAND PROPERTY AREA

		Dimensions	Area	Cost	Total Cost
		(Feet)	(Sq. Ft.)	\$/Sq. Ft.	\$
Con	struction Costs				
V	harf Areas				
	Ice Plant & Restaurant	230 x 135	31 000	12	372 000
	Aprons	30 x 860	26 000	15	390 000
	Finger Wharves	4 x 40 x 160	25 600	15	384 000
(1)	TOTAL				1 146 000
Bui	lding Areas				
	Fish Processing	100 x 800	80 000		
	Ice Plant & Restaurant	200 x 75	15 000		
(2)	TOTAL		95 000	20	1 900 000
(3)	Pavement	80 x 800	64 000	\$ 3/Sq. Yd.	21 000
(4)	Contingencies (5% of a	ibove)			153 000
	TOTAL CONSTRUCTI	ON COSTS (1) + (2)	+ (3) + (4)		3 220 000
Lan	d And Water Lot Costs				
(5)	Land	250 x 860	215 000 = 4.936 acres	55 000/acre	271 500
(6)	Water Lot	300 x 860	258 000 = 5,923 acres	17 500/acre	103 700
	TOTAL ACREAGE		10.859 acres		
	TOTAL LAND & WATER	R LOT COSTS (5) +	(6)		375 000
	GRAND TOTAL				3 595 000
					and the second se

#### 2. Giroday Property Area

#### (a) Design Variations

As in the case of the Granville Island Location water lot limitations have required that the facility be turned 90<sup>°</sup> and built with its processing area on land (Figure 7). In this instance, surrounding properties would seem to absolutely prevent further expansion from the basic design. Also, a certain amount of dredging would probably be required around aprons and fingers.

#### (b) Land Acquisition

The bulk of the land involved lies on a property owned by the Giroday interests, and would have to be purchased. Further, it would encroach on City property to the east, and on National Harbours Board property (False Creek Fishermen's Terminal) to the west.

#### (c) Other Considerations

The proposed design superimposes the ice plantrestaurant part of the complex directly over another proposal for a seafood restaurant that has been actively advanced by private interests. In the event that this site was chosen, it would probably benefit both parties to cooperate in a joint design. This area is under intensive private and public scrutiny at present.

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	Dimensions	Area	Cost	Total Cost
	(Feet)	(Sq. Ft.)	\$/Sq. Ft.	\$
Construction Costs				
Wharf Areas				
Ice Plant & Restaurant	230 x 135	31 000	12	372 000
Aprons	30 x 830	24 900	15	374 000
Finger Wharves	4 x 40 x 160	25 600	15	384 000
(1) TOTAL				1 130 000
Building Areas				
Fish Processing	100 x 800	80 000		
Ice Plant & Restaurant	200 x 75	15 000		
(2) TOTAL		95 000	20	1 900 000
(3) Pavement	80 x 800	64 000	\$ 3/Sq. Yd.	21 000
(4) Contingencies (5% of ab	ove)			153 000
TOTAL CONSTRUCTION	N COSTS (1) + (2) +	(3) + (4)		3 204 000
Land And Water Lot Costs				
(5) Land	275 x 830	228 000 = 5,234 acres	62 500/ acre	327 000
(6) Water Lot	300 x 860	258 000 = 5.923 acres	20 000/ acre	118 000
TOTAL ACREAGE		11,157 acres		
TOTAL LAND & WATER	R LOT COSTS (5) + (	(6)		445 000
GRAND TOTAL				3 649 000

# TABLE 21 - FISH PROCESSING FACILITY - CAPITAL COSTS GIRODAY PROPERTY AREA

#### 3. Granville Island Area

#### (a) Design Variations

While enough land is available to service the facility, limitations imposed by the surrounging waters of False Creek made it necessary to turn the design on its side, locating the processing area on land, rather than water. Further, the ice plant-restaurant structure is located "around the corner" from the processing sheds and is likewise on land. Finally, finger floats are eliminated and berthing is "alongside". This is indicated in Figure 8. Consequently, further expansion would be contingent upon acquiring more N.H.B. land along the waterfront.

#### (b) Land Acquisition

The land is owned by National Harbours Board, and it would simply be a question of the termination of existing leases, and negotiation of a new one.

#### (c) Other Considerations

False Creek is currently a focal point for the Vancouver City Parks Board's drive for recreational property. Consequently, any negotiations here could be difficult.

1



		Dimensions	Area	Cost	Total Cost
		(Feet)	(Sq. Ft.)	\$/Sq. Ft.	\$
Con	struction Costs				
M	Tharf Areas				
(1)	Aprons	75 x 1150	86 250	15	1 294 000
Buil	ding Areas				
	Fish Processing	100 x 800	80 000		
	Ice Plant & Restaurant	200 x 75	15 000		
(2)	TOTAL		95 000	20	1 900 000
(3)	Pavement	80 x 1030	82 400	\$ 3/Sq. Yd.	27 000
(4)	Contingencies (5% of above	e)			161 000
	TOTAL CONSTRUCTION	COSTS (1) + (2) + (3)	+ (4)		3 382 000
Land	d and Water Lot Costs				
(5)	Land	260 x 1100	286 000		
			= 6.566 acres	62 500/acre	410 000
(6)	Water Lot	100 x 1130	113 000		
			= 2.394 acres	20.000/acre	52 000
	TOTAL ACREAGE		9, 160 acres		
	TOTAL LAND & WATER L	OT COSTS (5) + (6)			452 000
	A States of the				
	GRAND TOTAL				3 844 000

## TABLE 22 - FISH PROCESSING FACILITY - CAPITAL COSTS GRANVILLE ISLAND AREA

#### 4. Campbell Avenue Area

#### (a) Design Variations

In this location, spacial constraints on either side of the proposed facility forced placement of the ice plant-restaurant portion of the complex on the land, rather than the seaward end of the dock. (Figure 9). Further, the 30 foot apron at the end of the restaurant was removed, and the finger wharves were reduced in length to 140 feet each. These modifications make it just possible to fit the complex between the B. C. Packers dock to the west, and the B. C. Sugar Refinery facilities to the east, leaving about 60 feet of width for passage of boats around wharf fingers. Also. because of this modification, an additional finger wharf has been added to the seaward end of the main structure. There is no spacial constraint to any conceivable seaward expansion of the facility.

#### (b) Land Acquisition

The facility would encompass the present fish dock at Campbell Avenue, owned by National Harbours Board. It would also be necessary, however, to secure the land and water lot holdings of Great Northern to the west, and an easement on a portion of B. C. Sugar Refinery's water lot holdings to the east.

#### (c) Other Considerations

A major problem at this site is how to replace the existing structure without disrupting business.



FIGURE 9 CAMPBELL AVE. AREA City of Vancouver

Scale : | " = 200'

	Dimensions	Area	Cost	Total Cost
	(Feet)	(Sq. Ft.)	\$/Sq. Ft.	\$
Construction Costs				
Wharf Areas				
Main Wharf	210 x 800	168 000		
Ice Plant & Restaurant	200 x 135	27 000		
Finger Wharves	5 x 40 x 140	28 000		
(1) TOTAL		223 000	12	2 796 000
Building Areas				
Fish Processing	100 x 800	80 000		
Ice Plant & Restaurant	200 x 75	15 000		
(2) TOTAL		95 000	20	1 900 000
(3) Contingencies (5% of a	bove)			235 000
TOTAL CONSTRUCTI	ON COSTS (1) + (2)	+ (3)		4 931 000
Land And Water Lot Costs				
(4) Land	100 x 410	41 000		
.,		= .941 acres	62 500/acre	58 800
(5) Water Lot	410 x 800	$328\ 000$ = 7.530 acres	20 000/acre	150 600
TOTAL ACREAGE		8.471 acres		
TOTAL LAND & WATH	ER LOT COSTS (4)	- (5)		209 000
GRAND TOTAL				5 140 000

#### TABLE 23 - FISH PROCESSING FACILITY - CAPITAL COSTS -CAMPBELL AVENUE AREA

#### 5. B. C. Ice and Cold Storage Area

(a) Design Variations

Close proximity of the Harbour headline, together with limited availability of land, forced abandonment of the optimal design for this site, and its replacement with a best alternative (Figure 4). There is no opportunity to expand beyond the present design at this site. The site itself is portrayed in Figure 10.

#### (b) Land Acquisition

Land required would involve three National Harbours Board owned properties: all of the former Continental Can lease, part of the City's lease at the foot of Trinity Street to the east, and part of B. C. Ice and Cold Storage's lease to the west.

#### (c) Other Considerations

A new prospective tenant is currently engaged in actively negotiating a lease for the Continental Can property. This could complicate any agreement at this site.



		Dimensions	Area	Cost	Total Cost
		(Feet)	(Sq. Ft.)	\$/Sq. Ft.	\$
Con	struction Costs				
M	Tharf Areas				
(1)	Main Wharf (including				
	Ice Plant & Restaurant)	555 x 510	283 000	12	3 397 000
Buil	ding Areas				
	Fish Processing	2 x 100 x 400	80 000		
	Ice Plant & Restaurant	200 x 75	15 000		
(2)	TOTAL		95 000	20	1 900 000
(3)	Contingencies (5% of above)	)			265 000
	TOTAL CONSTRUCTION	COSTS (1) + (2) + (3)			5 562 000
Land	And Water Lot Costs				
(4)	Land	650 x 50	32 500		
			= .746 acres	62 500/acre	46 600
(5)	Water Lot	650 x 555	360 800		
			= 8.282 acres	20 000/acre	165 600
	TOTAL ACREAGE		9.028 acres		
	TOTAL LAND & WATER	LOT COSTS (4) + (5)			212 000
	GRAND TOTAL				5 774 000

## TABLE 24 FISH PROCESSING FACILITY CAPITAL COSTS B. C. ICE AND COLD STORAGE AREA

- 6. Area West of Prince Rupert Fishermen's Co-op.
  - (a) Design Variations

The alternative design as shown in Figure 4 is also used for this site. Lack of available land has dictated a slightly larger wharf to accommodate parking areas. The design again crosses the harbour headline, and could not be expanded on this site. (Figure 11).

#### (b) Land Acquisition

The basic lease would be from National Harbours Board, but the facility would encroach on present leases held with the same body by Seafood Products on the west and by Prince Rupert Fishermen's Co-op on the east.

(c) Other Considerations

Proximity to the main boat channel could be a negative factor in terms of wash affecting boat unloading operations.



		Dimensions	Area	Cost	Total Cost
		(Feet)	(Sq. Ft.)	\$/Sq. Ft.	\$
Con	nstruction Costs				
V	Vharf Areas				
(1)	Main Wharf (including Ice Plant & Restaurant)	600 x 510	306 000	12	3 672 000
Bui	Iding Areas				
	Fish Processing	2 x 100 x 400	80 000		
	Ice Plant & Restaurant	200 x 75	15 000		
(2)	TOTAL		95 000	20	1 900 000
(3)	Contingencies (5% of above)				279 000
	TOTAL CONSTRUCTION O	COSTS (1) + (2) + (3)			5 851 000
Lan	d & Water Lot Costs				
(4)	Land	600 x 30	18 000 = .413 acres	62 500/acre	26 000
(5)	Water Lot	600 x 600	360 000 = 8.264 acres	20 000/acre	165 000
	TOTAL ACREAGE		8.677 acres		
	TOTAL LAND & WATER LC	T COSTS (4) + (5)			191 000
	GRAND TOTAL				6 042 000

## TABLE 25 FISH PROCESSING FACILITY CAPITAL COSTS AREA WEST OF PRINCE RUPERT FISHERMEN'S CO-OP

#### F. SUMMARY - AN OPTIMAL FISH PROCESSING FACILITY FOR GREATER VANCOUVER

The capital costs tabulated above were discounted over 25 years at ten per cent per year. These costs were reduced to a monthly charge, and the result divided by 80,000 square feet to give a cost per square foot per month. The full cost of the complex was therefore levied against processing, the additional second level office and storage space being included in "at no additional charge". To the extent that this space was rented separately the rental burden on first level processing space would be reduced. The ice plant and restaurant are assumed to operate at cost, their spacial charges also being borne by processors. The following additional costs were then added.

#### 1. Operating Costs

Operating costs of the facility run slightly more than \$4,000 per month at the current Campbell Avenue facility. These costs were arbitrarily increased to \$6,250 per month to take care of expansion and escalating salaries, material costs, etc.

#### 2. Transportation Costs

An attempt was made to allow for the transportation costs incurred in fish delivery from different sites. Using 1985 projected figures, all fish shipped out of the Lower Mainland was assumed to be equal cost between sites. The remainder (14,500,000 pounds) was attributed to central destinations in each sector of Greater Vancouver according to projected population in those sectors. Using an estimate of 1,000 pounds per delivery, the number of annual deliveries from each site to each part of the city was estimated. Finally, using data from Lea (N.D.) & Associates - Transportation systems for the City of Vancouver (1968) - average return truck travel time from each site to each sector was estimated. This multiplied by the number of trips per year gave total time involved in local transportation for each site. This figure was then costed at \$7.50 per hour, the going charter rate for a medium sized delivery truck and driver in the city. The result was reduced to a monthly charge, divided by 80,000 to arrive at a comparable square foot value, and the differential between sites applied to our total cost calculations.

Transportation calculations are shown below in Table 26.

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	Total I Involve Return	Hours ed - Trips	Annua at \$7.50	l Cost	Ma	onthly	Cost Per Square Foot	Cost Differen- tial Per SquareFt.
	H	rs.	:	\$		\$	\$	\$
Model Sand Area	14	762	110	716	9	200	.12	.03
Giroday Area	12	142	91	064	7	600	.10	.01
Granville Island	12	142	91	064	7	600	.10	.01
Campbell Avenue	11	890	89	176	7	400	.09	
Storage Area	11	538	86	536	7	200	.09	
Rupert Fish Co-op	11	076	83	070	6	900	.09	

# TABLE 26 DIFFERENTIAL TRANSPORTATION COSTS FOR LOCAL DELIVERY PROSPECTIVE FISH PROCESSING SITES - GREATER VANCOUVER

Total costs were then summarized for the six locations in Table 27.

 TABLE 27
 TOTAL COSTS
 PROSPECTIVE FISH PROCESSING SITES

 GREATER VANCOUVER

	Total Capital Costs	(1) Monthly Capital Costs	(2) Costs Per Sq. Ft. Per Month	Monthly Operat- ing Costs	Operating Cost Per Sq. Ft. Per Month	Capital & Operat- ing Cost Per Sq. Ft Per Month	Transpor- tation Differen- tial Per Sq. Ft. Per Month	Final CostPer Sq.Ft.Per Month to Pro- cessors
	\$'000	\$'000	\$	\$	\$	\$	\$	\$
Model Sand Area	3 595	33.0	. 41	6 250	.08	.49	.03	.52
Giroday Area	3 6 4 9	33.5	.43	6 250	.08	.51	.01	.52
Granville Island	3 844	35.3	•44	6 250	.08	.52	.01	.53
Campbell Avenue	5 1 40	47.2	.59	6 250	.08	.67		.67
B. C. Ice & Cold								
Storage Area	5 774	53.0	.66	6 250	.08	.74		.74
West of Prince Rup	ert							
Fish Co-op.	6 042	55.5	.70	6 250	.08	.78		.78

(1) Over 25 years at ten per cent per year.

(2) Based on 80,000 square feet of charged space.

Consequently, Model Sand, together with the two False Creek sites, appear most attractive from a cost viewpoint.

#### G. COLD STORAGE CONSIDERATIONS

Cold storage needs were considered separately. For a basic one storey cold wall storage structure, plus machinery, etc., capital costs were estimated in Table 28. These figures were derived from data on actual expenses being incurred in construction on a similar facility in Bellingham, Washington.

TABLE 28 - CAPITAL COSTS - PROSPECTIVE COLD STORAGE FOR VANCOUVER FISH PROCESSORS

	Require- ments	Cost		Tot	al t	Capitalized Annual Charge
	Sq. Ft.	\$/Sq. Ft.		\$		\$
Buildings Machinery, etc. Land	100 000 100 000 150 000	13.00 0.31	1	300 310	000	
	= 3.444 acm	res \$62,500/acre		215	000	
TOTAL			1	825	000	
Other & Contin- gencies				175	000	
GRAND TOTAL			2	,000	000	220 000

The cost would be slightly lower at Model Sand where land is cheaper. Further, a cold storage is not equally appropriate to all sites. This is indicated in Table 29.

#### TABLE 29 - SITE AVAILABILITY FOR COLD STORAGE ADJACENT TO PROSPECTIVE FISH PROCESSING LOCATIONS

#### SITE

Model Sand Area

Giroday Area

Granville Island

Campbell Avenue Area

B. C. Ice & Cold Storage

COMMENTS

Cold storage could be located here.

Cold storage space probably available. Might further infringe on False Creek.

A cold storage of the magnitude indicated could be built by obtaining further N.H.E. area currently under lease.

Space for cold storage does not appear available here without further major property acquisition.

No space for new cold storage here, but an existing one which has offered to give fish first priority is located next door.

West of Prince Rupert Fishermen's Co-operative

No room for a cold storage here.

Hence, it appears that a cold storage could be located at three of the six sites considered and that a fourth has one "on site" at the present time. The indicated capital costs, together with operating costs involved, are not integrated with processor rental charges, but would obviously have to be covered in some fashion for viable operation. If a capacity level of 20 million pounds of fish frozen per year were eventually obtained, this would imply a charge of \$0.11 per pound to cover capital expense.

H. THE INCIDENCE OF COST - GREATER VANCOUVER FISH PROCESSING COMPLEX

It is not the intention of this study to examine methods of financing and/or rental rates to actually be charged. This question is one that has been left by assumption for decision at the policy level. For informational purposes, an assessment of the potential effect on fish prices if ultimate incidence for all facility costs was transferred to the wholesale market is presented. An important qualification to this section is that no account is taken here, or elsewhere, of the savings in processing costs resulting from a new more efficient complex. Lack of data rendered a conclusion on this question of dubious validity. Nevertheless, it is clear that significant savings in unit operating costs of processors can be expected. To this extent, there will be a tendency for increased rental charges to be reduced or balanced by decreased operating costs and the ultimate effect on wholesale prices, as presented below, (Table 33) is therefore overstated.

	:		PF	RESEN	т		:		1	985		
	:			-			:		-			
		Proj Voli Input	ected ume t (1)	Weight Loss Due to Processing	W A P: i	leight After rocess - ing		Proj Vo Inpu	jected lume ut (2)	Weight Loss Due to Processing	W A Pr	eight fter ocess- ng
	:	'00	00 1b.	. %	'00	00 lb	.:	'00	00 1b.	%	'0	00 1b
(3) Salmon	:	4	329	5	4	113	: .	4	729	5	4	493
(4)	:						:					
Groundfish (5)	: :	9	314	50	4	657	:	12	390	50	6	195
Halibut (6)	:	1	339	10	1	205	:	1	339	10	1	205
Shellfish	:	1	800	60	-	720	:	2	100	60		840
TOTAL		16	782		10	695	:	20	558		12	733

TABLE 30	) -	PROJECTED	VOLUMES	OF FINAL	PRODUCT	-	VANCOUVER
			FISH PRO	OCESSING	FACILITY		

(1) See Table 5.

(2) 1963 total throughput increased by 22.5 per cent.

- (3) Salmon at the proposed facility was assumed to be landed dressed for the most part, and generally sold as is, with little filleting or other processing. Consequently, a reduction in volume of only 5 per cent was applied to landed weight.
- (4) Halibut was also assumed only slightly processed and final product judged to be 90 per cent of landed weight.
- (5) Groundfish is highly processed, and a 50 per cent reduction factor was applied, landed to final product weight.
- (6) Shellfish is also intensively processed and final product was considered to be 40 per cent of landed weight.

Weighted wholesale prices were applied to these volumes to establish final product values in Table 31.

		$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1	1 0 9 5				
	Final Product Weight	(1) Weighted Wholesale Price	Value		Final Product Weight	(2) Weighted Wholesale Price	Value	
	: '000 1b.	\$	\$'000	:	'000 lb.	\$	\$'000	
Salmon	: 4 113	.612	2 517		4 493	.612	2 ,750	
Groundfish	: 4 657	.246	1 456	:	6 195	.246	1 524	
Halibut	: : 1 205	.416	501	:	1 205	.416	501	
Shellfish	: 720	.875	630	:	840	.875	735	
	:			:				
FOTAL	: 10 695		5 104	:	12 733		5 510	

TABLE 31 - FINAL PRODUCT VALUES - VANCOUVER FISH PROCESSING FACILITY

- (1) Prices were obtained by dividing British Columbia wholesale values by corresponding final product weights, for major species processed by study operators, and falling within the table groupings.
- (2) Present prices are used again. This is justified if inflation increases costs apace with monthly revenues.

Finally, the incidence of the potential annual increase in cost at a new facility was applied on this wholesale market value, and the percentage increase in revenue required to cover it calculated in Table 32. For this purpose, the capital costs of the facility were discounted over 25 years, first at ten per cent per annum, and then at a lower rate of  $7\frac{1}{2}$  per cent. The first rate is close to the present market rate; the second represents more closely government bond rates.

TABLE	32	 POTENTIAL	IMPACT	OF	FACILITY	COSTS	ON	WHOLESALE	REVENUES	-	VANCOIVER	FISH	PROCESSORS
Provide the second seco	-	and the second se				and the second se		the second second second second second second			1	TTOIL	TROODDOORD

			(1) :	"MAR	KET" RAT	re (10%)	: "	(2) "BOND" RATE (7 <sup>1</sup> <sub>2</sub> %)											
	Fina V	Final Product 		Final Product Value		Final Product Value		Final Product Value		Annual : Cost at : Product Present : alue User : Charges :		Annual : Annual Cost at : Cost I Present : New t User : Facility I Charges :		Increases in to Abso Different	Value rb tial	Annual Cost New Facility	Annual Cost Differen - New tial to be Facility Absorbed	Increases in to Abs Differen	orb ntial
	Presen	t <u>1985</u>	:			Present 1985		:		Present	1985								
		\$'000	\$'000 :	\$'000	\$'000	%	%	: \$'000	\$'000	%	%								
Model Sand Area	5 104	5 510	75 :	471	396	7.8	7.2	: 397	322	6.3	5.8								
Giroday Area	5 104	5 510	75 :	477	402	7.8	7.3	: 402	327	6.4	5.9								
Granville Island	5 104	5 510	75 :	478	423	8.3	7.7	: 420	345	6.8	6.3								
Campbell Ave. Area	5 104	5 510	75 :	641	566	11.1	10.3	: 536	461	9.0	8.4								
B. C. Ice & Cold Storage Area	5 104	5 510	75 :	711	636	12.5	11.5	: 593	518	10.1	9.4								
West Of Prince																			
Rupert Fish Co-op.	5 104	5 510	75 :	741	666	13.0	12.1	: 617	542	10.6	9.8								

(1) Present rental per square foot multiplied by 80,000 square feet.

(2) Utilized to discount capital costs.

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Thus, product wholesale prices would have to be increased between 5.8 per cent and 12.1 per cent in 1985, depending on the site chosen, and the interest rate used to cover the increased costs of the new facility. Utilizing least cost site figures the implications of such an increase on species groups is shown in Table 33.

	:	;	"MARKET	" RATE	:	"BOND"	RATE	
		1968 Weighted Final Product Price Wholesale	Price After Present Increase of 7.8%	Price After 1985 Increase of 7,2%		Price After Present Increase of 6,3%	Price After 1985 Increase of 5,8%	** ** ** ** **
	:	¢/1b. :	¢/lb.	¢/1b.	:	¢/lb.	¢/1b.	
Salmon	:	61.2 :	66.0	65.6	•	65.1	64.7	
Groundfish	:	24.6	26.5	26,4	:	26.1	26.0	:
Halibut	:	41.6 :	44.8	44.6	:	44.2	44.0	:
Shellfish	:	87.5 :	94.3	93.8	:	93.0	92.6	
					•			

## TABLE 33 IMPACT OF OVERALL PRICE INCREASE BY SPECIES GROUP VANCOUVER FISH PROCESSORS

In conclusion, it should again be noted that because of predicted operating savings, the increase is net cost and its potential impact on the market is overstated in this analysis. In effect, Table 33 represents a worst possible result. More likely, net cost, and their market impact would be significantly reduced from the figures presented. Further, by assumption, the total incidence of net cost has been applied to the product market. It is possible at least for some species, that part or all of increased cost will be reflected on the supply side through the price paid to fishermen. Consequently, Table 33 quantifies on upward limit, rather than an expected result.

#### I. ICE PLANT - RESTAURANT COSTS EXCLUDED FROM PROCESSOR LEVY

Throughout the analysis, we have assessed all capital costs for the facility against processing, on the theory that the ice plant and restaurant were services provided to processors. Alternatively, ice plant and restaurant charges could be increased to include "rent", and processor charges reduced accordingly. The actual change in processor charges, if both wharf and structural costs but not land costs for these two facilities were excluded, and their impact on final product value is shown in Table 34.

	Capital Costs Ex. Ice Plant and Restaurant	(1) Annual Costs Capital Plus Operations	(2) Cost for Square Foct Per Month	Differen- tial to be Abscrbed	Increases in Value to Absorb Differential	
					Present	1985
	\$'000	\$'000	\$	\$1000	%	%
Model Sand Area	2 923	397	.41	322	6.3	5.8
Giroday Area	2 977	403	. 42	328	6.4	5,9
Granville Island	3 319	441	.46	366	6.8	6.3
Campbell Avenue Area	4 516	573	,60	498	9,0	8.4
B. C. Ice & Cold						
Storage Area	5 114	638	.66	563	10.1	9.4
West of Prince Rup	pert					
Fish Co-op	5 382	668	.70	593	10,6	9.8

#### TABLE 34 - VANCOUVER FISH PROCESSING FACILITY COSTS - EX. ICE PLANT AND RESTAURANT

(1) Total capital charges discounted over 25 years at ten per cent.

(2) Based on 80,000 square feet,

It can be observed that facility costs could have virtually the same impact on final product value if ice plant and restaurant costs were excluded and capital charges discounted at ten per cent (Table 34), or if construction costs for ice plant and restaurant were included and capital charges discounted at  $7\frac{1}{2}$  per cent (Table 32). If restaurant and ice plant were excluded and the  $7\frac{1}{2}$  per cent rate obtained, processor rental would be reduced even further to \$0.35 per square foot at the least cost site, and potential impact on final product value would decline to 5.1 per cent at present and 4.8 per cent in 1985.

#### J. FACILITY COSTS UNDER ASSUMED MAXIMUM REQUIREMENTS

In the foregoing sections on facility design, site location and derivation of cost, we have utilized a complex size of 80,000 square feet of processing space, close to our minimum assumption for future requirements.

If, however, we wish to consider maximum assumed needs of approximately 120,000 square feet of processing space, we can easily do so by making the reasonable assumption that costs per square foot will be about the same in the larger structure. As throughput would also rise proportionately, the rate derived from the smaller complex would continue to hold. On the other hand, spacial constraints would effectively remove the B. C. Ice and Cold Storage Area site, the site west of Prince Rupert Fishermen's Co-op. and possibly the Giroday site from consideration.

#### K. SUMMARY ON ECONOMIC EVALUATION OF FISH DOCK AND PROCESSING FACILITY IN GREATER VANCOUVER

The results of this study suggest that a new fish processing complex to service operators demonstrating a significant linkage with the Greater Vancouver market would require at minimum approximately  $2\frac{1}{2}$  times the processing space available at the present Campbell Avenue fish dock, and at maximum,  $3\frac{1}{2}$  times current square footage if it was to remain adequate through 1985. The optimal location for such a complex would be the Model Sand Area of North Vancouver, or the False Creek Area. The south shore of Burrard Inlet would be feasible, but less desirable. Construction of a new complex could mean a significant increase in rental charges if total costs were to be covered. Conversely, substantial relief in this area could be obtained by increased processing efficiency, leasing of second level premises to brokers, etc., and by deriving revenues in excess of costs in related services such as the ice plant, restaurant or cold storage.

The ultimate effect of such an increase on market prices is unlikely to reach the "upper limit" presented in this study. Further, prediction of demand's reaction to changes in price, whether large or small, is not in an advanced state. Consequently, the revenue effect of any likely price increase is indeterminate. The quantitative conclusions of the study are summarized in Table 35.

	: A : (1 : (1	Minimum Assumed Size (15 Operators)			Maximum Assumed Size (21 Operators)		
	: Pre	sent	1985	:	Present	1985	
Pounds Processed				:			
('000 lb.)	: 16	782	20 558	:	25 154	30 814	
Processing Space	:			:			
Required (Sq. Ft.)	: 63	400	77 700	:	96 600	118 400	
(1) Total Space Required	:			:			
(Square Feet)	: 120	700	139 600	:	165 000	193 600	
(2) Complex Cost (\$'000)	:	3 59	5	:	5 500	approx.	
Complex Cost Per <sup>(3)</sup>	:			:			
Sq. Ft. Per Month	:	.49		:	.49		
Complex Cost Per	:			:			
Sq. Ft. Per Month:	:			:			
(a) at lower interest	:			:			
rate <sup>(4)</sup>	:	.41		:	.41		
(b) ex. restaurant				:			
and ice plant	ç.	41			41		
r				:			
Complex Cost Per				:			
Sq. Ft. Per Month:	:						
	:			:			
- ex. restaurant and	:						
ice plant @ 7½%	:	.35		:	.35		

#### TABLE 35 - SUMMARY OF DATA PERTAINING TO A FISH PROCESSING FACILITY FOR GREATER VANCOUVER

(1) Not including ice plant or cold storage.

(2) Including ice plant, but not cold storage.

(3) Capital rates are discounted over 25 years at ten per cent.

(4) Capital rates are discounted over 25 years at  $7\frac{1}{2}$  per cent.