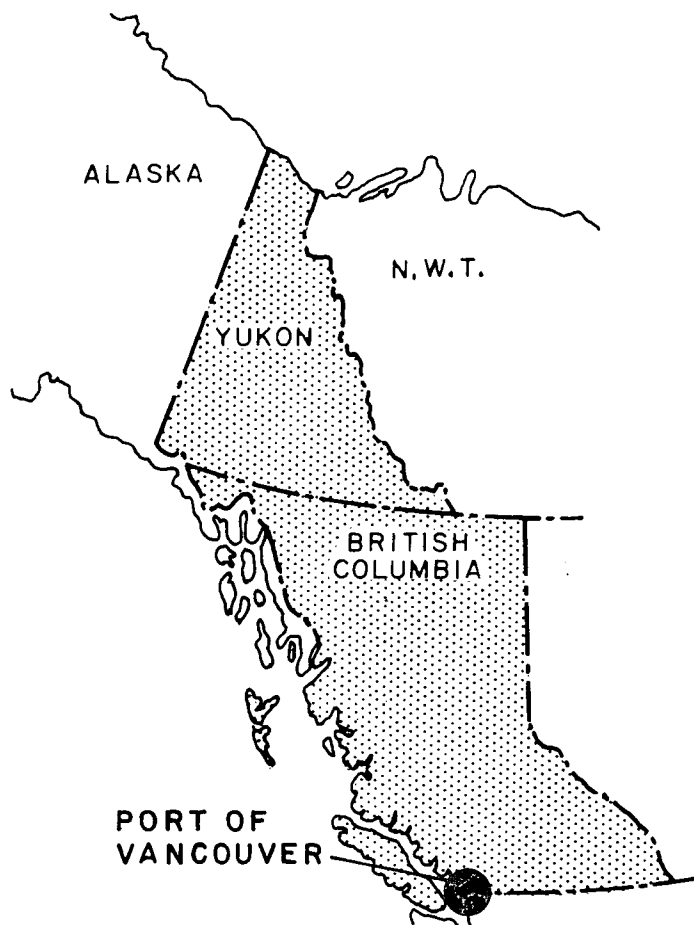


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NATIONAL HARBOURS BOARD
PORT OF VANCOUVER
ENVIRONMENTAL INVENTORY AND PRELIMINARY
ASSESSMENT REPORT

By . . .

M.K.Hendren

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PACIFIC REGION

September 1976

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1. INTRODUCTION

The Port of Vancouver, comprising the Burrard Inlet Inner Harbour and the coal loading terminal at Roberts Bank is a vital link in the economy of Western Canada. Exports of grain, sulphur, coal, metal concentrates and forest products pass through several bulk loading facilities and imports of manufactured goods offload at recently completed container handling terminals. Fishing vessels use the harbour as a centre for offloading their catch, and a variety of vessels from pleasure craft to ships awaiting repair use the mooring facilities available.

Over the course of time a variety of industries have located near the harbour, either to support vessel activities or to take advantage of the proximity to transportation required for their produce. Examples of the former case would be a ship repair facility and tug boat companies; of the latter, fish processing plants, oil refineries and chemical plants.

In Vancouver Harbour, the land on which the industries are located is, for the most part, leased by the industry from National Harbours Board, a Crown Corporation. On-going activities, such as log booming, taking place on the water within the harbour headlines are deemed to be occurring on National Harbours Board "Waterlots" and also require a leasing agreement.

National Harbours Board, therefore, have a degree of jurisdiction over a variety of industries and activities that occur in and around the harbour. To ensure that these industries are effectively regulated, National Harbours Board has stipulated in these lease agreements that industrial activities must conform to any and all municipal and provincial regulations that would apply to them if they were not located on federal land. Still, some regulatory agencies in the past have been hesitant in approaching these industries and consequently, there has been concern that some industries were not obeying applicable pollution control regulations. As there has also been concern

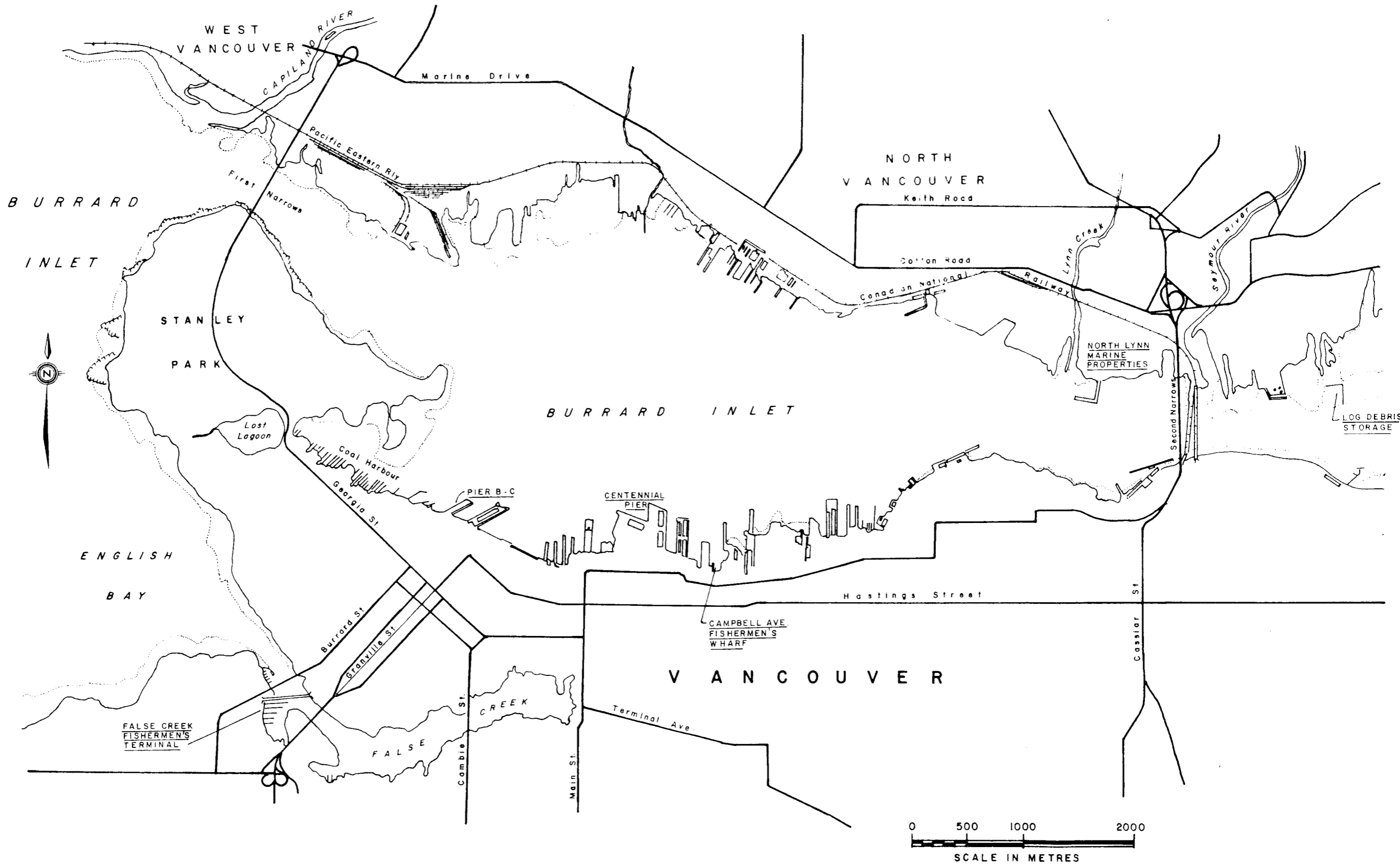


FIGURE I VANCOUVER INNER HARBOUR

voiced on subjects such as pollution from vessels and on debris removal problems faced by the National Harbours Board, EPS undertook to examine harbour activities in an attempt to define the potential pollution sources in the harbour and to subsequently report these to National Harbours Board.

This report presents the findings of the study performed, for the most part, in the Summer and Fall of 1975. The detail in which different subjects are discussed varies from a fast resume of several industries to conceptual design and cost estimates for alleviating existing problems. There are some problems that were too large to be covered in a first report. In view of their significance, they should be given further and particular attention so that solutions will be feasible and meaningful.

2. FACTORS CONSIDERED

The investigation of harbour facilities was broken down into two natural groups: vessels and their associated problems, and land based activities. In the case of vessels, discussions were held with the Harbourmaster, private interests, regional health authorities and Transport Canada. Comments on the technology of vessel pollution control came from the Federal Activities Vessel Program.

The land based activities were first screened initially to identify those lessee operations that were judged of minor importance. This included leases for private boat floats, easement agreements, summer camps, and other similar uses. The remaining lessee operations were systematically visited to check for discharges that were significant and to check for basic housekeeping practices. Facilities actually run by National Harbours Board were examined in somewhat more detail, in that conceptual solutions were laid out and costed for the benefit of National Harbours Board.

3. DISCHARGE FROM LAND BASED FACILITIES

The comprehensive site-by-site investigation of National Harbours Board lessees showed that there were few major problems with waste discharges from the industries visited. This is not to say that in future some of the industries may not be made to comply with various regulations, it just indicates that a good basic level of cooperation between industries and regulatory agencies exists at the present time. A table contained in Appendix I lists the main industries in the harbour area, their discharges and permit applications, and comments as required.

There are some areas of the harbour not yet served by sewer, and in these areas some raw discharges still exist. For the most part, however, these sewage discharges are of minor importance. Two National Harbours Board facilities that require a hook-up are Pier B-C and North Lynn Marine Properties. In the case of Pier B-C, no sewer is yet available, but the latter is in close proximity to the North Vancouver system and should be connected as soon as possible.

Industrial type waste is discharged in only a very few locations and is mostly covered by B.C. Pollution Control Branch permits. One discharge not covered is Canada Tungsten Ltd. in North Lynn Marine Properties. The waste from the company's concentrating process enters Lynn Creek near the ocean via the North Lynn Marine Properties sewer system. As the discharge enters the harbour via an National Harbours Board sewer, the Pollution Control Branch cannot directly approach Canada Tungsten to upgrade their effluent. There is, therefore, a "pollution haven" created at North Lynn by the National Harbours Board which should be rectified.

Yard drains from most industries discharge rainfall runoff directly to the harbour and these drains undoubtedly contribute oil and particulate waste to the harbour waters. However, these discharges represent only a minute portion of the urban street-

wash that enters the harbour from Vancouver and North Vancouver, and as such can be disregarded at the present time. Exceptions may occur where there is a possibility of toxic substance spillage in the catchment area.

Related to the problem of yard drains is the subsurface discharge to the harbour of materials travelling through gravel fill in unpaved areas. Uncovered storage piles of metal concentrate at Neptune Terminals may be discharging metal salts to the harbour during periods of rain, and no known sampling has been done to confirm or deny this suspicion. It was noticed that there were oil, paint and other material spillages in filled unpaved areas of a variety of industries, but these spillages were very small and of no real consequence.

The most visible discharge in the harbour at present is from Campbell Avenue Fishermans Wharf. This discharge has been of concern to city officials for some time now, as all other fish plants have connected to the sewer, and these plants are expressing resentment towards Campbell Avenue. This report contains recommendations in a latter section as to what is required at Fishermans Wharf.

Air pollution is regulated by GVRD, and it appears that industries with air discharges have applied to GVRD for permits. A notable case which is beyond GVRD jurisdiction and, for that matter, probably beyond solving, is the problem of drifting spray paint from ship building and repair operations. The paint can drift for a number of blocks and spot (permanently) other property in the area, although in most cases the paint does not travel very far and probably does not leave the yard. Burrard Dry Dock, the only shipyard located close to shopping areas, have warned members of the public with large signs posted frequently in areas close to the plant where paint aerosols may exist.

Solid waste management is acceptable as there is regular

garbage pick up at all industries. Extensive recycling of metal is practised at the various shipyards.

From an overall standpoint, it is noted that the majority of problems are those properties and activities more directly linked with National Harbours Board. These would include North Lynn Marine Terminals, Pier B-C, and Fishermans Wharf. This is, no doubt, due to the fact that National Harbours Board itself is not under the jurisdiction of the regulatory agencies that cover the National Harbours Board lessees, and in the case of Pier B-C, to the fact that there is no sewer in the area. There should be, however, effort made to bring these facilities up to date as soon as possible and, therefore, recommended schemes of implementation are contained in appropriate sections of this report.

It was found that the harbour water is, for the most part, aesthetically acceptable. Much of the credit for this is due to the Harbourmaster. Regular patrols, usually twice daily, are made by patrol vessels to check for discharges of oily or solid waste into the harbour confines.

4. DISCHARGES FROM COMMERCIAL VESSEL ACTIVITY

Regulations prohibiting the discharge of oil and garbage from vessels were promulgated by Transport Canada a few years ago. The Port of Vancouver Harbourmaster enforces these regulations in the Vancouver Harbour area.

Recently there has been some concern shown by Public Health officials towards the discharge of sewage by vessels in the port area. As yet, however, no claims of pollution from this source have been substantiated and there are no regulations that cover this aspect of vessel waste.

This section discusses the present oil and solid waste disposal methods, in line with present regulations, and also describes

the preliminary steps in determining the impact of vessel sewage on the bathing areas of Vancouver.

(a) Oil Disposal

At present, Transport Canada regulations stipulate that no oily waste, treated or otherwise, be discharged into Canadian waters. In the Port of Vancouver these regulations are enforced with large commercial vessels by the following procedures:

1. All bilge and ballast valves are sealed upon entry to the harbour.
2. Ships are allowed to pump clean ballast under the supervision of the Harbourmaster.
3. Ships with oily ballast or suspected oily ballast are not allowed to discharge in the harbour.

This system of enforcement is without a doubt the most effective means of keeping oily ballast water out of the harbour, but may cause undesirable side effects in that vessels may discharge such waste offshore. Last year there were over 200 incidents of small oil slicks coming ashore from discharges of this sort.

There has been suggestions put forward that an oily water separation service be started in the Port of Vancouver. The proponents of such a scheme have listed its advantages as being two-fold. Firstly, to allow those vessels with contaminated ballast to unload their ballast and replace it with cargo, thereby allowing more profit for the ship on a given run. Secondly, ships which now pump bilges prior to leaving or entering port may use the service and hence, decrease the number of "night pumps" that end up on the beaches of the Gulf Islands and Vancouver Island.

The first of the two potential advantages is purely economic and is of no environmental advantage; the second point may be valid depending on the cost of the service, although it is highly probable that a lot of "night pumping" would still occur. Therefore, the supply of such a service would not improve water quality in the Port of Vancouver and may not decrease the amount of small oil discharges outside of the harbour area. The oil discharges from vessels outside the Harbourmaster's jurisdiction do still provide a formidable problem to stop, and it is conceivable that the Port of Vancouver may play an active role in the control of oil discharges, but such ideas and solutions are beyond the terms of reference of this study.

(b) International Wastes

International wastes are animal manure, garbage and ship or aircraft refuse from a ship or aircraft arriving from another country. The mixing of international garbage with domestic garbage causes the total mix to be classified as international garbage. In the Port of Vancouver the largest part of this garbage is collected by Burrard Services via a self-propelled barge, is offloaded at Dillingham Corp. in North Vancouver and trucked to Leeder landfill where it is reported to be given special burial attention. The present procedures and facilities must eventually be upgraded. Under regulations that are soon to come into being, all international garbage "shall be incinerated forthwith under the supervision or to the satisfaction of an inspector", therefore, landfilling as practiced at present will no longer be acceptable.

In addition, there is a requirement to provide an adequate offloading facility for the garbage bins. The present location is not adequately safeguarded to prevent contaminated leachate from contacting workmen and materials,

nor to prevent spread of disease through vectors such as rats and mice. A publicly owned site should be available for the purpose of offloading the garbage collected in the harbour via barge, scow or whatever, and also for private boaters.

A special effort will be required by agencies and government departments at the various levels to ensure that international garbage is dealt with in a consistent and exemplary manner throughout the Vancouver and surrounding area's ports and Vancouver International Airport. Special consideration should be given to the need for one or two centrally located incinerators that are sized for requirements of both the Vancouver International Airport and ports. An overall characterization of the international waste problem in the Vancouver area is required and should be done in conjunction with the Harbour Commission. It should also relate to the recently completed Vancouver Airport Solid Waste Study. As a result of this study, Transport Canada is now considering the installation of an incineration facility.

(c) Sewage Discharge

As already mentioned, no regulations presently exist that cover the discharge of sewage from vessels. Transport Canada has the responsibility of producing and enforcing sewage discharge regulations from vessels in Canadian territorial waters, but is limited by the fact that international agreements are required before any type of sewage control is practicable. Therefore, local port authorities would have a difficult time dealing with any problems that may arise as none of the vessels would, as yet, be fitted with sewage holding or treatment devices. There should, however, be an investigation and a documentation of any problems which may exist due to discharge of sewage from deep-sea vessels, as this information could be used on a

national and international level to produce workable regulations.

The vessels most likely to have an impact on Vancouver receiving waters are those lying at anchor off Kitsilano Beach. Conceivably, sewage from these vessels could reach a number of popular bathing areas and, as the ships are of foreign origin, there may be a health hazard for bathers.

It is conceivable that in the future sewage pumpout facilities may be required to handle sewage to be evacuated from vessels with adequate holding or connecting facilities. Installation of these, with the one possible exception of Pier B-C, should proceed only after the international regulations are developed.

5. DISCHARGES FROM NATIONAL HARBOURS BOARD PROPERTIES

(a) North Lynn Marine Properties

North Lynn Marine Properties, situated just east of Lynn Creek in the District of North Vancouver, is a warehousing terminal and industrial park owned and leased by National Harbours Board. Having been built prior to the installation of the GVRD regional sewer system, it discharges its industrial, sanitary and storm liquids (waters) directly into Lynn Creek via two outfalls.

At present the system contains three separate and distinct flows; human wastes from the day workers, an industrial discharge from Canada Tungsten Ltd., and storm runoff. The area is very flat and the human sewage flow generally very low, therefore, waste material tends to accumulate in the sewers and these accumulations are subsequently cleared by the large amounts of stormwater from roofs and pavement that enter the system. The flow from Canada Tungsten Ltd. is very large in comparison to the human waste flow and is of uncertain composition.

The human waste discharge is, no doubt, very minor in overall impact on harbour water quality. Federal regulations, however, require that the discharge be directed into the North Vancouver sewer system for subsequent primary treatment at Lions Gate Sewage Treatment plant. To accomplish the transfer of wastes to the regional system, a collection point and lift station must be established near the main gate. As no stormwater is allowed in the North Vancouver collection system, the human waste will itself require completely new collection facilities. (The stormwater can continue to run in the present sewer.) As mentioned earlier, the area is very flat and the small volume of sewage generated depends on stormwater to adequately flush it through the lines. Without the benefit of stormwater in the new system, alternates to gravity must be considered for collecting the sewage from North Lynn.

Two such alternates are: a low pressure pumping system utilizing grinder pumps, or a vacuum sewage collection system. Of these two, the vacuum system offers more advantages for about the same cost.

The first system would consist of a number of small lift stations that would macerate the sewage and pump it through small diameter lines to the collection point. (The maceration allows the sewer size to be decreased significantly and thus saves installation costs.) Five such units would be required. The vacuum system, on the other hand, would utilize the small diameter piping, but would transport the sewage by means of a vacuum applied at the collection point. Layouts for the two systems are shown in Figures 2 and 3.

The relative advantages and disadvantages of the two systems are as follows:

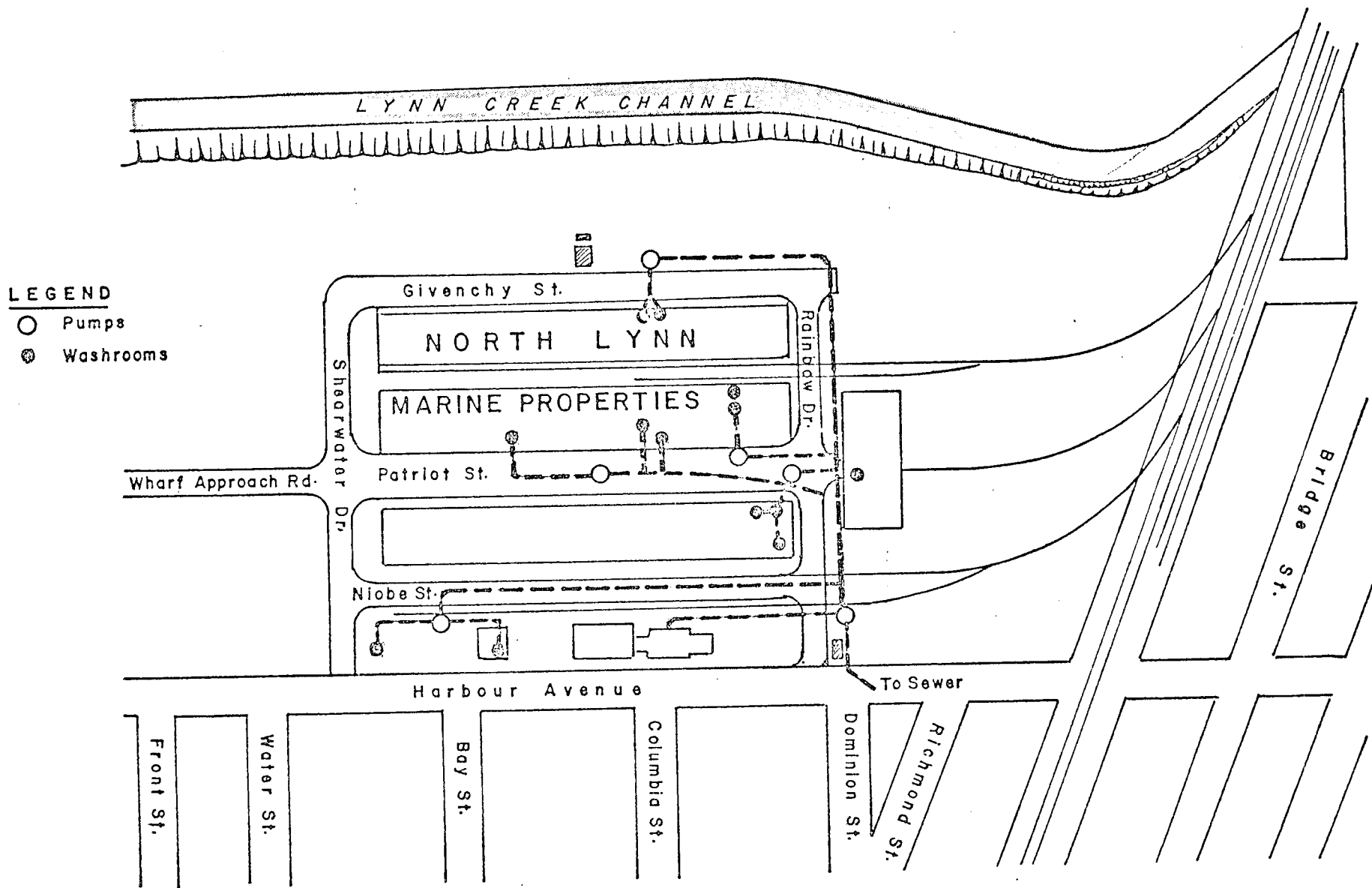
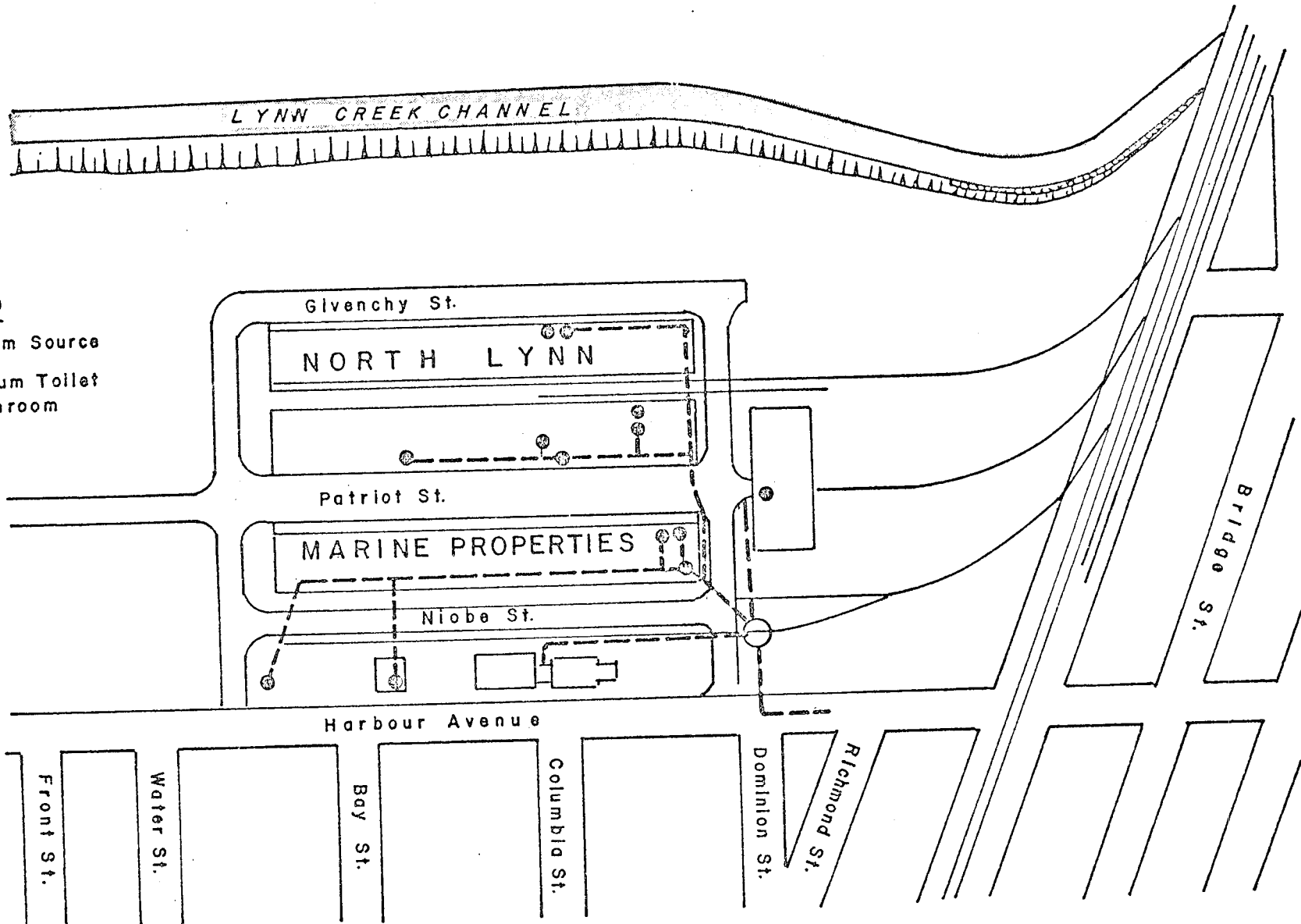


FIGURE 2 PUMPED SEWAGE SYSTEM FOR NORTH LYNN MARINE PROPERTIES



LEGEND

- Vacuum Source
- Vacuum Toilet Washroom

- 13 -

FIGURE 3 VACUUM SYSTEM FOR NORTH LYNN MARINE PROPERTIES

1. Initial cost @ 1976 prices - the two schemes are similar in cost as illustrated below:

Conventional System

5 small grinder pumps @ \$1250	\$ 6250
installation of pumps @ \$500 each	2500
5 manholes @ \$2000 each	10000
400 ft. 10" gravity sewer @ \$25/ft.	10000
2500 ft. 2" pipe @ \$15/ft.	37500
Connection to GVRD	<u>10000</u>
Subtotal	\$76,250
engineering and contingencies 20%	<u>15,250</u>
	\$91,500

(does not include upgrading of washrooms)

Vacuum System

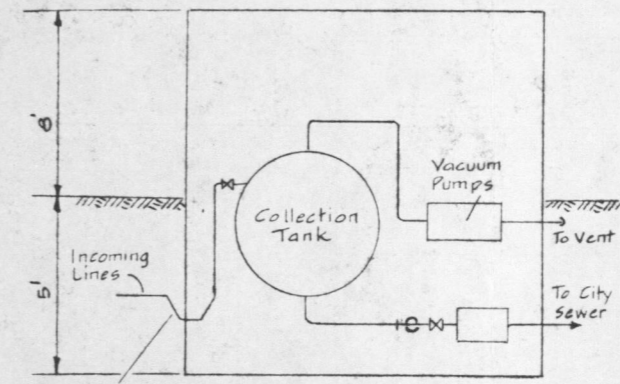
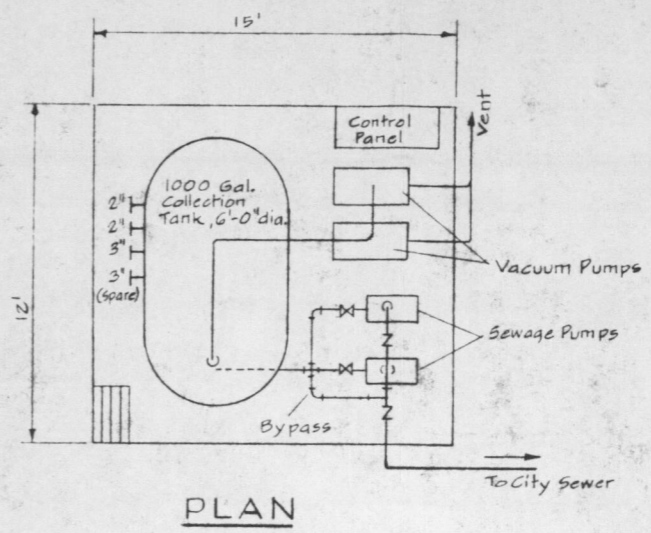
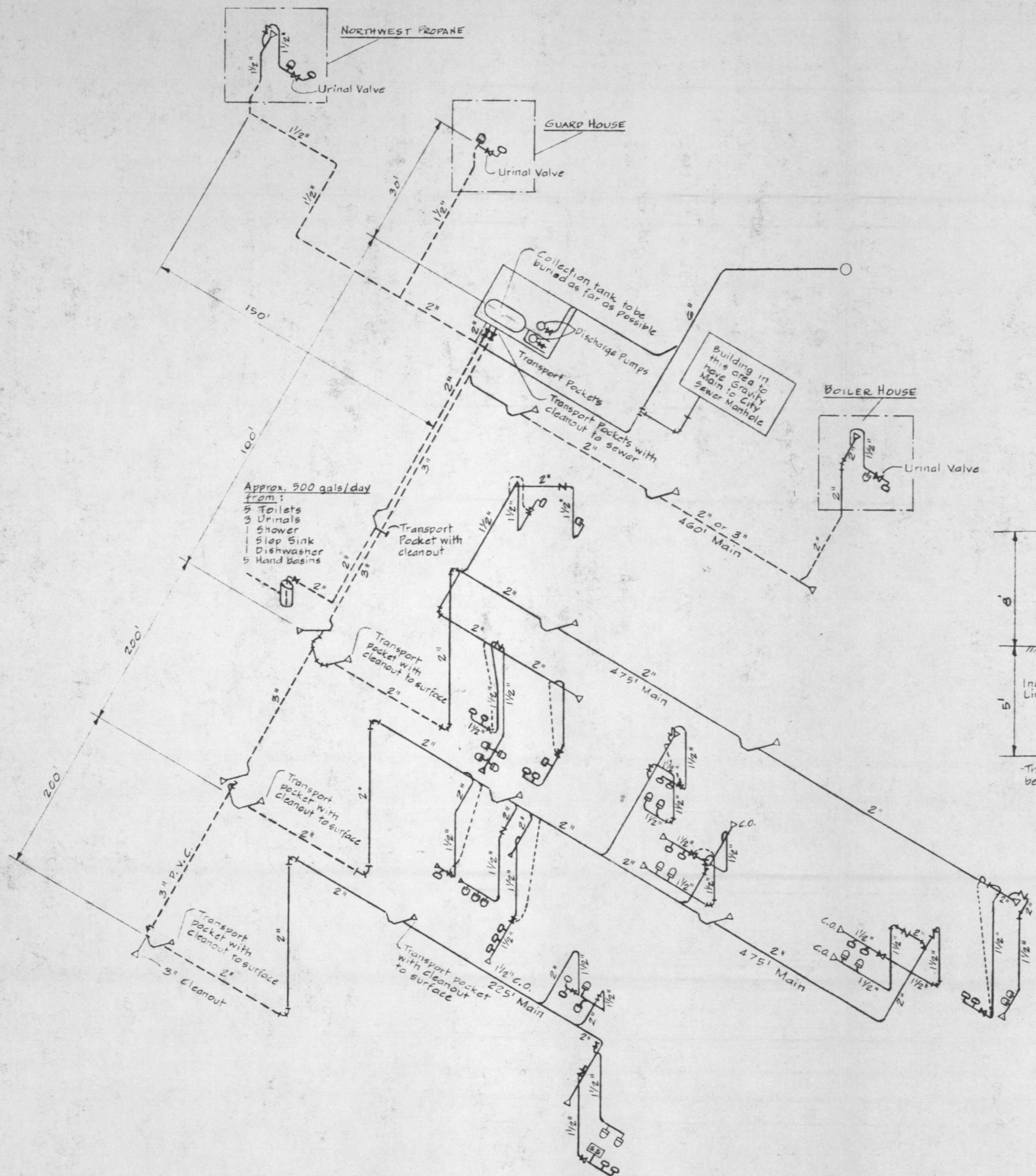
firm bid from Vacusan Systems	\$95,105
(as per Figure 4)	
connection to GVRD	<u>10,000</u>
	\$105,105

2. Operating Cost:

The power cost for the two systems is expected to be the same. The maintenance of the one vacuum station should be more convenient and easier than the maintenance of the several pumping units although, in general, the reliability of both systems is very good.

3. Flexibility:

Both systems offer a certain amount of flexibility in that other buildings when built can be added to the system at a later date without major changes to the equipment. However, it would be expected that it would be cheaper to add on to a vacuum system because no new pumps (and associated installation costs) would be required.



- REFERENCES**
1. See Details of Transport Pockets underground
 2. See Piping Details
 3. See Toilet and Fixture Connection Details.

- LEGEND**
- Handbasin
 - S.S. Slop Sink
 - Vacuum Toilet
 - ⊗ Interface Valve
 - ∨ Check Valve
 - △ Cleanout Cap
 - ~ Transport Pocket

- COLLECTION STATION DATA**
- 1000 Gallon Collection Tank (buried)
 - 2- 3404 Vacuum Pump
 - 2- 3" Discharge Pumps

- GENERAL NOTES**
1. All pipe runs to slope min. 3% towards Collection Tank.
 2. All lifts into 2" Main inside building # 2, 3 and 4 to be approx. 20'-2"
 3. Approx. 120 people from 8:00 A.M. to 5:00 P.M. 5 days a week.
 4. Pockets are required only if needed to make a lift.
 5. Cleanouts to be every 50-170 feet and at changes in direction.
 6. Check valves required only for toilets.
 7. Separate lift for toilets with check valves.
 8. Dimensions are approximate only.

Drawing reproduced from VACUSAN SYSTEMS LTD

FIG. 4 GENERAL PIPING SCHEMATIC FOR NORTH LYNN TERMINAL - NATIONAL HARBOURS BOARD

4. General:

As the lines from either system do not depend on gravity (within limits), they need not be laid to grade, hence saving some installation costs.

Furthermore, the vacuum lines can be carried on the inside of buildings rather than running it outside where major digging and repaving would be required. Use of the vacuum system would, therefore, maintain a neater appearance in the area and keep work to a minimum during installation.

Considering the two schemes, it is our opinion that the vacuum system, despite its slightly higher cost, offers several advantages over a pumped system, and is recommended for installation at North Lynn Marine Properties. Vacusan Canada Ltd. has prepared a supply and instal quote on a vacuum system for North Lynn. The quote includes new toilet fixtures, piping and central vacuum collector as per the schematic in Figure 4. Once the human waste is thus removed from the existing system, the remaining Canada Tungsten discharge must be dealt with.

(b) Canada Tungsten Ltd.

The discharge from Canada Tungsten Ltd. is, as mentioned previously, a sizeable discharge of uncertain composition. The firm did apply to the B.C. Pollution Control Branch for a waste discharge permit, but were turned down because the discharge was to a National Harbours Board (federally controlled) sewer. At the same time, National Harbours Board approached B.C. Research to qualify and quantify their effluent, which was subsequently completed in December of 1971.

The report stated that high levels of total solids and suspended solids (11.17 gm/l + 3.08 gm/l), and significant concentrations of iron and lead (24.61 mg/l and 1-1.5 mg/l)

were present in the process effluent in December 1971. These concentrations are higher than those permitted in the B.C. Pollution Control Branch level B guidelines that are now in effect. (For example, permitted concentrations of iron and lead are 1.0 mg/l and 0.1 mg/l, respectively.) If the results of the B.C. Research investigation are still valid, there must be an upgrading of the effluent at Canada Tungsten performed as soon as possible.

There are five options open to Canada Tungsten. These are:

1. Discharge as at present.
2. Treat the waste and discharge as at present.
3. Discharge to GVRD system (pre-treatment may be required).
4. Discharge through an outfall to the harbour.
5. Treat the waste and discharge through an outfall to the harbour.

The five options, as well as differing in cost and effectiveness, also differ with respect to whose final authority the discharge remains. If the discharge continues to flow through the National Harbours Board system, then the responsibility for the effluent quality and the position and type of outfall rests with National Harbours Board. The outfall would have to be monitored in order to ensure compliance with provincial regulations with respect to industrial waste. If the Canada Tungsten discharge is routed to the GVRD sewer system via the National Harbours Board collection point (i.e. if it is mixed with the human waste), the responsibility for effluent quality will be, again, with National Harbours Board who would, in turn have jurisdiction over Canada Tungsten. If Canada Tungsten makes their own connection to the GVRD system, then they would be directly regulated by GVRD. In both of these

cases, suitable arrangements could possibly be made with either the Provincial Pollution Control Branch or the GVRD to have direct control over the industries in question.

If it is decided to discharge through an outfall to the main harbour area, rather than the Lynn Creek estuary, the B.C. Pollution Control Branch will then take jurisdiction.

If it is deemed desirable that National Harbours Board play no part in the regulatory process, Canada Tungsten must be asked to remove their industrial waste from the North Lynn system and make their own arrangements for disposal. If National Harbours Board wants to continue to provide a sewer service for Canada Tungsten, then they should be prepared to enforce sewer regulations based on environmental or GVRD requirements, or make some arrangement for their enforcement.

As mentioned previously, there are five combinations of treatment and disposal open to Canada Tungsten Ltd. Naturally, Canada Tungsten will want to choose the solution most advantageous to themselves. In order to advance towards a solution of the discharge problem, the following series of events should be followed:

1. Canada Tungsten should be asked to retain a consultant to produce the following information:
 - (a) effluent quality and quantity with respect to parameters such as solids, heavy metals, pH and toxicity;
 - (b) cost data for the various treatment and disposal schemes required to satisfy environmental requirements.

2. When the most cost-effective scheme becomes apparent and if such a scheme involves the National Harbours Board sewer, a suitable regulatory scheme must be decided upon.

In summary, the Canada Tungsten discharge is one which does require immediate attention. No regulatory bodies have dealt in depth with its discharge because it is discharging through a National Harbours Board sewer. Whether or not the re-sewering of North Lynn is done, the Canada Tungsten discharge should be considered of major importance. A consultant should be retained by the firm to produce cost estimates for various environmentally acceptable solutions and then an acceptable regulatory system agreed upon and commenced.

(c) Campbell Avenue Fishermans Wharf

Campbell Avenue Fishermans Wharf is perhaps the most contentious facility on the waterfront with respect to pollution control regulations. It is now the only fish processing area along the waterfront that is not discharging into the city sewer. It is also a point of public interest where people from the Greater Vancouver area come to buy fish at two retail markets, at the same time viewing the fish offal in the water which is discharged through the floor drains of the twelve packing plants. As well, there is a potential health problem resulting from fly and rat infestation.

As Fishermans Wharf is an aesthetic as well as health problem, and as the City of Vancouver is going to seriously press the issue, it is imperative that the situation at Fishermans Wharf be corrected as soon as possible.

The following is a description of the present system and

of the proposed treatment system that should be installed:

1. Presently all domestic sewage is collected at the Campbell Avenue docks and discharged to the harbour interceptor sewer.
2. With the exception of the Rupert Brand (B.C.Packers) premises, all processing wastewaters and large amounts of offal are discharged through the floor drain holes to the marine environment below. The estimated total average flow rate is approximately 400 gpm.
3. Rupert Brand recently installed a processing wastewater system involving a collection system, rotary coarse screening and force main discharge to the harbour interceptor sewer. The estimated discharge volume is approximately 300 gpm., somewhat less than the maximum discharge capacity of 750 gpm. Apparently B.C.Packers anticipated the involvement of other facilities in their system. However, an agreement was never consummated.
4. The recommended pollution control works would involve a collection system, coarse screening, sump, fine screening and final discharge to the harbour interceptor. It is anticipated that the capital cost of this system would be in the order of \$200,000 to \$250,000, and the significant operating cost would be the requirement for an estimated one-half man year. It is envisioned that the collection system would involve pipe stubs on a main 8" diameter trunk. The responsibility for connecting to the trunk and installation of necessary appurtenant works, such as collecting sumps and pumps, would be left to the individual lessee operations. (e.g. The conveyors at both MacMillan and Norpac premises lie below the anticipated invert elevation of the main trunk, thereby precluding direct discharge.)

No conclusions at the present time can be drawn with respect to the methods of funding such a project. Discussions involving the City of Vancouver, National Harbours Board and EPS should be held to decide upon a course of action in this matter.

(d) Pier B-C

Pier B-C, located at the foot of Burrard, discharges raw sewage from 80 staff members directly into the harbour. These discharges emanate from several areas. The most important discharge is the main washrooms located near the entrance on the second floor, but 4 or 5 other washrooms are located in various locations on the bottom floor.

The obvious solution to this problem is to connect the pier to the City of Vancouver system, which will be extended to the area next year. It is not possible at this time to provide a cost estimate for the connection as the location of the proposed lift station is not known. Prior to the hook-up, a decision should be made as to what washrooms are required on the bottom level and where they should be placed. Low use high line length systems should be vacuumed or pumped, especially in the case of docks where no head for a gravity system is available. In the case of the existing toilet set up at Pier B-C, a vacuum collection system for those toilets on the bottom level, combined with a gravity system for those on the top level, would be the most desirable combination. A "ball park" estimate for upgrading present washroom facilities on the bottom floor and collecting the waste at a point convenient for sewer discharge, would be approximately \$30,000.

In anticipation of vessels with holding tanks, waste receiving stations could be installed on the face of Pier B-C, and could also discharge into the city system. Of particular interest are the cruise ships which regularly

berth at Pier B-C which usually have the capability of discharging their wastes into a collection system. Such a collection system should be made available for their use.

(e) National Harbours Board Fishermans Terminal

The National Harbours Board Fishermans Terminal is located on the south side of False Creek between the Granville and Burrard Streets bridges. The major use of the harbour is moorage for fishing craft, although pleasure craft are accommodated on a second priority basis. There are berths for approximately 500 vessels. No "live-a-boards" are permitted in the harbour.

There are at present two potential pollution problems in regard to the harbour operations; sewage discharge from vessels and oil discharge from a storm sewer draining the property. Garbage is collected in containers and there is no evidence of any problems emanating from this source. Likewise, sewage from the washroom and shower facilities provided is disposed of satisfactorily by means of a lift station and force main to a City of Vancouver sewer.

The oil discharge from the storm sewer is a case of poor housekeeping and can easily be stopped. Oil collection facilities are provided at the site and are probably used by most individuals. Evidence exists, however, of oil dumping at the far north end of the sheds and this oil has been observed to cause oil slicks at the point of discharge into False Creek (far north end of property). The answer to this problem is removal of contaminated fill from the area in question (1-2 yards of material), and to ensure people use the oil storage container provided.

The question of sewage discharge from the vessels is somewhat more complicated. Although toilets and washrooms are

provided for use, there is the possibility that people working on their vessels will utilize the vessel head rather than walk to the main facilities. There is no economical way of preventing this discharge as none of the fish boats have holding tanks. Also, there is some question as to whether or not the discharge is at all significant. Numerous visits to the facility indicate that usually 50 people or less are at work on their vessels at any given time and of these, a certain percentage probably use the onshore toilets. Therefore, it would be expected that the pollution from the source would be slight. A sampling program undertaken in September and October indicated that although there is evidence of fecal contamination in the vicinity of False Creek Fishermans Terminal, this evidence does not necessarily indicate that the pollution is due to terminal activity. There are two other sources of fecal contamination that could contribute to the counts found in the terminal area. These are:

1. The water east of Cambie Bridge.
2. A City of Vancouver outfall that discharges storm flow near False Creek Fishermans Terminal.

Counts in the area east of Cambie Bridge are 100 to 1000 times those found in the terminal area. Even slight tidal mixing of this water with that near the mouth of False Creek would cause high counts in the latter area. The second source identified is a storm outlet discharging immediately to the north of F.C.F.T. The count in the water discharging from this outfall, although visually small in quantity, had bacterial counts one hundred times that of the values around the terminal, thereby further masking any effect the terminal activity is having on False Creek receiving water. Basically, all that can be said with the present information is that the Fishermans Terminal discharges, if any, are very difficult to assess

because of high background counts from other sources. It would be possible to obtain a more definite answer with exhaustive studies, but the exercise would not be justified at this time in view of the fact that much larger and more definite sources of pollution exist.

Provision should be made for evacuation of pleasure boat holding tanks and subsequent pumping of waste to a city sewer. This can be accomplished by means of a pump on the dock or a vacuum evacuation system. The latter is preferred for several reasons:

1. less odour and mess;
2. easier to maintain in a low use, high line length situation;
3. no danger of damaged lines leaking sewage into water.

6. LOG DEBRIS DISPOSAL

For the past number of years, National Harbours Board has been collecting floating debris from the harbour and storing it at Maplewood Mud Flats. It is estimated that there are now 100 sections of wood (1 section = 1600 cu.ft.) stored in the Mud Flats area. As there are problems associated with the storage of wood at the present site (from time to time passing freighters disturb the area with their wakes, releasing the logs back into the harbour area) and, because the Dept. of Fisheries objects to land filling the logs at the present location, EPS looked into the possibilities of disposing of the logs by other methods.

Linked with the problem of disposing of the present stockpile is the problem of disposing of the yearly volume that enters harbour waters. This problem is common to a number of municipalities and government agencies and so will be discussed in relation to a comprehensive wide-ranging program.

(a) Alternatives for Disposal

The three alternatives for disposal to be discussed are:

1. on-site incineration utilizing a pit burner
2. off-site open burning (out of GVRD)
3. off-site disposal in conjunction with others with same problem

(b) Discussion of Alternatives

1. On-site pit incineration:

The alternative of on-site pit incineration is not a viable one due to the problems with air pollution in the Burrard Inlet area. A burner on site has been operated in the past but was shut down by the GVRD due to smoke and flyash emission.

2. Off-site open burning:

This alternative would be accomplished by transporting the logs into Georgia Strait and burning them without the benefit of mechanical burning equipment. Cost for such an operation is estimated to be approximately \$500/section for each of the estimated 100 sections at the site.

3. Off-site disposal in conjunction with others:

Conceivably, the most desirable means of disposal would be through a coordinated program with municipalities, logging companies, parks boards, and others. As the log debris problem is a widespread one, it seems logical that the most benefits from recovery, chipping, wood recovery, incineration and ash disposal would accrue from a larger more organized operation.

There is a debris committee that has been active for some time now looking into the overall wood debris disposal problem and National Harbours Board forms part of this board. It is recommended, therefore, that the National Harbours Board disposal problem be studied in conjunction with the overall problem faced by the debris committee. This would mean, as a first step, making a contribution towards an overall study of the disposal situation as and when required. If a central disposal facility can be set up, this facility would take care of the existing and the ongoing log disposal requirements.

(c) National Harbours Board Debris

1. Already accumulated in North Vancouver are 100 sections of wood debris.
2. The Fraser River is the source of about 70% of the coastal debris of the lower mainland. Control of Fraser River debris is to be increased.

Assuming,

1. Fraser River debris can be reduced to 20% of the total; and the other debris cannot
2. That the 100 sections represents 3 years accumulation

Then,

We have to dispose of an initial 100 sections, or
4000 tons *

Alternative Solution #1:

Scow mounted pit burner

24' burner capacity at 300 lb/ft/hr = 3.6 tons/hour

∴ combustion time:

	<u>Initial</u>	<u>Annual</u>
total hours	1100	222
total days at 8 hrs.	140	28

* Assuming 1 section = 1600 cu.ft. SWE
1 cu.ft. = 50 lbs.

7. CONCLUSIONS

- (a) In general, private industries in the harbour area comply with local, regional and provincial regulations with respect to their waste discharges. There are no serious environmental discharges from this sector.
- (b) There are several National Harbours Board operated facilities that require effluent upgrading. These are North Lynn Marine Properties, Campbell Avenue Fishermans Wharf, and Pier B-C. Requirements for these installations are as follows:
1. North Lynn Marine Properties requires a new collection system (for human waste) discharging to North Vancouver sewer system. A cost estimate for this work is \$105,000. Canada Tungsten, presently discharging to the North Lynn system, should be required to upgrade its effluent quality to at least provincial standards and suitably monitor its waste discharge on a regular basis. Depending on the final scheme chosen for the Canada Tungsten discharge, National Harbours Board may have to be part of the administration of pollution control at North Lynn.
 2. Campbell Avenue Fishermans Wharf requires immediate upgrading of the waste collection facilities. Floor drains collecting fish offal and process water should be connected to the harbour sewer interceptor via a screen. The screen will serve to remove the larger fish remains from the process water. Cost for this system is estimated at \$200,000.

3. Pier B-C requires a connection to the City of Vancouver sewer system when such a system comes available in the area in the near future.
- (c) National Harbour Board Fishermans Terminal was judged to have little impact on the already polluted waters of False Creek. In future, a collection system for evacuating vessel holding tanks may be required.
 - (d) Commercial vessels and their related activities have surprisingly little impact on the harbour waters and their usage. No oil is allowed to be discharged from the larger vessels (very small local spills from small vessels can be observed), garbage picked up from the ships on a regular basis and sewage, although discharged to the harbour waters, does not affect the use made of the inner harbour water. There is the possibility that ships at anchor off Kitsilano affect the water quality of the beaches in the area.
 - (e) The handling and disposal facilities for solid wastes of international origin will have to be improved in accordance with proposed Agriculture Canada regulations that will be promulgated in the near future. A study encompassing the international waste disposal from all harbour regions in the Vancouver area should be undertaken so that a base for designing disposal facilities can be determined.
 - (f) A solution to the log debris disposal problem should be sought through the existing log debris committee. Burning or landfilling on-site are not suitable alternatives.

8. RECOMMENDATIONS

- (a) Process water from Campbell Avenue Fishermans Wharf

be discharged to the City of Vancouver sewer at the earliest possible date.

- (b) A new sewage collection system to be installed at North Lynn Marine Properties. Discharge from the proposed system is to the North Vancouver sewer.
- (c) Canada Tungsten Ltd., on North Lynn Marine Properties should take steps to upgrade their effluent quality.
- (d) Pier B-C be connected to the City of Vancouver sewer at such time that it becomes available.
- (e) A study be made of suitable disposal methods of international garbage. This study should be undertaken in cooperation with the Fraser River Harbour Commission.
- (f) A solution to the log debris disposal problem be sought through the existing log debris disposal committee.

APPENDIX

HARBOUR ACTIVITIES AND DISCHARGES BY LESSEES

VESSEL LOADING AND UNLOADING

LESSEE	LEASE TYPE	ACTIVITY	LIQUID DISCHARGE	AIR DISCHARGE	SOLID WASTE DISCHARGE	COMMENTS
CPR Pier B.C.	S, L, W,	Unloading Vessels (Passenger & freight) General Offices	1) Sewage to harbour-80 people 2) Associated Vessel waste to	-- harbour	*	Van. City sewer is to be extended to area 1976.
United Grain Growers Ltd.	L, W,	Grain Loading	On sewer	Surveyed by GVRD	*	
Vanterm	L	Container terminal	To be connected to sewer	--	*	Under construction
Western Pool Terminals	L, W,		On sewer	--	*	
Alberta Pacific Grain Co.	L		On sewer	Surveyed by GVRD	*	

LEGEND:

- No discharge
- * Regular pick-up of refuse
- L Land
- W Waterlot
- S Structure

VESSEL LOADING AND UNLOADING

LESSEE	LEASE TYPE	ACTIVITY	LIQUID DISCHARGE	AIR DISCHARGE	SOLID WASTE DISCHARGE	COMMENTS
Northland Shipping (1962) Ltd.	L, W.		To be connected to sewer	--	*	
Terminal Dock Ltd.	L, W,	Concentrate handling	Septic tank	--	* Nickel sulphite spilled on premises	Possibility of Nickel sulphite spills to harbour
Alberta Wheatpool Ltd.	L, W,	Grain Loading	To sewer	Surveyed by GVRD	* Grain spillage washed to harbour	
Seabord Shipping	L	Lumber loading	To sewer	--	*	
Neptune Coal Ltd.	L, W,	Bulk material loading, coal Concentrate, Potash, others	To sewer except machine shop drains via sump. Leaching problem?	Applied to GVRD. Sprinklers for dust control	*	Possible leaching of metal concent through fill

LEGEND:

- No discharge
- * Regular pick-up of refuse
- L Land
- W Waterlot
- S Structure

VESSEL LOADING AND UNLOADING

LESSEE	LEASE TYPE	ACTIVITY	LIQUID DISCHARGE	AIR DISCHARGE	SOLID WASTE DISCHARGE	COMMENTS
Saskatchewan Wheat Pool	L, W,	Grain Loading	To sewer	Surveyed by GVRD	*	
Burrard Terminals	L, W,	Grain Loading	To sewer	Surveyed by GVRD	*	
British Yukon Navigation Ltd.	L, W,	Concentrate Loading	Applied for sewer connection	--	*	Some house-keeping problems
Cassiar Asbestos Ltd.	L, W,	Asbestos Loading	On sewer	--	*	

LEGEND:

- No discharge
- * Regular pick-up of refuse
- L Land
- W Waterlot
- S Structure

VESSEL BERTHING (WORK AND PLEASURE BOATS)

LESSEE	LEASE TYPE	ACTIVITY	LIQUID DISCHARGE	AIR DISCHARGE	SOLID WASTE DISCHARGE	COMMENTS
Weldwood Transportation Ltd.	W, S,	Vessel berthing Office space	Oil slicks from vessels Sewage to septic tank, 10 people	--	*	
Rivtow Straits Ltd.	L, W,	Vessel Berthing	Septic tank	--	*	
Rivtow Straits Ltd. (North Van)	W	Barge moorage		--		
Gulf of Georgia Towing (2 locations)	W	Barge moorage		--		
Seaspan International Ltd.	W	Barge moorage		--		

LEGEND:

- No discharge
- * Regular pick-up of refuse
- L Land
- W Waterlot
- S Structure

VESSEL SUPPORT INDUSTRIES (REPAIR)

LESSEE	LEASE TYPE	ACTIVITY	LIQUID DISCHARGE	AIR DISCHARGE	SOLID WASTE DISCHARGE	COMMENTS
B.C. Marine Shipbuilders Ltd.	L, W,	Ship Building and repair	on sewer	Spray painting operations	Recycling of steel *	Housekeeping questionable oil and solid waste
Sterling Shipyards Ltd.	L, W,	Ship building and repair	Septic tank	Spray painting operations	Recycling of steel *	Housekeeping poor. Oil washed to harbour
Burrard Drydock	L, W,	Ship building Repair	to sewer	Spray painting operations Warning signs erected	Recycling of steel *	Good housekeeping
Vancouver Shipyards Ltd.	W	Ship building Repair	to sewer	Spray painting operations Warning signs erected	Recycling of steel *	
McKenzie Barge and Marine Ways	W	Ship building Repair	to sewer	Spray painting operations Warning signs erected	Recycling of steel *	

LEGEND:

- No discharge
- * Regular pick-up of refuse
- L Land
- W Waterlot
- S Structure

VESSEL SUPPORT INDUSTRIES

LESSEE	LEASE TYPE	ACTIVITY	LIQUID DISCHARGE	AIR DISCHARGE	SOLID WASTE DISCHARGE	COMMENTS
Matsumoto Shipyards	W	Ship building	on sewer	Spray paint	Recycling of steel *	
Bel-Aire Shipyard Ltd.	W	Ship building	on sewer	Spray paint	Recycling of steel *	

LEGEND:

- No discharge
- * Regular pick-up of refuse
- L Land
- W Waterlot
- S Structure

OIL DISTRIBUTERS

LESSEE	LEASE TYPE	ACTIVITY	LIQUID DISCHARGE	AIR DISCHARGE	SOLID WASTE DISCHARGE	COMMENTS
Standard Oil of B.C. Ltd.	W	Floating Service Station	Sewage to Harb. via Septic tank Minor oil spills washed to Harb. with detergent	--	Garbage to landfill	
Home Oil Distributors Ltd.	W			--		
Imperial Oil Ltd.	W	Floating Service Station	"	--	Garbage to landfill	
Shell Canada Ltd.				--		
Texaco Canada Ltd.	W			--		

LEGEND:

- No discharge
- * Regular pick-up of refuse
- L Land
- W Waterlot
- S Structure

FISH HANDLING - PROCESSING

LESSEE	LEASE TYPE	ACTIVITY	LIQUID DISCHARGE	AIR DISCHARGE	SOLID WASTE DISCHARGE	COMMENTS
Babcock Fisheries (N. Van. Cold Storage)	L, W,	Cold Storage		--		
Canadian Fishing Co., Ltd.	L, W, S,	Fish canning	Process waste to harb. PCB PE 1813 RE1864 EPS4748-37/C440	--		To connect to city sewer in 1976
Campbell Ave. Fisherman's Wharf	S	Fish processing Retail sales	Process waste to harbour EPS 4748-37/B 430-8 PCB CE	--		Requires immediate attention
B.C. Ice and Cold Storage	L, W,	Fish processing & storage Rents space to other companies	3487 Cooling water to harbour. Waste to screen, then sewer	--		
Vancouver Marine Leaseholds Ltd.	L, W,	Several, fish process. office space, resturant	Connected to sewer	--		

LEGEND:

- No discharge
- * Regular pick-up of refuse
- L Land
- W Waterlot
- S Structure

FISH HANDLING AND PROCESSING

LESSEE	LEASE TYPE	ACTIVITY	LIQUID DISCHARGE	AIR DISCHARGE	SOLID WASTE DISCHARGE	COMMENTS
Seafood Products Ltd.	L, W	Fish Processing	Floor drains to rotary screen, then sewer. (in NC process)	--		
Prince Rupert Fisherman's Co-op	L, W,	Fish Processing	Connection to city sewer immanent	--		

LEGEND:

- No discharge
- * Regular pick-up of refuse
- L Land
- W Waterlot
- S Structure

GENERAL INDUSTRY

LESSEE	LEASE TYPE	ACTIVITY	LIQUID DISCHARGE	AIR DISCHARGE	SOLID WASTE DISCHARGE	COMMENTS
Newport Diving and Marine Contracting Ltd.	L	Storage mainly Low level of activity	Assumed to harbour about 5 people			
Fleck Bros. Ltd.	L, S,	Warehouse and Wholesale Sales	On city sewer			
Landex Modular Structures	L, S,	Carpentry work, Pre-fab homes	Septic tank about 10 people		Landfill	
Columbia Containers Ltd.	L, W,	Bulk loading of grain into containers	to sewer	Dust control equipment installed		

LEGEND:

- No discharge
- * Regular pick-up of refuse
- L Land
- W Waterlot
- S Structure

GENERAL INDUSTRY

LESSEE	LEASE TYPE	ACTIVITY	LIQUID DISCHARGE	AIR DISCHARGE	SOLID WASTE DISCHARGE	COMMENTS
B.C. Sugar Refining Co. Ltd.	W	Sugar Refining		Registered GVRD		
Buckerfields	L, W,	Fertilizer and Feed handling Storage Office space	Discharge to harbour	Registered GVRD		
West Coast Reduction	L	Reduction of waste products to fats	to sewer	Applied for GVRD permit		
Westroc Industries Ltd.	L, W,	Drywall Manufacturers	to sewer			
Dillingham Corp. of Canada	L, W,	Construction	To sewer drainage from shop floors to sumps, then		International Garbage stored on site.	

harbour discharge

LEGEND:

- No discharge
- * Regular pick-up of refuse
- L Land
- W Waterlot
- S Structure

GENERAL INDUSTRIES

LESSEE	LEASE TYPE	ACTIVITY	LIQUID DISCHARGE	AIR DISCHARGE	SOLID WASTE DISCHARGE	COMMENTS
Accurate Ornamental Iron	L	Ironworking (1 person)	Septic tank			
Mobile Auto Services	L	Auto repair (2 persons)				
Capilano Log Storage	W	Log Booming				
North Shore Disposal Services	L	Disposal of refuse in pit incinerator		Permit applic turned down by GVRD		
Canadian Occidental Petroleum	L, W,					Dealt with in length with other agencies

LEGEND:

- No discharge
- * Regular pick-up of refuse
- L Land
- W Waterlot
- S Structure

GENERAL INDUSTRY

LESSEE	LEASE TYPE	ACTIVITY	LIQUID DISCHARGE	AIR DISCHARGE	SOLID WASTE DISCHARGE	COMMENTS
Horne Bros. Shingle Mill	L, W,	Shingle Manufacturer	to sewer	GVRD Permit		
Viking Timber Ltd.	W	Log booming				
L & K Lumber Ltd.	W	Log booming				
Lengert Equipment (intercity haulage)	L	Truck storage (chemical haulage)	Truck washings to holding tank-septic tank			
Erco Industries Ltd.	W	Chemical Manufacture				

LEGEND:

- No discharge
- * Regular pick-up of refuse
- L Land
- W Waterlot
- S Structure

MISCELLANEOUS

LESSEE	LEASE TYPE	ACTIVITY	LIQUID DISCHARGE	AIR DISCHARGE	SOLID WASTE DISCHARGE	COMMENTS
Vancouver Rowing Club	W	Recreational	Assumed to harbour. PCB reg.no. 17-15-621		Landfill	Will eventually connect to sewer when B.Point Interceptor is reversed to flow to city system
Harbour Park Developments	L, W,	Not developed				
Marwest Hotel Company Ltd.	L, W,	Hotel complex (Bayshore Inn)	on city of Vancouver sewer		Landfill	
Embyr Enterprises	L, W,	Very little activity, unsure of nature of business	Assumed to harbour of business			No sewer available
Western Water Terminals	L, W,	Little activity	Portable toilets in use			

LEGEND:

- No discharge
- * Regular pick-up of refuse
- L Land
- W Waterlot
- S Structure

MISCELLANEOUS

LESSEE	LEASE TYPE	ACTIVITY	LIQUID DISCHARGE	AIR DISCHARGE	SOLID WASTE DISCHARGE	COMMENTS
Imperial Parking Ltd.	L	Parking Area				
Francis Millard Co.	W, S,	None				
Direct Delivery Service Ltd.	S	None				
W. Kleaman Marine Service Ltd.	W, S,	Low use	to septic tank			
Frank Mansuoto	S	Storage	None			

LEGEND:

- No discharge
- * Regular pick-up of refuse
- L Land
- W Waterlot
- S Structure

MISCELLANEOUS

LESSEE	LEASE TYPE	ACTIVITY	LIQUID DISCHARGE	AIR DISCHARGE	SOLID WASTE DISCHARGE	COMMENTS
Hatco Marine Services Ltd.	W, S,		Septic tank about 5 people			
Kingcome Navigation Ltd.			connected to sewer			
Empire Stevedoring Co. Ltd.	L	Stevedoring Equipment Storage Repair	Possible discharge of oil to harbour Housekeeping poor			
Fisheries Research Board	S	Office	Connected to sewer			
Missions to Seamen	L, S,		Septic tank			

LEGEND:

- No discharge
- * Regular pick-up of refuse
- L Land
- W Waterlot
- S Structure

MISCELLANEOUS

LESSEE	LEASE TYPE	ACTIVITY	LIQUID DISCHARGE	AIR DISCHARGE	SOLID WASTE DISCHARGE	COMMENTS
City of Vancouver	L, W,	Fireboad tie-up area	To septic tank or harbour about 5 people			
Bristol-Meyers of Canada Ltd.	L		on sewer			Relocating
United Cartage Ltd.	L	Trucking	On sewer Oil from engine maintenance may enter harbour			
Jay Lumber Co. Ltd.	L	Lumber storage	Septic tank			
James Casino Contracting	L	Equipment Storage	Septic tank			

LEGEND:

- No discharge
- * Regular pick-up of refuse
- L Land
- W Waterlot
- S Structure

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