

Every day, 100 million litres of raw, untreated sewage enter the waters of Halifax Harbour — everything that's flushed down toilets, dumped down household sinks or washed into street gutters ends up in the same harbour where fish, lobster, and other marine wildlife live. The same harbour people use for recreation and to import and export goods.

"Metro area residents have said the pollution of Halifax Harbour must be stopped," says Paul Calda, President of Halifax Harbour Cleanup Inc. (HHCI), the crown corporation established to manage the design and construction of a regional sewage collection and treatment system for Metro.

While there is overwhelming consensus that something needs to be done, there has been 20 years of heated debate over precisely what that should be. After a number of false starts, culminating in the aborted sewage treatment project slated for Sandwich Point in the late 1980's, the Province of Nova Scotia appointed a task force of members of the scientific, business and residential communities to study harbour uses and set water quality objectives that would meet environmental and community needs. In August 1990, the Halifax Harbour Task Force, chaired by oceanographer Dr. Robert Fournier, delivered a report with 18 recommendations for action. These became the building blocks on which today's proposed project is based.

HHCI Puts Project in Motion

Run by a nine-member Board of Directors and operating with a staff of six and a network of local consultants, HHCI is responsible for implementing those recommendations. "Since our mandate is to design and build a regional sewage collection and treatment system," says Mr. Calda, "that means we must connect the existing outfalls around the harbour shoreline and take all the sewage to a single treatment plant."

Approximately 18 kilometres of large diameter sewers and tunnels will be constructed to intercept all the untreated sewage now flowing into the harbour. The sewage will flow by gravity to a regional sewage treatment plant where an underground pumping station will pump it into the plant for primary treatment. After treatment, outflow from the plant will be disinfected before being discharged into the Inner Harbour. The project will be designed to initially accommodate approximately 136 million litres of sewage a day, and will have a life expectancy of at least 100 years.

HHCI Recommends Island Site

The selection of a site for the sewage treatment plant was probably the most difficult and most controversial phase of the project. While everyone can agree that the plant is needed and that we should treat the sewage in our own backyard, fears over the eventual appearance, odour and size of the facility made finding a suitable location extremely difficult.

After public consultation and extensive evaluation of the sites proposed by the Halifax Harbour Task Force, HHCI recommended that an island be constructed at Ives Cove, off the north end of McNabs Island.

Blueprint for a Cleaner Harbour

Metro residents say harbour pollution must stop

Architect Peter Connor, of Metro Engineering Inc. in Halifax, led a team comprised of engineers, a landscape architect and an environmental designer that produced the first comprehensive document on the site as well as plant requirements for the Harbour Cleanup Project.

The concept under consideration is a 9.3-hectare, infilled island. The channel separating it from McNabs will be 30 metres wide at its narrowest point and 75 metres at its widest, and it will be designed to encourage the development of marine life and vegetation in the channel. In order to create this channel, a small gravel spit extending from Ives Point will have to be removed.

The infilled island will be naturally landscaped with trees and shrubbery and contoured with low, undulating hills to emulate the physical characteristics and vegetation of

McNabs. Gently curved, green roofs will be constructed so that the plant will reflect the rounded curves of the island. Both the island and the plant will blend in with the existing scenery in Halifax Harbour.

"We were initially looking at developing several different plant buildings but realized we would be more efficient in building form and site usage if we consolidated the plant facilities into one complex," explains Mr. Connor. "This will reduce the island site to the smallest possible size, allowing it to become an aesthetically pleasing, yet functional addition to Halifax Harbour."

Environmental Design Important to Island Concept

In addition, construction of the proposed island site has been carefully considered to minimize any negative environmental impacts. For example, the island's perimeter will be shaped to allow for specially designed underwater slopes. These will provide an enhanced habitat for marine life. Part of the island's shoreline can also be constructed to promote the growth of saltmarsh plants which will attract wildlife. What's more, a fisheries habitat can be created and enhanced around the island to replace any marine environment displaced by the island infill. And the site's northwest shore will be covered with large armour stone to prevent erosion caused by waves.

A pathway will wind through the site allowing easy maintenance of island vegetation and providing public access to the part of the island reserved for future plant expansion. The shore of the island will be shaped to give visitors an enjoyable view of Halifax and Dartmouth.

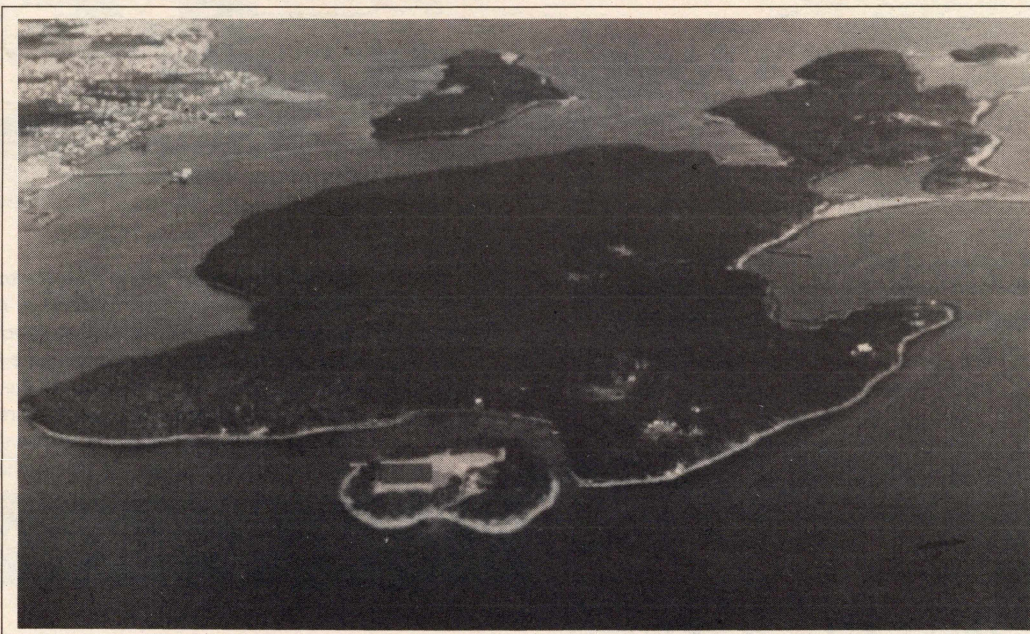
Task Force Recommends Primary Treatment

After a thorough assessment of scientific data, environmental quality objectives and information on harbour uses, the Halifax Harbour Task Force recommended that the Metro area needed primary sewage treatment.

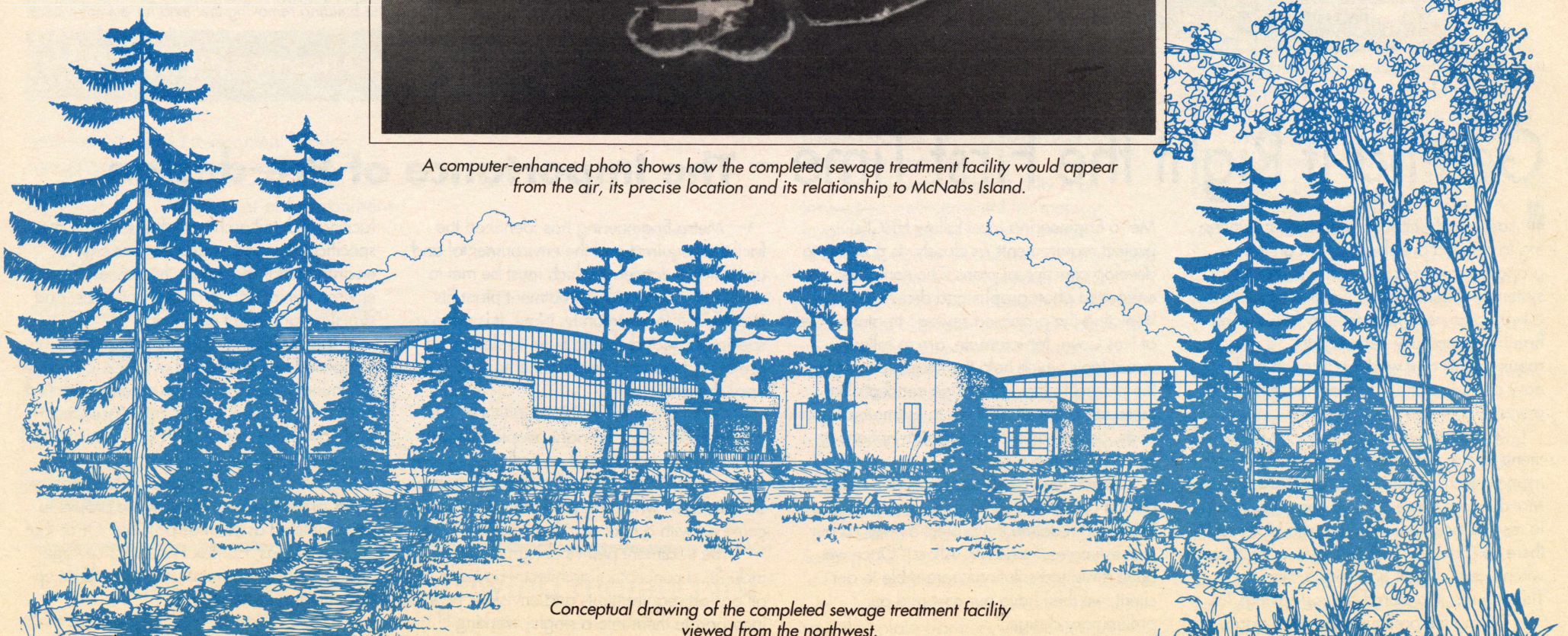
Primary sewage treatment will stop the flow of untreated raw sewage into the Halifax Harbour and allow the natural harbour environment to do the rest. But primary treatment is only part of the solution. The Task Force was careful to point out that primary treatment must go hand-in-hand with rigorous source control and monitoring programs. In other words, a fundamental commitment is needed from industry, citizens and government to stop the dumping of hazardous chemicals down sinks and toilets and into the harbour.

"Everyone must assume responsibility for reducing and managing waste water. We must learn to control the problem at its source" says Terry Simms, Senior Engineer with HHCI. "If we all take responsibility now, then maybe we won't have to repeat much of this major expenditure decades from now."

"Metro households should dispose of hazardous waste and chemicals properly, and municipalities must take a leading role in enforcing waste by-laws," says Mr. Simms. The sewage treatment system combined with responsible waste water management and the recuperative powers of nature itself, he says, will all play a role in revitalizing Halifax Harbour.



A computer-enhanced photo shows how the completed sewage treatment facility would appear from the air, its precise location and its relationship to McNabs Island.

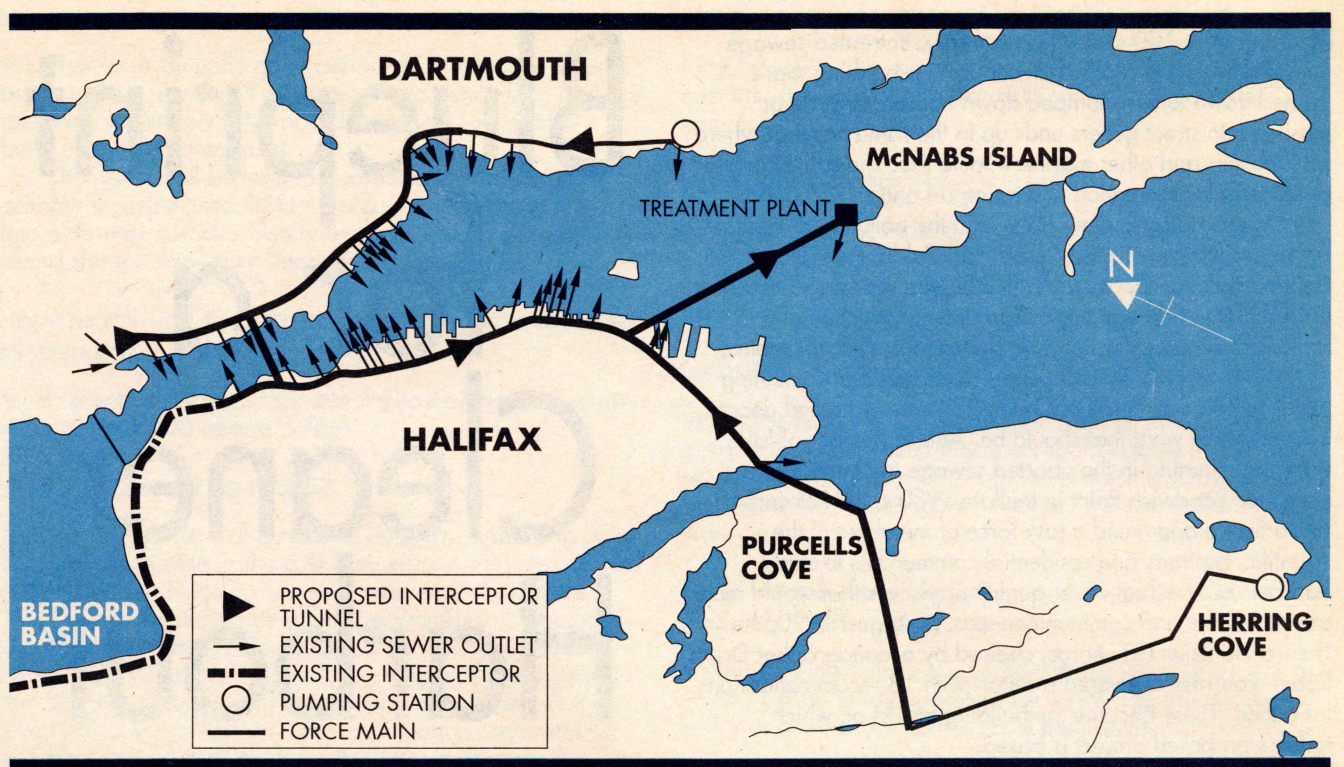


Conceptual drawing of the completed sewage treatment facility viewed from the northwest.

Harbour Cleanup Takes Shape

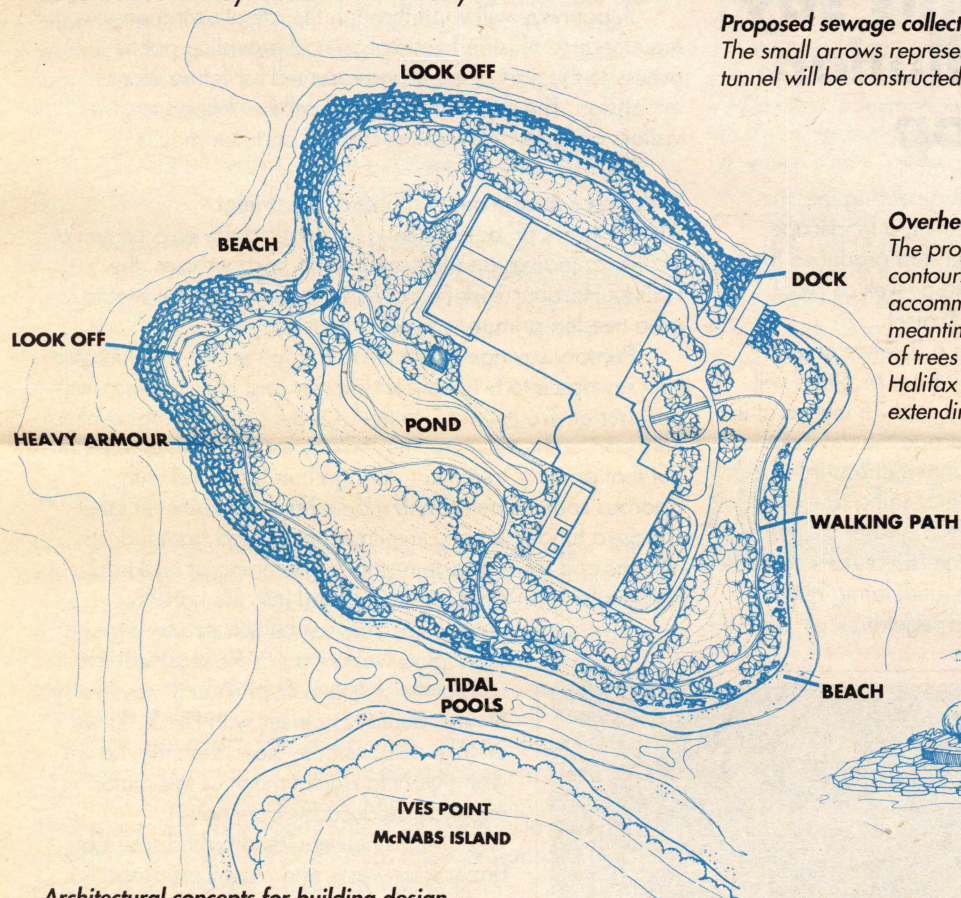
A team of local engineers, architects and environmental planners collaborated to develop the initial concepts for a sewage treatment plant that will be compatible with an island park. In the spirit of the Halifax Harbour Task Force recommendations, HHCI is planning a primary sewage treatment system that will be an integral part of the harbour environment.

Here are the challenges that the team must meet. This system must be designed to meet the needs of the community until at least the year 2041. The plant must be an attractive addition to the harbour and because it will be adjacent to an island park, it must blend in with its surroundings without detracting from the natural beauty of McNabs Island. This sewage treatment system will not be hidden in someone else's back yard but will be an integral part of the community it serves. Care must be taken throughout the design and construction phases so that we do not pass along huge operation and maintenance costs to our children and grandchildren. The site must be able to cost-effectively accommodate more advanced treatment levels should they become necessary.



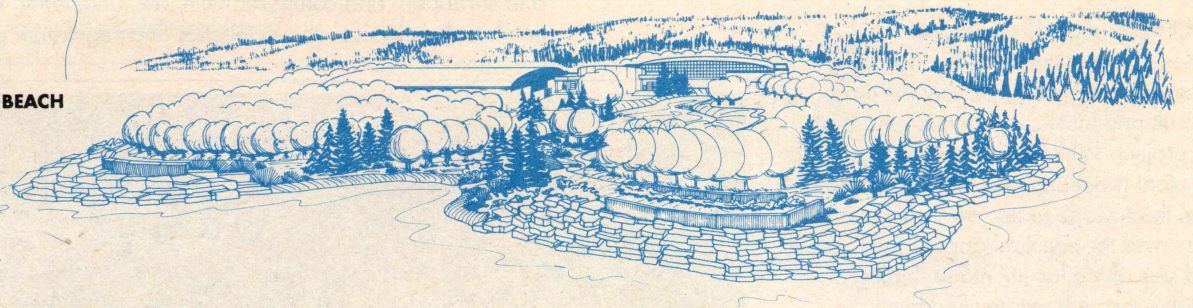
Proposed sewage collection system.

The small arrows represent the existing outlets through which 100 million litres of raw sewage flow into the harbour daily. An 18 kilometre tunnel will be constructed around the harbour to intercept the sewage and direct it to the treatment plant at Ives Cove.



Overhead view of the proposed island treatment plant concept.

The proposed island will be about 9 hectares, roughly the same area as Georges Island. It will follow the slopes and contours of McNabs Island rising approximately 12 metres above sea level. The island will be large enough to accommodate primary and eventual expansion to advanced primary treatment as well as population increases. In the meantime, architects are proposing that the unused land house a fresh water pond set into the island to permit irrigation of trees and shrubbery. In order for the island to remain within the 10 metre water depth guidelines established by the Halifax Harbour Task Force and encourage a channel where a marine habitat will be able to flourish, a gravel spit extending from the end of Ives Point will be removed.

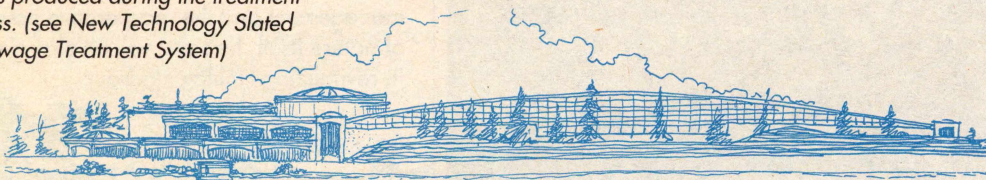


Aerial view of the island's northwest side.

Armour stone, partially covered by trees and shrubbery, and the island's shape will prevent erosion and allow the island to withstand storm waves of up to four metres. The plant will be nestled among the trees. The roof, which will extend five metres above the tree line, will carry on the natural curved shape of the island forms in the harbour. Environmental standards require that exhaust coming from the oil-from-sludge facility go through a stringent purification process. Cooled and purified air will be vented through the side of the building removing the need for a smoke stack.

Architectural concepts for building design.

The building will be designed to conform to the natural contours of the islands within the Inner Harbour. The building configuration will include the treatment facility, an administration building and an oil-from-sludge processing facility. The plant will be completely enclosed thereby containing any odours produced during the treatment process. (see New Technology Slated for Sewage Treatment System)



Getting it Right the First Time – The Importance of Pre-design

Last March, HHCI hired Metro Engineering to conduct pre-design work on the proposed sewage collection and treatment system for Halifax Harbour. Since that time, a team of experts from the local consulting firm has been busy defining HHCI's project requirements and working through preliminary design solutions to meet those requirements.

"Pre-design is one of the most vital elements in the realization of this sewage treatment project," explains Mr. Cyril Allan, Project Manager for Metro Engineering. "It allows us to resolve most design issues with HHCI so there will be no hidden surprises or problems when actual design and construction begin. This can result in incredible cost savings."

During the preliminary design stage,

Metro Engineering must follow HHCI's project requirements as closely as possible to develop conceptual plans. The computer-enhanced photographs and drawings depicting the proposed sewage treatment site at Ives Cove, for example, are excellent visual tools which help the Metro team bring the project to life. Pre-design concepts like these allow the consultants to estimate project costs, as well as evaluate design options to help reduce those costs.

"Each time HHCI approves one of the design options or alternatives, we must go back and redefine the project as well as our cost estimates," says Mr. Allan. "Once we have designed solutions agreeable to our client, we then have our cost and our preliminary design."

Metro Engineering has identified the facilities required and the environmental and operational concerns which must be met to ensure that the sewage treatment plant fits into the Metro community. Now, it is up to a specially selected design team to define the project criteria and develop the final preliminary designs.

"With a project of this magnitude, it is important to select the right people to head various departments and co-ordinate the pre-design team," explains Mr. Allan. "They are all specialists who must pool their expertise to come up with a final working solution."

The treatment plant's design team includes a conceptual architect who looks at all project requirements and envisions how to incorporate them into a single, working

facility; a detail architect who develops detail specifications and project dimensions; an environmental specialist who studies marine, environmental and terrestrial concerns; and structural and plant engineers.

The pre-design stage is scheduled to be completed before the end of 1992. Once the preliminary design and site recommendation have undergone environmental assessment and have been approved, HHCI can proceed with the final project design.

Final design and project construction will occur simultaneously to allow the project to be completed as soon as possible. Once that process begins, Halifax Harbour's sewage collection and treatment system could be up and running in six years.

Project Undergoes Environmental Assessment

■ HHCI's mandate clearly identifies two major challenges — to design and build a sewage collection and treatment system for Halifax Harbour, and to do it with as little negative impact as possible to the existing environment.

To help meet these challenges, HHCI hired a local consulting firm last June to assess the Cleanup Project's potential impacts and to recommend measures which would reduce these impacts during project construction and operation.

Jacques Whitford Environment Limited has commissioned 23 component studies which will examine many aspects of the proposed sewage treatment system. Using extensive research methods, including field studies, these consultants are defining and evaluating biophysical, socioeconomic, and heritage resource factors. The data collected will assist in the treatment project's environmental assessment.

The ongoing research will encompass studies of air quality, water quality and wildlife; studies of traffic patterns, noise, odour, and the visual and recreational environment; and studies of the tourism and fisheries industries. Archaeological studies of Halifax, Dartmouth, McNabs Island and the surrounding marine region have already been completed. Jacques Whitford is using the expertise of other local consultants — marine and terrestrial biologists, engineers, physical oceanographers, chemists and landscape architects — and will include their findings in a final report for the Joint Federal-Provincial Environmental Assessment Review Panel.

"The sewage treatment system should ultimately improve the environment but we must know what the existing conditions are to measure the potential impact," says Earle Hickey, Assessment Manager for Jacques Whitford. "These studies give us a picture of what is happening now. For example, we will be able to determine the type of construction procedures to be used in the area. The environmental assessment team can then predict impacts, and see where we can avoid or minimize any which are potentially adverse."

According to Mr. Hickey, most environmental assessments are conducted on industrial projects which have the potential to produce adverse impacts. But impact assessment of the proposed sewage treatment system is unique, he says, because the project itself will help alleviate many problems associated with the sewage flowing into Halifax Harbour.

The benefits of early intervention are twofold. "Impact assessment is usually done

Inside View of Primary Treatment

1 Pumping Station

The raw sewage which currently runs directly into the harbour will flow by gravity through large diameter sewers and interceptor tunnels which will circle the harbour to the primary treatment plant. It will then be pumped up from the tunnels into the plant.

2 Screening and Grit Removal

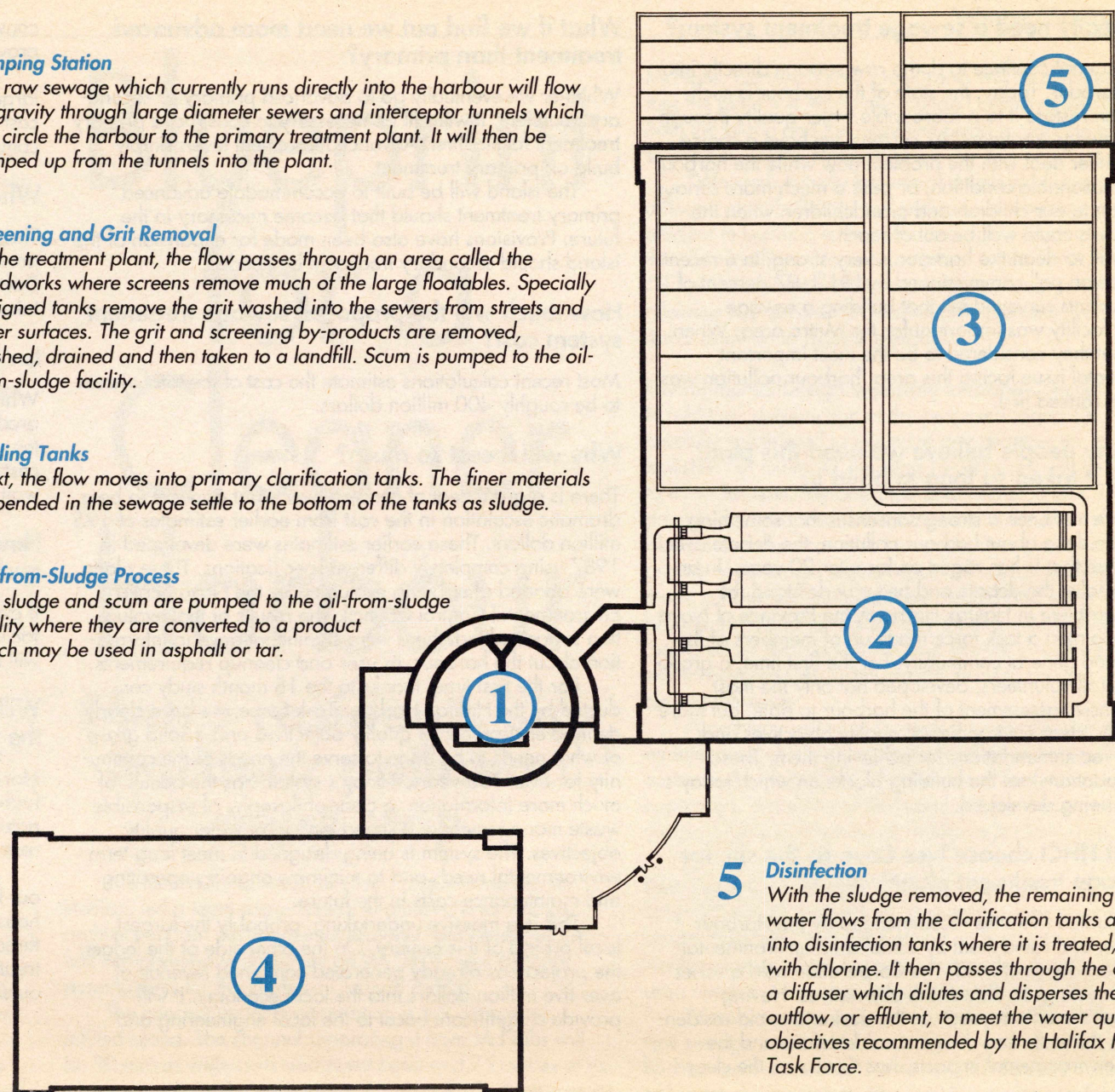
At the treatment plant, the flow passes through an area called the headworks where screens remove much of the large floatables. Specially designed tanks remove the grit washed into the sewers from streets and other surfaces. The grit and screening by-products are removed, washed, drained and then taken to a landfill. Scum is pumped to the oil-from-sludge facility.

3 Settling Tanks

Next, the flow moves into primary clarification tanks. The finer materials suspended in the sewage settle to the bottom of the tanks as sludge.

4 Oil-from-Sludge Process

The sludge and scum are pumped to the oil-from-sludge facility where they are converted to a product which may be used in asphalt or tar.



5 Disinfection

With the sludge removed, the remaining waste water flows from the clarification tanks and passes into disinfection tanks where it is treated, usually with chlorine. It then passes through the outfall to a diffuser which dilutes and disperses the treated outflow, or effluent, to meet the water quality objectives recommended by the Halifax Harbour Task Force.

in concert with early design so that modifications can be achieved quickly and easily," Mr. Hickey says. "Early impact assessment not only minimizes cost, it also provides an opportunity to alter plans before irrevocable decisions are made."

The consulting firm's report will be submitted to the Environmental Assessment Review Panel this summer. As part of the environmental assessment review process, the public will be invited to review and comment on the report — public hearings are planned for this November. If no further studies or investigations are required, the panel will submit a report along with recommendations to the federal and provincial Ministers of the Environment in March of 1993.*

New Technology Slated for Sewage Treatment System

■ Although the sewage treatment plant has yet to be finally designed, Metro Engineering, HHCI's pre-design consultant, has already developed a clear concept of what the facility **must** have if it is to properly service the Metro community.

And it is exactly this foresight which, in Project Manager Cyril Allan's view, will catapult the cleanup of Halifax Harbour into the world's limelight as a leading environmental project.

"We will be incorporating two new technologies into the design of the treatment facility," explains Mr. Allan. "These are an oil-from-sludge facility and innovative plate clarifiers. The technology we propose places us at the leading edge of environmental management."

The oil-from-sludge facility is an innovative environmental technology involving the conversion of domestic sewage sludge to oil. Although experts say this conversion will not produce great amounts of oil, it will substantially reduce the amount of sludge and the problem and cost of sludge disposal by conventional means. A pilot project has been under study in Burlington, Ontario, since 1982, and the sewage treatment plant at Highland Creek in Scarborough, Ontario, is scheduled to install a full-size operation this summer. HHCI will be closely monitoring the operations at that plant.

Treatment technology involving Plate Settling Clarifiers has been used extensively in France and has been installed in Quebec City's two new treatment plants. Mr. Allan says that plate clarifiers use slanted plates

which accelerate the settling process and are smaller in size than standard treatment clarifiers. Because less space is required to accommodate the facilities, cost savings in site development are possible. A smaller plant can also be covered, creating a more positive visual impact.

The proposed sewage treatment plant will also have four main sections to house administration and service offices, headworks, disinfection facilities, a pumping station, maintenance garages and repair shops. The plant will also accommodate a public information centre, a cafeteria and emergency facilities should a storm prevent employees from leaving the island.

The primary treatment plant will be sized to service a population of 295,200 by the year 2,011. Expansion, when necessary, will allow for a rise in population to 428,150 and, if required, will accommodate the Eastern Passage and Mill Cove plants.

At the same time, the plant will be designed to blend in with the natural contours of the infilled island — conforming with HHCI's commitment to create an aesthetically pleasing addition to the Metro community.

"What's important to remember," says Mr. Allan, "is that this is not an industrial project, but a project that will ultimately protect and improve the environment. We have a splendid opportunity here to alleviate the sewage problem in Halifax Harbour, and at the same time build a unique facility which may become renowned as a prime example for other communities."

SUMMARY OF ENVIRONMENTAL ASSESSMENT REVIEW SCHEDULE*

Jacques Whitford Environment Limited consultants start environmental assessment	24 • Jun • 91
HHCI and N.S. Department of Environment review final report	30 • Jun • 92**
NSDOE review/accept final report	15 • Jul • 92
NSDOE technical review/recommendation	15 • Aug • 92
Public Review	15 • Aug • 92
Panel Review	20 • Oct • 92
Panel Public Hearings	25 • Nov • 92

* To obtain a copy of the full environmental assessment review schedule, or if you have questions on the process, call 424-5300.

** Dates are tentative.

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Common Questions About Harbour Cleanup

Do we really need a sewage treatment system?

Yes. We cannot continue to dump raw sewage directly into Halifax Harbour. Today, the state of the harbour is such that we can restore it to a reasonable water quality through primary sewage treatment. As citizens, we have a choice. We can either deal with the problem now while the harbour is still in reasonable condition, or pass a much more serious problem on to our children and grandchildren when the cleanup costs could well be out of reach.

The will to clean the harbour is very strong. In a recent public opinion poll commissioned by HHCI, 97 percent of Metro residents surveyed felt that building a sewage treatment facility was important for the Metro area. When asked what they considered to be the most important environmental issue facing this area, harbour pollution was most often ranked first.

If so many people believe we need this plant, why has it taken so long to build it?

While there has been a strong consensus that something needs to be done about harbour pollution, the debate over exactly what that is has raged on for over 20 years. In an effort to resolve the debate and better understand the pollution problem in Halifax Harbour, the Province of Nova Scotia appointed a task force made up of members of the scientific and general community. For the first time, a group of experts (all volunteers) developed not only the most comprehensive assessment of the harbour to date, but more importantly, clear environmental quality objectives and workable recommendations for achieving them. These recommendations are the building blocks on which today's project is being developed.

Why did HHCI choose Ives Cove as the site for the sewage treatment plant?

HHCI evaluated five sites recommended by the Harbour Task Force, and rated them by established environmental and socioeconomic criteria. The Corporation held a series of public meetings to discuss the alternatives. Having weighed all the criteria, such as the desire to avoid residential areas, the costs and design considerations and the potential environmental impacts, Ives Cove was the clear choice.

Won't this plant be an eyesore?

No. Sewage treatment plants do not need to be ugly. The island and the plant itself are being designed to co-exist with an island park. The island concept adopts the natural contours of surrounding islands and will be an attractive addition to the harbour. It is also being designed to promote the establishment of vegetation and marine life on and around its shores.

There are examples, in Canada, of sewage treatment facilities which have successfully operated adjacent to or within parks. For example, the Iona Island sewage treatment plant near Richmond, British Columbia, has been operating for many years and has been designated as one of greater Vancouver's regional district parks. It is home to birds and wildlife and a popular destination for park visitors.

What about the smell?

Odour will not be a problem. The pumping station, headworks and oil-from-sludge facility will be completely enclosed. Exhaust from the equipment will be cooled and purified to meet air quality standards. This will eliminate the need for a smokestack. Other equipment will be backed up so that treatment can continue during an unforeseen failure or scheduled maintenance shutdown.

Is primary treatment enough?

The Halifax Harbour Task Force carefully assessed scientific data, environmental quality objectives and information on harbour uses. It concluded that primary level treatment will meet the water quality guidelines it recommended for the harbour. Primary treatment will remove floatables as well as 40-60 percent of suspended solids — allowing for more efficient disinfection of the effluent.

What if we find out we need more advanced treatment than primary?

Whether we eventually go to advanced primary or secondary treatment, it will still be necessary to construct a primary treatment facility first. Advanced treatment levels simply build on primary treatment.

The island will be built to accommodate advanced primary treatment should that become necessary in the future. Provisions have also been made for expansion of the island should secondary treatment be needed.

How much will the proposed sewage treatment system cost?

Most recent calculations estimate the cost of the total system to be roughly 400 million dollars.

Why will it cost so much?

There is a great deal of concern over what appears to be a dramatic escalation in the cost from earlier estimates of 195 million dollars. These earlier estimates were developed in 1987 using completely different specifications. These plans were aborted after being evaluated by the Nova Scotia Environmental Control Council. The results of that evaluation suggested that there were significant gaps in information about the harbour, its uses and cleanup requirements.

For the first time, thanks to the 18 month study conducted by the Halifax Harbour Task Force, we have clearly defined environmental quality objectives and a solid grasp of what needs to be done to serve the needs of the community for over 100 years. Today's system has the benefit of much more information, a clear philosophy of responsible waste management and stated long term water quality objectives. The system is being designed to meet long term environmental needs and to minimize ongoing operating and maintenance costs in the future.

This is a massive undertaking, probably the largest local project of this century. On the other side of the ledger, the project has already generated combined revenue of over five million dollars into the local economy. It will provide a significant boost to the local engineering and

construction industries. Once it is in operation, it will provide 35 to 40 permanent jobs for local residents.

In comparison, the Boston Harbour Cleanup, a much larger project with a higher level of sewage treatment will cost the citizens of that area up to six billion dollars to complete.

Who will pay for this project?

The project has been funded jointly by the federal and provincial governments and the municipalities of Halifax, Dartmouth and Halifax County. The municipal share is taken from the pollution surcharge on your water bill.

Isn't it better to wait until this recession is over?

While the costs are significant, the costs of waiting are even greater. Experts predict that costs could double in another ten years and every month that the project is delayed, the cost escalates by one million dollars. We can't afford to wait.

How long before the plant is fully operational and who will run it?

If everything remains on schedule, the sewage treatment facility will be in full operation by 1999. The municipalities will then assume the operation of the treatment system.

Will this sewage treatment system really clean the harbour?

Not by itself. The sewage treatment system will stop the further pollution from raw sewage which will allow the natural currents and water action of the harbour to do the rest. This Cleanup Project, however, is the biggest step.

Sewage treatment must work along with a change in our behaviour. Hazardous chemicals from industry and households contaminate the water, damaging the fishery, threatening marine life and human health. No sewage treatment plant will solve this problem. We must solve it ourselves.

THE HARBOUR CLEANUP PROCESS*	
Halifax Harbour Task Force Report	April 1989 – August 1990
HHCI Established	July 1989
Registration for Environmental Assessment	January 1991
Pre-design of the Project	April 1991 – November 1992
Site Recommendation	May 1991
Environmental Assessment Report Published	Summer 1992
EA Review Panel Hearings	Autumn 1992
Final Decision from Ministers of Environment (Federal and Provincial)	Early 1993
Design Starts	Immediately following Ministers' decision
Construction Starts	Late 1993 or Early 1994
Plant Operation Begins	1999
* Dates are tentative and dependent upon one another in some cases.	

Like the tides, information should flow both ways to be meaningful. Call for more information or to share your ideas and concerns on issues facing the harbour cleanup.

We want to keep you informed.
For more information, call

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Record your comments and opinions on our Public Comment Line

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