

REPORT ON A HEARING  
AIRPORT HOLDING CO. LTD.  
DOMESTIC WASTEWATER TREATMENT LAGOON

THE MANITOBA CLEAN ENVIRONMENT COMMISSION

JANUARY 15, 1990

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## AIRPORT HOLDING CO. LTD.

### DOMESTIC WASTEWATER TREATMENT LAGOON

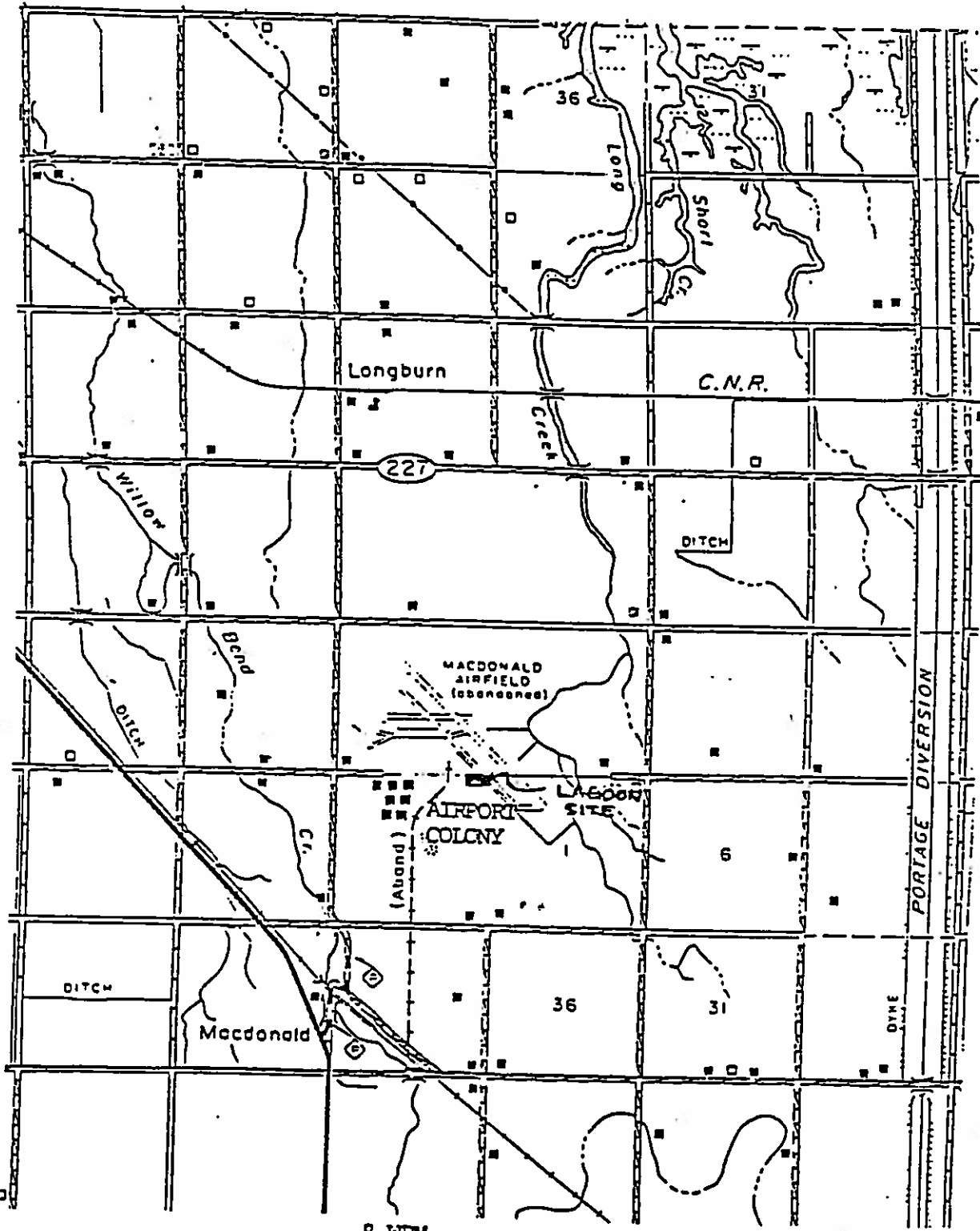
#### BACKGROUND

On behalf of the Airport Hutterite Colony, located at the abandoned MacDonald airforce training base in the R.M. of Portage la Prairie, the Manitoba Water Services Board filed a proposal for licensing under the Environment Act. The proposed development includes construction of a two-cell sewage lagoon, located on NE 2-13-8 WPM, to contain and treat domestic wastes collected from the residences of the Colony (see Figure 1). Treated effluent would be discharged twice a year (in spring and fall) to a drainage ditch flowing into Long Creek. The Colony also wants the option to apply treated effluent to agricultural land.

When the air force base at MacDonald was closed in the sixties, the mechanical wastewater treatment plant was abandoned. It is believed that the Colony continued to use the waste water collection system and one of the tanks which was a part of the treatment facility. This tank became filled with solids and now raw sewage from the Colony is being discharged to an area draining into Long Creek. Environment Department officials ordered the Colony to file the proposal, under consideration in this report, which details measures designed to rectify the problem.

Following public advertisement of the proposal by the Environment Department a number of objections were received. Accordingly, the Honourable J. Glen Cummings, Minister of the Environment, requested that the Clean Environment Commission hold a public hearing on the matter and provide him with a report and recommendations.

After giving notice, and advertising in appropriate newspapers, the Commission convened a hearing in Westbourne, Manitoba at 10:30 a.m., December 12, 1989. Commissioners in attendance at the hearing were: Mr. Stan Eagleton, Chairperson; Ms. Linda Ericsson; Ms. Donna Plant; and Mr. Maurice Blanchard.



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8 WPM

LOCATION PLAN OF AIRPORT COLONY

## SUMMARY OF PRESENTATIONS

Ms. Stella K. Fedeniuk, P.Eng. from the Manitoba Water Services Board described the proposal. The Water Services Board was asked by the Airport Colony to provide engineering and financial assistance in designing a lagoon and related works to handle their domestic wastes, and the Board is acting as the proponent on behalf of the Colony for this Licence application.

When the Colony was established in 1971 they began using parts of the water and sewer facilities installed several decades ago by the Department of National Defence when the airport was built. As noted earlier, the tank filled with solids and subsequently the Colony has been discharging untreated domestic sewage into an area draining to Long Creek. Animal wastes generated at the Colony are being handled separate from domestic wastewater.

Ms. Fedeniuk said that the treatment system being proposed by the Water Services Board would consist of a lift station, sewage force main and lagoon. The existing gravity sewer system is also in need of repair, but will be renewed through a continuing program to replace the aging clay tile pipes.

The lagoon system was designed to accommodate domestic wastes for the predicted maximum Colony population of 125 persons, so it will be oversized for some years until the population reaches this number. At present there are about 75 persons living on the Colony. Organic loading rates anticipated from a maximum population of 125 were used to determine the size of the primary cell. Sizing of the secondary cell was determined according to the predicted hydraulic loading rate for a population of 125 persons, to provide storage capacity for 200 days. To prevent seepage from the lagoon, the bottom and inside faces of dyke walls will be lined with 1 meter of low permeability clay from the site, and the clay will be compacted during construction to provide a relatively impermeable lining which will minimize the hazard to ground water pollution.

PRESENTATIONS (Cont.)

Soils at the Airport Colony were tested in the spring of 1989 to identify possible sites with suitable physical characteristics. A number of sites were found that had relatively impermeable clay sub-soils suitable for lagoon construction. There would be no danger of groundwater contamination from a lagoon at the selected site, which is at least 300 meters from the nearest residence but close enough to residences that force main construction will not be too expensive.

Potential odour problems are only expected during a 2-3 week period in the spring after ice on the lagoon melts, and any odour problems that might occur would be minimal because of the distance from the nearest residence.

It is intended that treated effluent from the secondary cell will be discharged twice annually with release on or just after May 15 and on or just before November 1st. Samples of the effluent would be taken two weeks prior to release and submitted for laboratory analysis to ensure discharges would be of the required quality. Ms. Fedeniuk said that the Manitoba Water Services Board could provide any training needed to ensure Colony representatives collect samples in conformance with guidelines.

Two options for discharge of treated effluent were proposed - release into a drainage ditch adjacent to the proposed lagoon or spreading onto agricultural land owned by the Colony. Release into the drainage ditch was the disposal method preferred by the Colony, but Ms. Fedeniuk said they also wished to retain the option to discharge onto agricultural land by spray irrigation.

The drainage ditch that would receive treated effluent empties into Long Creek which runs into Lake Manitoba. Ms. Fedeniuk had the expectation that some of the effluent would dissipate by way of evaporation and seepage in the creek bottom, and that nutrients would be taken up by plants in marshy areas along Long Creek, before reaching Lake Manitoba. Effluent applied to the land would only be applied to forage crops under regulated conditions.

PRESENTATIONS (Cont.)

Mr. William M. McMillan made a presentation to the Commission on his own behalf as a cottage owner at nearby Delta Beach and a landowner along the Creek. He briefly discussed the history of Hutterites in Manitoba and how they came to acquire the property where Airport Colony is now located.

Mr. McMillan said that the quality of water in Lake Manitoba is already being degraded by Assiniboine River floodwaters periodically entering the lake through the Portage Diversion. Whenever the Diversion is operated, debris washes up along the south shore of Lake Manitoba where 150 cottages are located at Delta Beach. He urged that nothing be permitted to enter Long Creek that might eventually flow to Lake Manitoba and add to these existing problems.

As an owner of farmland located on Long Creek downstream of Airport Colony, Mr. McMillan objected to discharge of lagoon effluent to the creek. He was concerned about obnoxious odours that might be emitted from the lagoon, and for that reason also objected to spray irrigation of the effluent on to agricultural land. It was Mr. McMillan's belief that the best option for disposal of treated wastewater from the Airport Colony would be to inject effluent directly into the soil.

Mr. Gerry E. Ferguson, President of the Delta Beach Association, presented a submission on behalf of the 165 cottage owners and 16 home owners at Delta, Manitoba. The Association objects to the discharge of any effluent to the drainage ditch that would eventually enter Lake Manitoba via Long Creek.

Mr. Ferguson pointed out that approximately 500 cottagers and hundreds of other persons use the lake and public beach at Delta for recreational purposes, including swimming, water skiing and boating. Lake Manitoba also supports a freshwater fishery. The Delta Beach Association recommended that effluent be spread on agricultural land rather than discharged into the drainage ditch to protect water quality at Delta Beach.

PRESENTATIONS (Cont.)

Mr. Ferguson questioned the frequency of sampling and testing of the lagoon system effluent. He enquired as to who would receive test results and who would ensure that licensing specifications were being followed. The Association wanted assurance that effluent will not be discharged into the drainage ditch at any time.

Mr. Russ Mead from the University of Manitoba Delta Field Station suggested that it might be appropriate to delay spring release of effluent past the proposed May 15 discharge date until later in the spring when vegetative growth rates, and thus nutrient uptake rates, would be greater. Mr. Mead said that the Field Station would be willing to collect samples and submit them to the Department for analysis to monitor the impact of effluent discharge on lake water quality. Sampling could begin this summer and continue for the next few years as necessary.

It was confirmed by Mr. Mead that in a dry year effluent will never get to Lake Manitoba. Long Creek was blocked off in the past, and the mouth of the creek has since silted up, so only flood waters during wet years actually reach Lake Manitoba from Long Creek. Mr. Mead suspected that effluent probably wouldn't flow as far as a downstream marsh adjacent to Lake Manitoba, and if effluent did flow that far it would be detained in the marsh. Last fall Mr. Mead was unable to paddle a canoe in Long Creek due to low water.

Mr. Maris Rutulis, P.Eng., a Hydrogeologist representing the Water Resources Branch of the Manitoba Department of Natural Resources said there was no danger of groundwater contamination caused by seepage from a lagoon located at the selected site. Lake clay with low permeability underlying this site is 10 to 20 meters thick. There are shallow freshwater aquifers in the area, located in old stream channels where the Assiniboine River once flowed.



PRESENTATIONS (Cont.)

A Groundwater Pollution Hazard Appraisal prepared by Mr. Rutulis in January of 1989 recommended that field investigations be conducted to ensure that the lagoon would not be located over a shallow aquifer. Soil testing subsequently conducted by the Water Services Board showed that the proposed lagoon site is not located over an aquifer, and that the site is suitable for a lagoon. Mr. Rutulis said that there are a few shallow aquifers located away from the selected site along Long Creek.

Mr. Mike Van Den Bosch, P.Eng., an Environmental Engineer with the Manitoba Environment Department described the proposal review conducted before the hearing. After the proposal was received, it was circulated to the interdepartmental Technical Advisory Committee, and was advertised in appropriate newspapers. Mr. Van Den Bosch summarized the responses received.

After conducting a field investigation of the lands in question, Historical Resources Branch indicated that it had no concerns. Manitoba Departments of Urban Affairs and Highways and the Municipal Planning Branch indicated they had no concerns.

It was recommended by the Department of Natural Resources that lagoon discharges meet Manitoba Surface Water Quality Objectives for both ammonia and dissolved oxygen (BOD) as prescribed for cool water fisheries. Since the Creek discharges to a marshy area adjacent to Lake Manitoba, the Fisheries Biologist was of the opinion that a substantial concentration of nutrients in the effluent would be assimilated by vegetation.

Comments from the Manitoba Environment Department were that effluent quality should meet acceptable standards consistent with secondary treatment. It was also noted that effluent disposal by irrigation onto agricultural land should be the principal method of disposal, but that the suitability of the effluent for irrigation with respect to salinity was not addressed.

PRESENTATIONS (Cont.)

Objections to the proposal were received from members of the public. As a result of the expressions of concern received, the proposal was referred to the Clean Environment Commission for a public hearing.

Overall, Mr. Van Den Bosch said the Environment Department was satisfied with the siting investigation. Although more ideal soil conditions for a lagoon site had been identified, those sites were not as suitably situated with respect to residences. The proposed site has an appropriate combination of soil conditions and distance from residences.

Mr. Van Den Bosch agreed with the recommendation by Natural Resources personnel that discharges from the lagoon should meet the Manitoba Surface Water Quality Objectives prescribed for a cool water fishery.

Sampling of effluent quality prior to discharge was considered by Mr. Van Den Bosch to be a prudent management practice, and he did not consider it inappropriate to require such sampling as a condition of the Licence. He noted that the Provincial Laboratories could conduct the required analyses. However, in this regard, it should be pointed out that prior to any effluent release from a lagoon, samples must be collected to establish whether the effluent quality limitations of the Environment Licence can be attained. Effluent discharge cannot occur unless the limits as established by the sampling procedure are met.

Referring to the suggestion made earlier during the hearing that spring discharges be delayed past May 15 until plant growth rates were accelerated, Mr. Van Den Bosch agreed that this might allow for better uptake of nutrients. May 15 is set as the earliest allowable release date to ensure that wastes accumulated in the lagoon over winter are treated and effluent quality is suitable for discharge. Mr. Van Den Bosch said that the Department would not object to later release dates, but the operator would then require increased lagoon storage capacity to accommodate the longer retention time.

PRESENTATIONS (Cont.)

In response to a question, Mr. Van Den Bosch said the Department does random inspections of all sewage lagoons, but due to enforcement staff limitations, site inspection of an individual lagoon might only occur about once every two years. If there was reason to believe there were problems at a particular lagoon (i.e., a history of past problems, complaints, or a high loading rate) the frequency of inspection would be greater.

Land application of treated effluent is in general preferred by the Environment Department over discharge to a water course because of the fate of nutrients released. In this case the ideal disposal route may be land application, with the option for emergency discharge to the creek, but Mr. Van Den Bosch pointed out that because land application was not really a part of the proposal, the appropriateness of spray irrigation at the Airport Colony had not been fully examined.

CONCLUSIONS

The Clean Environment Commission finds the proposal for a two-cell sewage lagoon, as submitted by the Manitoba Water Services Board, to be a suitable solution to the existing sewage disposal problems at the Airport Colony. Recommended limits, terms and conditions for construction and operation of this lagoon and the discharge of treated effluent into the adjacent drainage ditch are included with this report.

Land application of treated effluents is, in general, considered by the Clean Environment Commission to be the best environmental alternative for effluent discharge because it prevents the introduction of nutrients and other contaminants into surface waters. In considering this proposal, however, there remain unanswered questions as to whether land application of effluent in this situation would be appropriate. Also, in the particular circumstances considered, the discharge of treated effluent to Long Creek does not appear to have the potential to impair the environment in any significant degree since nutrients should be removed by vegetation in the Creek and marsh area, and

CONCLUSIONS (Cont.)

flow from Long Creek only reaches Lake Manitoba during high flow years. Discharge of treated effluent of the quality recommended in this report will not interfere with other uses of the receiving waters.

Permission to dispose of treated effluent by spray irrigation should not be granted as part of the Licence issued until the Director of the Environment Department is satisfied that:

- (a) the level of dissolved solids in the effluent is known and meets the accepted criteria for application to agricultural lands, and
- (b) that there will be no risk of groundwater contamination from this practice.

The proposed lagoon, and the drainage ditch that would receive treated effluent, are far enough away from any residences that odour is not expected to be a problem.

Groundwater contamination caused by seepage from the lagoon is unlikely because the selected site is located over a layer of impermeable clay, and it is proposed to line the lagoon with clay which when compacted will meet Departmental guidelines for seepage control.

In that the Colony have and continue to discharge untreated domestic wastewater to Long Creek, the Clean Environment Commission concludes that this practice should be discontinued as soon as practically possible.

RECOMMENDATIONS

1. The Applicant shall ensure that all domestic wastewater generated within the Colony is directed towards the wastewater treatment lagoon.

RECOMMENDATIONS (Cont.)

2. The Applicant shall ensure that no livestock waste is directed toward the wastewater treatment lagoon.
  
3. The Applicant shall take, in a manner prescribed by the Director, samples of wastewater stored in the lagoon two weeks prior to discharge and shall not discharge effluent from the wastewater treatment lagoon:
  - (A) where the organic content of the effluent, as indicated by the five day biochemical oxygen demand, is in excess of 30 milligrams per litre;
  
  - (B) where the fecal coliform content of the effluent, as indicated by the MPN index, is in excess of 200 per 100 millilitres of samples;
  
  - (C) where the total coliform content of the effluent, as indicated by the MPN index, is in excess of 1500 per 100 millilitres of sample;
  
  - (D) between the first day of November of any year and the fifteenth day of May of the following year, unless prior approval by the Director is given.
  
4. The Applicant shall not discharge effluent from the primary cell of the wastewater treatment lagoon, except to the secondary cell of the said lagoon.
  
5. The Applicant shall operate and maintain the wastewater treatment lagoon in such a manner that:
  - (A) the release of offensive odours is minimized;

RECOMMENDATIONS (Cont.)

- (B) the organic loading on the primary cell of the lagoon system, as indicated by the five day biochemical oxygen demand, is not in excess of 56 kilograms per hectare per day;
  - (C) the depth of sewage in the primary cell does not exceed 1.5 metres.
6. The Applicant shall to the satisfaction of the Director, undertake the necessary investigation of the chemical quality of the treated effluent and the site to which effluent is to be discharged to establish the suitability of land application of effluent.
7. The Applicant shall not discharge effluent onto agricultural lands without the approval of the Director.
8. The Applicant shall, in case of physical or mechanical breakdown of the wastewater collection and/or treatment system:
- (A) notify the Director immediately;
  - (B) identify the repairs to the wastewater collection and/or treatment system;
  - (C) complete the repairs in accordance with the written instructions of the Director.
9. The Applicant shall prior to the construction of dykes for the wastewater treatment lagoon:
- (A) remove all organic topsoil from the area where the dykes will be constructed; or,

RECOMMENDATIONS (Cont.)

- (B) remove all organic material for a depth of 0.3 metres and a width of 3.0 metres from the area where the dyke will be built, providing all the lagoon dykes are lined with clay or other suitable material as required by Clause 12 to a minimum thickness of one metre measured perpendicular to the face of the side wall.
10. The Applicant shall construct the wastewater treatment lagoon with clay or other suitable material such that all interior surfaces of the lagoon structure are underlain with a minimum of 1 metre of soil having a hydraulic conductivity of  $1 \times 10^{-7}$  centimetres per second or less.
11. The Applicant shall arrange with the designated Environment Officer a mutually acceptable time and date for any required soil sampling between the 15th day of May and the 1st day of November of any year, unless prior approval, by the Director, is given.
12. The Applicant shall either:
- (A) subject undisturbed soil samples from the completed wastewater treatment lagoon to hydraulic conductivity tests, the number and location of said samples to be specified by the designated Environment Officer up to a maximum of twenty samples; or,
  - (B) where undisturbed soil samples cannot be taken, test the soil of 4 plane surfaces of the wastewater treatment lagoon for hydraulic conductivity by an in situ field test method as prescribed by the designated Environment Officer.

RECOMMENDATIONS (Cont.)

13. The Applicant shall, not less than 2 weeks before the wastewater treatment lagoon is placed in operation, submit to the Director the results of the tests carried out pursuant to Clause 14.
14. The Applicant shall install a fence around the wastewater treatment lagoon to limit access.
15. The Applicant shall have the wastewater treatment system as licenced constructed prior to September 1st., 1990.



APPENDIX

L I S T   O F   E X H I B I T S

1. Hon. J. Glen Cummings, Minister of Environment, Letter (dated October 23, 1989) requesting the Clean Environment Commission to hold a public hearing regarding the Airport Holding Co. Ltd. proposal.
2. Ms. Stella Fedeniuk, Manitoba Water Services Board, Brief, (maps and diagrams).
3. Mr. William McMillan, Brief, (dated December 12, 1989).
4. Mr. Gerry Ferguson, Delta Beach Association, Brief.
5. Mr. M. Rutulis, Department of Natural Resources, Water Resources Branch, Verbal presentation.
6. Mr. Mike Van Den Bosch, Environmental Control Services, Brief (dated December 6, 1989).
7. Mr. Walter Keryluk, Manitoba Environment, Portage la Prairie, Verbal presentation (by request from the Chairperson, Mr. Keryluk answered questions from concerned citizens present at the hearing).