



CITY OF BURLINGTON

**A STUDY OF THE POTENTIAL
HAZARD TO AIRCRAFT OPERATIONS AT
BURLINGTON AIRPARK FROM A POSSIBLE SANITARY
LANDFILL AT SITE D.**

DECEMBER, 1987



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TO AIRCRAFT OPERATIONS AT BURLINGTON
AIRPARK FROM A POSSIBLE SANITARY LANDFILL
AT SITE D

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EXECUTIVE SUMMARY

In the last few years there has been a large increase in the number of sea gulls in Ontario. This increase has had several unpleasant side effects, which have not gone unnoticed by the general public. Predominant among the 16 gull species in the area is the Ring-billed gull which has come to dominate all other species in terms of its rapid population growth accompanied by aggressive nesting and feeding behaviour. During the period from 1976 to 1984 the nesting populations of the Ring-billed gull in the Great Lakes and Upper St. Lawrence River increased at an average annual growth rate of 11 percent. In 1984, there were an estimated 700,000 pairs of Ring-bills in that area. If the historic growth rates have continued, this population may now be approaching 1 million nesting pairs. In the area of most relevance to Site D [the outer Harbour East Headland at Toronto (the Leslie Street spit) to Hamilton Harbour, inclusive] there is likely an existing population of up to 400,000 birds. It is also a reasonable assumption that this population will continue to grow, depending on the availability of nesting sites, control measures employed and available food. In fact, the Canadian Wildlife Service sees room for expansion, and thus continuing growth of these colonies.

The Ring-billed gull is a very adaptable and opportunistic bird. It is equally at home nesting on natural islands or on man made breakwaters, piers and waste grounds. It's diet is extremely variable and they readily switch from one type of food to another. In Southern Ontario they have adapted readily to the human environment.

With regard to the construction of a sanitary landfill at Site D in the Regional Municipality of Halton, the following conclusions have been reached:

- . This location is located within the normal feeding range (up to 40 miles from roosting areas) of the large number of gulls located at the northwest end of Lake Ontario from the Leslie Street spit to Hamilton Harbour. It might be

anticipated that many of the birds attracted to Site D would come from the Hamilton Harbour area, although this may not be the exclusive source: some may come from the Leslie Street spit, others may come from small colonies along the shore of Lake Ontario between Toronto and Hamilton, and pre-nesting juvenile birds which may not have a specific allegiance to any colony will be an additional source. Gulls from the Leslie Street Spit or the north shore of Lake Ontario should not fly near Burlington Airpark enroute to and from Site D.

- . It should be noted that an SLS built in the Region at any site other than D (for example F) could anticipate the same gull situation, if it were located within the feeding range of the gulls.
- . However, it cannot be assumed that Hamilton Harbour will continue to be available for a nesting site after the next 5 to 10 years. The Eastport Marine and Industrial Development area, presently used by the gulls, will be developed over that period and will no longer be available to the gulls. The Hamilton Harbour Commission is also seeking ways, in the short term, to control and reduce the Ring-billed gull population. This program could reduce the number of gulls that would potentially use landfill sites in Halton Region.
- . There are mixed opinions on the routes the gulls might follow to Site D. On one hand, there is evidence to suggest they might follow a direct route to the site. On the other hand, some experts feel that the gulls may follow available water courses. The altitude of the gulls in transit between the overnight roosting areas on Lake Ontario and the inland feeding areas would probably be in the order of 200 to 700 feet above ground.

- . The likely number of gulls to be attracted to a landfill site cannot be accurately estimated. However, evidence from other sites where no mitigative measures are taken suggest that perhaps as high as 1,000 individual birds at any one time might be anticipated.
- . The control programs in use at Trenton, North Bay and Niagara Falls International airports, indicate that an SLS and airport can co-exist with the use of proper and persistent mitigative procedures. The use of similar procedures at Site D would likely have the same results in controlling gulls.
- . With regard to the potential impact on Burlington Airpark, it should be noted that airports generally tend to attract gulls, even without the presence of a nearby SLS:
 - airfields are flat open areas with good visibility and thus provide the gulls with a measure of look-out and protection
 - the runways, particularly if paved, are warm spots for gulls to rest
 - there is often pooled water after rain which is attractive to gulls
 - worms, grubs and other small creatures can be easily foraged by the gulls, particularly after rain and if the grass is cut short
 - the attraction is increased if refuse containing food is left around the airport.
- . The extent that gulls would impact on Burlington Airpark, could vary:
 - if there are suitable water and loafing areas at the SLS, then the gulls would likely remain close to the SLS and not seek these at the airport or on surrounding farm lands; but this does not mean that some gulls would not use these other areas from time to time

- if water and loafing areas are denied at the SLS, but the food supply remain available, then the gulls may seek other areas around the site as sources for these two requirements; these areas could include farms and the airport
- the attraction of the airport must therefore be minimized by allowing no standing water, no refuse or garbage, keeping off-runway grass slightly longer, and the institution of a worm control program
- it must be remembered that both the Site D SLS and the airport are in an agricultural area and that seasonal ploughing and harvesting will likely attract gulls in any event; the presence of an uncontrolled SLS would provide an additional attraction.

In terms of actions that might be considered by the Regional Municipality of Halton to control the gull population at a sanitary landfill to be constructed at Site D and to assist Burlington Airpark to offset any side effects from a possible gull population attracted to the SLS, the following are suggested. The best solution is to aggressively and persistently deny access by the gulls to the food source from the outset:

- during construction, when open earth exists (worm source), institute a program of scaring, such as using scare shells and firecrackers, as required
- once the delivery of refuse begins at the SLS, aggressive and persistent measures should be set up; these could be either a falcon program or overwiring such as is used at several major airports and SLS in the area
- either of these programs might need to be augmented by the occasional use of other scaring techniques, which have proven to be successful short-term measures at other sites
- assistance should be provided to Burlington Airpark to ensure that attractiveness to gulls is minimized; measures at the airport could be:
 - use of worm killing chemicals
 - advice on clean up
 - adequate grass cutting
 - removal of opportunities for standing water
 - assistance with scaring
 - use of a trained biologist and/or ornithologist to survey the airport periodically
 - periodic review of program and advice

- review of operating procedures to see if adjustments can be made to aircraft traffic patterns
 - encourage pilots to use landing lights at all times when in the vicinity of the airport
 - pursue publishing of a Notice To Airmen (NOTAM) warning of the potential danger from gulls
 - ensure a good record is kept of the incidence of gulls and of mitigative measures taken at the airport.
- if landfill operations are shut down from noon on Saturday until Monday morning, which is the peak operating period at the airport, risk from interference with flight operations by gulls could be further minimized.

If persistent mitigative procedures are applied, the airport and SLS should be able to co-exist.

I - INTRODUCTION

BACKGROUND

The Regional Municipality of Halton is presently considering two sites for the establishment of a new Sanitary Landfill Site (SLS). One of the proposed sites (Site D) is located approximately 3.5 km to the north of Burlington Airpark (see Exhibit 1), which is a privately-owned general aviation airport.

In completing a comparative assessment of various locations for the SLS, a number of background studies has been prepared and testimony has been presented to the hearings on the matter. One of the factors highlighted in this process is the possible impact of Site D on Burlington Airpark because of potential interference to air operations from gulls and other birds that might be attracted to the landfill site. A preliminary review of the background documentation and testimony indicated that there are different opinions as to the extent of the potential impact and the possible mitigative procedures that might be undertaken to allow the airport to continue with its current operations.

It was therefore decided that an independent consultant evaluation should be undertaken to provide additional perspective and detail on the possible effect of Site D on the airport and to clarify the types of mitigative measures that might be used to protect operations at the Airpark.

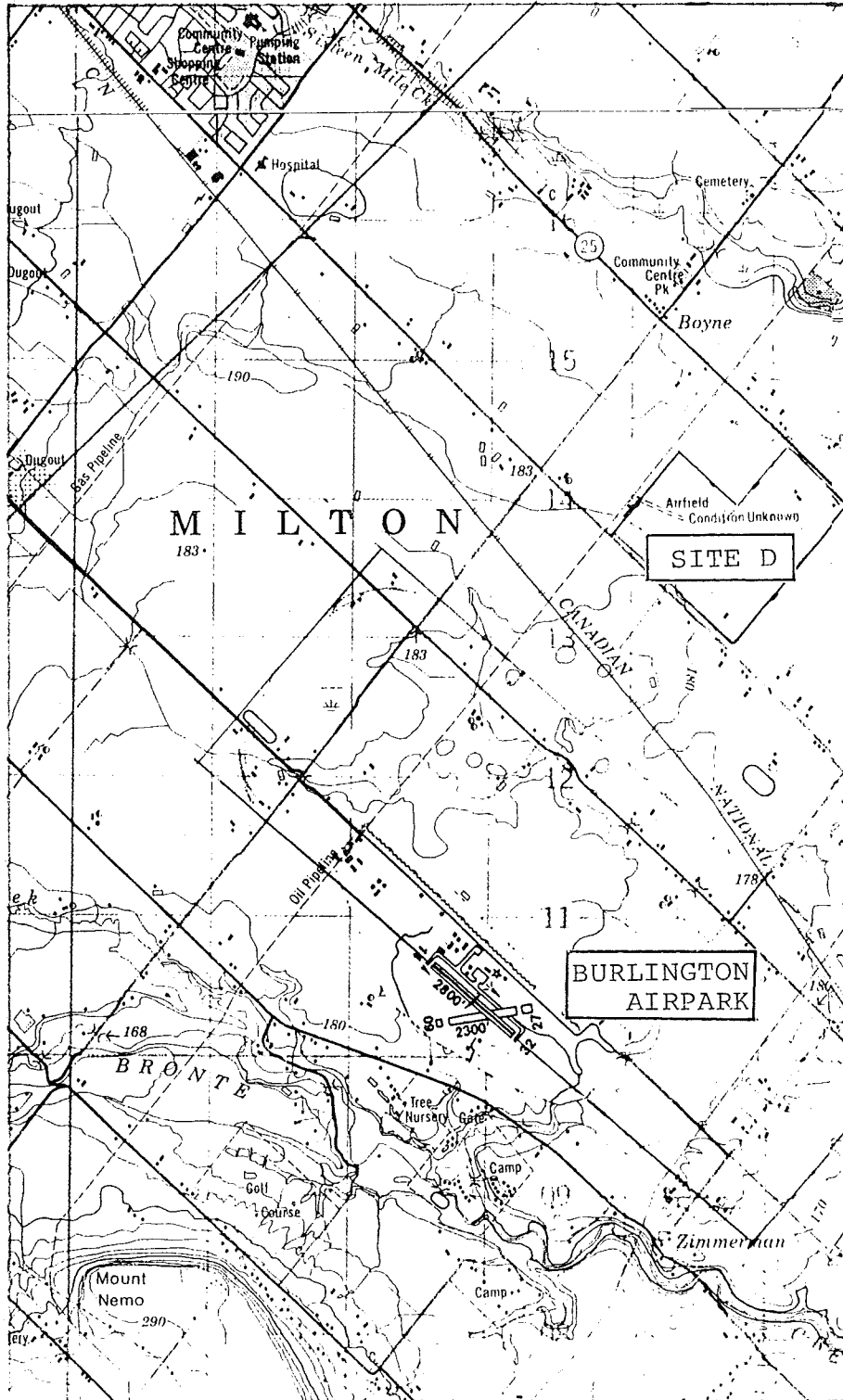
METHODOLOGY

The work program undertaken included the following main steps:

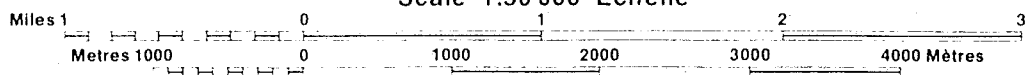
1. Collection and review of available reports and documentation prepared on this matter.
2. Discussions with regional representatives of Transport Canada in Toronto to ascertain present involvement, and

EXHIBIT 1
AREA OF SITE D

- 7 -



Scale 1:50 000 Échelle



their position and assessment of the situation, including any potential impacts of Site D on the helipad at Milton Hospital and on Lester B. Pearson International Airport.

3. Discussion with Transport Canada representatives in Ottawa regarding their approaches to the control of birds at airports, bird strike histories and statistics, effective mitigative procedures, and work with the Bird Strike Committee of Canada. These discussions included the staff biologist regarding information on the behavioural characteristics of bird species that are relevant to this analysis.
4. Discussions with the Metropolitan Toronto Regional Conservation Authority (MTRCA) and the Canadian Wildlife Service concerning bird populations and habitat considerations as they impact on landfill sites, airports and air operations in the Lake Ontario area.
5. Observations on the ground and by air of a number of landfill sites in Southern Ontario, including the present Burlington landfill site, the Keele Street site north of Toronto, the Brock Road site east of Toronto, the Quinte landfill site at Trenton, and several other smaller landfill locations between Toronto and Trenton.
6. Examination of several airports which are impacted by associated landfill sites and bird populations in Southern Ontario, including Maple Airport, Toronto Island Airport, Lester B. Pearson International Airport, Burlington Airpark, North Bay Airport, Trenton Airport (DND) and Niagara Falls International Airport (N.Y.). This work was undertaken by a combination of telephone discussions, ground visits and airborne observations.

7. Discussion with the owner of Burlington Airpark, Mr. Vic Kovachik.
8. Discussion with the Hamilton Harbour Commission regarding gull populations and land developments in Hamilton Harbour.
9. Examination of mitigative procedures, including the use of birds of prey (mainly falcons) and over-wiring systems, which are presently employed at other locations.

From the information obtained in the above work program, an assessment was prepared of the likelihood of operational problems at Burlington Airpark because of the proximity to the landfill site. Actions are suggested to eliminate the effects of potential bird populations at Site D.

ORGANIZATION OF THE REPORT

This introductory chapter describes the background and objectives of this study, and summarizes the overall work program completed. Chapter II examines the extent of the possible bird interference in terms of critical species, behaviour and anticipated patterns. Chapter III discusses the observations at the landfill sites and airports examined. Chapter IV presents a profile of Burlington Airpark, including an appreciation of future operations at the airport. Chapter V discusses the policy and standards prepared by Transport Canada and in use in the United States. Chapter VI summarizes the conclusions from the study and suggests possible actions that might be considered for controlling the bird population at Site D and to minimize the possible effects on operations at Burlington Airpark.

II - THE BIRD SITUATION

APPROACH

A preliminary review of available literature indicates that certain species of birds and in particular the Ring-billed gull, are presenting problems in Southern Ontario (and elsewhere) for sanitary landfill sites and airports that are located nearby or are situated on the path between the gulls' nesting/resting sites and the SLS. In order to provide a more definitive perspective on the extent of this problem as it could apply to Site D and Burlington Airpark, research was undertaken as part of the overall study, which included the following work elements:

- discussions with the Facilities and Environmental Management Division of Transport Canada in Ottawa, the Canadian Wildlife Service and the Metro Toronto and Region Conservation Authority
- collection and review of available reports on the gull situation in southern Ontario and possible mitigative procedures that might be considered.

OVERVIEW

Over the past few years there has been a large increase in the number of seagulls in Ontario. This increase has had several side effects, which have not gone unnoticed by the general public.

Of the 16 gull species that have occurred in Ontario, only 2 are often seen in or near areas of human activity. Those 2 species are the Herring gull and the Ring-billed gull. The Herring gull is a large gull which nests on numerous islands throughout Ontario. Most colonies are fairly small (less than 100 pairs) and sometimes single pairs are found nesting on a small shore location. The Ring-billed gull looks like a smaller version of the Herring gull but has a black "ring" around its yellow bill. Ring-bills also nest on islands and often share their colony sites with Herring gulls. Unlike the larger Herring gull, the Ring-bill is extremely colonial and tends to nest in large densely packed colonies containing many thousands of nests.

Most known large Ring-billed colonies are on the lower Great Lakes and the St. Lawrence River, often near cities and towns. After the breeding season, gulls of both species disperse from the nesting colonies.

Many of the Herring gulls from the Lake Ontario area that nest on the Great Lakes are believed to spend the winter in the Great Lakes basin. In contrast, most of the Ring-billed gulls migrate to warmer areas along the Atlantic coasts and, by mid-winter, many can be found in Florida.

It is the large and growing Ring-billed gull population which is the underlying cause of the various problems because of their propensity to remain in and near areas of human activity for much of the year. Several real problems have been caused by this species:

1. Threats to flight safety at many Ontario airports.
2. Economic damage to agricultural crops.
3. Plain nuisance to all those who like to eat their lunch outdoors without having aggressive gulls begging for food.

RELEVANT POPULATIONS

At present, the heartland of the eastern Ring-billed population is the Great Lakes area and the St. Lawrence River down to Trois Rivières. During the period 1976 to 1984 the nesting population of Ring-billed gulls in this area increased at an average annual growth rate of 11 percent. In 1984 there were an estimated 700,000 pairs of Ring-billed gulls in this area (about two-thirds in Canada and one-third in the U.S.A.). If this same growth rate is applied to the subsequent three years, by 1987 this population could be approaching 1 million nesting pairs.

The breeding areas at the northwest end of Lake Ontario from Bowmanville to Hamilton Harbour are of most interest in relation to Site D. Within this geographic breeding area it is estimated that there are probably about 400,000 birds. Based on the normal 40 mile feeding range of the Ring-billed gull, a SLS established at Site D would be an attraction to gulls nesting and living in this area

(Toronto Harbour at 29 miles/46 kms and Hamilton Harbour at 11 miles/17 kms are both within the feeding range).

Because Ring-billed gulls are highly adaptable it is likely that their numbers will continue to increase for several reasons:

1. The Ring-billed gull is protected in Canada under the Migratory Bird Convention Act.
2. Ring-billed gulls eat many things including fish, insects, earth worms, and garbage. They are bold and have become highly "urban", scrounging for food near fast food outlets, parking lots, play grounds, etc. They are also a familiar site in rural areas, where they forage on freshly mowed pasture or right behind farmers' ploughs, and have been reported to cause damage to crops (including tomatoes, asparagus, beans, strawberries and young vegetable shoots). They also make use of sanitary landfill sites as a source of of their food.
3. Ring-billed gulls avoid the harshness of Canadian winters, thus increasing their chances of over-winter survival.
4. Ring-bills are flexible with respect to nesting habitat, constructing their nests on remote islands as well as on various man-made structures such as dykes and headlands. When crowded for space in a particular nesting area, they adapt by simply moving nests closer together, and will often destroy natural ground cover to make additional nesting space.

For comparison, the Herring gulls present an somewhat different picture. The population estimated in 1983 for the Great Lakes area was 75,000 pairs. Its population has been much more stable and is reported to have grown little if at all, but some increase in numbers should be anticipated but not at the rate of the Ring-bill. The diet tends to be more restricted and the Herring gulls are not normally

seen on city streets or agricultural fields. They do, however, visit SLS in search of food.

KEY BEHAVIOURAL CHARACTERISTICS

The peak period of activity for Ring-billed gulls can be expected to be post-nesting (about the end of June) until migration (late fall) when the fledgelings have been added to populations of nesting adults and juvenile birds (up to 2 years old) to form a total foraging population. Added to this increase in the size of the foraging population is the phenomenon of post-nesting dispersion when the fledged chicks and adults leave the nesting sites and move inland in search of food.

At migration, many of the Ring-billed gulls in the Lake Ontario areas will leave to spend the winter on the southeast coast of the United States. But some will stay behind as long as open water and an adequate food supply are available. Those leaving will be replaced at Lake Ontario for the winter by gulls migrating from Northern Canada. As well, the resident Herring gull population will remain. Thus landfill sites will continue to be food sources for gulls during the winter months.

It is possible that many of the birds attracted to Site D would come from the Hamilton Harbour area, but this may not be the only source:

- some may come from the Leslie Street spit at the southeast end of Toronto Harbour
- others may come from small colonies along the shore of Lake Ontario between Toronto and Hamilton
- pre-nesting juvenile birds (up to 2 years old) which may not have specific allegiance to any colony will be an additional source of individuals.

Gulls from these other sources should not fly near the Airpark when transitting to and from Site D.

There are mixed opinions on the routes that gulls might follow to Site D from Hamilton Harbour. On one hand, there is evidence to suggest they might take a fairly direct route to the site. On

the other hand some experts feel that the gulls may follow available water courses.

The altitude of the gulls in transit between the overnight roosting areas on the lake and inland feeding areas will probably be in the order of 200 to 700 feet above ground, although a few might be expected to soar at higher altitudes, particularly during warmer weather when they can take advantage of the additional lift created by thermals.

ATTRACTIVENESS OF AIRPORTS

In seeking sources of food, such as at sanitary landfill sites, the gulls also appear to be interested in two other features: a readily available source of drinking water and a suitable area for loafing between feedings (a warm sunny site with good visibility is usually preferred). If there is adequate food at an SLS but the site is small and little loafing area or drinking water exists, the gulls will seek nearby sites such as farmers' fields and airports which are flat and open with good visibility. Airports are sometimes used because of the warm place in the sun offered by the runways. As well, airports may have pooled water following a rainfall, as well as a supply of worms and grubs which are attracted to the surface of the airport following precipitation.

The likely number of gulls that will be attracted to landfill sites cannot be accurately estimated. Evidence from personal observations and from site operators suggest that the numbers can vary widely depending on the size and characteristics of the site, distance from roosting areas, alternate food sources for the birds, water and loafing areas, time of year and mitigative procedures taken to control the gulls. Cases where little or no mitigative measures are taken suggest some volumes that might be expected at any time during the daylight hours:

- current Burlington and Brock Road landfills: at least several hundred and probably more in the post-nesting time frame

- Keele Valley landfill site: estimated by the Works Supervisor at probably 2,000 to 3,000
- CECOS International Site at Niagara Falls, New York, prior to the use of overwiring: reported as 2,000 to 3,000 gulls.

While at a landfill site, the gulls appear to remain close to the site as long as water and suitable loafing/resting are available. However, the gulls leave the sites each night for their roosting areas and come back in the morning to continue the feeding process. A few may also transit during the middle of the day between water sources or the roosting areas and the site.

III - EXAMINATION OF SITES

BACKGROUND

In other background reports completed for the evaluation of potential landfill sites for the Region, references were made to several airports with problems from gulls and the mitigative procedures being attempted. These other locations were discussed in the context of representing the types of impact that might be anticipated from gulls at Burlington Airpark because of a landfill site possibly located nearby. To provide additional perspective, it was decided to examine a number of other situations in the Southern Ontario area so that a more definitive picture could be formed of the likely attraction of gulls, their possible impact on airports located near locations where gulls tend to aggregate (and in particular landfill sites), and various approaches taken to offset or control the effects of the gulls.

Locations examined in the course of this research were:

- . Nesting sites in Hamilton Harbour
- . Maple Airport and the nearby Keele Valley Landfill site
- . Downsview Airport
- . Toronto Island Airport and the gull colonies to the east of the airport
- . Trenton Airport and the Quinte landfill site to the east of the airport and the large gull colony to the southwest of the airport
- . North Bay Airport and the landfill site located to the north of the airport
- . Lester B. Pearson International Airport
- . Niagara Falls International Airport (New York) and the CECOS landfill site located to the west of the airport
- . The present Burlington Landfill site to the north of Hamilton Harbour

- Other landfill sites at Brock Road (east end of Toronto), Cobourg and Brighton.

HAMILTON HARBOUR

We have examined the gull nesting sites in Hamilton Harbour, because of the possible importance of this area as a source of gulls that could be attracted to site D.

Exhibit 2 shows the Harbour layout. In 1984 the Canadian Wildlife Service (CWS) reported 12,000 nesting pairs of Ring-billed gulls in the Harbour. By 1987 the count by the CWS had increased to about 20,000 pairs. The main location for the Ring-bills is the Eastport Marine and Industrial Development at the south-east point in the Harbour. Several other smaller nesting sites are located on man-made islands at the north-east corner of the Harbour by Burlington Beach. These islands originally served as bases for hydro-electric transmission towers. The Hamilton Harbour Commission reports that the populations on the small islands are mainly Terns.

The Harbour Commission regards the Ring-billed gulls as a nuisance and are presently having a study completed by Ecologistics Ltd. of Waterloo on how to control and reduce the population. The study was due for delivery to the Commission in draft form in December 1987.

In the long term, the Eastport site will not remain as a nesting site for the gulls. The total site (124 acres) is to be developed over the period to the year 2000.

Forty acres have now been serviced and roaded, of which 6 acres have been leased and 8 to 10 acres are under active negotiation for leasing.

If the program for Hamilton Harbour proceeds as indicated, the impact of the gulls will be reduced on two counts:

- in the near term the population will be reduced by the institution of control measures and the gradual reduction of available nesting area
- in the long term, the current nesting area will be completely eliminated.

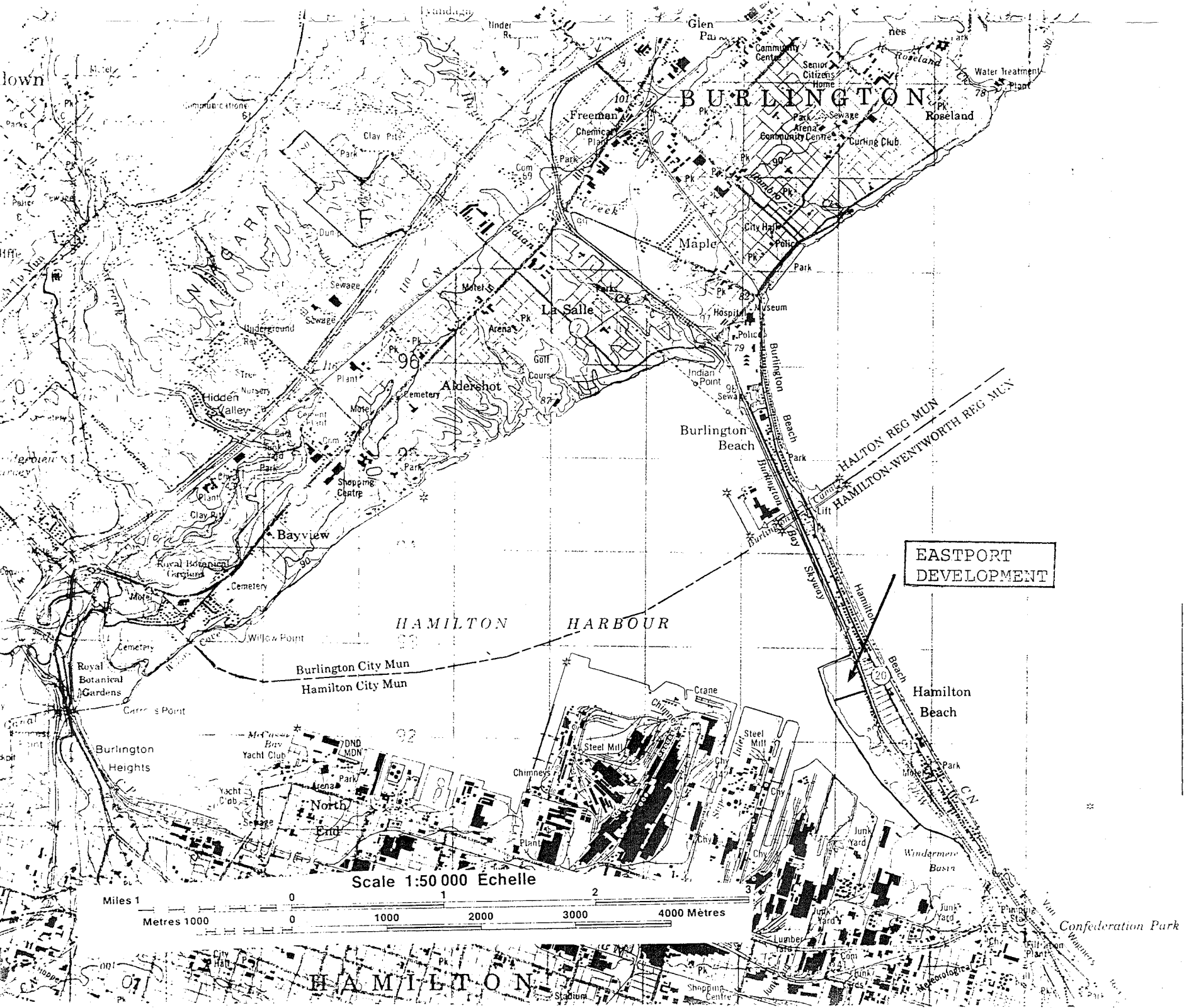


EXHIBIT 2
HAMILTON HARBOUR

MAPLE AIRPORT

Maple Airport is a small general aviation airport located on Major MacKenzie Drive several miles north of the City of Toronto. It is about the same size as Burlington Airpark. It is estimated that there are between 60 and 70 aircraft based at the airport (primarily light single and a few twin-engined). The Keele Valley landfill site is about 2.5 km to the northeast of the airport and about in line with the flight path of the northeast/southwest runway (runway 05-23). The situation is shown in Exhibit 3.

The airport was visited on the ground on three occasions. A discussion was also held with the Chief Flying Instructor, who has been at the airport for about 10 years. Several flights were subsequently made to the airport and over the Keele Valley SLS over a period of a number of months. These flights included a number of take-offs and landings at the airport. The discussion with the Chief Flying Instructor included the effects of the Keele Valley SLS on operations, as well as from any gulls attracted to the Shur-Gain farm (just to the north of the airport) and Canada's Wonderland (about 1.5 km to the west).

In the opinion of the Chief Flying Instructor, the landfill site creates essentially no bird hazard for the airport:

- . There are virtually no gulls at the airport except after rainfalls, when there is pooling of water for a time on the runways (which are paved) and the gulls are attracted in small numbers by the worms and other insects; the birds usually gather at about the intersection of the two runways.
- . There are no special mitigative measures taken to chase the gulls from the airport except that some pilots try to chase the birds with taxiing aircraft; the gulls generally just move over until the aircraft is gone and then resume their activity.
- . A few gulls are hit on take off (perhaps up to 5 per year), but the aircraft are at a low speed (30 to 40 m.p.h.) and no damage is sustained.
- . The Chief Flying Instructor does not directly connect gulls on the airport with the landfill site, Canada's Wonderland or the Shur-Gain Farm:

1. Gulls came to the airport in the same way (after rain) before the landfill site and Canada's Wonderland were active (in this way the airport exhibits the same characteristics as many other airports in attracting gulls).
2. There are some gulls at Canada's Wonderland but it is not felt they bother the airport.
3. The gulls at the landfill site generally stay in close proximity to the site and at low flight altitudes; aircraft using the northeast/southwest runway either turn before the site or, on a straight climb out/approach to this runway, are well above the birds (only a few gulls reported by pilots above a few hundred feet); a plot of a representative light aircraft circuit pattern confirms that the aircraft should be well clear of the site under most circumstances; this was confirmed by the consultant on subsequent flights into Maple Airport using this runway.
4. The Shur-Gain Farm poses little, if any, problem; gulls are attracted to the farm periodically (during plowing, harvesting), but do not interfere with flight operations at the airport.

During the ground visits to the airport, no gulls were seen, just a few small birds.

On the visits by aircraft to the airport observations were made on any bird or gull activity, the general terrain around the airport and circuits were flown to the runways.

There are several bodies of water around the airport which gulls might use to drink and rest: a slough at the west end of the airport, and a couple of large ponds on the north side of the airport on the Shur-Gain Farm and other farms, and a pond just to the east of the airport in the Town of Maple. No gulls were seen on any of the areas of water. There is also a large pond on the south side of Canada's Wonderland but no gulls were seen there.

At the airport, no gulls were seen - only a few small birds. There were no gulls on the Shur-Gain Farm or at Canada's Wonderland and only a few gulls on a couple of farm fields to the north of the Shur-Gain Farm. These fields appeared to be recently ploughed. From the air, the airport appears to be quite clean with no signs of loose garbage or refuse in the area. There is a restaurant (the Maple Inn)

located just to the east of the airport, which does not appear to attract any gulls. There was no garbage seen at the restaurant. Traffic circuits were flown on the northeast/southwest runway (05-23) so as to be representative circuits in size and altitude for the type of aircraft based at Maple (primarily light single-engined aircraft). Such a traffic pattern positions the base leg or the climb-out leg near the west edge of the Keele Valley SLS. Although there were a large number of gulls at the landfill site, virtually all were on the ground or at very low altitude and did not interfere with the aircraft operation. Flights to the airport were made both before and after the post-nesting dispersion of the gulls, but no differences in the above observations were noted.

The Keele Valley landfill site was visited and was toured in company with the Works Supervisor. Several flights were subsequently made over this site before and after the post-nesting dispersion of gulls. The SLS is located 18 miles/29 kms from Toronto Harbour.

A total of 920 acres was purchased for the site but only 245 acres are used for landfill. About 36,000 tons of refuse and garbage are transported into the site per week. The site is operated five and one-half days per week and the open face is continually worked and covered, covered over every night, kept to a minimum size (estimated about 200 X 100 feet) and the vehicles are all cleaned at the end of each day's work. Sand is used for cover, but the supervisor indicated that this is not ideal as it will not pack down like clay and is blown away easily, exposing refuse. Three large bull-dozer/front-end loaders work the face from a number of angles as trucks continually bring in the refuse.

The site is generally very dry and dusty but there are a few small areas of ponded water (the site is very close to the water table so it is difficult to eliminate water completely).

With regard to the gulls:

- it is estimated by the Works Supervisor and another representative of Metro Toronto Works Department that there are probably 2,000 to 3,000 gulls on the site at times
- most are right on or adjacent to the open face and very busy scavenging

- when disturbed by a bulldozer on the open face they fly to a low height and wait until the bulldozer moves away and then return to the refuse
- any at rest or loafing remain quite close on the ground but a few were observed near the ponded water (small flocks of about 50 birds)
- very few are observed soaring at much of an altitude, say over a couple of hundred feet
- the Works Supervisor observed that the gulls may stay within one-half mile of the site except when transiting to/from their roosting areas (it is felt that most gulls at this site come from the Leslie Street spit/Toronto Harbour); in fact, factories adjacent to the site are not bothered by the gulls except when water gathers after rain on the flat factory roofs and the gulls rest there; no complaints have been received from these establishments
- the gulls leave the site each night and come back in the early morning, but not in large flocks, rather as many individuals
- over the years, the Works Supervisor has tried various scaring techniques at different sites, but success is limited and temporary as the gulls quickly get used to the methods and then ignore them
- several crows were observed around the site but few other birds
- with regard to the possible impact on an airport near a site, the Works Supervisor observed that the gulls should not normally use the airport to congregate to rest or loaf as long as there is no garbage or food available at the airport.

The flights over the Keele Valley site confirm the above observation: there were either one or two open faces being worked with a very large number of gulls at the open faces; many birds were also resting or loafing on the sandy slopes and small numbers of gulls were at the various pools of water; there were also a number of gulls swarming over the site but none at a very high altitude.

Apart from keeping the open faces as small as possible during the working hours, covering over the open faces at night, and cleaning the vehicles, there are no other mitigative procedures taken (e.g. grass planting, scaring) to keep the gulls away from the landfill site.

Maple Airport is in an unusual situation:

- it is located close to a large landfill site where few active mitigative procedures are used
- it is between two closely located attractions for the gulls (Canada's Wonderland and the SLS).

Even with this situation, in the opinion of the airport operator, the airport continues to operate effectively with little interference from the gulls.

Maple Airport was closed permanently on September 30, 1987 for development of the land for other purposes.

DOWNSVIEW AIRPORT

Downsview Airport is located at Keele Street and Sheppard Avenue about five miles south of Maple Airport and the Keele Valley landfill site. It is almost in a direct line between the Keele Valley landfill site and Toronto Harbour. On several occasions it was observed by the consultant in the early morning and late evening that small flocks of gulls traverse the airport at low altitude presumably travelling between the Toronto Waterfront and the Keele Valley landfill site.

Downsview Airport has been bothered for a number of years with vermin and birds which tend to fluctuate depending on the procedure for operating the airport and the mitigative measures taken.

Downsview has been affected by gulls periodically, but primarily after rain when there are puddles on the runway and/or when the cloud ceiling is very low. The number of gulls have been observed to be from about 50 up to perhaps 100. A number of measures have been taken in the past to get rid of them. At one time, falcons were used but this was not deemed to be cost effective because of the low annual volume of aircraft movements (18,800 in 1986). The operations staff now chases them with scare shells or with vehicles, but finds the gulls are usually stubborn, but normally move to another part of the airport when bothered. Spraying with anti-worm chemicals has also been used in the past. Other than the gulls after the rain, there are no other bird problems. There are a couple hawks resident

in the area, but these are mainly at the east side of the field and do not interfere with air traffic. At times there are also snowy owls on the field which perch on low posts and signs (at about three feet) and tend to fly a low level over the grassy areas seeking food and therefore do not interfere with aircraft operations. There is also a family of red foxes living on the field.

The grass at the field is generally cut to 3 to 5 inches except for the helicopter training areas which are cut shorter. At one time the grass was kept longer but this led to a problem with rabbits. Grass at the present length does not result in any problems on the airfield.

Downsview exercises mitigative procedures to the extent considered necessary in relation to the level of operations. The measures appear to be effective.

TORONTO ISLAND AIRPORT

This airport is located about 4 km west of the Leslie Street spit (outer Harbour East Headland - see Exhibit 4), which is one of the largest Ring-billed gull nesting colonies (latest counts 45,000 nesting pairs which could translate into possibly over 200,000 birds when fledgelings and non-nesting juveniles are included). In addition, there are reports of other nesting areas for gulls around the Toronto Islands complex such as Mugg's Island, as well as problems with large colonies of geese and ducks.

Over the years the airport has tried a number of ways to ward off gulls and other birds, including dummy birds, decoys, recordings and the present practice of using scare shells or fire cracker shells to disperse the birds. The primary concern appears to be to move the birds off the runways when they congregate. They also used to shoot the gulls when they became too bothersome, but now only do this if there is a real necessity. The airport generally finds that once the level of aviation activity picks up during the day (it is one of the busiest airports in Canada) the gulls seem to keep their distance. The airport manager reported some strikes as they find the occasional dead gull on the airport that appears to have been hit by

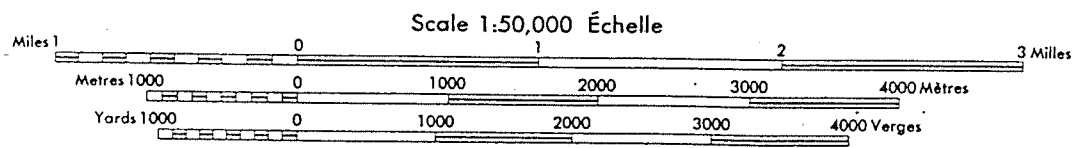


EXHIBIT 4
TORONTO ISLAND AIRPORT

an aircraft, but there is little reporting of strikes by the pilots themselves.

Overall, geese and ducks appear to be as big a problem to the airport as are the gulls:

- geese nest on the island around the airport and are very aggressive and difficult to move when nesting; the Canadian Wildlife Service is trying to remove some of the eggs to keep the goose population in control
- the airport tends to attract ducks to the airport after it rains, rather than many gulls.

An additional problem for the airport is the large grain elevator at the northeast end of the western gap. When there is loading or unloading at this facility, a great number of birds including gulls tend to be attracted. These birds flock close to the east end of the airport.

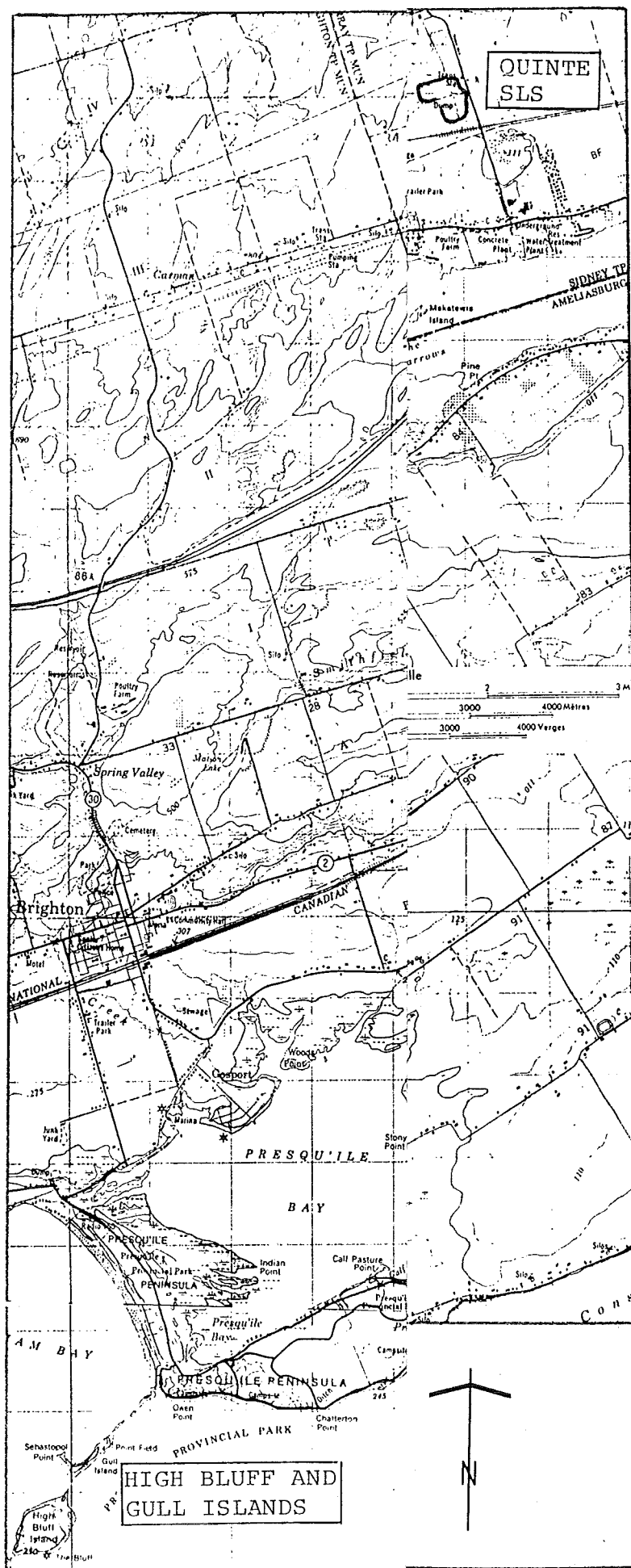
During two visits by the consultant to the airport, no large congregation of gulls could be seen on the airport, but there were individual gulls "cruising" over and around the airport at an estimated height of about 200 to 300 feet above ground. There is also a restaurant just at the ferry dock on the airport side of the channel that separates the island from the mainland. There were several full green garbage bags on the ground outside the back of the restaurant, and a group of 10 to 15 gulls were trying to land by the garbage. A number of ducks were seen on the ground around the airport, as well as several starlings and black birds in flight and on the ground. No geese were sighted.

With regard to the gull colony on the Leslie Street spit, it appears that the present policy is to attempt to maintain the Ring-billed population at about 40-45,000 nesting pairs. This is being carried out by an active control program on one-half of the spit with the use of falcons and other birds of prey, plus other scare tactics to deny the nesting sites to the birds. The remainder of the spit is left uncontrolled to allow the Ring-billed colony to continue and to permit space for other types of birds. The birds of prey are kept tethered to the ground or to a post so they will not attack other desirable birds on the spit. This program of control

takes place between the beginning of April and the end of June, which is the peak nesting season. After the new chicks have fledged, the colony tends to disperse around Southern Ontario. It appears from discussions with the Metro Toronto and Region Conservation Authority (MTRCA) that the Ring-billed population will not be decreased further.

TRENTON AIRPORT

The Canadian Forces airport at Trenton is concerned about the potential interference to flight operations from birds. There is a sanitary landfill site (the Quinte site) located 2.1 km off the east end of the main runway (see Exhibit 5). This site receives about 200 tons of refuse per day. Also closely located is one of the major Ring-billed colonies in North America, located on Gull Island and High Bluff Island in Lake Ontario, approximately 25 km to the southwest of the airport and the landfill site (also see Exhibit 5). It is estimated that there are probably in the order of 250,000 gulls resident on these two islands combined. The line of flight between the Quinte landfill site and the gull colonies is close to the airport. There are also two smaller landfill sites north of the town of Brighton and near the town of Cobourg. The approach and departure paths on the main runway puts aircraft about 300 to 500 feet over the Quinte SLS. Adding to the situation is that the airport is located on one of the major north/south bird migratory flight routes. The military has taken a strong position to control birds at both the Quinte site and on the airfield. Since 1979, the airport has employed a full time bird control contractor who uses birds of prey (primarily falcons) and scaring techniques, including shooting as required. A memorandum of understanding has been agreed with the Township to allow the bird contractor to operate at the landfill site. There is a bird control person stationed at the site from dawn to dusk every day who uses a shotgun to scare the birds and shoot one or two when required, and also to employ a falcon. The objective is to continually harass gulls approaching the landfill site and never let them get started. The effectiveness of this program is evident by the fact that there are never more than 10 to 12 gulls in the



vicinity of the site at any time. The falconer also patrols the airport in a radio equipped vehicle and does not permit gulls (or any other birds) to settle on the airfield. A falcon is used on the airfield as required.

In addition to the actual operation of the bird control program, the contractor is constantly studying patterns of gull activity around the general area in terms of annual nesting sites, dispersion, changes in the size of the gull colonies, weather patterns, seasonal changes to crops and general bird flight patterns and ecological factors which would shift the balance in any direction. He trains his own falcons (uses several kinds of birds of prey for different types of birds) and even uses a Great Horned Owl in the aircraft hangars to disperse small birds that could become nuisances. One of the features that the falconer has noticed over the years is the changing cultural patterns of the Ring-billed gulls. They have shown that they are very adaptable to human environments. Their loafing, nesting and feeding habits have changed in a very short time, as they have become more aggressive in seeking out new places to feed and to nest, as sources of these two items have become overcrowded.

The airport and Quinte landfill site were toured with the contractor. As well, over a period of several months, a number of flights were made into the area to observe the bird populations and activity at the island colonies, the landfill site and on the airport. On all visits the virtually complete lack of gulls was noted at the SLS and airport. At the SLS there might have been 2 or 3 gulls circling briefly at about 50 to 100 feet above ground, but the birds would not land and soon left the site. At the airport no gulls were seen, although a few small birds were present on or near the ground.

The effectiveness of this program is particularly noticeable when it is considered that poor caretaking procedures appear to be exercised at the dump by the operator: the site does not appear to be covered over at night.

The Department of National Defense (DND) is very pleased with the results. The overall effectiveness can be measured by the fact that there has not been a gull strike by an aircraft in over two years. The program also has the effect of reducing the incidence of problems

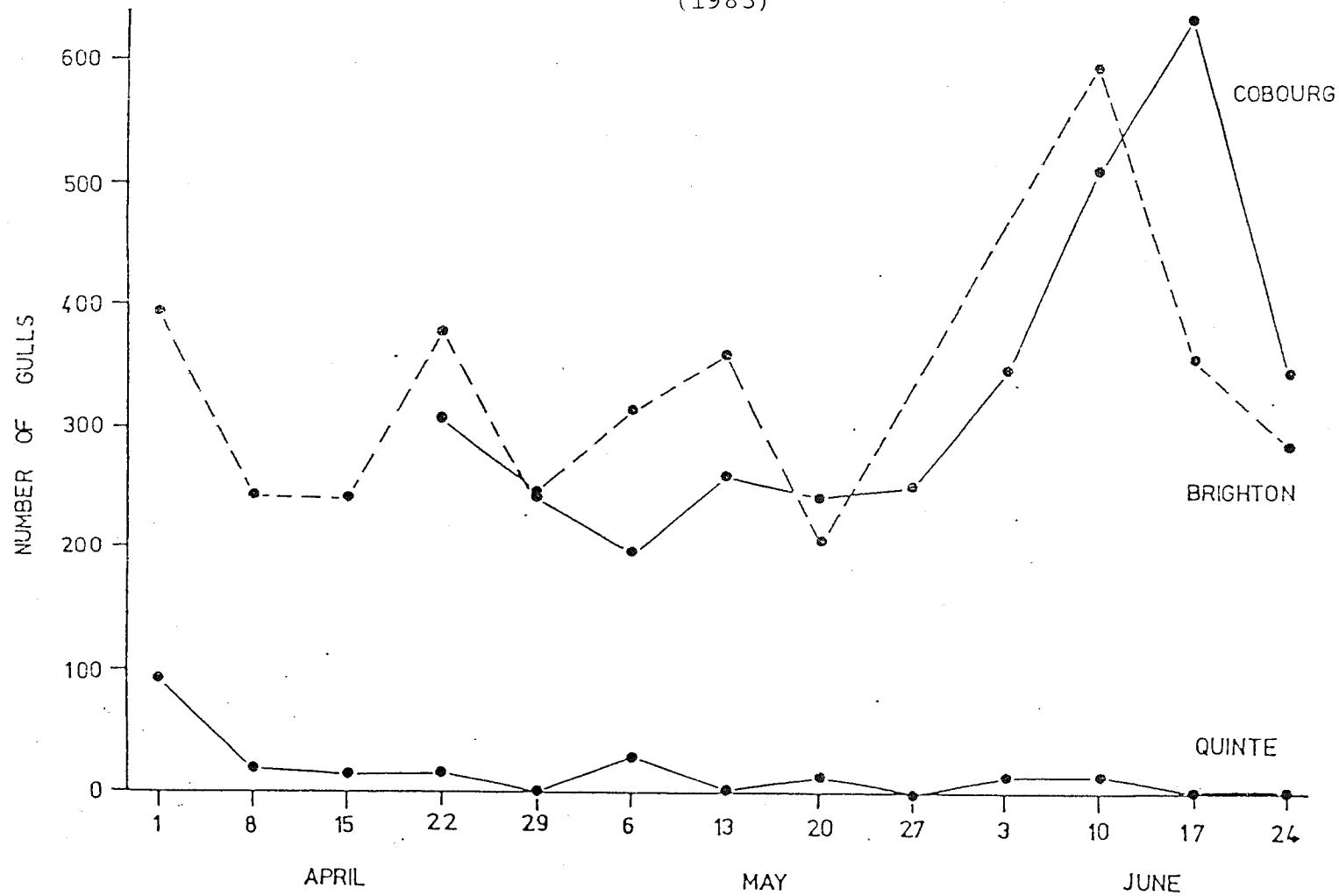
with other birds which are also scared off by the falcons. This is particularly important at this airport which is on a major bird migration route. There has only been one bird strike this year (a small swallow) even with the migration. There are incidents of hawks and owls attempting to establish residence around the airfield (airfields always seem to be desirable to these types of birds because of the open grassy spaces for hunting small mammals), but the falconer traps them and moves them to other locations. As well, his falcons, because they are trained at the airport, establish the airport as their hunting area and tend to drive off some of the hawks and owls.

With regard to other mitigative procedures, the falconer prefers to keep the grass cut as short as possible on the airfield. This keeps rodents, small mammals and small birds away from the airport and thus reduces the attractiveness for hawks and owls and other large mammals, such as foxes. The falcon program then keeps the gulls from using the shorter grass areas on the airfield.

Overall, the bird control program at Trenton is operated in a professional manner and is clearly effective. The gull populations attracted to the airport and the Quinte landfill site, for all intents and purposes, have been reduced to virtually zero. In comparison to the very effective results at the Quinte site, there are no bird control measures at the other sites in the area: Brighton and Coburg: and the number of gulls even at these two small sites were observed to be fairly large. Exhibit 6A, extracted from a study of Trenton Airport prepared by the Canada Wildlife Service in 1983, highlights this point. Exhibit 6B, prepared by the Bird Control Contractor at Trenton from information provided by the Base, shows the effectiveness of the program since the upgrading procedures were put in place in 1979. It is noteworthy that this result has been achieved, while over the same time period the number of gulls report in the area has increased from just over 100,000 in 1979 to about 250,000 in 1986.

In October 1987 a report was issued by the Environmental Assessment Board relating to an application by the present operator of the Quinte SLS for an expansion of the site. This report

EXTRACTED FROM STUDY OF TRENTON AIRPORT
(by Dr. Hans Blokpoel)
(1983)



Average number of gulls observed on all mid-day counts during each week of the study period.



EXHIBIT 6B

confirmed the information outlined above and made the following points:

- Aircraft movements recorded at the airport (CFB Trenton) were 86,600 in 1986; of these movements about two-thirds are in the direction of the SLS.
- The landfill is open all year and provides an almost continual exposure of food of the gulls, but there are also a number of other attractions in the area:
 - food at cultivated fields, drive-in restaurants, an outdoor theatre and fish in Quinte Bay
 - ample water in the Bay
 - worms on the ground at the airport and an adjacent golf course.
- The failure of the site operator to carry out proper cover procedures has increased the attractiveness of the site to the gulls.
- The bird control program, at an annual cost of \$133,000 which is borne entirely by the DND, has been successful. In its decision, the EAB noted only one gull strike having occurred at the site since 1979, and four or five probables.
- The comparison with the Brighton and Cobourg sites shown in Exhibit 6A is confirmed.

The results at Trenton show that, with a suitable program of mitigation, an airport and SLS can co-exist effectively.

NORTH BAY AIRPORT

This airport is in a somewhat similar situation to Trenton Airport, with the airport located between a landfill site and the roosting/nesting areas of gulls. There were 85,000 aircraft movements (landings and take-offs) recorded at the airport in 1986. There is a landfill site (100 to 125 tons of refuse per day) operated by the City of North Bay and located about 1.4 km off the northwest end of the secondary runway of the airport (see Exhibit 7). The site has been operated since 1962. Although located off the end of one runway it affects operations on all runways as the gulls cross the airport from Lake Nipissing and Trout lake which are between about 8

Scale 1:50,000 Échelle

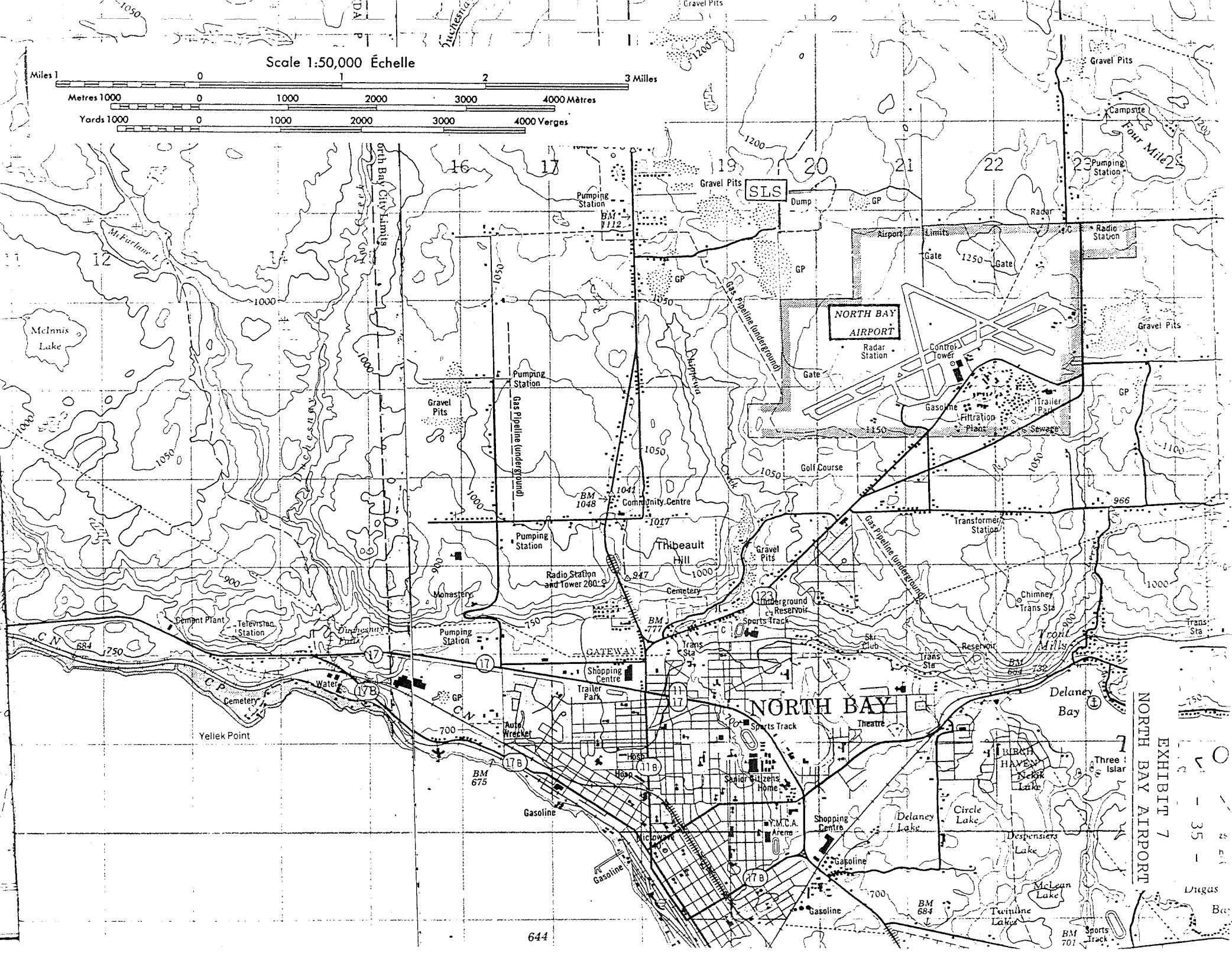
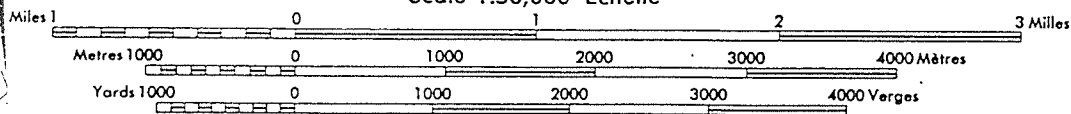


EXHIBIT 7
NORTH BAY AIRPORT

and 15 kms to the south of the site to get to the landfill site. They cross at an altitude of about 400 to 500 feet above the airport. Although the City attempts to keep the open face at the site as small as possible and covers it regularly, it continues to be an attraction to the gulls. The gulls nest mainly on the Manitou Islands in Lake Nipissing, but also use Trout Lake for water. The airport uses an aggressive bird control program, which includes the use of falcons at the landfill site, as well as on the airport. In addition, they use bangers, whistles, tapes and other noises. They have filled in all water sloughs on the airport. Very few gulls attempt to land at the airport due to the constant harassment. Since all of the lakes freeze over in the winter, the problem only exists during the period of open water.

According to the airport manager they are able to keep the gulls at the landfill site down to about 15 to 20 as long as a bird control person is stationed there. If they relax at all there are quickly 400 to 500 gulls at the site, followed by even more, if left unharassed. If the gulls are allowed at the landfill site, they tend to loaf on a south sunny slope near the site. The falconer employs 4 falcons and 2 goshawks.

The cost of the bird control program to Transport Canada is in the order of \$80,000 per year, but it is considered justified because of the potential for accidents with the high performance aircraft that operate at North Bay.

The gulls using the site for feeding tend to transit back to the lakes frequently for drinking which increases the incidence of crossing the airport.

Initial efforts at attempting to control the gulls were to shoot a few at the SLS, but this had limited affect and they subsequently determined that the use of falcons was the best action to provide adequate control, considering the risk to the aircraft.

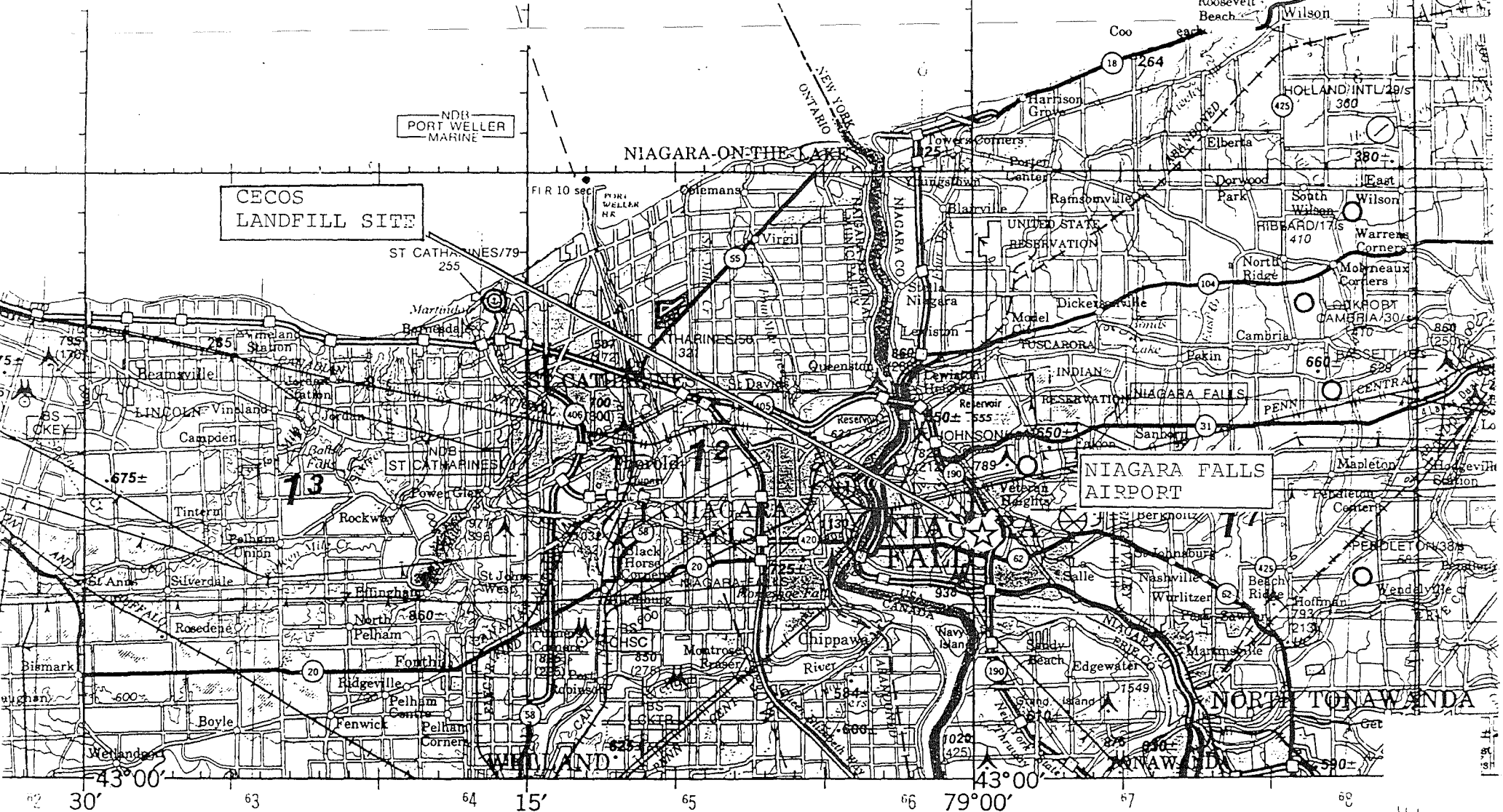
In November 1987 the Environmental Assessment Board issued a report dealing with an application by the City of North Bay for expansion of the existing landfill site. The report identified the problem with gulls at the landfill site and airport, outlined above, and the control program undertaken by Transport Canada. It concluded that the control program is very effective.

As at Trenton, the program at North Bay indicates that an airport and SLS can co-exist with the use of proper and persistent mitigative procedures.

NIAGARA FALLS (NEW YORK) INTERNATIONAL AIRPORT

The airport at Niagara Falls has about 100,000 aircraft movements per year, many of which are high performance civil and military aircraft. There is a landfill site about 3 miles to the west of the airport in line with one of the main runways (see Exhibit 8). The site is a combined chemical waste dump and sanitary landfill site. There was a request made some time ago by the operator of the site to expand, which would bring the site into the influence area of the airport. The expansion was only allowed on the basis that mitigative measures would be taken to ensure that an over-abundance of gulls would not be drawn to the site. Gulls have been a problem in the areas close to the Niagara Gorge, because it is one of the large breeding areas for Ring-billed gulls. It was reported by the Operation Manager at the SLS that there is a colony of about 20,000 gulls in the area. The Federal Aviation Administration confirmed this number, and further indicated that prior to the mitigative procedures now being used at the SLS, it was estimated that 2,000 to 3,000 gulls were at the site at times.

At the airport, they have been successful in controlling the number of gulls. On most days there are few if any gulls at the airport, except that after a rain and/or there is a low cloud ceiling they have perhaps up to 100 gulls. They disperse them with the use of scare shells, fire crackers, and shooting the occasional gull. Some time ago, they had a study done to ascertain if it was worms that appeared on the surface after the rain that attracted the gulls, but this did not appear to be the main factor. Grubs, small mammals and other items seem to attract them, as well. They keep the grass on the airfield fairly long (8 to 10 inches) to help dissuade the gulls from loafing on the airfield, but this leads to rodents, which in turn leads to foxes hunting the rodents. To counter the foxes they periodically employ a trapper to catch them and move them to another location. The airport manager noted that since the landfill



HABITÉS.....

TORONTO

LONDON

STRATFORD

Woodstock

Sandhill

Principal

Principale

Interchange

Échangeur

3 LANES TROIS VOIES

3 LANES TROIS VOIES

RAILROADS - CHEMINS DE FER

Normal gauge 1,44m (4.7') Voie normale

Narrow gauge Voie étroite

BOUNDARIES - LIMITES

International d'Etat

Primary administrative Subdivision de 1er ordre

VEGETATION - VÉGÉTATION

Woods-brushwood Bois-broussailles

HYDROGRAPHY - HYDROGRAPHIE

Falls: Rapids: Chute d'eau: Rapids

Swamp or marsh: Marais ou marécage

Rock: Sunken; Awash: Roches: Immergées; Découvertes

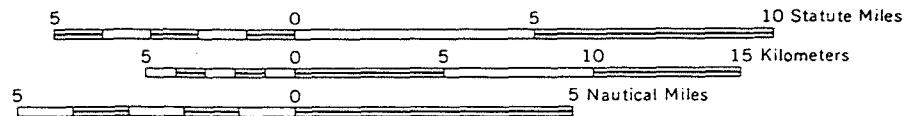
Foreshore flats: Etrants

Limit of danger; Reef: Limite de danger; Récif

Depth curves in fathoms: Courbes de profondeur en Fathoms

JOINT OPERATIONS GRAPHIC (A)

Scale 1:250 000



CONTOUR INTERVAL 100 FEET

ÉQUIDISTANCE DES COURBES 100 PIEDS

DEPTHS IN FATHOMS
PROFONDEUR EN FATHOMS

ELEVATIONS IN FEET
COTES EXPRIMÉES EN P

EXHIBIT 8
NIAGARA FALLS
INTERNATIONAL AIRPORT

site had instituted their stringent control measures, the number of gulls at the airport and in the area seems to have decreased, although specific counts have not been made.

At the landfill site an over-wiring system is used to control gulls. The wiring is mounted on telephone poles which place the top wires 100 feet above ground. The wire is strung on the four telephone poles in an approximate square and about 800 feet apart. This results in the wiring covering an area of about 12 acres which is well in excess of the area being worked. The four poles are embedded in the ground to a depth of 20 feet. The effect is to form a box over the working face of the landfill site. Access for the trucks is by pulling apart (like drapes) the vertical side wires while the open face is being worked. The wires on the side and across the top are about 5 feet apart.

The principle behind the wire operation is that the gulls, in searching for food, will "lock on" visually to a food source and will start decending in circles to the site. As they get close to the ground, the wire suddenly comes into their line of sight and they stop decending and veer away, assuming that they cannot get through the wire (although a few still manage to get through). After a period of experimentation and as soon as the 5 foot spaced wire was installed, the gull population at the site was reduced from the estimated 2,000 to 3,000 individuals to 200 or less, which is the present number.

During the visit to the site, the effectiveness of the overwiring could be seen. There were only about 100 gulls in total around the landfill site: about 75 were loafing on the only ungrassed bare slope in the area, about 15 were hovering above the wire trying to get in, and about five or so were under the wire feeding (a couple managed to descend through the wire and the others entered through the gap for the trucks to enter). Other control procedures used at the site include keeping the working face very small (it is continually covered as refuse is put in), virtually all inactive areas are grassed and the grass is kept between 8 and 10 inches in length to dissuade gulls from loafing, there is little if any ponded water on the site, and all vehicles are power washed every one or two days. Apart from the few gulls trying to get down through the wire, there

were very few gulls swarming over the site, except for a few isolated individuals flying at up to 200 feet above ground.

The site is on 390 acres, of which 240 will be used for refuse. There is approximately 25 more years of capacity left at this site for sanitary landfill. Volumes range between 800 tons and 2,500 tons per day. The site is operated 7 days per week, 24 hours per day.

Overall, the site is the cleanest of all landfill sites visited by the consultant. Great care is taken to ensure maximum gull control procedures are in place apart from using scare shells or shooting gulls (the site has permission for the use of firearms, but it is not company policy to do so at this time).

The control procedure has been so successful that the same system is now being used by BFI (Browning Farris Industries), the parent company of CECOS, at other landfill sites in New York City, Hampstead (Long Island), Cambridge (New Hampshire) and in Tennessee. Disney World has also built a similar system for use at their outdoor restaurants, apparently with good results. The Operations Manager at the CECOS International landfill site has now redesigned the system to make the telephone poles moveable. This provides much more flexibility in operating at a landfill site. The cost estimate provided by the Operations Manager for the system (in US dollars) is \$30,000 in capital, plus annual maintenance costs of about \$14,000, including labour and materials.

LESTER B. PEARSON INTERNATIONAL AIRPORT

Although LBPIA is not near a landfill site, the airport has experienced a number of problems with gulls, which are attracted by general conditions around the airport, and most specifically by garbage at the restaurants on Airport Road and Derry Road. The airport has therefore instituted a very active bird control program to handle both the gulls and all other types of birds (starlings, ducks and geese) because of the very high number of jet aircraft movements. In addition to the use of falcons, they use all other methods deemed necessary, such as trapping, scaring and shooting.

OTHER LANDFILL SITUATIONS

Several other landfill sites, which were not associated with airports, were observed through a combination of ground visits and overflights.

Present Burlington Landfill Site

The site was visited by ground and overflown and circled at about 500 feet above ground. There was only one open face with 2 or 3 trucks unloading and 1 or 2 bulldozers working on the site. There were a large number of gulls feeding on the open face, but there appeared to be not as many as at the Keele Valley site, but estimated to be several hundred in number. There was also a large number soaring over the site and loafing to the north of the open face. The soaring gulls all appeared to be at a relatively low level, estimated to be in the order of 200 to 300 feet above ground.

Several groups of 5 to 10 plus a number of individual gulls were also seen transiting between Hamilton Harbour and the site, but these also appeared to be only at about 200 to 300 feet above ground.

All gulls soaring around the site appeared to be within the bounds of the site. There was no open water noticed on the site area so it might be anticipated that a number of the gulls transiting between the site and the harbour may have already fed and returned to the harbour to drink. This would be consistent with information obtained on other SLS situations, for example North Bay.

Cobourg and Brighton

Two small landfill sites north of the Town of Cobourg and one north of Brighton were also observed. These are the same sites noted in the previous section on the Quinte SLS and Trenton airport. The refuse that had been dumped was open and no vehicles were working the open faces to cover up. There were a number of gulls at each site, estimated to be perhaps 200 or 300. Both of these sites are close to Lake Ontario and well within the feeding range of gulls nesting at the major colonies on Gull and High Bluff Islands.

Brock Road Site

This site, located in Pickering to the east of the City of Toronto, appears to resemble the Keele Valley site in many respects: one open face with several trucks dumping refuse and 2 or 3 bulldozers working to cover up the refuse. Apart from the open face, all of the site had been covered over with bare soil so that it would be a good open area for gulls to loaf. Some sod had been applied, but only to a small section at the south end. There is a large pool of water at the north end of the site. There was a large number of gulls (probably several hundred) on the open face, quite a few loafing on the open bare ground and a large number at the pond of water at the north end. A number of gulls were soaring over the site at an altitude estimated at 200 to 300 feet above ground.

SUMMARY

Exhibit 9 provides comparative data on the airports discussed in this report, including 1986 aircraft movements, distance from the SLS and main gull nesting area, and the reported nesting populations.

A number of conclusions can be reached on the basis of the site visits, discussions and observations presented in the foregoing paragraphs:

- . Sanitary landfill sites where no mitigative procedures are exercised will be attractors of gull populations. Specific numbers of gulls that might be attracted cannot be accurately estimated, but the information suggests that the numbers would likely be large, and perhaps in excess of 1,000 individuals at any one time.
- . But landfill sites are one of a number of sources of food used by gulls in the Lake Ontario area. The gulls will continue to eat many things including fish, insects and earth worms. They will continue to seek food at fast food outlets, parking lots and playgrounds, and, in rural areas, will forage in freshly harvested and plowed fields, and will feed on crops.

EXHIBIT 9
SUMMARY OF AIRPORTS

AIRPORT	ANNUAL AIRCRAFT MOVEMENTS (1986)	DISTANCE FROM SLS (km)	DISTANCE FROM MAIN GULL NESTING AREA	(km)	ESTIMATED GULLS (NESTING PAIRS)
Burlington Airpark	80,000 (est.)	3.5 kms (Site D)	Hamilton Harbour	18	20,000
Trenton	86,600	2.1 kms	Gull and High Bluff Islands	23	125,000
North Bay	85,000	1.4 kms	Lake Nipissing	15	n/a
Maple	61,000 (est.)	2.5 kms	Toronto Harbour*	30	53,000
Downsview	18,800	13.0 kms	Toronto Harbour*	16	53,000
L.B. Pearson International	301,400	--	Toronto Harbour*	24	53,000
Niagara Falls International (NY)	100,000	4.8 kms	Niagara Gorge	9	20,000
Toronto Island	182,300	--	Toronto Harbour*	4	53,000

* Leslie Street Spit plus Mugg's Island.

- . So long as the landfill site offers all of the features that are of interest to the gulls (food, resting places with good visibility and water), the gulls will probably stay within close proximity to the site apart from transiting to and from the overnight resting locations, which will tend to be along Lake Ontario. An airport located near a landfill site with these circumstances may not receive much interference to flight operations from gulls at the site.
- . However, if an airport is located between a landfill site and the resting locations (such as North Bay and Trenton), there may be some interference from birds transiting to and from the landfill site for daily feeding.
- . Mitigative procedures suggested in some of the background studies, such as scare techniques (noise, etc.), grassing and removal of ponded water may have limited and short term success in dissuading the gull populations from using the landfill sites. In fact, just denying loafing areas and water to the gulls but leaving the food source in place, may disperse the gulls for short periods to nearby locations to find these two requirements.
- . More extensive mitigative techniques such as falconry and overwiring applied persistently, are effective. Not only do they deny on a continuing basis access to the landfill sites and have the effect of dissuading the gulls from seeking food at the site, but they also have the effect of reducing the incidence of gulls at nearby airports (and probably other locations). Thus, with the applications of these techniques on a persistent basis, it is shown that the situations with gulls can be solved.
- . An airport and SLS can co-exist with the use of proper and persistent mitigative procedures.

IV - PROFILE OF BURLINGTON AIRPARK

LOCATION

Burlington Airpark is located on Bell School Line and south of Britannia Road in the Regional Municipality of Halton, approximately 3.5 kms south of Site D and 6 kms south of the Town of Milton (see Exhibit 10).

The airport is located on a 55 hectare site located at geographic co-ordinates 43° 27' N 79° 51' W. The airport is owned by Mr. Victor Kovachik, who also operates Kovachik Aircraft Service Limited. The operator of the airport is listed as Spectrum Airways.

The predominant land use around the airport is farming with some scattered rural residential development.

The site is 1.5 kms northeast of Bronte Creek and 5.5 kms southwest of Sixteen Mile Creek.

INVESTIGATION

Burlington Airpark was visited on several occasions by automobile to observe operations and flown into on two occasions when a number of take-offs and landings were performed. A final visit was made on November 30, 1987, when a discussion was held with the owner, Mr. V. Kovachik.

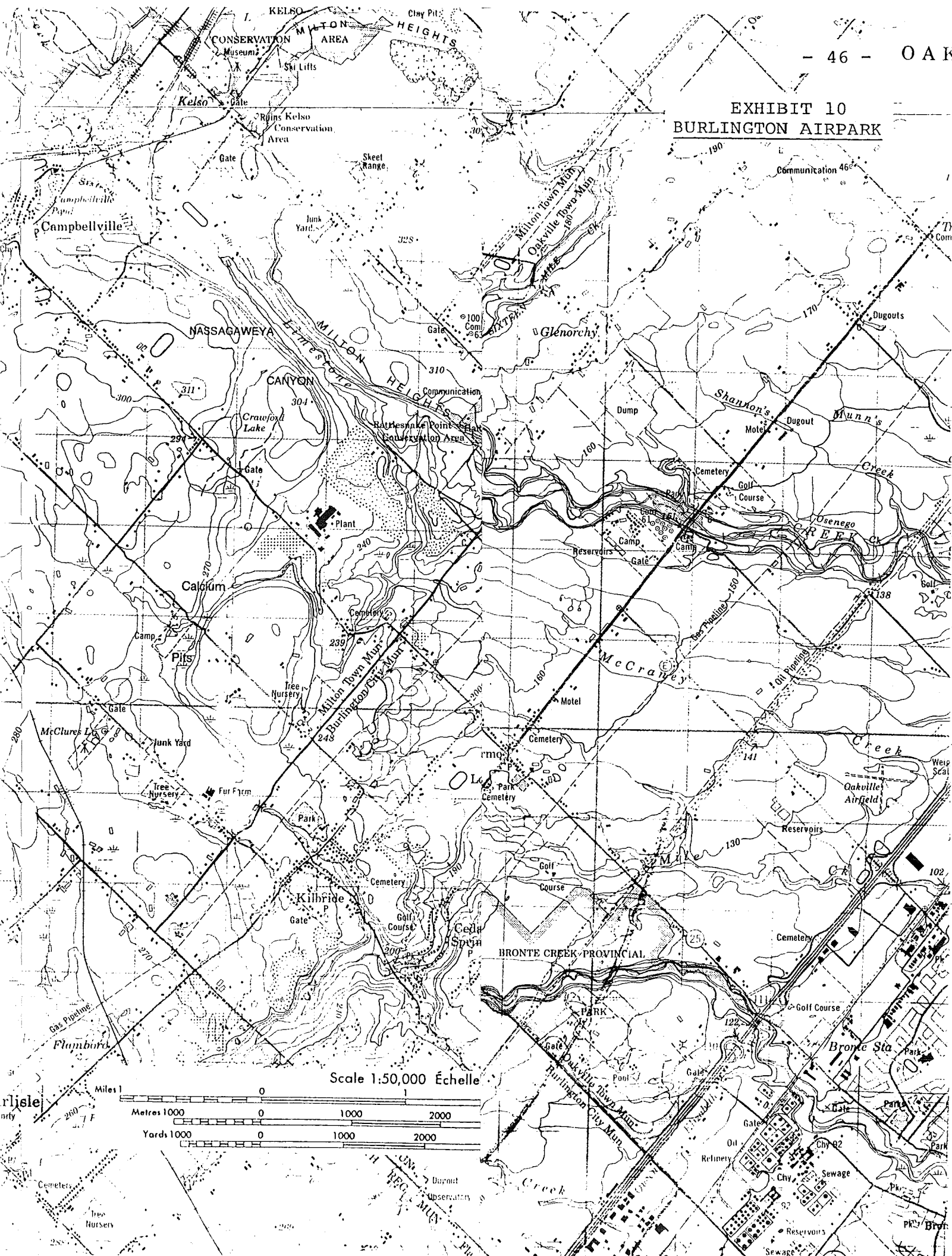
PHYSICAL FEATURES AND SERVICES

The airport is located on flat, open land at an elevation of 640 feet above sea level (ASL).

The airport is classified by Transport Canada as a Local Commercial Airport Sub-Class III. It has a public licence, which means it is open to all aircraft at the discretion of the pilots. There are two runways, both of which have displaced thresholds due to obstructions:

- the main runway is 2,800 feet long by 75 feet wide; the centre 40 feet is paved

EXHIBIT 10
BURLINGTON AIRPARK



- the secondary runway is 2,300 feet long by 200 feet wide and has a grass surface
- there is a taxiway paralleling the main runway, which provides access to the apron and aircraft parking areas on the northeast side of the airport.

Lighting for night flying is available only on the main runway. An aerodrome traffic frequency (ATF) is available for air to ground communication, but there is no positive air traffic control (an uncontrolled airport). Aircraft fuel and oil are available, as well as a number of other aircraft services.

ACTIVITY AND FORECASTS

The airport is used predominantly for recreational flying and for flying training, including air cadet glider training from April to June and September to October, on weekends and holidays. The owner reports, in a letter to Walker Wright Young Associates Limited (February 1983), that a number of local industries also use the airport for their aircraft. The owner also confirmed in discussion that a few light turbo-prop aircraft from the United States use the airport, but mainly in the summer.

Single and twin-engined aircraft in the following weight groups would be expected to be the major users of the airport:

WEIGHT GROUP

EXAMPLE AIRCRAFT TYPES

A (up to 4,300 lbs.)	Cessna 152 and 172, Piper PA28
B (4,301 to 7,000 lbs.)	Cessna 337, Beechcraft BE55

Forecasts prepared by Transport Canada (TC) in 1984 indicated 80 locally-based aircraft. In discussion with the City, the owner reported a population of about 100 aircraft. The owner now reports this as 120 to 130, and noted that about 10 had come following the closing of King City and Maple airports. In these same TC forecasts, the volume of activity estimated for 1983 was 58,000 movements (take-offs and landings), made up of 13,000 itinerant and 45,000 local movements.

The TC forecasts to the year 2,000, along with the above estimated 1983 values, are shown in the following table:

<u>YEAR</u>	<u>LOCAL</u>	<u>ITINERANT</u>	<u>TOTAL</u>
1983	13,000	45,000	58,000
1986	18,000	62,500	80,500
1991	19,900	74,200	94,100
1996	22,300	82,000	104,300
2000	24,400	88,700	113,100

This represents an average expected growth rate of about 4 percent per year over the period. Based on the widespread slowdown in activity at general aviation airports in Canada since 1982, it may be that these forecasts will be on the high side.

The owner could not confirm the volume of movements as he has never counted the activity.

In terms of weekend/weekday and day/night splits, no specific estimates have been prepared for Burlington Airpark, but the following general averages could be considered as typical, and were concurred with the owner:

- weekends: about 60% of total activity
- night: not more than 10% of total activity.

Commercial operations at the airport are presently conducted by Spectrum Airways, which is approved to provide the following classes of air service:

- Class 4: charter commercial air services, operated wholly within Canada
- Class 9-4: international charter commercial air service
- Class 7: specialty commercial air services, in the following sub-classifications:
 - AAD - aerial application and distribution of chemicals or other materials (such as pest spraying, fertilizing, seeding)
 - AC - aerial control: fire suppression or fire or frost prevention, etc.
 - AIRA - aerial inspection, reconnaissance or advertising

- APS - aerial photography or survey
- AP - aerial photography restricted to scenics
- RF - recreational flying (e.g. sightseeing)
- FT - flying training instruction.

The approved aircraft group for Spectrum for all of the above services is "A" - up to 4,300 lbs. on wheels, maximum authorized take off weight.

The owner's main business at the Airpark is aircraft maintenance, which employs six people. There are also two administrative support staff. Flying training is the other main activity which is showing some increase.

OPERATING CONSIDERATIONS

The airport is located 30 kms to the southwest of Lester B. Pearson International Airport (LBPIA), and about 5 kms south of the extended centre line of runway 06 Right/24 Left at LBPIA. To provide required vertical airspace protection for IFR (instrument flight rule) approaches to runway 06R at LBPIA, the aircraft circuit height at Burlington is limited to 1,500 feet ASL (860 feet above ground).

There are two prominent geographical features nearby, which are part of the Niagara Escarpment:

- Rattlesnake Point, located 5 kms to the northwest of the airport and almost in line with the extended centre line of the main runway; this feature rises to 1,020 feet ASL (380 feet above airport elevation) and has a couple of communication towers on it which rise to a height of 1,445 feet ASL (805 feet above airport elevation)
- Mount Nemo, located 2.5 kms to the southwest of the airport; this feature rises to an elevation of 950 feet ASL (310 feet above airport elevation).

Transport Canada indicates that traffic patterns for powered aircraft operating at the airport are designed so as to avoid climbing crosswind towards these hills when climbs are conducted to the west and northwest off the two runways. This procedure results in all aircraft operations being conducted to the northeast. This procedure is published in the Canada Flight Supplement (CFS). According to the owner, the reason for the direction of aircraft operations was not because of the hills, but was set up to avoid houses to the west of the airport.

The gliders operate off the grass to the west of the main runway and conduct their flight operations to the west and northwest of the airport to take advantage of the orographic lift over the hills.

FUTURE OPERATIONS

The forecasts prepared in 1980 by Transport Canada indicate a possible extension of the main runway to 3,800 feet in length. Presumably this would be done by the owner, and but he indicated he has no specific plans in this direction.

Examination of the Airpark was undertaken in early 1986 by Transport Canada with a view to exploring the potential expansion of the facility to accommodate a larger proportion of the traffic in the Toronto area. This brief study concluded that it would be impractical to consider upgrading of the airport to accommodate IFR traffic due to significant cost and physical constraints, and inability to zone the runways to meet IFR standards. As well, its location would not be entirely suitable as an alternate site for the majority of general aviation users in the Toronto area, who prefer locations much closer to the Toronto core area. For users to the southwest of Toronto, the newly upgraded Hamilton Airport was felt to be a better alternative. The report did mention extension of the main runway to 3,800 feet, but as noted previously Mr. Kovachik has no firm plans. The owner does plan to build a restaurant at the flying school.

OTHER SITE VISITS

During the other visits to Burlington Airpark by automobile and aircraft, the following points were noted:

- . The airport is very clean and dry with no loose paper or garbage in the area.
- . There is no water except for a small slough just to the east of the north end of the main runway. There is much less water than observed around Maple Airport.
- . On all visits, the only birds seen were a few small songbirds and black birds and two raptors perched in trees about 1 km southeast of the airport.
- . No gulls were sighted, but the owner indicated that a few gulls come on the ground when it rains. He regards this as being the same as for any airport located in the middle of farm country. They are not viewed by the owner as a problem.
- . Grass on the field is cut to about 3 to 5 inches and there is a ploughed field to the southwest of the intersection of the two runways.

V - TRANSPORT CANADA POSITION

POLICY, STANDARDS AND GUIDELINES

Two Transport Canada documents outline the policy, standards and guidelines which are used by the Department with regard to potential hazards from birds at airports:

- . TP 1247E: Land Use In The Vicinity of Airports, 5th Edition, November 1985, Part III Bird Hazards: this document describes the potential hazards from birds at airports and provides guidelines on the acceptability of different land use practices in the vicinity of airports. It recommends that food waste landfill sites not exist at a distance of 5 miles (8 km) or less from an airport boundary.
- . Document AK-75-10-000: Manual of Airport Bird Hazard Control: which provides policy, standards, and guidelines to deal with instructions for bird strike control at an airport and in the vicinity of an airport. It points out that approximately 80 percent of all bird strikes occur on the airport or in the immediate vicinity of an airport (i.e. at heights below 500 feet above ground).

The point to note in the second document is the differentiation between policies, standards and guidelines. The policies and standards (things that shall be done) are only enforceable on lands owned by Transport Canada. They highlight the types of actions that the airport manager must take to minimize the adverse impact on operations on the airport. These standards explicitly set out that no solid waste containing food garbage shall be dumped on airport property and that garbage dumps containing food garbage shall not be located on land owned by Transport Canada.

With regard to sites off airport property containing food garbage, only guidance is provided to municipalities and provinces as the Department's position is that the provisions and recommendations

are not enforceable on land not owned by Transport Canada. The regulation of land outside of the boundaries of airports owned by Transport Canada is a provincial matter.

With regard to zoning, a major question at Transport Canada is whether landfill sites can be classified in the same category as tall buildings and towers which can present hazards to flight operations at an airport. Landfill sites may not be in the same category, since bird activity at the landfill sites can be controlled so as to reduce the hazard. Bird activity on an airport can also be controlled. There is also no precise assurance of how many birds will be attracted. It should therefore be the responsibility of municipalities that are developing sanitary landfills, to consider the institution of proper control measures at the landfill sites.

THE TRANSPORT CANADA REGIONAL POSITION

Site D is 20 km from the outer beacon marker for Runway 24 Right at Lester B. Pearson International Airport and 27 km from the west end of the airport property. A discussion was held with a representative of the Airports Authority Group of Transport Canada in Toronto to explore whether possible bird activity at Site D might conflict with air traffic at LBPIA.

The position of Transport Canada is that because Site D is located outside the 8 km radius stipulated in document AK-75-10-000 "Manual of Airport Bird Hazard Control", the Department would have no concerns will regard to operations at LBPIA. It was further indicated that the 8 km radius is also suggested for other non-Transport Canada airports a guideline, but that this is often not followed due to other factors (proximity of landfill sites, low volume of aircraft activity, bird populations attracted, mitigating procedures taken and non-interference with operations).

THE UNITED STATES POSITION

The position of the United States Department of Transportation, Federal Aviation Administration (FAA), is outlined in their document 5200.5 of October 1974 "FAA Guidance Concerning Sanitary Landfills on or Near Airports".

The approach used in the United States is that sanitary landfills will be considered as an incompatible use if located within areas established for the airport according to the following criteria:

1. Landfills located within 10,000 feet of any runway used or planned to be used by turbo-prop or jet aircraft.
2. Landfills located within 5,000 feet of any runway used only by piston type aircraft.
3. Any landfill located such that it places the runways and or approaches and departure patterns of an airport between bird feeding, water or roosting areas.

These criteria require that disposal facilities not be located within these parameters unless the facility is found to not pose a bird hazard to aircraft.

The distances cited in the first two criteria for defining the danger zone for bird/aircraft collisions are based on a consideration that over 62 percent of all bird strikes occur below altitudes of 500 feet and that aircraft are generally below this altitude within the distances specified. It is generally the 10,000-foot criterion that receives most attention from the FAA in establishing an appropriate hazard-free zone.

It should be noted, however, that although the FAA is authorized to control airport operations to reduce bird hazards to aircraft, its authority does not extend to disposal facilities outside airport boundaries which may pose such hazard. It is also made clear that the regulations/standards do not prohibit the disposal of solid waste within the specified distances. Instead, the distance defines a "danger zone" within which particular care must be taken to ensure that no bird hazard arises.

VI - CONCLUSIONS AND SUGGESTED ACTIONS

GENERAL CONCLUSIONS

Ring-billed gulls will be a factor for any agency considering the establishment of a sanitary landfill site (SLS) in close proximity to the west end of Lake Ontario (say within up to 40 miles of the shore which is the approximate range the birds are reported to travel for food).

There is likely an existing population of up to 400,000 birds in the range from the Outer Harbour East Headland at Toronto (the Leslie Street Spit) to Hamilton Harbour, inclusive. It is also a reasonable assumption that this population will continue to grow, depending on the availability of nesting sites, control measures employed and available food. In fact, the Canadian Wildlife Service sees room for expansion, and thus continuing growth of the colonies.

The peak period of activity can be expected to be post-nesting (about the end of June) until migration (late fall) when the fledglings have been added to the population of nesting adults and juvenile birds (up to 2 years old) to form a total foraging population. Added to an increase in the size of the foraging population is the phenomenon of post-nesting dispersion when the fledged chicks and many nesting adults leave the nesting sites and move inland in search of food.

At migration, the majority of Ring-billed gulls in the Lake Ontario area will leave to spend the winter on the southeast coast of the United States. But some will stay behind as long as open water and an adequate food supply are available. Those leaving will be replaced to some extent at Lake Ontario for the winter by gulls migrating from northern Canada. As well, the resident Herring gull population will remain. Thus landfill sites will continue to be food sources for gulls during the winter months.

It is likely that many of the birds attracted to Site D would come from the Hamilton Harbour area, although this may not be the exclusive source:

- some may come from the Leslie Street Spit

- others may come from small colonies along the shore of Lake Ontario between Toronto and Hamilton
- pre-nesting juvenile birds (up to 2 years old) which may not have a specific allegiance to any colony will be an additional source.

Gulls from the Leslie Street Spit or the north shore of Lake Ontario should not fly near Burlington Airpark enroute to and from Site D.

However, Hamilton Harbour should not continue to be an available nesting site for the gulls beyond the next 5 to 10 years. The site presently being used by the gulls is being developed. As well, the Harbour Commission is seeking ways in the interim for controlling and reducing the population of Ring-billed gulls, which are considered a nuisance.

There are mixed opinions on the routes the gulls might follow to Site D. On one hand, there is evidence to suggest they might follow a fairly direct route to the site. On the other hand, some experts feel that the gulls may follow water courses.

The altitude of the gulls in transit between the over-night roosting areas on the Lake and the inland feeding areas will probably be in the order of 200 to 700 feet above ground.

LIKELY VOLUMES

The likely number of gulls to be attracted to a landfill site cannot be accurately estimated. Evidence from observations in preparing this report and from SLS operators suggests that the numbers can vary widely depending on the size and characteristics of the site, distance from roosting areas, alternate food sources for the birds, water and loafing areas, and mitigative or controlling measures taken.

Cases where little or no mitigative measures are taken suggest possible volumes to be expected:

- current Burlington and Brock Road Landfills: at least several hundred and probably more in the post-nesting period

- Keele Valley Landfill Site: probably 2,000 to 3,000
- CECOS International Site at Niagara Falls, N.Y. prior to the use of over-wiring: reported 2,000 to 3,000 gulls.

The results of the aggressive control programs at North Bay Trenton and Niagara Falls, N.Y. airports show that the gull populations at the landfill sites and the nearby airports can be effectively controlled. This limits significantly the hazards at the airport and the nuisance and unsanitary effects of the gulls at the site and surrounding locations.

Nevertheless, airports will still likely attract gulls at certain times, even without the presence of a nearby SLS:

- airfields are flat open areas with good visibility
- the runways, particularly if paved, are warm spots for gulls to rest
- there is often pooled water on airfields after rain which is attractive to gulls
- worms, grubs and other small creatures can be easily foraged by the gulls, particularly after rain and if the grass is cut short
- the attraction is increased if refuse containing food is left around the airport
- airports are often located in agricultural areas with ploughed fields and crops that attract gulls.

IMPLICATIONS

If no mitigative or control measures are taken at a SLS built at Site D, apart from keeping the working face as small as possible, cleaning the site vehicles, and covering over the face at the end of each working day (this would be similar to the Keele Valley operation), a thousand gulls might use the site daily for food, at least during the post-nesting summer period.

The extent that these gulls would impact on Burlington Airpark could vary:

- if there are suitable water and loafing areas at the SLS, then the gulls would likely remain close to the SLS and not seek these at the airport or on surrounding farm lands; but this does not mean that some gulls would not use these other areas from time to time
- if water and loafing areas are denied at the SLS, but the food supply remains available, then the gulls are likely to seek other areas around the site as sources for these two requirements; these areas could include the airport
- the attraction of the airport must therefore be minimized by allowing no standing water, no refuse or garbage, keeping off-runway grass slightly longer, and the institution of a worm control program; if a restaurant is built at Burlington Airpark, garbage must be closely controlled
- it must be remembered that both the Site D SLS and the airport are in an agricultural area and that seasonal plowing and harvesting will likely attract gulls in any event.

If the airport remains the same size as now, the traffic will probably continue to be mainly light single-engined aircraft and the risk of a bird strike and/or damage from a bird strike will remain somewhat less than if the runway is lengthened and there is an increase in use by turbo-prop and corporate jet aircraft.

SUGGESTED ACTIONS

It is likely that the strategy for the site control suggested in the Technical Study, Biophysical Analysis Report, Site D, August 1986 will provide some assistance, as far as the suggested measures go. But as long as the open face goes unprotected and access is not denied aggressively and persistently, gulls can be expected. The use of long grass and removal of standing water could transfer the search by the gulls for loafing and drinking to other surrounding areas, which could include farms and the Airpark.

The best solution is to aggressively and persistently deny access by the gulls to the food source from the outset. The following action is therefore suggested for consideration:

- during construction, when open earth exists (worm source), institute a program of scaring using scare shells, firecrackers, as required

- once the delivery of refuse begins at the SLS, aggressive measures should be set up; these could consist of either a falcon program or over-wiring; both programs might need to be augmented by the occasional use of other scaring techniques
- assistance should be provided to Burlington Airpark to ensure that attractiveness to gulls is minimized; measures to assist the Airport could be:
 - use of worm killing chemicals
 - advice on clean-up, including garbage from the planned restaurant
 - adequate grass cutting
 - removal of opportunities for standing water
 - assistance with scaring
 - use of a trained biologist and/or ornithologist to survey the airport periodically
 - periodic review of program effectiveness
 - review of air traffic and operating procedures to see if adjustments can be made
 - encourage pilots to use landing lights at all times when in the vicinity of the airport
 - pursue publishing of a Notice To Airmen (NOTAM) warning of the potential danger from gulls
 - ensure a good record is kept of the incidence of gulls and of mitigative measures taken at the airport.

These suggested actions were discussed with Mr. Paul McDonald of Transport Canada. His reaction to this program was, that if the Region was prepared to institute such measures at the SLS and the airport, this would be a reasonable approach that would give adequate consideration to the operation of the airport.

If landfill operations were shut down from noon on Saturday until Monday morning, which is the peak operating period at the airport, risk from interference with flight operations by gulls could be further minimized.