APPENDIX C

Noise Assessment of Proposed Expansion to Billy Bishop Toronto Centre Airport

November 2013

PROPOSED BILLY BISHOP AIRPORT EXPANSION HEALTH IMPACT ASSESSMENT

Noise Assessment

Submitted to:
Dr. David McKeown
Medical Officer of Health
Public Health
277 Victoria Street, 5th Floor
Toronto, Ontario M5B 1W2

REPORT

Report Number: 13-1151-0215

Distribution:

1 electronic copy - City of Toronto
1 electronic copy - Toronto Public Health
2 copies - Golder Associates Ltd., Mississauga

Golder Associates

Study Limitations

Golder Associates Ltd. (Golder) has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practising under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied is made.

This noise assessment was prepared for the exclusive use of the City of Toronto and Toronto Public Health. The report is based on observations of BBTCA operations, discussions with Toronto Port Authority and Porter Airlines personnel related to current and proposed operations, review of documentation provided by Porter Airlines and Bombardier. This report cannot account for changes in BBTCA operational practices completed after it has been finalised and submitted to the City of Toronto and Toronto Public Health.

The information, recommendations and opinions expressed in this report are for the sole benefit of the City of Toronto and Toronto Public Health, subject to the limitations and purposes described herein. No other party may use or rely on this report or any portion thereof without Golder's express written consent. Any other use of this report by others is prohibited and is without responsibility to Golder.

When evaluating BBTCA and developing this report, Golder has relied on information provided by the City of Toronto and Toronto Public Health, Porter Airlines and Bombardier, and others. Golder has acted in good faith and accepts no responsibility for any deficiencies, misstatements, or inaccuracies contained in this report resulting from omissions, misinterpretations or falsifications by those who provided Golder with information.

Table of Contents

1.0 INTRODUCTION 1

2.0 BACKGROUND 2

2.1 Existing BBTCA Operations 2

3.0 BOMBARDIER CS100 JET AIRCRAFT 4

3.1 Tripartite Agreement Adjusted Aircraft Noise Levels 4

4.0 ACOUSTIC TERMINOLOGY 6

5.0 METHODOLOGY 7

5.1 Approach 7

5.1.1 Noise Modelling Prediction Locations 8

5.1.2 Monitored Noise Levels 8

5.1.3 Background Noise Levels 9

5.1.4 BBTCA Air Traffic Noise Levels 9

5.1.4.1 Engine Run-Ups, Ferry Operations and Taxiing Noise Levels 9

6.0 NOISE MODELLING PREDICTION RESULTS 10

6.1 Noise Source Emissions 10

6.1.1 Background Road and Rail Noise 10

6.1.2 Airport Noise 10

6.1.3 Engine Run-Ups and Ferry Noise 11

6.2 Background Noise Levels 12

6.3 Existing BBTCA Operations 14

6.4 Proposed Future BBTCA Scenario with Jets 16

6.5 Engine Run-Ups, Ferry Operation and Taxiing 18

7.0 SUMMARY 21

8.0 REFERENCES 22

TABLES

Table 1: Certification Noise Levels for Proposed Proxy Aircraft 4

Table 2: Summary of Noise Data Used for Taxiing as Provided by Bombardier 11

Table 3: Summary of Noise Data Used for Engine Run-Ups and Ferry Operation 12

Table 4: Summary of Noise Monitoring Data 12

Table 5: Summary of Predicted Background Noise Levels 13

Table 6: Summary of Cumulative Predicted Noise Levels – Existing BBTCA Operations 15

Table 7: Summary of Cumulative Predicted Noise Levels – Proposed Future BBTCA Scenario 17

Table 8: Summary of Engine Run-Ups, Ferry Noise and Taxiing During Daytime Hours 19

Table 9: Summary of Engine Run-Ups, Ferry Noise and Taxiing During Nighttime Hours 20

ACRONYMS

BBTCA	Billy Bishop Toronto City Airport
HIA	Health Impact Assessment
TPH	Toronto Public Health
NEF	Noise Exposure Forecast
TPA	Toronto Port Authority
ECAC	European Civil Aviation Conference
CAA	Civil Aviation Authority
NPD	Noise Power Distance
FAA	Federal Aviation Administration
dB	Decibel
Hz	Hertz
dBA	A-weighted decibel
L_{eq}	Equivalent continuous sound level
L_{night}	Nighttime equivalent continuous sound level
L_{day}	Daytime equivalent continuous sound level
%HA	Percentage highly annoyed
INM	Integrated Noise Model
ISO	International Organization for Standardization
ppa	Passengers per annum

1.0 INTRODUCTION

The Billy Bishop Toronto City Airport (BBTCA) is considering an expansion to the existing operations which could allow jet airplanes to operate at the airport. The introduction of jets to the airport could cause a potential change to the local environment including air quality and noise. To address these changes, a rapid Health Impact Assessment (HIA) was initiated by the Toronto Public Health (TPH) to provide Toronto's Medical Officer of Health with sufficient information to advise on the potential health impacts and reduction of health risks associated with the potential expansion of service.

One of the primary concerns related to the proposed airport expansion is noise and as a result a noise assessment has been carried out which includes simulating cumulative conditions with noise modelling predictions; namely:

1) Background conditions without BBTCA operations (i.e., road and rail noise sources only);

2) Existing operations based on 3.8 million passengers per annum (ppa) and 202 commercial movements per day with Bombardier Q400 (turboprop aircraft); and

3) Proposed future scenario based on 4.3 million ppa and 202 commercial movements per day with Bombardier Q400 (75%) and jet aircraft (25%).

City of Toronto staff specified 202 commercial movements per day as the total maximum slot capacity for all commercial aircraft operations for the purposes of the HIA. Background noise levels for the study area shown in Figure 1 were simulated using road and rail traffic volume information obtained from the City of Toronto and railway operators respectively. Noise levels were also measured at four locations within the study area. The background scenario has not included noise emissions associated with BBTCA operations or any other potential localized noise sources such as industrial facilities and construction activities.

The existing operation was based on the operation of the Bombardier Dash8-Q400 (Q400) turboprop aircraft only with a maximum annual passenger capacity of 3.8 million, which corresponds with 202 commercial movements per day. The proposed future scenario assumed the use of jet aircraft operating at BBTCA such as the Bombardier CS100 (CS100). However, as the noise emissions data associated with the Bombardier CS100 have not yet been formally established, the use of the Boeing 737-700 has been considered in the analysis as a surrogate to the CS100. To account for some of the potential uncertainty with the noise emissions data, the Boeing 737-700 noise data has been modified to the maximum levels allowable by the Tripartite Agreement since it is understood the CS100 will be required to meet these levels if the Proposal is approved.

In the future scenario, it is assumed that 25% of the total movements will be jet aircraft and 75% of the movements will be the Q400 aircraft which would result in an annual capacity of 4.3 million passengers.

In preparing this noise assessment, Golder Associates Ltd. (Golder) has not attempted to establish the Noise Exposure Forecast (NEF) contours for the existing operation or proposed future BBTCA scenario. The focus of this assessment was to provide support to the Human Health specialists and therefore only noise indicators that were considered suitable for providing useful information to the HIA were evaluated.

2.0 BACKGROUND

The BBTCA is located at the north-western tip of the Toronto Islands (the "Islands") within the City of Toronto as shown in Figure 1. The Islands are located south of the mainland and are accessible from the mainland via ferry. A pedestrian tunnel between the mainland and the BBTCA is currently under construction and completion is expected in the second half of 2014.

The BBTCA opened in 1939. In 1983, the City of Toronto, Toronto Harbour Commission (now the Toronto Port Authority) and the Government of Canada (Minister of Transport) entered into a "Tripartite Agreement" for the lease of the airport lands for a term of 50 years. The Tripartite Agreement governs the operation of the airport by the Toronto Port Authority and includes a ban on jet aircraft, a night curfew between the hours of 11 pm – 6:45 am and a ban on expansion of existing runways and construction of new runways. Porter Airlines began commercial operations at BBTCA in 2006, relying exclusively on the Q400 aircraft to fly to regional ports generally within 925 kilometres of Toronto. Air Canada restarted operations at the BBTCA in 2011 following the award of 30 slots.

2.1 Existing BBTCA Operations

In 2010, the TPA carried out a capacity study (Billy Bishop Toronto City Airport Capacity Report, Feb 2010) to determine the daily number of commercial aircraft movements that could be accommodated at BBTCA which would allow the facility to meet the noise level limits set out in the Tripartite Agreement. The results determined that 202 daily slots for scheduled commercial aircraft arrivals and departures could be accommodated.

The BBTCA consists of a number of buildings and structures as well as runways. The BBTCA currently accommodates one type of commercial aircraft namely the Q400 (or similar) which can carry about 70 passengers per flight.

The maximum number of flights per year, based on a 202 slot cap, would be 73,730 flights per year. The number of scheduled commercial flights varies by day of week and holidays. Typically, weekday demand is about 97% of capacity while on Sundays and holidays this is reduced to about 70% and further reduced to about 50% on Saturdays. This amounts to about 62,500 flights per year or about 3.8 million passengers per year travelling through the airport. In 2012, the annual total was about 1.9 million passengers, roughly half of the estimated normal maximum capacity.

The peak number of Q400 flights per hour would be 16 flights per hour based on a 10 aircraft gate layout which would generate between 870 to 930 passengers per hour with an 85% aircraft capacity. On an annual basis, it is assumed that 25% of passengers (1 million/yr) transfer to another flight while the remaining (2.8 million/yr) move from the island to the mainland. On a peak hour, the number of passenger accessing the mainland would be 650 to 700 passengers per hour and a similar amount moving from the mainland to the island via the ferry.

In providing this level of service, flights arriving to and departing from BBTCA follow several flight paths. All flights departing BBTCA will always turn towards the south over Lake Ontario prior to adjusting course to destinations located north, east or west. When crossing over land, aircraft are required to be at either a minimum elevation of 3,000 or 5000 feet, depending on the flight path, to avoid flights to / from Pearson International Airport that are at lower elevations. There are two flight paths that travel directly over the City of Toronto in a north-south direction. The first, which is infrequently used and dependent on air traffic at Pearson, travels directly over the City core at a minimum elevation of 5,000 feet. The second path turns north and crosses the shoreline between the Beach and the Scarborough Bluffs at a minimum elevation of 3,000 feet. These flight paths and the many others are shown in Figures 2 through 6.

3.0 BOMBARDIER CS100 JET AIRCRAFT

The CS100 is still in testing phase and as such, the aircraft noise modelling parameters have not yet been developed. Generally, a substitute aircraft that is considered to be acoustically equivalent (i.e., similar noise emissions) has been developed to represent the actual aircraft type. However, when the selected aircraft is a significant contributor to the noise emissions from an airport, aircraft selected on the basis of noise emissions are unlikely to have sufficiently similar noise footprints to those they are replacing. Under these conditions the European Civil Aviation Conference (ECAC) recommends selecting as a proxy the listed aircraft with the closest weight, same number of engines and installed thrust-to-weight ratio to the unlisted aircraft.

Although it is preferred that the proxy aircraft should be from the same manufacturer as the unlisted aircraft, it is still acceptable to use other manufacturer aircraft. Jet engine differences can be taken into account subsequently by applying adjustments based on certified noise levels. The ECAC suggest making the adjustments under the form of equivalent numbers of operations. The UK Civil Aviation Authority (CAA) suggests a similar adjustment directly to the Noise Power Distance (NPD) levels of the proxy aircraft. The noise model data is adjusted based on differences between the projected certification data and the surrogate aircraft's known data.

Separate adjustments should be made for arrivals and for departures. For arrivals, the difference will be assessed based on the approach certification noise levels. For departures, the difference between the arithmetic averages of the certified lateral and flyover levels.

Bombardier suggested that the Boeing 737-700 should be used as a baseline surrogate while the Federal Aviation Administration (FAA) suggested the use of the EMB170. In addition, the CRJ900, a Bombardier manufactured aircraft was reviewed.

3.1 Tripartite Agreement Adjusted Aircraft Noise Levels

Bombardier has indicated that the CS100 will meet the cumulative noise levels set in the Tripartite Agreement but has not yet submitted individual certification noise levels. Based on this, the decision was made to develop a Tripartite Agreement compliant jet aircraft model based solely on the Tripartite Agreement noise levels. Table 1 highlights the certification noise levels of each proposed proxy aircraft against the Tripartite Agreement.

Table 1: Certification Noise Levels for Proposed Proxy Aircraft

Proxy Aircraft	Engine	MTOW (kg)		Approach	Sideline	Flyover
Tripartite Agreement			Certification	92.0	83.5	84.0
EMB170	CF348E	37,200	Certification	94.9	93	82.5
			Adjustment	2.9	9.5	-1.5
B737-700	CF567B	70,080	Certification	96.1	93	85.9
			Adjustment	4.1	9.5	1.9
CRJ900ER	CF348C5	37,421	Certification	93.2	89.5	83.9
			Adjustment	1.2	6.0	-0.1

The NPD curves for these three aircraft types were modified based on the adjustments required to match the certification noise requirements by the City of Toronto's aviation consultant Airbiz. For the purposes of this assessment, the B737-700 adjusted levels have been used as a proxy to the CS100 in consultation with AirBiz as this data (i.e., NPD) is currently not available for the CS100. This approach was also acceptable to Bombardier.

4.0 ACOUSTIC TERMINOLOGY

To understand the analysis presented in this noise assessment, the following is a brief discussion of technical noise terms.

The noise data presented in this report has been given in terms of sound pressure level measured in decibels ("dB"). In addition, data and analysis are provided in terms of frequency distribution. The levels are grouped into octave bands. Typically, the centre frequencies for each octave band are 31.5, 63, 125, 250, 500, 1000, 2000, 4000 and 8000 Hertz (Hz.). The human ear responds to the pressure variations in the atmosphere that reach the ear drum. These pressure variations are composed of different frequencies that give each sound we hear its unique character.

It is common practice to sum sound levels over the entire audible spectrum (i.e., 20 Hz to 20 kHz) to give an overall sound level. However, to approximate the hearing response of humans, each octave band measured has a weighting applied to it. The resulting "A-weighted" sound level is often used as a criterion to indicate a maximum allowable sound level. As human hearing is less sensitive to low frequency sound, the A-weighting filter emphasises frequencies between 500 Hz to 4000 Hz. Conversely, smaller relative contributions are considered at higher and lower frequencies. This corresponds approximately to the hearing response to humans at normal sound levels (e.g., 50 dB).

Environmental noise levels vary overtime, and are described using an overall sound level known as the L_{eq}, or equivalent energy averaged sound level. The L_{eq} is the equivalent continuous sound level, which in a stated time, and at a stated location, has the same energy as the time varying noise level. It is common practice to measure L_{eq} sound levels to obtain a representative average sound level. For the purposes of the HIA, the specific metrics that are considered include:

- L_{night};
- L_{day}; and
- %HA.

L_{night} is defined as the nighttime L_{eq} between the hours of 23:00 – 07:00. L_{day} is defined as the daytime L_{eq} between the hours of 07:00 – 23:00. %HA refers to the percentage of people that may be "Highly Annoyed" as defined in the Health Canada draft national guideline for evaluating health impacts of noise.

5.0 METHODOLOGY

The likely noise effects associated with existing road and rail noise sources and BBTCA have been evaluated with the aid of the Datakustik CadnaA noise prediction software, which has incorporated RLS90, Schall03, the FAA Integrated Noise Model (INM) version 7.0 and ISO 9613-2 noise prediction models. These models allow for the incorporation of the following environmental factors that can result in noticeable changes in noise levels:

- attenuation due to the distance between a noise source and receiver location;
- absorption of acoustic energy by the atmosphere;
- loss of acoustic energy as it travels around or over hills, or intervening buildings; and
- loss of acoustic energy as it passes over the ground (i.e., ground impedance).

5.1 Approach

To address the potential changes to noise from the proposed changes to BBTCA, three scenarios have been simulated with noise modelling predictions including;

1) Background conditions without BBTCA operations (i.e., road and rail noise sources only);
2) Existing operations based on 3.8 million passengers per annum (ppa), 202 commercial movements per day with Bombardier Q400 (turboprop aircraft) and no physical expansion of the runway; and
3) Proposed future scenario based on 4.3 million ppa, 202 commercial movements per day with Bombardier Q400 (75%) and jet aircraft (25%) and physical expansion of the runway.

City of Toronto staff specified 202 commercial movements per day as the total maximum slot capacity for all commercial aircraft operations for the purposes of the HIA. As a complete set of noise emissions data for the CS100 is currently not available, the Boeing 737-700 was selected as a surrogate, which incorporates the maximum noise emissions allowed by the Tripartite Agreement as identified in Table 1 and modified NPD curves for the Boeing 737-700. Where CS100 noise data was available (i.e., engine run-ups and taxiing), it was integrated into the prediction models.

The approach includes the cumulative change in noise levels by combining the background noise levels (i.e., road and rail sources) with either the existing (without jet aircraft) or the proposed future (with jet aircraft) scenarios. Noise predictions for all three scenarios were modelled at three different heights above local grade: 2 m, 15 m and 70 m.

In addition to the three scenarios identified, additional noise prediction modelling was carried out that considers noise from engine run-ups, ferry operation and taxiing as other BBTCA activities of concern. These three activities were identified as concerns from the local public and have therefore been included in the noise assessment. Noise predictions associated with these activities have been assessed separately, although taxiing has also been included in the airport operations.

5.1.1 Noise Modelling Prediction Locations

The effects on the noise environment due to the existing operations and proposed future scenario at BBTCA have been assessed at locations within the study area including, but not limited to: residences, schools, parks and daycares. Noise modelling results have been developed for the following wards:

- Ward 19/20 - Trinity-Spadina,
- Ward 27/28 - Toronto Centre-Rosedale,
- Ward 30 - Toronto-Danforth, and
- Ward 32 - Beaches-East York.

The City of Toronto and Toronto Public Health have identified discrete locations of interest, including the following:

1) Stadium Road;
2) Toronto Music Garden;
3) Harbour Square;
4) Ward's Island;
5) Harbour Side Co-op Homes;
6) Windward Co-op Homes;
7) Little Norway Park;
8) The Waterfront School / City School; and
9) The Island Public School.

5.1.2 Monitored Noise Levels

Extended noise monitoring was carried out at locations 1 to 4 in the list above. Monitoring was carried out between September 19 to October 2, 2013 and October 23 and October 30, 2013. Noise data was acquired continuously during the monitoring periods at 10-minute intervals. In addition, audio files were recorded throughout both monitoring periods. Unfortunately, during the monitoring periods, monitoring equipment was tampered with and as a result, some data was lost. Figure 1 shows the modelling domain and the nine specific locations identified by the City of Toronto and Toronto Public Health.

Monitored noise levels have been processed to provide L_{night}, L_{day} and %HA.

5.1.3 Background Noise Levels

Background noise levels were simulated using road and rail traffic volume information obtained from the City of Toronto without BBTCA operations and railway operators respectively. Noise modelling predictions were generated using RLS90 and Schall03 prediction models for road and rail respectively. In addition, an existing digital terrain model and building layers, provided by the City of Toronto, have been incorporated into the noise model to account for changes in ground elevation, shielding provided by buildings and elevated locations.

Noise modelling predictions generated include L_{night}, L_{day} and %HA.

5.1.4 BBTCA Air Traffic Noise Levels

The effect of noise emissions associated with airport air traffic activities was modelled using the prediction model Integrated Noise Model (INM) version 7.0 (within Datakustik CadnaA version 4.3.144) developed by the FAA. INM defines a network of grid points at ground level around BBTCA. It then selects the shortest distance from each grid point to each flight track and computes the noise level generated by each aircraft operation, along each flight track. Corrections are applied for atmospheric acoustical attenuation, acoustical shielding of the aircraft engines by the aircraft itself, and aircraft speed variations. The predicted noise levels for each aircraft are then summed at each grid location.

The cumulative noise exposure levels at all grid points are then used to develop noise exposure contours for selected acoustical metrics (e.g., L_{night} and L_{day}). Using the results of the grid point analysis, noise contours of equal noise exposure were plotted.

The prediction model INM was used to generate noise prediction results for the following aviation sources:

- Aircraft departures;
- Flight paths; and
- Aircraft arrivals.

Noise modelling predictions generated include L_{night}, L_{day} and %HA.

5.1.4.1 Engine Run-Ups, Ferry Operations and Taxiing Noise Levels

Noise levels associated with engine run-ups, ferry operations and taxiing were assessed separately from other BBTCA operations. The predictive analysis for engine run-ups and ferry operations was completed using the commercially available software package Datakustik CadnaA version 4.3.144. Geometrical spreading, attenuation from barriers, ground effect and air absorption were included in the analysis as determined from ISO 9613 (part 2), which is the Ontario Ministry of the Environment (MOE) accepted practice for the prediction of outdoor sound propagation. This model makes provisions to include a correction to address for downwind or ground based temperature inversion conditions. Conservatively, noise predictions have been made assuming a downwind or moderate temperature inversion conditions for all PORs, a design condition consistent with the accepted practice of the MOE.

6.0 NOISE MODELLING PREDICTION RESULTS

The noise modelling was carried out using Datakustik CadnaA Version 4.3.144 noise modelling software package, an internationally recognized software program that predicts sound propagation in the outdoor environment according RLS90, Schall03, INM version 7.0 and ISO 9613-2 methods and other documented standards.

6.1 Noise Source Emissions

Noise emissions associated with road / rail, BBTCA operations, engine run-ups and ferry operations have been provided by various sources. These data sources have been used in the predictive noise modelling for each scenario.

6.1.1 Background Road and Rail Noise

Road and rail traffic volumes have been obtained from the City of Toronto and Railway operators respectively. Noise emissions associated with road and rail sources are based on RLS90 and Schall03 respectively.

6.1.2 Airport Noise

Noise predictions require information related to both operation of equipment and the emissions associated with those operations. As an example, noise emissions associated with taxiing operations are different than noise emissions associated with engine run-ups even though the source is the same. Therefore, operations at BBTCA have been broken down to address the different characteristics of the noise emissions from various operations. The primary source of airport emission data was the INM prediction model and the Aircraft Noise Performance (ANP) database as they have a significant database of noise emissions for various aircraft. Additional airport noise emission data was provided to Golder by Bombardier, as provided on Table 2 for taxiing. These noise levels represent sound pressure level measurements at a distance of 150 feet (~ 45 m) around the aircraft. Position 1 represents a location 45 m directly in front of the aircraft nose. Each subsequent position is approximately 15 degrees from the previous position moving from the nose to tail of the aircraft. Measurements beyond 150 – 160 degrees (i.e., towards the aircraft tail) are not included due to prop wash and jet wash for the Q400 and CS100 respectively.

Table 2: Summary of Noise Data Used for Taxiing as Provided by Bombardier

Source	Overall Sound Pressure Level (dBA) @ 45 m Q400	Overall Sound Pressure Level (dBA) @ 45 m CS100	Provided By
Taxiing	Position 1: 93.1	Position 1: 85.0	Bombardier
	Position 2: 93.2	Position 2: 85.4	
	Position 3: 91.9	Position 3: 83.4	
	Position 4: 89.9	Position 4: 82.3	
	Position 5: 87.7	Position 5: 80.3	
	Position 6: 84.8	Position 6: 76.2	
	Position 7: 83.5	Position 7: 77.4	
	Position 8: 86.5	Position 8: 81.0	
	Position 9: 89.1	Position 9: 84.2	
	Position 10: 89.3	Position 10: 81.9	
	Position 11: 90.0	Position 11: 78.6	

6.1.3 Engine Run-Ups and Ferry Noise

Noise data associated with engine run-ups and ferry operation is summarized in Table 3. Engine run-up noise data was provided by Bombardier. Position 1 is located 45 m from the nose and each subsequent position is approximately 15 degrees from the previous measurement. Measurements beyond 150 – 160 degrees (i.e., towards the aircraft tail) are not included due to prop wash and jet wash for the Q400 and CS100 respectively.

Ferry noise data was obtained by direct measurement of noise emissions during ferry operations by Golder personnel on two separate occasions. The overall sound power level is presented in Table 2.

Table 3: Summary of Noise Data Used for Engine Run-Ups and Ferry Operation

Source	Overall Sound Pressure Level (dBA) @ 45 m Q400	Overall Sound Pressure Level (dBA) @ 45 m CS100	Provided By
Engine Run-Ups	Position 1: 112.3	Position 1: 98.8	Bombardier
	Position 2: 111.9	Position 2: 99.6	
	Position 3: 110.7	Position 3: 99.2	
	Position 4: 110.3	Position 4: 99.8	
	Position 5: 109.9	Position 5: 97.8	
	Position 6: 109.7	Position 6: 98.1	
	Position 7: 109.3	Position 7: 99.6	
	Position 8: 110.2	Position 8: 102.5	
	Position 9: 109.8	Position 9: 104.3	
	Position 10: 111.8	Position 10: 102.5	
	Position 11: 108.3	Position 11: 99.0	
Source	**Overall Sound Power Level (dBA)**		**Provided By**
Ferry Operation	99.8		Golder Associates

6.2 Background Noise Levels

Table 4 summarizes the monitored noise levels at the four monitoring locations identified by the City of Toronto. The data has been presented in a manner to assist in the HIA by identifying the measured L_{night} and L_{day} at each location.

Table 4: Summary of Noise Monitoring Data

Location	L_{night} (dBA)	L_{day} (dBA)
Stadium Road	51	58
Toronto Music Garden	53	66
Harbour Square	52	58
Ward's Island	47	54

Table 5 summarizes the predicted background noise levels at the nine identified locations excluding noise from BBTCA operations. These noise predictions are also shown as noise contours in Figures A1 through A9 within the project study area at three different heights (i.e., 2 m, 15 m and 70 m). Noise predictions were based on road and rail traffic volumes obtained from the City of Toronto and railway operators respectively, a digital terrain model and existing buildings layer.

Table 5: Summary of Predicted Background Noise Levels

Location	L_{night} (dBA)	L_{day} (dBA)	%HA
2 m Elevation			
Stadium Road	46	55	4.27
Toronto Music Garden	55	64	13.43
Harbour Square	49	58	6.35
Ward's Island	39	48	1.74
Harbour Side Co-op Homes	51	61	8.86
Windward Co-op Homes	47	56	4.85
Little Norway Park	48	57	5.87
The Waterfront School / City School	51	60	8.06
The Island Public School	31	39	0.61
15 m Elevation			
Stadium Road	49	57	6.00
Toronto Music Garden	58	67	18.21
Harbour Square	51	60	8.18
Ward's Island	39	48	1.76
Harbour Side Co-op Homes	50	58	6.72
Windward Co-op Homes	50	60	7.98
Little Norway Park	51	60	8.63
The Waterfront School / City School	55	63	12.76
The Island Public School	31	39	0.61
70 m Elevation			
Stadium Road	53	62	10.40
Toronto Music Garden	64	72	30.79
Harbour Square	56	65	14.73
Ward's Island	40	48	1.86
Harbour Side Co-op Homes	60	69	23.21
Windward Co-op Homes	56	64	13.97
Little Norway Park	58	66	17.32
The Waterfront School / City School	60	68	21.40
The Island Public School	31	40	0.62

6.3 Existing BBTCA Operations

Table 6 summarizes the predicted existing BBTCA operations noise levels at the nine identified locations including the background noise levels associated with road and rail sources. These noise predictions are also shown as noise contours in Figures A10 through A18 within the project study area at three different heights (i.e., 2 m, 15 m and 70 m). %HA has been shown as the difference from the background condition (i.e., Table 5) as Health Canada considers a potential significant effect occurs if the change in %HA from existing conditions is greater than 6.5%.

Table 6: Summary of Cumulative Predicted Noise Levels – Existing BBTCA Operations

Location	L_{night} (dBA)	L_{day} (dBA)	Change in %HA
2 m Elevation			
Stadium Road	51	61	11.73
Toronto Music Garden	56	65	4.32
Harbour Square	50	59	3.04
Ward's Island	41	51	2.29
Harbour Side Co-op Homes	52	62	4.62
Windward Co-op Homes	52	62	13.15
Little Norway Park	52	62	10.67
The Waterfront School / City School	52	62	5.58
The Island Public School	40	51	4.37
15 m Elevation			
Stadium Road	53	64	14.12
Toronto Music Garden	58	67	2.56
Harbour Square	52	61	2.53
Ward's Island	41	52	2.86
Harbour Side Co-op Homes	53	63	11.85
Windward Co-op Homes	52	62	5.73
Little Norway Park	54	64	9.11
The Waterfront School / City School	53	65	5.84
The Island Public School	40	51	4.62
70 m Elevation			
Stadium Road	55	65	12.27
Toronto Music Garden	64	72	1.52
Harbour Square	56	65	1.18
Ward's Island	41	51	2.33
Harbour Side Co-op Homes	61	69	2.97
Windward Co-op Homes	57	66	8.14
Little Norway Park	58	67	5.71
The Waterfront School / City School	60	69	3.97
The Island Public School	39	50	3.96

6.4 Proposed Future BBTCA Scenario with Jets

Table 7 summarizes the predicted proposed future scenario noise levels at the nine identified locations including the background noise levels associated with road and rail sources. These noise predictions are also shown as noise contours in Figures A19 through A27 within the project study area at three different heights (i.e., 2 m, 15 m and 70 m). %HA has been shown as the difference from the background condition (i.e., Table 5) as Health Canada considers a potential significant effect occurs if the change in %HA from existing conditions is greater than 6.5%.

Table 7: Summary of Cumulative Predicted Noise Levels – Proposed Future BBTCA Scenario

Location	L_{night} (dBA)	L_{day} (dBA)	Change in %HA
2 m Elevation			
Stadium Road	50	61	10.16
Toronto Music Garden	55	65	3.18
Harbour Square	49	59	2.08
Ward's Island	40	51	2.34
Harbour Side Co-op Homes	52	62	3.73
Windward Co-op Homes	51	61	10.19
Little Norway Park	51	61	8.91
The Waterfront School / City School	52	61	4.15
The Island Public School	36	48	2.67
15 m Elevation			
Stadium Road	52	63	11.43
Toronto Music Garden	58	67	1.79
Harbour Square	51	60	1.72
Ward's Island	40	52	2.60
Harbour Side Co-op Homes	52	63	9.57
Windward Co-op Homes	51	61	4.21
Little Norway Park	53	63	7.07
The Waterfront School / City School	55	65	4.15
The Island Public School	38	50	3.83
70 m Elevation			
Stadium Road	55	65	10.08
Toronto Music Garden	64	72	1.13
Harbour Square	56	65	0.85
Ward's Island	40	51	2.25
Harbour Side Co-op Homes	61	69	2.24
Windward Co-op Homes	57	66	6.47
Little Norway Park	58	67	4.44
The Waterfront School / City School	60	69	2.92
The Island Public School	37	50	3.35

6.5 Engine Run-Ups, Ferry Operation and Taxiing

As noted previously, engine run-ups, ferry operation and taxiing have been addressed separately from the air traffic operations of BBTCA to determine the noise effects associated with these activities. Table 8 summarizes the predicted noise levels during daytime hours. Table 9 summarizes the predicted noise levels during nighttime hours. These predictions are also shown as noise contours in Figures A28 through A39 at three different heights (i.e., 2 m, 15 m and 70 m).

Table 8: Summary of Engine Run-Ups, Ferry Noise and Taxiing During Daytime Hours

Location	Engine Run-ups (dBA)		Ferry (dBA)	Taxiing (dBA)*	
	Q400	CS100		Existing	Future
2 m Elevation					
Stadium Road	82	67	44	60	59
Toronto Music Garden	72	55	26	58	56
Harbour Square	75	62	14	52	49
Ward's Island	67	53	16	46	43
Harbour Side Co-op Homes	64	45	42	56	55
Windward Co-op Homes	77	63	49	61	59
Little Norway Park	76	62	48	60	59
The Waterfront School / City School	75	61	39	57	55
The Island Public School	77	68	22	49	44
15 m Elevation					
Stadium Road	86	72	44	62	61
Toronto Music Garden	74	59	26	57	55
Harbour Square	75	62	15	52	49
Ward's Island	69	54	17	48	45
Harbour Side Co-op Homes	85	71	49	61	60
Windward Co-op Homes	75	61	42	57	56
Little Norway Park	84	70	48	60	59
The Waterfront School / City School	83	69	40	59	58
The Island Public School	77	67	22	50	48
70 m Elevation					
Stadium Road	85	72	43	63	62
Toronto Music Garden	81	66	35	58	57
Harbour Square	73	60	21	51	49
Ward's Island	68	53	16	46	44
Harbour Side Co-op Homes	83	69	42	59	58
Windward Co-op Homes	84	70	48	62	60
Little Norway Park	83	69	47	61	60
The Waterfront School / City School	82	68	43	60	59
The Island Public School	75	66	20	48	47

*Existing taxiing only includes Q400 aircraft. Proposed taxiing includes both Q400 and CS100.

Table 9: Summary of Engine Run-Ups, Ferry Noise and Taxiing During Nighttime Hours

Location	Engine Run-ups (dBA)*		Ferry (dBA)	Taxiing (dBA)*	
	Q400	CS100		Existing	Future
2 m Elevation					
Stadium Road	N/A		40	49	46
Toronto Music Garden			22	46	44
Harbour Square			11	41	36
Ward's Island			13	34	30
Harbour Side Co-op Homes			38	45	43
Windward Co-op Homes			45	50	47
Little Norway Park			44	49	46
The Waterfront School / City School			36	46	43
The Island Public School			18	38	31
15 m Elevation					
Stadium Road	N/A		40	50	47
Toronto Music Garden			22	45	43
Harbour Square			12	41	36
Ward's Island			14	36	32
Harbour Side Co-op Homes			45	49	46
Windward Co-op Homes			39	46	43
Little Norway Park			44	48	45
The Waterfront School / City School			37	47	44
The Island Public School			18	38	36
70 m Elevation					
Stadium Road	N/A		40	51	48
Toronto Music Garden			32	46	43
Harbour Square			19	39	35
Ward's Island			13	35	30
Harbour Side Co-op Homes			38	47	44
Windward Co-op Homes			44	49	47
Little Norway Park			43	48	46
The Waterfront School / City School			40	48	45
The Island Public School			17	37	34

*Existing taxiing only includes Q400 aircraft. Proposed taxiing includes both Q400 and CS100. There are no engine run-ups during nighttime hours.

7.0 SUMMARY

The existing operations at BBTCA result in changes in %HA that are greater than 6.5% at some locations as compared to background levels without the airport operations. Similarly, the proposed future scenario at BBTCA will also result in changes to %HA that are greater than 6.5% compared to background levels without the airport operations, but these changes are either similar or smaller due to the reduced noise effects, due to lower noise emissions, associated with the operation of the CS100 compared to the Q400.

In addition, specific activities have been identified that result in noise effects that require further consideration. Specifically, engine maintenance run-ups, ferry operation and taxiing have been identified by local residents as concerns and predicted levels support this view in the community. Noise effects from the CS100 are lower for both engine run-ups and taxiing compared to the Q400. The ferry operation has been identified as a noise source which contributes to the local noise effects in the early morning hours (i.e., after 4 am) when background noise levels are lower, resulting in noise effects to the nearby residents.

8.0 REFERENCES

Airbiz Aviation Strategies (Airbiz). 2013. Billy Bishop Toronto City Airport, Porter Airlines Proposal Review, Interim Results / Findings. June 26, 2013.

BA Group. 2013. DRAFT Billy Bishop Toronto City Airport Transportation Assessment of Proposed Jet Activity. Executive Summary and Key Findings. Preliminary Draft – Version 1. October 2013.

Datakustic. 1999. Specification Road Traffic Noise. Calculation with CadnaA.

Federal Aviation Administration (FAA), 2011. Integrated Noise Model (INM) version 7.0.

Genivar Inc. 2012. Airport Noise Study Billy Bishop Toronto City Airport Final Report Transport Canada. August 2012.

Health Canada. 2005. Noise Impact Assessment Orientation Document for Projects Triggering CEAA. Draft Version.

HLT Advisory. 2013. DRAFT Economic Impact Considerations of an Expanded Billy Bishop Toronto City Airport. Draft for Discussion – Interim Findings, June 26, 2013.

International Organization for Standardization (ISO). 1993. International Standard ISO 9613-2: Acoustics - Attenuation of sound during propagation outdoors. Part 2.

International Organization for Standardization (ISO), 2003. International Standard ISO 1996-1. Acoustics – Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures.

Report Signature Page

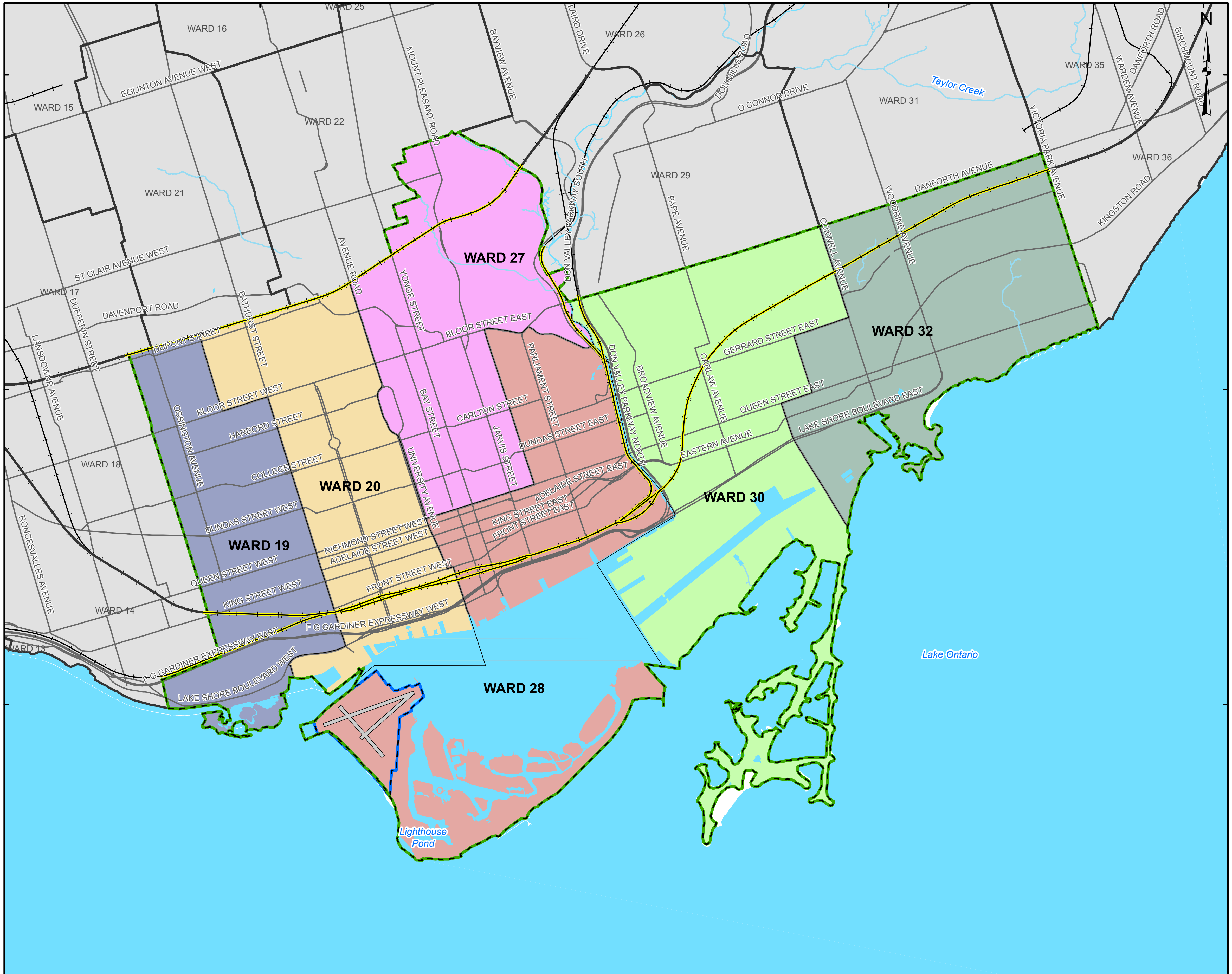
GOLDER ASSOCIATES LTD.

Stefan Cicak, B.A.Sc., P.Eng. Acoustics, Noise & Vibration Engineer	Danny da Silva, B.Sc., B.A.Sc., P.Eng. Associate / Acoustics, Noise & Vibration Engineer

SC/Dd/wlm

\\golder.gds\gal\mississauga\active\2013\1151\13-1151-0215 city of toronto - billy bishop\07 noise\report\final\13-1151-0215 rpt final 2013nov25 bbtca noise assessment.docx

FIGURES



LEGEND

- Major Roads
- Railways
- Watercourse
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

Wards

- Beaches-East York (32)
- Toronto Centre-Rosedale (27)
- Toronto Centre-Rosedale (28)
- Toronto-Danforth (30)
- Trinity-Spadina (19)
- Trinity-Spadina (20)
- Other

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

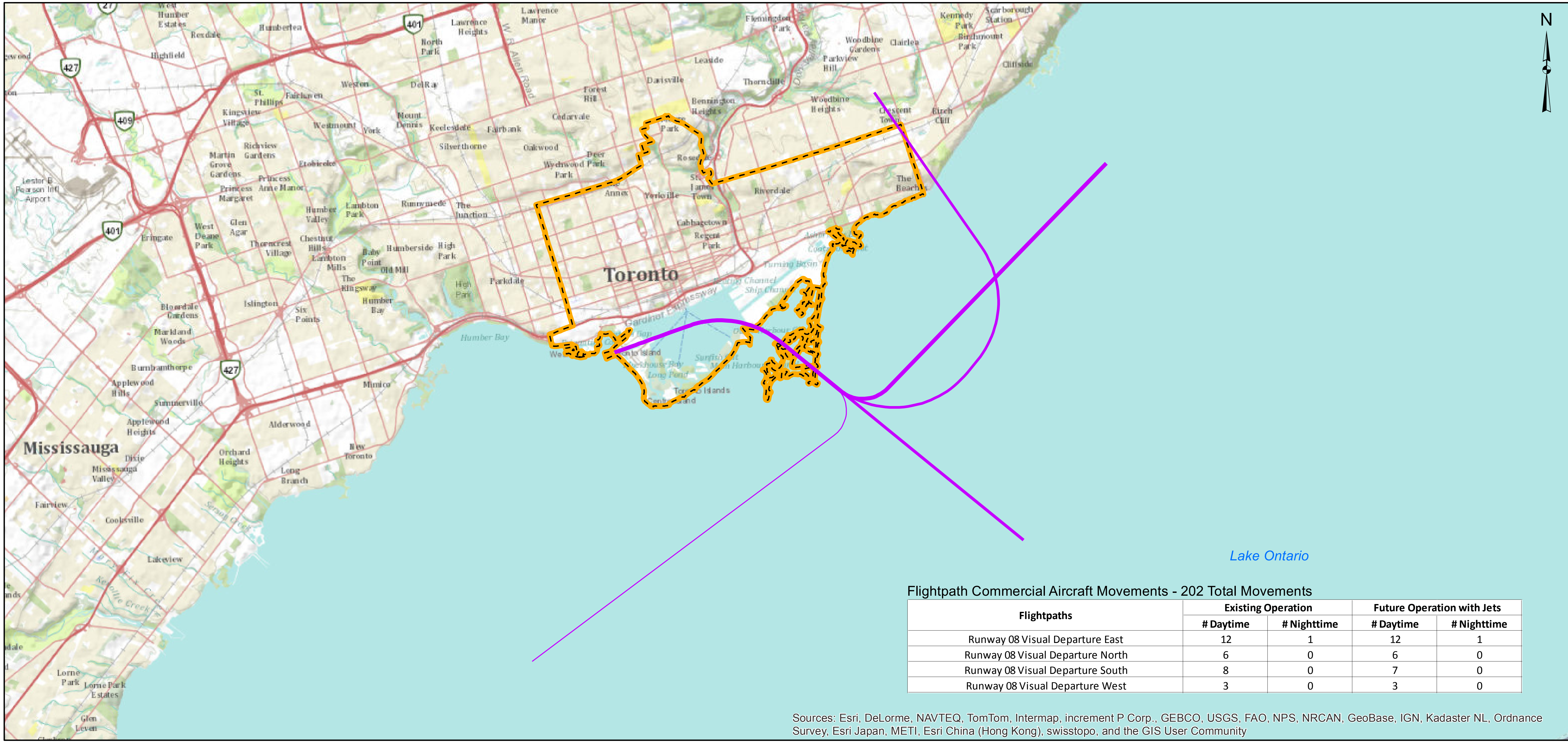
500 250 0 500 1,000 1,500
SCALE 1:50,000 METRES

PROJECT	CITY OF TORONTO HUMAN HEALTH IMPACT ASSESSMENT BILLY BISHOP AIRPORT
TITLE	**Site Location**

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008	FIGURE: 1	
GIS	JO	5 Nov. 2013		
CHECK	SC	5 Nov. 2013		
REVIEW	SC	5 Nov. 2013		

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\HIA\1311510215HIA027.mxd



Flightpath Commercial Aircraft Movements - 202 Total Movements

Flightpaths	Existing Operation		Future Operation with Jets	
	# Daytime	# Nighttime	# Daytime	# Nighttime
Runway 08 Visual Departure East	12	1	12	1
Runway 08 Visual Departure North	6	0	6	0
Runway 08 Visual Departure South	8	0	7	0
Runway 08 Visual Departure West	3	0	3	0

Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

2,000 1,000 0 2,000 4,000 6,000 8,000

SCALE 1:125,000 METRES

LEGEND

Existing and Future Fligthpaths

- 08 VIS Departure West
- 26 VIS Arrival West
- 08 RNAVC Arrival
- 08 VIS Departure East

REFERENCE

Base Data - MNR LIO, obtained 2013
Contains information licensed under the Open Government Licence –Toronto.
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2013
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

PROJECT

CITY OF TORONTO
BILLY BISHOP TORONTO CITY AIRPORT
HUMAN HEALTH IMPACT ASSESSMENT AIR & NOISE

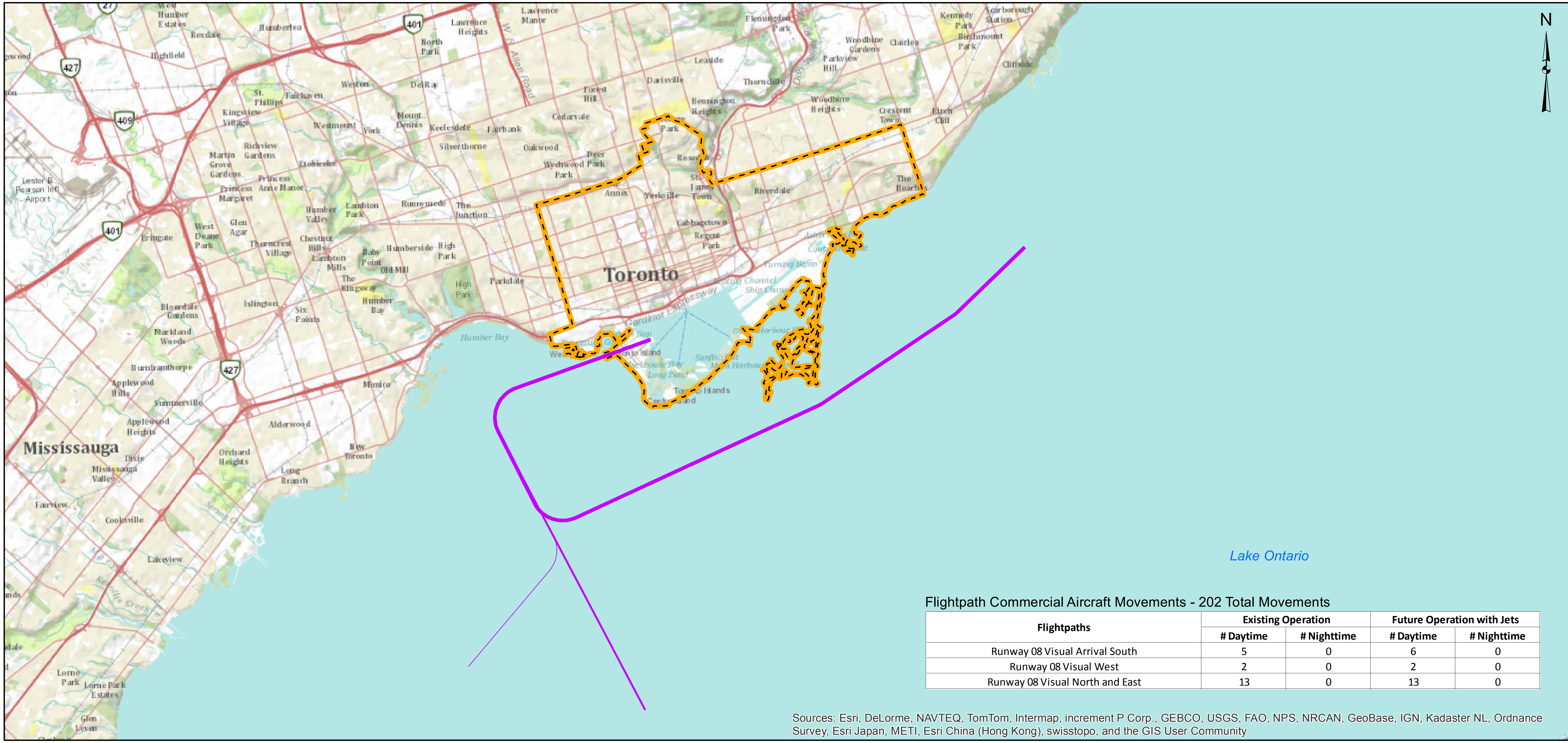
TITLE

Runway 08 Visual Departures

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	XX	14 Nov. 2008	**FIGURE: 2**	
GIS	JDO	18 Nov. 2013		
CHECK	SC	18 Nov. 2013		
REVIEW		18 Nov. 2013		

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\FlightPaths\1311510215FLP001.mxd



Flightpath Commercial Aircraft Movements - 202 Total Movements

Flightpaths	Existing Operation		Future Operation with Jets	
	# Daytime	# Nighttime	# Daytime	# Nighttime
Runway 08 Visual Arrival South	5	0	6	0
Runway 08 Visual West	2	0	2	0
Runway 08 Visual North and East	13	0	13	0

2,000 1,000 0 2,000 4,000 6,000 8,000
SCALE 1:125,000 METRES

LEGEND

Existing and Future Fligthpaths

- 08 VIS Arrival West
- 08 VIS Arrival North
- 08 VIS Arrival South
- 08 VIS Arrival East
- Health Impact Assessment Study Area

REFERENCE

Base Data - MNR LIO, obtained 2013
Contains information licensed under the Open Government Licence –Toronto.
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2013
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

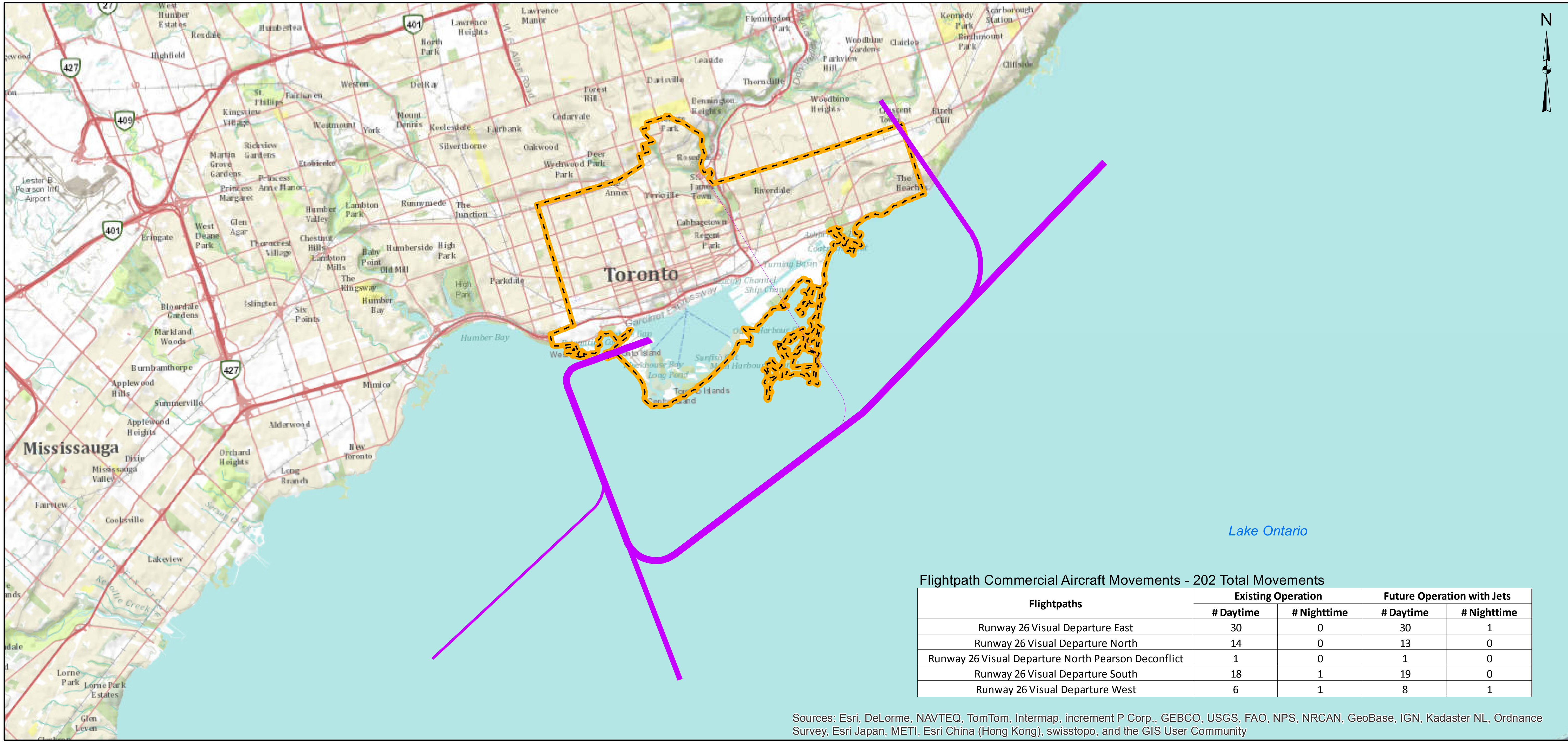
PROJECT
CITY OF TORONTO
BILLY BISHOP TORONTO CITY AIRPORT
HUMAN HEALTH IMPACT ASSESSMENT AIR & NOISE

TITLE
Runway 08 Visual Arrivals

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	XX	14 Nov. 2008	**FIGURE: 3**	
GIS	JDO	18 Nov. 2013		
CHECK	SC	18 Nov. 2013		
REVIEW		18 Nov. 2013		

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\FlightPaths\1311510215FLP002.mxd



Flightpath Commercial Aircraft Movements - 202 Total Movements

Flightpaths	Existing Operation		Future Operation with Jets	
	# Daytime	# Nighttime	# Daytime	# Nighttime
Runway 26 Visual Departure East	30	0	30	1
Runway 26 Visual Departure North	14	0	13	0
Runway 26 Visual Departure North Pearson Deconflict	1	0	1	0
Runway 26 Visual Departure South	18	1	19	0
Runway 26 Visual Departure West	6	1	8	1

LEGEND

Existing and Future Fligthpaths

- Runway 26 Visual Departure North Pearson Deconflict
- 26 VIS Arrival West
- 26 VIS Departure North
- 26 VIS Departure South
- 26 VIS Departure East
- Health Impact Assessment Study Area

REFERENCE

Base Data - MNR LIO, obtained 2013
Contains information licensed under the Open Government Licence –Toronto.
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2013
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

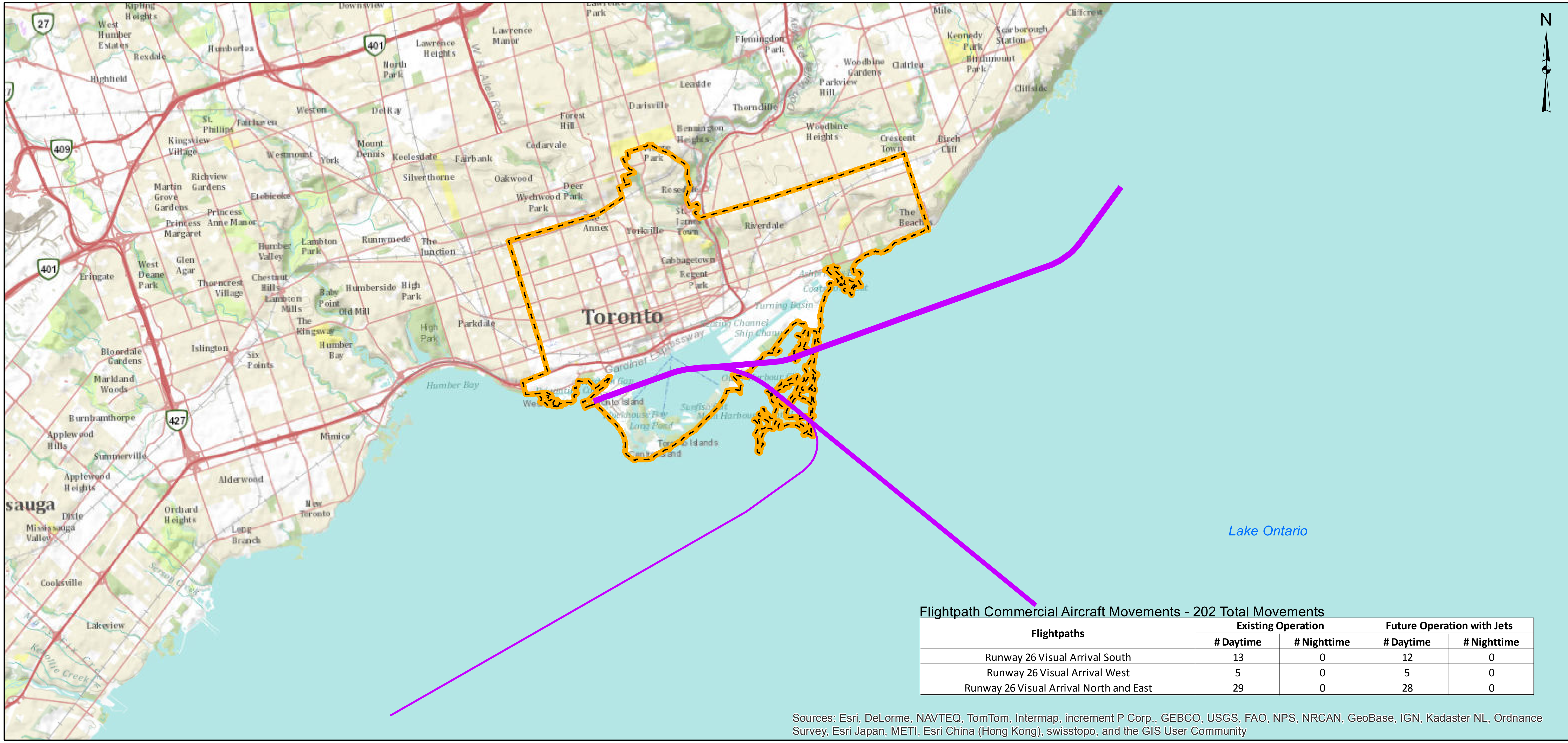
PROJECT
CITY OF TORONTO
BILLY BISHOP TORONTO CITY AIRPORT
HUMAN HEALTH IMPACT ASSESSMENT AIR & NOISE

TITLE
Runway 26 Visual Departures

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	XX	14 Nov. 2008	**FIGURE: 4**	
GIS	JDO	18 Nov. 2013		
CHECK	SC	18 Nov. 2013		
REVIEW		18 Nov. 2013		

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\FlightPaths\1311510215FLP003.mxd



Flightpath Commercial Aircraft Movements - 202 Total Movements

Flightpaths	Existing Operation		Future Operation with Jets	
	# Daytime	# Nighttime	# Daytime	# Nighttime
Runway 26 Visual Arrival South	13	0	12	0
Runway 26 Visual Arrival West	5	0	5	0
Runway 26 Visual Arrival North and East	29	0	28	0

Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

2,000 1,000 0 2,000 4,000 6,000 8,000

SCALE 1:115,194 METRES

LEGEND

Existing and Future Fligthpaths

- 26 VIS Arrival West
- 26 VIS Arrival North
- 26 VIS Arrival South
- 26 VIS Arrival East
- Health Impact Assessment Study Area

REFERENCE

Base Data - MNR LIO, obtained 2013
Contains information licensed under the Open Government Licence –Toronto.
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2013
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

PROJECT

CITY OF TORONTO
BILLY BISHOP TORONTO CITY AIRPORT
HUMAN HEALTH IMPACT ASSESSMENT AIR & NOISE

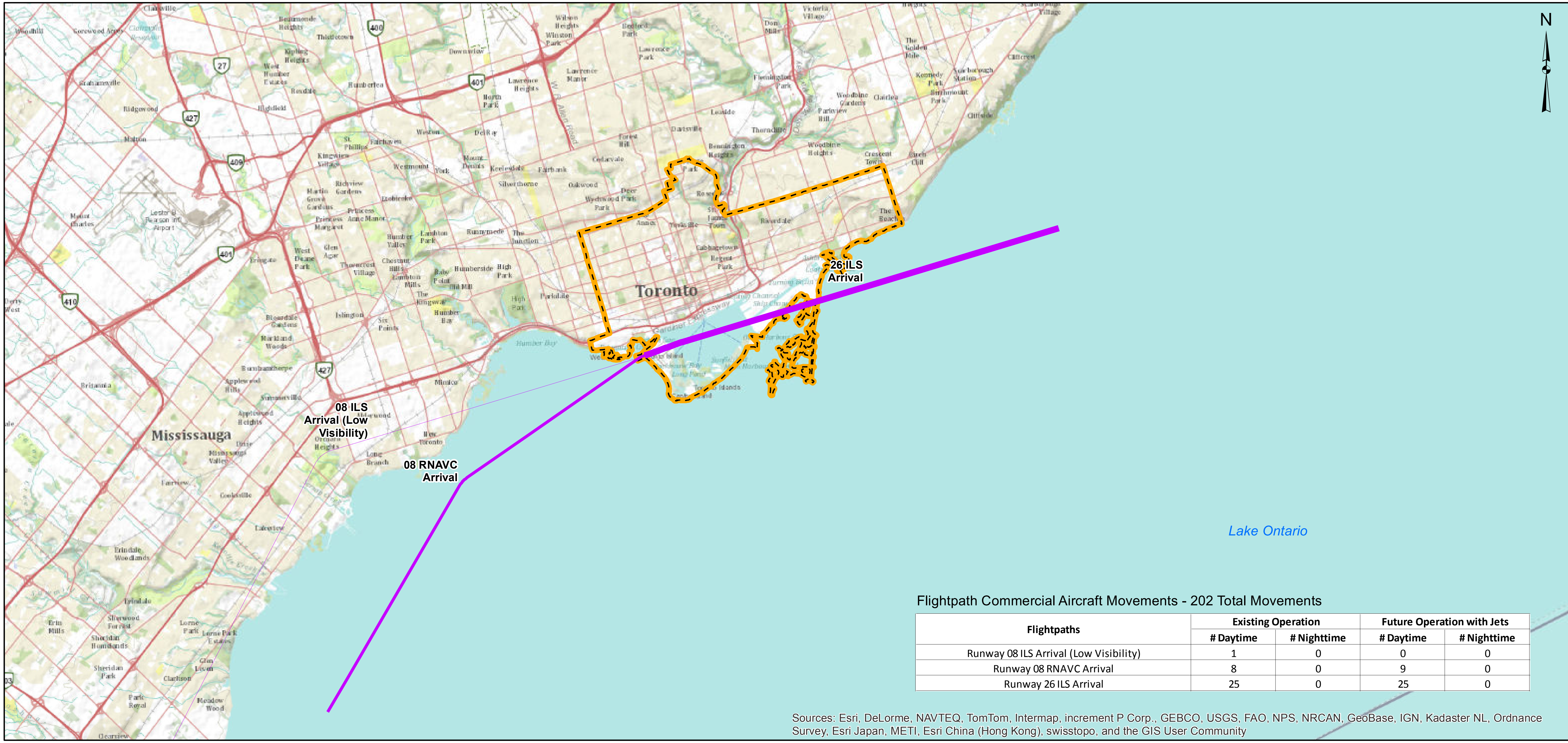
TITLE

Runway 26 Visual Arrivals

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	XX	14 Nov. 2008	FIGURE: 5	
GIS	JDO	28 Oct. 2013		
CHECK	SC	28 Oct. 2013		
REVIEW		28 Oct. 2013		

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\FlightPaths\1311510215FLP004.mxd



Flightpath Commercial Aircraft Movements - 202 Total Movements

Flightpaths	Existing Operation		Future Operation with Jets	
	# Daytime	# Nighttime	# Daytime	# Nighttime
Runway 08 ILS Arrival (Low Visibility)	1	0	0	0
Runway 08 RNAVC Arrival	8	0	9	0
Runway 26 ILS Arrival	25	0	25	0

Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

2,000 1,000 0 2,000 4,000 6,000 8,000

SCALE 1:150,000 METRES

LEGEND

Existing and Future Fligthpaths

- 08 ILS Arrival (Low Visibility)
- 08 RNAVC Arrival
- 26 ILS Arrival
- Health Impact Assessment Study Area

REFERENCE

Base Data - MNR LIO, obtained 2013
Contains information licensed under the Open Government Licence –Toronto.
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2013
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

PROJECT

CITY OF TORONTO
BILLY BISHOP TORONTO CITY AIRPORT
HUMAN HEALTH IMPACT ASSESSMENT AIR & NOISE

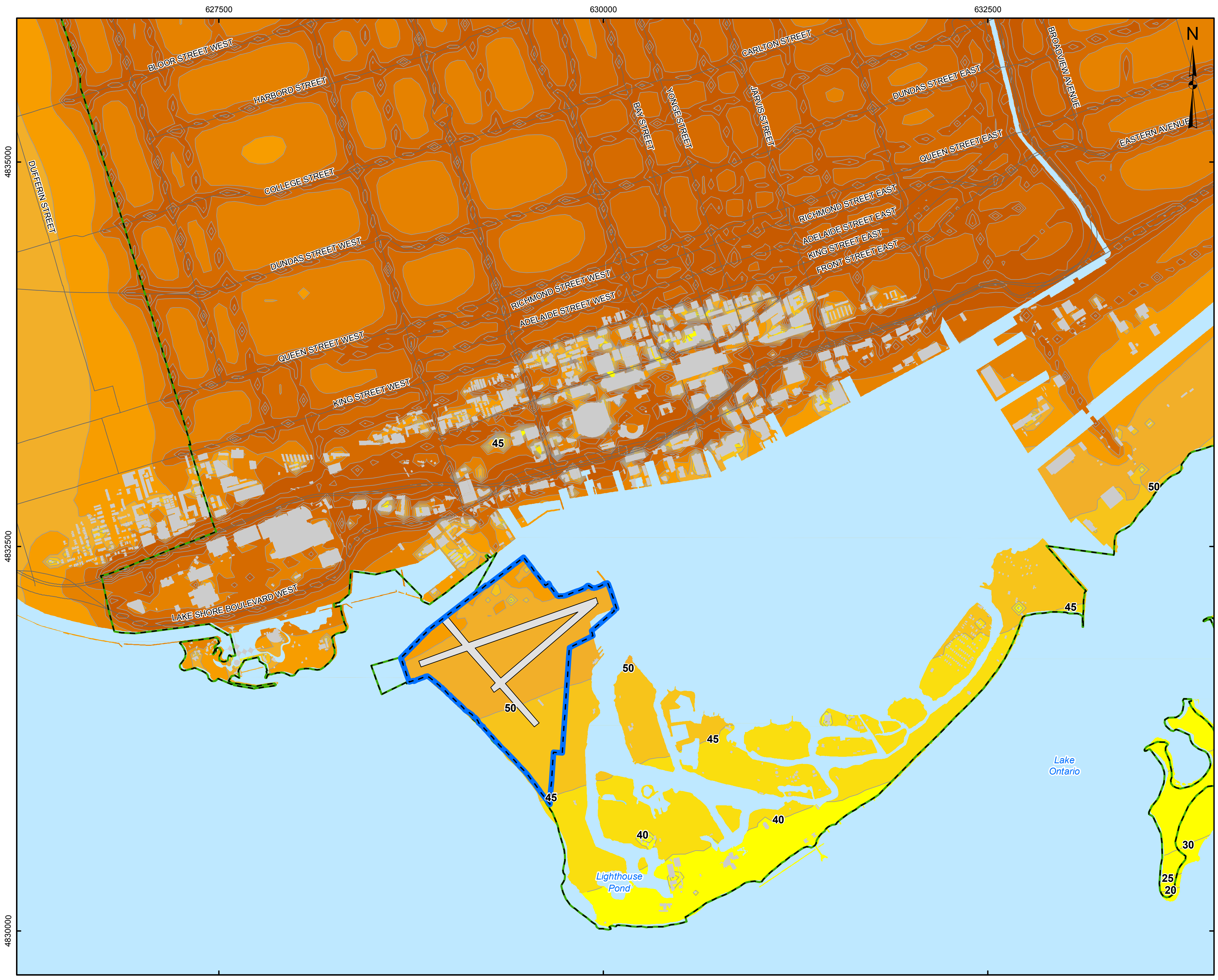
TITLE

Runway 08 and Runway 26 RNAVC and ILS Arrivals

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	XX	14 Nov. 2008	FIGURE: 6	
GIS	JDO	18 Nov. 2013		
CHECK	SC	18 Nov. 2013		
REVIEW		18 Nov. 2013		

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\FlightPaths\1311510215FLP005.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area
- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- >70

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250
SCALE 1:25,000 METRES

PROJECT
CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

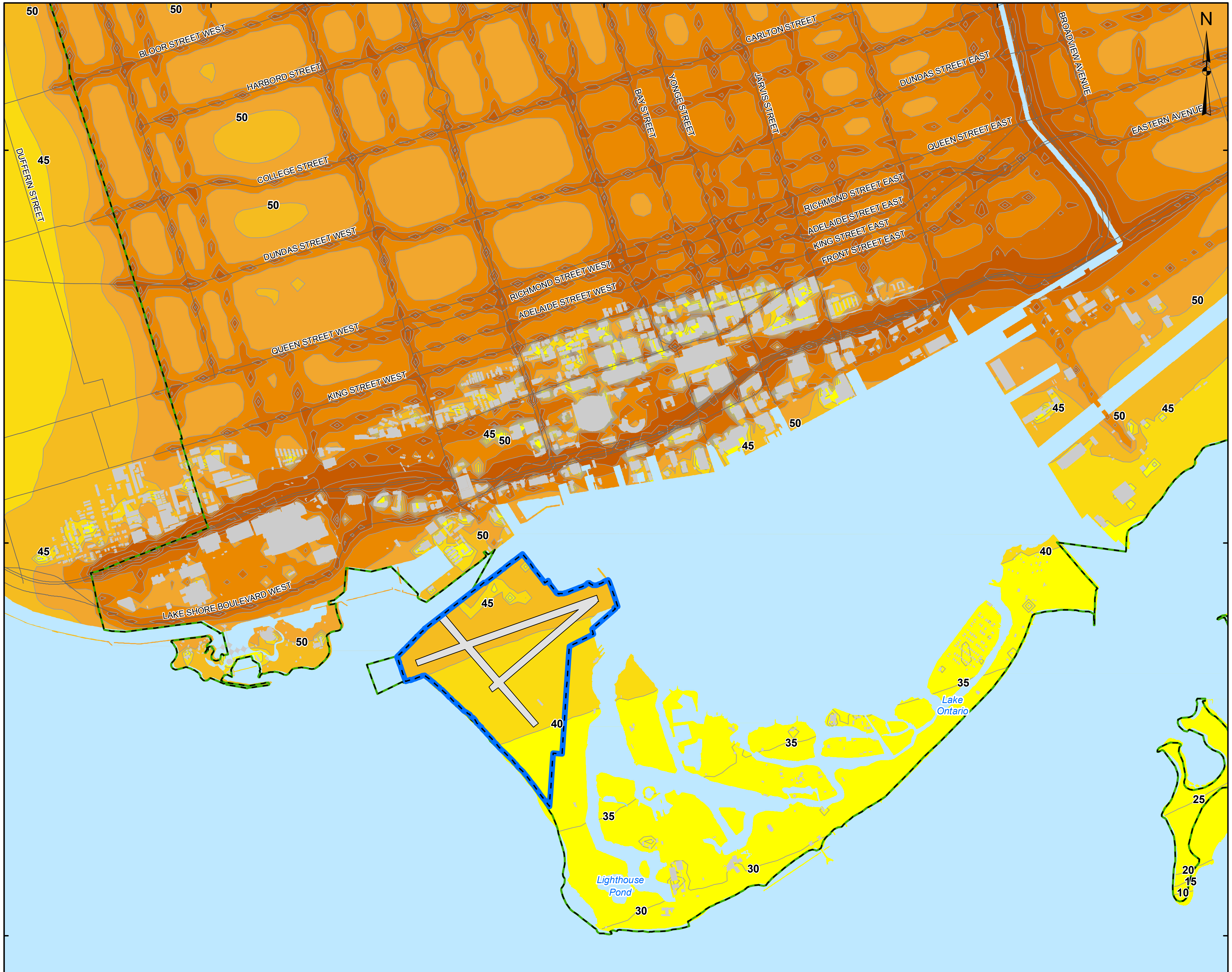
TITLE
Predicted Background Noise Levels - Daytime Leq at 2 m Above Ground

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

Golder Associates
Mississauga, Ontario

FIGURE: A1

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Daytime_Current_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area
- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- > 65

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250
SCALE 1:25,000 METRES

PROJECT
CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

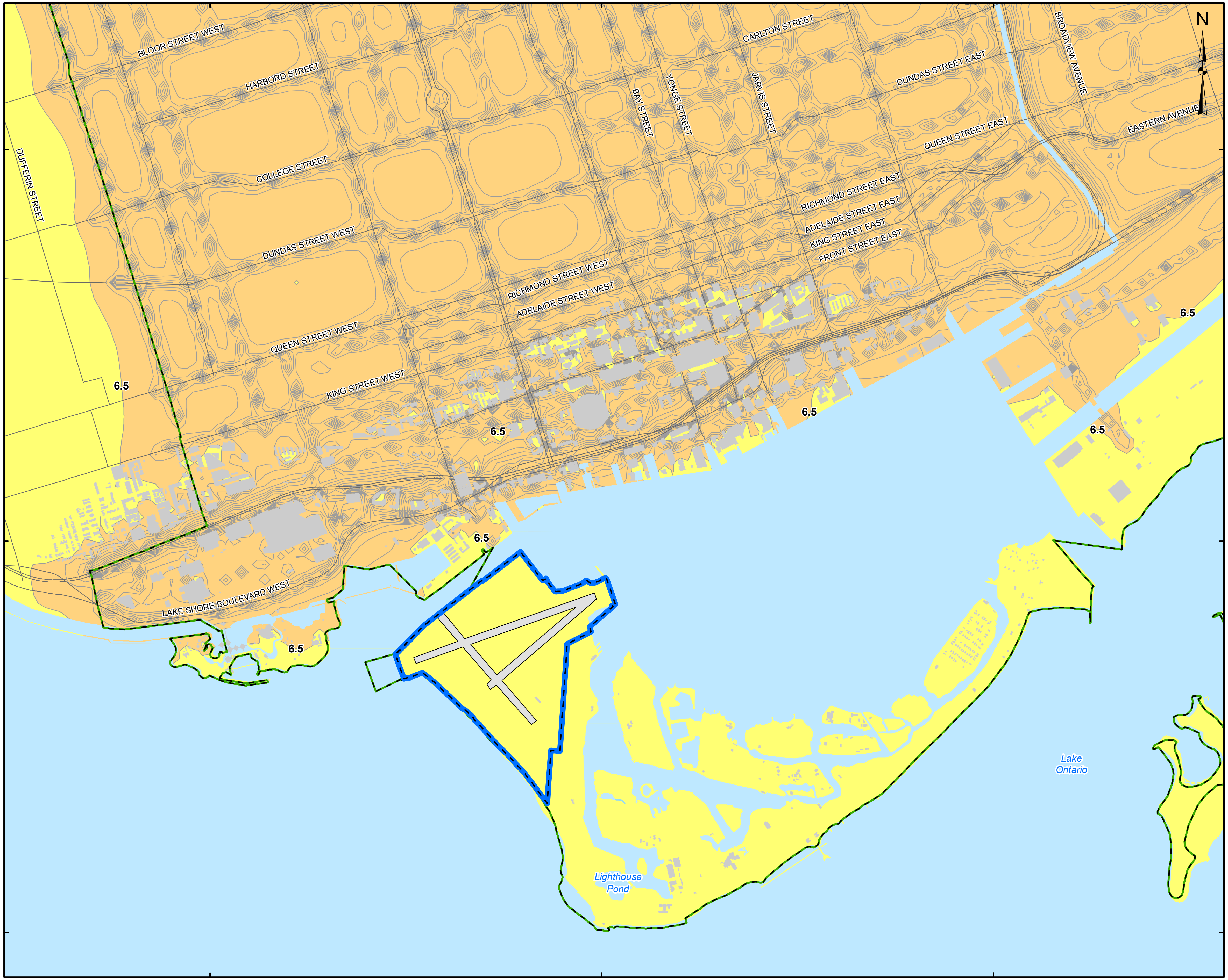
TITLE
Predicted Background Noise Levels - Nighttime Leq at 2 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A2

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Nighttime_Current_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

Noise Contour

%HA

- < 6.5%
- >6.5%

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250

SCALE 1:25,000 METRES

PROJECT

CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

TITLE

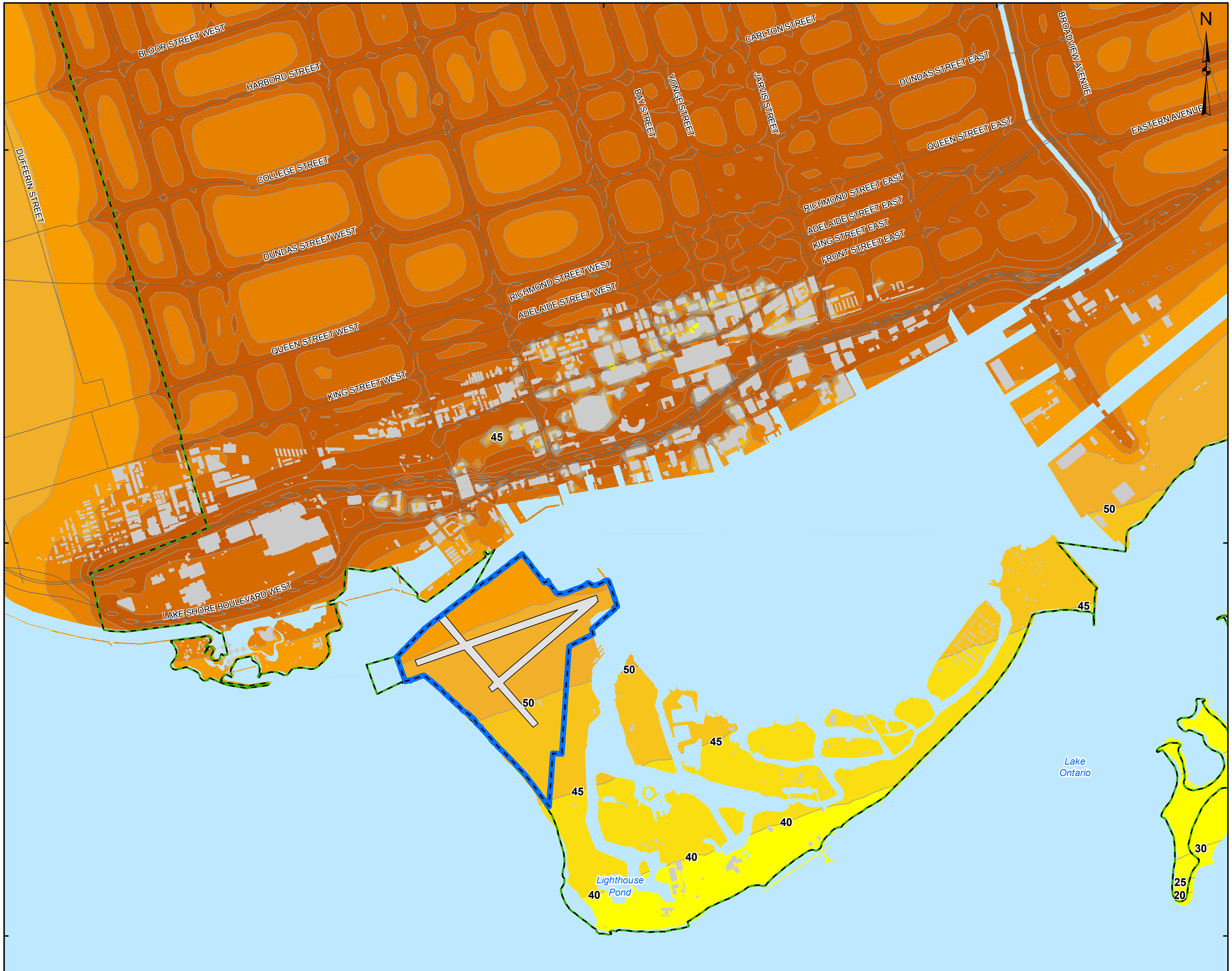
Predicted Background Noise Levels - %HA at 2 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A3

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Noise_Levels_Current_Percentage_Change_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- >70

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250
SCALE 1:25,000 METRES

PROJECT
CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

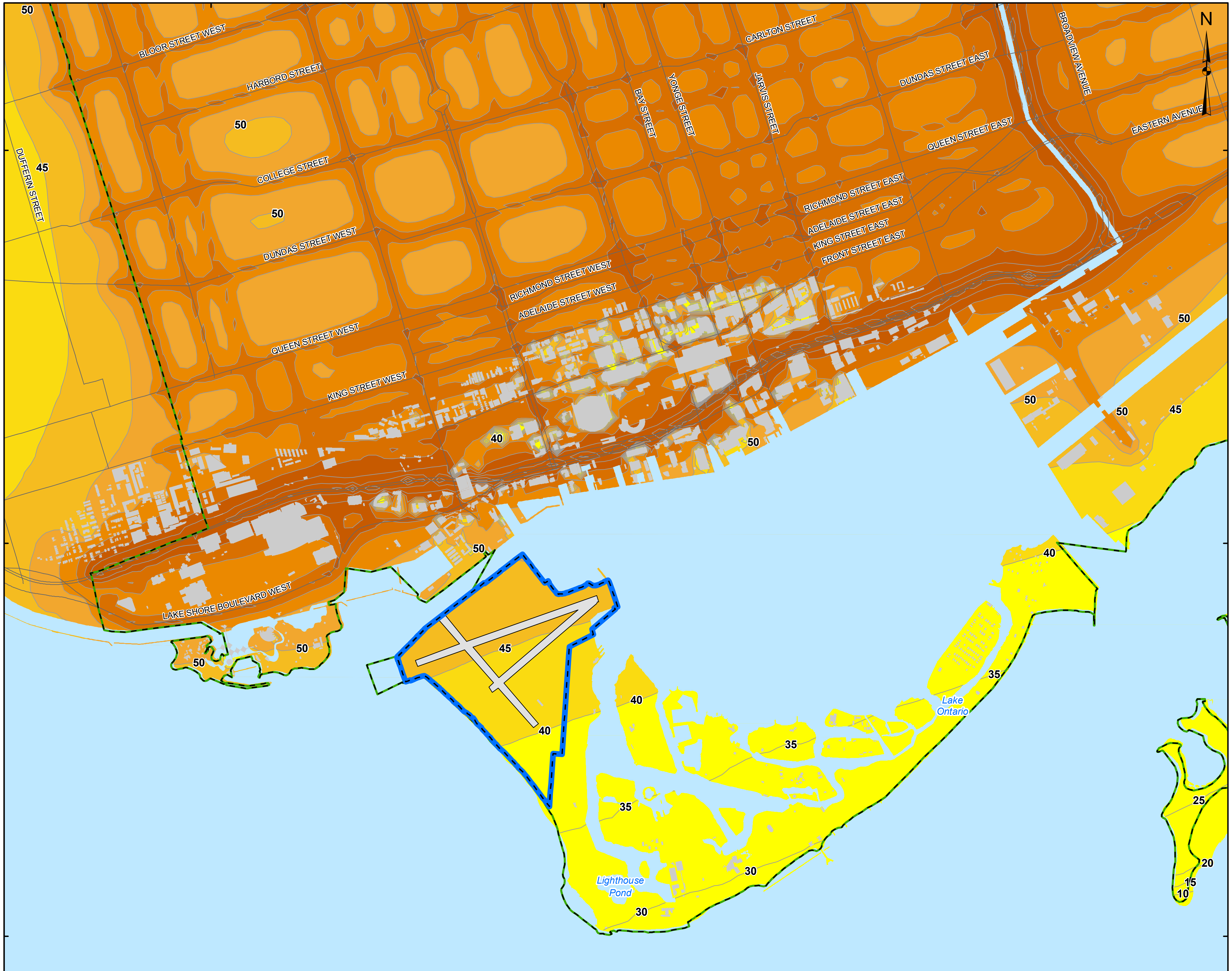
TITLE
Predicted Background Noise Levels - Daytime Leq at 15 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A4

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Daytime_Current_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- > 65

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250
SCALE 1:25,000 METRES

PROJECT
CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

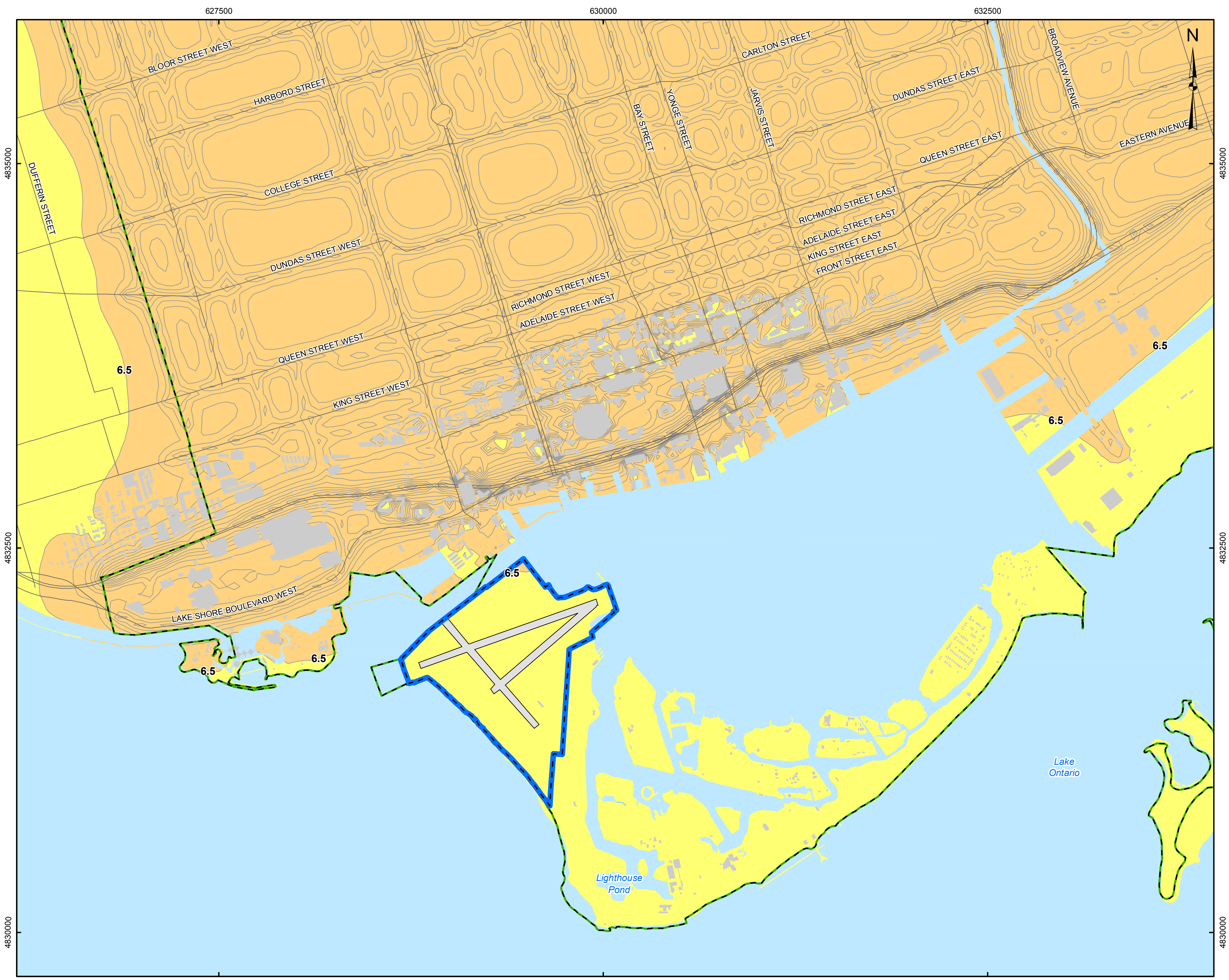
TITLE
Predicted Background Noise Levels - NighttimeLeq at 15 m Above Ground

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

Golder Associates
Mississauga, Ontario

FIGURE: A5

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Nighttime_Current_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

- Noise Contour

%HA

- < 6.5%
- >6.5%

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250

SCALE 1:25,000 METRES

PROJECT
CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

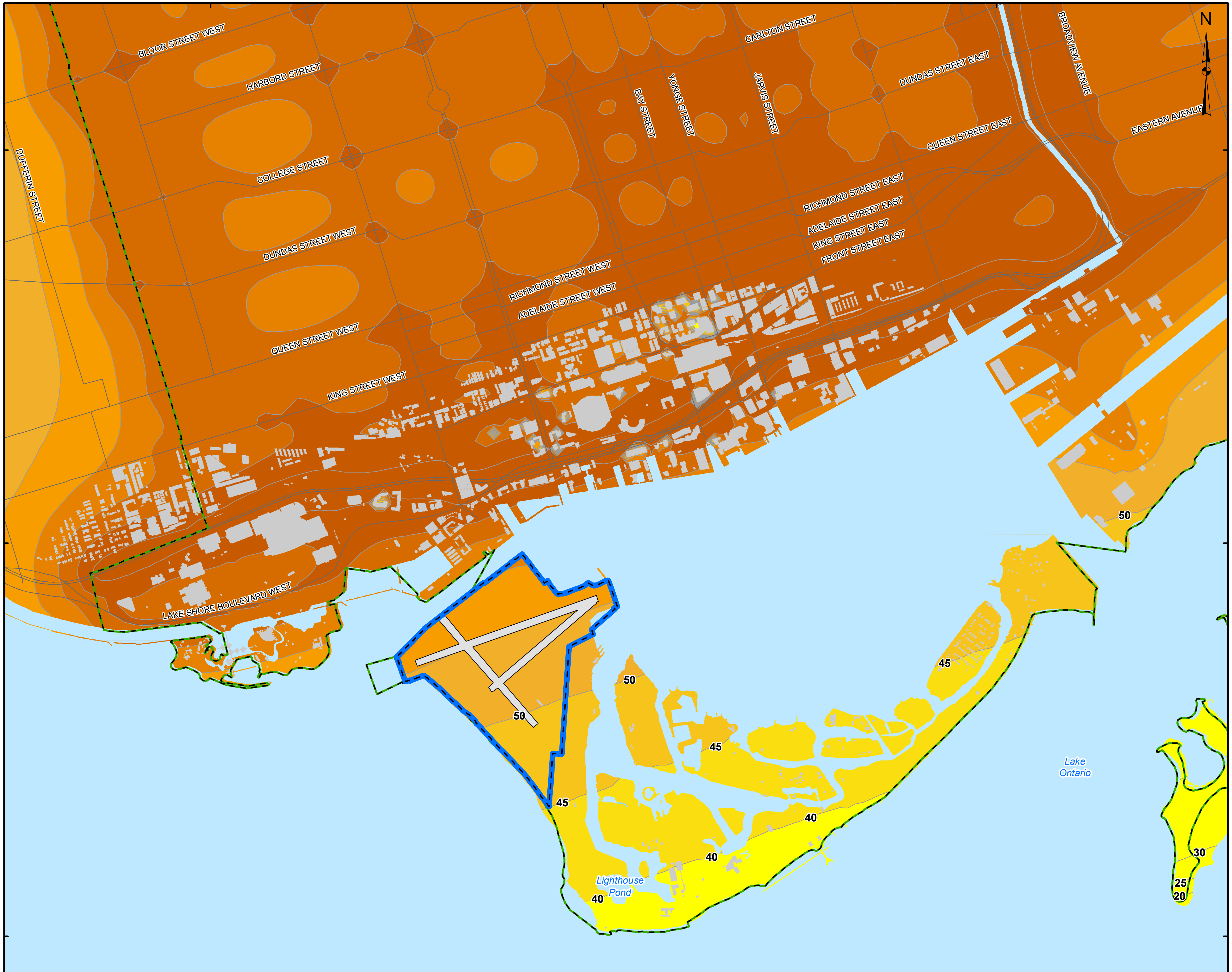
TITLE
Predicted Background Noise Levels - %HA at 15 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A6

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Noise_Levels_Current_Percentage_Change_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area
- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- >70

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250

SCALE 1:25,000 METRES

PROJECT

CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

TITLE

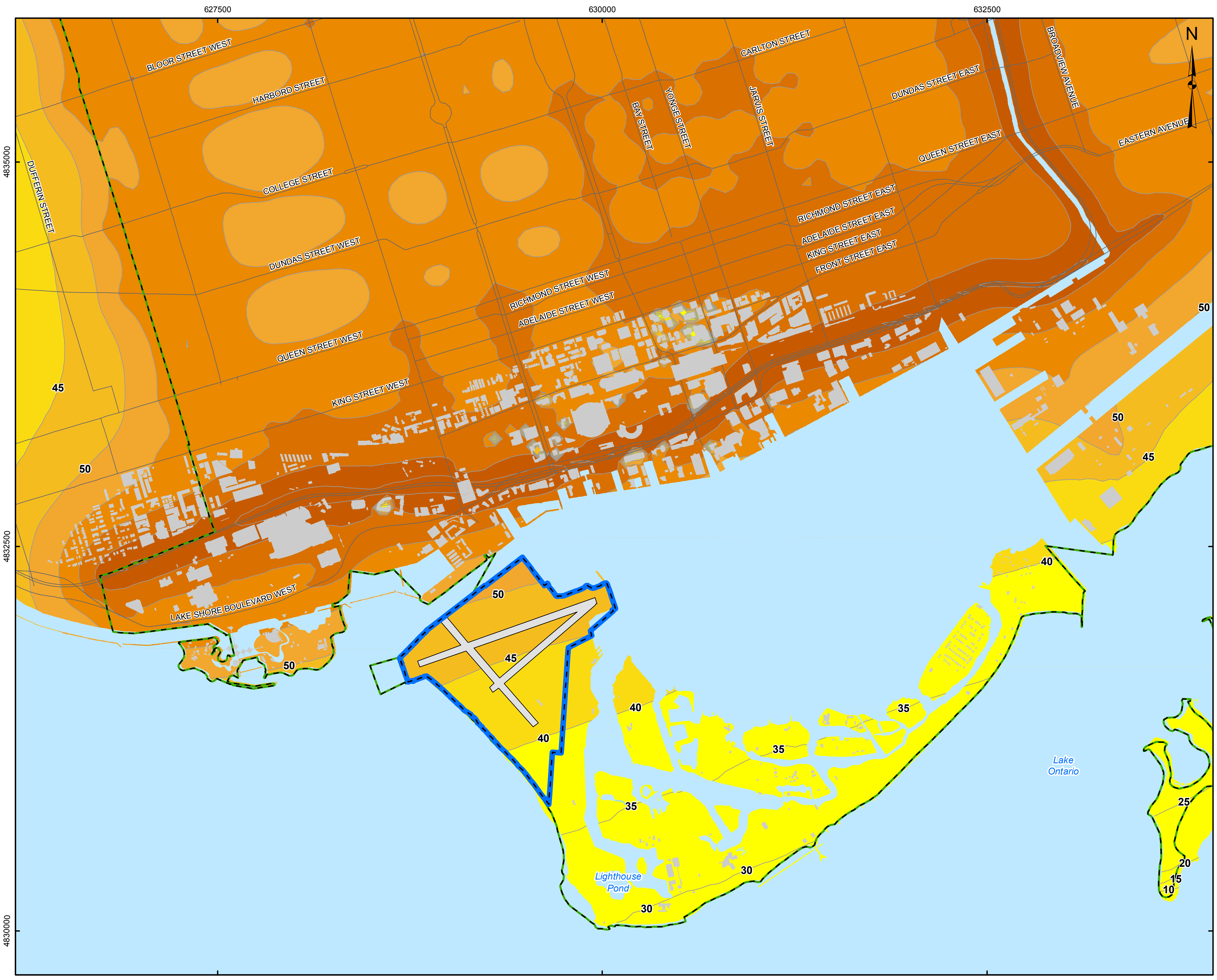
Predicted Background Noise Levels - Daytime Leq at 70 m Above Ground

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

Golder Associates
Mississauga, Ontario

FIGURE: A7

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Daytime_Current_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area
- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- > 65

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250
SCALE 1:25,000 METRES

PROJECT
CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

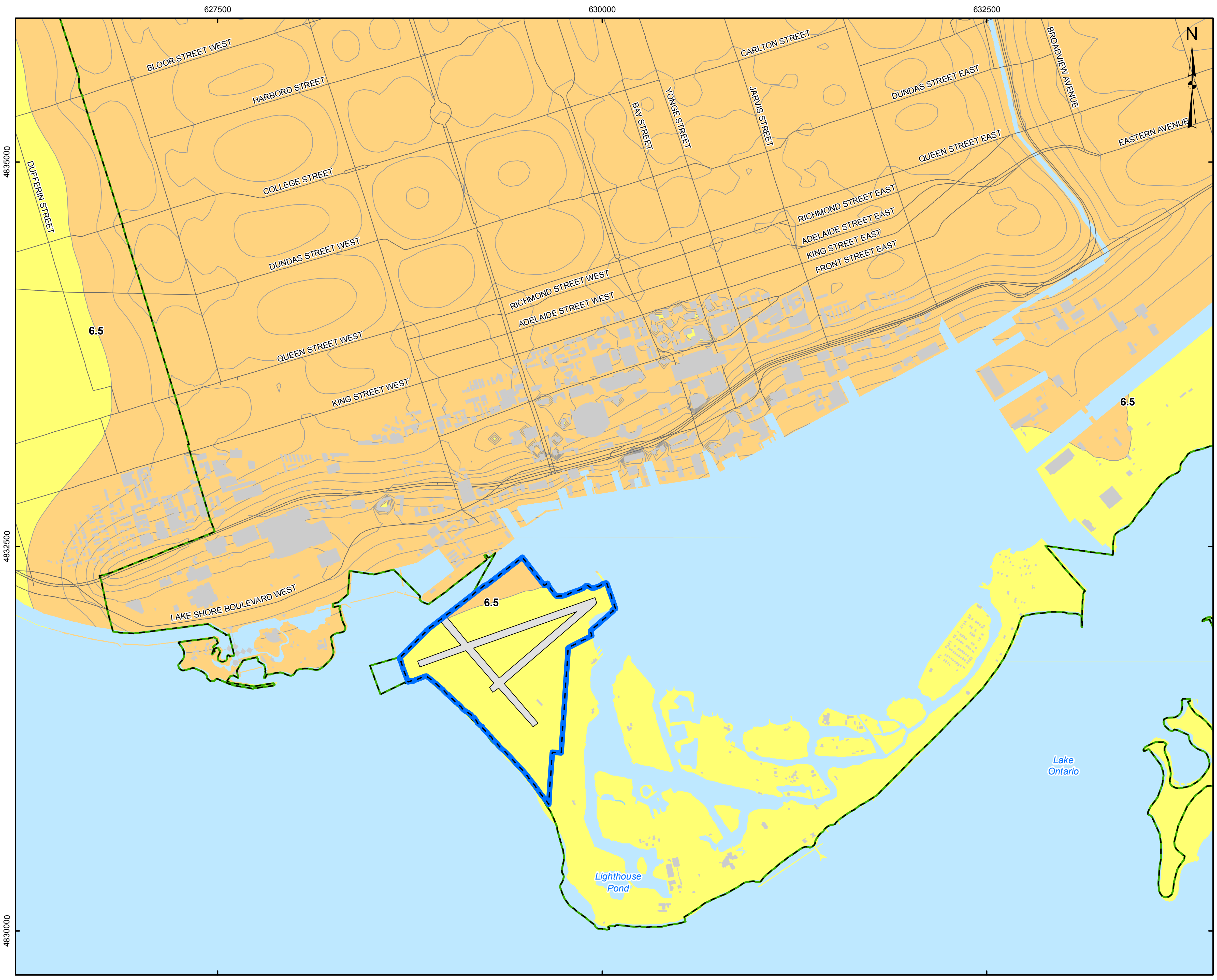
TITLE
Predicted Background Noise Levels - Nighttime Leq at 70 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A8

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Nighttime_Current_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

Noise Contour

%HA

- < 6.5%
- >6.5%

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250

SCALE 1:25,000 METRES

PROJECT

CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

TITLE

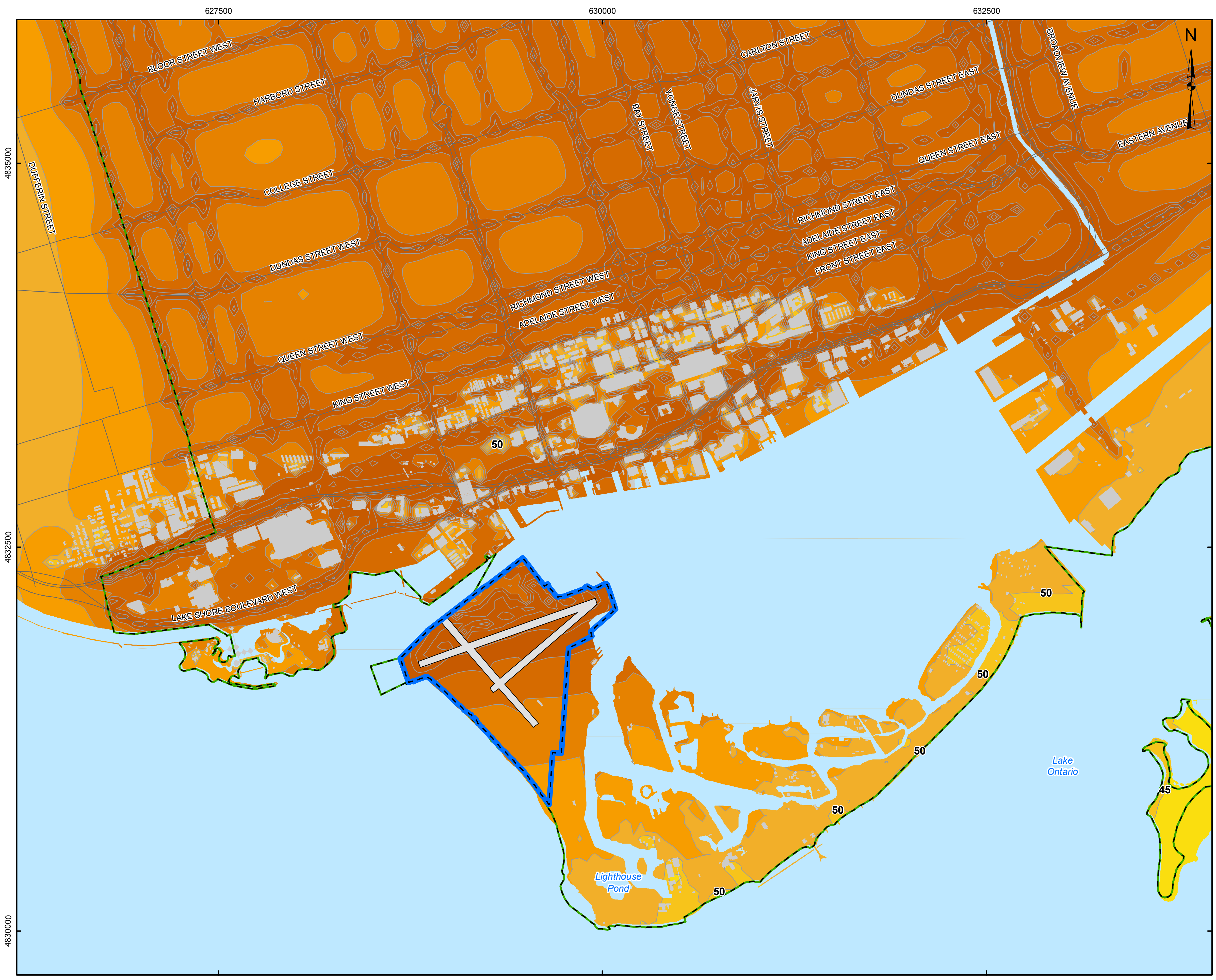
Predicted Background Noise Levels - %HA at 70 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A9

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Noise_Levels_Current_Percentage_Change_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- >70

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250
SCALE 1:25,000 METRES

PROJECT
CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

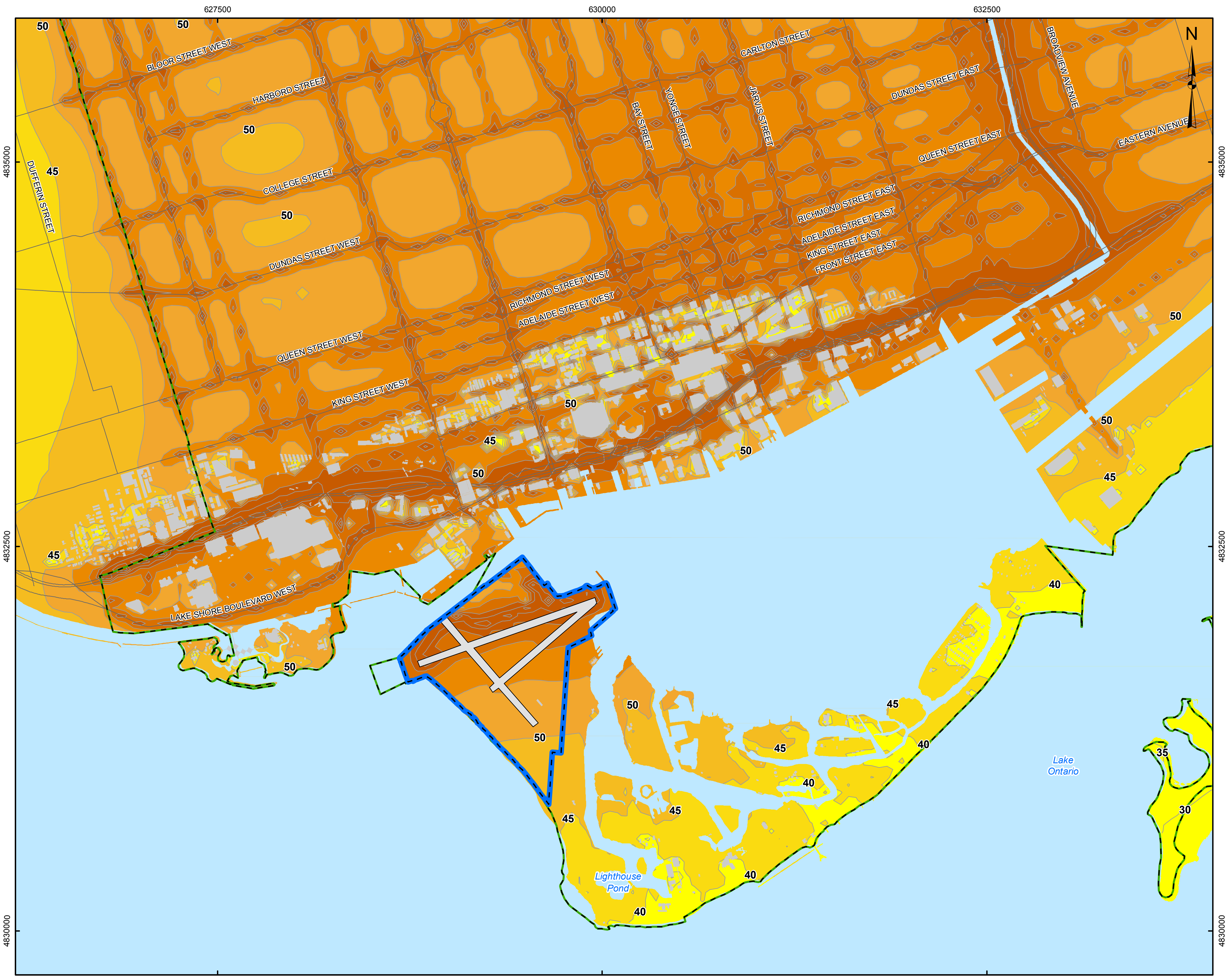
TITLE
Predicted Existing Airport Operation Noise Levels - Daytime Leq at 2 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A10

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Daytime_Current_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area
- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- > 65

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250
SCALE 1:25,000 METRES

PROJECT
CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

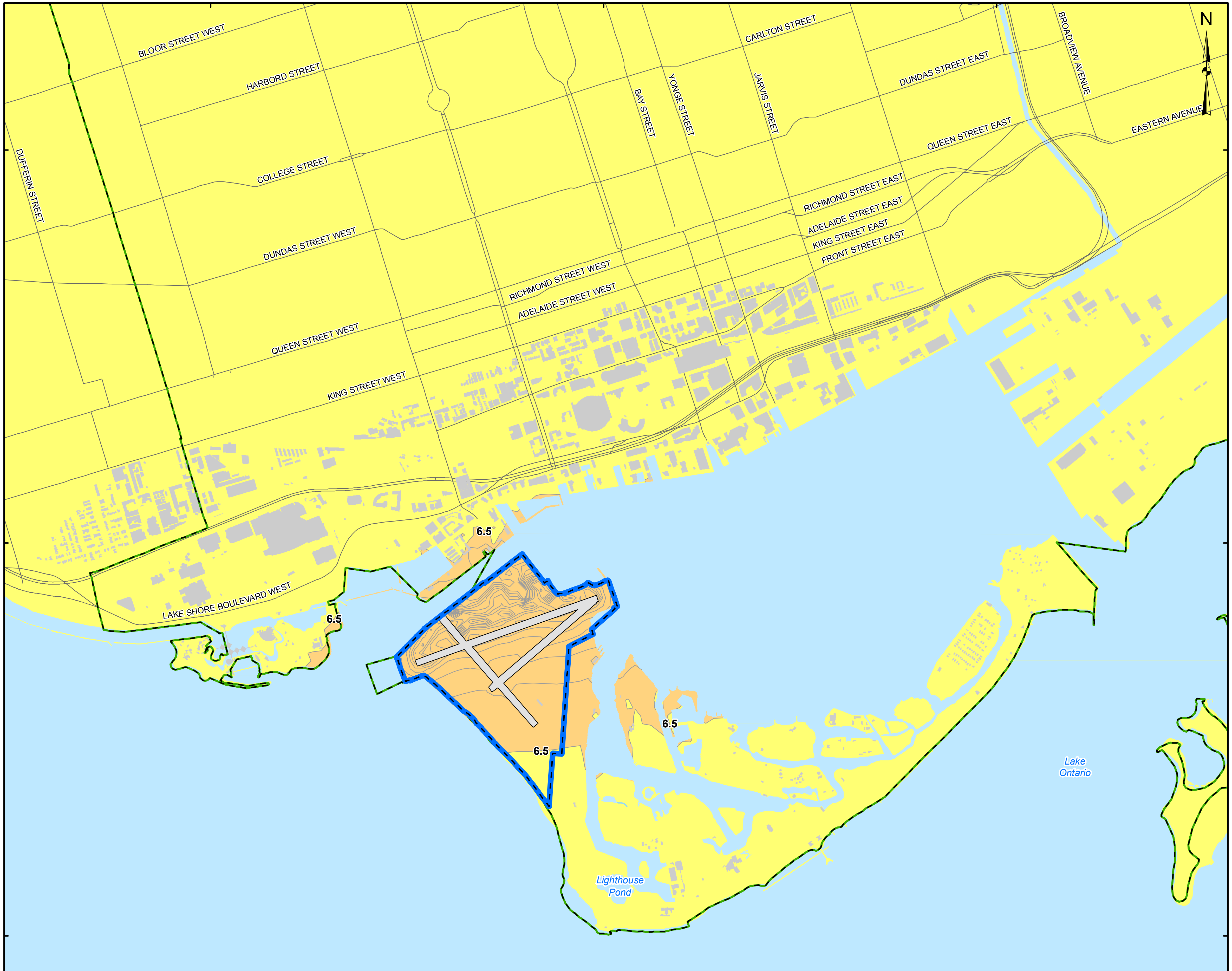
TITLE
Predicted Existing Airport Operation Noise Levels - Nighttime Leq at 2 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A11

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Nighttime_Current_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area
- Noise Contour

%HA

- < 6.5%
- >6.5%

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250

SCALE 1:25,000 METRES

PROJECT

CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

TITLE

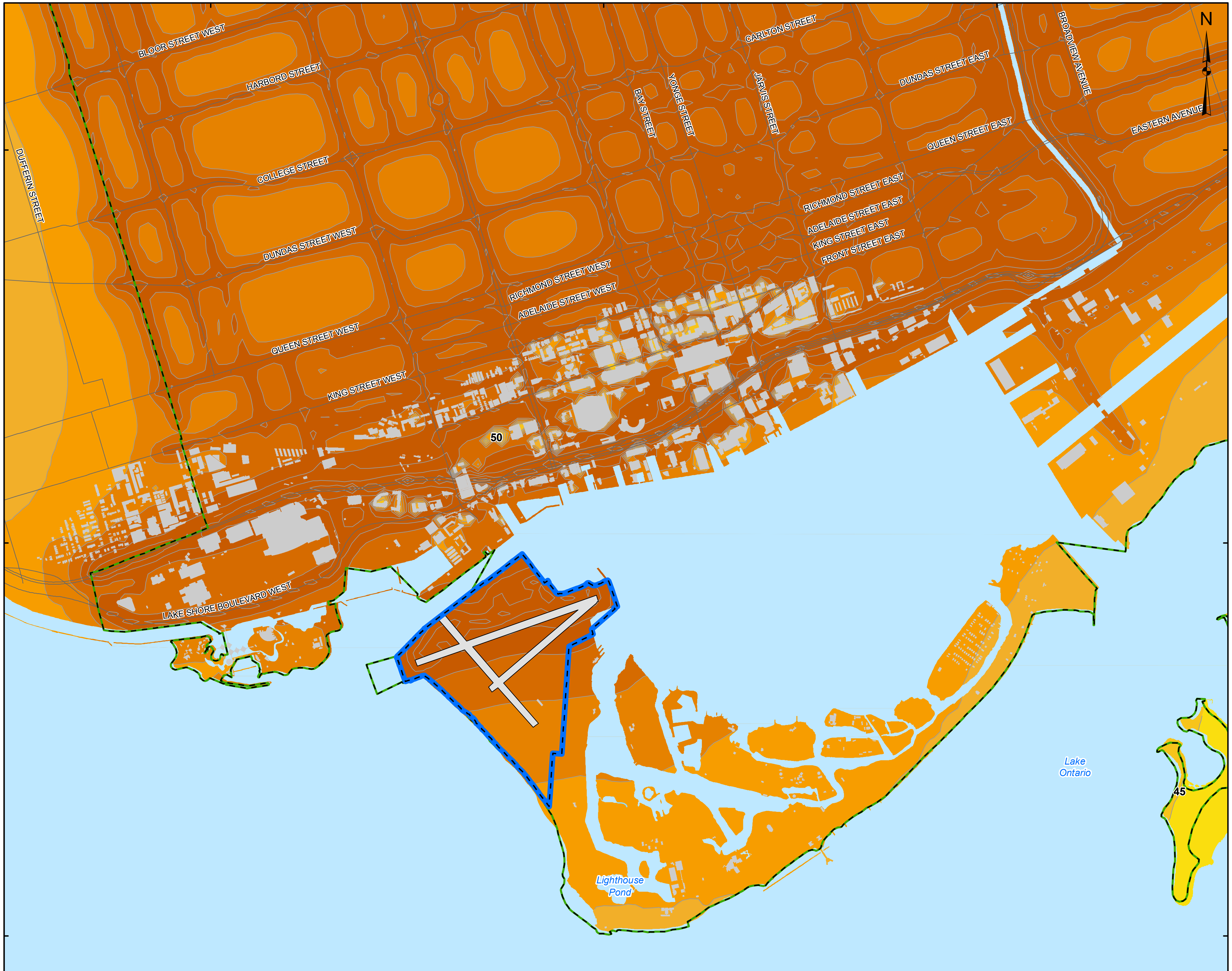
Predicted Existing Airport Operation Noise Levels - Change in %HA at 2 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A12

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Noise_Levels_Current_Percentage_Change_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area
- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- >70

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250

SCALE 1:25,000 METRES

PROJECT

CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

TITLE

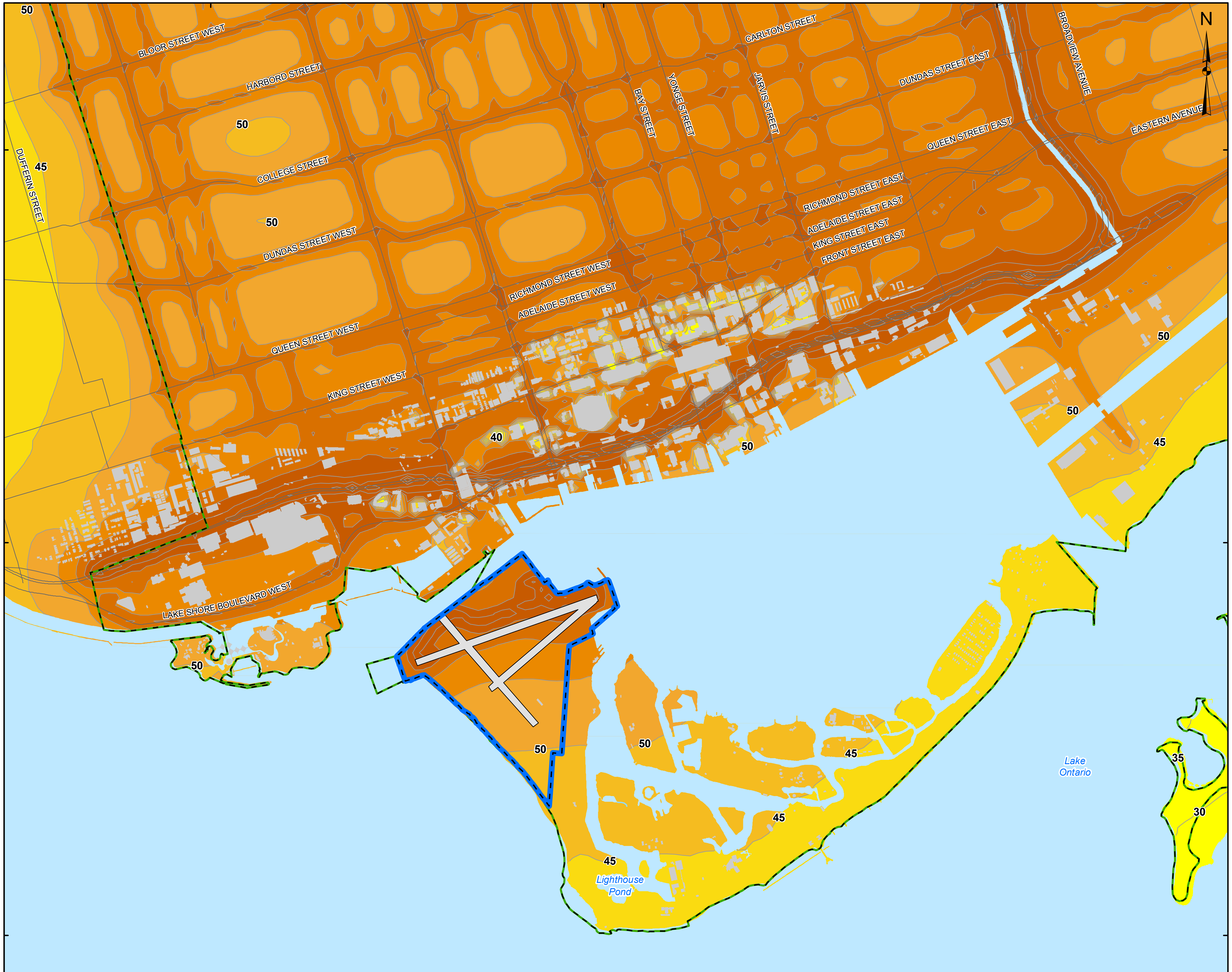
Predicted Existing Airport Operation Noise Levels - Daytime Leq at 15 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A13

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Daytime_Current_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area
- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- > 65

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250

SCALE 1:25,000 METRES

PROJECT

CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

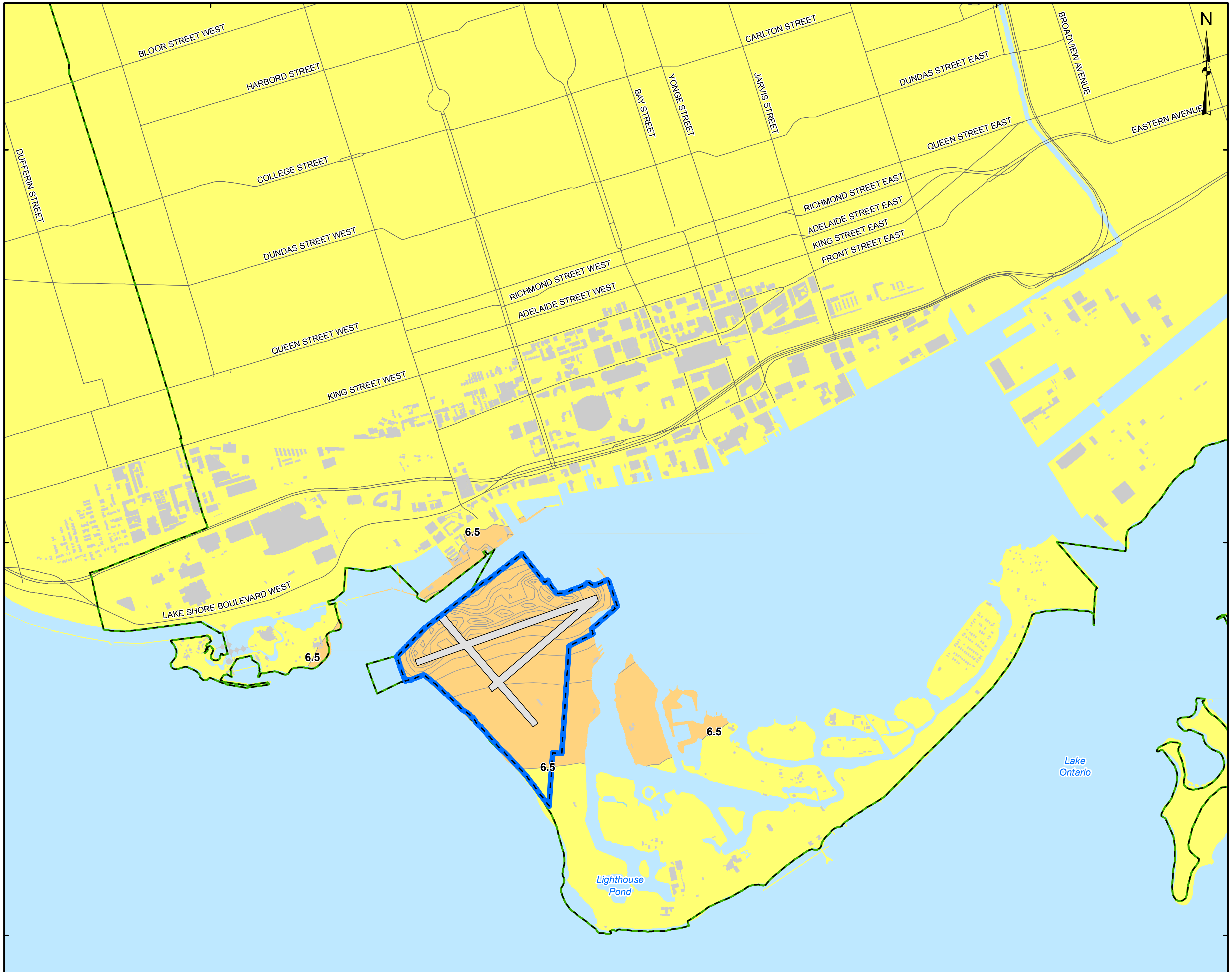
TITLE

Predicted Existing Airport Operation Noise Levels - Nighttime Leq at 15 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008	FIGURE: A14	
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Nighttime_Current_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area
- Noise Contour

%HA

- < 6.5%
- >6.5%

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250

SCALE 1:25,000 METRES

PROJECT

CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

TITLE

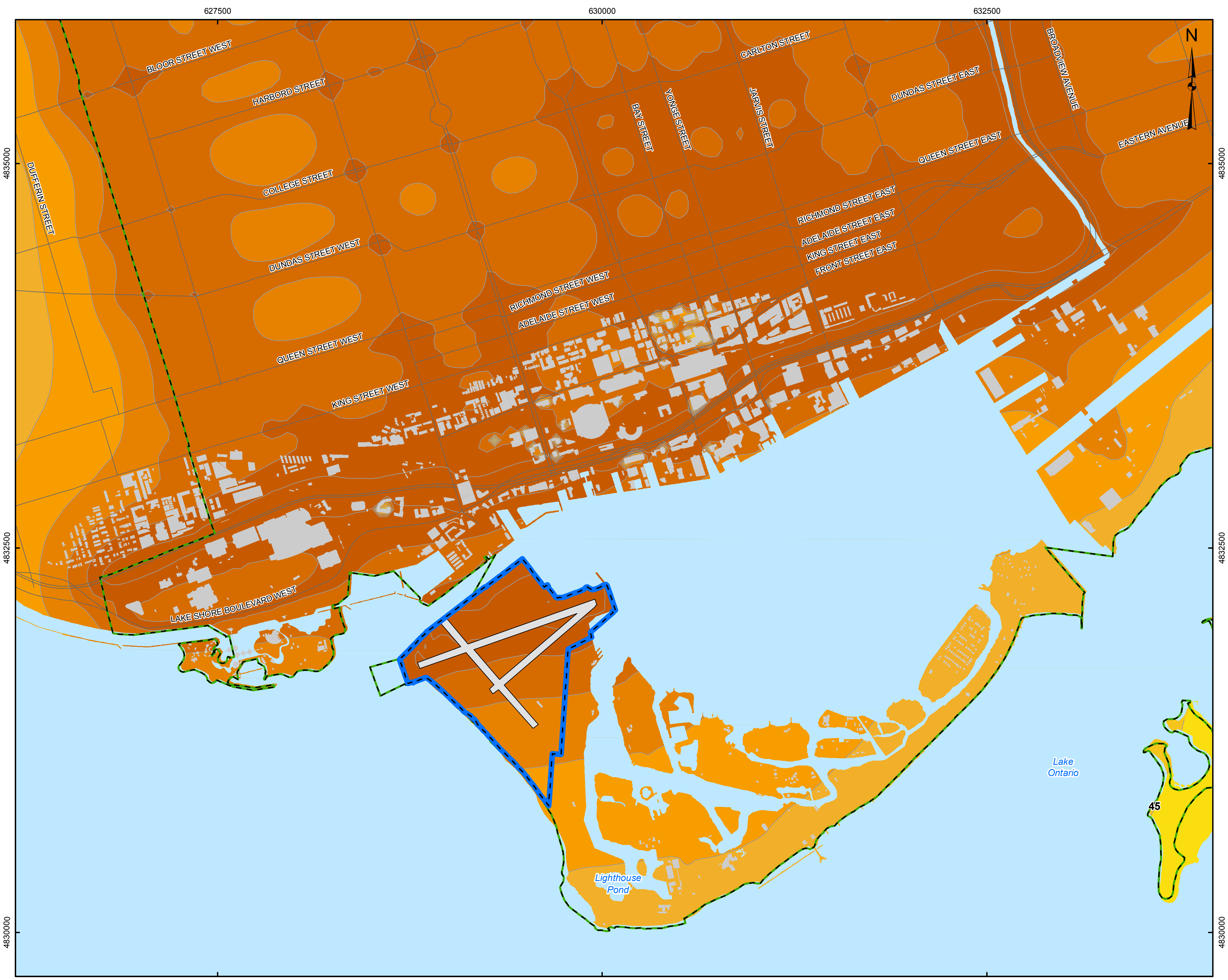
Predicted Existing Airport Operation Noise Levels - Change in %HA at 15 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A15

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Noise_Levels_Current_Percentage_Change_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- >70

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250
SCALE 1:25,000 METRES

PROJECT
CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

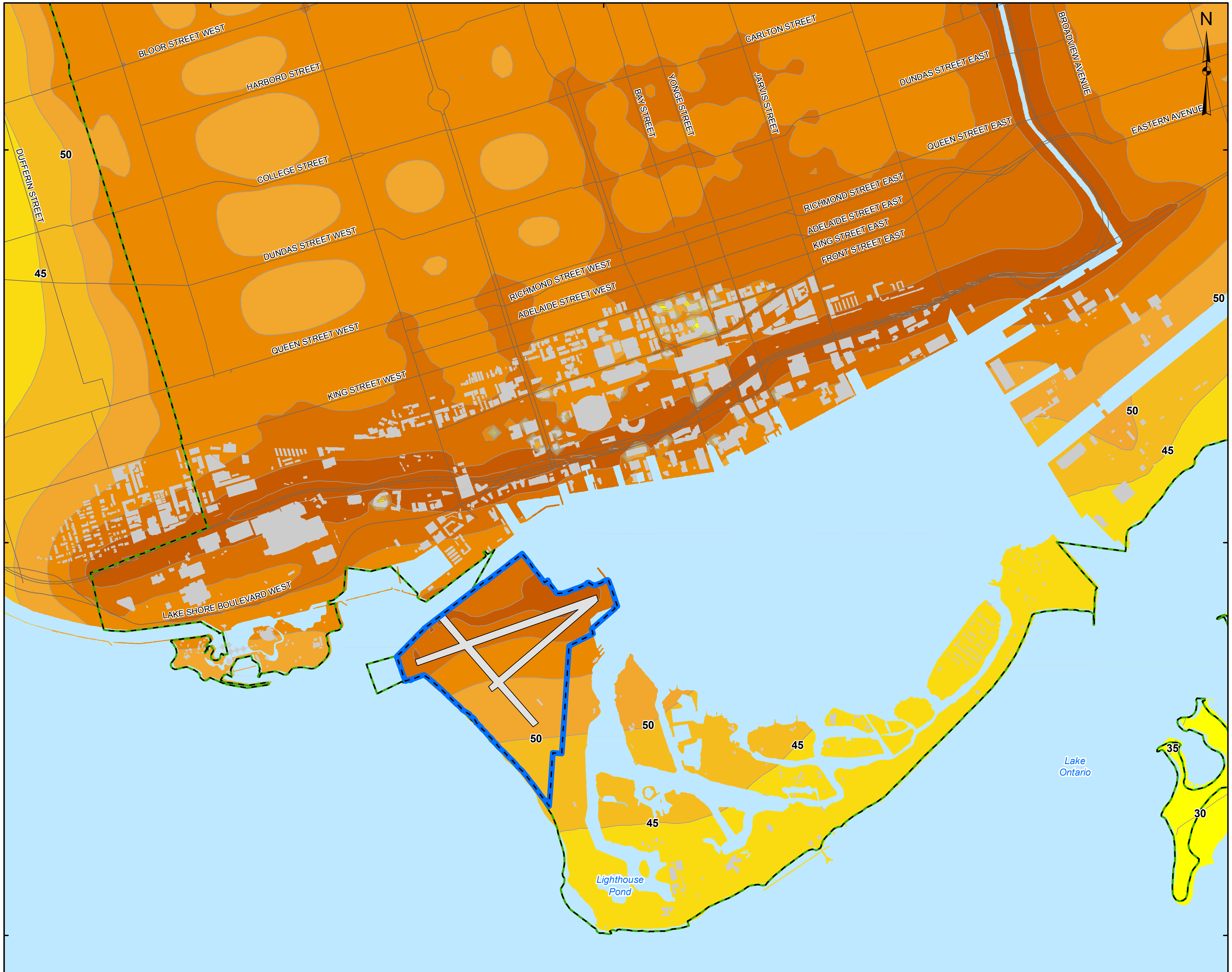
TITLE
Predicted Existing Airport Operation Noise Levels - Daytime Leq at 70 m Above Ground

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

Golder Associates
Mississauga, Ontario

FIGURE: A16

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Daytime_Current_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- > 65

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250
SCALE 1:25,000 METRES

PROJECT
CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

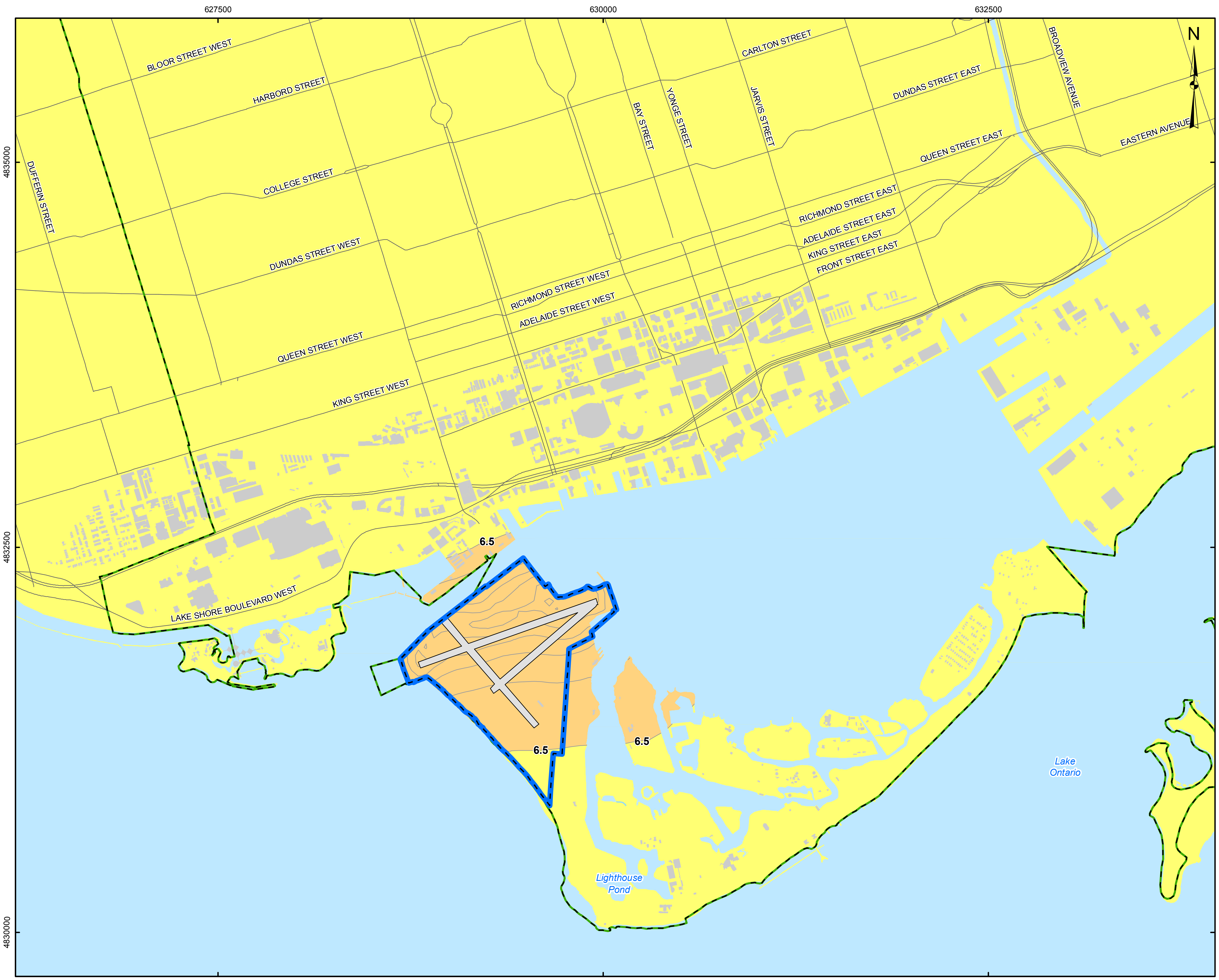
TITLE
Predicted Existing Airport Operation Noise Levels - Nighttime Leq at 70 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A17

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Nighttime_Current_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

Noise Contour

%HA

- < 6.5%
- >6.5%

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250

SCALE 1:25,000 METRES

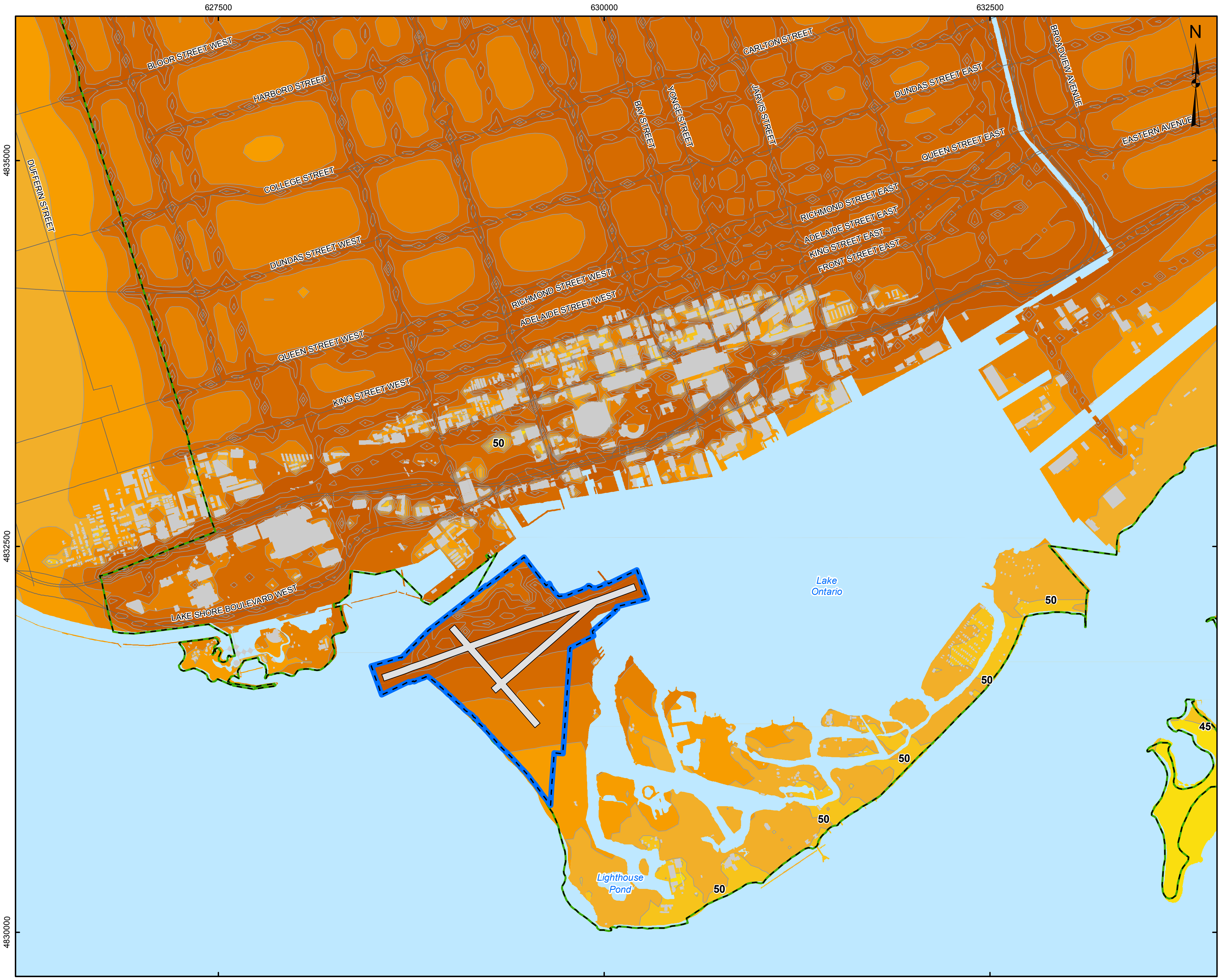
PROJECT
CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

TITLE
Predicted Existing Airport Operation Noise Levels - Change in %HA at 70 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008	FIGURE: A18	
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Noise_Levels_Current_Percentage_Change_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- >70

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250

SCALE 1:25,000 METRES

PROJECT

CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

TITLE

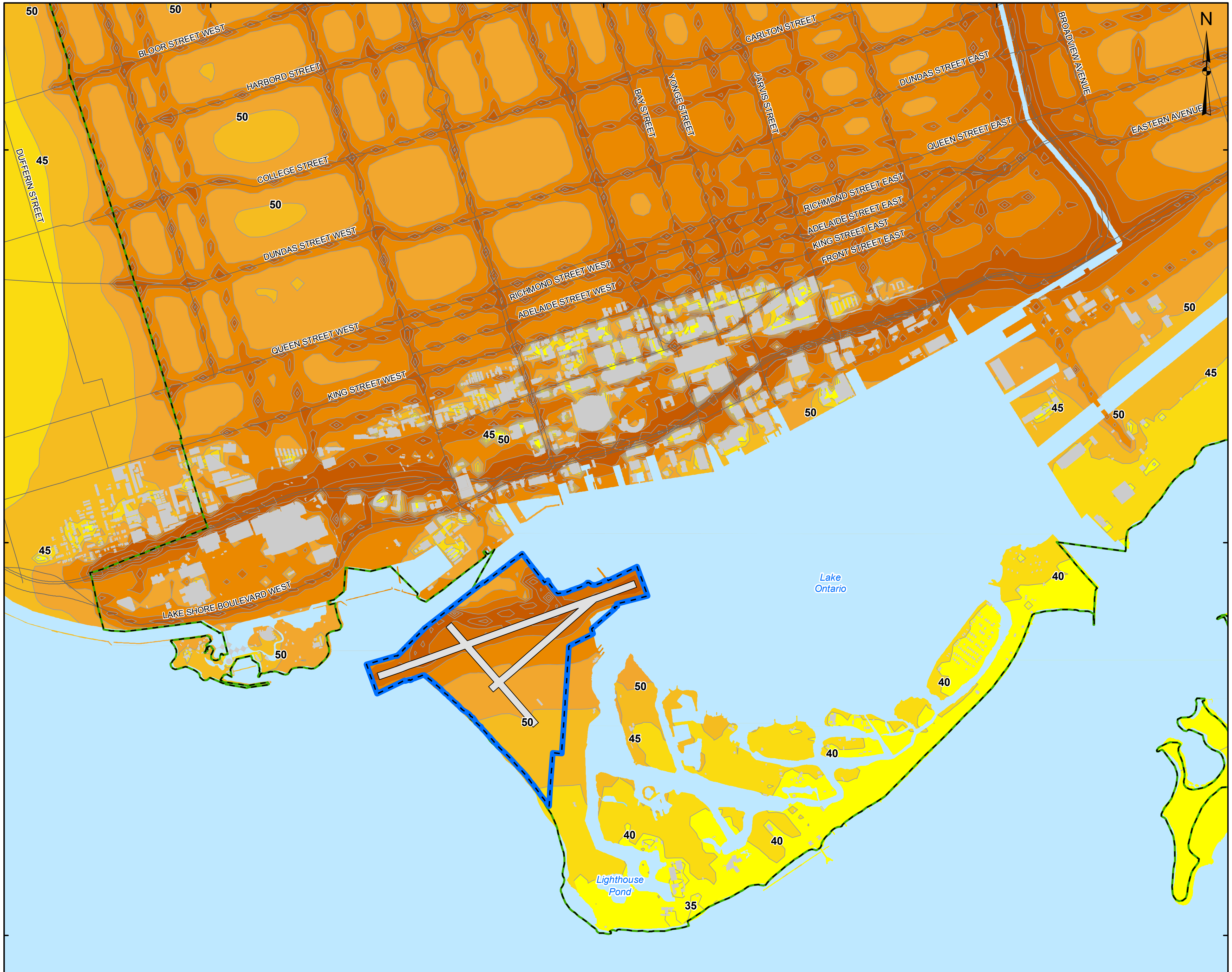
Predicted Future Operation With Jets Noise Levels - Daytime Leq at 2 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A19

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Daytime_Future_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- > 65

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250
SCALE 1:25,000 METRES

PROJECT
CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

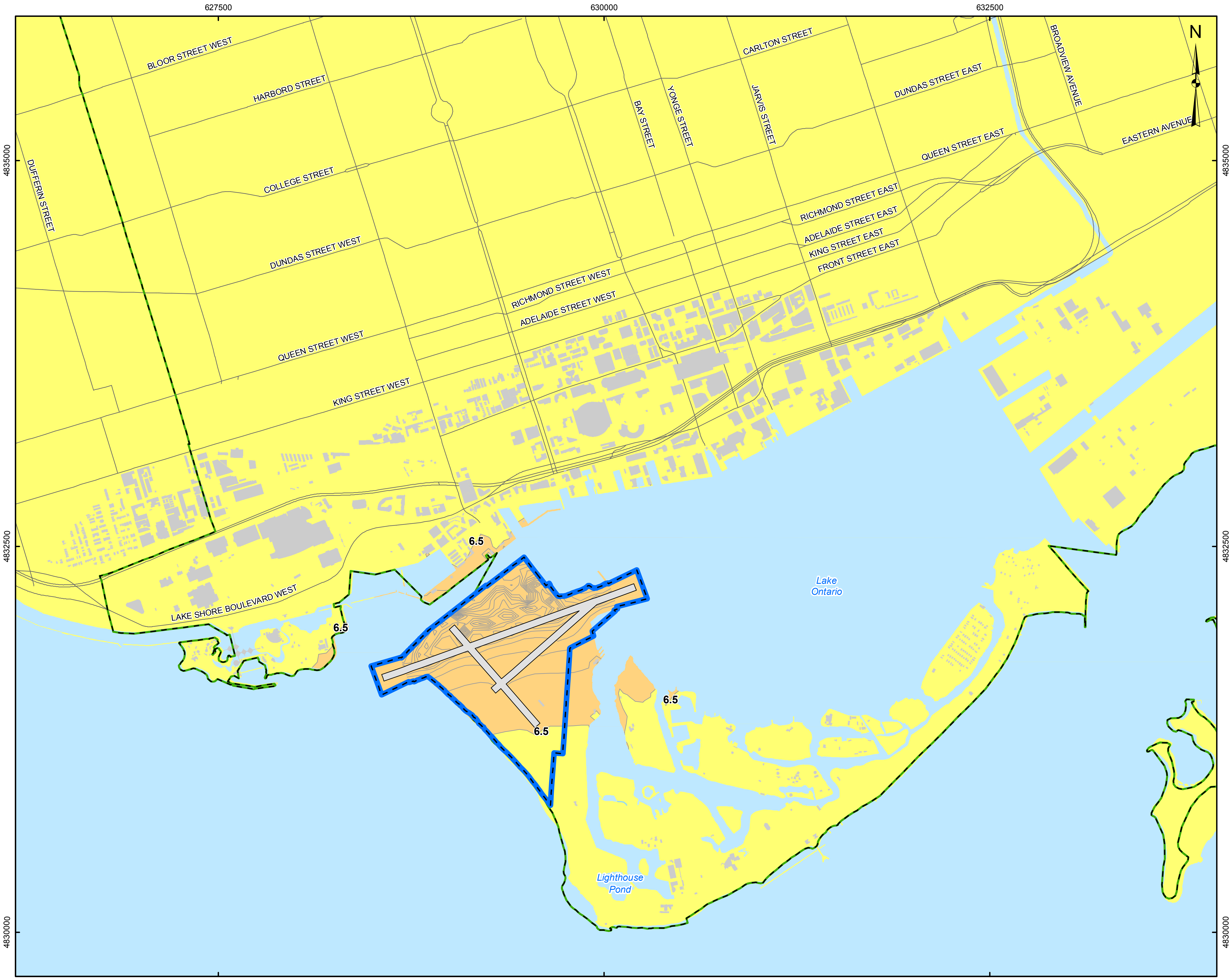
TITLE
Predicted Future Operation With Jets Noise Levels - Nighttime Leq at 2 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A20

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Nighttime_Future_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

Noise Contour

%HA

- < 6.5%
- >6.5%

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250

SCALE 1:25,000 METRES

PROJECT

CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

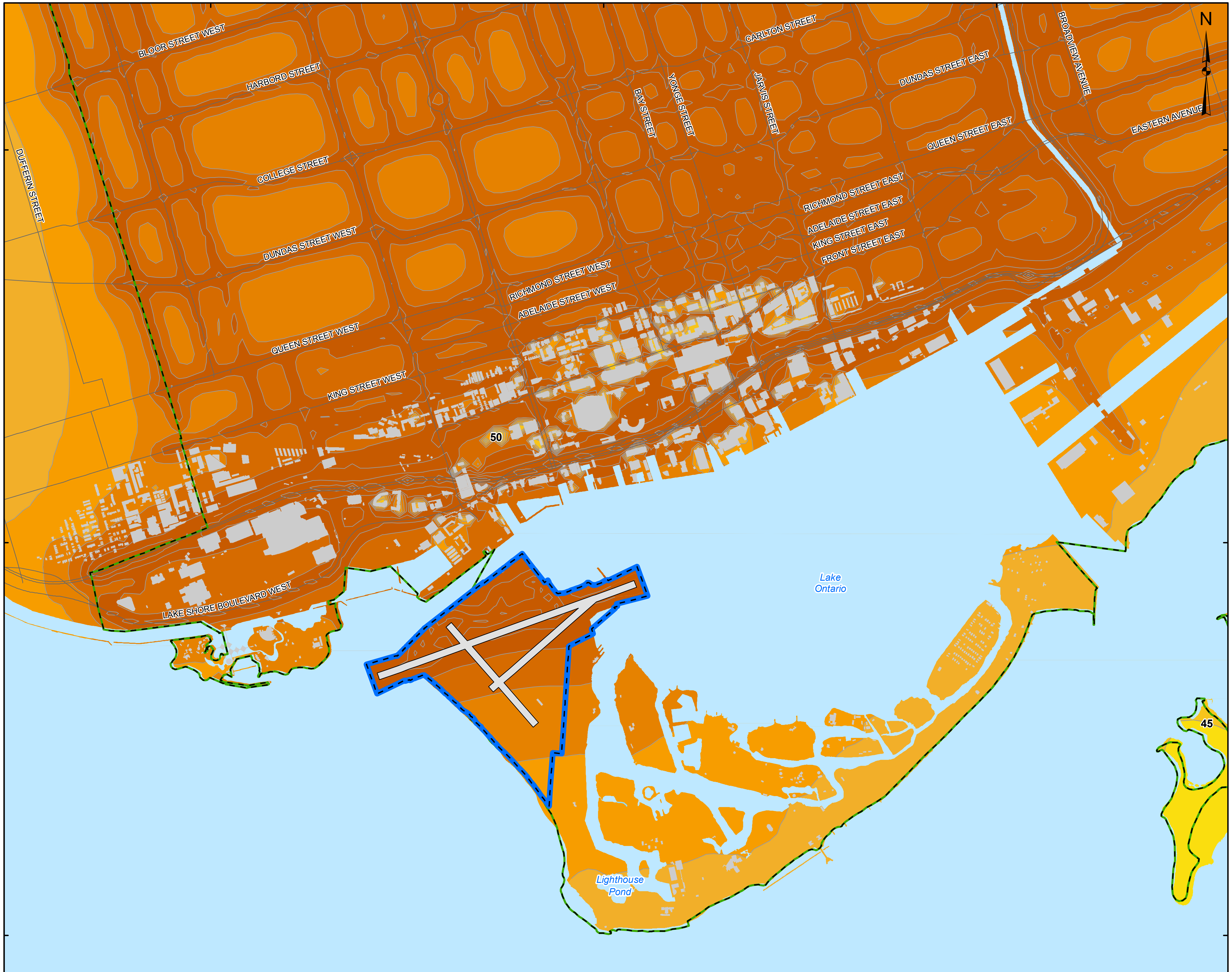
TITLE

Predicted Future Operation With Jets Noise Levels - Change in %HA at 2 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008	**FIGURE: A21**	
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Noise_Levels_Future_Percentage_Change_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- >70

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250

SCALE 1:25,000 METRES

PROJECT

CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

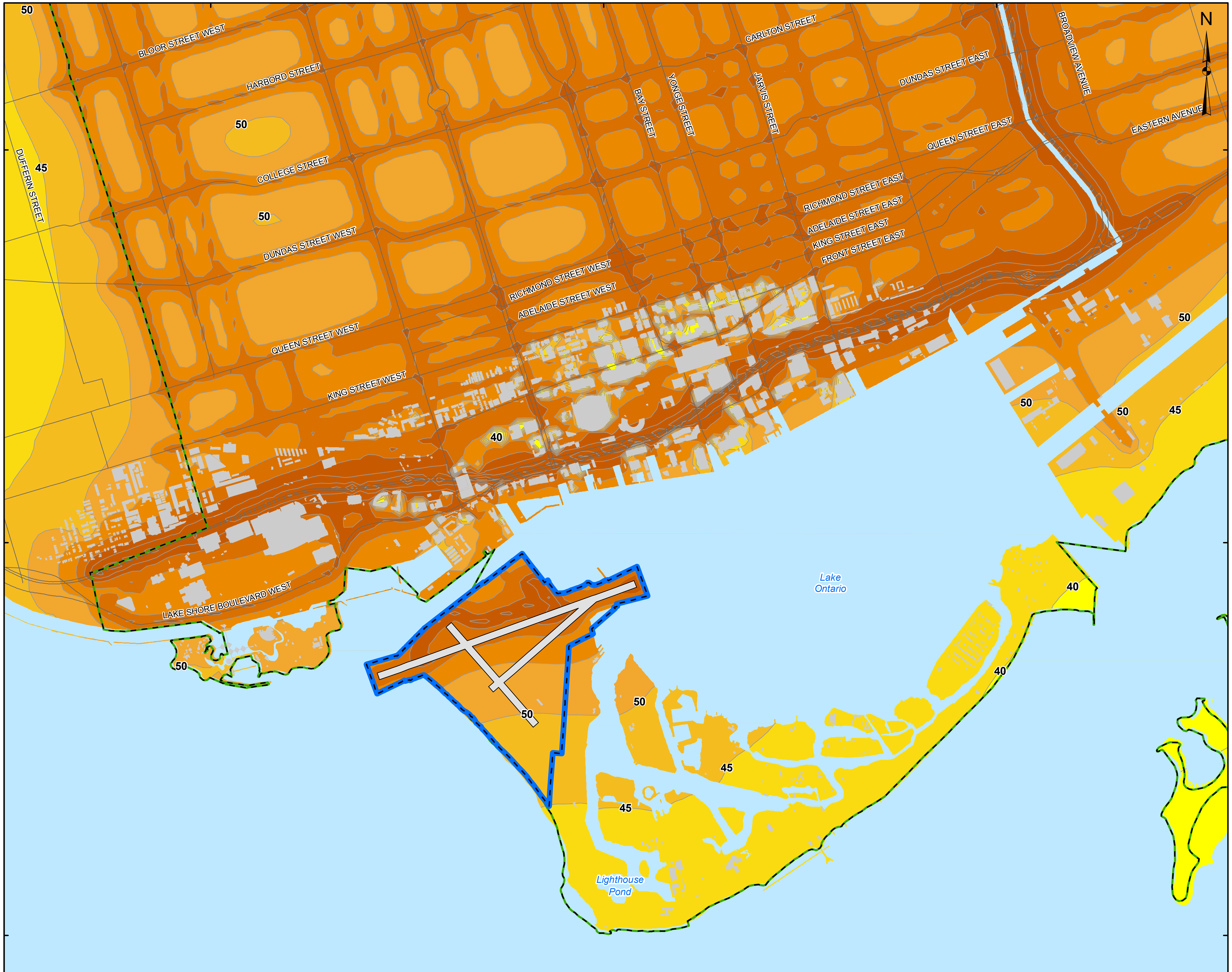
TITLE

Predicted Future Operation With Jets Noise Levels - Daytime Leq at 15 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008	**FIGURE: A22**	
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Daytime_Future_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- > 65

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250

SCALE 1:25,000 METRES

PROJECT

CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

TITLE

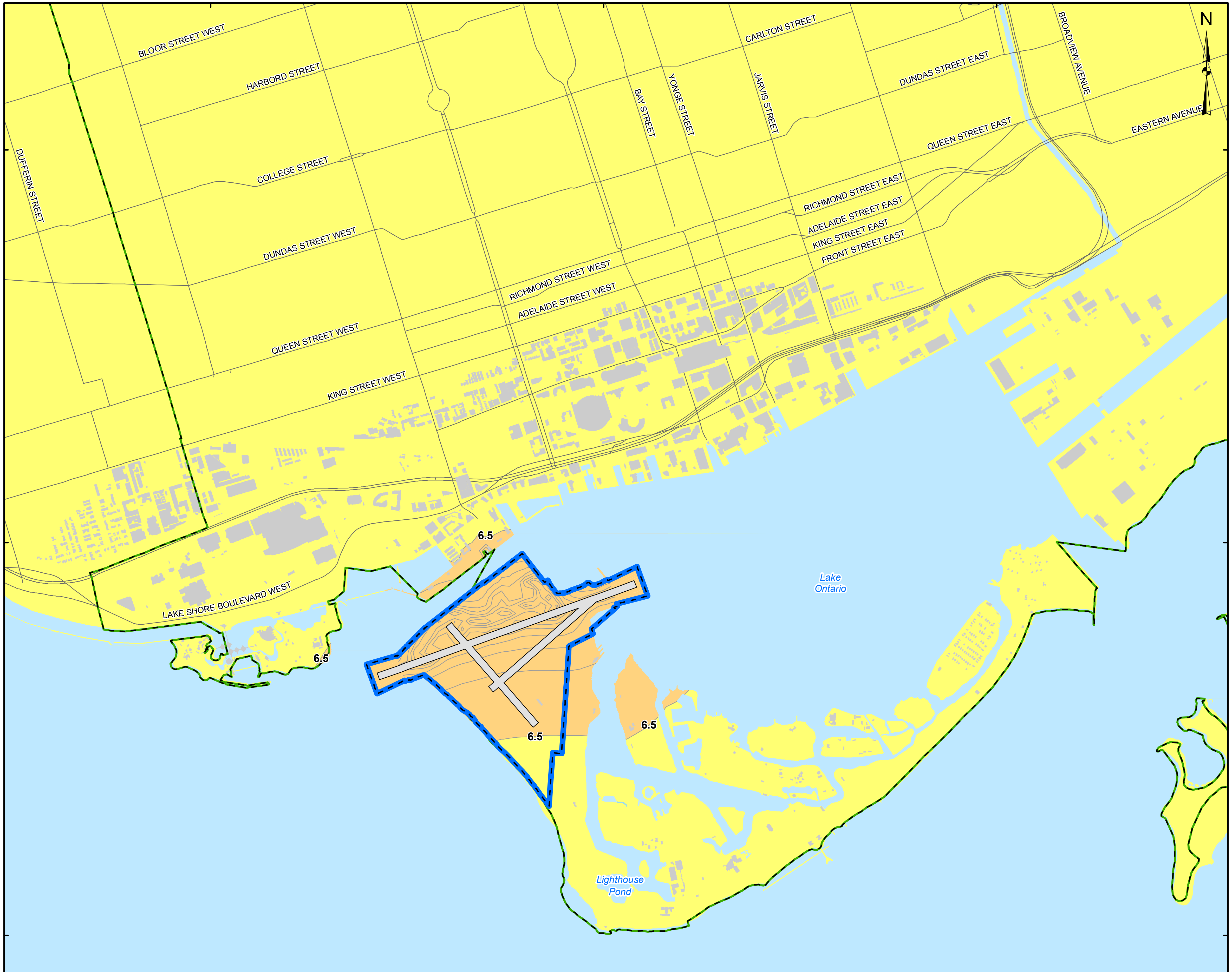
Predicted Future Operation With Jets Noise Levels - Nighttime Leq at 15 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A23

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Nighttime_Future_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

Noise Contour

%HA

- < 6.5%
- >6.5%

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250

SCALE 1:25,000 METRES

PROJECT

CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

TITLE

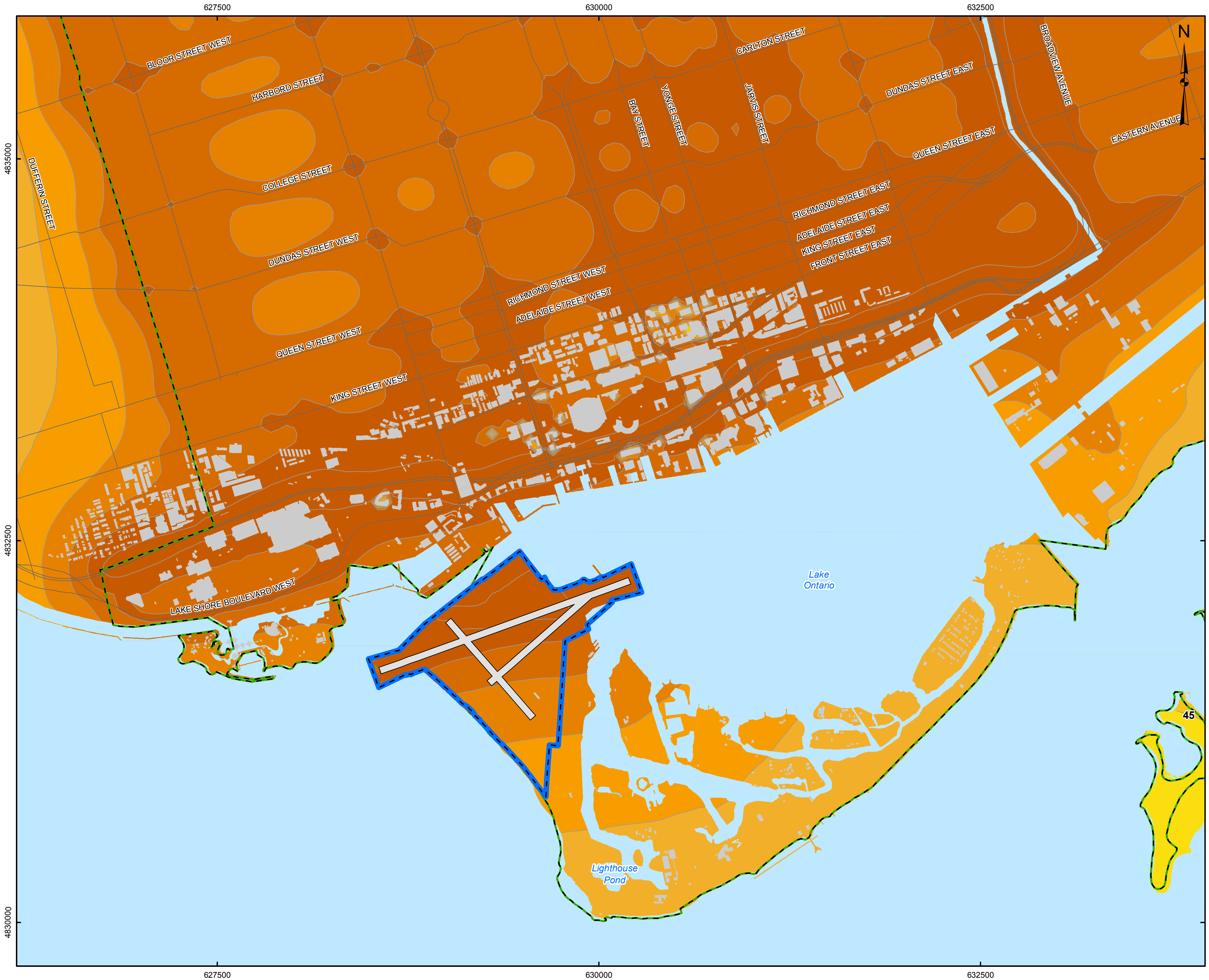
Predicted Future Operation With Jets Noise Levels - Change in %HA at 15 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A24

G:\CLIENTS\CITY_OF_TORONTO\BBTCA99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Noise_Levels_Future_Percentage_Change_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area
- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- >70

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250
SCALE 1:25,000 METRES

PROJECT
CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

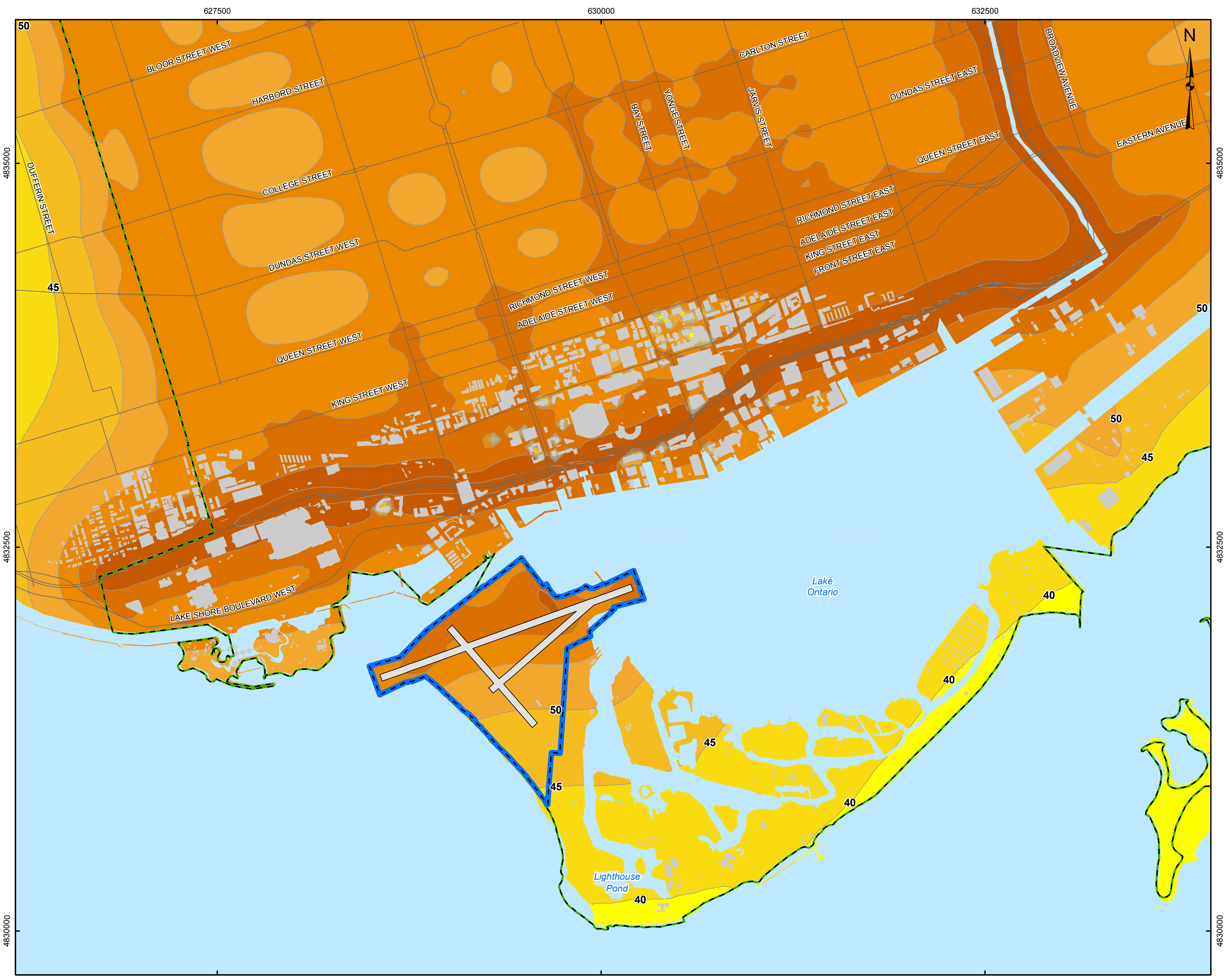
TITLE
Predicted Future Operation With Jets Noise Levels - Daytime Leq at 70 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A25

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Daytime_Future_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- > 65

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250
SCALE 1:25,000 METRES

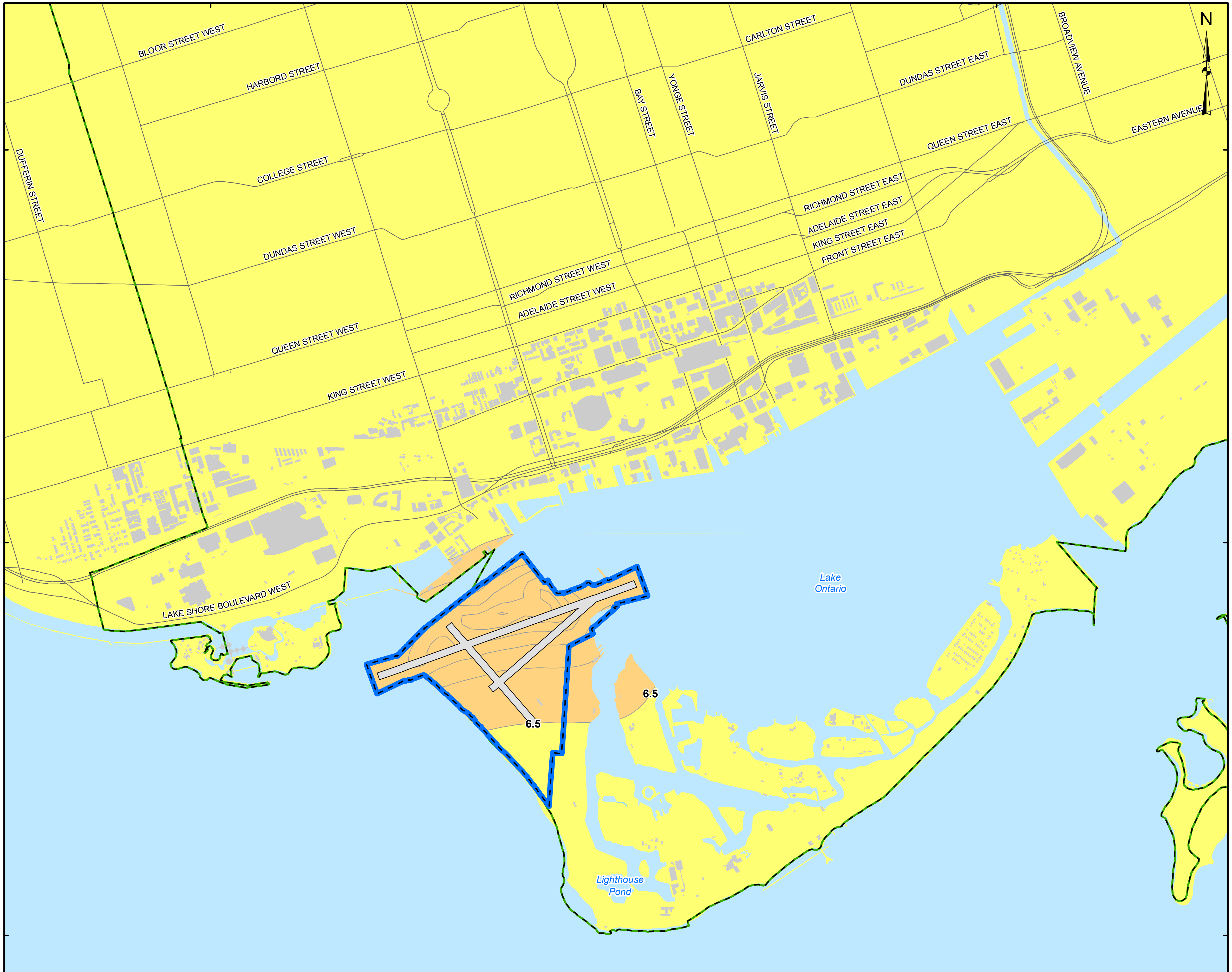
PROJECT
CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

TITLE
Predicted Future Operation With Jets Noise Levels - Nighttime Leq at 70 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008	FIGURE: A26	
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Nighttime_Future_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

Noise Contour

%HA

- < 6.5%
- >6.5%

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250

SCALE 1:25,000 METRES

PROJECT

CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

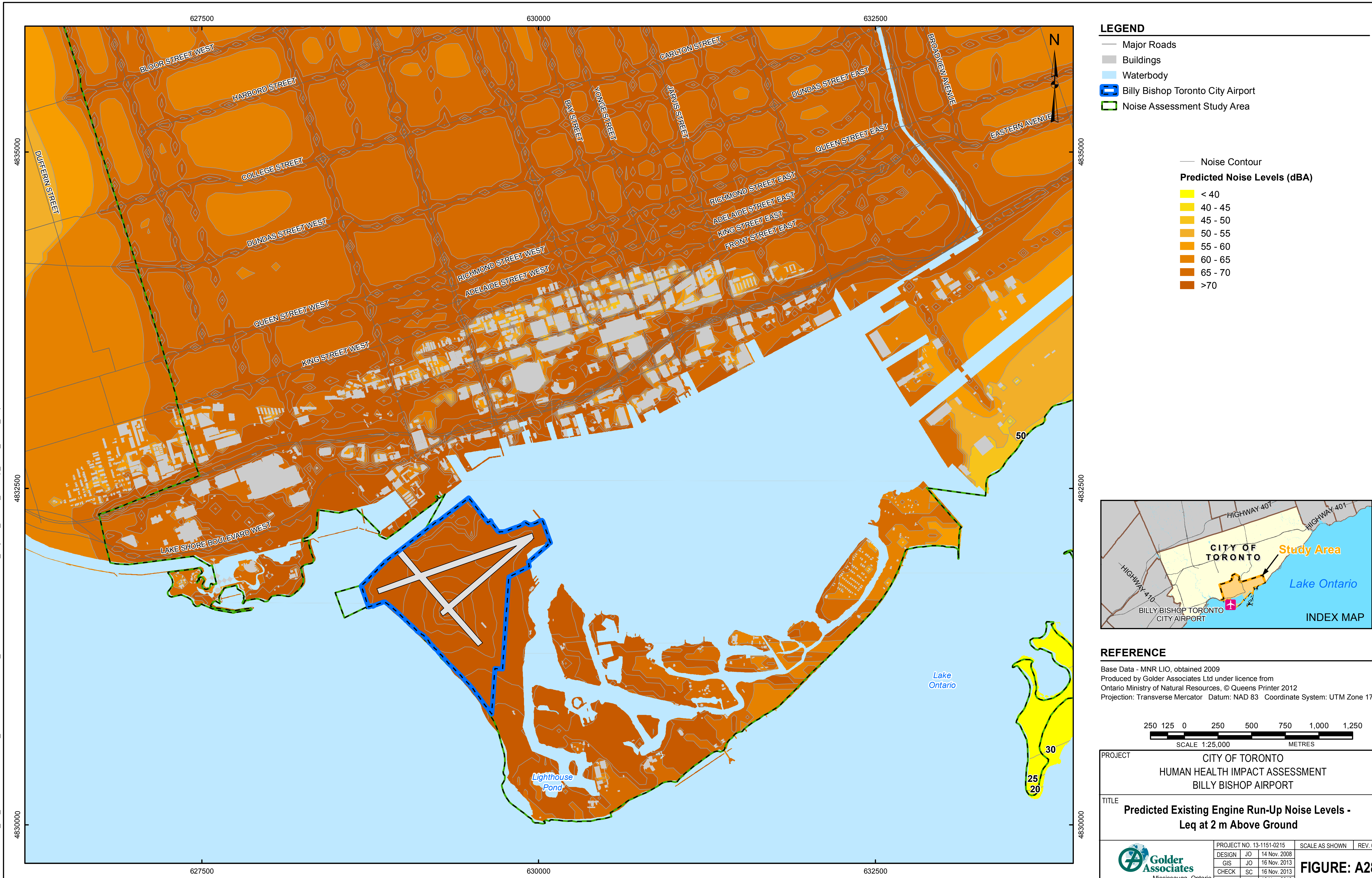
TITLE

Predicted Future Operation With Jets Noise Levels - Change in %HA at 70 m Above Ground

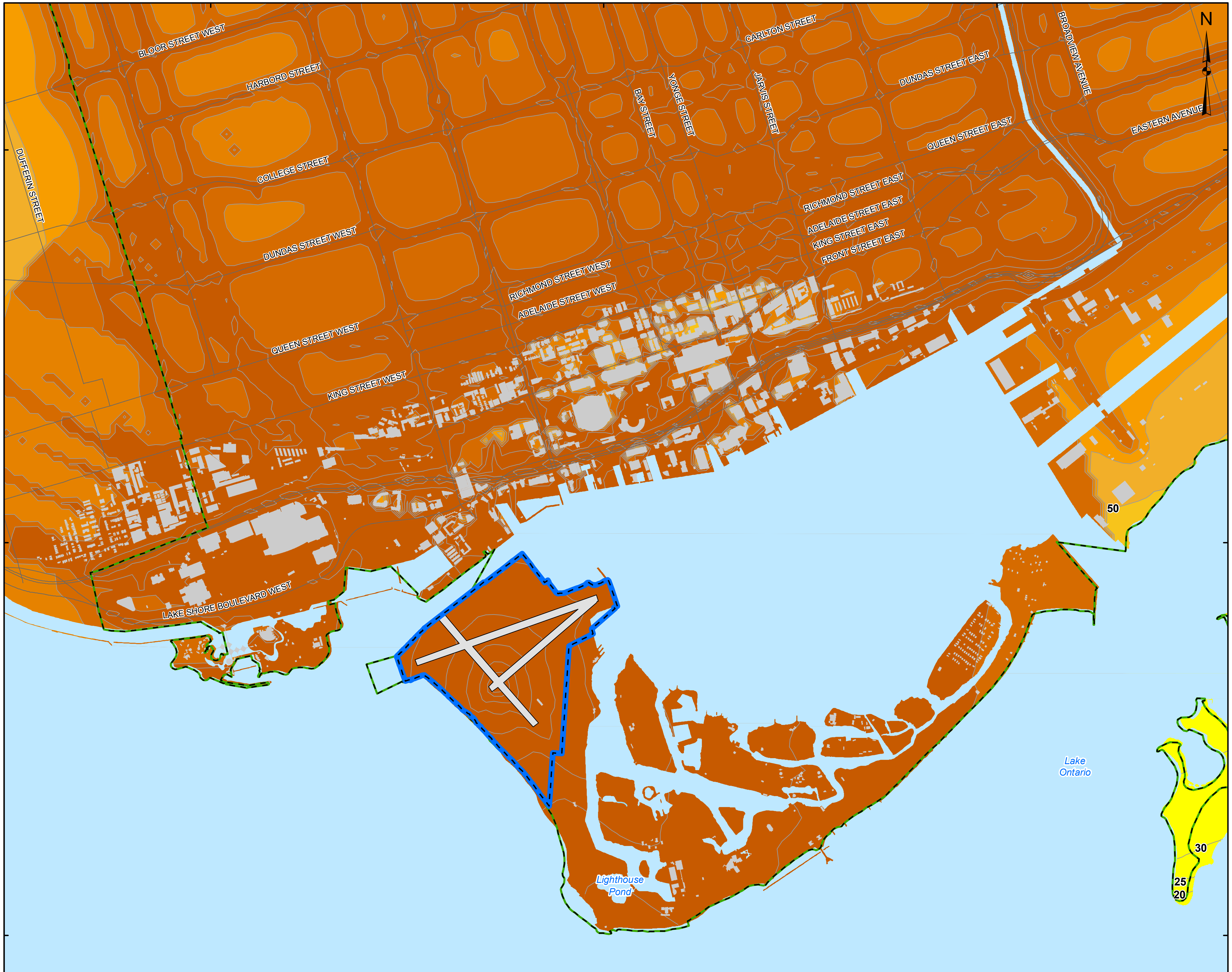
Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008	**FIGURE: A27**	
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NO\Predicted_Noise_Levels_Future_Percentage_Change_Mapbook.mxd



627500
630000
632500
4835000
4832500
4830000
BLOOR STREET WEST
HARBORD STREET
COLLEGE STREET
DUNDAS STREET WEST
QUEEN STREET WEST
KING STREET WEST
RICHMOND STREET WEST
ADELAIDE STREET WEST
LAKE SHORE BOULEVARD WEST
CARLTON STREET
DUNDAS STREET EAST
QUEEN STREET EAST
RICHMOND STREET EAST
ADELAIDE STREET EAST
KING STREET EAST
FRONT STREET EAST
BAY STREET
YONGE STREET
JARVIS STREET
BROADVIEW AVENUE
EASTERN AVENUE
DUFFERIN STREET
Lake Ontario
Lighthouse Pond
N
50
30
25
20
LEGEND
Major Roads
Buildings
Waterbody
Billy Bishop Toronto City Airport
Noise Assessment Study Area
Noise Contour
Predicted Noise Levels (dBA)
< 40
40 - 45
45 - 50
50 - 55
55 - 60
60 - 65
65 - 70
>70
HIGHWAY 407
HIGHWAY 401
HIGHWAY 410
CITY OF TORONTO
Study Area
Lake Ontario
BILLY BISHOP TORONTO CITY AIRPORT
INDEX MAP
REFERENCE
Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17
250 125 0 250 500 750 1,000 1,250
SCALE 1:25,000
METRES
PROJECT
CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT
TITLE
Predicted Existing Engine Run-Up Noise Levels - Leq at 2 m Above Ground
PROJECT NO. 13-1151-0215
SCALE AS SHOWN
REV. 0.0
DESIGN JO 14 Nov. 2008
GIS JO 16 Nov. 2013
CHECK SC 16 Nov. 2013
REVIEW DS 16 Nov. 2013
Golder Associates
Mississauga, Ontario
FIGURE: A28
G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Daytime_Current_Run-Up_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area
- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- >70

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250

SCALE 1:25,000 METRES

PROJECT

CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

TITLE

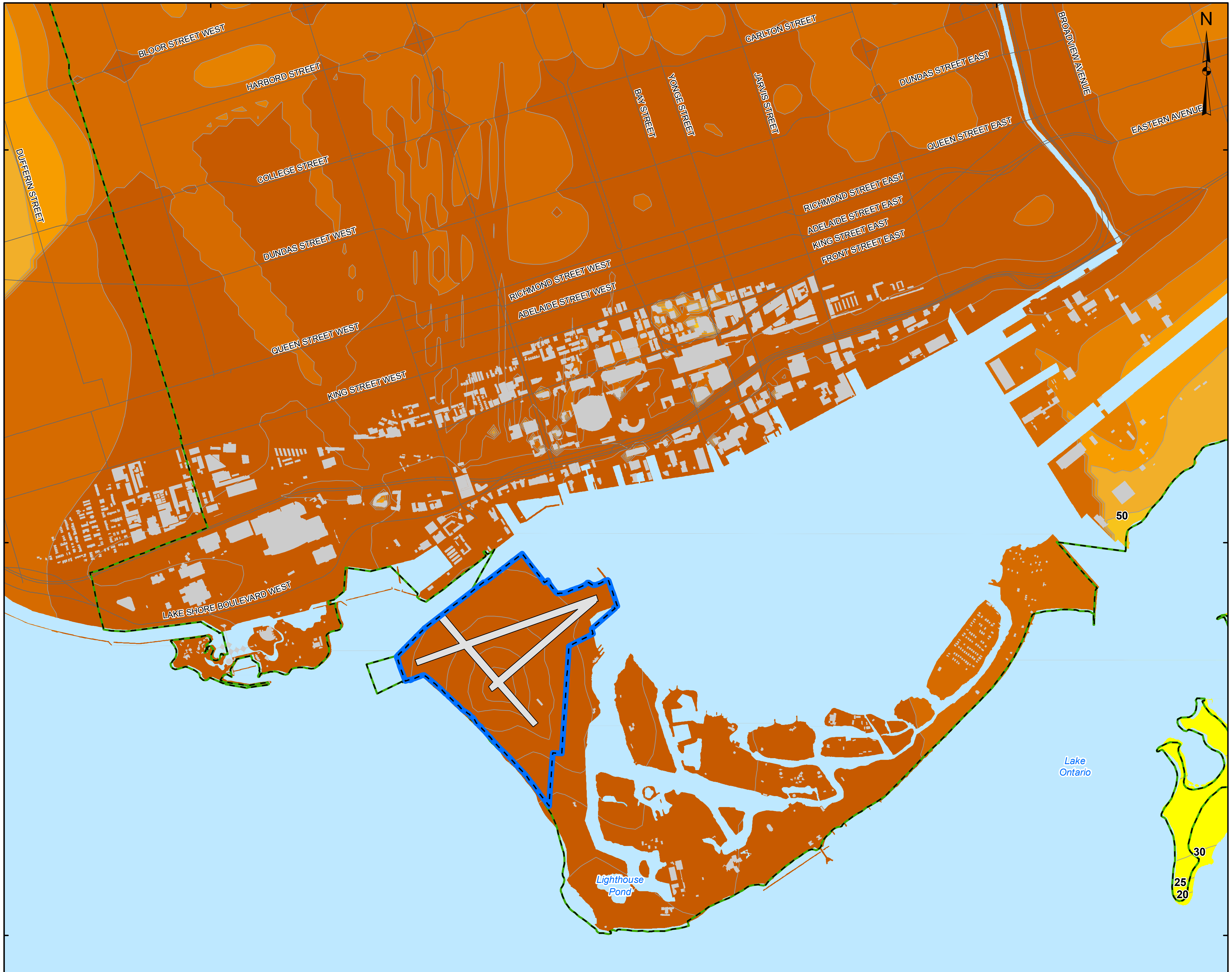
Predicted Existing Engine Run-Up Noise Levels - Leq at 15 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A29

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Daytime_Current_Run-Up_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- >70

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250
SCALE 1:25,000 METRES

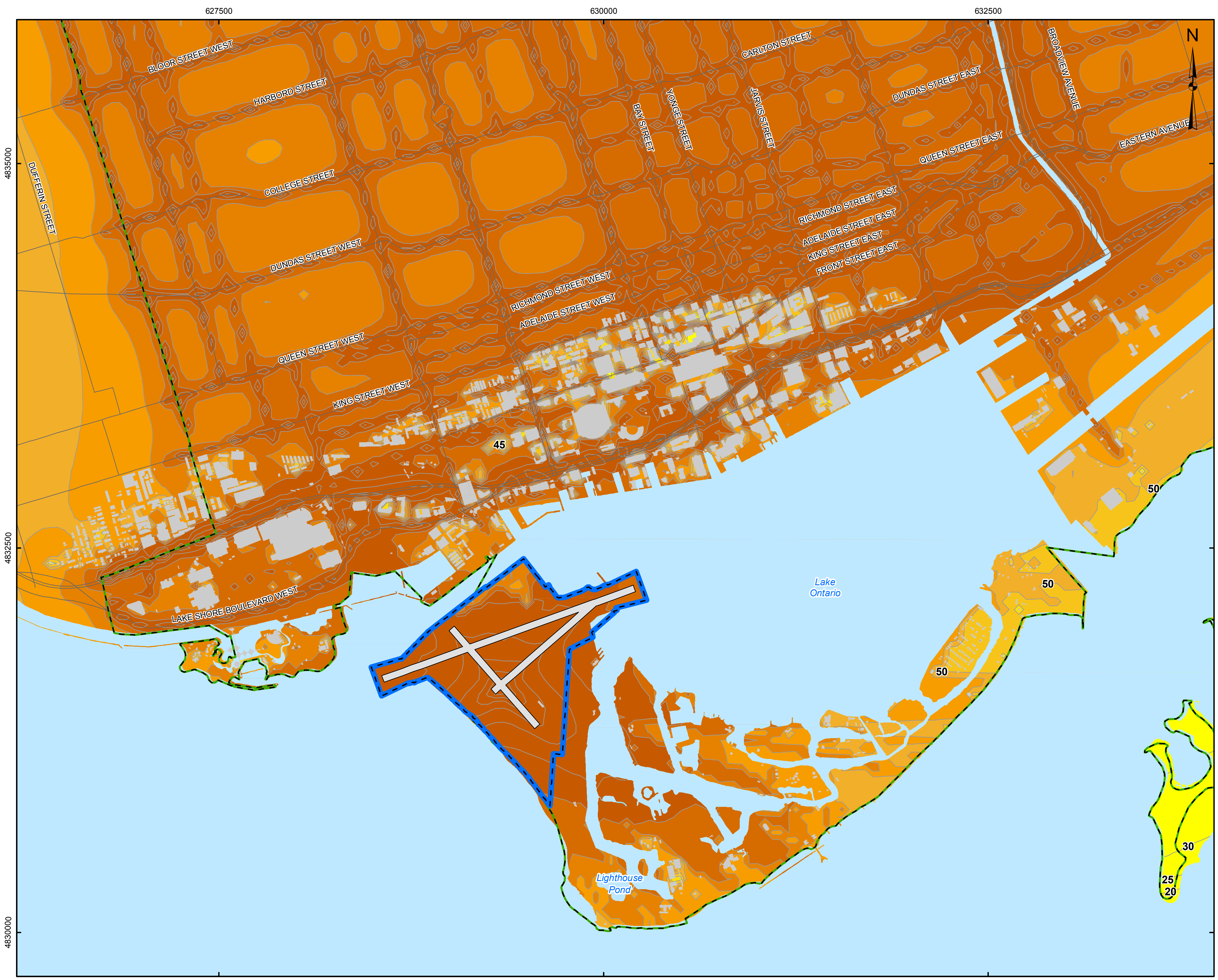
PROJECT
CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

TITLE
Predicted Existing Engine Run-Up Noise Levels - Leq at 70 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008	FIGURE: A30	
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Daytime_Current_Run-Up_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- >70

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250

SCALE 1:25,000 METRES

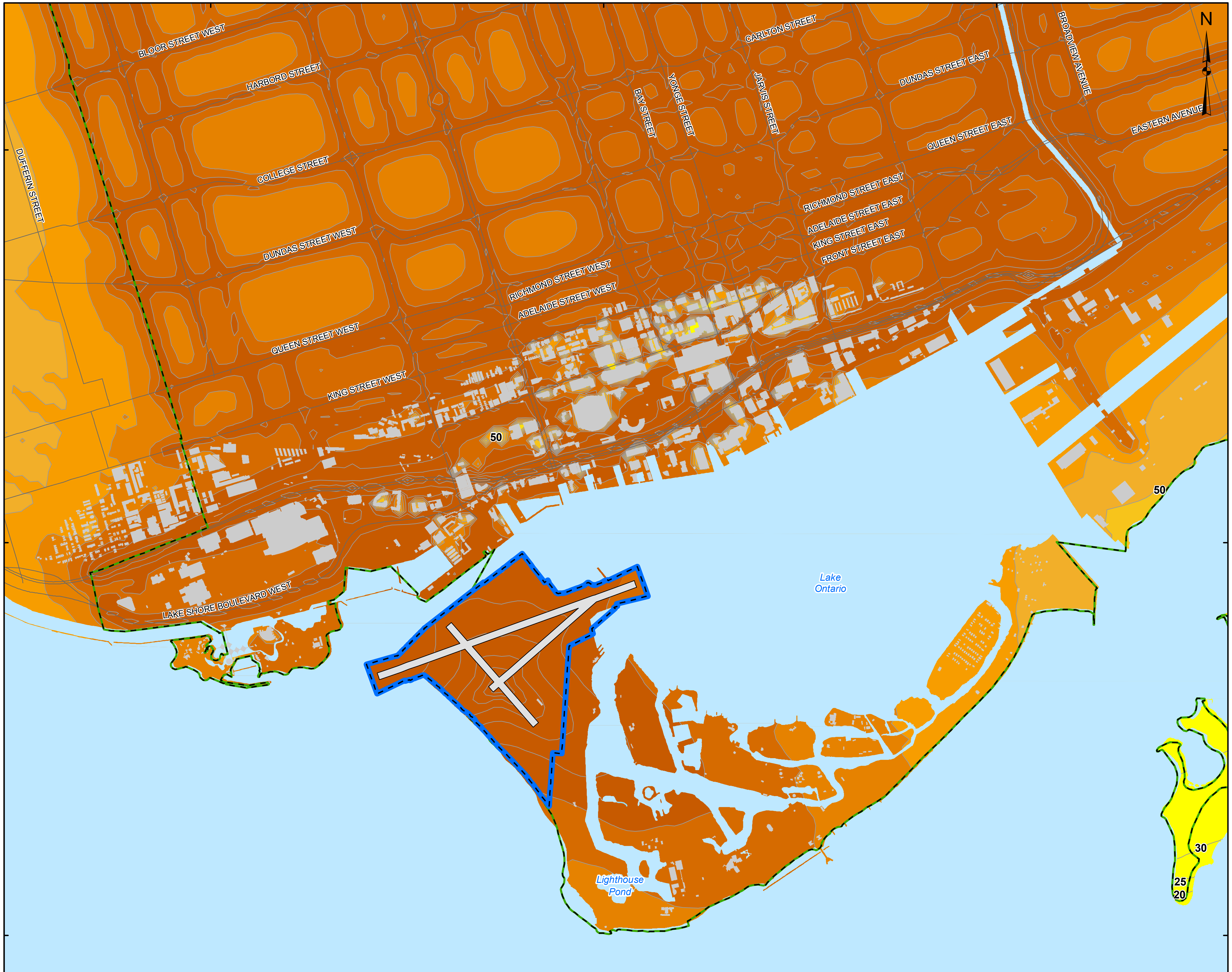
PROJECT
CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

TITLE
Predicted Future Engine Run-Up Noise Levels - Leq at 2 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008	FIGURE: A31	
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Daytime_Future_Noise_Run-Up_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- >70

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250

SCALE 1:25,000 METRES

PROJECT

CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

TITLE

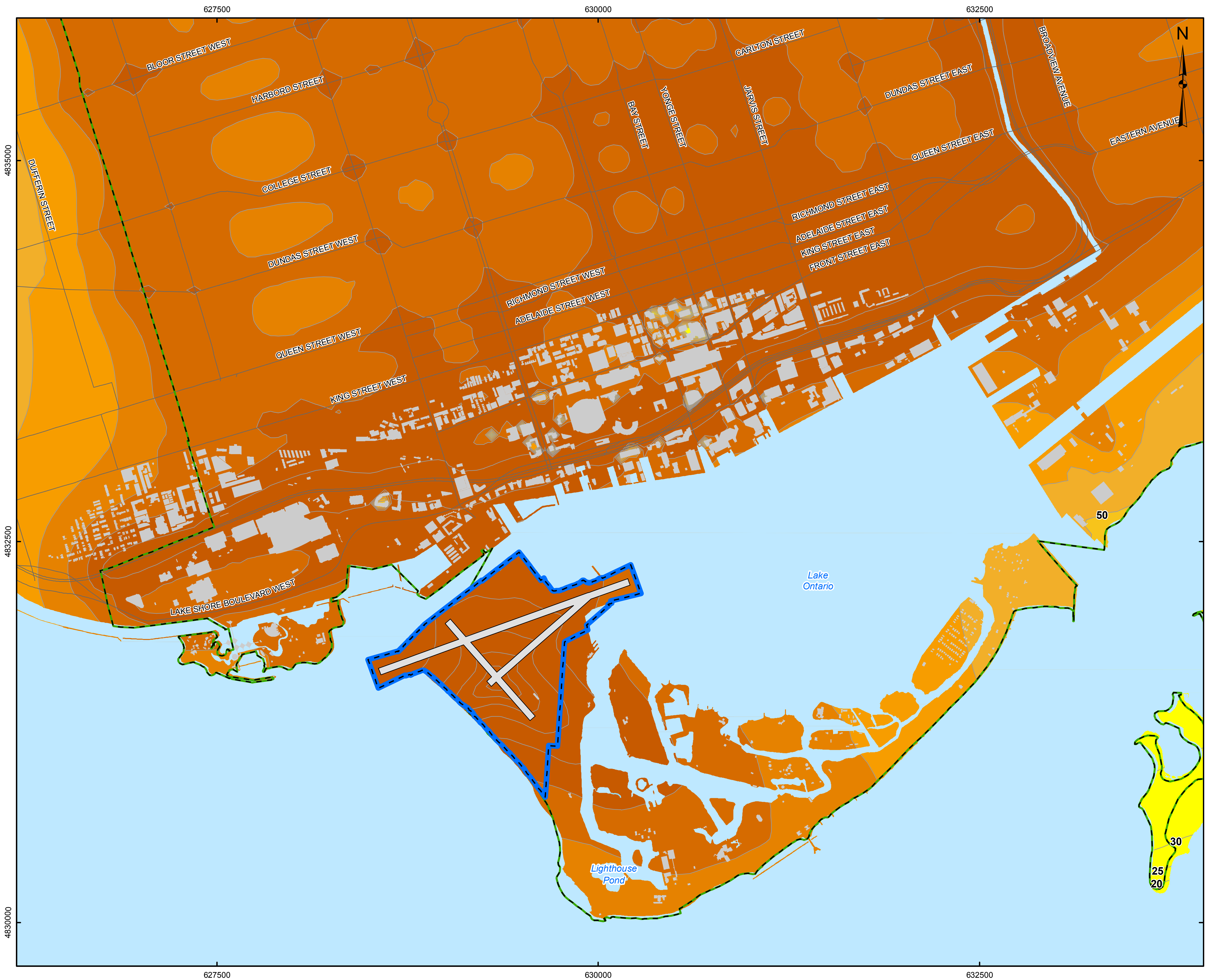
Predicted Future Engine Run-Up Noise Levels - Leq at 15 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A32

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Daytime_Future_Noise_Run-Up_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- >70

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250
SCALE 1:25,000 METRES

PROJECT
CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

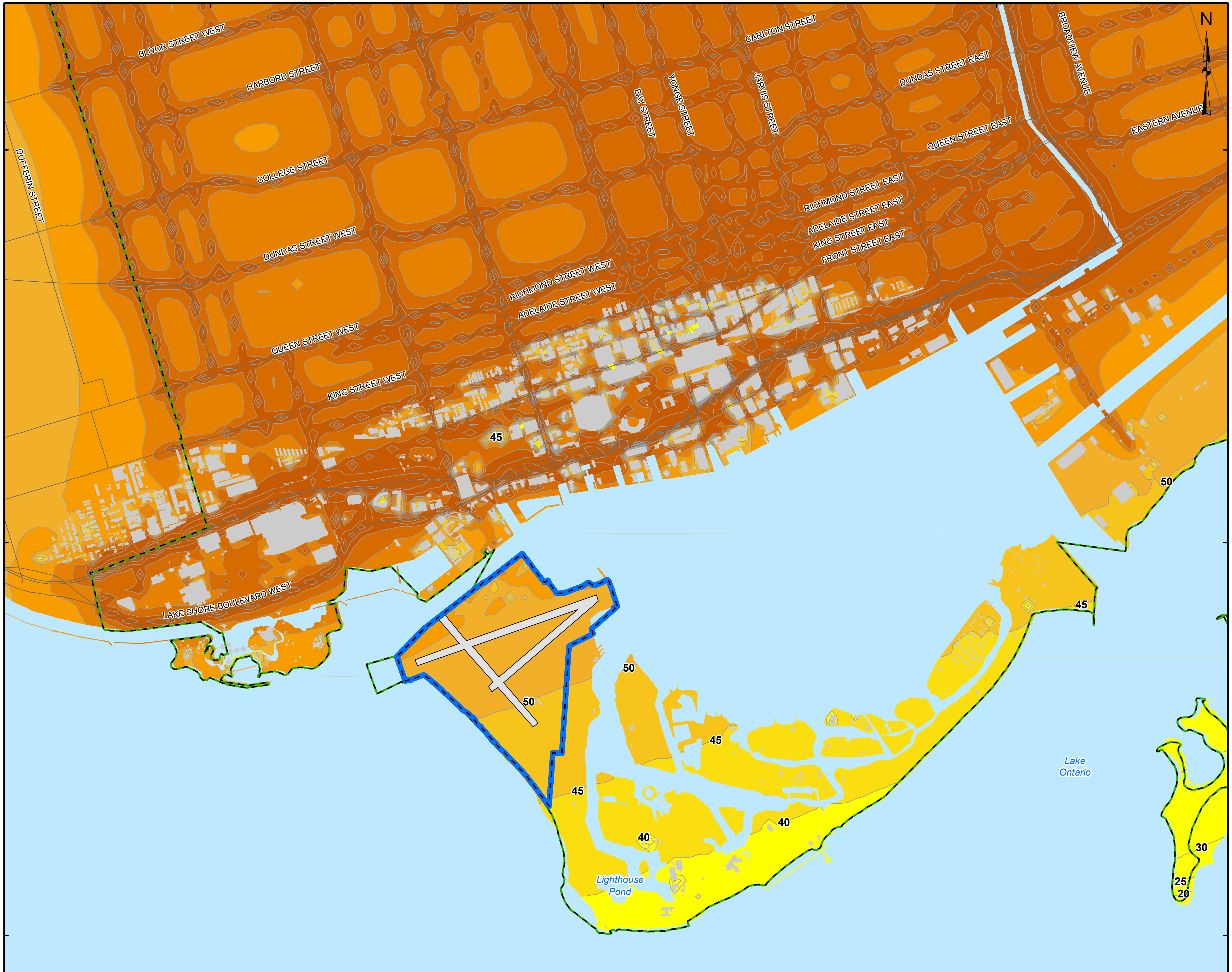
TITLE
Predicted Future Engine Run-Up Noise Levels - Leq at 70 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A33

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Daytime_Future_Noise_Run-Up_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- >70

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250

SCALE 1:25,000 METRES

PROJECT

CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

TITLE

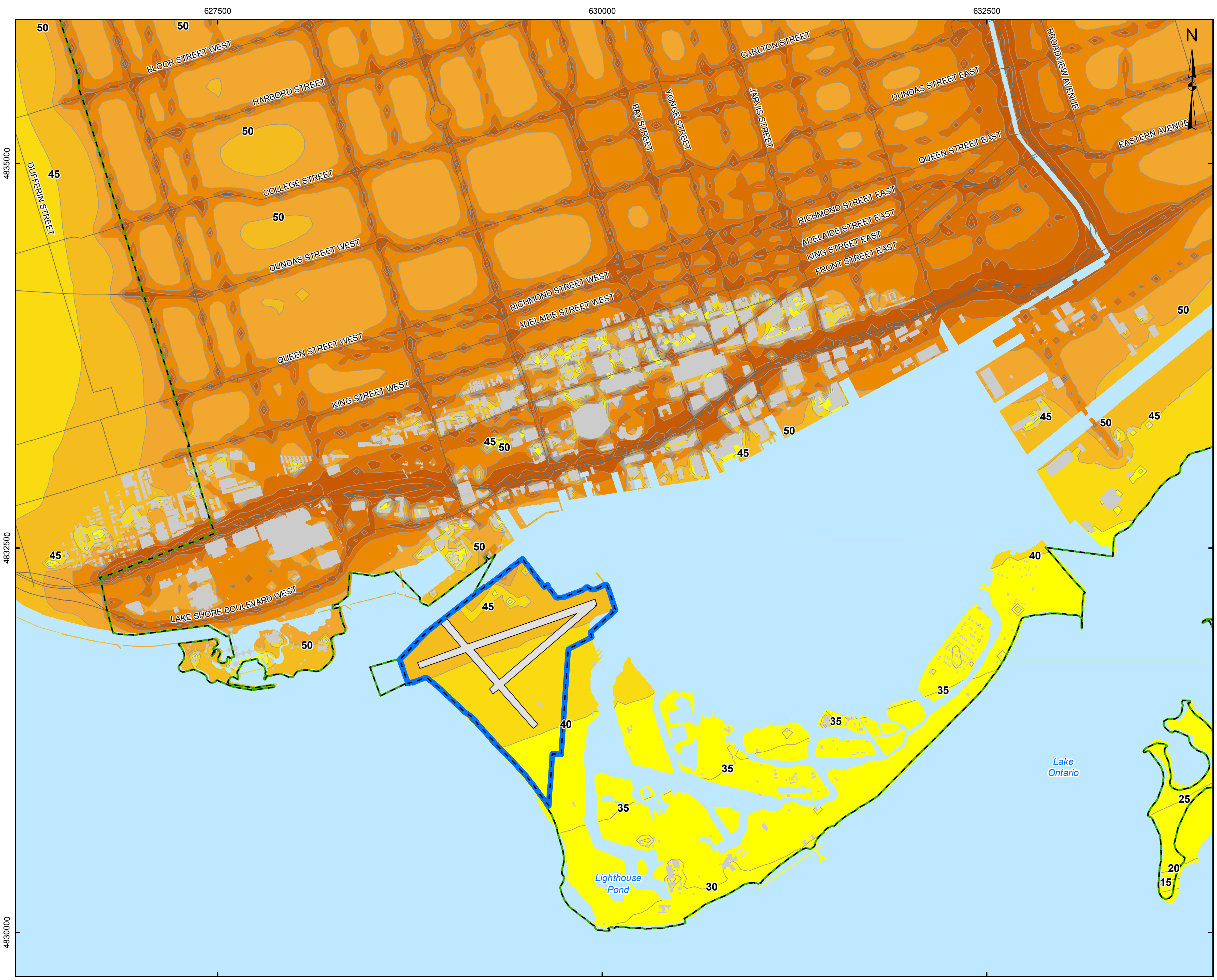
Predicted Ferry Operation Noise Levels - Daytime Leq at 2 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A34

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Daytime_Current_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area
- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- > 65

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250
SCALE 1:25,000 METRES

PROJECT
CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

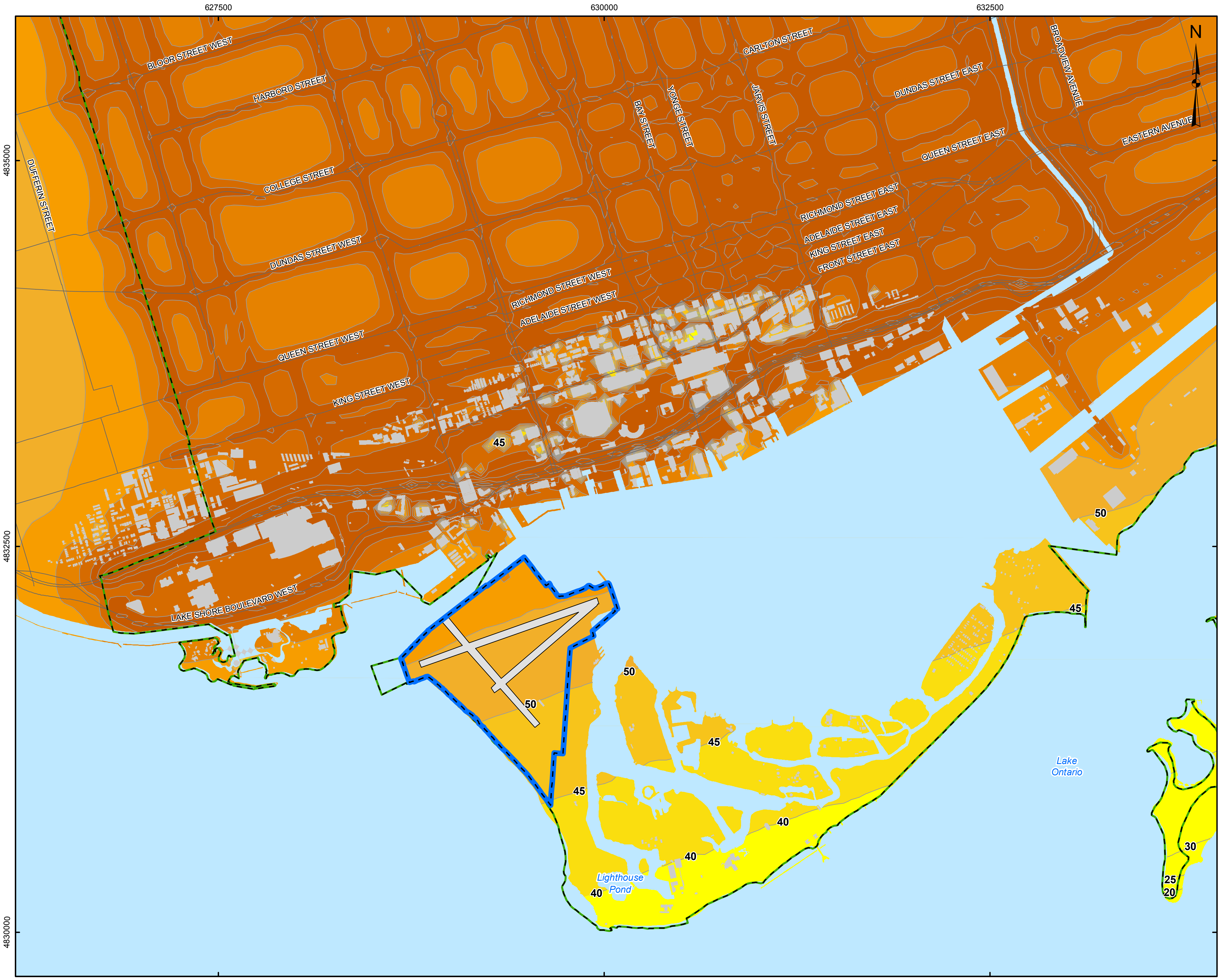
TITLE
Predicted Ferry Operation Noise Levels - Nighttime Leq at 2 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A35

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Nighttime_Current_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area
- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- >70

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250

SCALE 1:25,000 METRES

PROJECT

CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

TITLE

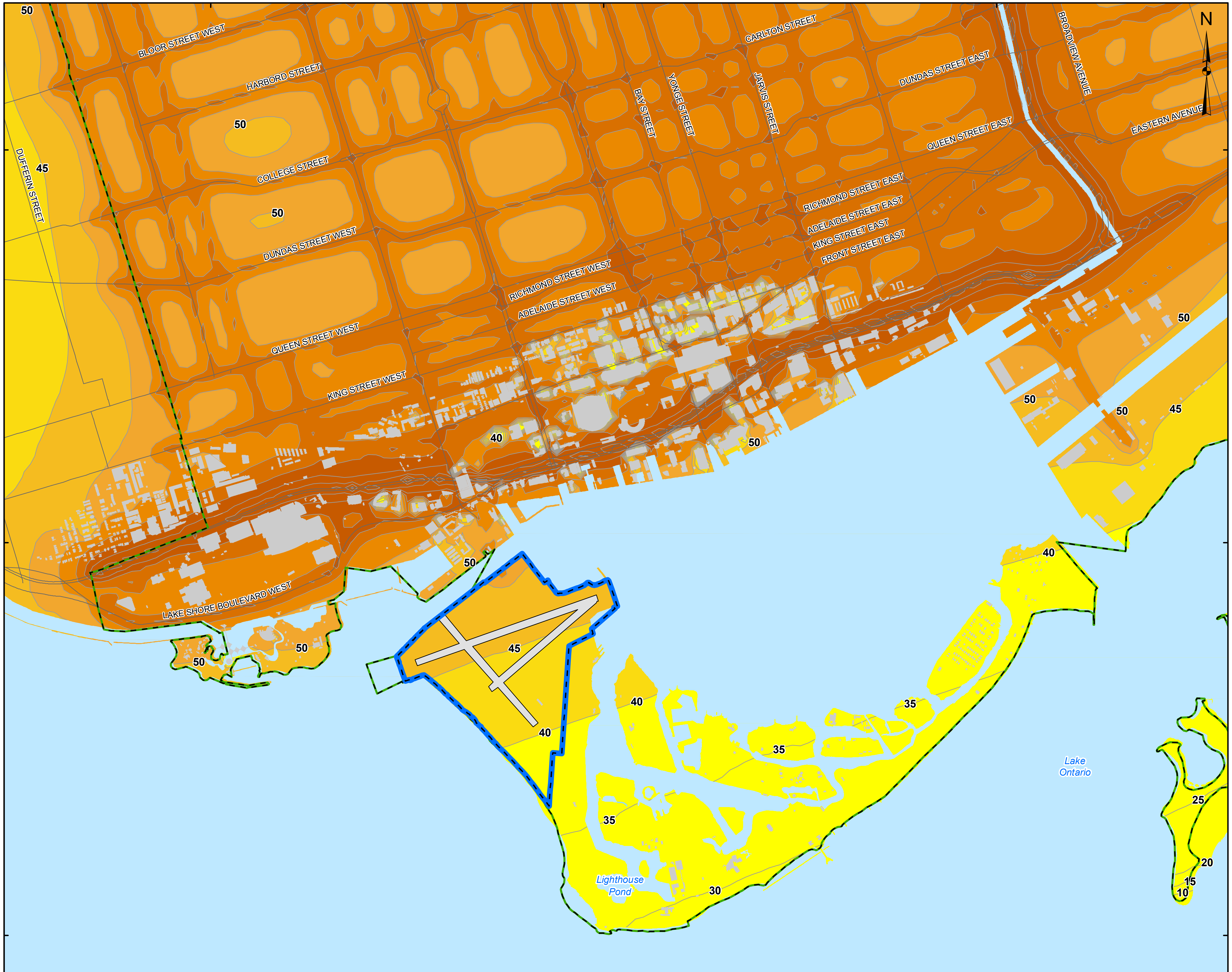
Predicted Ferry Operation Noise Levels - Daytime Leq at 15 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A36

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Daytime_Current_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- > 65

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250
SCALE 1:25,000 METRES

PROJECT

CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

TITLE

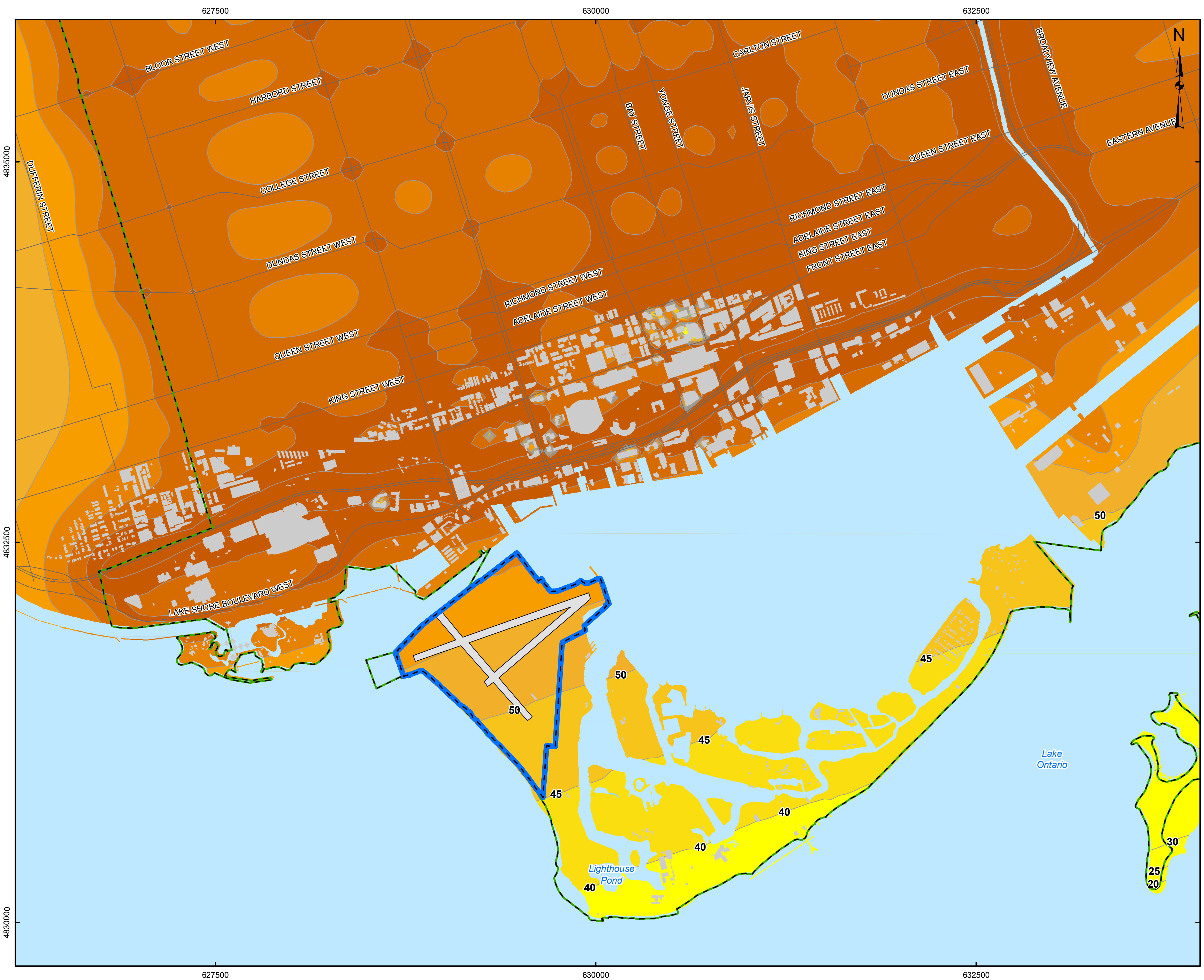
Predicted Ferry Operation Noise Levels - Nighttime Leq at 15 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A37

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Nighttime_Current_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area
- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- >70

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250
SCALE 1:25,000 METRES

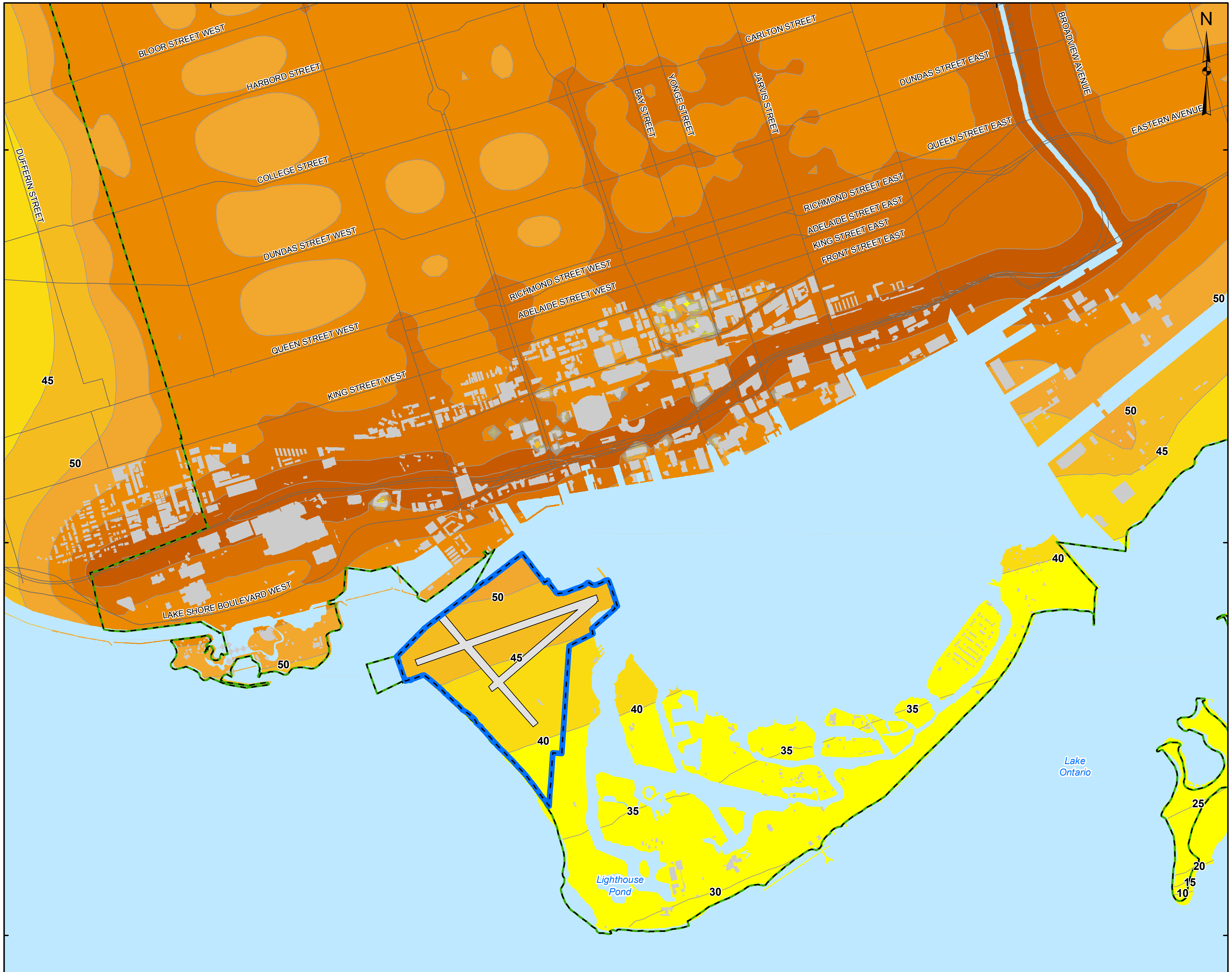
PROJECT
CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

TITLE
Predicted Ferry Operation Noise Levels - Daytime Leq at 70 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008	**FIGURE: A38**	
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Daytime_Current_Noise_Levels_Mapbook.mxd



LEGEND

- Major Roads
- Buildings
- Waterbody
- Billy Bishop Toronto City Airport
- Noise Assessment Study Area

- Noise Contour

Predicted Noise Levels (dBA)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- > 65

REFERENCE

Base Data - MNR LIO, obtained 2009
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2012
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

250 125 0 250 500 750 1,000 1,250
SCALE 1:25,000 METRES

PROJECT
CITY OF TORONTO
HUMAN HEALTH IMPACT ASSESSMENT
BILLY BISHOP AIRPORT

TITLE
Predicted Ferry Operation Noise Levels - Nighttime Leq at 70 m Above Ground

Golder Associates
Mississauga, Ontario

PROJECT NO. 13-1151-0215			SCALE AS SHOWN	REV. 0.0
DESIGN	JO	14 Nov. 2008		
GIS	JO	16 Nov. 2013		
CHECK	SC	16 Nov. 2013		
REVIEW	DS	16 Nov. 2013		

FIGURE: A39

G:\CLIENTS\CITY_OF_TORONTO\BBTCA\99_PROJ\13-1151-0215\05_PRODUCTION\NOI\Predicted_Nighttime_Current_Noise_Levels_Mapbook.mxd

As a global, employee-owned organisation with over 50 years of experience, Golder Associates is driven by our purpose to engineer earth's development while preserving earth's integrity. We deliver solutions that help our clients achieve their sustainable development goals by providing a wide range of independent consulting, design and construction services in our specialist areas of earth, environment and energy.

For more information, visit golder.com

Africa	+ 27 11 254 4800
Asia	+ 86 21 6258 5522
Australasia	+ 61 3 8862 3500
Europe	+ 356 21 42 30 20
North America	+ 1 800 275 3281
South America	+ 56 2 2616 2000

solutions@golder.com
www.golder.com

Golder Associates Ltd.
141 Adelaide Street West, Suite 910
Toronto, Ontario M5H 3L5
Canada
T: +1 (416) 366 6999