aercoustics

Aercoustics Engineering Ltd.
1004 Middlegate Road, Suite 1100
Mississauga, ON L4Y 0G1

Tel: 416-249-3361
Fax 416-249-3613
aercoustics.com

NOISE IMPACT STUDY – **Project: 23238.02**

Upper West Side Secondary Plan

Hamilton, ON

Prepared for:

Upper West Side Landowners Group
c/o Corbett Land Strategies Ltd.,
5045 South Service Road, Suite 301
Burlington, Ontario, L7L 5Y7

Prepared by:

Dónal Finnerty, Ph.D.

Derek Flake, M.Sc., P.Eng.

November 20, 2023

Revision History

Version	Description	Author	Reviewed	Date
- -	Initial Report	DAF	DF	November 20, 2023

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1 Introduction

Aercoustics Engineering Limited has been retained by Upper West Side Landowners Group to prepare a Noise Impact Study to support an Official Plan Amendment which is proposing a Secondary Plan for a new complete community in the City of Hamilton, Ontario. The proposed secondary plan includes noise sensitive land uses such as residential, institutional and mixed use land uses.

The purpose of this study was to examine the existing and future noise environment in the surrounding area and evaluate its impact potential on the expected noise sensitive receptors in the proposed secondary plan. This study also investigates any noise controls required for the secondary plan in order to abide by the noise guidelines of Ontario's Ministry of the Environment, Conservation and Parks (MECP) and to satisfy the requirements of the City of Hamilton. This report considered the MECP guideline NPC-300 "Stationary and Transportation Sources – Approval and Planning" (August 2013).

The location of the proposed secondary plan is in the City of Hamilton and covers a significant portion of the lands north of Dickenson Road West, west of Upper James Street, south of Twenty Road West and East of Glancaster Road. The proposed land uses of the secondary plan is included in Appendix A. Surrounding land uses include existing residential to the north, agricultural to the west, south and east and the Hamilton International Airport to the south. The proposed area of the secondary plan is located within the Airport Employment Growth District Secondary Plan. Northern sections of the proposed area are within the urban expansion areas. The key plan of the proposed secondary plan is provided in Figure 1. The proposed location of noise sensitive land uses is provided in Figure 2. The location of critical receptors for road traffic noise are provided in Figure 3.

2 Guidelines and Criteria

2.1 Transportation Noise – Road Traffic

2.1.1 Outdoor Living Area (OLA)

MECP guidelines recommend that equivalent noise levels (L_{eq}-16hr) in outdoor living areas should not exceed 55 dBA. If it is not technically, economically, or administratively feasible to achieve a level of 55 dBA, predicted noise levels between 55 dBA and 60 dBA may be acceptable provided that the future occupants of the building are made aware of the potential noise problems through appropriate warning clauses. Noise levels above 60 dBA are generally not acceptable and will warrant noise control measures.

All unenclosed balconies that are less than 4 m in depth and outside the exterior of the building façade are exempt from meeting the MECP outdoor noise criteria with regards to transportation noise sources. Should the depth of the future balconies and terraces be greater than 4 m, they will be subject to the MECP noise level limit of 55 dBA.

2.1.2 Indoor Living Spaces

Indoor noise levels due to road traffic were also examined with respect to the MECP guidelines. Bedrooms are required to meet an indoor noise level (L_{eq}-8hr) of 40 dBA from road traffic during nighttime hours. The indoor daytime noise level (L_{eq}-16hr) due to road traffic should not exceed 45 dBA for living or dining rooms. Lounges, lobbies, retail or general office spaces should meet the indoor noise level of 50 dBA from road traffic. In order to achieve these levels, the MECP guidelines provide a basis for the types of windows, exterior walls, and doors that will be required based on projected outdoor noise levels.

The MECP also requires that a central air conditioning system be installed for dwellings when the daytime or nighttime outdoor transportation noise levels at the façade of the dwelling are above 65 dBA or 60 dBA, respectively. The provision for the future installation of central air conditioning must be made if:

- the nighttime sound level is greater than 50 dBA and less than or equal to 60 dBA on the outside face of a bedroom window;
- the daytime sound level is greater than 55 dBA and less than or equal to 65 dBA on the outside face of a bedroom window or of a living/dining room window.

This provision involves a ducted heating system sized to accommodate the addition of central air conditioning by the occupant.

The required limits as per NPC-300 are summarized in Table 1.

Table 1: Noise Limits Due to Road Traffic

Type of Space	Time Period	Minimum L_{eq} (dBA)
Living/dining, den areas of residences, hospitals, nursing homes, schools, day-care centres (Indoor)	07:00 – 23:00	45 dBA
Living/dining, den areas of residences, hospitals, nursing homes (Indoor)	23:00 – 07:00	45 dBA
Sleeping quarters (Indoor)	07:00 – 23:00	45 dBA
	23:00 – 07:00	40 dBA
Outdoor Living Areas (OLA)	07:00 – 23:00	55 dBA

2.2 Transportation Noise – Air Traffic

The noise impact due to aircraft is assessed using Noise Exposure Forecasts (NEF), contours produced for an airport based on methodologies approved by Transport Canada. These contours are based on a 24-hour equivalent sound level (L_{eq}-24hr) that attempts to

account for the perceived noise and annoyance of residents who live within the areas defined by the NEF contours.

2.2.1 Outdoor Living Areas

The MECP guidelines recommend that the noise level due to air traffic at outdoor living areas should not exceed NEF 30.

2.2.2 Indoor Living Spaces

The MECP guidelines recommend two different indoor sound level limits due to noise from air traffic. The recommended sound level limit for sleeping quarters is NEF 0. For other noise sensitive spaces such as living/dining/den areas of residences, hospitals, schools, nursing/retirement homes and daycare centres the limit is recommended to be NEF 5. These limits are intended to be a guideline for the design of acoustical insulation for these noise sensitive spaces. The limits assume, for the purposes of determining indoor sound levels, that the windows and doors are closed and provide a measure of sound isolation from the air traffic noise.

Table 2 Noise Limits due to Air Traffic (Applicable over a 24-hour period)

Type of Space	Minimum NEF
Living/dining, den areas of residences, hospitals, nursing homes, schools, day-care centres (Indoor)	5
Sleeping quarters (Indoor)	0
Outdoor Living Areas (OLA)	30

2.2.3 Noise Control Measures

Recommended noise control measures for noise sensitive land uses in the vicinity of an airport are provided in NPC-300 to address the noise impact from air traffic. These recommendations are summarised in Table 3.

Table 3 Noise Control Recommendations for Noise Sensitive Land Uses in the Vicinity of an Airport

Location of Noise Sensitive Land Use	NPC-300 Recommended Noise Controls
NEF < 25	• No further assessment required
25 < NEF < 30	• Provision for installation of central air conditioning with the inclusion of warning clause Type C. • Building components (windows, walls, doors, ceiling/roof) should be designed to achieve indoor sound level limits.
NEF >= 30	• Central air conditioning must be installed with the inclusion of warning clause Type D. • Building components (windows, walls, doors, ceiling/roof) should be designed to achieve indoor sound level limits. • Outdoor Living Areas (OLAs) are generally not permitted except under specific circumstances with the support of the planning authority

2.2.4 Transport Canada Guidelines – Residential

Guidelines for land use compatibility in the vicinity of airports have been produced by Transport Canada in their publication "Land use in the Vicinity of Aerodromes TP1247E" (2013/14). Table 2A in this publication outlines the guidelines for land use compatibility in the vicinity of an airport in the context of noise impact from the airport on residential land uses.

This guideline indicates that the development of residential land uses on lands located between the NEF 25 and NEF 30 contours should require that prospective tenants or purchasers of the residential units are made aware of the potential noise impact due to air traffic. It is also recommended that a development only proceed if the responsible authority is satisfied that acoustic insulation has been appropriately considered in the building design.

The guideline indicates that new construction or development of residential land uses should not be undertaken in locations inside the NEF 30 contour. However, the guidelines indicate that if a new construction or development can be approved by the responsible authority but should only proceed if the responsible authority is satisfied that:

- The appropriate acoustic insulation features have been considered in the building.
- A noise impact assessment study has been completed and shows that this construction or development is not incompatible with aircraft noise.

The guidelines recommend that all prospective tenants or purchasers be made aware of the potential for noise due to air traffic to result in annoyance and speech interference.

2.2.5 Transport Canada Guidelines – Non-residential

Proposed land uses in the secondary plan, included in Appendix A, include mixed-use and institutional land uses. The Transport Canada guidelines provide recommendations for a wide array of land uses in the vicinity of an airport. This section provides a summary of the types of land uses expected as part of this secondary plan.

The guidelines provide guidelines for land use compatibility for public land uses such as schools, churches, hospitals, nursing homes, libraries and community centres in Table 2D of the guidelines. The guidelines indicate that these public land uses are acceptable on lands that are up to NEF 35 as long as a detailed noise study of the facility is conducted, and the building design considers the required noise insulation features.

The guidelines also provide guidelines for land use compatibility for commercial land uses such as offices, retail stores, restaurants, hotels and motels in Table 2C of the guidelines of the document. The guidelines indicate that all these commercial land uses are all appropriate for lands that NEF 30 and below.

Hotels and motels are defined as commercial noise sensitive land uses in NPC-300 and as such they should meet the sound level limits in Table 2. The guidelines provided by Transport Canada indicate that hotels and motels are appropriate up to NEF 35 if a detailed noise study is conducted, and the building design considers the required noise insulation features. In lands that are between NEF 35 and NEF 40 it is recommended that the hotels and motels are directly related to aviation-oriented activities and services, and it also highlights that special noise insulation features should be included.

The other commercial uses, offices, retail, and restaurants, are deemed appropriate at all NEF levels given a detailed noise study is conducted and the building design considers the acoustic insulation required to meet an indoor sound level appropriate for the proposed land use. It is recommended that these land uses be directly related to aviation-oriented activities and services on lands that are located inside the NEF 40 contour.

2.2.6 Urban Hamilton Official Plan

The Urban Hamilton Official Plan provides guidance for development, infill development and redevelopment of residential or other sensitive land uses in areas of NEF 25 and higher. This official plan states that the development of noise sensitive land uses shall comply with the requirements which are presented in Table C.4.8.1 which are presented below in Table 4.

Table 4 Requirements for Development in the Vicinity of John C. Munro International Airport

Locational Criteria	Requirements
35 NEF and greater, and/or within the Airport Influence Area	a. All new development of residential and other sensitive land uses, including infill development and redevelopment, shall be prohibited. b. New land uses which may cause a potential aviation hazard shall be prohibited.
28 NEF and greater, but less than 35 NEF	a. All new development of residential and other sensitive land uses, including infill development and redevelopment, shall be prohibited. b. New land uses which may cause a potential aviation hazard shall be prohibited. c. All development applications approved prior to approval of this Plan may proceed.
25 NEF and greater, but less than 28 NEF	a. All development and redevelopment proposals for residential and other sensitive land uses shall be required to submit a detailed noise study, employ noise mitigation measures, and include appropriate warning clauses in accordance with Section B.3.6.3 - Noise, Vibration and Other Emissions, and Policy C.4.8.6. b. New land uses which may cause a potential aviation hazard shall be prohibited.

3 Noise Level Predictions

3.1 Transportation Noise – Road Traffic

3.1.1 Road Traffic Noise Calculations Procedure

The dominant road traffic noise sources in the subject study area include the existing roads: Twenty Road West, Glancaster Road, Dickenson Road West and Upper James Street. As part of the secondary plan, four arterial collector roads are proposed that could represent significant sources of noise for noise sensitive land uses: Collector Road A, Collector Road B, Collector Road C and an extension to Garth Street.

Noise level calculations were performed in accordance with the MECP guidelines and using the U.S. Department of Transportation's Traffic Noise Model (TNM) Version 2.5 within DataKustik's CadnaA environmental noise prediction software.

The equivalent sound levels (L_{eq}) due to road traffic were calculated at worst-case noise sensitive residential receptors in the proposed secondary plan. Calculations were performed for both daytime and nighttime conditions at receiver heights representing the worst-case residential storey. Noise levels were also predicted at critical outdoor living areas (OLAs) throughout the secondary plan.

3.1.2 Road Traffic Data

Road traffic data was provided by the City of Hamilton for Glancaster Road, Twenty Road West and Upper James Street which was extrapolated to 2033 with an assumed growth

of 2% per year. As the proposed secondary plan included the construction of new roads which will influence the local traffic, a second set of data was provided by the Traffic Engineer retained by Corbett Land Strategies to prepare a Traffic Impact Study to support this application. This data was also extrapolated to 2033 at an assumed growth of 2% per year. The two data sets were compared and the larger traffic volume for each road was used to predict the future road traffic noise impact. The road traffic data used to predict the noise impact are presented in Table 5.

Table 5: Road Traffic Volumes

	AADT (2033)	Day/Night Split [%]	Percentage of Trucks [%]	Medium/Heavy Split [%]	Posted Speed [km/hr]
Upper James	44372	90/10	5	50/50	70
Twenty	23049	90/10	2	50/50	60
Dickenson West	15606	90/10	2	50/50	60
Glancaster	14566	90/10	5	50/50	50
Garth Extension	13005	90/10	4*	50/50	50
Collector A	4162	90/10	4*	50/50	50
Collector B	6242	90/10	4*	50/50	50
Collector C	10924	90/10	4*	50/50	50

3.2 Stationary Noise

There are no significant sources of stationary noise such as an industrial facility or large commercial operation in the vicinity of the proposed secondary plan that require assessment for the determination of land use compatibility.

As the design of the secondary plan is refined, the noise impact of stationary noise from smaller, more local, external sources and noise sources introduced as part of the development of the secondary plan will be assessed at a later, more appropriate stage.

4 Noise Impact Predictions

4.1 Road Traffic Predictions

At this stage of the development process site plans have not been generated that show the location of the noise sensitive buildings which would determine the location of the points of reception at which the noise should be assessed. As such, representative receptor locations have been placed at locations where the road traffic impact would be the greatest to determine the most conservative noise control measures.

Figures 4, 5 and 6 include contours of noise impact due to traffic impact over the areas of the secondary plan that are designated noise sensitive land uses.

Table 6 Predicted Sound Pressure Levels due to Road Traffic

Receptor	Receptor Height (m)	Predicted Noise Impact	
		Day [L_{eq} (16)]	Night [L_{eq} (8)]
C01	4.5	62	55
OLA1	1.5	62	-
C02	4.5	61	55
OLA2	1.5	62	-
C03	4.5	62	55
OLA3	1.5	63	-
C04	4.5	62	55
OLA4	1.5	63	-
C05	4.5	62	56
OLA5	1.5	63	-
C06	4.5	62	56
OLA6	1.5	63	-
C07	4.5	60	53
OLA7	1.5	60	-
C08	4.5	61	55
OLA8	1.5	62	-
C09	4.5	59	53
OLA9	1.5	60	-

4.2 Transportation Noise - Air Traffic

The proposed land uses of the secondary plan were informed by the John C. Munro Hamilton International Airport - Airport Master Plan (May 2011). This master plan presents multiple sets of NEF/NEP contours for the noise exposure of the airport in the years 2005, 2010, 2015 and 2025. The NEP contours for the year 2025 represent the most applicable contours at the time of this report. These contours are included in Appendix B.

A proposed set of NEF contours for the John C. Munro Hamilton International Airport were put forward in the Airport Master Plan and Strategic Plan (PED19084(h), September 11, 2023). These NEF contours are based on a Strategic Plan that proposes a significant expansion to the air traffic at the airport. Both the Strategic Plan and the resulting contours included in the proposed Airport Master Plan are still under review. The NEF contours included in that Master plan are included in Appendix B.

5 Noise Control Measures

5.1 Transportation Noise - Road Traffic

5.1.1 Outdoor Living Areas

The predicted sound levels at the outdoor living areas exceed the 55 dBA limit. Depending on the location of the outdoor living areas of the proposed secondary plan, acoustic barriers may be required to reduce the sound levels to meet the 55 dBA limit outlined in Table 1. It is recommended that all purchase, tenancy and lease agreements for dwellings associated with these outdoor living areas include Warning Clause A. Proposed wording for Warning Clause Type A is included in Section 7.

If the design of barrier to reach the 55 dBA limit is infeasible, an acoustic barrier that meets a sound level of 60 dBA may be acceptable with the inclusion of Warning Clause Type B on all purchase, tenancy and lease agreements associated with those outdoor living areas. Proposed wording for Warning Clause Type B is included in Section 7.

5.1.2 Indoor Living Spaces

As the nighttime sound level does not exceed 60 dBA and the daytime sound level does not exceed 65 dBA it is expected that no noise control measures will be required to meet the indoor sound level limits and building construction that meets the Ontario Building Code will provide sufficient sound insulation.

5.2 Transportation Noise – Air Traffic

5.2.1 Outdoor Living Areas

A significant portion of proposed secondary plan is located inside the NEF-30 contour. Consequently, a large number of potential OLA locations exceed the MECP limit of NEF 30. However, as no means of economically or practically feasible mitigation is available for aircraft noise in outdoor areas, OLAs are still permitted by Transport Canada's guidelines at the discretion of the planning authority even if the NEF-30 limit is exceeded.

Elevated outdoor spaces such as balconies, terraces or patios are not considered an OLA if they do not exceed four meters in depth per MECP guidelines.

The building envelope of any common amenity spaces which might be open to balconies or terraces provided in lieu of or as a supplement to OLAs as described above shall be designed to satisfy the applicable NEF 5 limit for living/dining areas.

All purchase, tenancy and lease agreements for residential dwellings with OLAs that are located inside the NEF 30 contour should include Warning Clause Type D. Proposed wording for Warning Clause Type D is included in Section 7.

5.2.2 Indoor Living Spaces

At this stage of the secondary plan process architectural plans have not been developed for the dwellings and buildings of the different land uses and as part of the secondary plan. To determine the feasibility of the noise sensitive land uses and predict the interior sound levels within the NEF contours it has been assumed that the interior spaces would have an area of glazing on the façade that is 80% of the floor area and the roof would be 100% of the floor area. The required STC of the different building components to meet NEF 0, the most stringent limit for aircraft noise impact, are presented in Table 7.

Table 7 Required STC of building components to meet the interior sound level limits due to aircraft noise

Location of Dwelling	Exterior Walls	Windows	Roof
NEF 25	38	31	39
NEF 30	48	35	56
NEF 35	48	42	62
NEF 40	58	45	62

As the buildings of the secondary plan are further designed it should be confirmed that these recommendations achieve the indoor sound level limits with the proposed window, wall and roof areas.

Residential dwellings that are located between NEF 25 and NEF 30 should be provided with the provision for central air conditioning and all purchase, tenancy and lease agreements for these dwellings should include Warning Clause Type C. Proposed wording for Warning Clause Type C is included in Section 7.

Residential dwellings that are located inside the NEF 30 contour should be provided with central air conditioning and all purchase, tenancy and lease agreements for these dwellings should include Warning Clause Type D. Proposed wording for Warning Clause Type D is included in Section 7.

6 Conclusion

Aercoustics Engineering Limited has been retained by Upper West Side Landowners Group to prepare a Noise Impact Study to support an Official Plan Amendment which is proposing a Secondary Plan for a new complete community in the City of Hamilton, Ontario.

Future residential buildings will require exterior wall, window and roof construction that is designed and built to insulate noise due to aircraft traffic to meet the recommended MECP indoor sound level limits. The acoustic insulation ratings for the different building components outlined in Section 5 are presented as a guide of what level of construction may be required to meet the interior sound level limits for a bedroom of a residential

dwelling. The provision for central air conditioning and central air conditioning will need to be provided for residential units located inside the NEF 25 contour.

Road traffic that travels through and around the secondary plan may require mitigation in the form of an acoustic barrier around outdoor living areas to achieve the MECP sound level limits. Given the proposed location for residential land uses some outdoor living areas will be located inside the NEF 30 contour. It is expected that no economically or practically feasible mitigation method will be available for these outdoor living areas but, as provided for in TP1247E, outdoor living areas inside NEF 30 are permitted with the approval of the responsible authority.

Balconies or terraces of the residential units and/or amenity spaces which are less than 4 m in depth are not subject to OLA sound level limits and do not require further consideration according to MECP guidelines. The building envelope of any common amenity spaces which might be open to balconies or terraces provided in lieu of or as a supplement to OLAs as described above shall be designed to satisfy the applicable NEF 5 limit for living/dining areas.

Based on the analysis of stationary source noise impact conducted as part of this feasibility study, mitigation is not required for stationary noise sources surrounding the proposed secondary plan. However, as detailed plans are not available at this stage, further detailed noise impact studies will be required for individual developments within the proposed secondary plan as part of the planning and permitting process. The detailed noise impact studies will need to consider the future stationary and transportation noise impact on the individual developments and the noise impact of the developments on the surrounding environment.

6.1 Policy Recommendations

All noise sensitive land uses developed within the proposed area of this secondary plan should complete a detailed noise impact study that assesses the noise impact of stationary and transportation sources and provides mitigation recommendations to meet the appropriate sound level limits.

Residential developments should be permitted up to NEF 30 as outlined in the Provincial Policy Statement, NPC-300 and TP1247.

Residential developments should be permitted above NEF 30 up to NEF 35 if the responsible authority is satisfied that the following conditions have been met as outlined in TP1247:

- The appropriate acoustic insulation features have been considered in the building;
- A noise impact assessment study has been completed and shows that the construction or development is not incompatible with aircraft noise; and

- All prospective tenants or purchasers of residential units are informed of the potential impact of airport noise through the appropriate warning clauses.

Where permission has been granted to develop residential land uses above NEF 30, exceedances to the outdoor living area sound level limits provided by NPC-300 should be expected and addressed by warning clauses.

7 Warning Clauses

Purchase, rental, and lease agreements for certain residential units in the proposed development are recommended to include the following warning clauses:

Type A:

"*Purchasers/tenants are advised that sound levels due to increasing road traffic may be audible and may occasionally interfere with some activities of the dwelling occupants.*"

Type B:

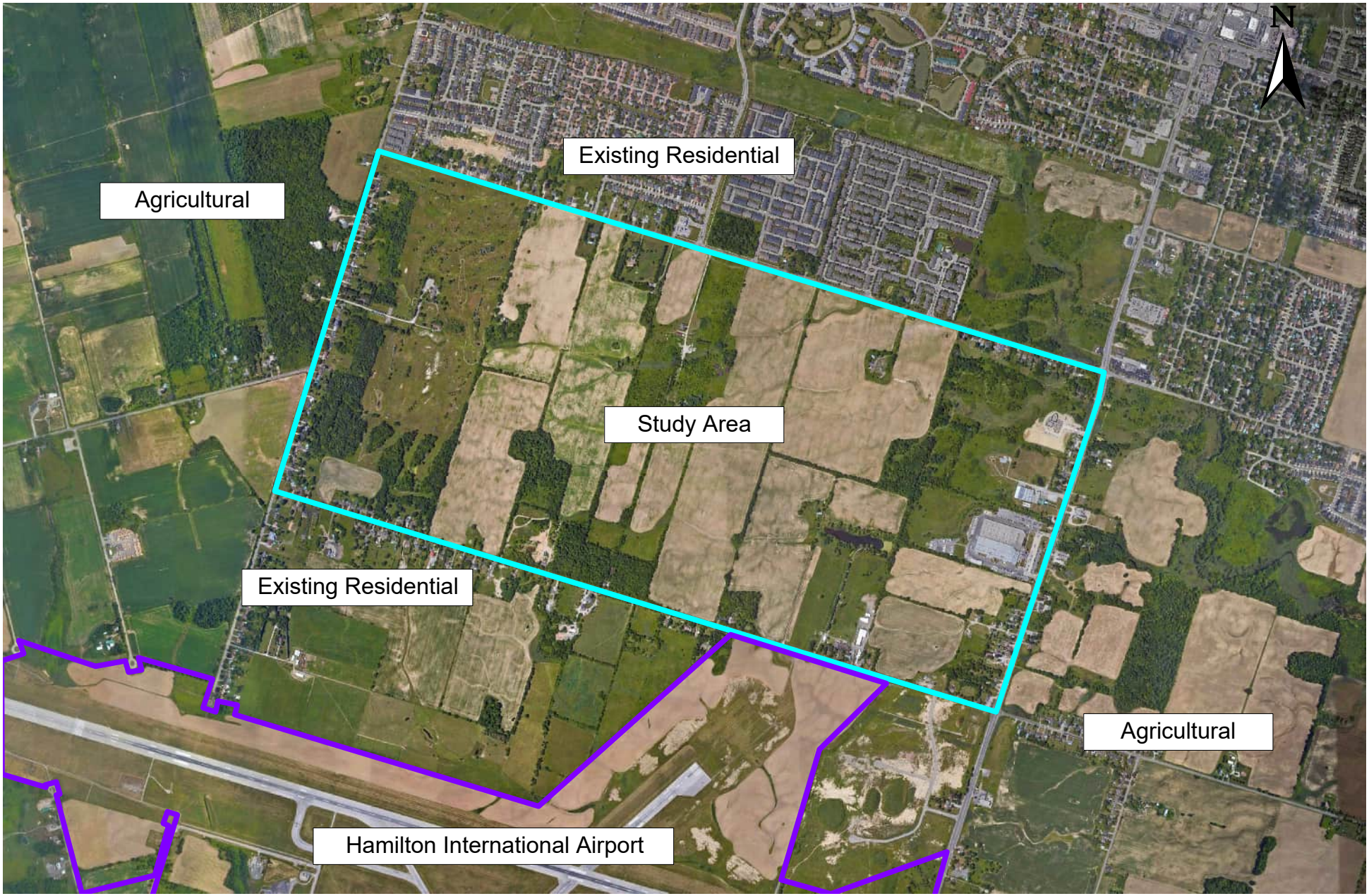
"*Purchasers/tenants are advised that despite the inclusion of noise control features in the development, sound levels due to increasing road traffic may on occasion interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Ministry of the Environment, Conservation and Parks.*"

Type C:

"*This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Ministry of the Environment, Conservation and Parks.*"

Type D:

"*This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City of Hamilton and the Ministry of the Environment, Conservation and Parks."*



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Reviewed by: DF
Date: Nov, 2023
Revision: 1

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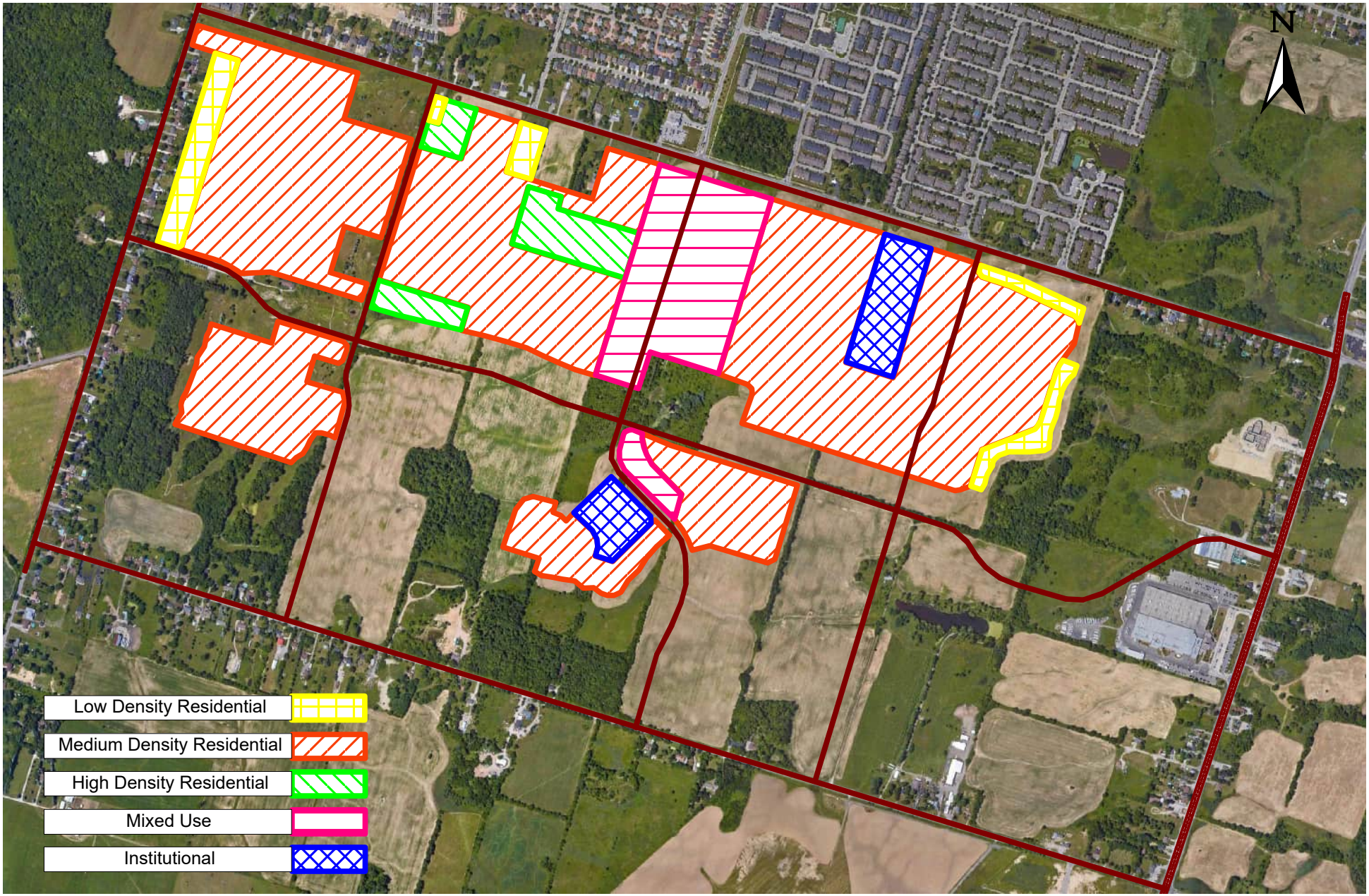
Upper West Side Noise Impact Study

Figure Title

Secondary Plan Study Area and Existing Surrounding Land Uses

Figure 1



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Upper West Side Noise Impact Study

Figure Title

Proposed Areas of Noise Sensitive Land Use

Figure 2

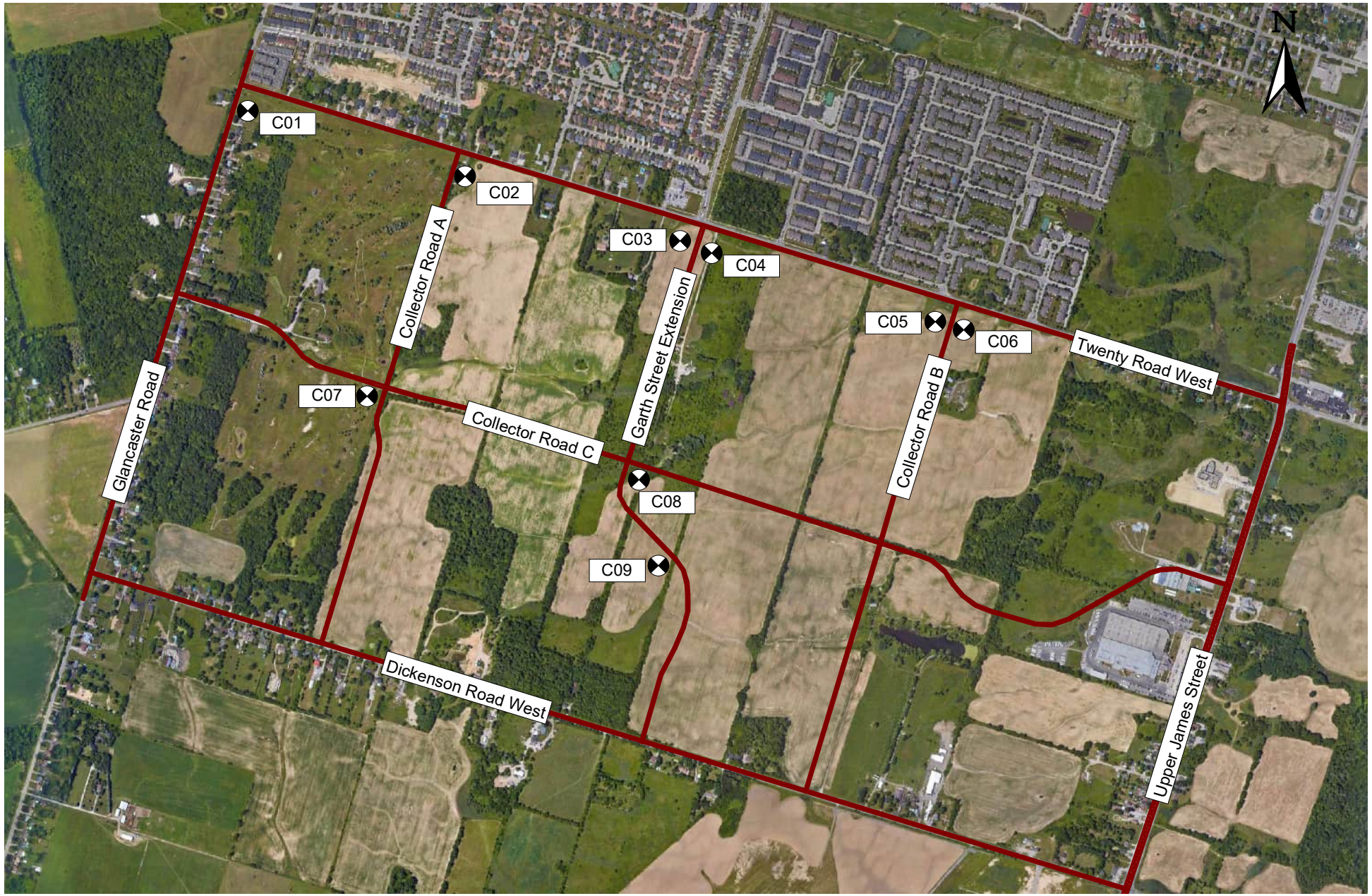

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Figure Title

Existing and proposed roads and receptor locations

Figure 3

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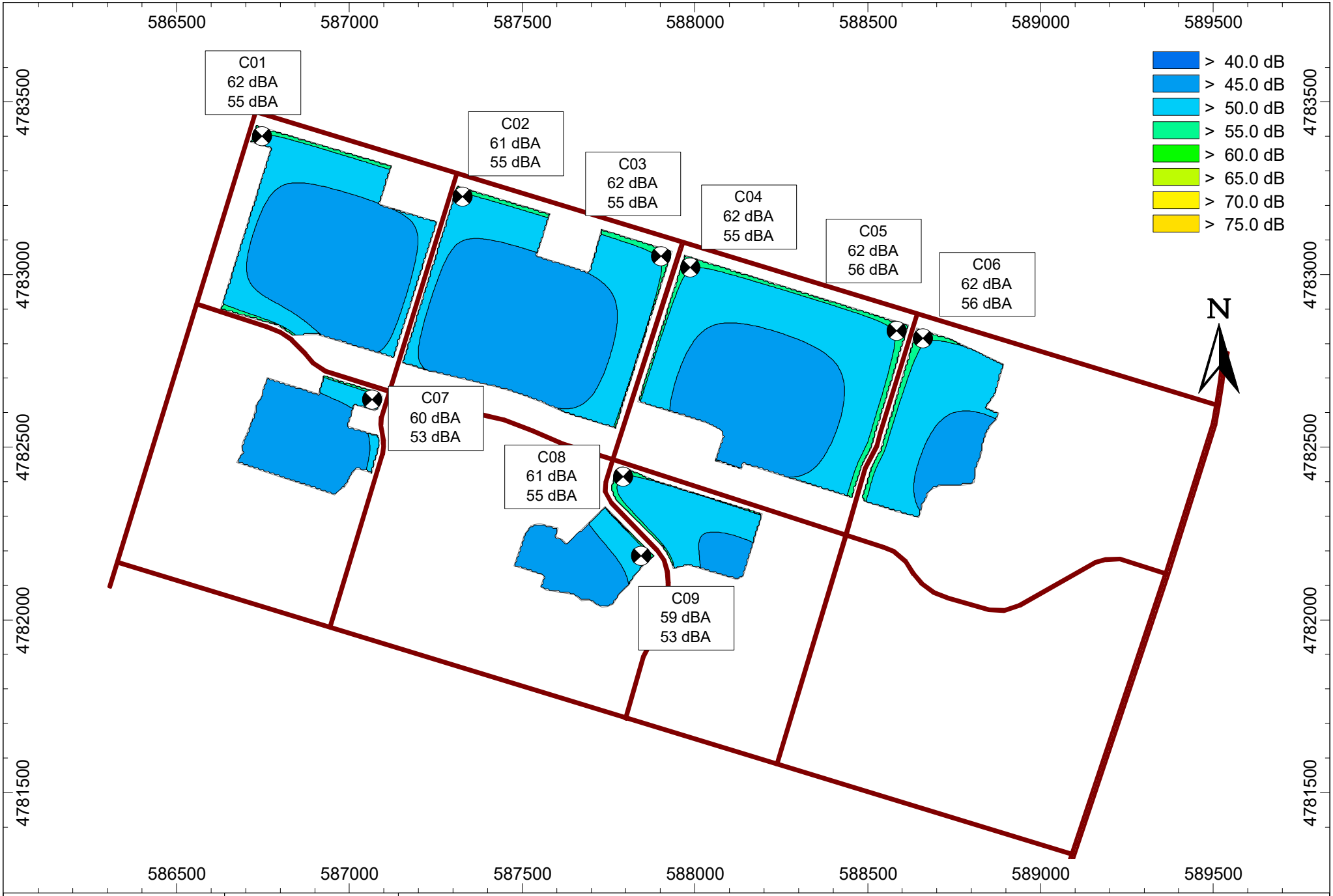
Figure Title

Contours of Daytime Road Traffic Noise Impact at 4.5 m

Figure 4



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Project Name

Upper West Side Noise Impact Study

Figure Title

Contours of Nighttime Road Traffic Noise Impact at 4.5 m

Figure 5

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Revision: 1

Project Name

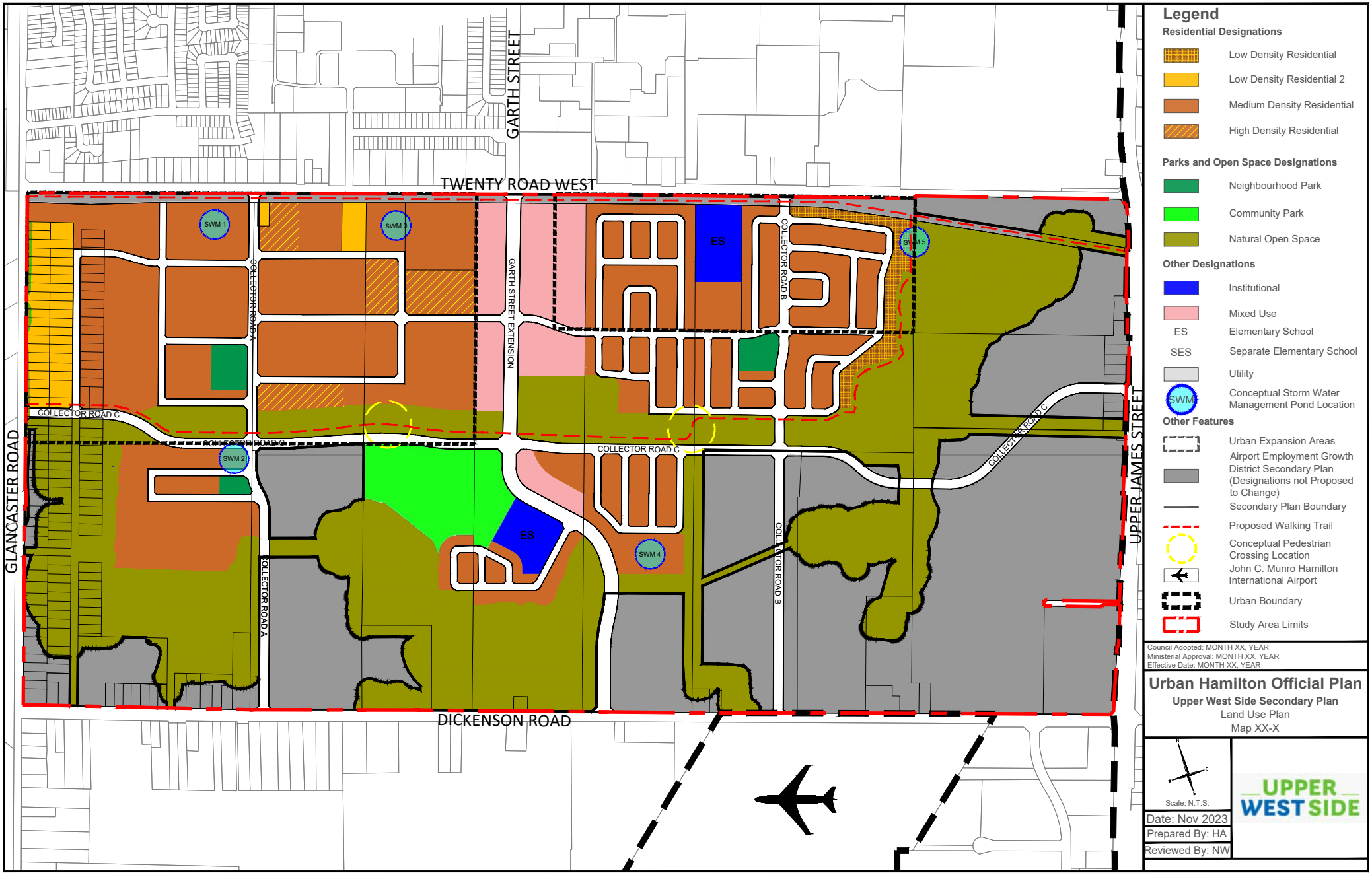
Upper West Side Noise Impact Study

Figure Title

Contours of Daytime Road Traffic Noise Impact at 1.5 m

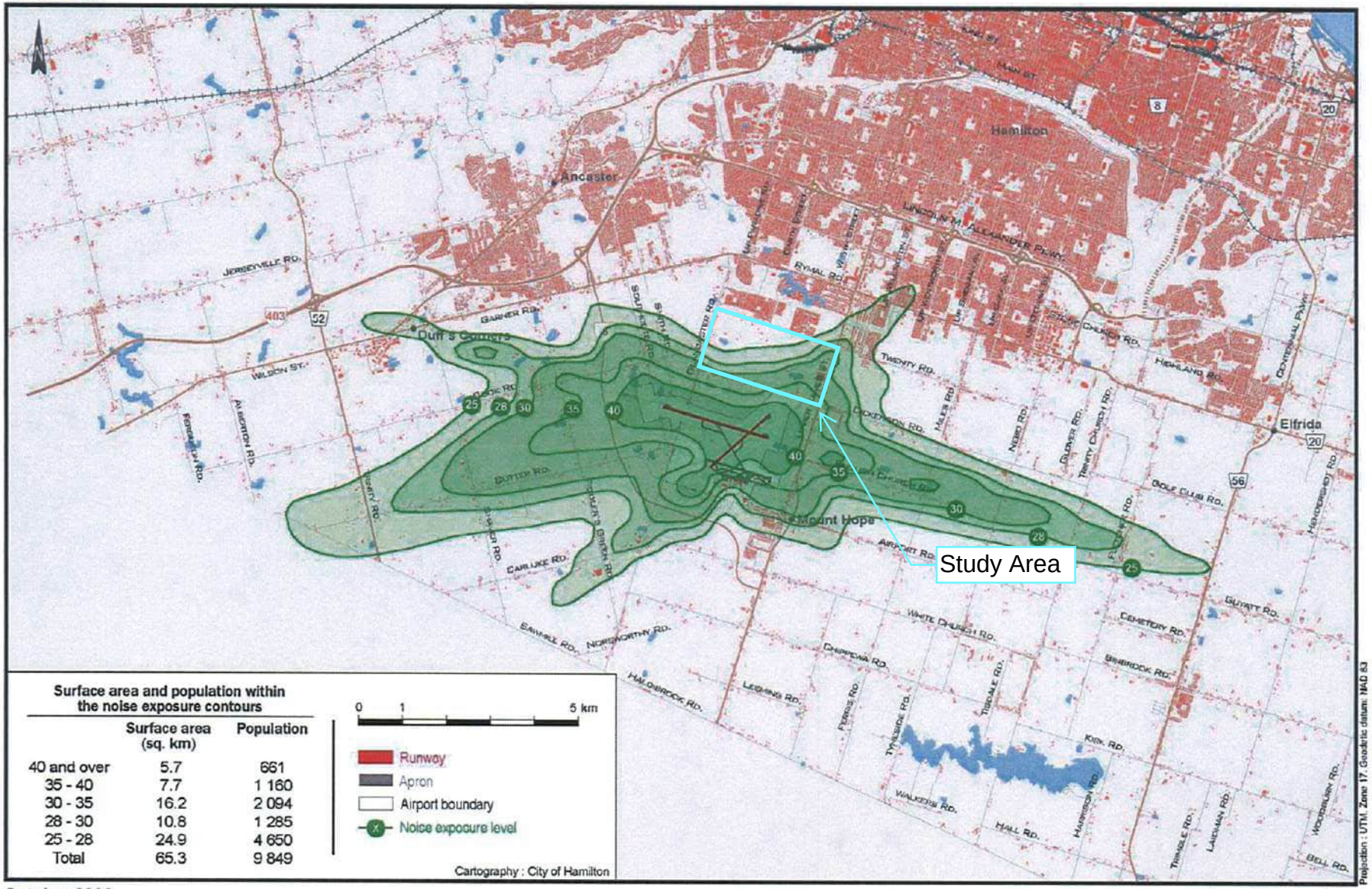
Figure 6

Appendix A
Secondary Plan – Proposed Land Uses


GARTH STREET
TWENTY ROAD WEST
GLANCASTER ROAD
UPPER JAMES STREET
DICKENSON ROAD
GARTH STREET EXTENSION
COLLECTOR ROAD A
COLLECTOR ROAD B
COLLECTOR ROAD C
SWM 1
SWM 2
SWM 3
SWM 4
SWM 5
ES
Legend
Residential Designations
Low Density Residential
Low Density Residential 2
Medium Density Residential
High Density Residential
Parks and Open Space Designations
Neighbourhood Park
Community Park
Natural Open Space
Other Designations
Institutional
Mixed Use
ES Elementary School
SES Separate Elementary School
Utility
SWM Conceptual Storm Water Management Pond Location
Other Features
Urban Expansion Areas
Airport Employment Growth District Secondary Plan (Designations not Proposed to Change)
Secondary Plan Boundary
Proposed Walking Trail
Conceptual Pedestrian Crossing Location
John C. Munro Hamilton International Airport
Urban Boundary
Study Area Limits
Council Adopted: MONTH XX, YEAR
Ministerial Approval: MONTH XX, YEAR
Effective Date: MONTH XX, YEAR
Urban Hamilton Official Plan
Upper West Side Secondary Plan
Land Use Plan
Map XX-X
Scale: N.T.S.
Date: Nov 2023
Prepared By: HA
Reviewed By: NW
UPPER WEST SIDE

Appendix B
Proposed NEF Contours

Figure 12.
2025 Noise Exposure Projection
Extended Runway 06, Runway 12 displaced threshold removed
John C. Munro Hamilton International Airport



October 2006

Jacques Savard, M.Sc.
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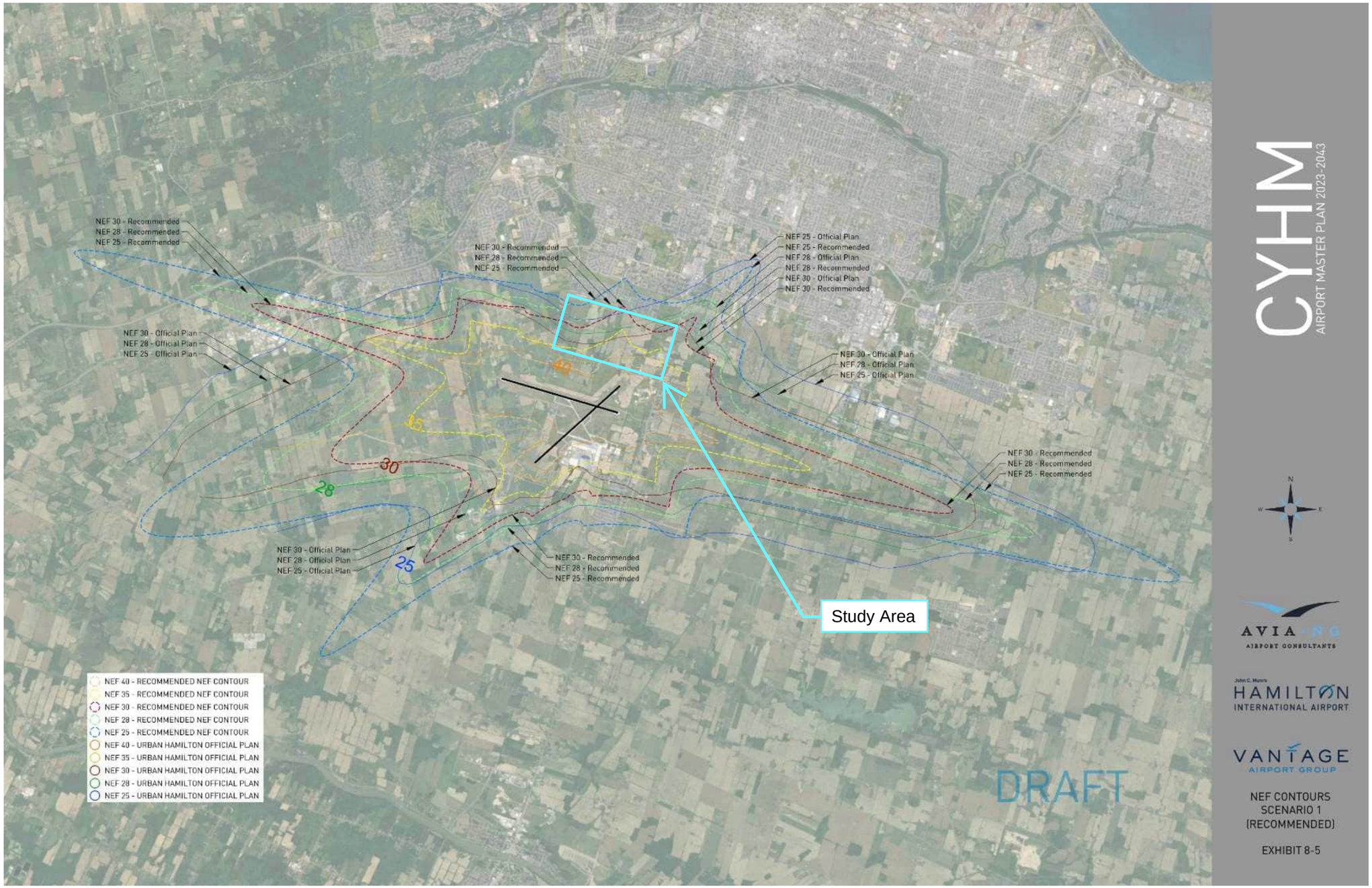
CYHM
AIRPORT MASTER PLAN 2023-2043
NEF 30 - Recommended
NEF 28 - Recommended
NEF 25 - Recommended
NEF 30 - Official Plan
NEF 28 - Official Plan
NEF 25 - Official Plan
NEF 25 - Official Plan
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NEF 28 - Official Plan
NEF 28 - Recommended
NEF 30 - Official Plan
NEF 30 - Recommended
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Study Area
NEF 40 - RECOMMENDED NEF CONTOUR
NEF 35 - RECOMMENDED NEF CONTOUR
NEF 30 - RECOMMENDED NEF CONTOUR
NEF 28 - RECOMMENDED NEF CONTOUR
NEF 25 - RECOMMENDED NEF CONTOUR
NEF 40 - URBAN HAMILTON OFFICIAL PLAN
NEF 35 - URBAN HAMILTON OFFICIAL PLAN
NEF 30 - URBAN HAMILTON OFFICIAL PLAN
NEF 28 - URBAN HAMILTON OFFICIAL PLAN
NEF 25 - URBAN HAMILTON OFFICIAL PLAN
DRAFT
AVIA NG
AIRPORT CONSULTANTS
John C. Munro
HAMILTON
INTERNATIONAL AIRPORT
VANTAGE
AIRPORT GROUP
NEF CONTOURS
SCENARIO 1
(RECOMMENDED)
EXHIBIT 8-5

End of Report