Introduction

Introduction

The Detroit Metropolitan Wayne County Airport (DTW) Federal Aviation Regulation (FAR) Part 150 Study is a five-year program. The baseline year for this update is 2004 with the future baseline being 2011. The purposes of an FAR Part 150 Program are: to assess the noise environment, to prepare forecasts of aviation operations, to identify land uses within the airport environs, and to explore ways to mitigate land use compatibility conflicts.

FAR Part 150 requires the development of Noise Exposure Maps that depict the existing aircraft noise levels, expressed in terms of the Day-Night Noise Level (DNL) metric, and the five-year future noise levels in terms of DNL. Thus, the Study has a five-year planning horizon. The threshold DNL used for compatibility purposes is the 65 DNL noise contour. In addition to the previously accepted Noise Exposure Maps (found on pages D.48 and I.5), a Noise Compatibility Program (NCP) has also been prepared which is presented in the Issues/Actions and Recommendations Chapter. The Recommendations, once approved, forms the NCP. The NCP contains the recommendations for noise mitigation and abatement that the sponsoring agency, the Wayne County Airport Authority in this case, is recommending for implementation. The parties responsible for that implementation, is also presented. This document represents a submittal of the Noise Compatibility Program.

Noise Exposure Maps

The Noise Exposure Maps presented in this document were accepted by the Federal Aviation Administration in March 2006. The Maps are still accurate and valid for purposes of Part 150. There are no substantial new non-compatible uses within the contours nor is there a significant new reduction in noise over existing non-compatible uses[1].

Subsequent to the development and acceptance of the Noise Exposure Maps, the Noise Compatibility Program was developed through a public process. During the development of the Noise Compatibility Program, Northwest Airlines and Delta Airlines announced their intent to enter into a merger, and it is anticipated the Detroit Metropolitan Wayne County Airport may become an even larger airline hub after the merger with growth in airport operations and enplanements. Once the merger is complete and aircraft operations have stabilized, and any necessary environmental processing is completed, the Airport will consider updating the NEM's to reflect updated activity levels.

Prior to the initiation of the Part 150 Study, and pursuant to a separate commitment made by the Airport, the FAA agreed to test two new flight procedures. It was determined that the test and the evaluation of the test would be conducted during the preparation of the Part 150 Study. The test procedures, protocol and evaluation methodology, along with the test results were presented and discussed at several Committee meetings during the Part 150 process. In fact, a separate "hot line" was set up so that the public could comment during the test. Due to the fact that the test was pursuant to a separate agreement outside the Part 150 process, the implementation of the two additional departure headings were not included in the NCP, and have been treated as a separate issue to be implemented outside the parameters of the Part 150 Study. The complaint data showed that

[1] 14 CFR 150.21(d)(1) A change in the operation of an airport creates a substantial new noncompatible use if that change results in an increase in the yearly day-night average sound level of 1.5 dB or greater in either a land use which was formerly compatible but is thereby made noncompatible under Appendix A (Table 1), or in a land area which was previously determined to be noncompatible under that Table and whose noncompatibility is now significantly increased. A change in the operation of the airport creates a significant reduction in noise over existing noncompatible uses if that change results in a decrease in the yearly day-night average sound level of 1.5 dB or greater in land area which was formerly noncompatible but is thereby made compatible under Appendix A.

there was little reaction to the test in terms of complaints. In fact, only three callers asked about a potential change. The Future NEM with the test procedures would not result in substantial new non-compatible uses within the contours nor is there a significant new reduction in noise over existing non-compatible uses from the Future NEM without the test, which is the previously accepted NEM.

Summary

The various measures are listed and described, and each is evaluated in terms of its appropriateness with, and relationship to, Detroit Metropolitan Wayne County Airport. In addition, recommendations are made as to which alternatives should be implemented at the Airport. The document then presents a schedule for review and updating of the elements contained in this FAR Part 150 Plan and Program to ensure success of the program. This document, in terms of content and recommendations, has culminated from many meetings, with the Study Advisory Committee, Airport Staff and Management, the Airport Authority, the Federal Aviation Administration and other interested parties. All proposals are consistent with the Airport Master Plan and Airport Layout Plan.

FAR Part 150 Noise Compatibility Program Checklist

I.	**IDENTIFICATION AND SUBMISSION OF PROGRAM:**	**Page Number**
	A. Submission is properly identified:	
	1. FAR 150 NCP?	Yes, Cover, Cover Letter
	2. NEM and NCP together?	Yes
	3. Program revision?	N/A
	B. Airport and Airport Operator's name identified?	Yes, Cover, Flysheet
	C. NCP transmitted by airport operator cover letter?	Yes
II.	**CONSULTATION:**	
	A. Documentation includes narrative of public participation and consultation process?	Yes, J.1, Appendix
	B. Identification of consulted parties:	
	1. All parties in 150.23(c) consulted?	Yes, J.1, Appendix
	2. Public and planning agencies identified?	Yes, J.1, Appendix
	3. Agencies in B.2., above, correspond to those indicated on the NEM?	Yes, J.1, Appendix
	C. Satisfies 150.23(d) requirements:	
	1. Documentation shows active and direct participation of parties in B, above?	Yes, J.1, Appendix
	2. Active and direct participation of general public?	Yes, J.1, Appendix
	3. Participation was prior to and during development of NCP and prior to submittal to FAA?	Yes, J.1, Appendix
	4. Indicates adequate opportunity afforded to submit views, data, etc.?	Yes, J.1, Appendix

D. Evidence included of notice and opportunity for a public hearing on NCP?	Yes, Appendix
E. Documentation of comments:	
1. Includes summary of public hearing comments, if hearing was held?	Yes, J.1, Appendix
2. Includes copy of all written material submitted to operator?	Yes, Appendix
3. Includes operator's responses/disposition of written and verbal comments?	Yes, J.1
F. Informal agreement received from FAA on flight procedures?	N/A

III. **NOISE EXPOSURE MAPS:** [150.23,B150.3, B150.35 (f)]
(This section of the checklist is not a substitute for the Noise Exposure Map checklist. It deals with maps in the context of the Noise Compatibility Program submission.)

A. Inclusion of NEMs and supporting documentation:	
1. Map documentation either included or incorporated by reference?	Yes, D.48, I.5
2. Maps previously found in compliance by FAA?	Yes
3. Compliance determination still valid?	Yes
4. Does 180-day period have to wait for map compliance finding?	No
B. Revised NEMs submitted with program: (Review using NEM checklist if map revisions included in NCP submittal)	
1. Revised NEMs included with program?	N/A
2. Has airport operator requested FAA to make a determination on the NEM(s) when NCP approval is made?	N/A
C. If program analysis used noise modeling:	
1. INM or HNM, or FAA-approved equivalent?	Yes, C.34
2. Monitoring in accordance with A150.5?	Yes, C.34
D. Existing condition and 5-year maps clearly identified as the official NEMs?	Yes, D.48, I.5

IV. **CONSIDERATION OF ALTERNATIVES:** [B150.7, 150.23 (e)]

A. At a minimum, are the alternatives below considered?	
1. Land acquisition and interest therein, including air rights, easements, and development rights?	Yes, H.4, H.8
2. Barriers, acoustical shielding, public building sound proofing	Yes, H.4-H.5
3. Preferential runway system	Yes, F.19
4. Voluntary Flight procedures	Yes, G.5-G.73
5. Restrictions on type/class of aircraft (as least one restriction below must be considered) taking into account applicable legislation (49 U.S.C 47521 et. seq.), powers and duties of the Administrator, and grant assurances.	
a. deny use based on Federal standards	Yes, F.5-F.9
b. capacity limits based on noisiness	Yes, F.5-F.9
c. mandatory noise abatement takeoff/approach procedures	Yes, F.1-F.19
d. landing fees based on noise or time of day	Yes, F.9
e. nighttime restrictions	Yes, .F.9
6. Other actions with beneficial impact not listed herein	Yes, E.1-E.19
7. Other FAA recommendations (see D, below)	N/A
B. Responsible implementing authority identified for each Considered alternative?	Yes
C. Analysis of alternative measures:	
1. Measure clearly described?	Yes, G.1-G.122
2. Measures adequately analyzed?	Yes, G.1-G.122
3. Adequate reasoning for rejecting alternatives?	Yes, G.1-G.122
D. Other actions recommended by the FAA:	
Should other actions be added?	N/A
(List separately, or on back, actions and discussions with airport operator to have them included prior to the start of the 180-day cycle. New measures adopted by the airport sponsor must be subject to consultation before they can be submitted to the FAA for action. (See E., below)	

V. **ALTERNATIVES RECOMMENDED FOR IMPLEMENTATION:**
[150.23 (e),B150.7, B150.35 (b), B150.5]

A. Document clearly indicates:
1. Alternatives recommended for implementation? Yes, I.1-I.49
2. Final recommendations are airport operators', not those of consultant or third party? Yes, Cover Letter

B. Do all program recommendations:
1. Relate directly or indirectly to reduction of noise and noncompatible land uses? Yes, I.1-I.49
(Note: All program recommendations, regardless of Whether previously approved by the FAA in an earlier Part 150 study, must demonstrate a noise benefit if the airport sponsor wants FAA to consider the measure for approval in a program update. See E., below)
2. Contain description of contribution to overall effectiveness of program? Yes, I.1-I.49
3. Noise/land use benefits quantified to extent possible? Yes, I.5-I.49
4. Include actual/anticipated effect on reducing noise exposure within noncompatible area shown on NEM? Yes, I.1-I.49
5. Effects based on relevant and reasonable expressed assumptions? Yes, I.1-I.49
6. Have adequate supporting data to support its contribution to noise/land use compatibility? Yes, I.5

C. Analysis appears to support program standards set forth in 150.35 (b) and B150.5? Yes, I.1-1.5

D. When use restrictions are recommended:
1. Does (or could) the restriction affect Stage 2 or Stage 3 aircraft operations (regardless of whether they presently operate at the airport)? (If restriction affects Stage 2 helicopters, Part 161 also applies.) N/A
2. If the answer to 1. is yes, has the airport operator completed the Part 161 process and received FAA Part 161 approval for a restriction affecting Stage 3 aircraft? For restrictions affecting only Stage 2 analysis and consultation process required by Part 161? N/A
3. Are alternative with potentially significant noise/compatible land use benefits thoroughly analyzed so that appropriate comparisons and conclusions can be made?

4. Did the FAA regional or ADO reviewer coordinate the use restriction with APP-600 prior to making determination on start of 180-days?

E. Do the following also meet Part 150 analytical standards:
   1. Formal recommendations which continue existing practices? — Yes, I.8-I.49

   2. New recommendations or changes proposed at end of Part 150 process? — Yes, I.8-I.49

F. Documentation indicates how recommendations may change previously adopted plans? — Yes, I.8-I.49

G. Documentation also:
   1. Identifies agencies which are responsible for implementing each recommendation — Yes, I.9-1.49
   2. Indicates whether those agencies have agreed to implement? — N/A
   3. Indicates essential government actions necessary to implement recommendations? — Yes, I.9-I.49

H. Time Frame:
   1. Includes agreed-upon schedule to implement alternatives? — Yes, I.9-I.49
   2. Indicates period covered by the program? — Yes, Cover Letter, I.1-I.8

I. Funding/Costs:
   1. Includes costs to implement alternatives? — Yes, I.9-I.49
   2. Includes anticipated funding source? — Yes, I.9-I.49

VI. **PROGRAM REVISION:** [150.23 (e) (9)]
Supporting documentation includes provision for revision? — N/A

U.S. Department
of Transportation
**Federal Aviation
Administration**

Detroit Airports District Office
Metro Airport Center
11677 S. Wayne Road, Ste. 107
Romulus, MI 48174

June 2, 2009

RECEIVED
JUN - 8 2009
Barnard Dunkelberg

Mr. Lester W. Robinson, CEO
Wayne County Airport Authority
Detroit metropolitan Wayne County Airport
L.C. Smith Terminal, Mezzanine
Detroit, MI 48242

Dear Mr. Robinson:

Detroit Metropolitan Wayne County Airport
Detroit, Michigan
Noise Compatibility Program Approval

The Federal Aviation Administration (FAA) has evaluated the noise compatibility program for the Detroit Metropolitan Wayne County Airport contained in the FAR Part 150 Noise Compatibility Study Update and related documents submitted to this office under the provisions of Title 49, USC, Chapter 475. The recommended noise compatibility program proposed by the Wayne County Airport Authority is identified in the FAR Part 150 Noise Compatibility Program Chapter I, "Noise Compatibility Program Recommendations". I am pleased to inform you that the Great Lakes Region Airports Division Manager has approved fourteen of the twenty actions elements. Three recommendations are related to revised flight procedures for noise abatement and require no action at this time. Three recommendations were disapproved. The specific FAA action for each noise compatibility program element is set forth in the enclosed Record of Approval (ROA). The effective date of this approval is June 1, 2009. All of the FAA actions are more fully explained in the enclosed Record of Approval.

Each airport noise compatibility program developed in accordance with Part 150 is a local program, not a Federal program. The FAA does not substitute its judgment for that of the airport proprietor with respect to which measures should be recommended for action. The FAA approval or disapproval of Part 150 program recommendation is measured according to the standards expressed in Part 150 and Title 49, and is limited to the following determinations:

> The noise compatibility program was developed in accordance with the provisions and procedures of Part 150;
>
> Program measures are reasonably consistent with achieving the goals of reducing existing non-compatible land uses around the airport and preventing the introduction of additional non-compatible land uses around the airport.

Program measures relating to the use of flight procedures can be implemented within the period covered by the program without derogating safety, adversely affecting the efficient use and management of the navigable airspace and air traffic control systems, or adversely affecting other powers and responsibilities of the Administrator as prescribed by law.

Specific limitations with respect to FAA's approval of an airport noise compatibility program are delineated in Part 150, section 150.5. Approval is not a determination concerning the acceptability of land uses under Federal, state, or local law. Approval does not by itself constitute an FAA implementing action. A request for Federal action or approval to implement specific noise compatibility measures may be required, and an FAA decision on the request may require an environmental assessment of the proposed action. Approval does not constitute a commitment by the FAA to financially assist in the implementation of the program nor a determination that all measures covered by the program are eligible for grant-in-aid funding from the FAA under Title 49, USC, Chapter 471. Where Federal funding is sought, requests for project grants must be submitted to the FAA Detroit Airports District Office in Romulus, Michigan.

The FAA will publish a notice in the Federal Register announcing approval of this noise compatibility program. You are not required to give local official notice, although you may do so if you wish.

Thank you for your continued interest in noise compatibility planning.

Sincerely,

Matthew J. Thys
Manager, Detroit Airports District Office

Enclosure – Record of Approval

cc: APP-400 – Vicki Catlett
AGL-7 – Chuck Prock
AJW-327E – Maria Acevedo
ASW-520 – Annette Davis
AGL-230 – Merel Perrine
AGL-611.1 – Lindsay Butler
Michelle Plawecki - DTW Airport
Ryk Dunkelberg – Barnard Dunkelberg Company

FEDERAL AVIATION ADMINISTRATION

RECORD OF APPROVAL

14 CFR PART 150 NOISE COMPATIBILITY PROGRAM

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT

DETROIT, MICHIGAN

Detroit Airports District Office Manager	5/21/09 Date	✓ Concur	Nonconcur
Great Lakes Region Office of Regional Counsel Environmental Attorney	5/28/09 Date	✓ Concur	Nonconcur
Great Lakes Region Airports Division Manager	6/1/09 Date	✓ Approve	Disapprove

RECORD OF APPROVAL
DETROIT METROPOLITAN WAYNE COUNTY AIRPORT
NOISE COMPATIBILITY PROGRAM

INTRODUCTION

The Noise Compatibility Program (NCP) for Detroit Metropolitan Wayne County Airport (DTW) includes measures to reduce aircraft noise, control land development, mitigate the impact of noise on non-compatible land uses, carry out and update the program. Title 14 Code of Federal Regulations (CFR) Part 150 requires the Noise Exposure Maps (NEM) associated with the NCP apply to a period of no less than five years into the future. However, the NCP may apply to a longer period if the sponsor so desires. The airport sponsor will apply the program measures to the 2004 NEM (Figure D-25). This represents existing conditions (2009) at the airport and it covers a larger area for potential mitigation. When the NEMs do not represent the airport's noise environment, Title 14 CFR Part 150 requires the airport sponsor to update the NEMs. This occurs when there is a significant increase or decrease in noise over incompatible land uses (§150.21(d)).

The objective of the noise compatibility planning is to improve the compatibility between aircraft operations and noise-sensitive land uses in the area, while allowing the airport to continue to serve its role in the community, state, and nation. The airport sponsor recommends the Federal Aviation Administration (FAA) approve these actions. The approvals indicate only the actions would, if carried out, be consistent with the purposes of Part 150. These approvals do not constitute decisions to implement the actions. Subsequent decisions concerning possible implementation of these actions may be subject to applicable environmental procedures, aeronautical study, or other requirements.

The program elements below summarize the airport operator's recommendations in the noise compatibility program. They are cross-referenced to the program. The statements contained within the summarized program elements and before the indicated FAA approval, disapproval, or other determination, do not represent the opinions or decisions of the FAA.

The Airport sponsor has certified the existing conditions shown in the 2004 NEM and the future 2011 NEM that were presented at the public hearing. The Airport sponsor has further certified the conditions depicted for 2004 are representative of 2009, the year of this submittal and the year 2011 is still representative of that year. The FAA accepted these maps on March 8, 2006.

PROGRAM ELEMENTS

Section I of the Part 150 Update contains a summary of the recommended program elements. Many of the program elements continue the existing NCP, approved in 1993. Where noted, the new recommendations are revisions or updates of existing measures.

The complete 1993 Record of Approval (ROA) of the existing program, referenced above is in the Appendix of the document.

NOISE ABATEMENT/AIRCRAFT OPERATIONAL RECOMMENDATIONS

Recommendation 1 – Ground Run-up Procedures. See page I-9 and I-10. This recommendation would move existing run-up locations to a more centralized location on the Airport until construction of a Ground Run-up Enclosure is complete (see recommendation 2). The recommendation would provide for an improved description of where and how each run-up can occur and then provide a means of tracking the compliance with these procedures. The proposed run-up locations are similar to the existing run-up locations, with one new position closer to the center of the Airport. This new location is closer to the center and south end of the Airport, where nearby population densities are lower. The loudest aircraft types that perform a full power run-up would use this location. Pages I.9 – I.10 of the NCP provide more detail on this recommendation. The new location would reduce the number of people exposed to ground run-up associated noise, with an approximate 38% in population exposed to the 70 dBA.

FAA Determination: Approved.

Recommendation 2 – Construct Ground Run-up Enclosure. See page I-11 and I-12. This recommendation is to build a ground run-up enclosure for use by all aircraft during maintenance operations. The Airport will build the facility and require all operators to use it. Such a facility could achieve 100% reduction in population exposed to 70 dBA. Pages I.11 – I.12 of the NCP provide more detail on this recommendation.

The final location will undergo an FAA airspace study to ensure the location meets all FAA airport design standards, does not create a line of site issue and will not increase the likelihood of a runway incursion.

FAA Determination: Approved.

Recommendation 3 – Work with the FAA to Develop FMS Procedures to Concentrate a Portion of South Turning Aircraft and Fan others For Runway 4R Departures. See pages Page I-13 to I-15. This recommendation will locate some flight paths over predominately-compatible land uses, concentrate those paths, and spread the rest of the paths that fly over non-compatible land uses. The Airport Authority would work the FAA Air Traffic Control to develop and use satellite-based navigation technologies to fly multiple headings using a combination of procedures to concentrate noise in some areas, and disperse in others for departures on Runway 4R. The headings used would correspond with the different routes that aircraft fly as they depart the Detroit airspace. Departures to locations to the north, east, and northwest would be fanned between 350 and 035 degrees, while south-bound aircraft from Runway 4R would be turned sooner that the existing flight patterns. Paths designed to concentrate noise would be developed and used to stay on course to the west and then to the south. The general corridor proposed to concentrate noise would follow a path along Michigan Avenue and the turning southward at a point north of Willow Run Airport.

This recommendation requires the development and successful implementation of satellite-based procedures. The NCP identifies conventional flight tracks in an attempt to achieve the goals noted above and to serve aircraft not equipped with satellite based FMS type technology. However, conventional tracks cannot represent the numerous course corrections that would be necessary to achieve the flight tracks shown in the graphic. Therefore, the conventional tracks would only be precise within about 5 miles of the airfield. Coordination of the final tracks would be required. Pages I.13 – I.15 of the NCP provide more detail on this recommendation.

Air Traffic will assign these aircraft a heading or path that provides appropriate divergence from the jet departure corridor, when operationally necessary during periods of peak traffic. Accordingly, Air Traffic will determine the operational circumstances for the use of this measure.

FAA Determination: No action required at this time. This measure relates to the use of flight procedures under 49 U.S.C. 47504(b). Additional analysis and communication between the airport operator, the FAA's Air Traffic Organization and the local Airport Traffic Control Tower is required. Analysis and communication will consider the feasibility, aviation safety and efficiency aspects of the proposal, its potential environmental impacts, and demonstrate whether the measure would provide an overall noise benefit. If implemented, it will be voluntary for purposes of Part 150, subject to wind, weather, efficiency, and safety.

Recommendation 4 – Work With the FAA to Develop FMS Procedures to Concentrate a Portion of South Turning Aircraft and Fan Others from Runway 3L Departures. See page I-16 and I-17. With this recommendation, aircraft bound for northern, western, and eastern locations would follow existing flight tracks using dispersion procedures. Southbound aircraft would depart Runway 3L and fly runway heading for one mile past the departure end of the runway, then turn eastward on a satellite-based heading designed to follow the I-94 freeway corridor and the rail line corridor. At approximately eight miles form the Airport, aircraft would turn south. The Airport Authority would work with the FAA to develop FMS procedures that would concentrate a portion of the south turning departures only, instead of concentrating all departures. Aircraft would use satellite-based navigation technologies to fly multiple heading using a combination of concentrated and dispersed tracks. Aircraft flying to north, east and west destinations would fly along the same paths as they do today, using dispersed flight procedures. Pages I.16 – I.17 of the NCP provide more detail on this recommendation.

Air Traffic will assign these aircraft a heading or track that provides necessary separation and efficiency when wind, traffic, weather and safety allow. Therefore, Air Traffic will determine the operational circumstances for the use of this measure.

FAA Determination: No action required at this time. This measure relates to the use of flight procedures under 49 U.S.C. 47504(b). Additional analysis and communication between the airport operator, the FAA's Air Traffic Organization and the local Airport Traffic Control Tower is required. Analysis and communication will consider the feasibility, aviation safety and efficiency aspects of the proposal, its potential environmental impacts, and demonstrate whether the measure would provide an overall noise benefit. If implemented, it will be voluntary for purposes of Part 150, subject to wind, weather, efficiency, and safety.

Recommendation 5 – Work with FAA to Develop FMS Procedures to Concentrate Departures While in South Flow. See page I-18 and I-19. With this recommendation, aircraft bound for eastern locations departing on Runway 21R would fly runway heading to at least one-half mile past the end of the runway before commencing any turns to the east. Current procedures have some early turns flying near or over the southeastern portions of Romulus. Aircraft departing on Runway 2L to southern destinations would use a 190-degree heading to avoid overlying New Boston. Aircraft departing from Runway 22L to western or northern destinations would turn westward over a wide range of possible headings; assigned based on destination, required aircraft separation, and ATC work load. Aircraft flying to northern destinations would fly the northern portion of the existing turn on a heading of 240 degrees. Aircraft flying to western destinations would fly the southern portion of the existing turn on an initial heading of 240 degrees. The goal of the procedure would be to have all turns completed before reaching New Boston. The Authority would work with FAA to develop FMS procedures that would concentrate departures while in south flow. This procedure would take the existing Instrument Flight Rule procedures and translate into satellite-based navigation to enable greater concentration along the existing tracks. Aircraft would fly the same tracks as they do today. Modern navigational technology would reduce over flights of the more densely populated areas to the south by reducing drift. Pages I.18-I.19 of the NCP provides more detail on this recommendation.

This recommendation requires the development and successful implementation of satellite-based procedures. The NCP identifies conventional flight tracks in an attempt to achieve the goals noted above. This description is based on "old technology" that would be update once satellite-based procedures are in place and are functioning properly. The NCP provides preliminary definition of the recommended tracks. These would be refined in coordination with the FAA to achieve the objectives noted earlier.

Air traffic will assign these routes or tracks when appropriate and when air traffic determines that wind, weather and safety allow.

FAA Determination: No action required at this time. This measure relates to the use of flight procedures under 49 U.S.C. 47504(b). Additional analysis and communication between the airport operator, the FAA's Air Traffic Organization and the local Airport Traffic Control Tower is required. Analysis and

communication will consider the feasibility, aviation safety and efficiency aspects of the proposal, its potential environmental impacts, and demonstrate whether the measure would provide an overall noise benefit. If implemented, it will be voluntary for purposes of Part 150, subject to wind, weather, efficiency, and safety.

Recommendation 6 – Extend Hours of Contraflow at Night. See page I-20 and I-21. This recommendation would increase the hours of **voluntary** contraflow (land from the south, take-off to the south) operations at night when operationally feasible, from 11:00 pm to 6:00 am. From midnight until 6:00 am, contra-flow is used. FAA has stated that it is willing to consider extending contra-flow to begin at 2330, but no earlier due to the amount of late night arrival traffic that flows in around 2300. This procedure allows for reducing nighttime flights over the densely populated areas north of the Airport. Pages I.20-I.21 of the NCP provides more detail on this recommendation.

This recommendation may be possible during times of low traffic and subject to wind, weather, safety and air traffic efficiency. Thus, Air Traffic will determine the times and traffic demand periods during which this procedure could be utilized.

FAA Determination: Approved as voluntary (starting no earlier than 2330) for purposes of Part 150, subject to wind, weather, efficiency, and safety.

Recommendation 7 – Implement Continuous Descent Approach, When Practicable. See pages I-2 to I-23. This recommendation is to implement a continuous descent approach (CDA) when feasible, which is an approach procedure that allows aircraft to approach and land at an airport with minimal changes in engine power/thrust. During a CDA approach, aircraft are not leveled-out; rather aircraft gradually descend from high altitude to reach the 3-degree glide slope. The recommendation is for the Airport Authority to work with the FAA and the airlines to develop, implement, and use CDA type approaches during lower activity periods. This type of approach could result in a 3 to 6 dB reduction in single event noise under the flight path. Pages I.2 –I.23 of the NCP provide more detail on the recommendation.

Due to local air traffic and airspace considerations, this measure may only be implemented when traffic conditions permit, as determined by Air Traffic.

FAA Determination: Approved for Additional Study. This measure relates to the use of flight procedures under 49 U.S.C. 47504(b). Additional analysis and communication between the airport operator, the FAA's Air Traffic Organization and the local Airport Traffic Control Tower is required. Analysis and communication will consider the feasibility, aviation safety and efficiency aspects of the proposal, its potential environmental impacts, and demonstrate whether the measure would provide an overall noise benefit.

Recommendation 8 – Continue to Study the Feasibility of an Extension to Runway 3L/21R to Reduce Noise. See page I-24 and I-25. This recommendation calls for the continuation of evaluating the feasibility of an extension to Runway 3L/21R to reduce noise, taking into consideration operational and economic costs associated with such an extension. At the beginning of this Part 150 an extension of the runway to the south was shown on the approved Airport Layout Plan and identified to be implemented within the life of this Study. However, subsequent to the initiation of this Study, an update to the Airport Master Plan was undertaken. The final Master Plan was submitted to the FAA after the part 150 study was completed and the extension has been identified on a different runway and in a time period beyond the life of this Study. Therefore, the sponsors planning studies no longer support this recommendation. Pages I.24 – I.25 of the NCP provide more detail on this recommendation. At the time of the update to the noise study, it may be appropriate to revisit the feasibility of the proposed extension for noise purposes.

FAA Determination: Disapproved for purposes of Part 150 as the airport sponsor's Master Plan does not support this project.

<u>Recommendation 9 – Develop Noise Abatement Procedures for Use During Runway Maintenance Operations.</u> See Page I-26 and I-27. This recommendation would result in the development of noise abatement procedures for runway/airfield maintenance that involves; establishment of a runway usage program specific to runway / airfield maintenance activities, and the development of a Community Outreach Program to raise awareness of temporary changes in noise exposure occurring because of such activities. Pages I.26 – I.27 of the NCP provide more detail of this recommendation.

The use of this measure has the potential to reduce aircraft noise levels during facility maintenance and provide community outreach to the affected communities. There could be several extended periods of changes in normal operations due to maintenance in the new few years.

FAA Determination: Approved as Local Measure.

<u>Recommendation 10 – Continue to Study the Feasibility of Implementing Displaced Thresholds on Runways 21L and 22R to Reduce Noise.</u> See page I.28 and I.29. This recommendation calls for the continuation of evaluating the feasibility of implementing displaced thresholds to reduce noise, taking into consideration operational and economic costs associated with such an action. Although displaced thresholds are not normally considered economically feasible except in the case of avoid obstructions, a displaced threshold could result in aircraft arriving over residential areas at a higher altitude. Subsequent to the initiation of this Study, an update to the Airport Master Plan was undertaken. The final Master Plan was submitted to the FAA after the part 150 study was completed and displaced Thresholds were not recommended. Therefore, the sponsors planning studies no longer support this recommendation. Pages I.28 – I.29 of the NCP provide more detail on this recommendation.

FAA Determination: Disapproved for purposes of Part 150 as the airport sponsor's Master Plan no longer supports this project.

LAND USE COMPATIBILITY RECOMMENDATIONS

Recommendation 11 – Voluntary Acquisition of Residential Units within 70 DNL. See page I.29 and I.30. Recommendation would provide for the voluntarily acquisition of homes within the 70 DNL noise contour. This is a continuation of the current land acquisition program (Land Use Action 10 of the 1993 program). There are approximately three homes along Merriman Road south of Ecorse Road that are either in the 70 DNL or adjacent to the 70 DNL noise contour. These are isolated homes that are not within a subdivision or other residential development areas. The property will be sold for compatible development after the homes are removed. This is an expansion a Land Use Measure in the 1993 Record of Approval. Pages I.29 – I.30 of the NCP provide more detail on this recommendation.

FAA Determination: Approved.

Recommendation 12 – Require Buyer Notification Within the 60 DNL. See pages I.31 and I.32. This recommendation would provide direct notice to prospective homebuyers that the home they are considering may be subject to aircraft noise intrusion. Many new homebuyers are not aware of the nearness of the airport to the home they are considering. Such a notice on the plat or deed would require the local jurisdiction to adopt and implement because the Authority does not have land use control authority. The Airport Authority would work with the surrounding communities to require notice of the noise to be place on subdivision plats or deeds for each individual lot. Such notice would be recorded on the deed and is identified in a title opinion or title insurance report. This action would continue the previous measure Land Use Action 14 approved in the1993 Record of Approval. This is an expansion and continuation of Land Use Measure 14e of the 1993 Record of Approval. Pages I.31– I.32 of the NCP provides more detail on this recommendation.

Outside the 65 DNL, FAA encourages a local effort to prevent new non-compatible development immediately abutting the 65 DNL and to provide a buffer for possible growth in noise contours beyond the forecast period. The Federal government has no authority to control local land use; the local government has the authority to implement this measure.

FAA Determination: Approved as local measure.

Recommendation 13 – Work With Communities to Update Comprehensive Plans to Discourage Noise Sensitive Uses Within the 65 DNL. See Pages I.33 and I.34. All of the communities surrounding the Airport have adopted comprehensive plans. The communities update these plans as conditions change. The Airport Authority would work with the communities to ensure that the plans do not recommend the introduction or continuation of non-compatible land uses within the 65 ṄL noise contour. There is concern about developing vacant property within the 65 DNL into non-compatible land uses. This is a continuation of Land Use Measure 15 of the 1993 Record of Approval. Pages I.33 – I.34 of the NCP provide more detail on this recommendation.

The Federal government has no authority to control local land use; the local government has the authority to implement this measure. Approval of this measure does not commit the FAA to future Federal funding assistance.

FAA Determination: Approved as local measure.

Recommendation 14 – Work with Communities to Update Zoning Ordinances to Prohibit Noise Sensitive Uses Within the 65 DNL. See Pages I.35 and I.36. All the communities surrounding the Airport have adopted zoning ordinances, which are updated periodically as conditions change. Most of the property within the 65 DNL is zoned for non-residential uses. However, zoning is a creation of the political body and can be changed through the political process. In addition, one of the dilemmas of modern planning and zoning is to incorporate high-density residential development in commercial, retail and industrial zones. While most of an area may be non-residential, introducing residential units can result in noise concerns that were not as prevalent with non-residential uses. The Airport Authority will work with the communities to either amend zoning ordinances to prohibit such uses or continue to utilize those ordinances, which do prohibit such development. This is a continuation of Land Use Measure 14b of the 1993 Record of Approval. Pages I.35-I.36 of the NCP provides more detail on this recommendation.

The Federal government has no authority to control local land use; the local government has the authority to implement this measure. Approval of this measure does not commit the FAA to future Federal funding assistance.

FAA Determination: Approved as local measure.

Recommendation 15 – Work With Communities to Update Building Codes to Require Sound Attenuation of New Residences Within the 65 DNL. See pages I.37 and I.38. This recommendation would amend building code requirements to include sound attenuation standards for any new construction of noise sensitive uses within the 65 DNL contour. The action would not address existing residences, but would prevent future incompatibilities by requiring noise reduction or sound attenuation for new construction. Prior to building permit or plat approval, noise sensitive uses would be required, through construction techniques, to achieve a 30 dB noise reduction between outside noise levels and inside noise levels. This is a continuation of Land Use Measure 14a of the 1993 Record of Approval. Pages I.37 – I.38 of the NCP provides more detail on this recommendation.

The Federal government has no authority to control local land use; the local government has the authority to implement this measure. Approval of this measure does not commit the FAA to future Federal funding assistance.

FAA Determination: Approved as local measure.

Recommendation 16 – If Federal Funds Become Available at Reasonable Exchange, Sound Insulate Residential Units Within the 60 DNL. See Pages I.39 and I.40. Currently FAA funding for residential units beyond the 65 DNL is not as readily available as funds are for insulating residential units within the 65 DNL. There is some discussion that such funds will be more readily available at the same levels that funds are available within the 65 DNL. If such funds become available, then the Airport Authority would insulate those residential uses in the same manner and extent that they have traditionally done for house in the 65 DNL. Page I.39 – I.40 of the NCP provide more detail on this recommendation.

FAA Determination: Disapproved pending additional study and coordination. The airport sponsor has adopted the Federal guidelines published at Table 1 in 14 CFR Part 150. Federal guidelines state that land uses located at less than the DNL 65 dB noise level are compatible with airport operations. The NCP does not show that local jurisdictions have established standards that differ from the Federal guidelines. The Airport will need to develop a current 60 DNL noise map and the local communities will need to adopt the 60 DNL as their noise standard for non-compatible land uses. After this has occurred, the airport sponsor may submit the revised study to the FAA for determination of whether it meets the requirements of the Part 150 program.

ADMINISTRATIVE/NOISE PROGRAM RECOMMENDATIONS

Recommendation 17 – Install Aircraft Flight Track/Noise Monitoring System. See pages I.41 and I.42. This recommendation would install an Aircraft Flight Track/Noise Monitoring System to improve the ability to monitor flights, respond to the public in a timely manner, and develop a Fly Quiet Program (see Recommendation 19). The system would provide the necessary automation to develop regular reports or monitor aircraft compliance with noise abatement procedures. A key component of the upgrade will be the ability for the public to view flight tracks via the Internet. Pages I.41 – I.42 of the NCP provide more detail on this recommendation.

For purposes of aviation safety, this approval does not extend to the use of monitoring equipment for enforcement purposes by in-situ measurement of any preset noise thresholds. The airport shall not use this system for mandatory enforcement of any voluntary measure.

FAA Determination: Approved.

Recommendation 18 – Follow-up Noise Advisory Committee. See pages I.43 and I.44. This recommendation calls for establishing a follow-up noise advisory committee, with a balanced representation of airlines, local government, Airport Authority, FAA, and citizen stakeholders to assist and provide continuing guidance in implementing the study recommendations. This committee will utilize knowledge developed through the Part 150 Study and help build the partnerships needed to implement these measures. Pages I.43 – I.44 of the NCP provide more detail on this recommendation.

FAA Determination: Approved.

Recommendation 19 – Fly Quiet Program. See Pages I.45 to I.47. This recommendation calls for the development and implementation of a Fly Quiet Program at DTW. This recommendation will provide a regular report card to the public explaining how the airlines are doing in following noise procedures. It can also act as a positive incentive to reward the airlines for good performance. The noise advisory committee will develop specific parameters to be included in the reports. Implementation of this program is dependent on Recommendation 17 above. Pages I.45 – I.47 of the NCP provides more detail on this recommendation.

FAA Determination: Approved for study. The development of a Fly Quiet Program is approved for study. This approval does not extend to implementation of the Fly Quiet Program. Once the Fly Quiet Program has been developed, the airport sponsor may submit it to FAA for a determination of whether the Fly Quiet Program measures meet the requirements of the Part 150 regulation.

Recommendation 20 – Subsequent Part 150 Updates. See Page I.48. This recommendation calls for the review and update the Part 150 Study as needed to reflect changes in the noise environment. A Part 150 study is a "snapshot" in time to look at the noise conditions produced by the current fleet mix and level of operations and the five-year forecast levels. Federal regulations require a new study be completed if there is a significant increase or decrease in noise levels resulting from changes at the airport. Page I.48 of the NCP provide more detail on this recommendation.

If made necessary by NEM changes, an update to the NCP would address requirements of 150.23(e)(9). Section 150.21(d), as amended, states that the NEM shall be updated either if there is a substantial new noncompatible use within the DNL 65 dB contour, or if there is a significant reduction in noise over existing noncompatible land uses.

FAA Determination: Approved.

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DETROIT METRO • WILLOW RUN
WAYNE COUNTY AIRPORT AUTHORITY

CHAPTER A
INVENTORY

Inventory

Introduction

Detroit Metropolitan Wayne County Airport (DTW) is an integral component of the transportation infrastructure serving the Detroit Metropolitan area, southeast Michigan, and northwest Ohio. Because of its airfield and facility capabilities, Detroit Metropolitan Wayne County Airport is also a vital part of the national system of airports. The Airport serves as not only the City of Detroit's front door by providing visitors with an important first impression of the community, but also is the state's largest airport. The Airport provides transportation facilities that are an absolute necessity for some businesses, and a "required" convenience for others. Additionally, Detroit Metropolitan Wayne County Airport provides recreational and leisure traveler's convenient access to air transportation with convenient non-stop and connecting service to many popular destinations.

This Federal Aviation Regulation (FAR) Part 150 Noise Compatibility Planning Study is an update of a 1992 Study that was adopted by Wayne County and approved by the Federal Aviation Administration (FAA) in 1993. The Wayne County Airport Authority has implemented many of the recommendations contained in the previous FAR Part 150 Study. However, since completion of the previous study, there have been changes to the airfield, type of aircraft, and the number of aircraft operating at the airport. As such, many of these changes have likely resulted in changes to noise exposure and therefore the need for an update to the previous Study.

The purpose of this airport facilities INVENTORY chapter of the Part 150 Study is to establish a baseline of information about existing airport facilities and operations, as well as local land use. Much of this inventory data will be used to model new aircraft noise exposure contours showing the areas exposed to significant aircraft noise, as defined by the FAA. The inventory includes data concerning airport facilities, flight procedures, noise abatement procedures, noise complaints, and land use conditions and policies within the environs of the Airport.

Airport Facilities

Detroit Metropolitan Wayne County Airport is the primary air transportation hub of southeast Michigan. The Airport resides on approximately 6,700 acres of land within Wayne County and is located entirely within the City of Romulus, approximately 10 miles southwest of downtown Detroit. Municipalities in the vicinity of the Airport include the City of Allen Park, City of Belleville, City of Dearborn, City of Dearborn Heights, City of Garden City, City of Inkster, City of Livonia, City of Romulus, City of Taylor, City of Wayne, City of Westland, Huron Township, Sumpter Township, and Van Buren Township.

The Airport is served by 16 major scheduled legacy and low cost airlines including: Air Canada, American, American Eagle, America West, British Airways, Continental, Delta, Lufthansa, Northwest, KLM, Royal Jordanian, Southwest, Spirit, United, USA 3000, and US Airways Express. The Airport is served by seven (7) commuter airlines including: ASA (Delta), Comair (Delta), Continental Express, Mesaba (Northwest Airlink), Pinnacle Airlines(Northwest Airlink), United Express, and US Airways Express. There are approximately seven (7) charter airlines operating at the Airport. Both Federal Express and United Parcel Service conduct major scheduled cargo operations. The Airport provides non-stop air service to 110 cities within the United States and 44 cities internationally. In terms of passenger activity, Detroit Metropolitan Wayne County Airport was the 10th busiest US airport in 2003 with respect to scheduled enplaned passengers. The generalized Airport location is illustrated on **Figure A1, AIRPORT LOCATION MAP.**

Detroit Metropolitan Wayne County Airport is owned by Wayne County and is operated by the Wayne County Airport Authority. The Authority is managed by an independent, seven-member Board of Directors. Four members are appointed by the Wayne County Executive; two members are appointed by the Governor; and one member is appointed by the Wayne County Commission. Terms of the appointments range from two to eight years. The Authority is responsible for the management and operation of Detroit Metropolitan Wayne County Airport and Willow Run Airport - including the power to plan, promote, extend, maintain, acquire, purchase, construct, improve, repair, enlarge, and operate both Airports. The Director of the Airport is responsible for the day-to-day operations of the Detroit Metropolitan Wayne County Airport.

Airport property boundaries are completely within Wayne County and the City of Romulus. **(Figure A2**, **AIRPORT VICINITY MAP**). Figure A3 depicts the Existing Airport Layout.

The Wayne County Airport Authority is currently preparing an updated Master Plan package for Detroit Metropolitan Wayne County Airport that is evaluating airside and landside facility requirements for the next 20 years.

Figure A1 **Airport Location Map**

Approximate Scale = 1" = 40 Miles

Source: Microsoft Streets & Trips 2004

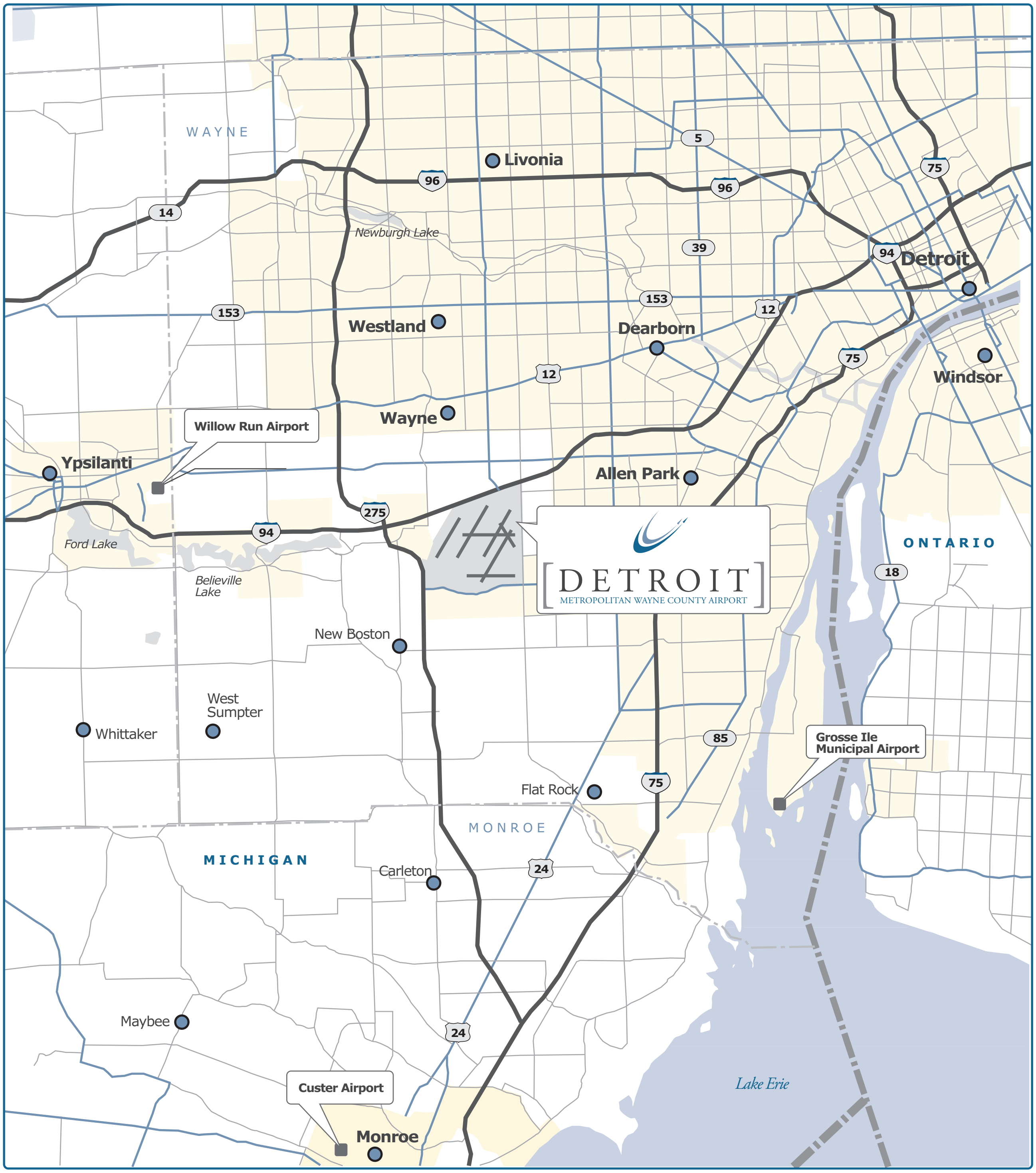
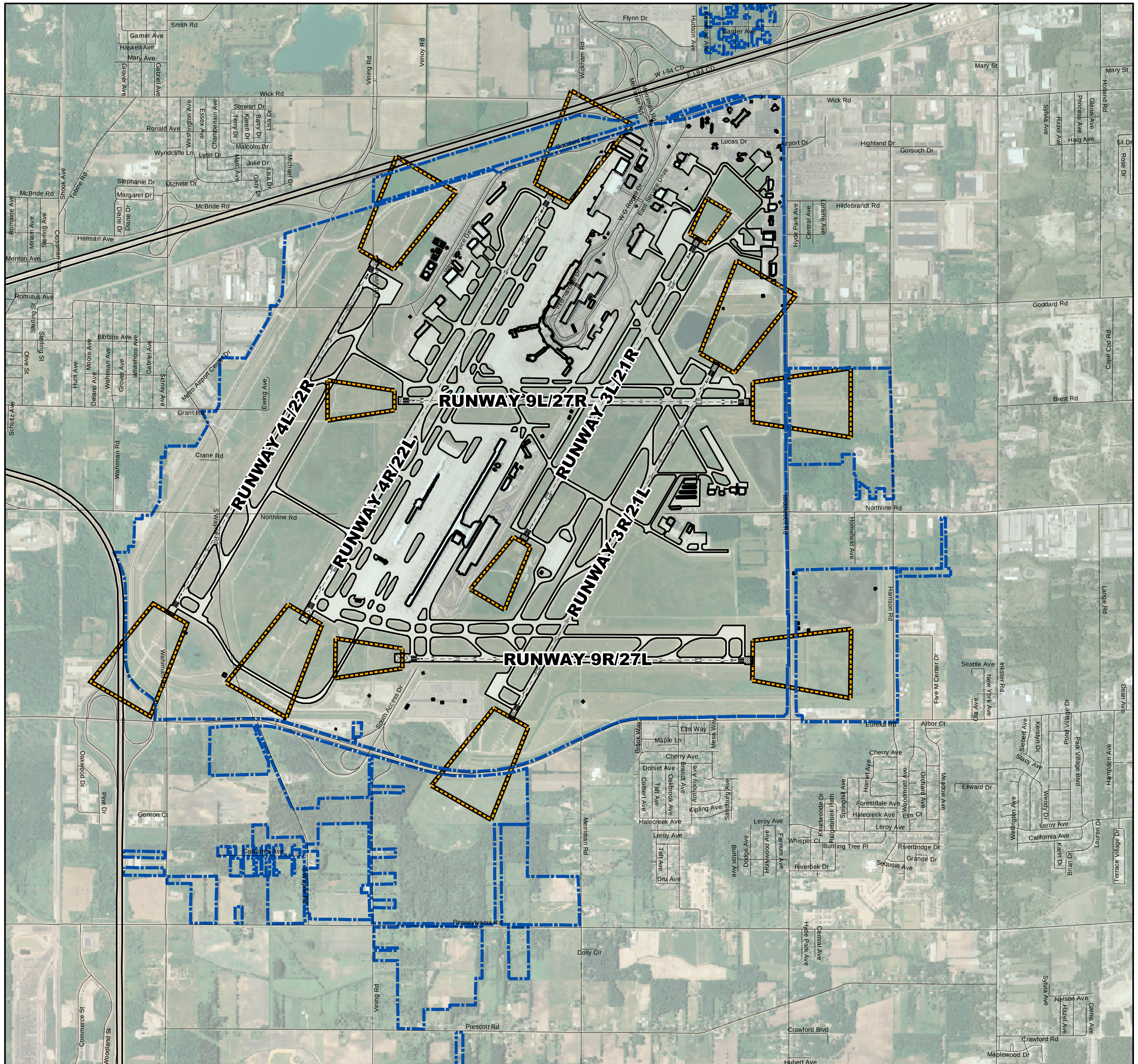


Figure A2 **Airport Vicinity Map**

Approximate Scale = ?

Source: Microsoft Streets & Trips 2004

Figure A3 **Existing Airport Layout**



Legend

- Airport Property Line
- Runway Protection Zones

N

Source: Michigan Department of Natural Resources, SEMCOG

DETROIT
METROPOLITAN WAYNE COUNTY AIRPORT

Airside Inventory

Runways. Detroit Metropolitan Wayne County Airport has an Airport Reference Point (ARP) of Latitude 42° 12 44.750"N, Longitude 083° 21' 12.213"W and an elevation of approximately 646 feet above mean sea level (AMSL). The Airport currently has the following six (6) runways:

- Runway 4L/22R – 10,000 feet long and 150 feet wide.
- Runway 4R/22L – 12,001 feet long and 200 feet wide.
- Runway 3L/21R – 8,500 feet long and 200 feet wide.
- Runway 3R/21L – 10,000 feet long and 150 feet wide.
- Runway 9L/27R – 8,700 feet long and 200 feet wide.
- Runway 9R/27L – 8,500 feet long and 150 feet wide.

Runway 4L/22R (northeast/southwest orientation) is 10,000 feet in total length and 150 feet in width. Runway 4L/22R is equipped with High Intensity Runway Edge Lights (HIRL) and in-pavement centerline lights. Runway 4L has precision runway markings. Runway 4L has a Category II and III Instrument Landing System (ILS)/Distance Measuring Equipment (DME) approach with ALSF-2 (approach lighting system with sequenced flashing lights) approach lights. Runway 22R also has precision runway markings and an ILS/DME approach with MALSR (medium intensity approach lighting system) approach lights.

Runway 4R/22L (northeast/southwest orientation) is 12,001 feet in total length and 200 feet in width. Runway 4R/22L is equipped with HIRL and in-pavement centerline lights. Runway 4R has precision runway markings. Runway 4R has a Category II and III ILS/DME approach with ALSF-2 approach lights as well as a SSALR (simplified short approach lighting system with runway alignment indicator lights) approach light system. Runway 22L also has precision runway markings and an ILS)/DME approach with MALSR approach lights.

Runway 3L/21R (northeast/southwest orientation) is 8,500 feet in total length and 200 feet in width. Runway 3L/21R is equipped with HIRL and in-pavement centerline lights. Runway 3L has nonprecision runway markings, Runway End Identifier Lights (REIL), and Precision Approach Path Indicator (PAPI) lights. Runway 21R has nonprecision runway markings, PAPI lights, and MALSR approach lights.

Runway 3R/21L (northeast/southwest orientation) is 10,000 feet in total length and 150 feet in width. Runway 3R/21L is equipped with HIRL and in-pavement centerline lights. Runway 3R has precision runway markings and PAPI lights. Runway 3R has Category II and III ILS with ALSF-2 approach lights and SSALR approach lights. Runway 21L also has precision runway markings and PAPI lights. Runway 21L has an ILS with MALSR approach lights.

Runway 9L/27R (east/west orientation) is 8,700 feet in total length and 200 feet in width. Runway 9L/27R is equipped with HIRL and in-pavement centerline lights. Runway 9L has precision runway markings and REIL. Runway 27R has precision runway markings and PAPI lights. Runway 27R has an ILS with MALSR approach lights.

Runway 9R/27L (east/west orientation) is 8,500 feet in total length and 150 feet in width. Runway 9R/27L is equipped with HIRL and in-pavement centerline lights. Runway 9R has precision runway markings. Runway 27L has precision runway markings and PAPI lights. Runway 27L has an ILS with MALSR approach lights.

Taxiways. All runways are provided with taxiway access to runway ends and connector or exit taxiways. All runways have a parallel taxiway. The taxiway system has been designed to primarily provide quick and safe access to and from runway ends and the main passenger terminal. The taxiway system also provides aircraft access to cargo, maintenance, and hangar areas. Taxiway width and pavement characteristics vary depending on the aircraft specifications that utilize the facilities and runways that the taxiways serve.

Landside Inventory

Terminal. Detroit Metropolitan Wayne County Airport has four (4) existing passenger terminal buildings; however, only three are in operation. The Smith Terminal (constructed in 1954) is no longer used for passenger service; the McNamara Terminal (constructed in 2002) a midfield terminal with a satellite concourse; the Berry International Terminal (constructed in 1974); and the North Terminal, opened in 2008. The North Terminal, the newest terminal, serves all domestic carriers except Northwest Airlines and its partners. The Berry International Terminal serves certain international arrivals and international departures, as well as most charter operations and some domestic service flights. The McNamara Terminal, the second newest and state-of-the-art terminal, (completed in 2002) serves all Northwest Airlines operations and those of their airline partners.

Cargo. Major air cargo facilities at Detroit Metropolitan Wayne County Airport are generally located toward the north portion of the Airport area adjacent to Runways 22R, 22L, and 21R; however, there are some cargo facilities, such as UPS, that are located in other areas. The cargo areas for the largest cargo tenants (Federal Express and United Parcel Service) are located in separate locations. The passenger airline cargo facilities and smaller cargo carriers are generally concentrated in two areas located adjacent to Merriman Road.

Airport Maintenance Facilities. Detroit Metropolitan Wayne County Airport is host to multiple aircraft maintenance operations including: Northwest Airlines, United Airlines, UPS, FedEx, and others. Aircraft serviced at the maintenance facilities range from small single engine general aviation aircraft to Boeing 747 jets. Maintenance facilities are generally located on north end of the central terminal area; however, there are maintenance facilities in other locations as well (e.g. FedEx).

Airport Rescue and Fire Fighting Facility (ARFF). The Aircraft Rescue and Fire Fighting (ARFF) facility is located in the central portion of the airfield between the north terminal complex and the midfield terminal. A second smaller ARFF facility is located north of the International Terminal. A third ARFF is located north of Taxiway V between runways 22L and 22R. The County operates an Index E ARFF facility, the highest index, which is required by the FAA for airports that accommodate at least five daily departures by aircraft up to 200 feet in length (e.g., the B-767, DC-10).

Airport Traffic Control Tower (ATCT) Facility. The FAA ATCT located near the north end of the McNamara Terminal building operates twenty-four hours a day. The Terminal Radar Approach Control (TRACON) facility, that is responsible for Detroit Metropolitan Wayne County Airport and other regional airports, is located within the ATCT building.

General Aviation. General aviation (GA) and corporate aircraft hangars and ancillary facilities are located in various locations around the airfield that provide apron space and roadway access. The primary Fixed Base Operator (FBO) is Signature Flight Support, who supplies aircraft fuel, parking, hangars, catering, and other flight services to the GA community.

Air Traffic Operations Activity

Detroit Metropolitan Wayne County Airport averages 672 scheduled aircraft departures per day, and is served by 34 major/national, regional/commuter, and charter airlines. A summary of airport activity is provided in **Table A1, Summary of Historical Aviation Activity**. Between 1990 and 2000, total aircraft operations increased from approximately 391,000 to 561,000, representing an average annual growth rate of approximately 3.3 percent. Closely following national trends, aircraft activity declined from 2000 to 2003 to 491,000 operations. It should be noted that the decrease in overall operations and enplanements for 2001 and 2002 was influenced by the downturn in commercial passenger traffic following the terrorist events of September 11, 2001, the temporary closure of airports in the U.S., and the subsequent economic downturn.

Between 1990 and 2000, passenger enplanements increased from approximately 10.5 million to 17.5 million, representing an average annual growth rate of approximately 5%. Passenger activity declined in 2003 to 15.6 million passenger enplanements. In 2003, the Airport provided for the transportation of 242,366 metric tons of total cargo. Approximately 89% of this cargo (215,806 metric tons) was freight, and approximately 11% (27,061 metric tons) was mail. Approximately 74% of the freight transported at Detroit Metropolitan Wayne County Airport was carried in cargo aircraft and the remaining 26% of air freight was transported on passenger aircraft. All of the 27,061 metric tons of mail transported at Detroit Metropolitan Wayne County Airport was transported on passenger aircraft.

Table A1
SUMMARY OF HISTORICAL AVIATION ACTIVITY, 1990-2006
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update

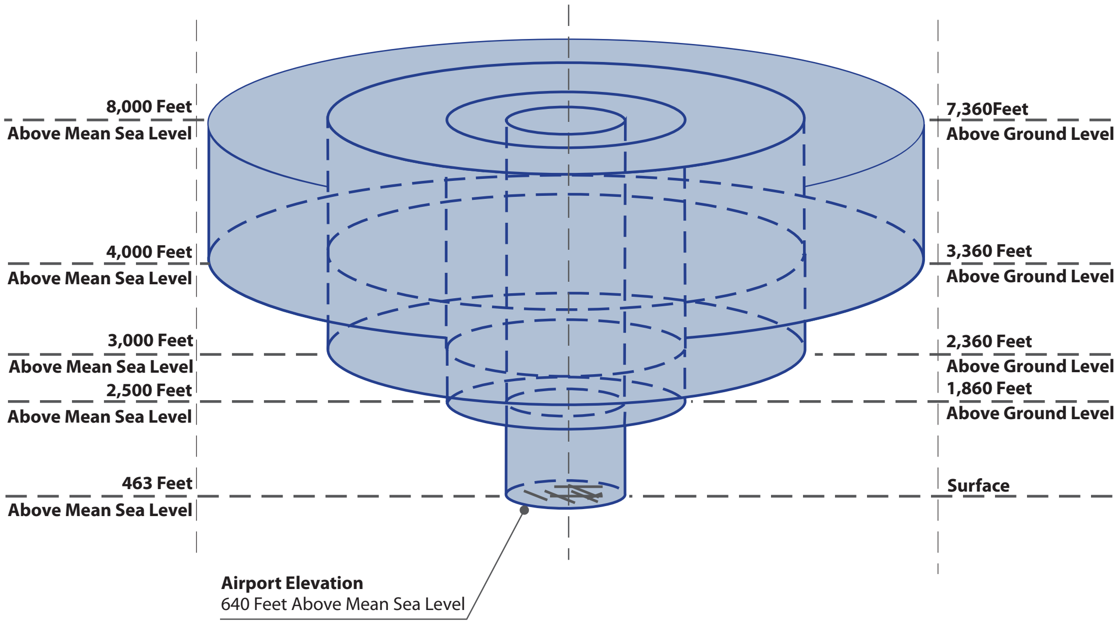
Year	Passenger Enplanements	Air Carrier Operations	Air Taxi/ Commuter Operations	General Aviation Operations	Military Operations	Total Operations
1990	10,552,053	279,148	56,001	55,796	220	391,165
1991	10,241,703	271,720	68,429	50,147	567	390,863
1992	10,983,586	277,880	83,788	49,804	2,072	413,544
1993	11,496,509	297,422	97,419	63,011	2,157	460,009
1994	12,801,476	316,855	94,316	66,682	1,885	479,738
1995	13,990,302	333,002	94,644	69,721	1,520	498,887
1996	14,866,851	349,630	100,370	79,532	1,566	531,098
1997	15,028,353	351,053	106,019	84,000	1,554	542,626
1998	15,456,583	336,457	108,989	84,199	1,689	531,334
1999	16,962,103	331,153	154,790	73,667	1,685	561,295
2000	17,520,806	330,399	159,972	69,154	1,598	561,123
2001	16,766,532	319,194	167,672	52,692	1,408	540,966
2002	15,166,353	337,816	127,236	25,309	302	490,663
2003	15,630,702	330,110	140,984	19,768	213	491,075
2004	16,748,147	325,704	172,349	15,369	168	513,590
2005	17,545,384	325,415	191,394	14,725	344	531,777
2006	17,323,171	287,793	185,109	12,841	105	485,848
2007[1]	17,885,915	280,062	181,025	11,485	153	472,725

Source: FAA Terminal Area Forecasts 2007. Fiscal Year Data
[1] Forecast Data

Airspace

The following is presented to better help the public understand the complexities of Air Traffic Control. Local airspace surrounding Detroit Metropolitan Wayne County Airport is designated as Class B airspace. **Figure A4,** entitled **GENERALIZED CLASS B AIRSPACE ILLUSTRATION,** is shown on the following page. The exact configuration of each Class B airspace area is tailored to the individual airport. However, Class B airspace usually consists of a 20 Nautical Mile (NM) radius circle surrounding an airport; the floor and ceiling of the airspace is unique to each airport. There is a 20 to 30 NM ring around an airport that requires all aircraft to have a two-way transponder. Air traffic in the vicinity of the Airport is monitored using the regional ASR-9 radar unit (Airport Surveillance Radar).

SIDE VIEW



TOP VIEW

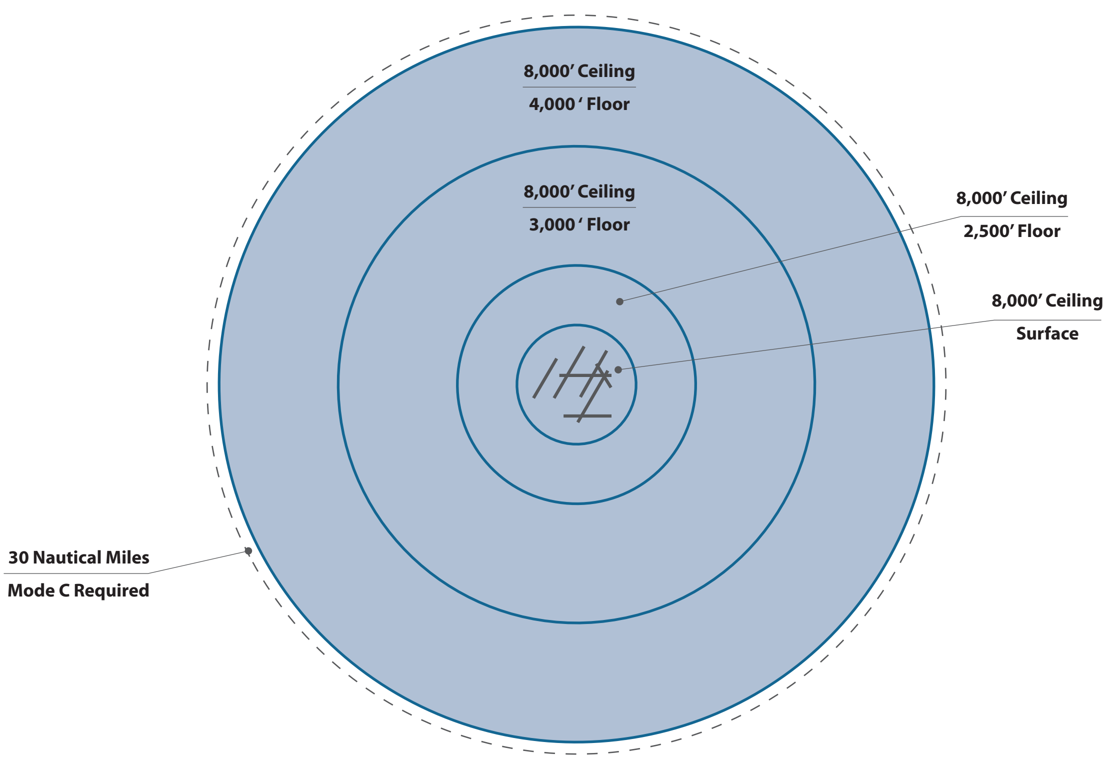


Figure A4 **Generalized Class B Airspace Illustration**

Source: Detroit Sectional Aeronautical Chart, 63rd Edition, October 2001.

Each person operating an aircraft must establish two-way radio communications with the ATCT facility providing air traffic services prior to entering Class B airspace and, thereafter, must maintain those communications within the airspace. Aircraft entering Class B airspace must also have clearance to enter the airspace. Around Detroit Metropolitan Wayne County Airport, the Class B airspace, within the inner 5 NM radius circle, extends from the surface (the ground elevation at Detroit Metro Airport is 646 feet above mean sea level (AMSL) to an elevation of 8,000 feet AMSL. Airspace within the 10 NM radius circle, extends from varying floor elevations (2,500, 3,000, and 4,000 feet AMSL) to the same 8,000-foot AMSL altitude cap as the inner circle.

International boundaries, military airports, military operations areas, restricted areas, temporary flight restrictions, and prohibited areas can also impact airspace use in the vicinity of a civil airport.

All aircraft flights are governed by either Visual Flight Rules (VFR) or Instrument Flight Rules (IFR). Definitions are contained in FAR Part 91 and summarized below. The basic difference between VFR and IFR rules is that the pilot maintains spatial orientation of an aircraft by reference to the earth's surface for VFR and by reference to aircraft instruments for IFR. Under IFR rules, a pilot can operate in poor visibility conditions within controlled airspace. Flights under VFR rules require good visibility and maintenance of specified distances from clouds.

IFR Operations

Air carrier and many turbojet general aviation and military aircraft operating to or from the Airport under IFR, are reassigned coded flight routes and procedures referred to as Standard Instrument Departure (SIDs) procedures and Standard Arrival Routes (STARS). Navigation of IFR aircraft within the Detroit TRACON airspace is generally provided by radar vectors (routes) to achieve efficient sequencing, spacing, and separation between aircraft. Therefore, actual aircraft flight tracks, particularly close to the Airport, will not conform exactly to the SIDS and STARS depicted.

In general, however, IFR arrival aircraft are cleared to the Airport by the Cleveland ARTCC via these STARS while descending from en-route altitudes. These aircraft arrivals are "handed off" via radar from the ARTCC to the Detroit TRACON at various "gates" or fixes. In other words, there are established arrival routes that aircraft utilize and pilots are in contact with a sequence of controllers as they approach the Airport.

The TRACON assumes responsibility for guiding arriving aircraft to their final approach course at the destination airport and for separating them from each other. Lower performance aircraft, and some commuter/air-taxi aircraft, operate at lower altitudes below or clear of the jet aircraft routes. These lower performance aircraft are "laced" into arrival routes close to the Airport to minimize the effects of speed differentials.

When arriving aircraft are in the vicinity of their destination airport the TRACON gives descent instructions until they are approximately 3,000 feet above the destination airport and approximately seven nautical miles (NM) from the runway threshold on the final approach. TRACON then clears the aircraft for the final approach and instructs the pilot to contact the destination airport's tower.

Similarly, departing IFR aircraft are guided and separated from other aircraft by the Detroit TRACON through its delegated airspace. Shortly after departure, when the aircraft is airborne, the tower clears the aircraft to contact the TRACON for departure control. The TRACON then directs departing aircraft toward the departure fixes. Again, low performance aircraft are turned immediately after take-off to separate them from the jet departure stream and to keep them at lower altitudes. As soon as departing aircraft either pass the departure fix or climb out of the TRACON airspace, they are transferred to ARTCC for en-route control.

Unless visual (VFR) separation is in effect, TRACON provides all IFR aircraft with a radar separation of at least three nautical miles (NM) longitudinally, or 1,000 feet of vertically within their terminal airspace. Additional longitudinal separation to avoid wake turbulence is provided for various combinations of aircraft sizes. The minimum longitudinal separation in terminal airspace is listed in Table A2.

Table A2
AIRCRAFT LONGITUDINAL SEPARATIONS
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update

Lead Aircraft Classification (NM)	**Trailing Aircraft Classification**	**Separation**
Heavy	Heavy	4
Heavy	Large	5
Large	Small	4
Heavy	Small	6
B-757	Small	5
B-757	Large/Heavy	4

Source: FAA Handbook 7110.65L, "Air Traffic Control" with changes.

For the purpose of wake turbulence separation minimums, the FAA classifies aircraft as Heavy, Large, or Small as follows:

- **Heavy:** Aircraft capable of take-off weights of 250,000 pounds or more whether or not they are operating at this weight during a particular phase of flight (Examples: B-747, B-777, DC-10). [Exception: the B-757 is handled as a Heavy aircraft for separation purposes].
- **Large:** Aircraft of more than 41,000 pounds, maximum certified take-off weight, up to 250,000 pounds (Examples: B-737, MD-80, Dash-8, Large Business jets).
- **Small:** Aircraft of 41,000 pounds or less maximum certified take-off weight (twin and single engine piston/turboprops, Small Business Jets).

Within the Detroit Class B airspace, the Detroit TRACON provides all VFR aircraft a radar separation of one and one-half nautical mile (NM) longitudinally, or 500 feet of vertical separation, from all IFR/VFR aircraft more then 19,000 pounds and all turbojets.

Navigation and Communication Aids

Detroit Metropolitan Wayne County Airport, like all U.S. airports, functions within the local, regional, and national system of airports and airspace. The following illustration, **Figure A5, AIRSPACE/NAVAIDS SUMMARY**, and narrative provide a brief description of Detroit Metropolitan Wayne County Airport's role as an element within these systems. Please refer to http://www.faa.gov/library/manuals/aviation/instrument_flying_handbook/ for a more detailed explanation of the following discussion.

Air Traffic Service Areas

The FAA is responsible for the safe and efficient use of the national air space. This airspace is divided into three specific types: en-route, terminal, and tower. When an aircraft departs an airport, air traffic controllers working in an airport traffic control tower handle its movement. When the aircraft is approximately one to five miles away from the Airport, the aircraft is handed off to controllers working the Terminal Radar Approach Control Facility (TRACON) located at Detroit Metropolitan Wayne County Airport. These controllers are responsible for the airspace extending out 40 nautical miles from the Airport in all directions. The aircraft then enters the third type of airspace and becomes the responsibility of en-route controllers working in one of twenty-two domestic Air Route Traffic Control Centers (ARTCC). The en-route controllers retain control until the aircraft nears its intended destination. The air-traffic control process is then reversed for landings. Detroit Metropolitan Wayne County Airport is contained within the Cleveland ARTCC jurisdiction, which has an airspace size of 70,000 square miles.

Figure A5 **Airspace/NAVAIDS Summary**

Approximate Scale = 1″ = 7 Nautical Miles

Source: Detroit Sectional Aeronautical Chart, 63rd Edition, October 2001.

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Detroit Metropolitan Wayne County Airport has a 24-hour, continuously operating Airport Traffic Control Tower (ATCT) that has a designated Class B airspace surface area. Aircraft that operate within Class B airspace must be in contact at all times with the tower controllers, especially to receive approval for take-offs and landings. Aircraft operating in Class B airspace must have clearance to enter the airspace.

Navigational Aids

A variety of navigational facilities are currently available to pilots around Detroit Metropolitan Wayne County Airport, whether located at the Airport or located elsewhere in the region, and are available to en-route air traffic as well. Additionally, there are a number of navigational aids (NAVAIDS) that allow a variety of instrument approaches to the Airport.

The NAVAIDS available for use by pilots in the vicinity of the Airport are Non-Directional Radio Beacon (NDB) facilities, VHF Omnidirectional Range/Distance Measuring Equipment (VOR/DME), and VHF Omnidirectional Range/Tactical Air Navigation (VORTAC) facilities. NDBs are general purpose low- or medium-frequency radio beacons that aircraft equipped with a loop antenna can home in on or determine its bearing relative to the sending facility. A VOR/DME system is a Very High Frequency Omnidirectional Range Station with Distance Measuring Equipment transmitting very high frequency signals, 360 degrees in azimuth (the angular position along the horizon, measured clockwise from the north) oriented from magnetic north. This DME equipment is used to measure, in nautical miles (NM), the slant range distance of an aircraft from the navigation aid. A VORTAC is a navigational aid providing VOR azimuth, TACAN azimuth, and TACAN distance measuring equipment at a single site.

TACAN's are en route navigation stations using the ultra-high-frequency (UHF) portion of the radio spectrum and were previously used exclusively by the military. However, within the last thirty-years, most VHF and UHF airway stations have been combined to form a single nationwide airway system shared by all users of the national airspace system. Thus, VOR and TACAN facilities co-located and operating simultaneously are referred to as VORTAC stations.

Airport and regional navigational and landing aids available for Detroit Metropolitan Wayne County Airport include an Instrument Landing System, with Localizer and Glide Slope, for Runways 22L/4R, and Runway 4L/22R; Runway 21L/3R is equipped with an ILS, and Runway 21R/3L is equipped with a PAPI visual slope indicator. Runways 9L/27R are equipped with an ILS approach on Runway 27R; Runways 27L/9R are equipped with an ILS on Runway 27L. In addition, the VHF Omnidirectional Range/Distance Measuring Equipment (VOR/DME) is located on the airfield.

Additional navigational aids within the vicinity of Detroit Metropolitan Wayne County Airport include the Detroit VOR-DME (113.40 DXO) located on the field, The Carleton VORTAC (115.70 CRL) located 11 NM south of the Airport, the Salem VORTAC (114.30 SVM) located 16 NM north of the Airport, the Windsor VOR-DME (113.80 CYQG) located 23 NM east of the Airport, and the Pontiac VORTAC (111.00 HRK) located 30 NM north of the Airport. NDB facilities located within proximity of the Airport include: Grosse Ile (419 RYS) located eleven (11) NM southeast of the Airport, Berz (215 UIZ) located 32 NM northeast of the Airport, Howell (243 OZW) located northwest of the Airport and Adrian (278 ADG) located 38 NM southwest of the Airport.

Current Noise Management Program

The existing noise management program at Detroit Metropolitan Wayne County Airport combines elements of the existing approved Part 150 Noise Compatibility Plan with air traffic control requirements to ensure the safe and expeditious handling of air traffic. While safety is paramount to any ATC operation, noise sensitivity to the surrounding communities is also of key importance in airport operations. The following information describes the integration of noise abatement procedures with safe and expeditious air traffic control procedures. The procedures are part of a runway use program and participation by pilots and aircraft operators is voluntary.

The FAA has a primary function to determine under what conditions flight operations may be conducted without causing degradation of safety. Under ideal conditions aircraft takeoffs and landings should be conducted into the wind. Considerations such as delay and capacity problems, runway length, approach aids, noise abatement, and other factors may require aircraft operations to be conducted in a specific manner.

Noise Compatibility Plan

The previous Noise Compatibility Plan was approved by the FAA is 1993. Many of the operational and land use measures approved in the 1993 study have been completed or are continuing to be implemented. The previously approved Noise Compatibility Plan has allowed the Airport to obtain federal discretionary funding for noise related projects, such as property acquisitions, residential sound insulation, school sound insulation, and purchase assurance. Several Recommendations in the previous Plan have been implemented and the fleet mix has changed. Thus the Plan needed updating.

Operational actions approved in the pervious Noise Compatibility Plan which have been implemented or are underway include the following noise abatement procedures:

- Preferential runway use
- Fanning of departure flight tracks
- Ground run-up procedures
- Study an extension of Runway 3L and a Ground Run-up Enclosure
- Construction of noise barriers
- Establishment of a Noise Office

Land use actions approved in the pervious Noise Compatibility Plan which have been implemented or are underway include:

- School sound insulation program
- Residential sound insulation program
- Residential acquisition and relocation program
- Residential purchase assurance program
- Encourage local jurisdictions to implement compatible land use controls

Portions of the above elements are further described in the sections below.

Procedures

The FAA Airport Traffic Control Tower (ATCT) at Detroit Metropolitan Wayne County Airport determines runway use based on achieving safe aircraft operations in compliance with FAA regulations. Weather, wind direction and speed, visibility, and cloud cover, schedule load, and noise abatement procedures are all considered when the FAA determines which procedures will be operated at any given time at the Airport. As conditions change, such as weather, the ATCT responds by adjusting operating procedures to ensure safe and efficient operation.

Through the previously approved Noise Compatibility Plan and continued coordination with the ATCT and airline operators, the Wayne County Airport Authority, in concert with the FAA, has developed a preferential runway use program to be implemented by the ATCT when weather conditions permit. Presently, the preferential runway use for the Airport is to concentrate noise over the least densely populated areas south of the Airport. Although aircraft are generally directed into the wind, this procedure calls for southern departures with up to a 7-knot tailwind to maximize the availability of this procedure.

During periods of low operations demand (such as late-night) the ATCT will operate in reverse flow (also called head-to-head or contra flow) by having departures to the south as well as arrivals from the south. This procedure only applies to nighttime operations and conditions when aircraft operations are very low and is primarily utilized between the hours of midnight and 5:59 a.m.

In addition to noise abatement runway use procedures, the ATCT direct the departing aircraft in a "fanning" procedure to disperse the noise to reduce impacts on noise sensitive areas. Preferential noise abatement flight tracks have been designated for aircraft departures that disperse or "fan" traffic over noise sensitive land uses.

Noise Generated During Aircraft Engine Maintenance and Ground Run-Ups

The routine requirement of running aircraft engines to almost full power during ground maintenance procedures can produce an unwanted amount of noise. To mitigate the effects of noise generated by these engine run-ups, Detroit Metropolitan Wayne County Airport has developed ground run-up procedures to limit the amount of aircraft noise in noise sensitive areas. The ground- run-up procedures at the Airport identify specific locations on the airfield where run-ups can be conducted and the position/orientation of the aircraft.

Sound Insulation and Program

Through the previous Part 150 Study approved by the FAA in 1993, the Wayne County Airport Authority has initiated a residential sound insulation program. The goal of the program is to preserve and improve neighborhoods surrounding Detroit Metropolitan Wayne County Airport by making the interior environment of homes more compatible with exterior aircraft noise. Residential construction modifications to homes within the previous federally-approved noise contours established in 1993 include replacement of existing windows and doors with acoustical windows and doors, attic insulation if required, and air conditioning if required.

To date, insulation modifications have been completed for over 2,200 eligible homes, with additional homes currently programmed to receive treatment. The sound insulation program is voluntary with the goal of reducing the level of aircraft-related noise within the interior of the homes. The FAA has set a goal for Wayne County residents of reducing noise levels inside the home to below 45 decibels and to achieving an overall reduction of at least five decibels after installation of sound insulation treatments. The Program is free; there are no out-of-pocket expenses for eligible participants. A field inspector works on behalf of each home owner to ensure all work is satisfactory to the owner.

Residential Property Acquisition and Purchase Assurance

In addition to residential sound insulation, previous Part 150 Study approved by the FAA in 1993 included a program for the purchase of noise impacted residential properties within the 75 DNL noise contour. Additionally, the previous Part 150 Study included provisions for the purchase assurance of homes within the 70-75 DNL noise contour. Purchase assurance guarantees that if homeowners within the 70-75 DNL noise contour are unable to sell their house for fair market value, they could be paid the difference between the appraised value and the actual selling price. **Note that the definition of the DNL metric is discussed in a following chapter on Noise.**

Noise Complaint Response

DTW's Noise Programs Office operates a Noise Complaint Hotline that is available 24 hours a day to receive public comments. Filing of noise complaints can be done directly via telephone to the Noise Programs Office. This information was used to help site the noise monitors used for this Study.

Noise complaints are evaluated to identify the cause of the noise event and determine if an aircraft is operating outside the noise plan parameters. Noise complaints are not necessarily reflective of the severity of the noise, but can be useful to the airport in identifying problems and issues that are important to the various communities surrounding the airport. Noise complaint information also helped determine noise monitor locations.

The airport staff investigates the source of each noise complaint. If an aircraft is found to be outside the preferred procedures, additional research will be done to determine why, and this information will be forwarded to the airline and/or the FAA as appropriate. In 2003, the Noise Programs Office received 492 complaints. This reflects a continued downward trend in the overall noise complaints received at the airport. The total annual noise complaints since 1999 are presented in **Table A3, TOTAL ANNUAL NOISE COMPLAINTS.**

Aircraft noise complaint information was obtained as part of the baseline data for this FAR Part 150 Study. These complaints, when coupled with the aircraft noise exposure contours and flight track maps, provide one means of an illustration of the locations where individuals are concerned with aircraft noise exposure. In some cases, specific noise concerns are identified which help determine which issues should be included in this FAR Part 150 Study or help identify new issues as they arise. However, because some citizens will not call noise complaint hotlines or submit complaints in writing, the complaint information is not the sole determinate of where and how people are concerned with aircraft noise.

Table A3
TOTAL ANNUAL NOISE COMPLAINTS, 1999-2003
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update

Year	Total Calls
1999	1,146
2000	757
2001	776
2002*	474
2003	492

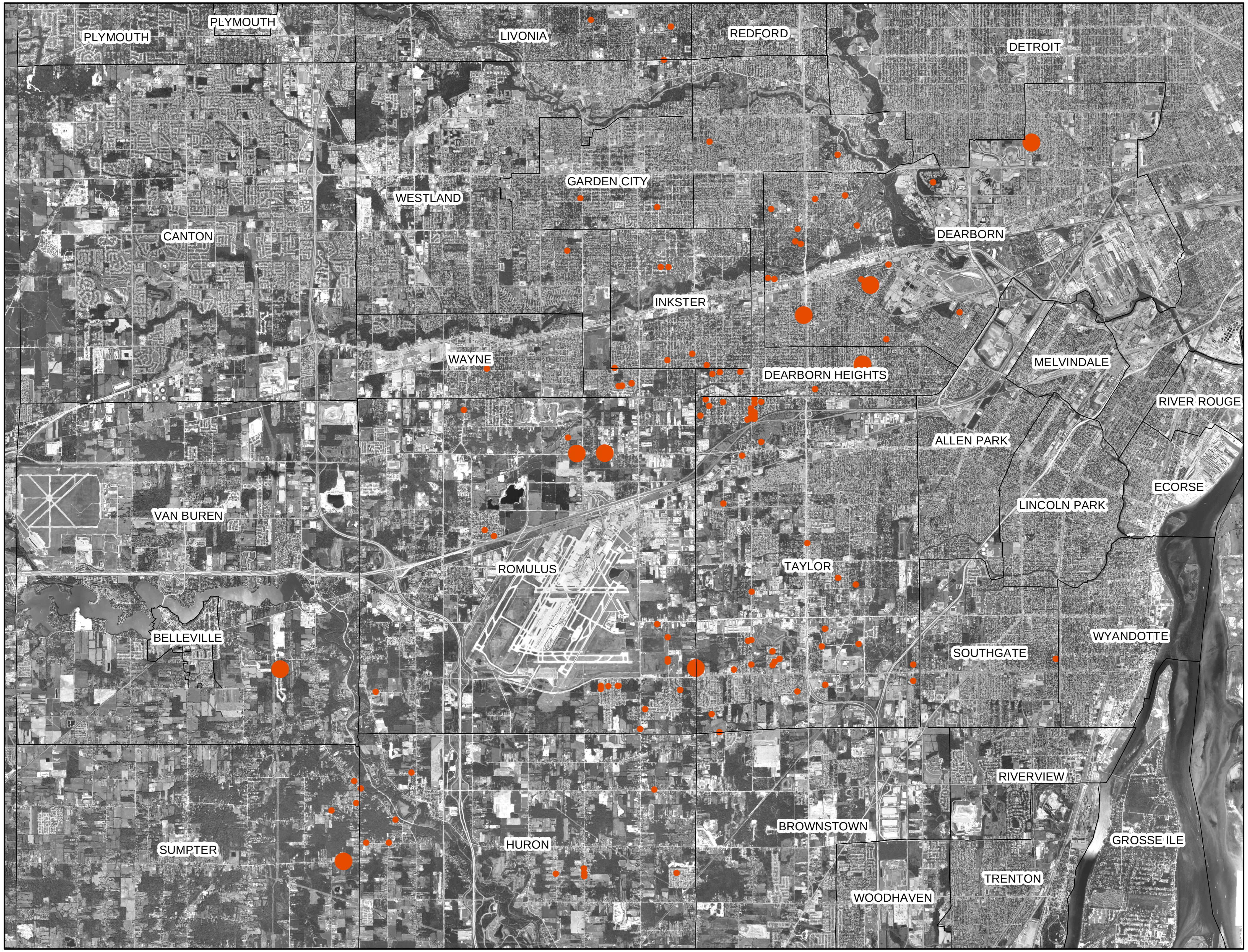
Source: Detroit Metropolitan Wayne County Airport
* Yearly total for 2002 is for January - November

The complaint data was then processed in order to map each complaint address, to categorize the complaints, and to correlate the complaint data with flight track data during the time period that flight track data are being analyzed. The report data categorizes the complaints by geographic area, which is depicted in **Figure A6, LOCATION OF NOISE COMPLAINTS.**

This figure shows the location of the complaints received in 2003 on a base map surround the airport. Note that there are some complaints at greater distances that are not shown on this map. Also note that not all callers provided an address, or sufficient information was not received or can not be determined. This map displays only those calls for which the locations could be determined.

The complaint data have been analyzed according to several variables: location, time of day, season, and the day of week for each call. The hotline calls for 2003 are summarized in the following tables and figure.

Figure A6 **Location of Noise Complaints**



Legend

Number of Complaints

- 1 - 5
- 6 or more

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Source: Michigan Department of Natural Resources, SEMCOG, Detroit Metropolitan Wayne County Airport files.

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Table A4 presents the number of complaints by community. This table shows both the total number of complaints as well as the number of complaints by individual callers. This is useful for illustrating if the calls come from a few people or many different people. As the table below indicates, the majority of complaints received originated from the City of Romulus.

Table A4
TOTAL NOISE COMPLAINTS BY COMMUNITY, 2003
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update

Community	Total Calls	Individual Callers
Amerstberg	2	1
Bellville	17	5
Brownstaun	1	1
Dearborn	122	28
Dearborn Heights	8	3
Garden City	2	2
Huron	14	5
Inkster	5	5
Livonia	7	3
New Boston	3	2
Pickney	27	1
Romulus	127	24
Southgate	1	1
Taylor	56	46
Van Buren	39	2
Wayne	1	1
Westland	9	7
Unknown	51	0
Total	**492**	**137**

Source: Detroit Metropolitan Wayne County Airport

Table A5 presents the number of complaints by hour of the day. The highest number of complaints is associated with events between 9 p.m. – 10 p.m. (63 complaints); the second, third, and fourth highest number of complaints is associated with events between 7:00 and 8:00 p.m., between 12:00 and 1:00 p.m. and between 9:00 and 10:00 a.m. (39, 34 and 31 complaints, respectively).

Table A5
TOTAL NOISE COMPLAINTS PER HOUR, 2003
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update

Hour of Day	Total Calls	Percent of Total
12 am	4	1%
1 am	5	1%
2 am	1	0%
3 am	1	0%
4 am	5	1%
5 am	14	3%
6 am	26	5%
7 am	28	6%
8 am	20	4%
9 am	31	6%
10 am	18	4%
11 am	12	2%
12 pm	34	7%
1 pm	26	5%
2 pm	27	6%
3 pm	21	4%
4 pm	27	6%
5 pm	25	5%
6 pm	15	3%
7 pm	39	8%
8 pm	21	4%
9 pm	63	13%
10 pm	17	4%
11 pm	12	2%
Total	**492**	**100%**

Source: Detroit Metropolitan Wayne County Airport

The Noise Programs Office categorizes each noise complaint relative to the source of the disturbance; such as complaints associated with a particular loud aircraft type, an aircraft at a low altitude, or an aircraft engine maintenance run-up. There was not enough significant data to extract the nature of the call for complaints in the year 2003.

Table A6 presents the number of complaints per month during 2003. As would be expected for locations with seasonal climate, data shows that more complaints occur during the summer season (when windows are open) than during the winter season. The month with the most number of complaints was June with 18% of the total complaints.

Table A7 presents the number of complaints per day of the week in 2003. Typically, one might expect more complaints during the weekends when most people are at home, however, that is not the case for DTW. As the table indicates, all of the days are relatively similar, with Monday having the highest number of complaints and Saturday having the lowest number of complaints.

Table A6
TOTAL NOISE COMPLAINTS PER MONTH, 2003
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update

Month	Total Calls	Percent of Total
January	10	2%
February	15	3%
March	57	12%
April	53	11%
May	42	9%
June	87	18%
July	38	8%
August	41	8%
September	56	11%
October	38	7%
November	34	7%
December	21	4%
Total	**492**	**100%**

Source: Detroit Metropolitan Wayne County Airport

Table A7
TOTAL NOISE COMPLAINTS PER DAY OF THE WEEK, 2003
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update

Weekday	Total Calls	Percent of Total
Sunday	63	13%
Monday	79	16%
Tuesday	67	14%
Wednesday	77	16%
Thursday	77	16%
Friday	75	15%
Saturday	54	10%
Total	**492**	**100%**

Source: Detroit Metropolitan Wayne County Airport

The data was also analyzed relative to how often individual people contact the Airport concerning noise. These results are presented in Table A8. The data show that of the total of 176 individuals that contacted the airport, 131 people contacted the Airport only once (or anonymously), while there was one person who complained 82 times during calendar year 2003. Analysis indicates that 74% of individuals who submitted complaints in 2003, called only once (or called anonymously). 51% of the total complaints originated from the same eight individuals.

Table A8
NOISE COMPLAINTS PER INDIVIDUAL CALLER, 2003
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update

Complaints Per Caller	Number of Callers	Total Number of Complaints	Percent of All Callers	Percent of All Complaints
1	131	131	73%	27%
2	20	40	10%	8%
3	10	30	5%	6%
4	2	8	1%	2%
5	1	5	1%	1%
6	3	18	1%	4%
8	1	8	1%	2%
10	1	10	1%	2%
11	1	11	1%	2%
12	1	12	1%	2%
14	1	14	1%	3%
27	1	27	1%	5%
36	1	36	1%	7%
60	1	60	1%	12%
82	1	82	1%	17%
Total	**176**	**492**	**100%**	**100%**

Source: Detroit Metropolitan Wayne County Airport

Airport Environs

Detroit Metropolitan Wayne County Airport is the primary air transportation hub of southeast Michigan. The Airport resides on approximately 6,700 acres of land within Wayne County and is located entirely within the City of Romulus, approximately 10 miles southwest of downtown Detroit. Municipalities in the vicinity of the Airport include the City of Allen Park, City of Belleville, City of Dearborn, City of Dearborn Heights, City of Garden City, City of Inkster, City of Livonia, City of Romulus, City of Taylor, City of Wayne, City of Westland, Huron Township, Sumpter Township, and Van Buren Township.

Existing Land Use

A significant amount of residential development is located within the study area, as are other noise-sensitive land uses, such as educational, religious, medical, and public facilities. The study area also encompasses parks and recreational areas, agricultural, open space, and vacant lands, as well as commercial and industrial development. The Airport resides on approximately 6,700 acres of land within Wayne County and is located entirely within the City of Romulus, which borders the airport on all sides. The following section summarizes land uses in the immediate vicinity of Detroit Metropolitan Wayne County Airport:

- North: The City of Wayne, City of Westland, City of Inkster, Garden City, Dearborn and Dearborn Heights are located north of the Airport. Existing land use north of Detroit Metropolitan Wayne County Airport is primarily residential with intermittent commercial and industrial uses occurring adjacent to major roadways and highways. Immediately adjacent to the north border of the Airport is Interstate 94, a major east/west artery in and out of the City of Detroit and the primary access to the Airport. Further north of the Airport are the City of Livonia, Redford Township, and the western portion of the City of Detroit. Land uses in these areas are primarily residential uses. This north area also includes religious, educational, and medical facilities, as well as cemeteries.
- South: Huron Township is directly south of the Airport, Sumpter Township is southwest of the Airport, and Brownstown Township is southeast of the Airport. Immediately south of Detroit Metropolitan Wayne County Airport, existing land use is primarily open and agricultural uses with residential developments interspersed. The community of New Boston is located southeast of the Airport in Huron Township and is primarily residential with light commercial and industrial. Further south there is a low density of residential and other noise sensitive uses. Facilities south of the Airport include religious, educational, open space, park land, and cemeteries.
- East: The City of Taylor is located directly east/northeast of the Airport with residential, commercial and industrial uses throughout the City. The City of Romulus is adjacent the Airport to the east with residential and commercial uses. Further east of the Airport lies the City of Allen Park, City of Lincoln Park, and City of Southgate, which are comprised of residential, industrial, commercial, parks and open land uses. These areas include religious, educational, and medical facilities, as well as cemeteries.
- West: The City of Romulus is also west of and adjacent to the Airport, with commercial and industrial uses closest to the Airport. Van Buren Township lies directly west of the Airport, which includes the community of Belleville. Van Buren Township is generally comprised of residential developments interspersed with agricultural and open land. Willow Run Airport, which is also operated by the Wayne County Airport Authority, is located within Van Buren Township. Interstate 275, a north/south roadway, boarders the Airport's western property and also provides access to the Airport via Eureka Road.

In summary, properties immediately adjacent to the Airport are comprised of compatible land uses; however, residential uses are near the Airport, particularly to the north and east of the south crosswind runway. Generally, there is a higher concentration of residents to the north and lower residential concentrations south of the Airport. Furthermore, areas to the east are generally more densely populated than areas to the west. **Figure A7, EXISTING LAND USE**, depicts the existing generalized land uses for areas near the Airport. An estimate of population, residential units, and noise sensitive facilities exposed to aircraft noise of 65 DNL and higher are presented in the land use analysis section of a subsequent working paper.

Future Land Use

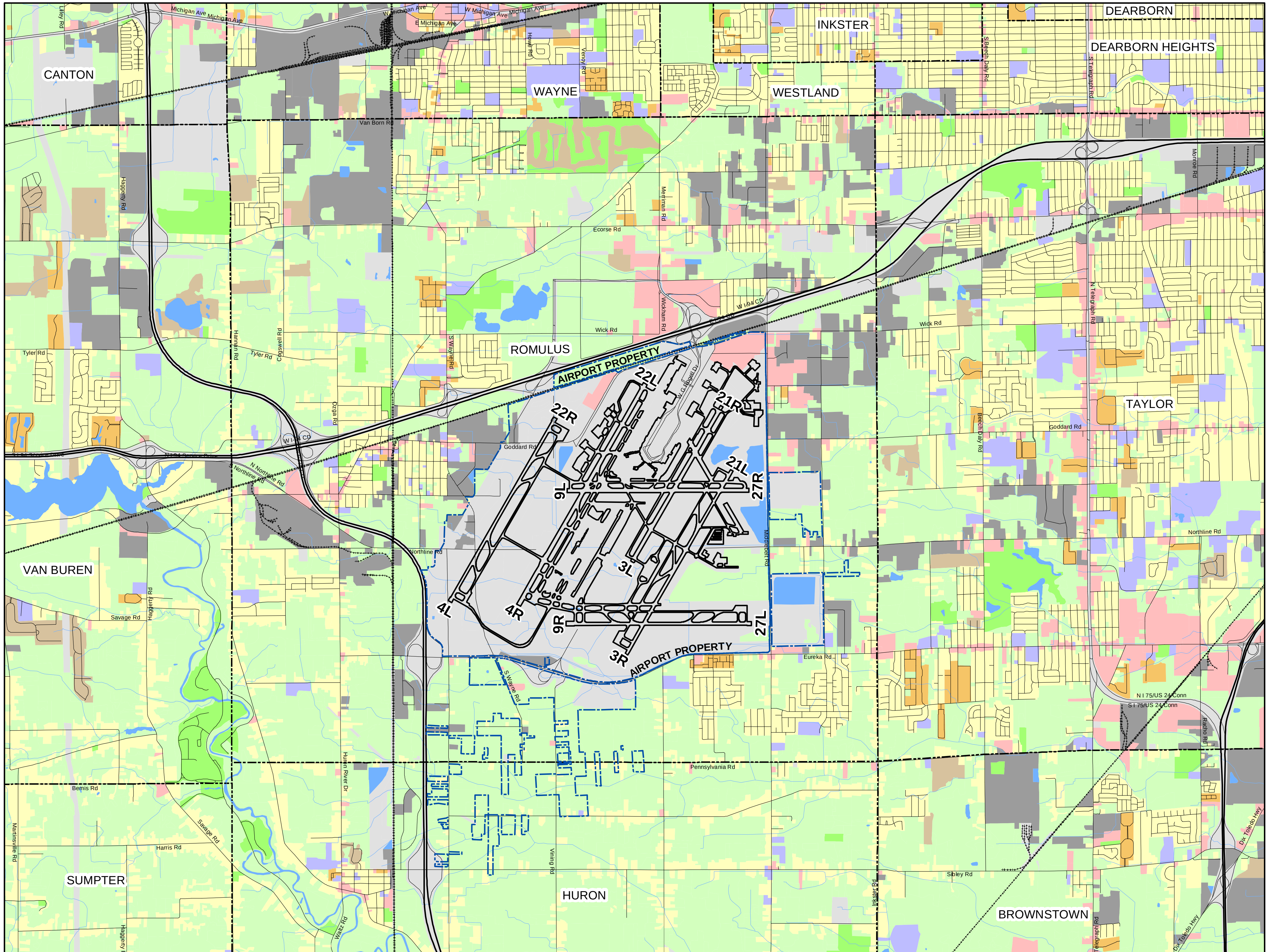
The Southeast Michigan Council of Governments (SEMCOG), formed in 1968 is the regional planning agency for Southeast Michigan. SEMCOG plans in areas that cross jurisdictional boundaries in the Southeast Michigan region that encompasses Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne counties. SEMCOG assists local governments in planning for common needs and in recognizing regional opportunities as well as facilitates cooperation among local governments, educational institutions, and state and federal agencies for mutual benefit.

SEMCOG was created to provide the basic information and planning services necessary to solve problems which transcend the corporate boundaries and fiscal capabilities of the local units of government comprising the southeast Michigan region. As part of this mission, SEMCOG has developed a 2020 Land Use plan for Wayne County. This plan provides a generalized land use plan for Wayne County.

The generalized future land use plan indicates that the land uses north of the Airport will consist primarily of high density urban uses and the areas east and west of the Airport are shown as medium density urban uses. South of the Airport is shown as a primary corridor for non residential uses; however, there are a few isolated areas of high density urban uses. **Figure A8, FUTURE LAND USE**, depicts the generalized land uses planned for areas near the Airport.

Many of the jurisdictions within the vicinity of Detroit Metropolitan Wayne County Airport have adopted land use plans described within comprehensive plans developed, or currently being developed, by each of the jurisdictions. The land use plans for the communities that have developed and approved comprehensive plans are outlined below. Many of these communities also have adopted traditional zoning ordinances and overlay zones which divide a jurisdiction into districts and prescribe certain requirements for allowable uses to control the types of land uses on specific parcels; however, none of the jurisdictions have specific zoning or land use codes pertaining to airport-related activities and aircraft noise.

Figure A7 **Existing Generalized Land Use**



Land Use Legend

- Single-family residential
- Residential areas with 25% or more vacant land
- Multiple-family residential
- Commercial and office
- Industrial
- Institutional
- Transportation, communication, and utility
- Under development
- Cultural, outdoor recreation, and cemetery
- Woodland and wetland
- Active agriculture
- Extractive and barren
- Grassland, and shrub
- Vacant nonresidential
- Water
- City Limits Boundary

N 0 0.5 1 2 Miles

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Source: Michigan Department of Natural Resources, SEMCOG

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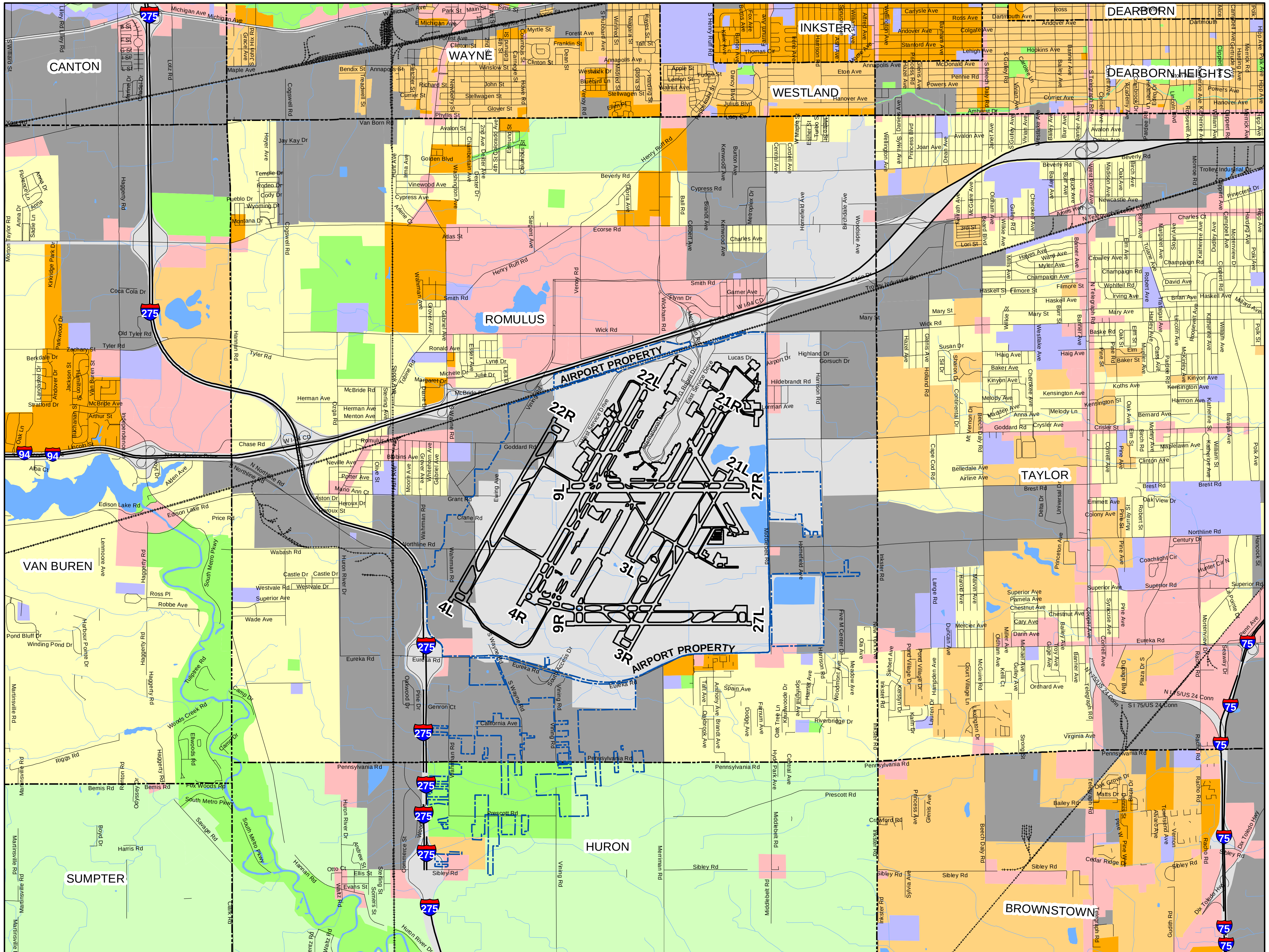
Figure A8 **Future Generalized Land Use**



Land Use Legend

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Commercial/Mixed Use
- Office
- Industrial
- Institutional/Public/Quasi Public
- Planned Unit Development/Other Use
- Transportation/Communication/Utility
- Open Space/Conservation
- Agricultural/Rural Residential
- Water
- City Limits Boundary

N 0 0.5 1 2 Miles

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Source: Michigan Department of Natural Resources, SEMCOG

Airport Zoning Act (Act 23 of 1950)

The State of Michigan Airport Zoning Act was adopted to empower and direct the Michigan Aeronautics Commission to adopt airport approach plans for publicly owned airports within the state; to empower the Michigan Aeronautics Commission, municipalities, and other political subdivisions to promulgate, adopt, establish, administer, and enforce airport zoning regulations limiting the height of structures and objects of natural growth, and otherwise regulating the use of property in the vicinity of publicly owned airports, and to acquire, by purchase, grant, condemnation, or otherwise, air rights and other interests in land. The Airport Zoning Act provides for the establishment of zoning commissions, administrative agencies, and boards of appeals to administer the provisions of the act, and to provide for their organization and procedure and appeals. The act provides for penalties and remedies for violations of the act or ordinances or regulations made under the authority granted through the act. The Airport Zoning Act also provides for reciprocity with adjoining states maintaining and operating airports and to repeal any inconsistent act or parts of acts.

The Airport Zoning Act was developed to provide a mechanism for jurisdictions to control the land use and zoning within and around airports to reduce hazards to aircraft, persons, and property. The Act provides a mechanism with options as to which jurisdictions may adopt regulations pertaining to aviation related zoning as well as define the role of the Michigan Aeronautics Commission in the process. The Act allows airport sponsors to form joint boards with surrounding jurisdictions to regulate both the heights of objects within certain identified areas around an airport and also the use of land to avoid noise sensitive land uses.

Tall Structures Act

The Michigan Tall Structures Act provided a mechanism for the Michigan Aeronautics Commission to control the heights of objects around airport. The Act requires that a permit be obtained for certain structures defined in the Act or for structures that exceed certain height requirements. The permit may require the installation of obstruction lights on a specific structure, or other applicable markings.

Michigan Jurisdictions

Jurisdictions in the State of Michigan, including counties, townships, and cities, have authority, through multiple state acts, to develop and implement plans, policies, and programs for development activities, land uses, and zoning. However, counties, townships, and cities are in most instances not required to develop or update such plans. Many of the cities have developed planning programs and documents; however, many not been update in recent time (past 20 years) and few of the jurisdictions near the airport have developed specific planning, land use, or zoning guidelines specific to aviation or aviation noise. The following paragraphs describe each of the cities in the vicinity of Detroit Metropolitan Wayne County Airport.

City of Romulus

The Detroit Metropolitan Wayne County Airport is located entirely in the City of Romulus. The City of Romulus is 36 square miles in size with a population of approximately 23,000 people. In 2000, there were a total of 8,943 housing units within the city limits. Although portions of the community are still rural, Romulus is under development pressure influenced by the presence of the Airport, combined with good access to freeways, major roads, and railroad facilities.

Several major mixed-use developments such as Metro World Centre and Metro Airport Center, including corporate offices, R&D, retail and residential uses are being planned and developed in close proximity to the Airport. An Interstate 94 interchange at Vining Road was completed two years ago to provide access to the Metro Center area. Most of the balance of commercial development is of the local type. Industrial development is clustered around the Airport along Middle Belt, Merriman, and Goddard Roads. Interstate 275 has influenced industrial development south and west of the Airport.

Existing residential development is in the form of small tract development and scattered single family residences. A large hotel/commercial area has developed north of Interstate 94 along Merriman Road which is adjacent to the Metro Center development area.

The City of Romulus has a City Master Plan which was adopted in 1989. An update to the city's master plan is currently underway. The adopted City Master Plan recognized the influence of the Detroit Metropolitan Wayne County Airport and identified how the city plans to accommodate and adapt to the changing characteristics of the Airport and its immediate surroundings. The City of Romulus has adopted zoning ordinances which were made effective in June 2002 with revisions periodically updated. The zoning ordinances and associated 20 zoning districts have been enacted for the entire city. The City of Romulus has specifically identified an Airport District; which is primarily comprised of airport property; although, portions of airport property are zoned Light Industrial and General Industrial. The Airport District is designated to permit those uses, activities, facilities, and structures necessary for the safe and efficient operation of aircraft and for providing the services and facilities required to accommodate Airport patrons and employees. The zoning code outlines uses within the Airport district and details area, height, and placement requirements for all structures near the Airport. The zoning code also specifies that all structures permitted within the Airport District, within 700 feet of the district boundary, or within 700 feet of a major or secondary thoroughfare traversing the Airport District a site plan must be submitted to the Planning Commission for review.

City of Allen Park

The City of Allen Park is 7.4 square miles in size with a population of approximately 29,000 people. In 2000, there were a total of 12,254 housing units within the city limits. Located south of the Cities of Dearborn and Detroit, Allen Park is comprised mainly of middle income residential dwellings with commercial development along the major thoroughfares of Allen Road, Southfield (M-39), and Ecorse Road. Industrial plant and warehouse uses have developed in the northern part of the city between the Southfield and Interstate 94 Freeway and Norfolk & Western Railroad which parallels I-94. Another freeway, Interstate 75, crosses the southeast corner of Allen Park, and is paralleled by Conrail. This access provides the city with surface transportation linkage to the region and the nation.

The City of Allen Park Zoning Code does not contain any ordinances or overlays pertaining to the Airport or its operations.

City of Belleville

The City of Belleville is 1.2 square miles in size with a population of approximately 4,000 people. In 2000, there were a total of 1,926 housing units within the city limits. The City of Belleville is nearly fully developed and does not have any planned land use changes. The City of Belleville does not have any ordinances or overlays pertaining to the Airport or its operations.

City of Dearborn

The City of Dearborn is 24 square miles in size with a population of approximately 98,000 people. In 2000, there were a total of 38,981 housing units within the city limits. The City of Dearborn has a mixture of residential neighborhoods, shopping districts and, commercial and industrial developments. Ford Motor Company's World Headquarters is located in the city as well as the Fairlane Development by Ford Motor Land Development Corporation. Tourist attractions in the City of Dearborn include Greenfield Village, The Henry Ford Museum, and Henry Ford Estate/Fairlane Mansion.

The City of Dearborn has a zoning ordinance and city master plan; however, there are no provisions related to the Airport or its operation.

City of Dearborn Heights

The City of Dearborn Heights is 12 square miles in size with a population of approximately 58,000 people. In 2000, there were a total of 23,913 housing units within the city limits. Dearborn Heights is located in the central part of Wayne County on the periphery of heavily populated areas of Detroit and Dearborn. Dearborn Heights is primarily residential with commercial and light industrial uses along major thoroughfares.

The City of Dearborn Heights has a zoning ordinance and city master plan; however, there are no provisions related to the Airport or its operation.

Garden City

Garden City is 5.9 square miles in size with a population of approximately 30,000 people. In 2000, there were a total of 11,791 housing units within the city limits. Garden City is largely developed, predominately with single-family residential homes. Three new subdivisions are currently under construction. New home construction and existing home renovations are at their highest levels in thirty years. The community is transcended by State Route M-153. Retail businesses are located along the M-153 corridor making it the major business district for the city. Downtown Garden City is located at the intersection of M-153 and Middlebelt Road, which is the busiest intersection in Wayne County. A 60 acre industrial park is located in the Northwest section of the City, consisting of small, medium, and large businesses.

Garden City has a zoning ordinance and city master plan; however, there are no provisions related to the Airport or its operation.

Huron Township

Huron Township is 36 square miles in size with a population of approximately 14,000 people. In 2000, there were a total of 4,888 housing units within township limits. Huron Township is characterized by large lot residential development and three small residential settlements, Willow, Waltz and New Boston are the principal local commercial centers. The Huron Clinton Metropolitan Authority owns and operates three recreation facilities on about 3,500 acres in the township. Industrial development is concentrated around the Sibley Road and South Huron Drive interchanges of I-275.

Huron Township has a zoning ordinance and master plan; however, there are no provisions related to the Airport or its operation.

City of Inkster

The City of Inkster is 6.3 square miles in size with a population of approximately 30,000 people. In 2000, there were a total of 12,013 housing units within the city limits. The city is primarily a residential community with some industrial and commercial development that is concentrated along Michigan Avenue (US-12), and Middlebelt and Inkster Roads.

The City of Inkster has a zoning ordinance and master plan; however, there are no provisions related to the Airport or its operation.

City of Livonia

The City of Livonia is 36 square miles in size with a population of approximately 100,500 people. In 2000, there were a total of 38,658 housing units within the city limits. The City of Livonia is comprised of primarily residential uses with several regional shopping centers, strip business development on nearly all north-south, east-west mile roads, and an industrial corridor combining major railroad and highway access. The city has acquired over 1800 acres of park land and open space. New development is taking place down the Interstate 275 Freeway corridor spilling over from southern Oakland County. The Interstate 96 Freeway and C&O Railroad form the spine of Livonia's industrial corridor running east and west.

The City of Livonia has a zoning ordinance and City Master Plan; however, there are no provisions related to the Airport or its operation.

Sumpter Township

Sumpter Township is 37 square miles in size with a population of approximately 12,000 people. In 2000, there were a total of 4,563 housing units within township limits. Sumpter Township is the most sparsely settled municipality in Wayne County. Although there is considerable business in the township, most of the residents earn their primary income from employment outside the community. The major agriculture outputs are sod, soybeans, corn, and small fruits. Livestock, primarily horses, are raised in the area. There is only a small amount of industry, and only small commercial centers. The Crosswinds Marsh Preserve is located in the Township.

Sumpter Township has a zoning ordinance and City Master Plan; however, there are no provisions related to the Airport or its operation.

City of Taylor

The City of Taylor is 24 square miles in size with a population of approximately 66,000 people. In 2000, there were a total of 25,905 housing units within the city limits. The City of Taylor is a growing industrial and residential community. Interstate 94 Freeway, an east-west route, and Interstate 75, a north-south route, provide access to the region, while Telegraph Road (US-24) runs north-south bisecting the City. Five major county roads cross the community east-west and three major railroads, Conrail, G.T.& W, and Norfolk Southern provide rail service. Residential development is located throughout the City, while industry has tended to locate along the rail corridors and the east-west major roads. Commercial development is generally located along the major roads and a major regional shopping center is located in the City's southeast corner.

The City of Taylor Code of Ordinances does include height restrictions for developments within the City, including a regulation that states that all building heights shall be subject to review and approval in relation to flight patterns at Detroit Metropolitan Wayne County Airport. Additionally, the regulations state that the City or Taylor reserves the right to submit development plans to the Airport for their review, comments, and approval.

The City of Taylor has enacted zoning ordinances and City Master Plan to guide their development. Neither documents airport-specific uses; however, the areas potentially affected by noise are generally planned to remain park/open space, industrial, transportation, and commercial uses.

Van Buren Township

Van Buren Township is 36 square miles in size with a population of approximately 23,500 people. In 2000, there were a total of 10,417 housing units within township limits. Interstate 94 traverses East and West through the center of the Township. Interstate 275 cuts through the Northeast quarter of the Township and Michigan Avenue. US-12 crosses the Northwest corner. Ecorse Road connects Willow Run Airport to Haggerty Road. The Haggerty Road corridor is the general area of most of the Township's industrial growth. Rail service from Penn Central (Conrail) dissects over two miles of industrial zoned land in the Northwest region of the township. A large Township park on the west side of the Township and the Lower Huron Metro Park along the Southeast border provide hundreds of acres of open recreation space.

Van Buren Township has a zoning ordinance; however, there are no provisions related to the Airport or its operation.

City of Wayne

The City of Wayne is 6 square miles in size with a population of approximately 19,000 people. In 2000, there were a total of 7,651 housing units within the city limits. The City of Wayne is located in the central part of Wayne County and is the second largest manufacturing site for Ford Motor Co. in the nation. Michigan Avenue is the main thoroughfare for the City where several commercial and industrial businesses are situated including the Michigan Truck Plant, Wayne Stamping and Assembly Plant and the Ford Paint Plant. Residential developments in the community include single-family homes and modern apartments. The City shares its public school system with the City of Westland.

The City of Wayne has a planning and zoning ordinances in place; however, there are no provisions related to the Airport or its operation.

City of Westland

The City of Westland is 20 square miles in size with a population of approximately 86,500 people. In 2000, there were a total of 38,077 housing units within the city limits. Industrial growth is occurring in the western part of the community adjacent to Ford Road (M-153) and the CSX Transportation System. The City has six industrial parks as well as a major regional shopping mall located at Warren and Wayne Roads in the heart of Westland's commercial district. Retail, restaurant, and office uses are located along Joy Road, Ford Road and other main roads. The residential development in the City is a blend of single family homes, apartments, and condominiums. The City has over 1500 acres of parks, two golf courses, nature trails, and the county-owned Edward Hines Parkway, as well as other recreational uses.

The City of Westland has a planning and zoning ordinances in place; however, there are no provisions related to the Airport or its operation.

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CHAPTER B
FORECAST OF AVIATION ACTIVITY

Forecast of Aviation Activity

Introduction

This chapter summarizes past aviation activity at Detroit Metropolitan Wayne County Airport (DTW), and estimates future activity. This forecast of aviation activity serves as the basis for analyzing existing aircraft noise levels and identifying future noise levels associated with aircraft activity. Forecasts, like the prediction of next month's weather, are never exact; rather, the forecast indicates, based on past conditions, how activity may change in the future. In that manner, the forecast serves as a basis for evaluating how noise exposure may change in the future. The following section describes the basic methodology for developing the forecast of aircraft operations at DTW. This information served as the basis for the future fleet mix forecasts described in the following Noise Analysis chapter.

Background

In preparing a Federal Aviation Regulation (FAR) Part 150 Noise Compatibility Plan, one of the key products is the preparation of the Noise Exposure Maps (NEM's). The Noise Exposure Maps identify the existing and future noise exposure (typically five years into the future from the date of submission of the NEM's), and are prepared using the Federal Aviation Administration's Integrated Noise Model (INM). To prepare a noise exposure contour map for a particular year, the INM requires information concerning the number of aircraft operations, the types of aircraft (fleet mix), and the time of day (day or night) that the activity occurs. This forecast chapter presents the method used to identify future aircraft operations, which along with the future aircraft fleet mix assumptions described in the Noise Analysis chapter serve as the basis for developing the noise exposure contour maps.

Aviation demand forecasting is often incorrectly perceived of as a science with all of the variables being predictable and known. However, as previously mentioned, precise forecasting for specific future years, particularly more than 10 years in the future, is very difficult. In addition, Aviation demand has been particularly difficult to forecast, due to the volatility of the industry beginning with deregulation in the late 1970's, through airline consolidations of the 1980's, airline financial difficulties of the early 1990's, and again in the late 2001 through 2005 period when this text was being prepared.

Each year the Federal Aviation Administration (FAA) Office of Policy and Plans prepares and publishes a forecast of aviation activity at the nation's airports. This forecast, called the Terminal Area Forecast (TAF), is "prepared to meet the budget and planning needs of the constituent units of the FAA and to provide information which can be used by state and local authorities, the aviation industry, and the general public."[1/]. The FAA's TAF prepared for fiscal year 2004 and published in January 2005, served as the basis for future aircraft operations projections. In assessing aviation traffic and demand, an aircraft operation is defined as either an aircraft arrival or departure from the Airport. A FAR Part 150 Noise Study is required to examine existing conditions and noise conditions five years into the future, therefore, for this study 2011 is used as the primary forecast year. A longer-range forecast of 2016 is also summarized in this paper for informational purposes.

Forecast Methodology

As previously mentioned, the FAA's Terminal Area Forecast was used as the basis for forecasting future aircraft operations. The TAF, as published includes operations projections for four (4) categories of aircraft operations; air carrier, air taxi/commuter, military and general aviation. What the TAF does not provide is operations by actual aircraft type or by time of operation (night or day); both integral needs of creating the noise exposure contour maps. Therefore, the first task undertaken was to determine the existing fleet mix and day/night operation profile for DTW. This profile was derived from air traffic control tower data from 2004.

Once the baseline fleet mix and day/night distributions were identified, these assumptions were applied to the future projections of operations from the TAF, resulting in a future forecast of operations, identified by aircraft type and time of operation. The final step in the process was to identify and implement assumptions regarding future changes to the fleet mix and distribution of day/night operations.

To assist in understanding how the aircraft fleet mix at DTW will likely change over time, the following were researched and considered:

- Airline fleet mix trends – Airline aircraft orders, aircraft phase out plans and trends in aircraft usage on routes to/from DTW were all researched and considered. This included meeting specifically with Northwest Airlines, DTWs hub airline.

[1/] http://www.apo.data.faa.gov/faatafall.HTM

- Flight time trends – Future changes to arrival and departure banks at DTW were analyzed to understand potential changes to the overall distribution of flights throughout the day.

Finally, the process included applying various fleet mix assumptions to the future operations projections. The following section describes the forecast of operations and a summary of fleet mix and day/night distribution of flights. The specific fleet mix assumptions utilized in future years and the resulting INM inputs are described in detail in the Noise Analysis chapter.

Future Passenger Activity

After deregulation in 1978, Detroit Metropolitan Wayne County Airport passenger traffic declined slightly. Activity rebounded and grew until the late 1980's and then dipped again shortly until growing strongly again until 2001. This strong growth was primarily the result of the creation of a Northwest Airlines hub at DTW. The events of September 11, 2001 resulted in a large decline in activity at DTW, as was experienced throughout the country. It has taken several years to recover, with slow increases in passengers, as reflected in the following table. Since 2002, traffic levels have steadily rebounded and are projected to reach 2000 levels in 2006. **Table B1** depicts the FAA's 2005 forecast of total annual enplaned passengers at DTW.

Table B1
SUMMARY OF FAA's 2005 TAF ANNUAL PASSENGER FORECAST
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update

Year	Total Enplaned Passengers	Percent Growth
2000	17,520,806	---
2001	16,766,532	-4.5
2002	15,118,121	-10.9
2003	15,617,111	3.2
2004	16,666,705	6.3
2006	18,462,147	9.7
2011	22,496,596	17.9
2016	26,461,442	14.9

Source: *Detroit Metropolitan Airport, FAA 2005 TAF*

Future Aircraft Operations

According to the FAA's 2005 TAF, total operations at DTW are forecast to increase at an Average Annual Growth Rate (AAGR) of 3.4 percent from 2004 through 2016. **Table B2** depicts a summary of the FAA's forecast of total aircraft operations. As previously described, the 2011 and 2016 projections for operations were used for this analysis.

Table B2
SUMMARY OF TAF ANNUAL AIRCRAFT OPERATIONS FORECAST
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update

Year	Total Operations	Percent Growth Over 2000	Average Annual Daily Operations
2000	561,123	---	1,537
2001	540,966	-3.6	1,482
2002	490,663	-14.4	1,344
2003	491,075	-14.3	1,345
2004	514,358	-9.1	1,409
2006	445,848	13.4	1331
2007	472,425		1,295
2011	513,128		1,406
2016	566,895	0.98	1,559

Source: *Detroit Metropolitan Airport,* FAA 2007 Terminal Area Forecast

Table B3 depicts the baseline and forecast operations by general aircraft type that are projected to use Detroit Metropolitan Wayne County Airport (DTW). These aircraft types depicted in the table are derived from the actual baseline fleet mix from the 2004 air traffic control tower data and the future fleet mix assumptions that were applied to the 2011 and 2016 forecast years.

Table B3
SUMMARY OF OPERATIONS BY AIRCRAFT CATEGORY (Recent, Historic, and Forecast)
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update

Aircraft Category	2004 Baseline	2011	2016
Passenger Air Carrier and Air Cargo	**500,702**	**501,685**	**554,246**
Wide Body Jets	12,696	21,252	26,205
Narrow Body Jets	299,055	249,326	257,857
Regional Jets	133,383	185,878	223,584
Commuter Prop	55,568	45,229	46,600
General Aviation and Small Air Taxi	**21,912**	**11,290**	**12,496**
Corporate Jets	14,302	7,754	8,138
Single & Multi-Engine Prop	7,610	3,536	4,358
Military/Other	**27**	**153**	**153**
Total Operations	**522,641**/1	**513,128**	**566,895**

Source: Detroit Metropolitan Airport fleet mix data, FAA 2007 Terminal Area Forecast and fleet mix assumptions for future years
Notes:
1/ Total operations for the baseline is representative of actual aircraft operations as reported by the DTW ATCT and does not correspond exactly with the FAA TAF operations for 2004.

The following Noise Analysis chapter provides the breakdown of the baseline and future operations by aircraft type and by day or night. The fleet mix assumption and day/night assumption methodology, as well as the resulting fleet mix by actual aircraft type and time of day are descried in detail for the baseline fleet mix, the future fleet mix for the 2011 and 2016 forecast years and the day/night distribution.

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CHAPTER C

BACKGROUND INFORMATION ON NOISE & ITS MEASUREMENT

Background Information on Noise and its Measurement

Introduction to Background Information on Noise

Noise, by its definition, is unwanted sound. Noise is perceived by, and consequently affects people in a variety of ways. This section presents background information on the characteristics of sound and provides insight into the human perception of noise. This section also provides a means to relate the sound made by aircraft operating to and from Detroit Metropolitan Wayne County Airport (DTW) to the noise in the surrounding communities. The metrics (the way noise is measured or described) and methodologies used in the Part 150 Noise and Land Use Compatibility Study (Study) to describe noise from aircraft operating at DTW are also presented. These metrics enable the characterization of existing and future noise. This section is divided into the following sub-sections:

- Characteristics of Sound - Presents properties of sound that are important for describing noise in the airport setting.
- Factors Influencing Human Response to Sound - Discusses sound level conditions that produce subjective perceptions and elicit a response in humans.
- Health Effects of Noise - Summarizes the potential disturbances and health effects of noise to humans.
- Sound Rating Scales - Presents various sound rating scales and how these scales are applied to assessing noise from aircraft operations.
- Noise/Land Use Compatibility Guidelines - Summarizes the current guidelines and regulations used to control the use of land in areas affected by aircraft noise.
- Airport Noise Assessment Methodology - Describes computer modeling and on-site sound level measurements used to measure aircraft and other noise in the vicinity of airports.

Characteristics of Sound

Sound Level and Frequency. Sound is described in terms of the sound pressure (amplitude) and frequency (similar to pitch).

Sound pressure is a direct measure of the magnitude of a sound without consideration for other factors that may influence its perception. The range of sound pressures that occur in the environment is so large that it is convenient to express them on a logarithmic scale. The standard unit of measurement for sound pressure is the Decibel (dB). One decibel is used to describe the reference point of 20 micro Pascals or about 0.000000003 pounds per square inch of energy. Thus, 65 decibels is that amount to the 65th power. A logarithmic scale is used because of the difficulty in expressing such large numbers.

Highlights of Sound

Noise by definition is unwanted sound. There are many ways to describe noise (metrics), however, the most commonly relied on metric is the decibel (dB), which uses a weighting system that most closely reflects the human ear (the A-weighted decibel – dBA).

A number of factors affect sound, including weather, ground effects, as well as human reaction to the noise source. Health effects associated with aircraft noise are typically impacts to sleep and communication that cause stress.

As required by Federal law, aircraft noise must be measured using the Day-Night Average Level (DNL), which is based on averaging dBA. The Airport Authority will be supplementing this metric with other tools such as the Sound Exposure Level (SEL) and the Time Above (TA) measures.

FAA and other federal agencies have established land use compatibility guidelines based on the DNL, that identify the acceptability of various types of land use with aircraft noise exposure.

On the logarithmic scale, a sound level of 70 dB has 10 times the energy as a level of 60 dB, while a sound level of 80 has 100 times as much acoustic energy as 60 dB. This differs from the human perception to noise, which typically judges a sound 10 dB higher than another to be twice as loud, 20 dB higher to be four times as loud, and so forth.

The frequency of a sound is expressed as Hertz (Hz) or cycles per second. The normal audible frequency range for young adults is 20 Hz to 20,000 Hz. The prominent frequency range for community noise, including aircraft and motor vehicles, is between 50 Hz and 5,000 Hz. The human ear is not equally sensitive to all frequencies, with some frequencies judged to be louder for a given signal than others. As a result, research studies have analyzed how individuals make relative judgments as to the "loudness" or "annoyance" of a sound. The most prominent of these scales includes Loudness Level, Frequency-Weighted Contours (such as the A-weighted scale), and Perceived Noise Level. Noise metrics used in aircraft noise assessments are based upon these frequency weighting scales. Below is a glossary of noise metric terminologies, which is discussed in the following paragraphs.

Loudness Level. This scale has been devised to approximate the human subjective assessment of the "loudness" of a sound. Loudness is the subjective judgment of an individual as to how loud or quiet a particular sound is perceived.

Frequency-Weighted Contours (dBA, dBB, and dBC). To simplify the measurement and computation of sound loudness levels, frequency-weighted metrics are used. These frequency-weighted contours demonstrate different aspects of noise, and are presented in **Figure C1**.

The most common frequency weighting is the A-weighted noise curve. The A-weighted decibel scale (dBA) focuses on frequencies approximating the sensitivity of the human ear. In the A-weighted decibel, everyday sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud). Most community noise analyses are based upon the A-weighted decibel scale. Examples of various sound environments, expressed in dBA, are presented in **Figure C2**.

Some interest has developed in using a noise curve that measures lower frequency noise sources. For example, the C-weighted curve is used for the analysis of the noise impacts from artillery noise, which captures the low rumble that many associate with vibration.

Perceived Noise Level. Perceived noisiness was originally developed for the assessment of aircraft noise. Perceived noisiness is defined as "the subjective impression of the unwantedness of a not unexpected, non-pain or fear-provoking sound as part of one's environment," (Kryter, 1970) "Noisiness" curves differ from "loudness curves" in that they have been developed to rate the noisiness or annoyance of a sound as opposed to the loudness of a sound (i.e., perception of the noise).

As with loudness curves, noisiness curves have been developed from laboratory surveys of individuals. However, in noisiness surveys, individuals are asked to judge in a laboratory setting when two sounds are equally noisy or disturbing if heard regularly in their own environment. These surveys are more complex and are therefore subject to greater variability. Aircraft certification data are based upon these types of noisiness curves [see Federal Aviation Regulation (FAR) Part 36 Regulations presented in the Noise and Land Use section of this chapter].

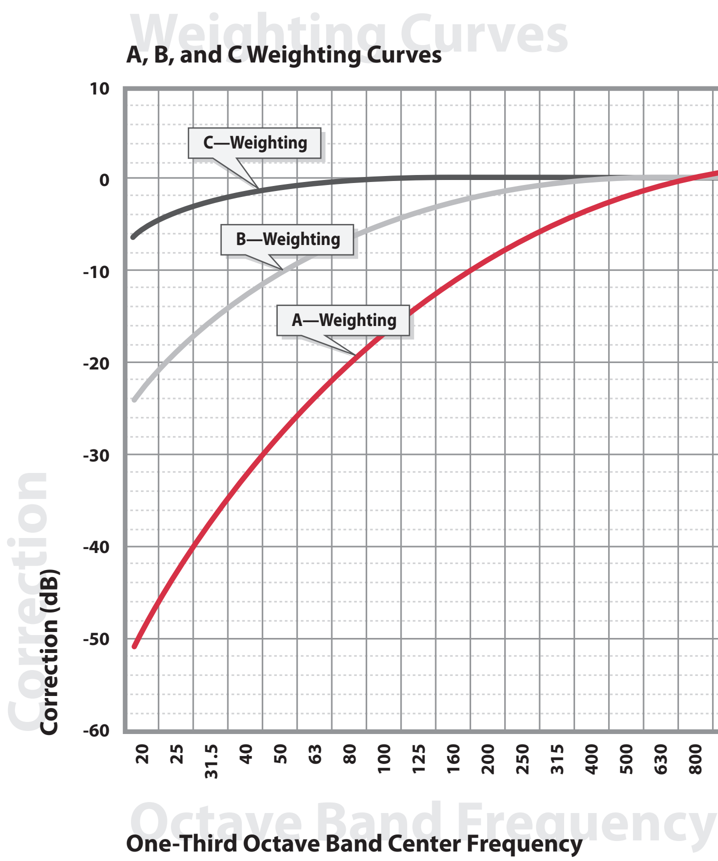


Figure C1 **Frequency Weighted Contours (dBA, dBB, dBC)**

EXAMPLES OF VARIOUS A-WEIGHTED DECIBEL SOUND ENVIRONMENTS

dB(A)	OVER-ALL LEVEL Sound Pressure Level Approx. 0.0002 Microbar	COMMUNITY (Outdoor)	HOME or INDUSTRY	LOUDNESS Human Judgement of Different Sound Levels
130		Military Jet Aircraft Takeoff with Afterburner from Aircraft Carrier @ 50 ft. (130)	Oxygen Torch (121)	120 dB(A) 32 Times as Loud
120 110	UNCOMFORTABLY LOUD	Concorde Takeoff (113)	Riveting Machine (110) Rock and Roll Band (108-114)	110 dB(A) 16 Times as Loud
100		Boeing 747-200 Takeoff (101)		100 dB(A) 8 Times as Loud
90	VERY LOUD	Power Mower (96) DC-10-30 Takeoff (96)	Newspaper Press (97)	90 dB(A) 4 Times as Loud
80		Car Wash @ 20 ft. (89) Boeing 727 Hushkit Takeoff (89)	Food Blender (88) Milling Machine (85) Garbage Disposal (80)	80 dB(A) 2 Times as Loud
70	MODERATELY LOUD	High Urban Ambient Sound (80) Passenger Car, 65 mph @ 25 ft. (77) Boeing 757 Takeoff (76)	Living Room Music (76) TV-Audio, Vacumn Cleaner	70 dB(A)
60		Propeller Airplane Takeoff (67) Air Conditioning Unit @ 100 ft. (60)	Cash Register @ 10 ft. (65-70) Electric Typewriter @ 10 ft. (64) Conversation (60)	60 dB(A) 1/2 Times as Loud
50	QUIET	Large Transformers @ 100 ft. (50)		50 dB(A) 1/4 Times as Loud
40		Bird Calls (44) Low Urban Ambient Sound (40)		40 dB(A) 1/8 Times as Loud

"Aircraft takeoff noise measured 6,500 meters from beginning of takeoff roll
(Source: Advisory Circular AC-36-3G)"

Figure C2 **Example of Various Sound Environments**

Propagation of Noise. Outdoor sound levels decrease as a result of several factors, including increasing the distance from the sound source, atmospheric absorption (characteristics in the atmosphere that actually absorb sound), and ground attenuation (characteristics on the ground that absorb sound). Sound typically travels in spherical waves, similar to waves created from dropping a stone into water. As the sound wave travels away from the source, the sound energy is spread over a greater area, dispersing the sound power of the wave.

Temperature and humidity of the atmosphere also influence the sound levels at a particular location. These influences increase with distance and become particularly important at distances greater than 1,000 feet. The degree of absorption depends on the frequency of the sound, as well as humidity and air temperature. For example, when the air is cold and humid, and therefore denser, atmospheric absorption is lowest. Higher frequencies are more readily absorbed than the lower frequencies. Over large distances, lower frequency sounds become dominant as the higher frequencies are attenuated. Examples of the effects of temperature and humidity on sound absorption are presented in **Figure C3**.

Noise propagation is particularly relevant in the Detroit area due to winter weather conditions. During the winter, high humidity and cold overcast conditions result in lowered noise attenuation, causing noise levels to remain higher farther from a noise source than would occur under standard summer conditions. Winter weather facilitates an atmospheric inversion (when the air nearest the earth is colder than the air above), which also results in higher aircraft noise than when inversions are not present.

Duration of Sound. Duration of a noise event is an important factor in describing sound in a community setting. The longer the noise event, the more likely that the sound will be perceived as annoying. The "effective duration" of a sound starts when a sound rises above the background sound level and ends when it drops back below the background level. Studies have confirmed a relationship between duration and annoyance and established the amount a sound must be reduced to be judged equally annoying over an increased duration time.

This relationship between duration and noise level forms the basis of how the equivalent energy principal of sound exposure is measured. Reducing the acoustic energy of a sound by one-half results in a 3 dB reduction. Conversely, doubling the duration of the sound event increases the total energy of the event by 3 dB. This equivalent energy principle is based upon the premise that the potential for a noise to impact a person is dependent on the total acoustical energy content of the noise. Noise descriptors explained below (DNL, LEQ and SEL) are all based upon this equivalent energy principle.

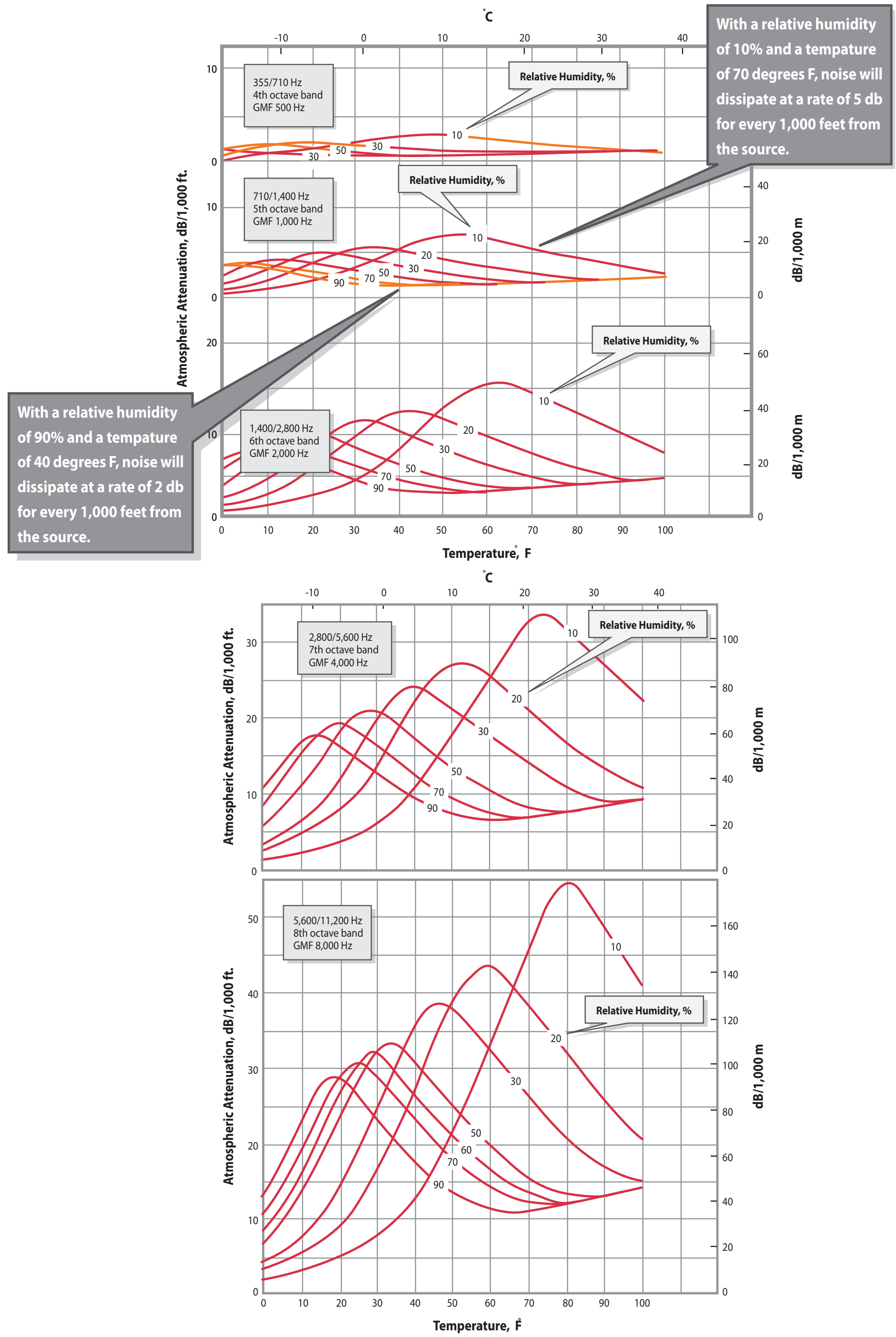


Figure C3 **Atmospheric Attenuation-How Noise Changes Over Distance Based On Humidity and Temperature**

Change in Noise Levels. The concept of change in sound levels is related to the reaction of the human ear to sound. The human ear detects relative differences between sound levels better than absolute values of levels. Under controlled laboratory conditions, a human listening to a steady unwavering pure tone sound can barely detect a change of approximately one decibel for sound levels in the mid-frequency region. However, when ordinary noises are heard, a young healthy ear can only detect changes of two to three decibels. A five-decibel change is noticeable while a 10-decibel change is judged by the majority of people as a doubling effect of the sound.

Masking Effect. One characteristic of sound is its ability to interfere with the listener's ability to hear another sound. This is defined as the masking effect. The presence of one sound effectively raises the threshold of audibility for the hearing of a second sound. For a sound to be heard, it must exceed the threshold of hearing for that particular individual and exceed the masking threshold for the background noise.

The masking characteristic is dependent upon many factors, including the spectral (frequency) characteristics of the two sounds, the sound pressure levels, and the relative start time of sound events. The masking effect is greatest when it is closest to the frequency of the signal. Low frequency sounds can mask higher frequency sounds; however, high frequency sounds do not easily mask low frequency sounds.

Ground Effects. This term describes the effects of vegetation on noise. As sound travels away from the source, some of it is absorbed by grass, plants, and trees. The amount of such ground attenuation (rate that noise level reduces at distances farther from the noise source) depends on the structure and density of trees and foliage, as well as the height of both the source and receiver and the frequency of the sound being absorbed. If the source and the receiver of the sound are both located below the average height of the intervening foliage, the ground covering will be most effective. If either the source or the receiver rises above the height of the ground covering, the excess attenuation will become less effective. Reflected sound, however, will still be reduced.

Factors Influencing Human Response to Sound

Many factors influence how a sound is perceived and whether or not it is considered annoying to the listener. This includes not only physical characteristics of the sound, but also secondary influences such as sociological and external factors. The "Handbook of Noise Control" describes human response to sound in terms of both acoustic and non-acoustic factors. These factors are summarized in **Table C1.**

Sound rating scales are developed to account for how humans respond to sound and how sounds are perceived in the community. Many non-acoustic parameters affect individual response to noise. Background sound, which is an additional acoustic factor, is important in describing sound in rural settings. Research has identified a clear association of reported noise annoyance and fear of an accident. In particular, there is firm evidence that noise annoyance is associated with: (1) the fear of an aircraft crashing or of danger from nearby surface transportation; (2) the belief that aircraft noise could be prevented or reduced by pilots or authorities related to airlines; and, (3) an expressed sensitivity to noise generally. Thus, it is important to recognize that such non-acoustic factors, as well as acoustic factors, contribute to human response to noise.

Table C1
FACTORS THAT AFFECT INDIVIDUAL ANNOYANCE TO NOISE
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update

Primary Acoustic Factors
Sound Level
Frequency
Duration
Secondary Acoustic Factors
Spectral (Frequency) Complexity
Fluctuations in Sound Level
Fluctuations in Frequency
Rise-time of the Noise
Localization of Noise Source
Non-acoustic Factors
Physiology
Adaptation and Past Experience
How the Listener's Activity Affects Annoyance
Predictability of When a Noise will Occur
Whether the Noise is Necessary
Individual Differences and Personality

Source: C. Harris, 1979

Health Effects of Noise

Noise is known to have adverse effects on people. From these effects, criteria have been established to help protect the public health and safety and prevent disruption of certain human activities. These criteria are based on effects of noise on people, such as hearing loss (not a factor with typical community noise), communication interference, sleep interference, physiological responses, and annoyance. Each of these potential noise impacts is briefly discussed in the following points:

- **Hearing Loss** is generally not a concern in community/aircraft noise situations, even when close to a major airport or a freeway. The potential for noise induced hearing loss is more commonly associated with occupational noise exposure in heavy industry; very noisy work environments with long-term, sometimes close-proximity exposure; or, certain very loud recreational activities such as target shooting, motorcycle or car racing, etc. The Occupational Safety and Health Administration (OSHA) identifies a noise exposure limit of 90 dBA for 8 hours per day to protect from hearing loss (higher limits are allowed for shorter duration exposures). Noise levels in neighborhoods near airports, even in very noisy neighborhoods, do not exceed the OSHA standards and are not sufficiently loud to cause hearing loss.

- **Communication Interference** is one of the primary concerns with aircraft noise. Communication interference includes interference with hearing, speech, or other forms of communication such as watching television and talking on the telephone. Normal conversational speech produces sound levels in the range of 60 to 65 dBA, and any noise in this range or louder may interfere with the ability of another individual to hear or understand what is spoken. There are specific methods for describing speech interference as a function of the distance between speaker, listener, and voice level. **Figure C4** shows the relationship between the quality of speech communication and various noise levels.

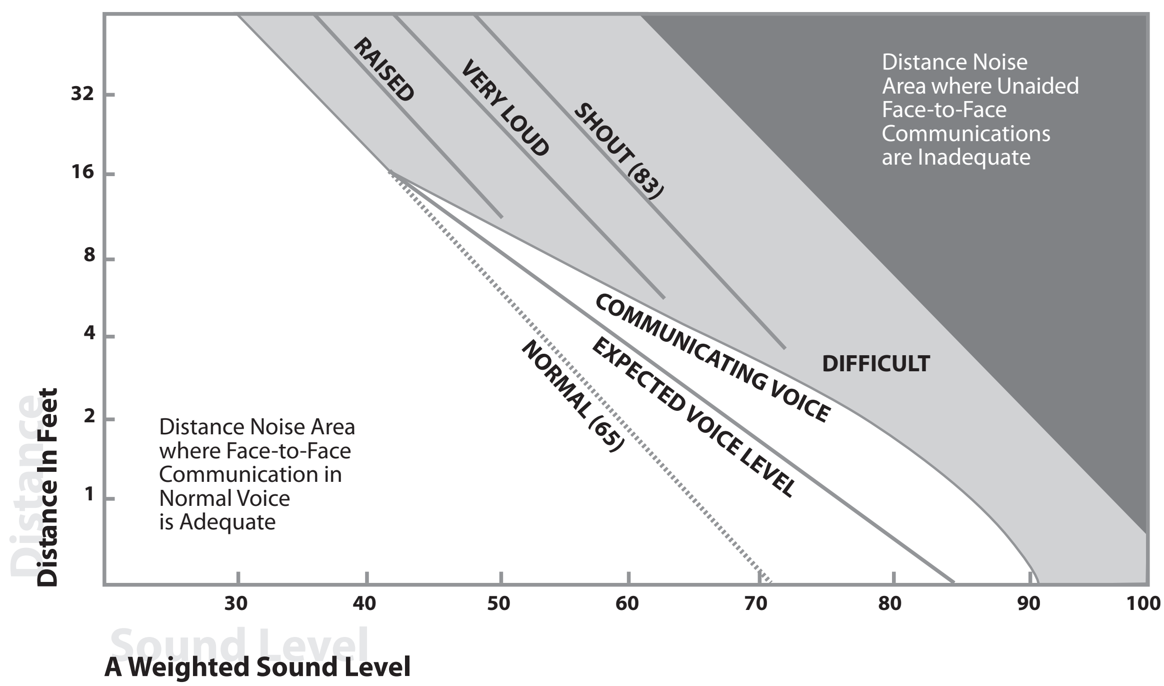


Figure C4 **Quality of Speech Communication in Relation to the Distance Between the Talked and the Listener**

- **Sleep Interference**, particularly during nighttime hours, is one of the major causes of annoyance due to noise. Noise may make it difficult to fall asleep, create momentary disturbances of natural sleep patterns by causing shifts from deep to lighter stages, and may cause awakenings that a person may not be able to recall.

  Research has shown that once a person is asleep in his own home, it is much more unlikely that he will be awakened by a noise. Some of this research has been criticized because it has been conducted in areas where subjects had become accustomed to aircraft noise. On the other hand, some of the earlier laboratory sleep studies have been criticized because of the extremely small sample sizes of most laboratory studies and because the laboratory was not necessarily a representative sleep environment.

  An English study assessed the effects of nighttime aircraft noise on sleep in 400 people (211 women and 189 men; 20-70 years of age; one per household) living at eight sites adjacent to four U.K. airports, with different levels of night flying. The main finding was that only a minority of aircraft noise events affected sleep, and, for most subjects, that domestic and other non-aircraft factors had much greater effects. As shown in **Figure C5**, aircraft noise is a minor contributor among a host of other factors that lead to awakening response.

  Likewise, the Federal Interagency Committee On Noise (FICON) in an earlier 1992 document, entitled **Federal Interagency Review of Selected Airport Noise Analysis Issues,** recommended an interim dose-response curve for sleep disturbance based on laboratory studies of sleep disturbance. This review was updated in June 1997, when the Federal Interagency Committee on Aviation Noise (FICAN) replaced the FICON recommendation with an updated curve based on the more recent in-home sleep disturbance studies. The FICAN recommended a curve based on the upper limit of the data presented, and, therefore, considers the curve to represent the "maximum percent of the exposed population expected to be behaviorally awakened," or the "maximum awakened."

  The FICAN recommendation is shown on **Figure C6**. This is a very conservative approach. A more common statistical curve for the data points is also reflected in Figure C6. The differences indicate, for example, a 10% awakening rate at a level of approximately 100 dB SEL, while the "maximum awakened" curve prescribed by FICAN shows the 10% awakening rate being reached at 80 dB SEL. (The full FICAN report can be found on the internet at www.fican.org). Sleep interference continues to be a major concern to the public and an area of debate among researchers.

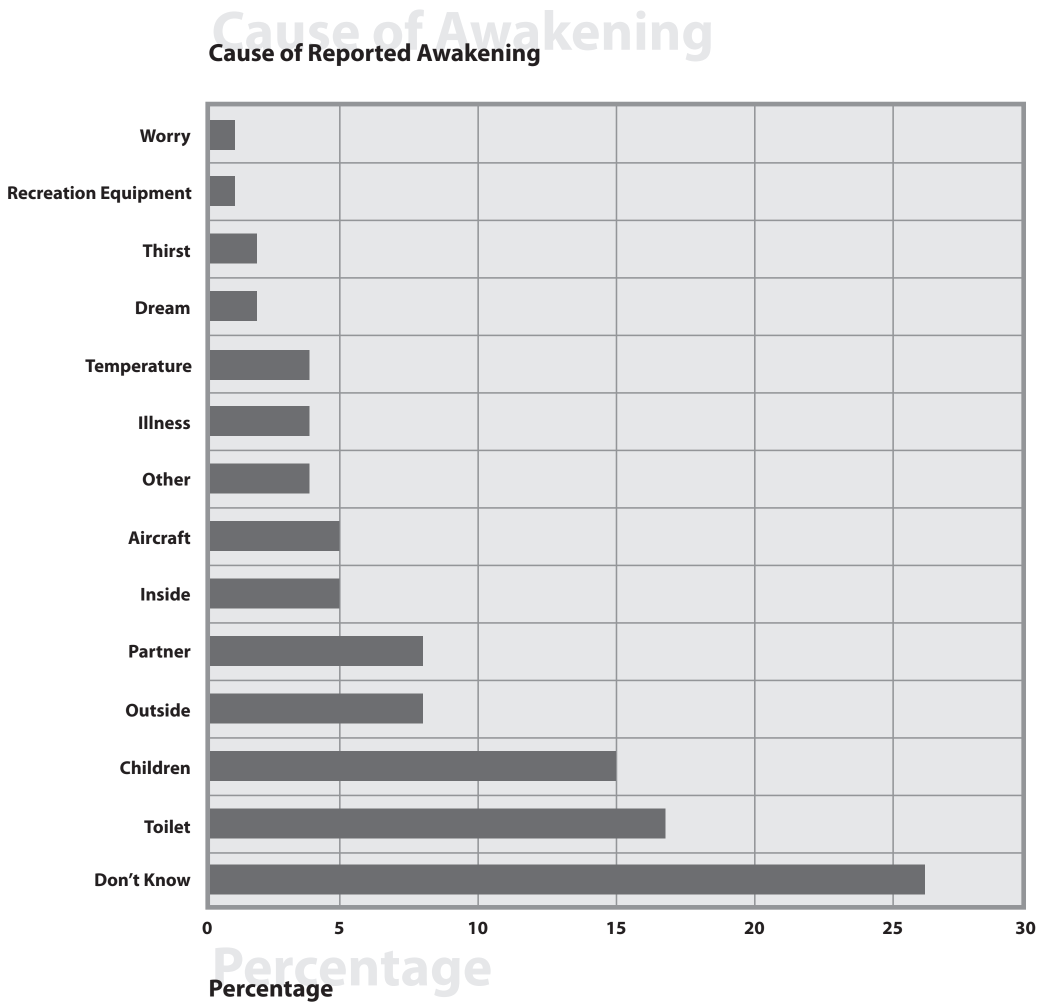


Figure C5 **Causes of Reported Awakenings**

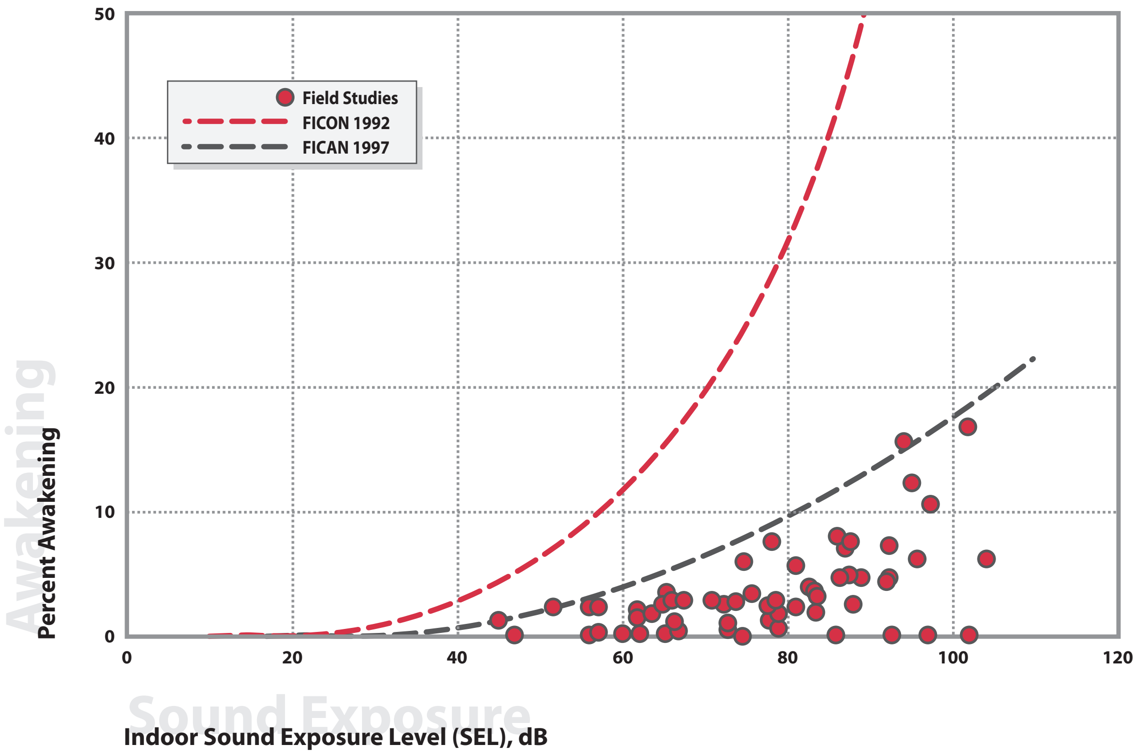


Figure C6 **Probability of Awakening for Different Indoor Sound Exposure Levels**

- **Physiological Responses** reflect measurable changes in pulse rate, blood pressure, etc. Generally, physiological responses reflect a reaction to a loud short-term noise, such as a rifle shot or a very loud jet over flight. While such effects can be induced and observed, the extent to which these physiological responses cause harm is not known.

- **Annoyance** is the most difficult of all noise responses to describe. Annoyance is an individual characteristic and can vary widely from person to person. What one person considers tolerable may be unbearable to another of equal hearing capability. The level of annoyance also depends on the characteristics of the noise (i.e., loudness, frequency, time, and duration), and how much activity interference (e.g., speech interference and sleep interference) results from the noise. However, the level of annoyance is also a function of the attitude of the receiver. Personal sensitivity to noise varies widely. It has been estimated that 2 to 10% of the population are highly susceptible to annoyance from noise not of their own making, while approximately 20 percent are unaffected by noise. Attitudes are affected by the relationship between the listener and the noise source (Is it your dog barking or the neighbor's dog?). Whether one believes that someone is trying to abate the noise will also affect their level of annoyance.

Sound Rating Scales

The description, analysis, and reporting of community sound levels are made difficult by the complexity of human response to sound, and the myriad of sound-rating scales and metrics that have been developed for describing acoustic effects. Various rating scales have been devised to approximate the human subjective assessment of "loudness" or "noisiness" of a sound.

Noise metrics can be categorized as single event metrics and cumulative metrics. Single event metrics describe the noise from individual events, such as an aircraft flyover. Cumulative metrics describe the noise in terms of the total noise exposure throughout the day. The noise metrics used in this study are summarized below:

Single Event Metrics

- **A-Weighted Metrics (dBA)**. To simplify the measurement and computation of sound loudness levels, frequency weighted metrics have obtained wide acceptance. The A-weighting (dBA) scale has become the most prominent of these scales and is widely used in community noise analysis. This metric has shown good correlation with community response and may be easily measured. The metrics used in this study are all based upon the dBA scale.

- **Maximum Noise Level.** The highest noise level reached during a noise event is called the "Maximum Noise Level," or Lmax. For example, as an aircraft approaches, the sound of the aircraft begins to rise above ambient noise levels. The closer the aircraft gets, the louder it is until the aircraft is at its closest point directly overhead. As the aircraft passes, the noise level decreases until the sound level settles to ambient levels. This is plotted at the top of **Figure C7**. It is this metric to which people generally respond when an aircraft flyover occurs.

- **Sound Exposure Level (SEL).** The duration of a noise event, or an aircraft flyover, is an important factor in assessing annoyance and is measured most typically as SEL. The effective duration of a sound starts when a sound rises above the background sound level and ends when it drops back below the background level. An SEL is calculated by summing the dB level at each second during a noise event (referring again to the shaded area at the top of **Figure C7**) and compressing that noise into one second. It is the level the noise would be if it all occurred in one second. The SEL value is the integration of all the acoustic energy contained within the event. This metric takes into account the maximum noise level of the event and the duration of the event. For aircraft flyovers, the SEL value is numerically about 10 dBA higher than the maximum noise level. Single event metrics are a convenient method for describing noise from individual aircraft events. Airport noise models contain aircraft noise curve data based upon the SEL metric. In addition, cumulative noise metrics such as Equivalent Noise Level (LEQ) and Day Night Noise Level (DNL) can be computed from SEL data (these metrics are described in the next paragraphs). The SEL metric will be used as a supplemental metric in the Detroit Metropolitan Wayne County Airport Part 150 Noise Compatibility Study.

Cumulative Metrics

Cumulative noise metrics have been developed to assess community response to noise. They are useful because these scales attempt to include the loudness and duration of the noise, the total number of noise events, and the time of day these events occur into one rating scale.

- **Equivalent Noise Level (LEQ).** LEQ is the sound level corresponding to a steady-state A-weighted sound level containing the same total energy as a time-varying signal (noise that constantly changes over time) over a given sample period. LEQ is the "energy" average taken from the sum of all the sound that occurs during a certain time period; however, it is based on the observation that the potential for a noise to impact people is dependent on the total acoustical energy content. This is graphically illustrated in the middle graph of **Figure C7**. LEQ can be measured for any time period, but is typically measured for 15 minutes, 1 hour, or 24 hours. LEQ for one hour is used to develop the DNL values for aircraft operations.

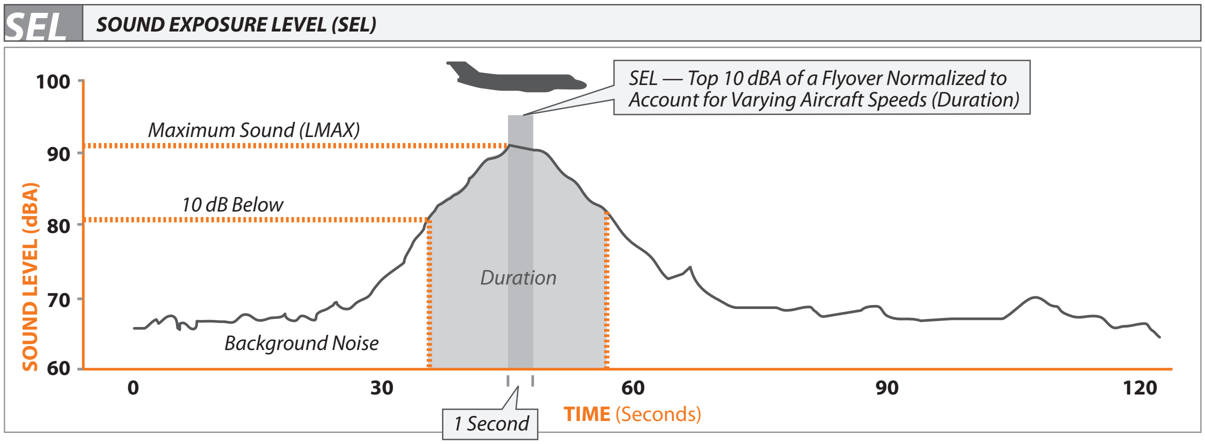
- **Day Night Noise Level (DNL).** The DNL describes noise experienced during an entire (24-hour) day. DNL calculations account for the SEL of aircraft, the number of aircraft operations, and include a penalty for nighttime operations. In the DNL scale, noise occurring between the hours of 10 p.m. to 7 a.m. is penalized by 10 dB. This penalty was selected to account for the higher sensitivity to noise in the nighttime and the expected further decrease in background noise levels that typically occur at night. DNL is required by the FAA for the measurement of aircraft noise and in evaluating noise during a Part 150 Study. In addition, it is used by other federal agencies including the Environmental Protection Agency (EPA), the Department of Defense (DOD), and the Department of Housing and Urban Development (HUD). DNL is graphically illustrated in the bottom of **Figure C7**. Examples of various noise environments in terms of DNL are presented in **Figure C8**. The FAA, with the support of these agencies, has developed land use compatibility guidelines that identify the acceptability of various land uses with aircraft noise.

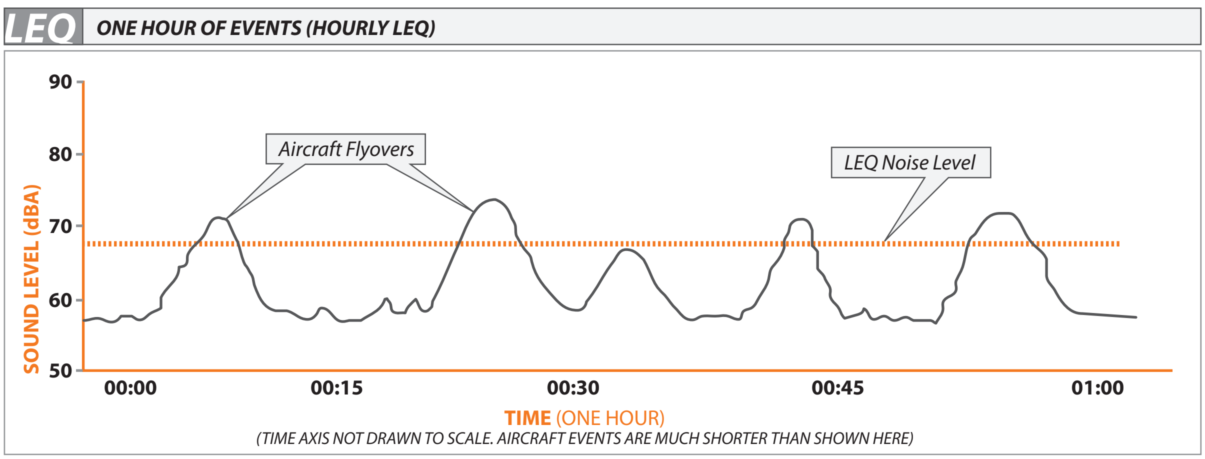
Supplemental Metrics

While FAA's Part 150 guidance requires the use of the DNL to measure noise, other noise metrics (referred to as supplemental metrics) will be used during this study for DTW to supplement the DNL:

- **Time Above (TA).** The FAA developed the Time Above metric as a second metric for assessing impacts of aircraft noise around airports. The Time Above metric refers to the total time in seconds or minutes that aircraft noise exceeds certain dBA noise levels in a 24-hour period. It is typically expressed as Time Above 65, 75, and 85 dBA sound levels, which can be used to illustrate various degrees of noise interference. There are no noise/land use standards related to the Time Above index.

  The Time Above levels can be used to illustrate the time that noise may disrupt various activities. One such threshold is the Time Above 65 dBA, which generally represents the time when noise is above 65 dBA, and is the level for where outdoor speech interference starts to occur. This metric will be used as a supplemental metric in the Detroit Metropolitan Wayne County Airport Part 150 Noise Compatibility Study.





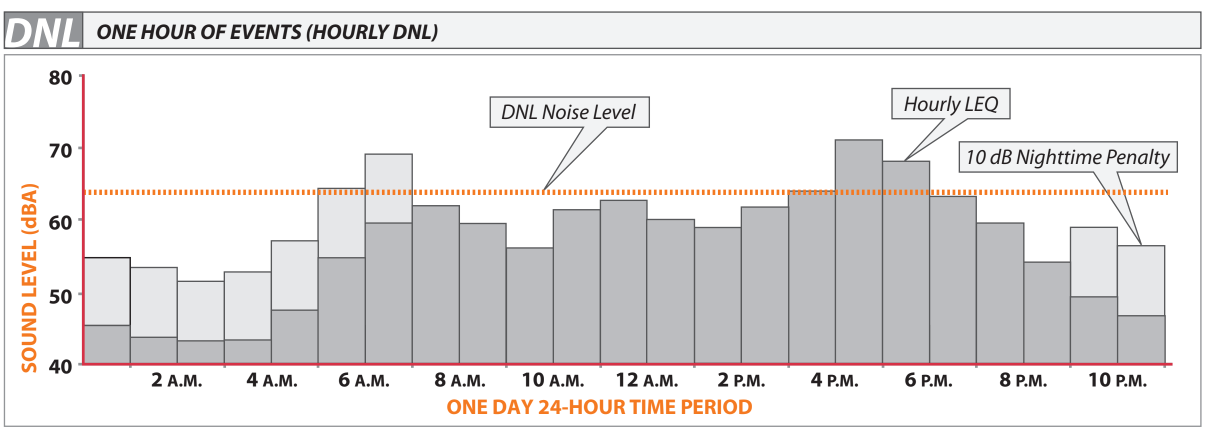


Figure C7 **Examples of Lmax, SEL, LEQ, and DNL Noise Levels**

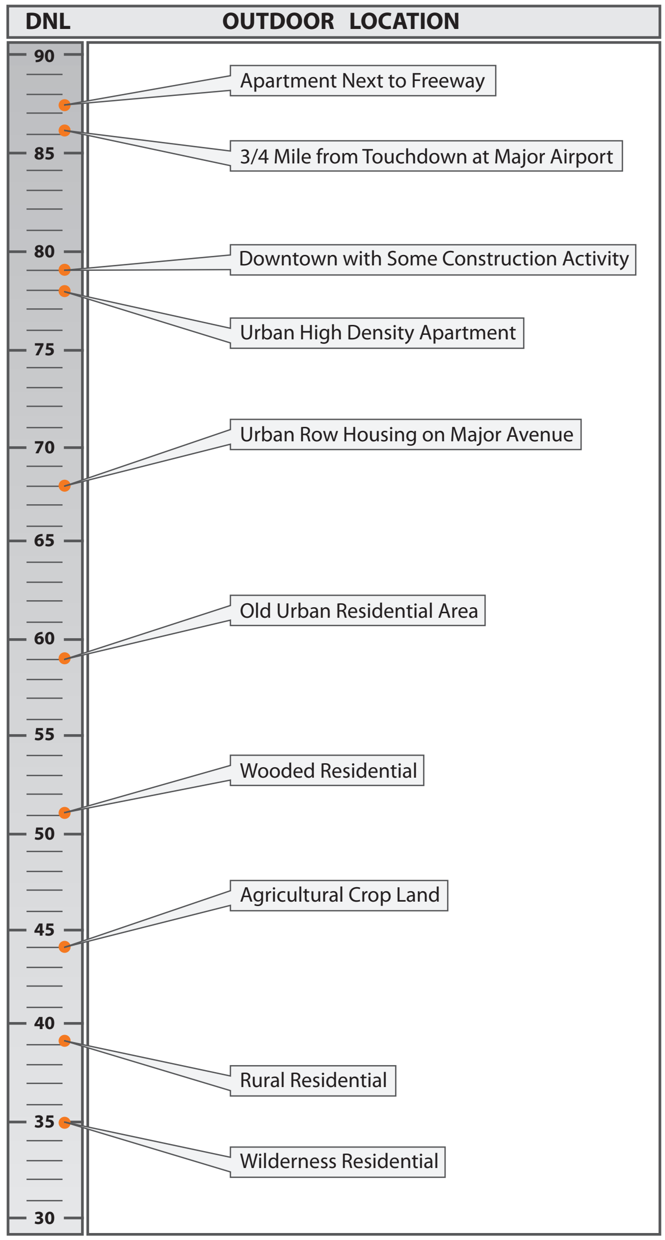


Figure C8 **Typical Outdoor Noise Levels in Terms of DNL**

Percent Noise Level (L_n). The Ln characterizes intermittent or fluctuating noise by showing the noise level that is exceeded n% of the time during the measurement period. It is usually measured in the A-weighted decibel, but can be an expression of any noise rating scale. Percent Noise Levels often are used to characterize ambient noise where, for example, L_{90} is the noise level exceeded 90% of the time, L_{50} is the level exceeded 50 percent of the time, and L_{10} is the level exceeded 10% of the time. L_{90} represents the background or minimum noise level; L_{50} represents the median noise level; and, L_{10} the peak or intrusive noise levels. Percent noise level is commonly used in community noise ordinances that regulate noise from stationary noise sources, such as mechanical equipment, entertainment noise sources, and the like.

For the Detroit Metropolitan Wayne County Airport Part 150 Noise Compatibility Study, the L_{90} is used to represent the background or ambient noise environment and will serve as a supplemental metric.

Noise/Land Use Compatibility Standards and Guidelines

Noise metrics describe noise exposure and help predict community response to various noise exposure levels. The public reaction to different noise levels has been estimated based upon extensive research on human responses to exposure of different levels of aircraft noise. **Figure C8** relates DNL noise levels to community response. Based on human response, land use compatibility guidelines have been developed that are defined in terms of the DNL described earlier (a 24-hour average that includes a sound level weighting for noise at night). Using these metrics and surveys, agencies have developed guidelines for assessing the compatibility of various land uses with the noise environment.

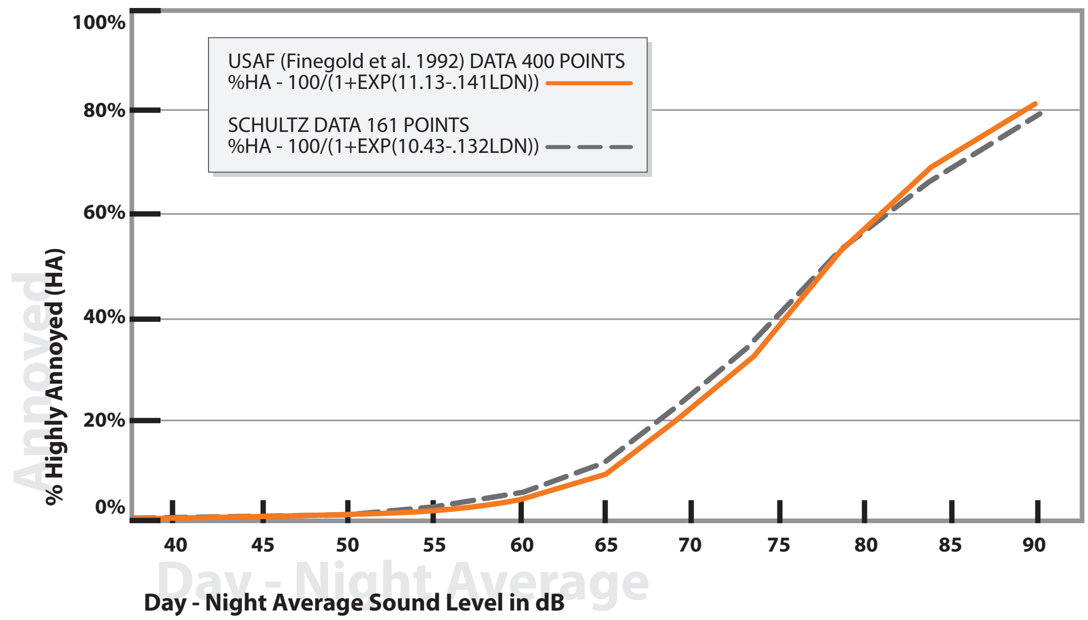
Highlights of Land Use Compatibility Guidelines

FAA and other federal agencies have established land use compatibility guidelines based on the DNL that identify the acceptability of various types of land use with aircraft noise exposure.

- Residential uses are compatible with noise up to 65 DNL and up to 70 DNL with sound insulation;
- Schools are compatible with noise up to 65 DNL and up to 70 DNL with sound insulation;
- Commercial development is compatible with noise up to 75 DNL

Numerous laws have been passed concerning aircraft noise.

- ASNA: FAA required to use DNL
- Phase-out of noisiest aircraft (Stage 2) >175,000 lbs in the year 2000;
- ANCA prevents adoption of airport access restrictions (i.e., curfews, and caps)



USAF	0.40	0.831	1.66	3.31	6.48	12.29	22.1	36.47	53.74	70.16	82.64
SCHULTZ	0.576	1.11	2.12	4.03	7.52	13.59	23.32	37.05	53.25	68.78	81.00

CALCULATED % HIGHLY ANNOYED (HA) POINTS

Figure C9 **Example of Community Reaction to Aircraft Noise**

The most common noise/land use compatibility guidelines or criteria used are 65 dBA DNL. The Schultz [9] curve, as shown in **Figure C9**, predicts approximately 14% of the exposed population would be highly annoyed with exposure to the 65 dBA DNL. At 60 dB DNL, it decreases to approximately 8% of the population highly annoyed. However, recent updates to the Schultz curve, done by the U.S. Air Force, indicate that even a higher percentage of residents may experience annoyance with 65 DNL.

A summary of pertinent regulations and guidelines is presented below:

- **Federal Aviation Regulation, Part 36, "Noise Standards: Aircraft Type and Airworthiness Certification"**

  Originally adopted in 1960, FAR Part 36 prescribes noise standards for issuance of new aircraft type certificates; it also limited noise levels for certification of new types of propeller-driven, small airplanes as well as for transport category, large airplanes. Subsequent amendments extended the standards to certain newly produced aircraft of older type designs. Other amendments extended the required compliance dates. Aircraft may be certificated as Stage 1, Stage 2, or Stage 3 (also called Chapter number outside the U.S.) aircraft based on their noise level, weight, number of engines, and, in some cases, number of passengers. Stage 1 aircraft over 75,000 pounds are no longer permitted to operate in the U.S. Stage 2 aircraft over 75,000 pounds were phased-out of the U.S. fleet effective at the start of 2000, as discussed below by the Airport Noise and Capacity Act of 1990.

- **Federal Aviation Regulation, Part 150, "Airport Noise Compatibility Planning"**

  As a means of implementing the Aviation Safety and Noise Abatement Act (ASNA), the FAA adopted Federal Aviation Regulation Part 150, Airport Noise Compatibility Planning Programs. FAR Part 150 established a uniform program for developing balanced and cost effective programs for reducing existing and future aircraft noise at individual airports. Included in FAR Part 150 was the FAA's adoption of noise and land use compatibility guidelines discussed earlier. An expanded version of these guidelines/chart appears in Aviation Circular 150/5020-1 (dated August 5, 1983) and is reproduced in **Figure C10**. These guidelines offer recommendations for determining acceptability and compatibility of land uses. The guidelines specify the maximum amount of noise exposure (in terms of the cumulative noise metric DNL) that would be considered acceptable or compatible to people in living and working areas.

LAND USE	BELOW 65	YEARLY DAY-NIGHT NOISE LEVEL (DNL) IN DECIBELS 65-70	70-75	75-80	80-85	OVER 85
RESIDENTIAL						
Residential, other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
PUBLIC USE						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
COMMERCIAL USE						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail-building materials, hardware and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade-general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
MANUFACTURING AND PRODUCTION						
Manufacturing, general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing resource production and extraction	Y	Y	Y	Y	Y	Y
RECREATIONAL						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables and water recreation	Y	Y	25	30	N	N

Numbers in parentheses refer to NOTES.

The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable under Federal, State or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

TABLE KEY

SLUCM	Standard Land Use Coding Manual.
Y(Yes)	Land Use and related structures compatible without restrictions.
N(No)	Land Use and related structures are not compatible and should be prohibited.
NLR	Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25, 30 or 35	Land Use and related structures generally compatible; measures to achieve NLR of 25, 30 or 35 dB must be incorporated into design and construction of structure.

NOTES

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB to 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

(2) Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(4) Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(5) Land use compatible provided that special sound reinforcement systems are installed.

(6) Residential buildings require an NLR of 25.

(7) Residential buildings require an NLR of 30.

(8) Residential buildings not permitted.

Figure C10 **FAA FAR Part 150 Land Use Compatibility Matrix**

- **Federal Aviation Administration Order 5050.4A and Order 1050.1E for Environmental Analysis of Aircraft Noise Around Airports**

  FAA , like many other federal agencies, issues guidance for compliance with the National Environmental Policy Act (NEPA). FAA Order 1050.1E **Considering Impacts: Policies and Procedures,** identified the procedures for complying with NEPA for all divisions of the FAA. FAA Order 5050.4A (with 5050.4B in draft form) supplements 1050.1E and identified issues specific to the Airports Division of the FAA. These orders specify the processes for considering environmental factors when evaluating federal actions under NEPA, and include methodologies for assessing noise, as well as thresholds of significant project-related noise changes. This guidance requires the use of the FAA's Integrated Noise Model (INM), the preparation of noise contours showing 65, 70 and 75 DNL, and note that "A significant noise impact would occur if analysis shows that the proposed action will cause noise sensitive areas to experience an increase in noise of DNL 1.5 dB or more at or above DNL 65 dB noise exposure when compared to the no action alternative for the same time frame." Noise abatement alternatives that result in shifting of noise may trigger an environmental documentation process, subject to one of these orders, before they can be implemented.

- **Airport Noise and Capacity Act of 1990 (ANCA)**

  The Airport Noise and Capacity Act of 1990 (PL 101-508, 104 Stat. 1388), also known as ANCA or the Noise Act, established two broad directives for the FAA: (1) establish a method to review aircraft noise, and airport use or access restriction, imposed by airport proprietors, and (2) institute a program to phase-out Stage 2 aircraft over 75,000 pounds by December 31, 1999 [Stage 2 aircraft are older, noisier aircraft (B-737-200, B-727 and DC-9); Stage 3 aircraft are newer, quieter aircraft (B-737-300, B-757, MD-80/90)]. To implement ANCA, FAA amended Part 91 to address the phase-out of large Stage 2 aircraft and the phase-in of Stage 3 aircraft. In addition, Part 91 states that all Stage 2 aircraft over 75,000 pounds were to be removed from the domestic fleet or modified to meet Stage 3 by December 31, 1999. There are a few exceptions, but only Stage 3 aircraft greater than 75,000 pounds are now in the domestic fleet. The airlines have phased out Stage 2 aircraft, and the mainland domestic fleet is now all Stage 3 aircraft. Stage 2 aircraft less than 75,000 pounds include various older corporate jet aircraft such as Lear 25s and Gulfstream IIs, which are not common to Detroit Metro.

  Furthermore, FAR Part 161 was adopted to institute a highly stringent review and approval process for implementing use or access restrictions by airport proprietors. Part 161 sets out the requirements and procedures for implementing new airport use and access restrictions by airport proprietors. They must use the DNL metric to measure noise effects, and the Part 150 land use guideline table, including 65 DNL as the threshold contour to determine compatibility.

ANCA applies to all local noise restrictions that are proposed after October 1990, and to amendments to existing restrictions proposed after October 1990. The FAA has approved only one completed Part 161 Study to date (for restricting Stage 2 corporate jets). Recent litigation has upheld the validity and reasonableness of that Part 161 restriction.

- **Federal Interagency Committee on Noise (FICON) Report of 1992**

  The use of the DNL metric criteria has been criticized by various interest groups concerning its usefulness in assessing aircraft noise impacts. As a result, at the direction of the EPA and the FAA, the Federal Interagency Committee on Noise (FICON) was formed to review specific elements of the assessment on airport noise impacts and to recommend procedures for potential improvements. FICON included representatives from the Departments of Transportation, Defense, Justice, Veterans Affairs, Housing and Urban Development, the Environmental Protection Agency, and the Council on Environmental Quality.

  The FICON review focused primarily on the manner in which noise impacts are determined, including whether aircraft noise impacts are fundamentally different from other transportation noise impacts; how noise impacts are described; and, whether impacts outside of Day-Night Average A-Weighted Sound Level (DNL) 65 decibels (dB) should be reviewed in a National Environmental Policy Act (NEPA) document.

  The committee determined that there are no new descriptors or metrics of sufficient scientific standing to substitute for the present DNL cumulative noise exposure metric. FICON determined that the DNL method contains appropriate dose-response relationships (expected community reaction for a given noise level) to determine the noise impact is properly used to assess noise impacts at both civil and military airports. The report does support agency discretion in the use of supplemental noise analysis, recommends public understanding of the DNL and supplemental methodologies, as well as aircraft noise impacts. FICON did, however, recommend that if screening analysis shows a 1.5 dB increase within a 65 DNL or a 3.0 dB increase within a 60-65 DNL, then additional analysis should be conducted.

Introduction to Noise Assessment Methodology

Existing and future aircraft noise environments for airports are typically determined through a combination of computer modeling and on-site sound level measurements. Computer generated noise contours of existing aircraft noise are developed and then verified using the on-site measurements. The on-site measurements also help establish the ambient, (non-aircraft) noise environment and identify noise levels at specific areas of interest. Once reliable, computer generated contours are developed for existing conditions, the computer input files are altered to reflect future conditions based on forecasts of future operations and/or proposed noise abatement aircraft operational measures. New computer generated data and contours are then developed to assess those future conditions. The following sections provide the details on this process. This section is divided into the following sub-sections:

Highlights of Noise Assessment

Two tools are used to evaluate aircraft noise:

- Noise Monitoring of aircraft and ambient noise
- Integrated Noise Model (INM) computer model

FAA Part 150 Studies are required to model aircraft noise with the FAA Integrated Noise Model (INM) computer model.

Actual noise monitoring is not required for FAA Part 150 studies. It is used to supplement the computer model and as a tool to show citizens actual noise measurements.

Actual measurements were conducted during December 2004. Tests were collected at 42 sites: 20 sites for short periods and 22 sites for longer periods.

Aircraft radar data for a six month period was collected to identify the flight paths and use of the runways. This data was also compared with the actual noise measurements to identify aircraft and altitude.

- Noise Measurement Survey – Describes the noise monitoring sites and the methodology used in the noise measurement survey.
- Computer Modeling – Describes the computer noise model and modeling techniques used in the study.
- Measurement and Analysis Procedures – Describes the measurement and analysis procedures used to develop the various noise metrics of use in this study.

Noise Measurement Survey

Purpose of Measurement Survey

Measuring noise directly using calibrated and reliable monitoring devices augments computer modeling and offers several advantages over relying solely on computer modeling. While not specifically required by FAR Part 150, such programs are often very helpful in showing actual noise levels and ensuring the accuracy of the computer based modeling. The noise measurement survey is an integral part of this Study; it serves to:

- Identify noise levels for individual aircraft operations specific to the local Detroit Metropolitan Wayne County Airport environment and its unique conditions.
- Validate the computer model using actual noise measurement data from aircraft operating at the Airport. Specific issues unique to the Airport include:
    - The number of hush-kited DC9 aircraft that operate at the Airport.
    - The number of MD80 aircraft that operate at the Airport.
- Identify the aircraft and ambient noise level at multiple locations around the Airport using a variety of noise metrics.
- Give confidence in the accuracy of the noise exposure contours.

The primary goal of the measurement program for the Detroit Metropolitan Wayne County Airport Part 150 Noise Compatibility Study is the identification of the single event noise levels that can then be correlated to a variety of different aircraft types flying the different paths and procedures that are present in the Detroit metro area. Based upon this single event data and the annual operational flight data, it is then possible to calculate various different noise metrics of interest. These data can also be compared to the predicted single event noise levels incorporated within the FAA Integrated Noise Model (INM). The modeling assumptions can then be adjusted to more accurately reflect real-world conditions. With the verified noise model, it is then possible to ensure that the contours reflect real measurements and to prepare supplemental noise metrics. When it is not possible for the contour to exactly match the measurements, that difference is known.

Types of Field Noise Measurements

The field noise measurement program conducted for the Part 150 Noise Compatibility Study included the use of long-term and short-term portable measurement sites. Short-term site are sites where the equipment was placed for one to two days, whereas the monitors were placed at the long-term sites for two to three weeks of continuous measurements. The noise monitors recorded the one-second average noise levels on a continuous basis and were later analyzed to compute other noise metrics. These noise metrics included DNL, hourly LEQ, Time Above noise levels (TA85, TA75, and TA65), single event (SEL, Lmax, and duration), and ambient descriptors (L1, L10, L50, L90, L99).

Measurement locations were selected through coordination with the Study Advisory Committee and local community officials. The measurement program included the following numbers of measurement sites:

- Twenty-two (22) long-term aircraft and non-aircraft noise measurement sites
- Twenty (20) short-term aircraft and non-aircraft noise measurement sites

Site Selection Criteria

Noise monitoring sites included locations within the communities exposed to ground noise sources, and additional sites located along the primary flight paths (over-flight noise) within the study area. Noise monitoring sites were selected based upon technical suitability, as well as locations of public interest. Information used in the selection of the noise monitoring sites includes land use pattern/proximity to neighborhoods, flight tracks, distribution of the sites representatively around the Airport, and proximity to the previous and expected 65 DNL noise contour. Examples of the site selection criterion are listed below:

General Criteria

- Exposure to a variety of different aircraft activity sources:
  - Departures and arrivals
  - Commercial, commuter, and general aviation aircraft
  - Ground noise and/or over-flight noise
- Proximity of the site to the 65 DNL noise contour
- Representation of the potential exposure to surrounding residents
- Representation of the noise environment in the local area
- Locations that are not in close proximity to localized non-aircraft noise sources
- Locations that are not exposed to high wind speeds
- Locations that are not severely shielded from the aircraft activity
- Locations of public interest
- Security and ease of access to the noise monitoring equipment

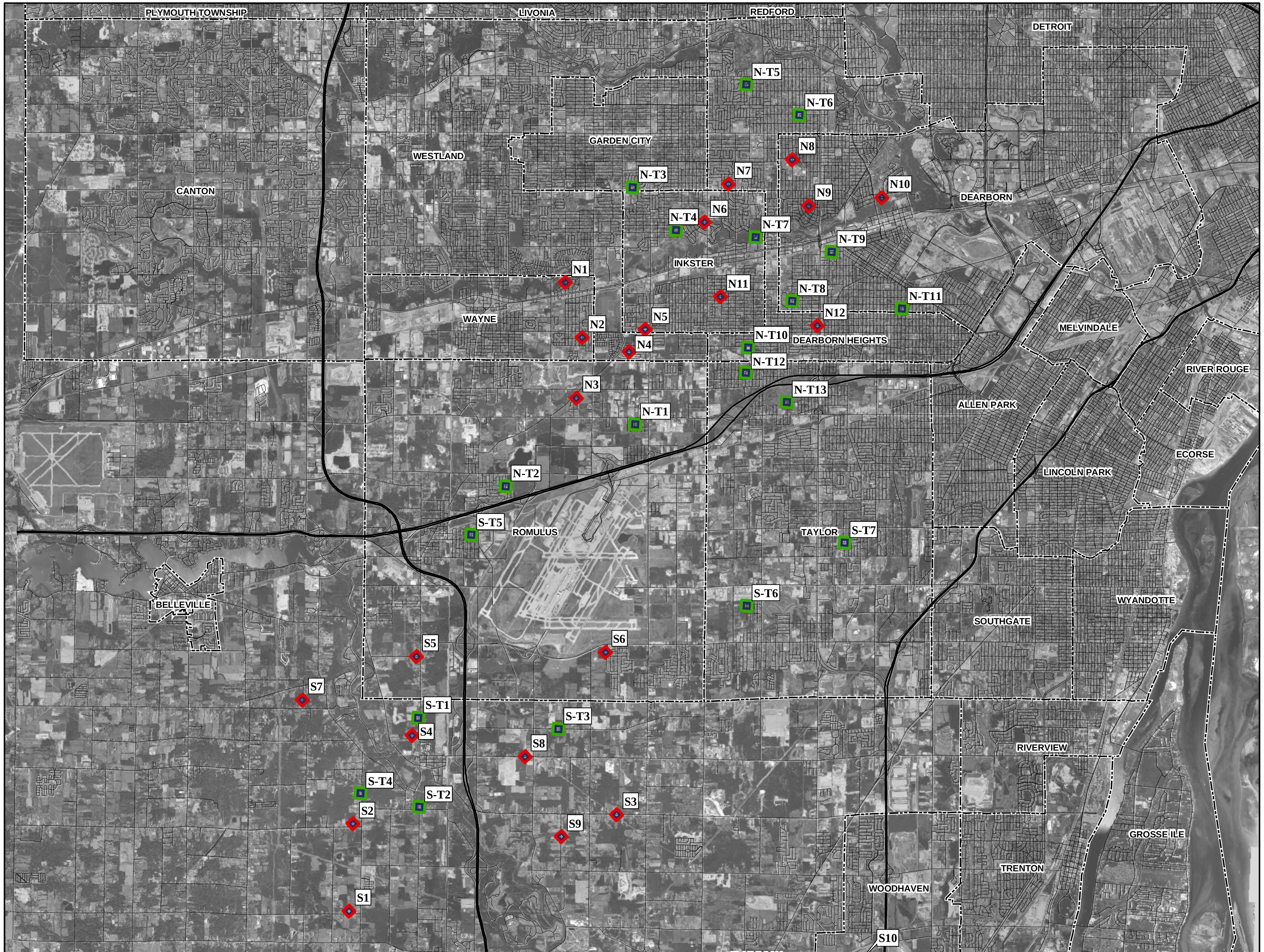
Specific Criteria

- Multiple locations at different distances sideline from the departure and arrival flight paths
- Locations exposed to both jet aircraft and commuter aircraft flight paths
- Locations at different distances along the flight path to measure departure noise at different stages of the climb profiles for notable aircraft types. This should include those sites both close to and more distant from the Airport.

Noise Measurement Locations

Noise measurements were conducted at selected locations within the Airport environs. The portable noise monitoring sites, both short-(1 to 2 days) and long-(1 to 3 weeks) term are presented in **Figure C11**. **Table C2** reflects the addresses of those locations where noise equipment was placed for monitoring purposes to the south of the Airport, and **Table C3** reflects the locations where the noise equipment was placed for monitoring purposes to the north of the Airport. The array of sites is designed to measure the difference in the sideline noise at different distances away from the flight path in conjunction with the data from the permanent noise monitoring system.

Figure C11 **Combined Noise Measurement Sites**



Legend

Long-term

Short-term

Long-Term Noise Monitoring Sites, South

Site	Address	City
S1	39933 Wear Road	New Boston
S2	39791 Judd Road	Belleville
S3	31740 King Road	New Boston
S4	37610 Harvest Lane	New Boston
S5	37541 Barth Street	Romulus
S6	15248 Colbert	Romulus
S7	17007 Renton Road	Belleville
S8	33675 Sibley Road	New Boston
S9	21950 Dickenson Road	New Boston
S10	32304 Stefano Court	Brownstown

Long-Term Noise Monitoring Sites, North

Site	Address	City
N1	2988 Hubbard Street	Wayne
N2	4851 Harrison Street	Wayne
N3	6547 Gloria Street	Romulus
N4	30131 Julius Blvd.	Westland
N5	29536 Thomas Circle	Inkster
N6	1072 Eastwood Street	Inkster
N7	337 Rosemary Street	Dearborn Heights
N8	1315 N. Silvery Lane	Dearborn
N9	24407 Rockford Street	Dearborn
N10	22262 Long Blvd.	Dearborn
N11	27019 Penn Street	Inkster
N12	24096 Lehigh Street	Dearborn Heights

Short-Term Noise Monitoring Sites, South

Site	Address	City
S-T1	17718 Huron River Dr.	New Boston
S-T2	37370 Judd Road	Huron
S-T3	32515 Prescott Road	Huron
S-T4	20530 Clark Road	Huron
S-T5	11087 Whitehorn Ave	Romulus
S-T6	13605 Harold	Taylor
S-T7	23230 Clinton	Taylor

Short-Term Noise Monitoring Sites, North

Site	Address	City
N-T1	7230 Burton Street	Romulus
N-T2	Malcom Dr and Lisa Dr.	Romulus
N-T3	29971 Leona Ave.	Garden City
N-T4	28503 Hazelwood Ave.	Inkster
N-T5	Figueroa & Rockland	Dearborn Hts
N-T6	George & Kingsbury	Dearborn Hts
N-T7	26111 S. River Park Drive	Inkster
N-T8	Westwood and Union	Dearborn
N-T9	23726 Harvard	Dearborn
N-T 10	26206 Powers Ave	Dearborn Hts
N-T11	3807-3821 Harding	Dearborn
N-T12	Ducan Ave, NE corner of Northwest Park	Taylor
N-T13	6708 Cherokee	Taylor

N

February 2005

DETROIT
METROPOLITAN WAYNE COUNTY AIRPORT

Source: Michigan Department of Natural Resources, SEMCOG, Detroit Metropolitan Wayne County Airport files.

Table C2
COMBINED NOISE MEASUREMENT SITES, SOUTH
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update

Sites	City	Address
Long-Term Sites (One – Three Weeks)		
S1	New Boston	39933 Wear Road
S2	Belleville	39791 Judd Road
S3	New Boston	31740 King Road
S4	New Boston	37610 Harvest Land
S5	Romulus	37541 Barth Street
S6	Romulus	15248 Colbert
S7	Belleville	17007 Renton Road
S8	New Boston	33675 Sibley Road
S9	New Boston	21950 Dickenson Road
S10	Brownstown	32304 Stefano Court
Short-Term Sites (One – Two Days)		
S-T1	New Boston	17718 Huron River Drive
S-T2	Huron	37370 Judd Road
S-T3	Huron	32515 Prescott Road
S-T4	Huron	20530 Clark Road
S-T5	Romulus	11087 Whitehorn Avenue
S-T6	Taylor	13605 Harold
S-T7	Taylor	23230 Clinton

Source: BridgeNet, December 2004

Table C3
COMBINED NOISE MEASUREMENT SITES, NORTH
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update

Sites	City	Address
Long-Term Sites (One – Three Weeks)		
N1	Wayne	2988 Hubbard Street
N2	Wayne	4851 Harrison Street
N3	Romulus	6547 Gloria Street
N4	Westland	30131 Julius Blvd
N5	Inkster	29536 Thomas Circle
N6	Inkster	1072 Eastwood Street
N7	Dearborn Heights	337 Rosemary Street
N8	Dearborn	1315 N. Silvery Lane
N9	Dearborn	24407 Rockford Street
N10	Dearborn	22262 Long Blvd
N11	Inkster	27019 Penn Street
N12	Dearborn Heights	24096 Lehigh Street
Short-Term Sites (One – Two Days)		
N-T1	Romulus	7230 Burton Street
N-T2	Romulus	Malcom Drive & Lisa Drive
N-T3	Garden City	29971 Leona Avenue
N-T4	Inkster	28503 Haezelwood Avenue
N-T5	Dearborn Heights	Figueroa & Rockland
N-T6	Dearborn Heights	George & Kingsbury
N-T7	Inkster	26111 S. River Park Drive
N-T8	Dearborn	Westwood & Union
N-T9	Dearborn	23726 Harvard
N-T10	Dearborn Heights	26206 Powers Avenue
N-T11	Dearborn	3807-3821 Harding Ave, NE Corner
N-T12	Taylor	Duncan Avenue, Northwest Park
N-T13	Taylor	6708 Cherokee

Source: BridgeNet, December 2004

Measurement Procedures

Noise measurements were conducted for this study starting from November 30, 2004 - December 14, 2004 and were conducted for a two to three week period at each of the long-term noise monitoring sites. Noise monitoring was conducted during this time period due to the timing of the Part 150 Study. While the noise measurements conducted in December 2004 were not used as INM model inputs, they were used to verify the shape and size of the noise contour to accurately depict aircraft operations at DTW. Short-term noise monitoring sites were set up to simultaneously collect continuous 1-second noise levels during the entire time the noise monitor is at a given location, generally one to two days. The equipment was checked and calibrated on a regular basis throughout the measurement survey. The time at each temporary site varied depending on the type of noise gathered. The noise measurements were conducted when the operations at the Airport were in a predominantly South direction. This direction, or traffic flow, occurs about 70 percent of the time, making it the most commonly used direction in which aircraft operate.

Acoustic Data

The noise measurement survey utilized specialized monitoring instrumentation that allowed for the measurement of aircraft single event data and ambient noise levels. The data determined at each portable noise measurement site is listed below:

- continuous one-second noise levels
- single event data (SEL, Lmax and Duration) for individual aircraft
- hourly noise data (LEQ, Level Percent, Time Above)
- daily noise level (DNL)
- correlation of noise data with aircraft identification
- non-aircraft ambient sound level (Level Percent)

The survey utilized software that provides continuous measurement and storage of the 1-second LEQ noise level. From this data, the above noise descriptors could be calculated. In addition, this data can be used to plot the time histories for noise events of interest.

Instrumentation

The monitoring program was consistent with state-of-the-art noise measurement procedures and equipment. The measurements consisted of monitoring A-weighted decibels in accordance with procedures and equipment that comply with specific International Standards (IEC), and measurement standards established by the American National Standards Institute (ANSI) for Type 1 instrumentation, as specified in FAA guidance concerning such measurement programs.

These sites utilized the Brüel & Kjaer 2236, Larson Davis 824 Sound Level Meters, and 01dB Solo sound level meters. The analyzers automatically calculate the various single event data. The Brüel & Kjaer, Larson Davis, and the 01dB systems include software that provides data storage for later retrieval and analysis.

During the survey, the noise monitoring instrumentation was calibrated at the start and end of each measurement cycle. This calibration was based on standards set by the National Institute of Standards and Technology, formerly the National Bureau of Standards. An accurate record of the meteorological conditions during measurement times was also maintained. All noise monitoring was consistent with FAR Part 150 guidelines.

Computer Modeling

Computer modeling generates maps or tabular data of an airport's noise environment expressed in the various metrics described above such as SEL, DNL, or TA. Computer models are most useful in developing contours that depict, like elevation contours on a topography map, areas of equal noise exposure. Accurate noise contours are largely dependent on the use of reliable, validated, and updated noise models, and collection of accurate aircraft operational data.

The FAA's Integrated Noise Model (INM) models civilian and military aviation operations. The original INM was released in 1977. The latest version, INM Version 6.1, was released for use in May 2003 and is the state-of-the-art in airport noise modeling. The program includes standard aircraft noise and performance data for over 100 aircraft types that can be tailored to the characteristics of specific individual airports. Version 6.1 includes an updated database that includes some newer aircraft, the ability to include run-ups (maintenance test when the aircraft is on the ground) and topography in the computations, and a provision to vary aircraft profiles in an automated fashion. It also includes more comprehensive and flexible contour plotting routines than earlier versions of the model.

Operational data for input to the INM are gathered in a meticulous manner to assure its accuracy, and the data are arranged for input to the model. The INM program requires the input of the physical and operational characteristics of an airport. Physical characteristics include runway coordinates, airport elevation, and temperature and, optionally, topographical data. Operational characteristics include aircraft types, flight tracks, departure procedures, arrival procedures, and stage lengths (flight distance) that are specific to the operations at the Airport. Aircraft data needed to generate noise contours include:

- Total operations
- Types of aircraft
- Number of aircraft operations by aircraft type
- Day/night time distribution by aircraft type
- Flight tracks
- Flight track utilization by aircraft type
- Flight profiles
- Typical operational procedures
- Average meteorological conditions

Measurement and Analysis Procedures

The following section outlines the methodology used to measure and quantify noise levels from aircraft operations and from ambient noise level conditions. Measurement methodology and analysis techniques used in the study are also described.

Continuous Measurement of the Noise

The methodology employed in this study used a data collection program that was designed to continuously measure and record the noise at each measurement location. An example of the time history of the continuous noise measured by each portable noise monitor is presented in **Figure C12**. This graph shows the continuous noise at one site for a 15-minute period. It is possible to see the duration of noise events and the time period of ambient noise in between the events. Since all of the noise data is collected during the measurements, it is possible to process the data and calculate different metrics of interest that may arise, including the aircraft single event noise event level, cumulative daily noise levels, time above levels, and the ambient levels. The process of calculating noise events from this data includes the use of floating threshold methodology, which allows for the measurement of lower noise level events. The parameters are adjustable and can be modified so that it is possible to recalculate noise events from raw data any time in the future.

Network of Multiple Noise Monitors

A network of portable noise monitors was set up to simultaneously and continuously measure noise at multiple monitoring sites. The network of continuously operating noise monitors is useful to compare noise levels at different locations for the same aircraft. For example, networks of noise monitors are established to illustrate the sideline noise levels at varying distances from the flight path centerline. An example of data from three sites is presented in **Figure C13**. This figure shows the continuous noise levels for the three sites north of the Airport. It is possible to see the different noise levels and different time sequences of the noise as the aircraft passes over the set of sites. In addition, the network of noise monitors is also used to help separate aircraft noise from other noise sources. Knowing the time sequence of noise events provides a pattern that is one of the components of the noise and flight data correlation process.

Operational Data and Field Observations

The Detroit Metropolitan Wayne County Airport Noise Management Office does not operate a permanent noise monitoring system. Radar flight track information was obtained from Passur, a third-party provider of radar data. Passur was used to obtain aircraft flight track data since it is more precise that the FAA's Aircraft Radar Tracking System (ARTS) or ASDi data. The radar data was collected independent from the FAA ARTS, but provides much of the same information. Once collected, the software program performs a number of processes, including determining if the track is associated with a departure or arrival operation, and assigning a runway to the track. Six months of data were collected during 2004. Flight data, radar tracks, and noise monitoring data were collected and integrated in a database for analysis and reporting of the radar data. To determine the direction of aircraft traffic, Aircraft Situational Display to Industry (ASDi) data as used; a full year of ASDi data was collected to determine the flow of aircraft traffic.

The radar data includes flight information about the aircraft that is operating on each track, as well as position information of the flight. The flight information includes data such as the aircraft type, airline code, flight number, type of operation, and runway. The position information includes the X and Y coordinates that position each aircraft for the flight track every four seconds of the flight, as well as the altitude of the aircraft at each point.

Example flight information data are listed below. An example of the data is also presented in **Table C4**. These input data were registered into a database that included all of the information associated with each flight.

- date and time of flight
- base or airport of operation
- operator
- aircraft type
- airline and flight number
- type of operation (departure or arrival)
- flight path
- runway
- comments

Figure C12
Example of Continuous Measurement of Noise
Period: Dec 2, 2004 00:30:00 AM to Dec 2, 2004 00:59:59 AM
Site: PS04 - 37610 Harvest Lane

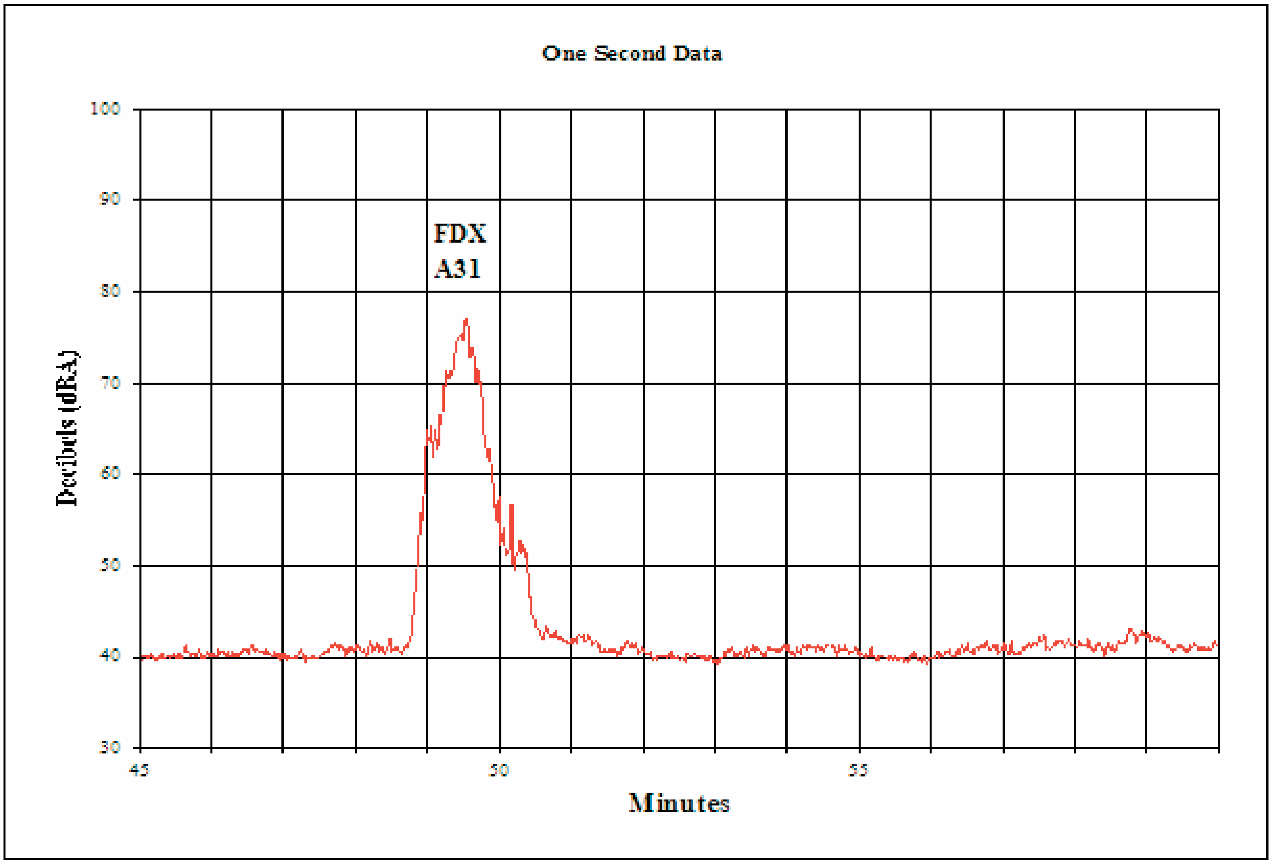


Figure C12 **Example of Continous Measurement of Noise**

Figure C13

Continous Noise Measurement at Multiple Sites

Period: Dec 17, 2004 09:15:00 to Dec 17, 2004 09:45:00

Sites: N03 - 6547 Gloria Street ; N04 - 30131 Julius Blvd; N05 - 29536 Thomas Circle

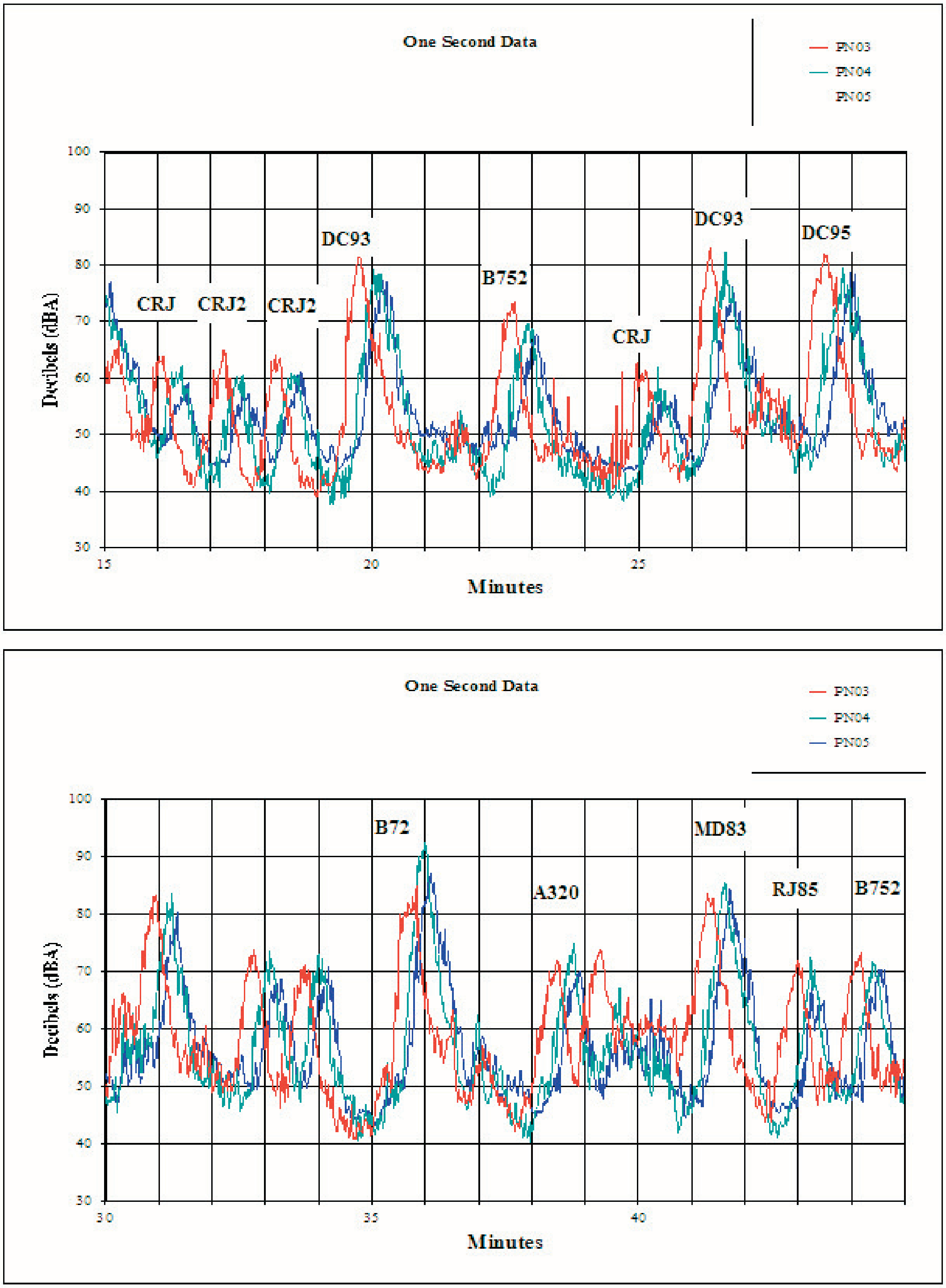


Figure C13 **Example of Continous Measurements at Multiple Sites**

In addition to the radar data, other sources of flight data used in the study included:

- field observations by engineers conducting the measurements
- aircraft situational display data (data from FAA national airspace system)
- airport tower counts

Correlation of Noise and Flight Data

From the radar data, it is possible to reconstruct the flight path for each operation. An example of flight paths for aircraft operations is presented in **Figure C14**. This figure illustrates the flight path of an aircraft at one point in time. The noise levels from each monitor at that same point in time are also shown. Computer software was used to correlate noise events with aircraft operating in the sky near the noise monitor at that same point in time. **Figure C15** represents a sample noise event time history taken from a site that is correlated with its source of operation.

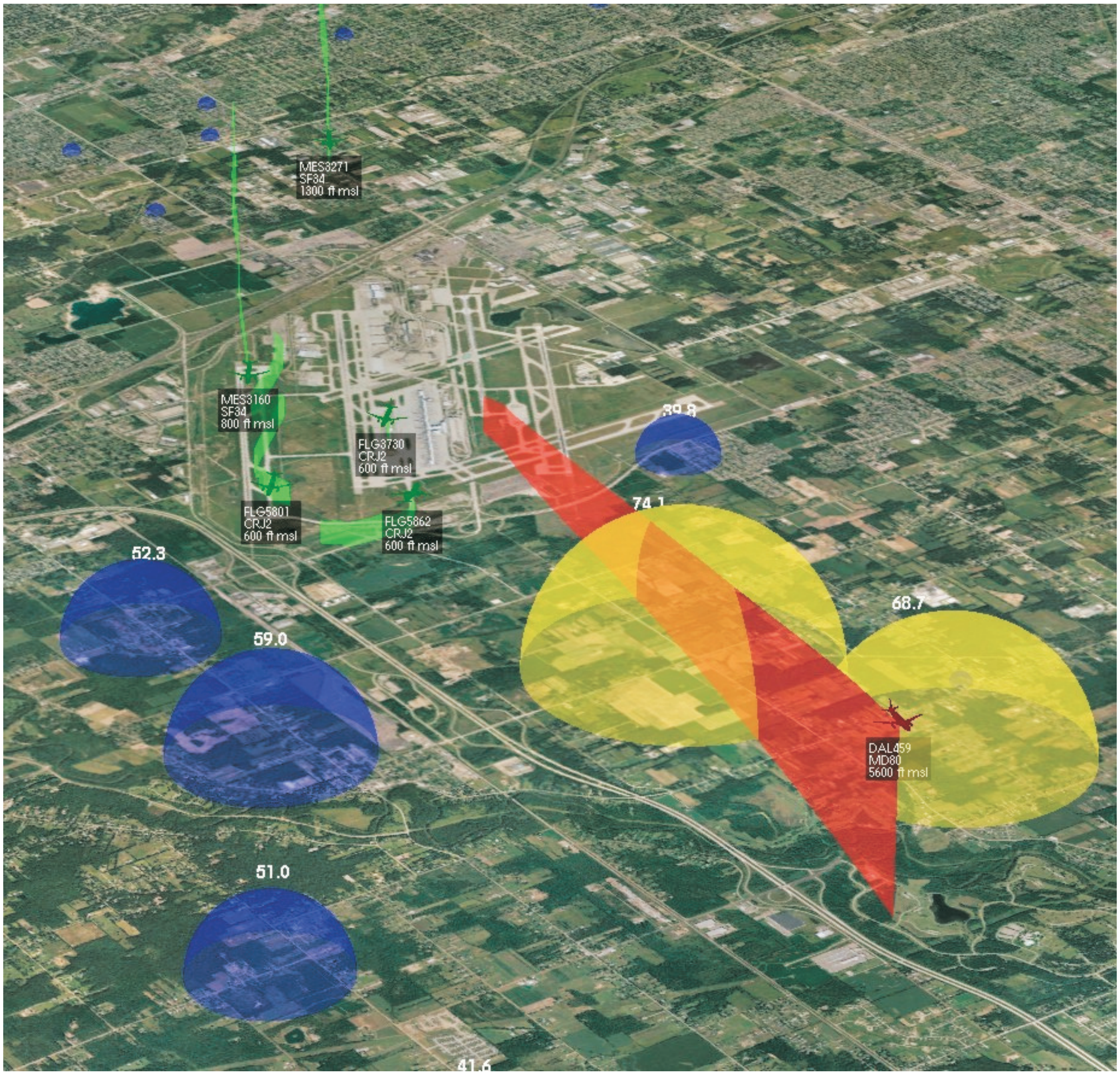
Calculation of Aircraft Noise Metrics

Once the collection and correlation of the noise and flight data are complete, the various noise metrics can then be calculated. A computer program is used to calculate the single event, time above, and cumulative noise metrics of interest. These results are presented in the next section.

Flight Data Listing Report
Detroit Metropolitan (Wayne County) Airport
Period: December 1, 2004

Date And Time	Airline Code	Aircraft ID	Aircraft Type	Runway	Operation	Destination
Dec-01 06:03:52	FDX	FDX1711	DC10	4L	A	IND
Dec-01 06:04:55	COM	COM198	CRJ1	3L	D	CVG
Dec-01 06:16:15	JIA	JIA2480	CRJ2	3L	D	PHL
Dec-01 06:26:39	LOF	LOF3592	E145	3L	D	PIT
Dec-01 06:26:59	DHL	DHL456	B72Q	4L	A	CVG
Dec-01 06:28:02	ASH	ASH7124	CRJ2	3L	D	IAD
Dec-01 06:31:54	UAL	UAL1205	A319	3L	D	ORD
Dec-01 06:39:23	EGF	EGF877	E135	3L	D	LGA
Dec-01 06:46:19	COM	COM288	CRJ2	3L	D	JFK
Dec-01 06:46:38	UPS	UPS482	A306	3R	A	SDF
Dec-01 06:51:06	SWA	SWA658	B73G	3L	D	MDW
Dec-01 06:55:57	AAL	AAL1793	MD82	3L	D	DFW
Dec-01 06:56:43	BTA	BTA2063	E135	3L	D	CLE
Dec-01 06:58:16	COA	COA1289	B73G	3L	D	IAH
Dec-01 07:04:17	USC	USC361	C208	3R	A	CMH
Dec-01 07:06:17	ABX	ABX138	DC9Q	3R	A	ILN
Dec-01 07:08:45	BTA	BTA2046	E145	3L	D	EWR
Dec-01 07:09:28	NWA	NWA1739	DC94	4R	A	CLE
Dec-01 07:10:13	SWA	SWA2316	B733	3L	D	BNA
Dec-01 07:11:32	KHA	KHA364	B72Q	4R	A	FWA
Dec-01 07:13:23	NWA	NWA1442	A319	4R	D	PVD
Dec-01 07:14:32	SWA	SWA2055	B73G	3L	D	PHX
Dec-01 07:14:55	MES	MES3218	SF34	3L	D	SDF
Dec-01 07:15:28	FLG	FLG5801	CRJ2	4L	A	MKG
Dec-01 07:17:32	NWA	NWA526	B752	4R	D	LGA
Dec-01 07:18:25	MES	MES3160	SF34	4L	A	DAY
Dec-01 07:20:30	NWA	NWA336	B752	4L	A	LAX
Dec-01 07:22:01	NWA	NWA1405	DC93	3R	A	IAD
Dec-01 07:23:01	MES	MES3096	SF34	3L	D	CLE
Dec-01 07:24:20	MES	MES3194	SF34	4L	A	SAW
Dec-01 07:24:24	NKS	NKS788	MD83	3L	D	PVD
Dec-01 07:24:24	HKA	HKA1632	C208	4R	D	MBS
Dec-01 07:27:07	FLG	FLG5862	CRJ2	4L	A	PLN
Dec-01 07:27:20	NWA	NWA289	A320	4R	D	MEM
Dec-01 07:28:38	NWA	NWA658	DC93	3L	D	EWR
Dec-01 07:29:53	NWA	NWA346	A320	3R	A	SFO
Dec-01 07:30:20	NKS	NKS709	MD83	3L	D	LGA
Dec-01 07:30:24	MRA	MRA852	C208	4R	D	LAN
Dec-01 07:33:16	NWA	NWA1918	DC93	3L	D	PIT
Dec-01 07:33:39	FLG	FLG5998	CRJ2	3R	A	GSP
Dec-01 07:34:30	NWA	NWA1778	A320	4R	D	PHL
Dec-01 07:34:35	NWA	NWA211	B752	3R	A	BWI
Dec-01 07:35:43	NWA	NWA739	B753	4R	D	MSP

Table C4 **Example of Flight Data Information**

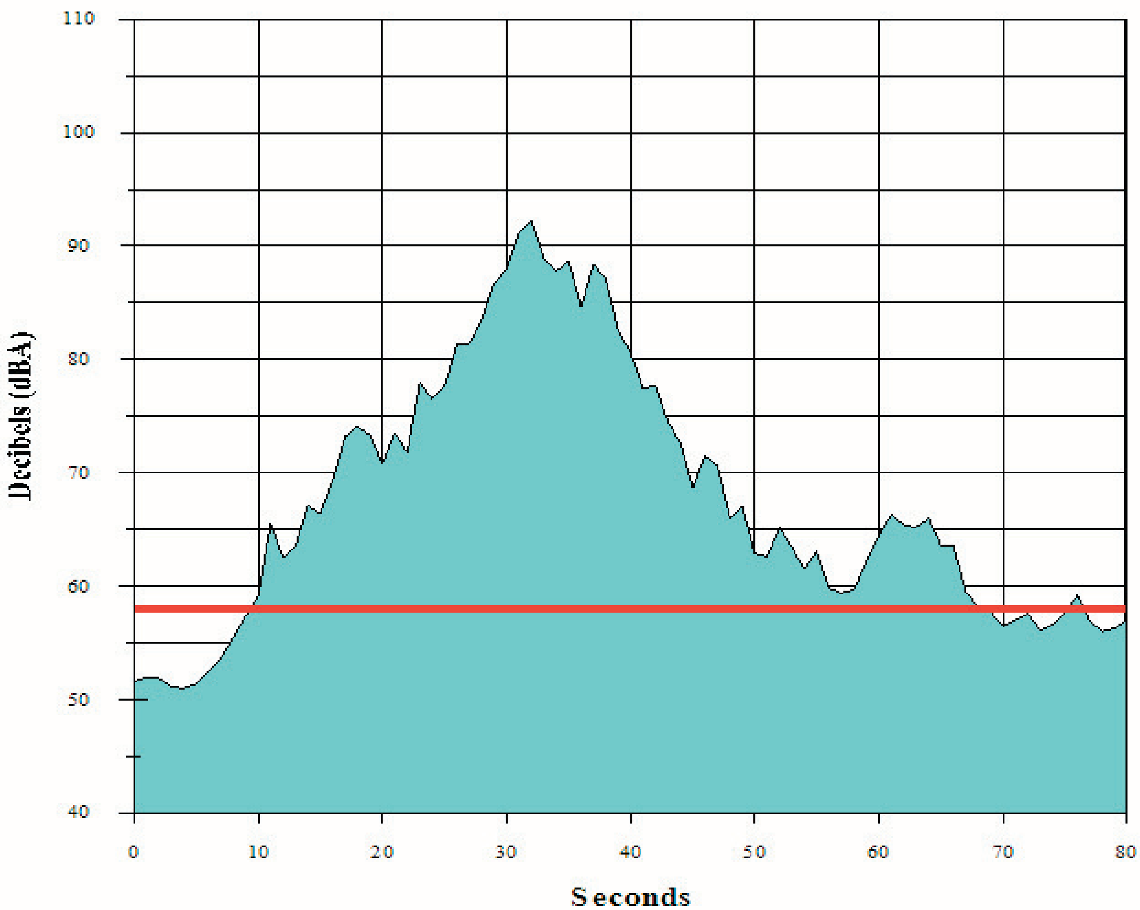


FigureC14 **Example of Playback on Noise and Flight Track Information**

Figure C15
Noise Event Plot Report
Period: 12/4/2004 1:40:21 PM
Site: S06 - 15248 Colbert

Start time:	1:29:59 PM	**Lmax time:**	1:40:21 PM
SEL (dBA):	99.6	**Max (dBA):**	92.3
Duration (seconds):	59	**Start to peak (seconds):**	22
SEL threshold (dBA):	58		
Filght No:	NWA1124		
Aircraft Type:	DC94	McDonnell-Douglas McDonnell-Douglas DC9-40	
Airline Code:	NWA	Northwest Airlines	
Operation:	Departure		
Runway:	21R		
Destination:	BUF	Greater Buffalo Intl - NY - USA	

Time History Plot of Noise Event



FigureC15 **Example of Correlated Noise and Flight Track Information**

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT
FAR PART 150 NOISE COMPATIBILITY STUDY UPDATE

DETROIT METRO • WILLOW RUN
WAYNE COUNTY AIRPORT AUTHORITY

CHAPTER D
EXISTING & FUTURE BASELINE NOISE CONDITIONS

Existing and Future Baseline Noise Conditions

Introduction

Noise measurements were conducted between November 30, 2004 and December 30, 2004 at various locations within the Wayne County area. The purpose of the measurement program was to validate the computer model using actual noise measurement data from aircraft operating at the Airport and was **NOT** used to generate the contours. Measurement data were collected at a total of twenty-two (22) long-term noise monitoring locations and twenty (20) short-term noise monitoring locations. The measurements were conducted at the long-term locations for periods of one to three weeks; the short-term portable noise monitoring consisted of one day of monitoring spread over a number of different days.

The portable measurements consisted of: (1) single event noise levels from individual aircraft flyovers, (2) cumulative 24-hour continuous measurements, and (3) ambient non-aircraft noise. Ambient noise is defined as noise generated from numerous sources for a general background noise level. Ambient noise is determined by the living conditions, i.e., urban, suburban, or rural area. Each will have varying ambient noise levels determined by such items as roadway noise, proximity to school yards, dogs barking, lawn mowers, etc. The survey used specialized equipment that recorded and displayed the complete time history of sound at the respective sites. The methodology used in the noise measurement program and a description of the measurement locations are presented in Section C, **Background Information on Noise/Methodology**. The results of the measurement program are summarized in the following paragraphs. Additional data, with more detailed results for each measurement site, is presented on the Detroit Metropolitan Wayne County Airport Part 150 project web site. This section consists of the following sub-sections:

- Noise Measurement Results – Describes the results of the actual noise measurements. The measurement results are described by:
  - Continuous noise measurements
  - Ambient or background sound levels
  - Single event sound levels for aircraft
  - Day-Night Average Level (DNL) noise levels
  - Hourly noise levels
  - Time Above noise levels (TA)

- Noise Contour Modeling Results –Presents the results of the computer modeling process that creates aircraft noise exposure contour maps.

Noise Measurement Results

Continuous Noise Measurements

Sound levels were continuously recorded at each of the portable noise-monitoring sites set up for this study. Continuous one-second noise data continually notes the actual sound level every one second. In addition to recording the noise events from aircraft, monitors also registered the ambient, or background noise level of the site, since the monitors were continuously monitoring all sounds. An example of continuous noise measurements is presented in **Figure D1**; 15-minutes of continuous sound data are shown for two sites. The graphic shows the measured A-weighted noise level on the Y/vertical axis versus time for the sample 15 minute period on the X/horizontal axis. The aircraft events and the ambient noise can be easily distinguished in this plot; each of the peaks was caused by an aircraft over-flight, and the valleys typically reflect ambient or background sound.

The top portion of the graph plots the data for Site S04, a site close to the Airport to the south. The bottom portion of this plot shows the same time period for Site S01, a more distant site south of the Airport, along the same general flight path. Aircraft departing to the south first pass over Site S04, and then about fifteen seconds later pass over Site S01. The time sequence of each of the noise events is shown in that noise events occur first at S04 and then at S01.

Ambient or Background Sound Levels

The ambient sound level at each site was identified based on the survey data. In this case, ambient level refers to the background sound level that would occur without influences from aircraft over-flight at each site. Ambient sound level is measured using the Percent Noise Levels (Ln). Percent Noise Level is the noise level exceeded different percentages (n) of the time (i.e., L90 represents the sound level exceeded 90% of the time). These metrics are described in greater detail in the background section (Section C). Such data helps identify the ambient noise environment and aids in assessing how intrusive aircraft noise is at a particular location. The sources of background sound include noise from cars on roadways, railroads, and commercial sources.

The results of the ambient noise measurement survey at each measurement site are described in the following figures and tables. **Table D1** presents a summary of the ambient measurements for all of the sites in tabular format. This table presents the Ln noise level for the Lmin, L90, L50, L10, and Lmax. The Lmax is presented for the peak dBA value that was measured while the Lmin is the lowest (quietest) dBA value that was

Table D1
AMBIENT MEASUREMENT RESULTS FOR LONG-TERM SITES, NORTH AND SOUTH (Aircraft events included)
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update

NMS	Description	Address	Statistical Noise Levels (dBA) Max	L10	L50	L90	Min
Long-Term Sites (North)							
N1	Wayne	2988 Hubbard Street	86	53	48	45	40
N2	Wayne	4851 Harrison Street	82	52	45	42	37
N3	Romulus	6547 Gloria Street	84	58	49	45	39
N4	Westland	30131 Julius Blvd	89	57	47	43	37
N5	Inkster	29536 Thomas Circle	88	57	46	43	38
N6	Inkster	1072 Eastwood Street	96	55	45	42	35
N7	Dearborn Heights	337 Rosemary Street	82	52	43	41	35
N8	Dearborn	1315 N. Silvery Lane	77	52	44	40	33
N9	Dearborn	24407 Rockford Street	80	52	43	39	32
N10	Dearborn	22262 Long Blvd	77	50	42	38	27
N11	Inkster	27019 Penn Street	88	53	46	41	36
N12	Dearborn Heights	24096 Lehigh Street	79	53	47	44	37
Long-Term Sites (South)							
S1	New Boston	39933 Wear Road	81	52	44	39	30
S2	Belleville	39791 Judd Road	92	58	46	41	36
S3	New Boston	31740 King Road	84	54	46	43	37
S4	New Boston	37610 Harvest Lane	92	59	48	45	39
S5	Romulus	37541 Barth Street	88	58	49	45	38
S6	Romulus	15248 Colbert	88	59	51	47	37
S7	Belleville	17007 Renton Road	82	59	53	51	43
S8	New Boston	33675 Sibley Road	86	60	52	48	37
S9	New Boston	21950 Dickenson Road	85	53	45	41	33
S10	Brownstown	32304 Stefano Court	84	52	48	46	39

Source: BridgeNet International

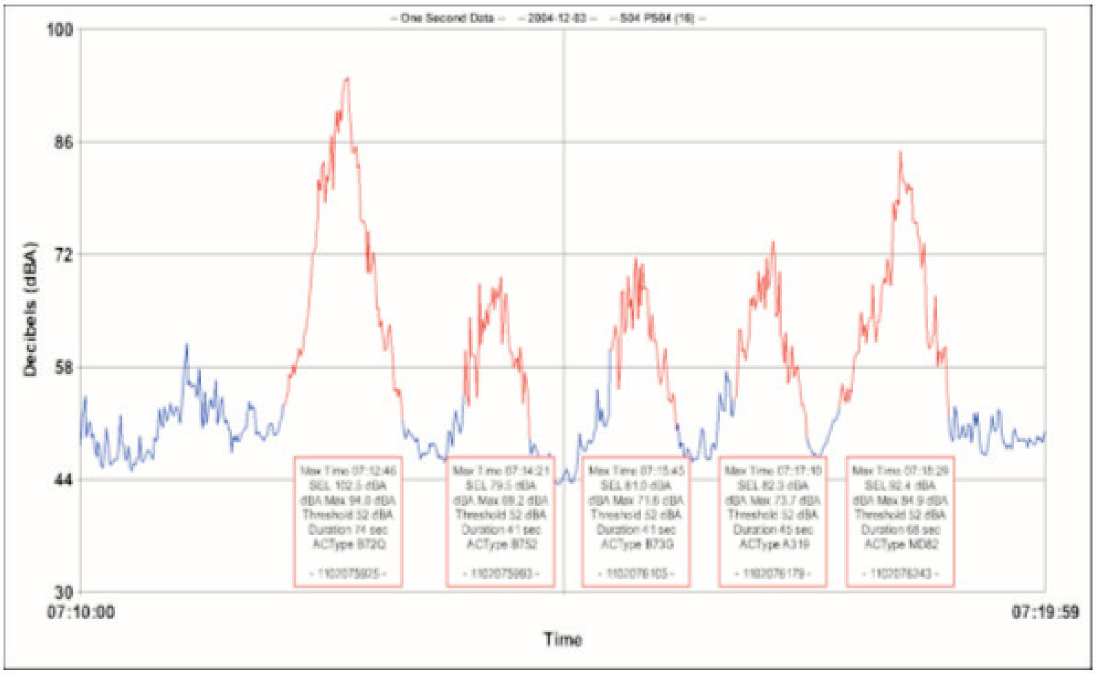
measured. This table illustrates the range in noise levels that exists at each site. Note that aircraft noise is included in this information and is typically the source of the peak, or maximum, noise levels. Although Lmax is not technically a component of the ambient noise levels, it is included in the table because at most noise monitor locations aircraft noise is the loudest event.

Figure D-1

Sample Time History Noise Plot of Aircraft and Ambient Noise

Period: Dec 03, 2004 7:10:00 to Dec 03, 2004 7:29:59

Site: PS04 - 37610 Harvest Lane



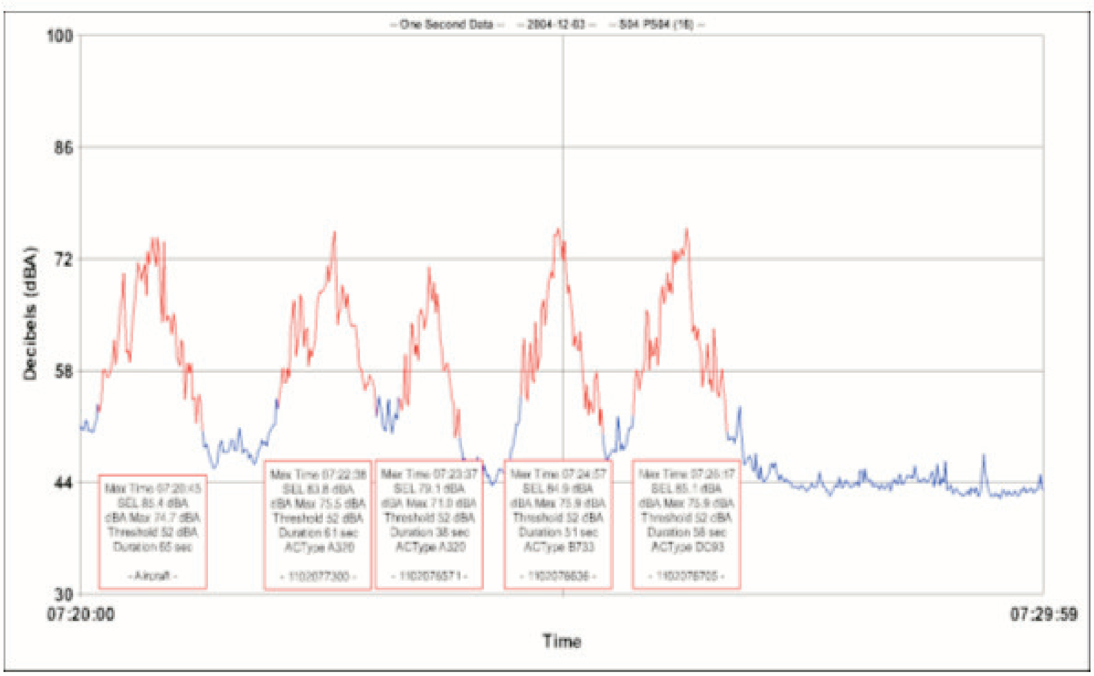


Figure D1 **Sample Time History Noise Plot of Aircraft and Ambient Noise**

This same information is illustrated in **Figure D2**. The top portion of the figure presents data for the long-term permanent sites. The bottom portion presents the data for the short-term sites. Industry practices indicate that the L90 generally represents the ambient or background sound level. It represents the level of noise that is exceeded 90 percent of the time. Therefore it is commonly referred to as the residual sound when other sources of noise are not present and is the level above which noise events occur, such as an aircraft over-flight or train pass-by. The L50 noise level is referred to as the median noise level. Half the time the noise is below this level; half the time it is above this level. During peak hours of aircraft activity, the L50 noise level could be influenced by the aircraft noise, but on a 24-hour basis, this level is generally reflective of ambient noise levels.

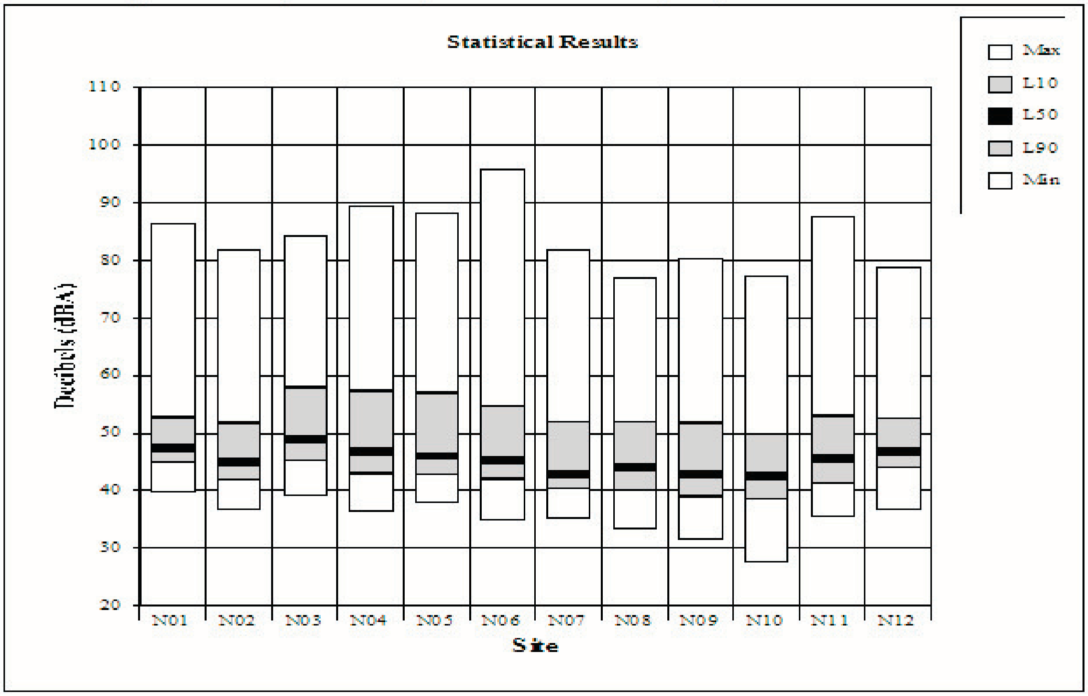
The results of all of the measurements conducted for this study showed that background L90 noise levels ranged from a low of 39 dBA to a high of 50 dBA. Most sites had background L90 noise levels in the mid 40s dBA. The majority of these sites are located in relatively quiet settings that are not exposed to community noise sources, such as highways. The sites with the higher ambient noise levels were typically exposed to roadway noise. These levels are typical of urban residential environments.

Ambient noise levels vary by day and time of day. To illustrate this range in noise, ambient noise data from one of the sites (Site S04) is summarized in **Figure D3**. The data for all other sites is presented on the Part 150 Noise Study Website, http://www.airportnetwork.com/dtw. The top portion of **Figure D3** presents the day-to-day measurement results. The bottom portion of the figure shows each hour of measurement for one typical day. The results show that day-to-day ambient noise levels are approximately the same for each day, except occasional days that are higher. These higher ambient days occurred generally during bad weather conditions. As is shown, ambient noise levels do vary by time of day, where background noise levels are quieter at night and during late evening and early morning hours. The ambient levels increase during daytime hours. Typical daytime ambient noise levels are about 5 to 10 dBA higher than the nighttime hours.

Figure D-2

Site Specific Ambient Noise Measurement Results (Aircraft Events Included)

North Long-Term Sites (December 15, 2004 to December 30, 2004)



South Long-Term Sites (November 30, 2004 to December 15, 2004)

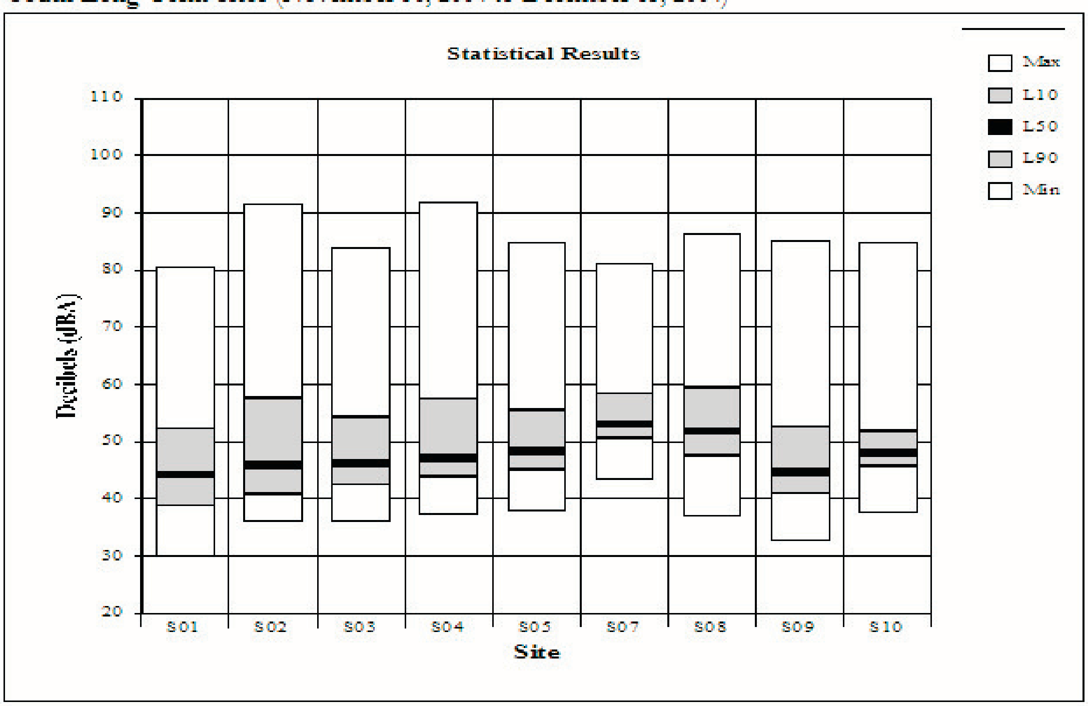


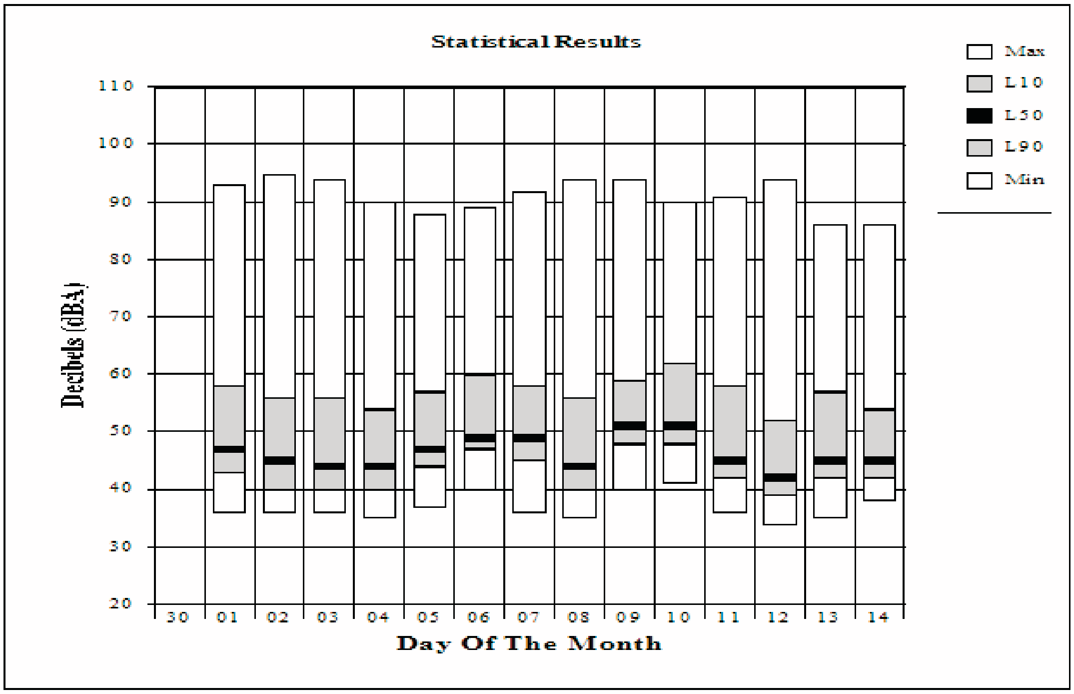
Figure D2 **Site Specific Ambient Noise Measurement Results (Aircraft Events Included)**

Figure D3

Site Specific Ambient Noise Measurement Results (Aircraft events included)

Site: PS04 - 37610 Harvest Lane

Period: November 30, 2004 to December 14, 2004



Period: December 7, 2004

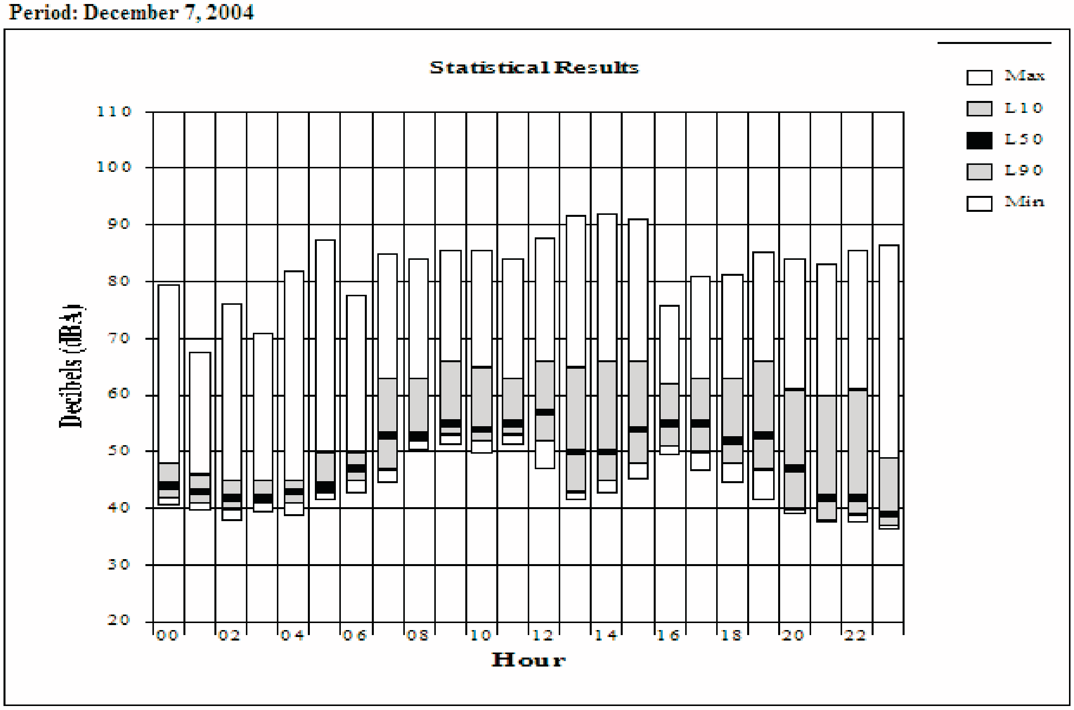


Figure D3 **Site Specific Ambient Noise Measurement Results (Aircraft Events Included)**

Single Event Sound Levels From Aircraft

Aircraft single event noise levels were identified at each measurement site. The acoustic data included the maximum noise level (Lmax), Sound Exposure Level (SEL), and the time duration of aircraft events. The single events measured during the survey were correlated with flight operations information. Using single event noise data, it was possible to separately identify the single event sound levels from the different aircraft types operating at Detroit Metro Airport. The single event levels are summarized in the following paragraphs. Additional single event sound level data are presented in the web site (http://www.airportnetwork.com/dtw).

The number of aircraft noise events measured daily at a site is presented graphically in **Figure D4**. This figure presents one day of events for one measurement site (Site S08). The table presents the SEL noise value plotted as a histogram. The Y/vertical axis presents the number of events in each hour. The X/horizontal axis shows the hour of the day. The SEL values are plotted vertically for each event in each hour. Data for each long-term site and each measurement day is presented on the web site.

The single event data were analyzed in terms of noise level per aircraft type and in terms of the total range in noise events. An example of the range in noise data is presented for two sites in **Figure D5**. This figure presents a histogram of all the aircraft events that were measured at Site N04 and at Site N06. The histogram shows the number of measured aircraft events on the vertical column and the measured SEL on the horizontal column. Site N04 is representative of a location closer to the Airport, while Site N06 is representative of a location more distant from the Airport. These results show the wide range in aircraft events that occur at each site, as well as the number of noise events.

Once correlated to the operational information, the single event levels were analyzed in terms of noise level per aircraft type. An example of the single event noise level by aircraft type is presented in **Figures D6** and **D7**. The data for Site N04 is presented in **Figure D6** for departure noise levels and **Figure D7** for arrival levels. These figures show the type of aircraft, the number of measured noise events correlated to that aircraft type, and the average noise level measured for that aircraft type. The longer bar graph illustrates those aircraft with the loudest events. The louder events were generally older generation commercial aircraft. These data also illustrate the difference in noise events generated by departures versus arrivals. These data show that departure noise generates higher noise level and a wider range in noise per the different aircraft types. For arrivals, the relative difference in noise among the different aircraft types is less.

Figure D4

One Day of Measured Aircraft Noise Events

Period: December 9, 2004

Site: S08 - 33675 Sibley Road

This table presents one day of events for one measurement site. The table presents the SEL noise value plotted as a histogram. The vertical axis presents the number of events in each hour. The horizontal axis is the hour of the day. The SEL values are plotted vertically for each event in each hour. The data shows that the noise events generally occur during peak times of the day. This peak period varies from day to day and is not always the same hours. Numbers in Red are higher noise level events when the SEL exceeds 94.5 dBA.

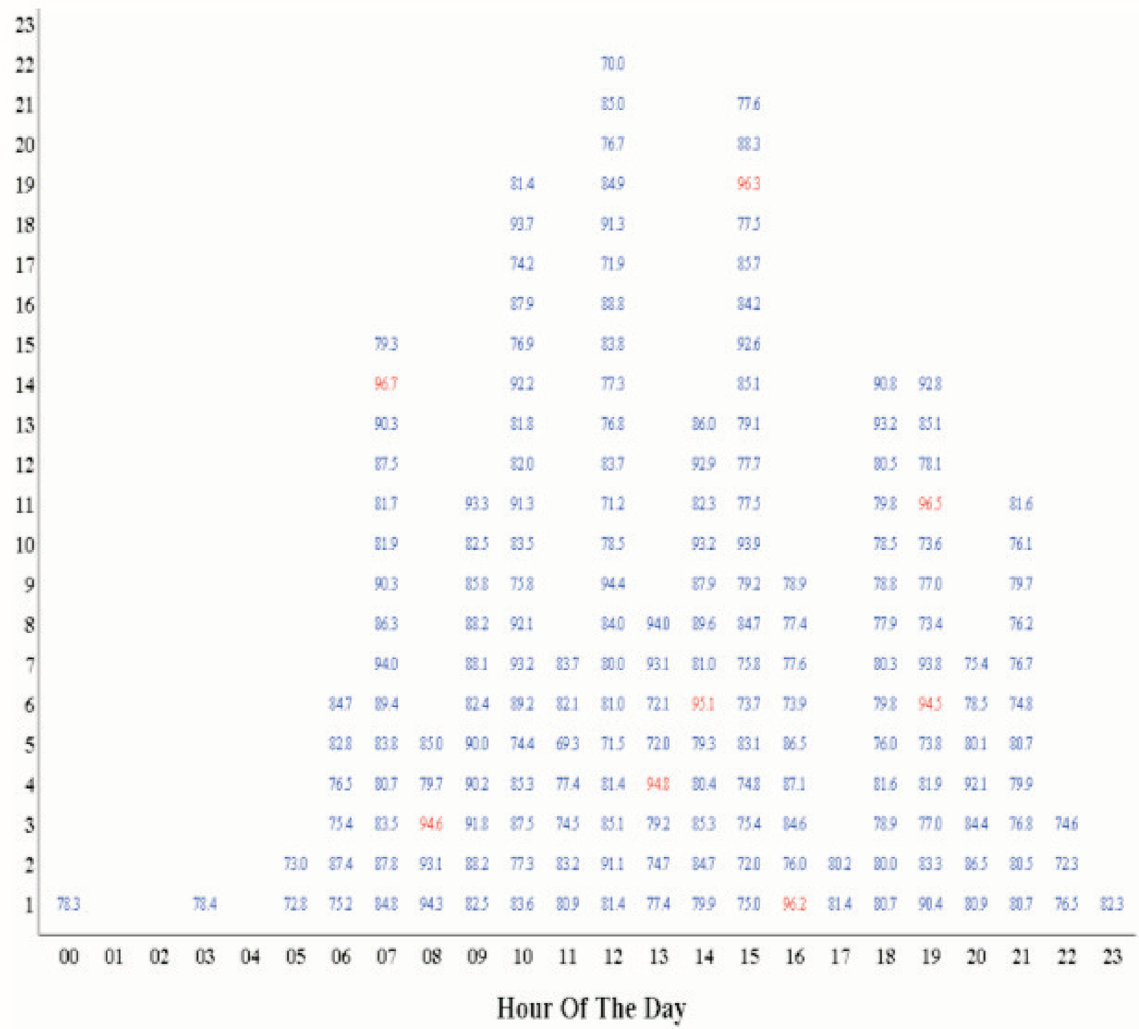
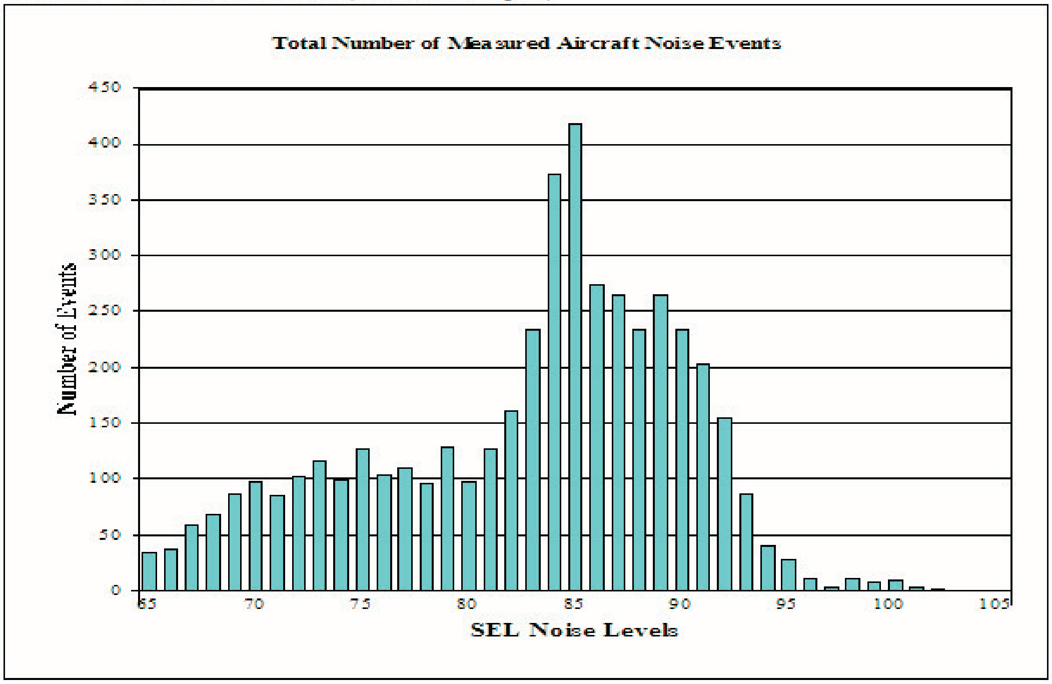


Figure D4 **One Day of Measured Aircraft Noise Events**

Figure D5
Range of Noise and Number of Events Histrograms
Period: November 30, 2004 to December 14, 2004

Site: S04 - 37610 Harvest Lane (closer to the airport)



Site: S01 - 39933 Wear Road (more distant from the airport)

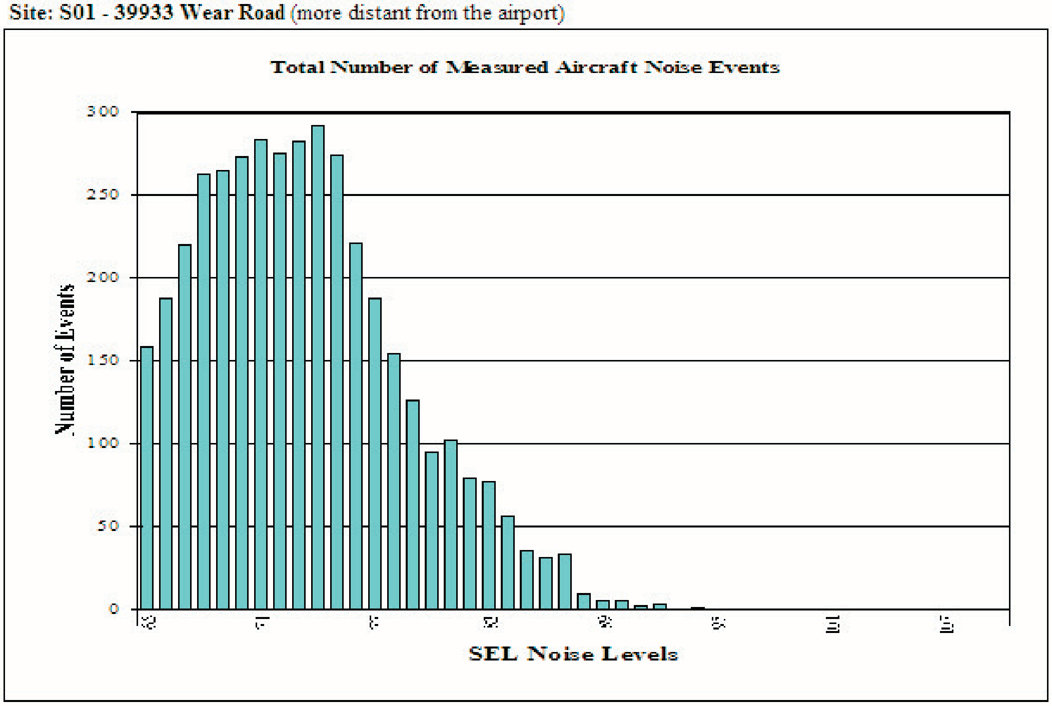


Figure D5 **Range of Noise and Number of Events Histograms**

Figure D6
Single Event Noise Level by Aircraft Report
Detroit Metropolitan (Wayne County) Airport
Period: December 2004
Site: N05 - PN05 - 29536 Thomas Circle
Operations: D Runways: 4L;4R Tracks: ALL

Aircraft	Event Count	Energy Average SEL
A330	2	82.1
B72Q	4	99.4
B73B	23	82.1
B744	11	97.0
B752	78	80.6
BA46	15	78.2
CRJ2	31	71.3
DC10	2	88.1
DC9Q	87	89.1
EA32	71	82.1
MD80	11	91.2
Other Aircraft	4	84.2

Graph of Energy Average SEL

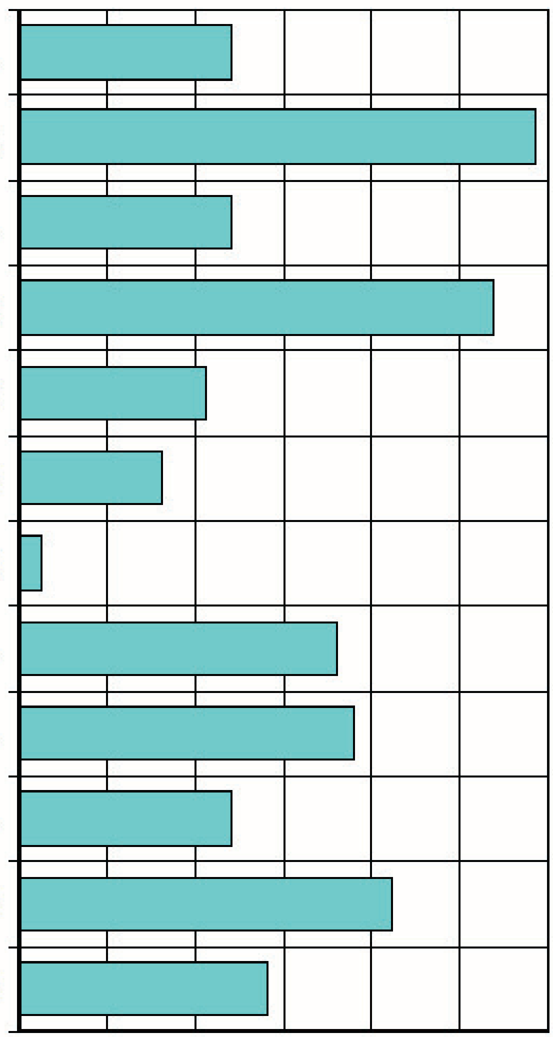


Figure D6 **Single Event Noise Level by Aircraft Report**

Figure D7
Single Event Noise Level by Aircraft Report
Detroit Metropolitan (Wayne County) Airport
Period: December 2004
Site: N05 - PN05 - 29536 Thomas Circle
Operations: A Runways: 22R;22L Tracks: ALL

Aircraft	Event Count	Energy Average SEL
A330	41	86.1
B72Q	17	89.2
B73B	158	84.2
B73Q	1	83.8
B744	21	88.8
B752	223	85.2
BA46	159	81.1
CRJ2	551	80.3
CRJ7	4	80.0
DC10	15	88.4
DC8Q	7	89.2
DC9Q	601	86.2
EA32	426	83.5
MD11	8	89.8
MD80	133	85.0
SF34	375	82.8
Other Aircraft	41	82.0

Graph of Energy Average SEL

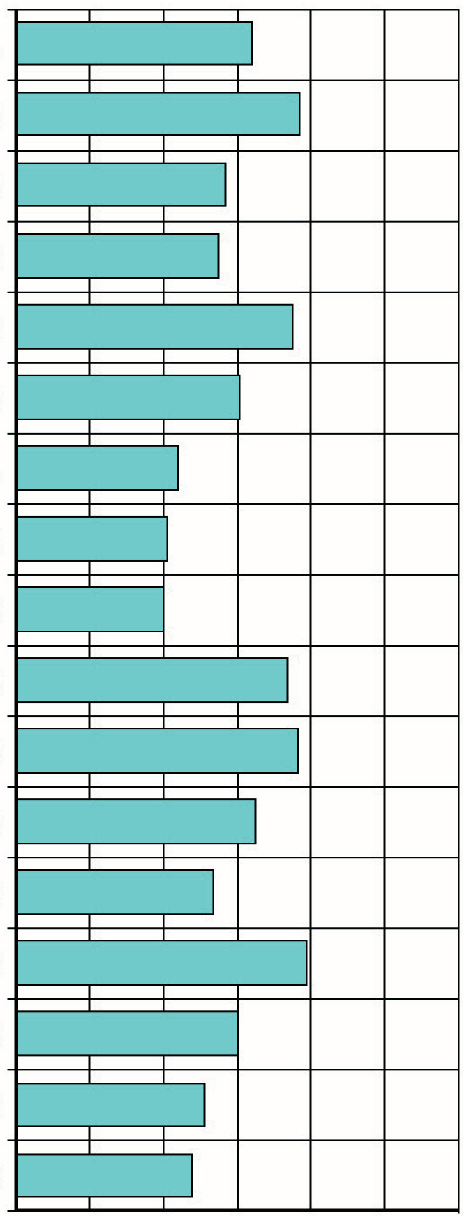


Figure D7 **Single Event Noise Level by Aircraft Report**

To better illustrate which aircraft generate the highest noise events, the 25 loudest single event noise levels at each measurement site were identified. These events were correlated with an aircraft type and plotted. The results are shown in **Figures D8** and **D9** for Sites N04 and N01, respectively. The figure includes the date and time of the event, the aircraft type, the operation, and the associated noise levels. For most of the measurement locations, the loudest identified aircraft were typically older generation commercial aircraft, such as DC9s. Data for other sites are presented on the Detroit Metropolitan Wayne County Airport Part 150 project web site, which can be found at (www.airportnetwork.com/dtw).

Day-Night Average Sound Level (DNL) Noise Levels

Aircraft-related DNL levels were identified for each of the long-term noise monitoring sites. **Table D2** presents the results of the DNL noise measurements at the 22 long-term noise-monitoring locations. This table lists the average DNL due to aircraft events for the period monitored at each site (November 30, 2004 to December 30, 2004).

It is important to note that the DNL is defined as an average annual sound level. As actual measurements were not conducted over a year, estimates of DNL can be generated from long-term measurement data to enable comparison to the computer generated noise exposure contour maps discussed in a later section. Therefore, the actual measurements noted as DNL reflect either a daily or short-term period approximation of the average annual noise levels.

Figure D10 shows the same results of the DNL noise measurements at the 22 long-term sites in graphical format. The top portion of the graph shows the average DNL noise level measured at each noise monitoring location for the duration of the measurement survey. The bottom portion of the table shows the range of daily DNL-type values, along with the average DNL for the entire measurement period. The results show the wide range in noise levels that is experienced at each location. The number of operations and the pattern of the operations vary with the weather, which affects which runway is used. Peak day DNL-type data were an average of 3 to 7 dBA higher than the average day.

Figure D11 graphically presents the DNL noise level due to aircraft events for each day the noise level was monitored at Site N04. **Figure D12** graphically presents the same data at Site S04. This figure presents the day-to-day change in noise levels. The bottom portion of the graphic represents the range of measured SEL noise levels during the measurement period. Additional figures presenting this information for the other sites are presented on the Detroit Metropolitan Wayne County Airport Part 150 project web site (http://www.airportnetwork.com/dtw).

Table D2
DNL NOISE MEASUREMENT RESULTS FOR LONG TERM SITES, NORTH and SOUTH
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update
Measurement Period November 30, 2004 through December 30, 2004

NMS	Description	Address	Aircraft DNL Noise Level
Long-Term Sites (North)			
N1	Wayne	2988 Hubbard Street	55
N2	Wayne	4851 Harrison Street	56
N3	Romulus	6547 Gloria Street	60
N4	Westland	30131 Julius Blvd	63
N5	Inkster	29536 Thomas Circle	62
N6	Inkster	1072 Eastwood Street	59
N7	Dearborn Heights	337 Rosemary Street	56
N8	Dearborn	1315 N. Silvery Lane	54
N9	Dearborn	24407 Rockford Street	54
N10	Dearborn	22262 Long Blvd	52
N11	Inkster	27019 Penn Street	55
N12	Dearborn Heights	24096 Lehigh Street	55
Long-Term Sites (South)			
S1	New Boston	39933 Wear Road	56
S2	Belleville	39791 Judd Road	61
S3	New Boston	31740 King Road	59
S4	New Boston	37610 Harvest Lane	65
S5	Romulus	37541 Barth Street	61
S6	Romulus	15248 Colbert	61
S7	Belleville	17007 Renton Road	56
S8	New Boston	33675 Sibley Road	62
S9	New Boston	21950 Dickenson Road	58
S10	Brownstown	32304 Stefano Court	48

Source: BridgeNet International

Figure D8
Twenty five Loudest SEL Noise Events
Period: November 30, 2004 to December 14, 2004
Site: S06 - 15248 Colbert

Aircraft	Airline	Event Time	Aircraft	Ops	Rwy	Lmax	SEL	Graph Of SEL
	NORTHWEST	Dec 04, 09:31	DC95	D	21R	91.4	100.9	
	NORTHWEST	Dec 04, 10:40	DC95	D	21R	90.4	100.1	
	NORTHWEST	Dec 04, 13:40	DC94	D	21R	92.3	99.6	
	NORTHWEST	Dec 04, 10:47	DC95	D	21R	90.8	99.4	
	NORTHWEST	Dec 13, 10:03	DC95	D	21R	88.0	98.3	
	NORTHWEST	Dec 08, 07:17	DC93	D	21L	87.8	97.8	
	NORTHWEST	Dec 12, 13:50	DC93	D	21R	89.6	97.8	
	NORTHWEST	Dec 08, 21:20	DC95	D	21R	88.9	97.6	
	NORTHWEST	Dec 12, 19:57	DC93	D	21R	87.5	97.5	
	NORTHWEST	Dec 12, 17:51	DC95	D	21R	88.3	97.1	
	NORTHWEST	Dec 08, 10:36	DC94	D	21R	82.3	96.8	
	NORTHWEST	Dec 12, 17:47	DC95	D	21R	86.7	96.6	
	NORTHWEST	Dec 04, 14:19	DC95	D	21R	86.5	96.5	
	NORTHWEST	Dec 04, 13:49	DC93	D	21R	88.6	96.3	
	NORTHWEST	Dec 04, 09:07	DC93	D	21R	86.6	96.1	
	NORTHWEST	Dec 12, 14:37	DC95	D	21R	87.3	96.1	
	NORTHWEST	Dec 04, 12:32	DC94	D	21R	85.7	96.1	
	NORTHWEST	Dec 08, 15:24	DC94	D	21R	85.6	96.0	
	NORTHWEST	Dec 04, 15:29	DC93	D	21R	88.2	95.9	
	NORTHWEST	Dec 12, 17:46	DC93	D	21R	88.1	95.9	
	NORTHWEST	Dec 04, 10:27	DC93	D	21R	85.4	95.7	
	NORTHWEST	Dec 04, 14:25	DC93	D	21L	86.4	95.7	
	NORTHWEST	Dec 03, 17:21	DC93	D	21R	86.6	95.7	
	NORTHWEST	Dec 09, 09:43	DC95	D	21R	85.9	95.5	
	NORTHWEST	Dec 12, 21:21	DC95	D	21R	87.1	95.5	

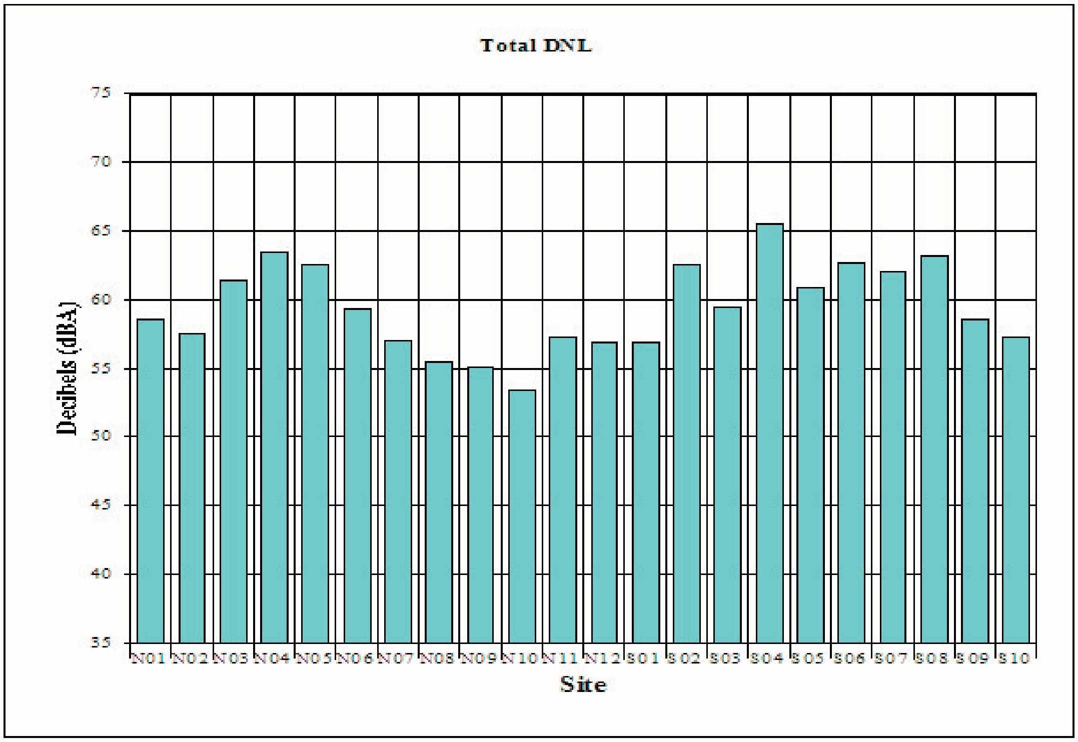
Figure D8 **Twenty Five Loudest SEL Noise Events**

Figure D9
Loudest Aircraft Noise Events Site Report
Period: December 15, 2004 to December 30, 2004
Site: N04 - 30131 Julius Blvd.

Aircraft	Airline	Event Time	Aircraft	Stage	Ops	Rwy	Lmax	SEL	Graph Of SEL
	CA	Dec 26, 11:07	B722	3	D	4R	94.2	103.9	
	CA	Dec 17, 09:36	B72Q	3	D	4R	92.4	101.8	
	CA	Dec 19, 07:51	B72Q	3	D	4R	92.2	101.1	
	U	Dec 19, 14:01	B744	3	D	4R	92.6	99.9	
	CA	Dec 23, 13:37	B72Q	3	D	4R	89.9	99.8	
	NORTHWEST	Dec 22, 14:10	DC93	3	D	4R	85.6	99.4	
	NORTHWEST	Dec 22, 14:17	B744	3	D	4R	89.6	99.1	
	NORTHWEST	Dec 19, 13:33	B744	3	D	4R	90.8	98.4	
	NORTHWEST	Dec 19, 14:24	B744	3	D	4R	91.1	98.3	
	NORTHWEST	Dec 26, 14:05	B744	3	D	4R	90.5	98.2	
	NORTHWEST	Dec 26, 15:20	B744	3	D	4R	90.8	97.9	
	NORTHWEST	Dec 22, 13:43	B744	3	D	4R	89.3	97.9	
	SPIRIT	Dec 22, 19:34	MD83	3	D	4R	86.3	95.7	
	NORTHWEST	Dec 22, 19:41	DC95	3	D	4R	82.0	95.2	
	NORTHWEST	Dec 23, 14:49	B744	3	D	4R	86.1	95.2	
	NORTHWEST	Dec 19, 15:07	B744	3	D	4R	86.3	95.1	
	GA	Dec 18, 09:37	LJ24	2	A	22R	84.6	94.8	
	KITTY HAWK	Dec 21, 07:04	B72Q	3	A	22R	88.2	94.7	
	NORTHWEST	Dec 26, 14:12	DC93	3	D	4R	79.6	94.6	
	SPIRIT	Dec 17, 09:41	MD83	3	D	4R	85.4	94.6	
	SPIRIT	Dec 22, 21:54	MD83	3	D	4R	86.8	94.6	
	NORTHWEST	Dec 18, 07:48	DC95	3	A	22R	86.2	94.4	
	SPIRIT	Dec 26, 20:46	MD83	3	D	4R	84.4	94.3	
	FEDERAL EXPRESS	Dec 22, 10:06	B72Q	3	A	22R	87.0	94.1	
	NORTHWEST	Dec 26, 13:26	B744	3	D	4R	85.0	94.1	

Figure D9 **Loudest Aircraft Noise Events Site Report**

Figure D-10
Aircraft DNL
Period: November 30, 2004 to December 30, 2004
Neighborhood: All Long-term Sites



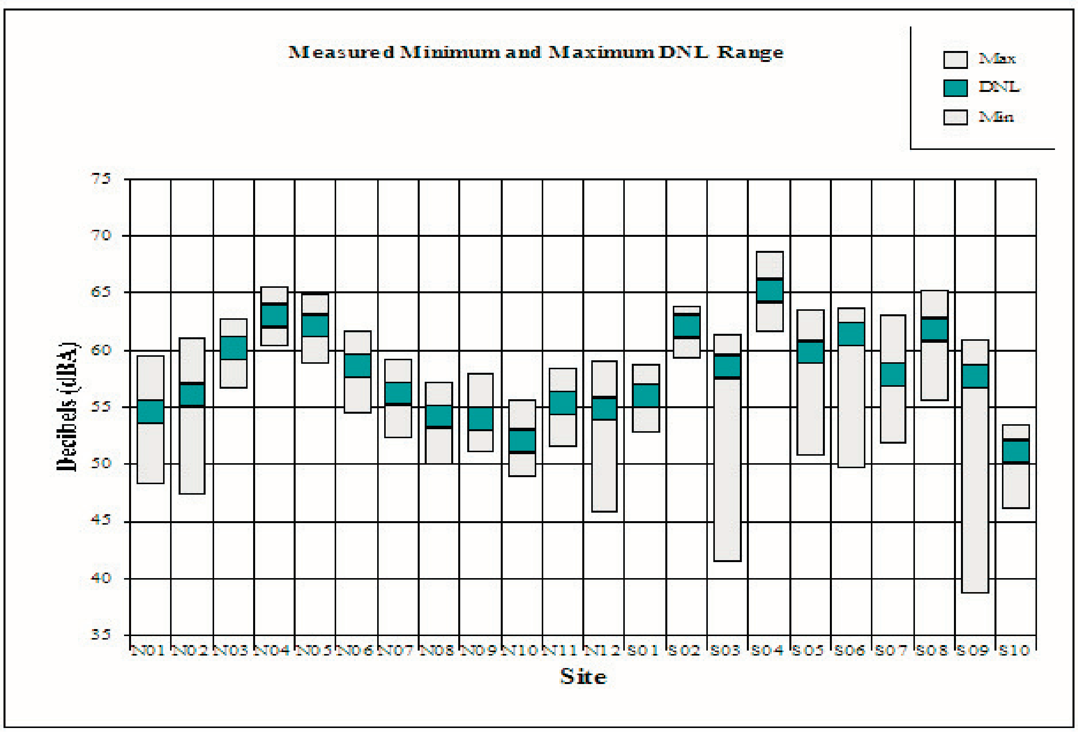
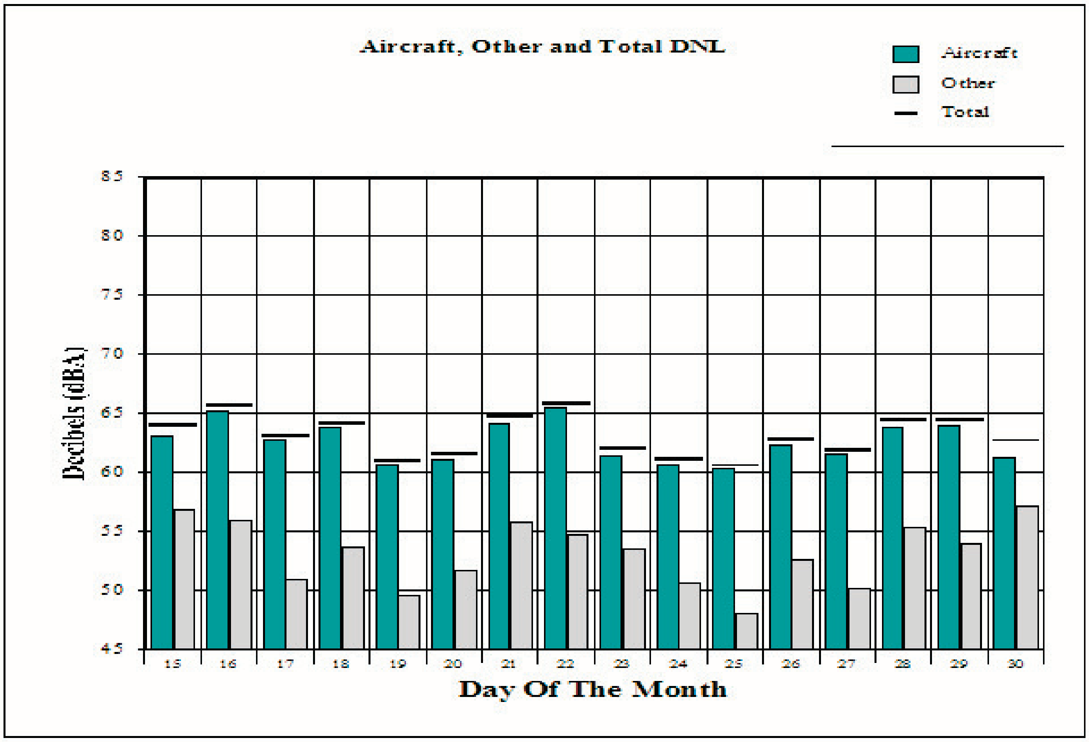


Figure D10 **Aircraft DNL**

Figure D-11
DNL Contribution and SEL Distribution Results
Period: December 15, 2004 to December 30, 2004
Site: N04 - 30131 Julius Blvd.



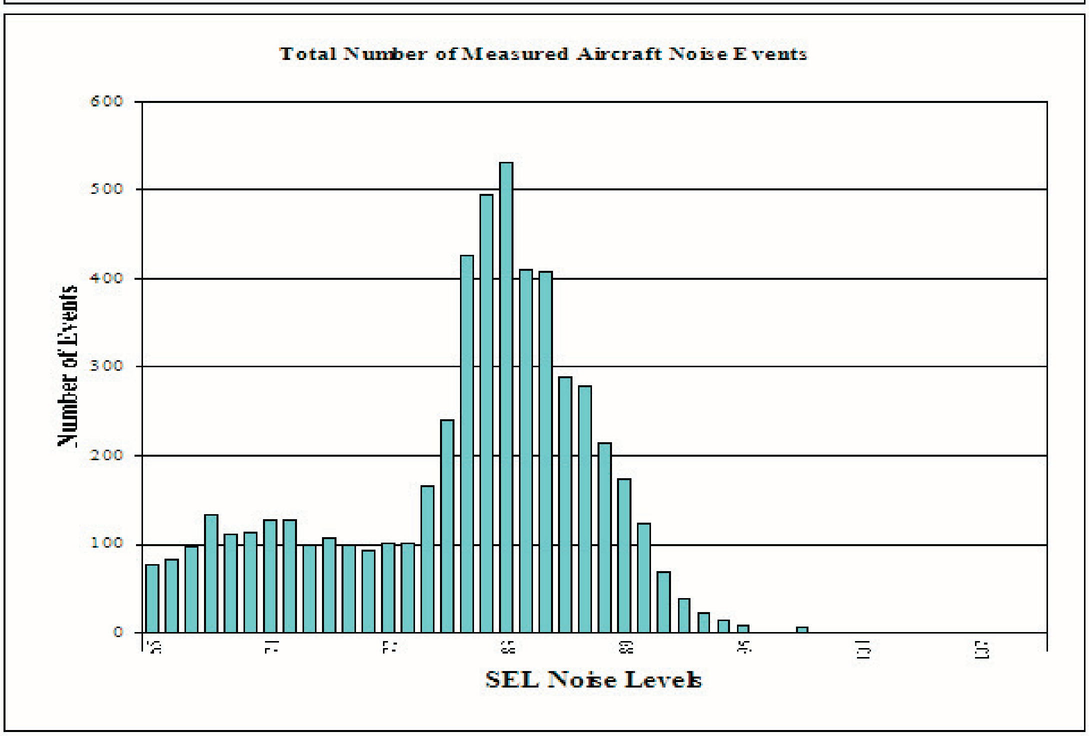


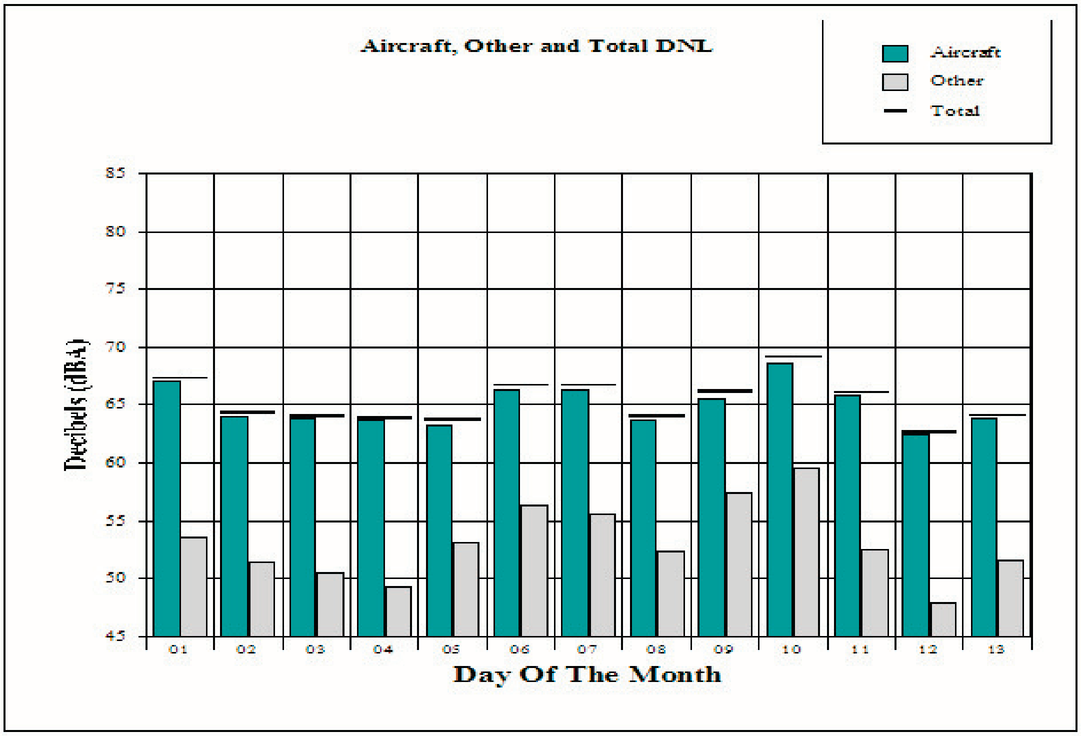
Figure D11 **DNL Contribution and SEL Distribution Results**

Figure D-12

DNL Contribution and SEL Distribution Results

Period: December 1, 2004 to December 13, 2004

Site: S04 - PS04 - 37610 Harvest Lane



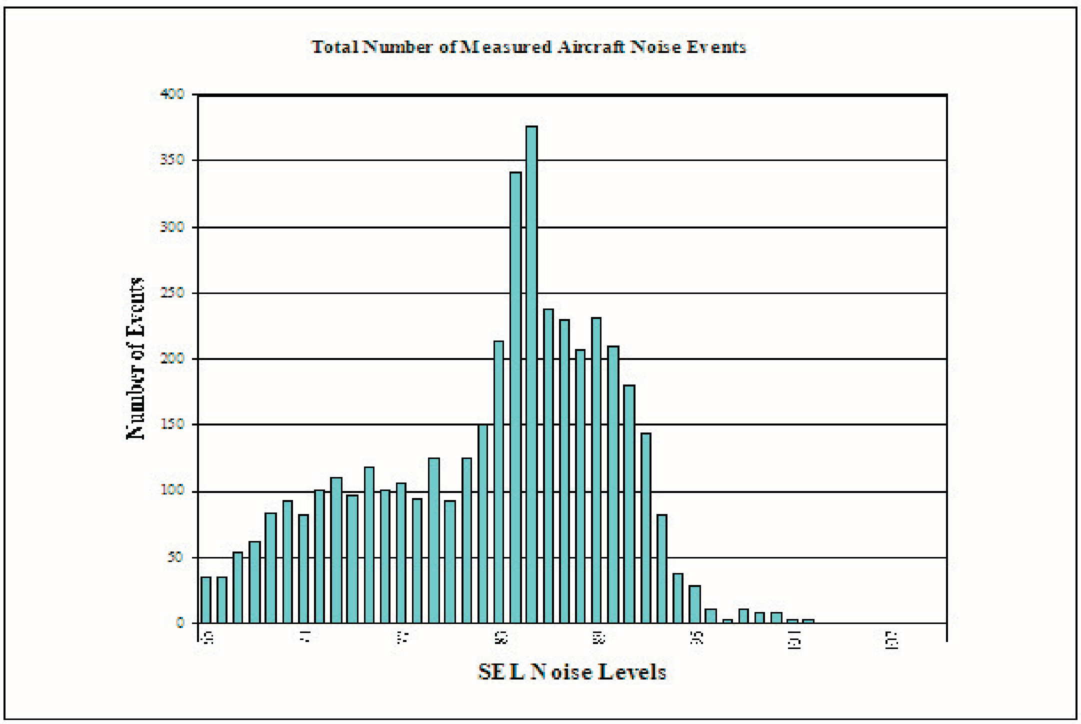


Figure D12 **DNL Contribution and SEL Distribution Results**

As described in the Methodology section, the primary purpose of the measurements was not to measure DNL, but to measure the single event noise levels that can be used to validate the aircraft noise exposure contour maps.

Hourly Noise Levels

Hourly noise level data were recorded for each of the measurement locations. Hourly values include the aircraft LEQ, non-aircraft LEQ, and total LEQ.

An example of the hourly LEQ noise data, including aircraft and non-aircraft events, for Site PS08 is presented in **Table D3**. This table shows that the hourly noise level varies throughout the day. Also note that there are some louder nighttime hours; however, typically the nighttime operations are less except for some cargo operations on the east side of the Airport.

Table D-3
Hourly Noise Level Site Report
Period: December 3, 2004 to December 15, 2004
Site: S09 - 21950 Dickenson Road

Metric: Aircraft LEQ

DATE	Hour Of The Day																								DNL
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
Dec 3	--	--	--	--	--	--	--	--	--	--	--	--	56	62	59	63	58	61	56	63	41	62	49	55	61
Dec 4	0	46	36	45	0	34	57	66	63	57	60	58	62	61	60	63	60	62	61	63	51	62	50	0	61
Dec 5	0	39	40	34	0	52	57	63	53	40	62	27	38	27	43	30	28	37	39	33	46	35	33	0	56
Dec 6	0	25	41	29	0	25	15	0	0	0	31	27	30	27	29	23	18	28	35	39	33	27	22	23	38
Dec 7	24	21	23	21	14	0	43	45	33	0	0	42	60	60	59	62	62	50	48	45	44	58	55	54	57
Dec 8	50	0	27	40	0	48	57	63	56	59	58	57	63	63	61	63	58	64	54	64	55	62	55	52	61
Dec 9	32	0	0	41	38	47	52	62	57	59	62	48	60	60	61	62	53	33	56	60	54	35	47	36	58
Dec 10	32	44	34	0	26	33	29	41	43	40	43	35	47	43	45	47	42	50	47	50	49	53	50	51	52
Dec 11	44	46	38	30	0	37	30	49	48	54	49	41	45	48	47	51	47	62	58	50	44	44	41	50	53
Dec 12	22	0	0	0	39	45	50	62	61	61	59	61	56	57	59	63	62	60	61	66	57	65	48	51	60
Dec 13	39	34	38	37	38	32	56	65	59	65	65	63	63	47	44	45	40	49	34	45	44	46	44	48	59
Dec 14	37	38	40	41	34	37	39	51	31	39	0	29	38	43	39	30	31	40	46	62	53	61	55	55	56
Dec 15	0	41	0	39	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	46
Energy Average	41	41	36	39	33	45	53	61	57	58	59	56	59	58	57	60	57	58	56	60	51	59	51	51	58

Table D3 **Hourly Noise Level Site Report**

Time Above Noise Measurement Results

Time Above is the time in minutes per day that the noise levels were greater than a specific sound level. The Time Above (TA) levels that were determined from the noise measurement survey are: TA 65 dBA, which is designed to reflect when aircraft are clearly audible; TA 75 dBA, which is designed to reflect when aircraft would start to cause speech interference, and TA 85 dBA, which is designed to reflect when aircraft are sufficiently loud so that speech is clearly interfered with.

The Time Above 65 dBA is not to imply that noise levels below 65 dBA would not be audible or be annoying to all individuals, but it is reflective of when an aircraft would be clearly audible in the typical daytime environments. The results of the Time Above measurements are summarized in **Table D4**. These results show the amount of time that the noise levels were greater than the specified noise levels.

The results show that the Time Above 85 dBA noise levels occur less than one minute per day for all sites. Time Above 85 dBA represents the high interruption level. The results show that the high noise levels do not occur often and, when they do occur, the duration is short. Generally, the noise is only above 85 dBA when an aircraft is directly overhead or in close proximity. The duration of events that have a maximum noise level greater than 85 dBA is typically less than 10 seconds. The data shows that the majority of the noise from aircraft operations is below 85 dBA.

In terms of the Time Above 75 dBA level, the results show that the Time Above 75 dBA noise levels occur less than 21 minutes per day. Time Above 75 dBA roughly represents when some degree of activity interference may occur, such as speech communication. For those aircraft events that generate noise levels greater than 75 dBA, the noise from the aircraft over-flight is generally above 75 dBA for a period of 10 to 30 seconds.

The results in terms of Time Above 65 dBA occur between 14 and 85 minutes per day. The majority of measurable noise events from aircraft operations generated noise levels greater than 65 dBA. The noise events from aircraft noise are on average above 65 dBA for 50 seconds. Many events from older and louder hush kit aircraft can last longer.

Table D4
TIME ABOVE MEASUREMENT RESULTS
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update

			Time Above Noise Level (Minutes per Day)		
NMS	**Description**	**Address**	**TA-65**	**TA-75**	**TA-85**
Long-Term Portable Sites – North Sites					
N1	Wayne	2988 Hubbard Street	14.2	0.9	0.0
N2	Wayne	4851 Harrison Street	14.7	1.5	0.0
N3	Romulus	6547 Gloria Street	52.2	2.9	0.0
N4	Westland	30131 Julius Blvd	79.8	11.2	0.2
N5	Inkster	29536 Thomas Circle	72.6	7.8	0.1
N6	Inkster	1072 Eastwood Street	38.5	1.1	0.0
N7	Dearborn Heights	337 Rosemary Street	24.4	0.4	0.0
N8	Dearborn	1315 N. Silvery Lane	11.9	0.2	0.0
N9	Dearborn	24407 Rockford Street	13.8	0.2	0.0
N10	Dearborn	22262 Long Blvd	7.5	0.1	0.0
N11	Inkster	27019 Penn Street	17.8	1.1	0.0
N12	Dearborn Heights	24096 Lehigh Street	16.8	1.0	0.0
Long-Term Portable Sites – South Sites					
S1	New Boston	39933 Wear Road	14.3	0.3	0.0
S2	Belleville	39791 Judd Road	68.1	6.0	0.2
S3	New Boston	31740 King Road	34.9	4.6	0.0
S4	New Boston	37610 Harvest Lane	85.2	20.7	0.6
S5	Romulus	37541 Barth Street	48.3	6.9	0.3
S6	Romulus	15248 Colbert	74.5	7.8	0.3
S7	Belleville	17007 Renton Road	40.3	1.5	0.0
S8	New Boston	33675 Sibley Road	74.7	7.5	0.1
S9	New Boston	21950 Dickenson Road	30.4	3.6	0.0
S10	Brownstown	32304 Stefano Court	5.0	0.1	0.0

Source: BridgeNet International

Existing Baseline Noise Modeling Inputs

Existing Aircraft Operations

The existing noise environment for Detroit Metropolitan Wayne County Airport was evaluated based upon the level of aircraft operations in 2004, and the associated airport operational characteristics. A Part 150 Noise Compatibility Study requires that the baseline or existing noise exposure contour maps reflect annual conditions using a recent continuous 12-month period. The development of the Baseline conditions used data from a variety of sources. The sources of data for this study are listed below:

- Aircraft Tower Counts
- Aircraft Situational Display Information (ASDi) Data
- Airline Activity Reports
- Field Observations and Noise Monitoring Results from Noise Measurement Survey
- Discussions with Airport Staff

As noted earlier, aircraft noise exposure maps are generated using the FAA's Integrated Noise Model (INM). The INM computer model requires a variety of operational data to evaluate the noise environment around an airport. These data include the following information, which are discussed in detail in the following paragraphs:

- Total Aircraft Activity Levels
- Aircraft Fleet Mix Categories
- Detailed Fleet Mix
- Time of Day
- Runway Use
- Departure and Arrival Procedures
- Flight Paths
- Flight Path Utilization

Total Aircraft Activity Levels

The total aircraft operational levels were derived directly from the FAA's Air Traffic Control (ATC) tower activity data, called tower counts. The tower count data showed that, for 2004, there were a total of approximately 522,641 operations, or an average of

1,432 operations per day (an operation is one takeoff or one landing). The tower count information also provided a breakdown as to ATC category of operations reflecting broad categories of aircraft operators (i.e., air carrier, air taxi, military, etc). **Table D5** summarizes the tower count data for 2004. Air taxi operations are essentially non-scheduled passenger operations generally using general aviation type aircraft.

Table D5
AIRPORT TOWER COUNT FOR BASELINE PERIOD
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update

Category	Annual Operations	Average Daily Operations
Air Carrier	331,629	909
Air Taxi	175,694	481
General Aviation	15,168	42
Military	150	<1
TOTAL	**522,641**	**1,432**

Calendar Year 2004
Source: BridgeNet International

Aircraft Fleet Mix Categories

The breakdown of aircraft operator categories identified in ATC tower counts is useful for air traffic purposes, but does not provide sufficient detail necessary for the noise analysis. As a result, the breakdowns by aircraft fleet mix categories of aircraft operations are presented within this section with further refinements of these categories in the subsequent section **Detailed Aircraft Fleet Mix**. Aircraft fleet mix categories are defined relative to type of aircraft (i.e., jet or propeller), as well as size and noise characteristic. These categories were determined from the different sources with the primary source being the landing reports that each airline submits to the Airport Authority. **Table D6** presents operations for the different categories of aircraft.

It is not possible to definitively categorize all of the operations into unique groups. For example, some general aviation propeller operations are actually unscheduled commuter propeller flights. Similarly, some air taxi operations are small single engine piston aircraft that may be categorized as general aviation piston, or vise versa. But these generally define the categories of operations that occur at the Airport and will be used within this study.

Table D6
OPERATIONS BY AIRCRAFT CATEGORY - 2004 BASELINE PERIOD
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update

Operations Category	Daily Operations	Annual Operations	Percent Operations
Air Carrier Wide Body	41	14,881	3%
Air Carrier Narrow Body Louder	427	155,882	30%
Air Carrier Narrow Body Quieter	388	141,485	27%
Regional Jets	366	133,582	25%
Commuter Prop	152	55,606	11%
General Aviation Jet	38	13,980	3%
GA/Air Taxi/Cargo Prop	20	7,225	1%
TOTAL	**1,432**	**522,641**	**100%**

Source: BridgeNet International

Detailed Aircraft Fleet Mix

The specific mix of aircraft that operate at the Airport is one of the most important airport noise exposure factors. Fleet mix data were determined from all of the data described previously, with the primary source being the FAA's actual radar data. A full year of Aircraft Situational Display Information (ASDi) radar data for 2004 was collected and used to determine the existing fleet mix. This data was supplemented with Landing Activity Reports submitted by Northwest Airlines. The fleet mix assumptions are presented in **Table D7**. This table presents the average daily operations for each type of aircraft used in the INM noise model, as well as a description of these aircraft.

The aircraft fleet mix data reported in the previously identified sources does not identify the specific engine type used on the aircraft, which is required for noise modeling with the INM. Therefore, it was necessary to assign an INM aircraft type. For instance, airline X may operate B-737-700 aircraft types. B-737-700 aircraft can be equipped with one of three different engines; each has a different noise profile. The INM aircraft type assigned for each of the aircraft operating at Detroit Metropolitan Wayne County Airport was based upon the INM type that most closely matched the type of aircraft (and aircraft/engine combination) that each airline operates at the Airport. Some aircraft with smaller numbers of operations were grouped into the aircraft type that was most representative of the aircraft operated by that airline.

Table D7
Aircraft Fleet Mix Assumptions (2004)
Detroit Metropolitan (Wayne County) Airport

INM Type	Category	Daily Operations	Annual Operations
74720B	Widebody	0.18	67
747400	Widebody	10.04	3,663
767300	Widebody	0.54	198
777200	Widebody	1.52	554
A30062	Widebody	0.74	271
A310	Widebody	0.96	351
A330	Widebody	11.90	4,343
A340	Widebody	2.52	919
DC1030	Widebody	8.66	3,161
DC870	Widebody	2.27	828
DC8QN	Widebody	1.26	462
MD11PW	Widebody	0.18	65
727EM1	Narrowbody Louder	0.34	124
727EM2	Narrowbody Louder	6.47	2,360
737N17	Narrowbody Louder	0.43	157
DC95HW	Narrowbody Louder	345.74	126,195
MD83	Narrowbody Louder	74.10	27,047
7373B2	Narrowbody Quieter	36.62	13,368
737400	Narrowbody Quieter	0.14	51
737500	Narrowbody Quieter	10.84	3,958
737700	Narrowbody Quieter	11.95	4,362
737800	Narrowbody Quieter	10.41	3,799
737900	Narrowbody Quieter	0.20	73
757300	Narrowbody Quieter	0.98	357
757PW	Narrowbody Quieter	73.26	26,741
757RR	Narrowbody Quieter	18.60	6,789
A319	Narrowbody Quieter	110.33	40,272
A320	Narrowbody Quieter	110.21	40,228
A32123	Narrowbody Quieter	1.12	408
F10065	Narrowbody Quieter	2.96	1,080
BAE300	Regional Jet	54.20	19,781
EMB145	Regional Jet	37.91	13,839
EMB14L	Regional Jet	270.51	98,734
F10062	Regional Jet	3.36	1,227
BEC190	Commuter Prop	1.45	530
BEC9F	Commuter Prop	0.61	224
DHC6	Commuter Prop	0.54	198
DHC8	Commuter Prop	6.03	2,203
SF340	Commuter Prop	143.70	52,451
CIT3	General Aviation Jet	2.40	878
CL600	General Aviation Jet	3.51	1,282
CNA55B	General Aviation Jet	5.10	1,863
CNA750	General Aviation Jet	4.88	1,781
FAL20	General Aviation Jet	1.51	552
GIIB	General Aviation Jet	1.01	367
GIV	General Aviation Jet	7.89	2,878
IA1125	General Aviation Jet	0.90	330
LEAR25	General Aviation Jet	1.29	471
LEAR35	General Aviation Jet	5.37	1,961
SABR80	General Aviation Jet	4.43	1,618
BEC58P	GA/Air Taxi Prop	1.52	556
CNA441	GA/Air Taxi Prop	7.27	2,652
GASEPV	GA/Air Taxi Prop	11.00	4,017
Total		**1,432**	**522,642**

Table D7 **Aircraft Fleet Mix Assumptions (2004)**

Note that the same INM types are shown more than once in the table; this is to identify the separate categories of operations (i.e., scheduled cargo vs. general aviation).

The mix of jet aircraft is illustrated in **Figures D13** and **D14**. **Figure D13** presents the average daily operations of commercial/cargo jet aircraft. **Figure D14** shows the number of these jet aircraft operations by each airline. These figures also show the percentage of jet aircraft that are hush kit aircraft versus manufactured Stage 3.

Time of Day

In the DNL metric, any operation that occurs after 10 p.m. and before 7 a.m. is considered more intrusive and its noise level is penalized by adding 10 dBA. The nighttime operations assumptions were determined from the FAA's radar data. The overall percentage of nighttime operations at Detroit Metropolitan Wayne County Airport was 8% as summarized in **Table D8;** of the 1,432 average daily operations, 8% or 115 operations occurs between 10 p.m. and 7 a.m. The specific percentages of daytime versus nighttime of the INM categories were presented in the previous table (**Table D7**). **Table D8** presents a summary of nighttime operations.

Table D8
SUMMARY HOURS OF OPERATIONS BY CATEGORY, YEAR 2003
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update

Category	**Percentage Nighttime Operations**		
	Arrivals	Departures	Average
Air Carrier Wide Body	24%	26%	25%
Air Carrier Narrow Body Louder	9%	7%	8%
Air Carrier narrow Body Quieter	13%	5%	9%
Regional Jets	4%	7%	5%
Commuter Prop	1%	6%	3%
General Aviation Jet	13%	12%	13%
General Aviation Prop	43%	46%	45%
TOTAL	**7%**	**9%**	**8%**

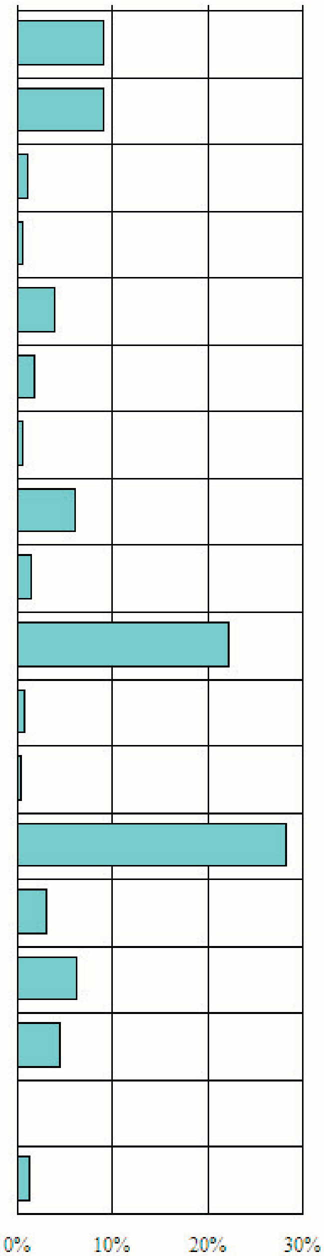
Source: BridgeNet International

Figure D13

COMMERCIAL JET OPERATIONS BY AIRCRAFT TYPE

Period: January 1, 2004 to December 31, 2004

Jet Aircraft	Built *FAR 36 Stage*	Operations Average Per Day	Percentage Of Total *Percent of Total*
A319	3	110.8	9%
A320	3	110.1	9%
A330	3	12.0	1%
B72Q	2	7.0	1%
B733/4/5	3	48.1	4%
B737/8/9	3	22.7	2%
B744	3	7.6	1%
B752	3	74	6%
B753	3	17	1%
CRJ1/2/7	3	270	22%
DC10	3	9	1%
DC8Q	2	3	0%
DC9Q	2	345	28%
E145/35	3	38	3%
MD80	3	75	6%
RJ85	3	54	4%
Other Aircraft (Built Stage 2)	2	0	0%
Other Aircraft (Built Stage 3)	3	14.5	1%



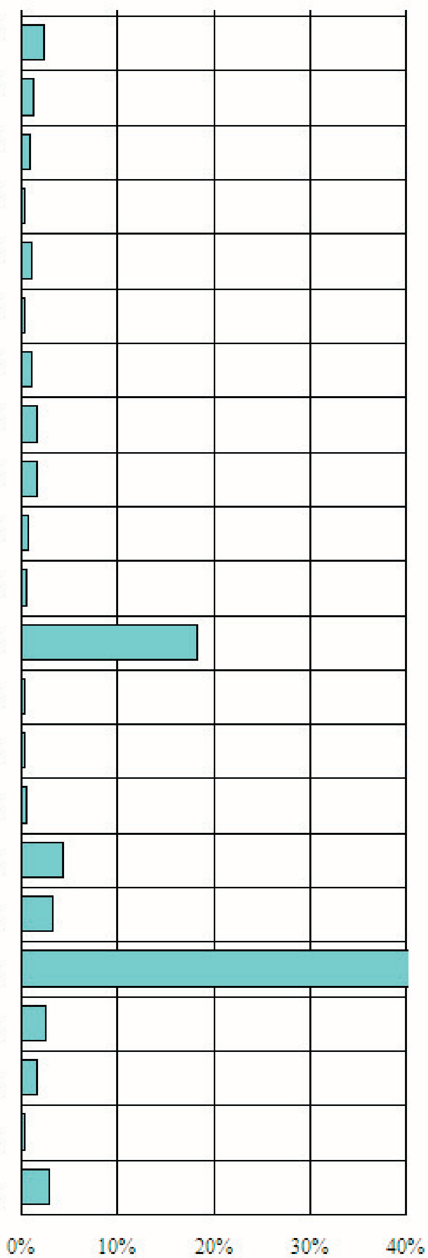
Numbers are rounded to nearest 0.0 value

Figure D13 **Commercial Jet Operations by Aircraft Type**

Figure D14
COMMERCIAL JET OPERATIONS BY AIRLINE (2004)
Period: January 1, 2004 to December 31, 2004

Airline		Operations Average Per Day	*Percent of Total*
American	AAL	30	2%
Mesa Airlines	ASH	15	1%
America West Airlines	AWE	11	1%
United Express	BLR	5	0%
Continental Express	BTA	14	1%
Chautauqua Airlines	CHQ	5	0%
Continental Airlines	COA	13	1%
Delta Connection Comair	COM	20	2%
Delta Air Lines	DAL	19	2%
American Eagle	EGF	8	1%
Federal Express	FDX	7	1%
nwa Airlink	FLG	222	18%
USA 3000 Airlines	GWY	4	0%
independence air	IDE	5	0%
American Connection	LOF	6	0%
Mesaba Airlines	MES	54	4%
Spirit	NKS	41	3%
Northwest	NWA	651	53%
Southwest Airlines	SWA	30	2%
United	UAL	20	2%
USAir	USA	5	0%
Other Airlines	Other	35	3%

Percent of Total



Numbers are rounded to nearest 0.0 value

Airlines with 4 or more operations per day

Figure D14 **Commercial Jet Operations by Airline (2004)**

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT

Runway Use

An additional important consideration in developing the noise exposure contours is the percentage of time each runway is used. The speed and direction of the wind dictate the direction in which the runways are operated (north versus south). In general, aircraft operate into the wind – landing into the wind and departing into the wind. When the wind direction changes, the operations are shifted to the runway end that favors the new wind direction.

The existing runway use percentages presented in **Table D9** are based upon a full year of FAA actual radar data (Aircraft Situational Display for Industry [ASDi] radar data) and six months of FAA terminal radar. ASDi radar data is long-range data that updates every one minute. Terminal radar covers a shorter distance, typically 50 miles, and updates every 5 seconds. The table presents the percentage that each runway was used for departures and arrivals separately during the daytime and nighttime hours. These same data are presented graphically in **Figure D15**. The top portion of this figure shows the total number of departure operations per hour of the day for each runway. The same data are presented in the bottom portion of the graph for arrivals.

The data show that the Airport is in south flow (departing to the south and arriving from the north/to the south) about 68% of the time, north flow (departing and arriving to the north) about 30% of the time, and the crosswinds about 2% of the time. The majority of the time, the outboard runways (of the four parallel runways, the outboards are the outer east and west runway) are used for arrivals, while the inboard runways are used for departures. **Figure A3** in the *Inventory* chapter presents a diagram of the runway configuration.

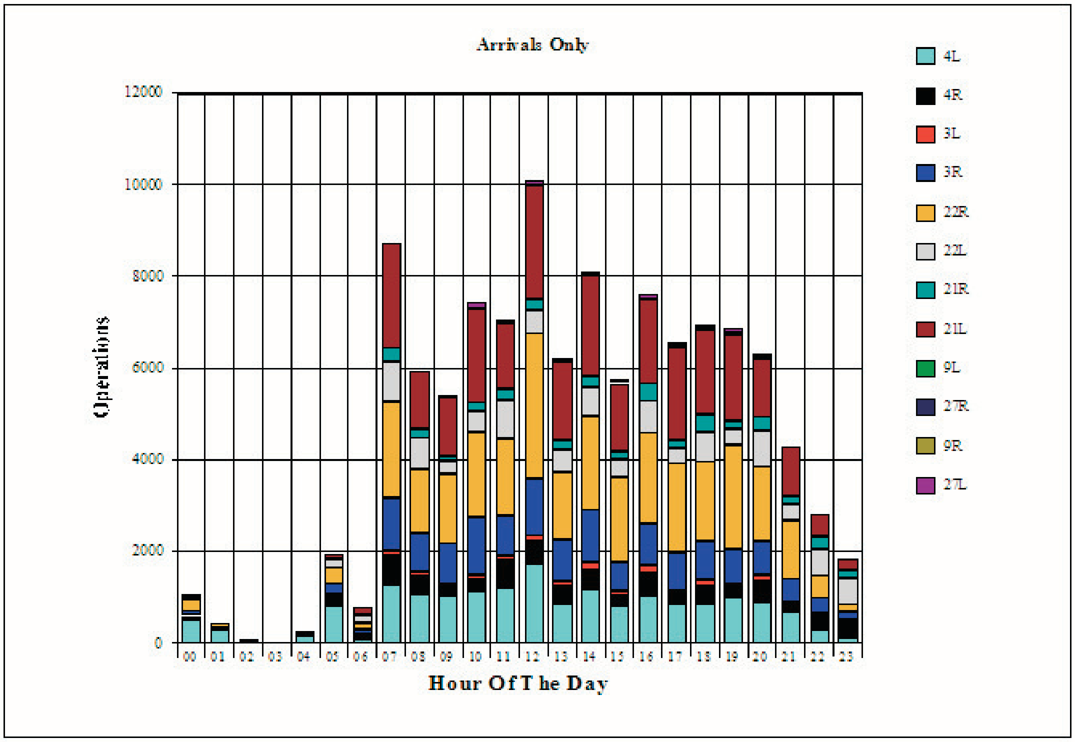
Table D9
PERCENTAGE RUNWAY UTILIZATION
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update

Name	Flow	Location	Arrival Daytime	Arrival Nighttime	Departure Daytime	Departure Nighttime
4L	North	West Outboard	14%	13%	0%	0%
4R	North	West Inboard	3%	4%	15%	15%
3L	North	East Inboard	1%	1%	15%	15%
3R	North	East Outboard	12%	11%	1%	1%
22R	South	West Outboard	32%	36%	1%	1%
22L	South	West Inboard	9%	11%	31%	32%
21R	South	East Inboard	4%	4%	34%	33%
21L	South	East Outboard	23%	18%	1%	1%
9L	East	North Runway	<1%	<1%	<1%	<1%
27R	West	North Runway	<1%	<1%	<1%	<1%
9R	East	South Runway	<1%	<1%	<1%	<1%
27L	West	South Runway	<1%	<1%	<1%	<1%

Source: BridgeNet International

Figure D15
OPERATIONS PER EACH HOUR OF THE DAY PER RUNWAY

Based Upon Six Months of Radar Data



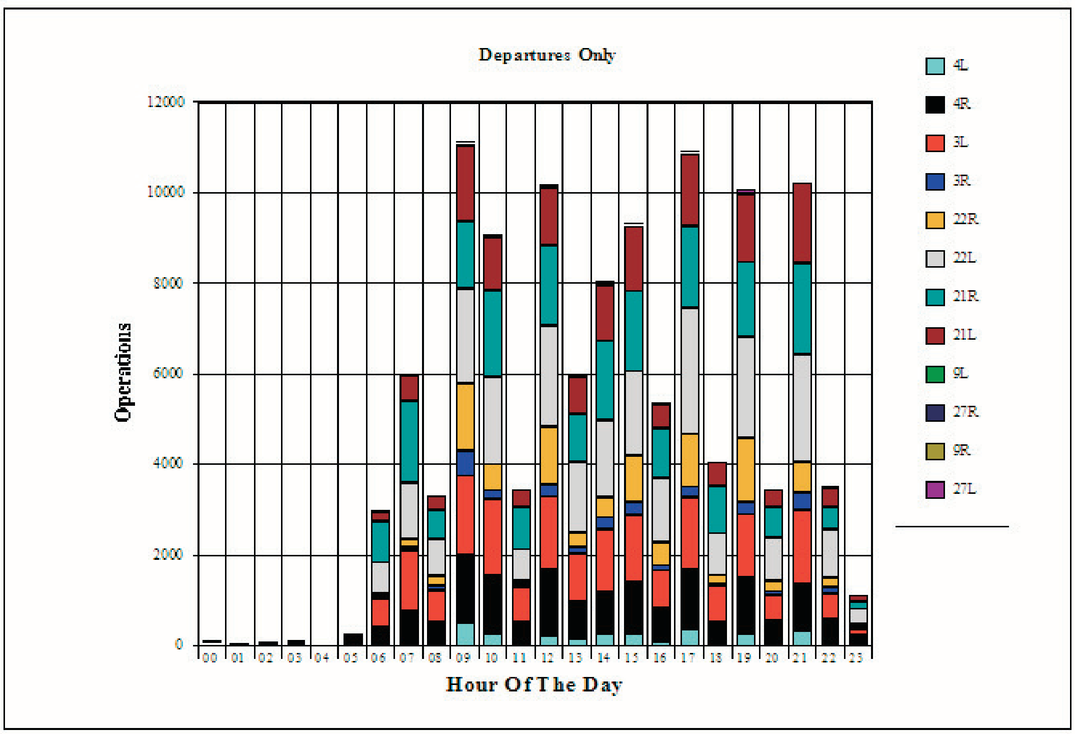


Figure D15 **Operations Per Each Hour of the Day Per Runway**

The runway use information, obtained from the previously identified sources, enables the identification of each runway used by each operation. Therefore, runway use can be aircraft type specific. Different aircraft have different runway uses based upon aircraft size, performance, and location relative to the passenger terminal gates.

The more detailed breakdown of runway use by category of aircraft is presented in **Table D10**. The table includes the percentage of operations by aircraft category using each of the runways. Note that wide-body aircraft use the longest runway (4L/22R) most often, while cargo and general aviation aircraft used the east runways (3L&R/21R&L) because of their proximity to the passenger terminal gates.

Table D10
RUNWAY UTILIZATION BY CATEGORY OF AIRCRAFT
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study

Aircraft Class	4L	4R	3L	3R	22R	22L	21R	21L	9L	27R	9R	27L
ARRIVALS												
Wide Body	19%	5%	1%	4%	42%	14%	1%	10%	<1%	<1%	<1%	<1%
Loud Narrow Body	13%	3%	1%	12%	29%	12%	5%	21%	<1%	<1%	<1%	<1%
Quiet Narrow Body	13%	3%	1%	12%	32%	12%	3%	20%	<1%	<1%	<1%	<1%
Regional Jet	13%	2%	1%	13%	27%	11%	4%	25%	<1%	<1%	<1%	<1%
Propeller	6%	2%	3%	18%	12%	8%	8%	39%	<1%	<1%	<1%	<1%
Business Jet	14%	1%	1%	13%	34%	8%	2%	23%	<1%	<1%	<1%	<1%
DEPARTURES												
Wide Body	0%	22%	5%	2%	1%	46%	17%	3%	<1%	<1%	<1%	<1%
Loud Narrow Body	0%	13%	15%	1%	1%	31%	34%	1%	<1%	<1%	<1%	<1%
Quiet Narrow Body	0%	14%	14%	1%	1%	34%	31%	1%	<1%	<1%	<1%	<1%
Regional Jet	0%	11%	17%	1%	1%	26%	39%	1%	<1%	<1%	<1%	<1%
Propeller	0%	13%	15%	1%	1%	31%	34%	1%	<1%	<1%	<1%	<1%
Business Jet	0%	5%	23%	1%	1%	17%	44%	5%	<1%	<1%	<1%	<1%

Source: BridgeNet International

Departure Climb Profile

The aircraft departure stage length is the distance the aircraft flies from the Airport to its first destination. The stage length of a flight can be used as a rough surrogate for the weight of the flight. Generally, heavier aircraft climb at a slower rate; thus, the noise levels under the flight path are likely to be louder. The rate of climb of an aircraft is called the departure climb profile. The stage length assumption is used to determine the rate of climb of each of the different aircraft operating at the Airport. Small aircraft such as commuter aircraft that fly shorter distances only have Stage Length 1 available (flying up to 500 nautical miles). The different stage lengths used in the INM model are listed below:

Stage Length 1	0 to 499 nautical miles flight distance
Stage Length 2	500 to 999 nautical miles flight distance
Stage Length 3	1000 to 1499 nautical miles flight distance
Stage Length 4	1500 to 2499 nautical miles flight distance
Stage Length 5	2500 to 3499 nautical miles flight distance
Stage Length 6	3500 to 4499 nautical miles flight distance
Stage Length 7	+4500 nautical miles flight distance

Figure D16 presents the location of North American airports that are points of service for commercial and cargo jet operations to/from Detroit Metropolitan Wayne County Airport. The larger the dot, the greater the number of operations associated with that airport. Note that the graphic shows that many of the aircraft flights are to nearby hub airports for the major airlines. Thus, the majority of the stage lengths for Detroit Metropolitan Wayne County Airport are less than 1,500 nautical miles (Stage Length 3 or less).

The INM noise model contains different departure climb profiles for each of the aircraft contained in the model. These climb profiles define the rate of climb, speed, and engine thrust based upon the weight of the aircraft. Typically, the flight distance stage length is used to assign the departure climb profile using the flight distance data as was presented in the previous figure. However, flight distance does not always correlate to the departure climb profile.

Thus, for this study, the aircraft departure climb profiles were identified based upon the actual climb gradient for aircraft operating at Detroit Metropolitan Wayne County Airport, as obtained from radar data. This data was obtained from the six months of terminal radar data from Passur. Passur is a third-party source for flight track radar data. The radar data can be used to show the rate of climb for different aircraft.[1]

An example of the departure climb profiles for the DC9 and the A319 aircraft are presented in **Figure D17**. The red lines are actual Passur radar data plots for those aircraft. The lines show the distance flown along the X axis versus the altitude along the Y axis. The green line shows the average climb profile for these aircraft. The bolder blue lines illustrate the departure profiles contained in the INM noise model.

Based upon these data, the departure climb profiles that were used in the model were those that were actually flown based upon the actual Passur radar data. Each aircraft is assigned the climb profile that most closely matches the climb profile that was flown. For example, the B737-300 aircraft were all modeled at the lower climb profile that most closely matched the measured departure climb gradients. This methodology resulted in low climb rates and thus higher noise levels than would have occurred using standard methodology. This also more closely matched the noise measurement data results.

[1] Passur data was necessary as the FAA's ASDi radar data is not at a sufficient detail close-in to the Airport to enable its use in improving the accuracy of the INM.

Figure D16

Flight Destinations for DTW Jet Aircraft Operations

Detroit Metropolitan Wayne County Airport

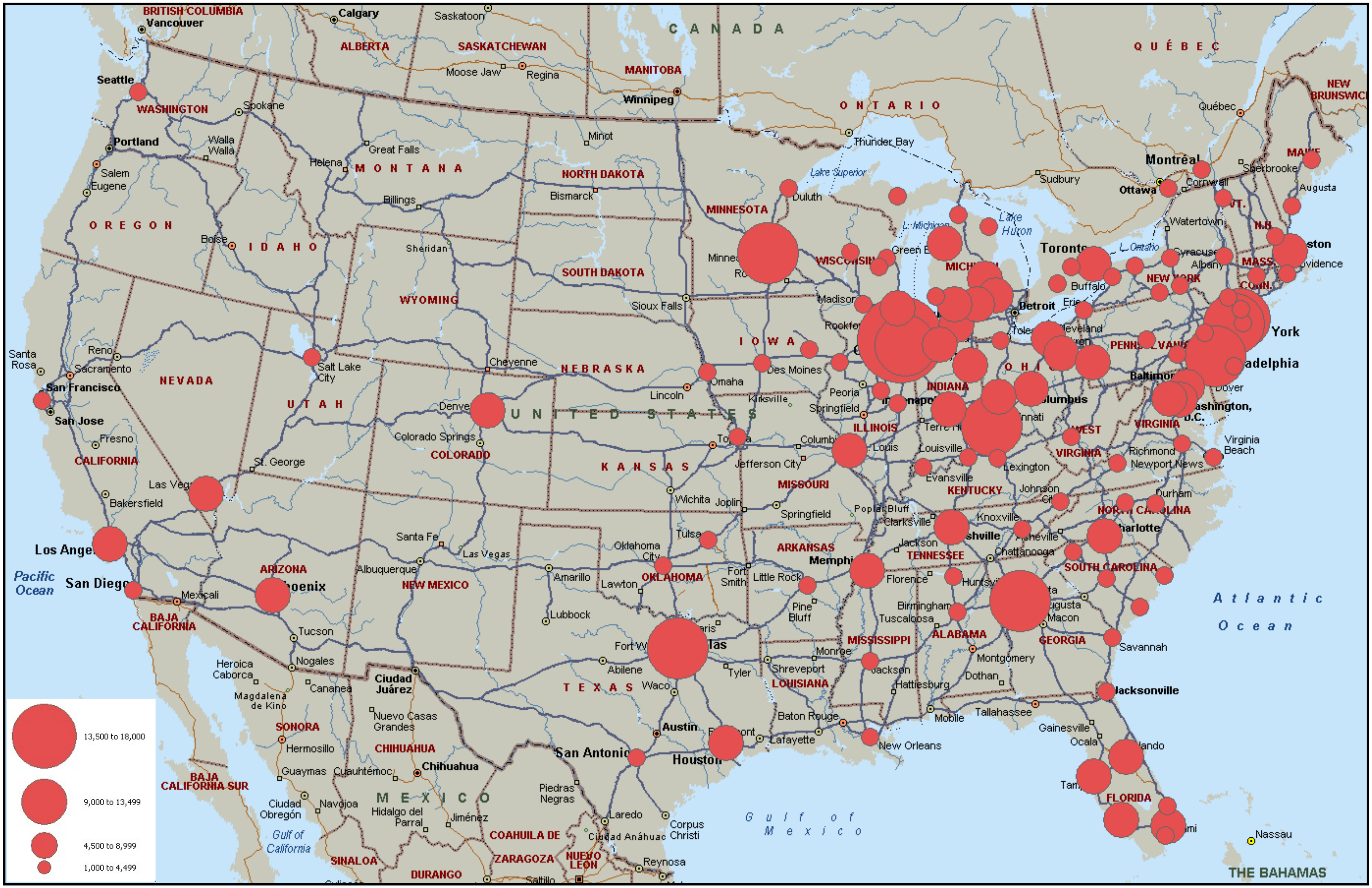
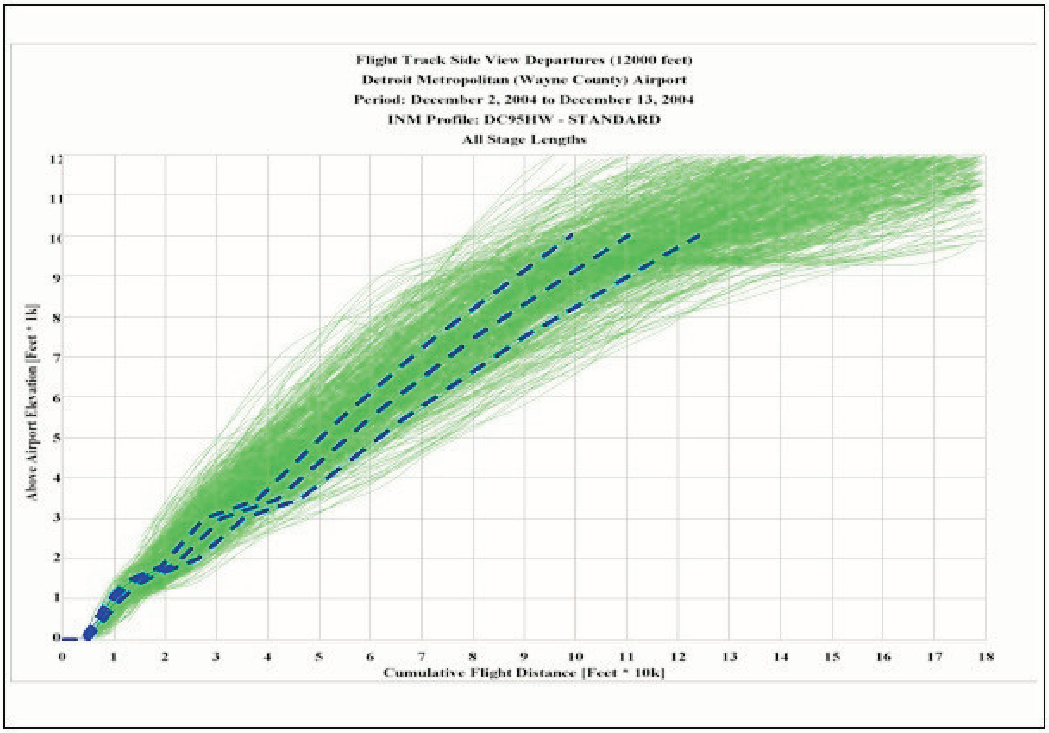


Figure D17
Departure Profiles for DC9Q and A320 Aircraft



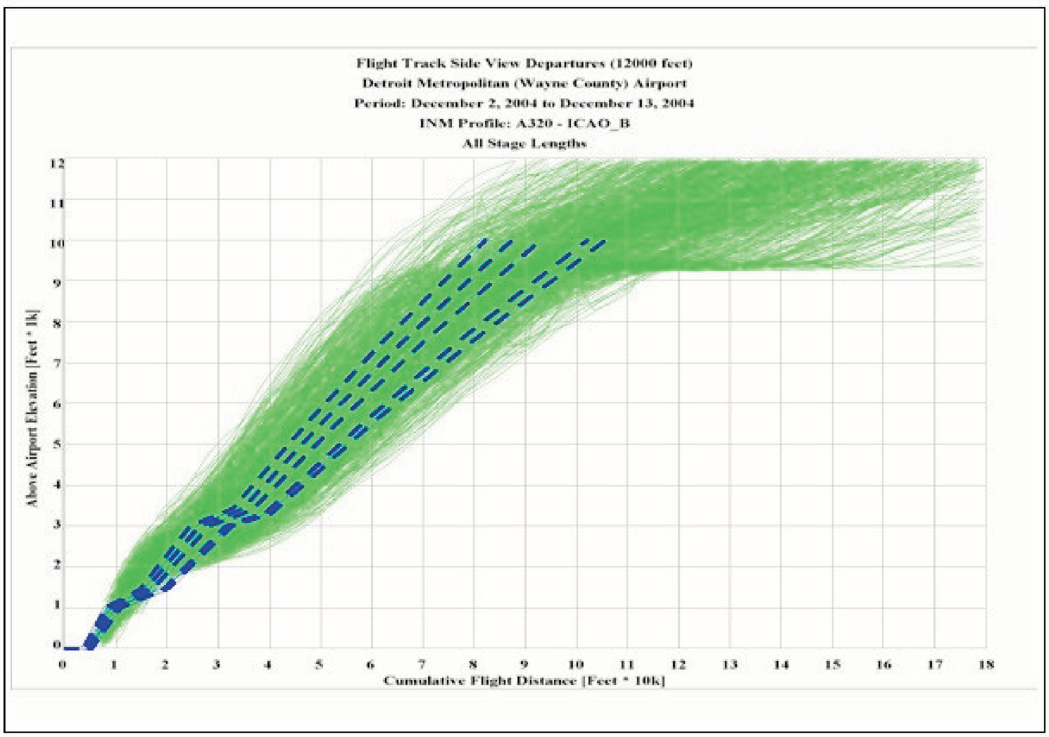


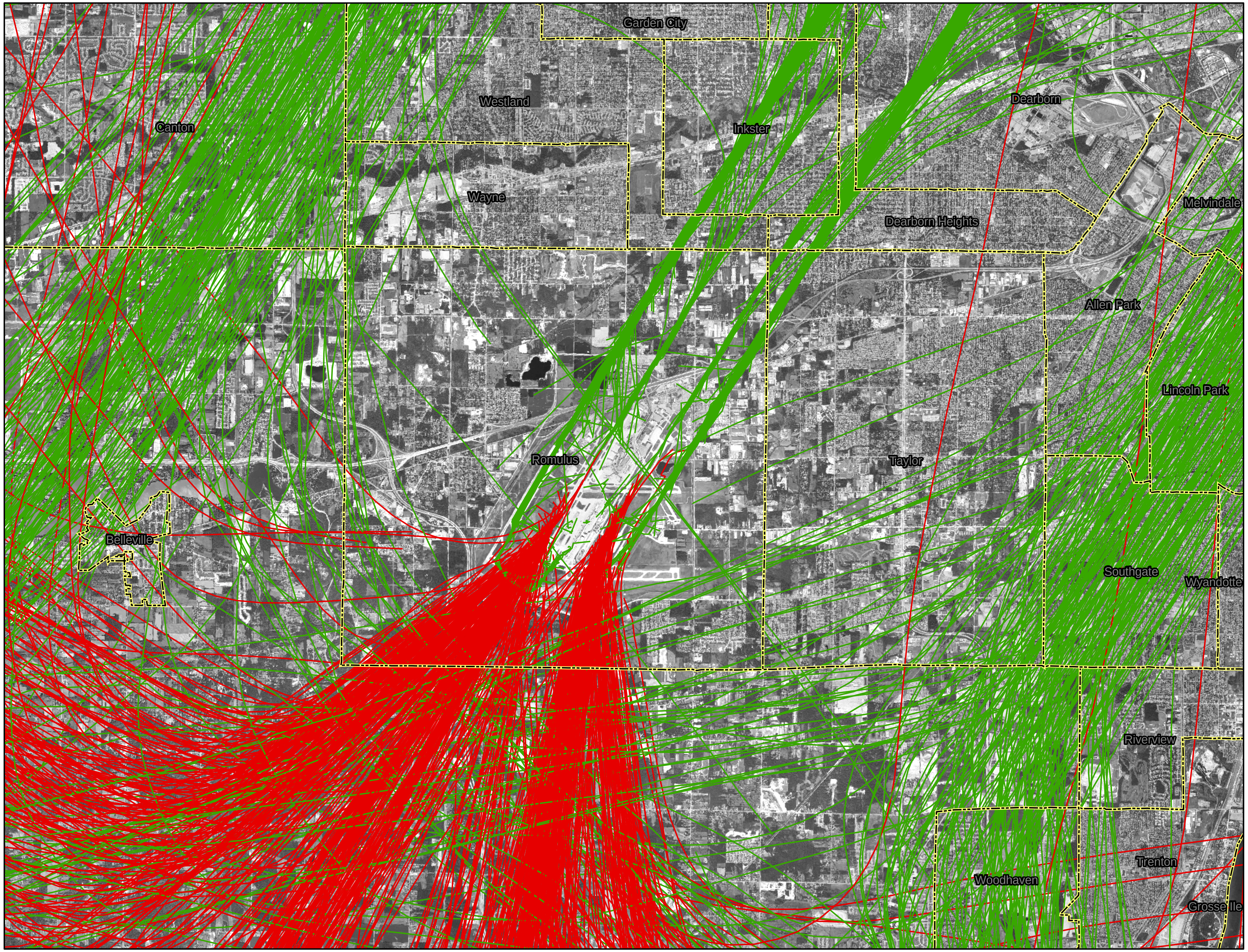
Figure D17 **Departure Profiles for DC9Q Family and A320 Aircraft**

Flight Paths/Tracks and Flight Path Use

The Federal Aviation Administration (FAA) has established paths (sometimes called tracks) for aircraft arriving and departing from Detroit Metropolitan Wayne County Airport. These paths are not precisely defined ground tracks, but represent a path along the ground over which aircraft generally fly. The identification of the location and use of the flight path is based upon third-party Passur radar data, field observations, and discussions with Airport Authority noise-abatement personnel. Six months of actual FAA ASDi terminal area radar data were used in the development of the INM flight paths used in this Study. The flight paths used in the INM noise model are derived from all of the actual flight paths flown throughout the base period study year, 2004. Six months of third-party radar data were used; the six months were spread throughout the year to allow for weather and seasonal changes that affect runway usage.

Example actual flight tracks for different operational conditions are presented in the following figures. Jet flight tracks for south flow conditions (which occur about 68% of the time) are presented in **Figure D18**; arrival tracks are shown in green; while departure tracks are shown in red. Similarly, jet flight tracks for north flow conditions (arrivals from the south, departures to the north, which occur about 30% of the time) are shown in **Figure D19**. Examples of a west flow (arrivals from the west, departures to the east) arrival day (which occurs about 2% of the time) are presented in **Figure D20**.

Figure D18 **South Flow Jet Flight Tracks**



Legend

Jets South Flow

- Arrivals
- Departures

N

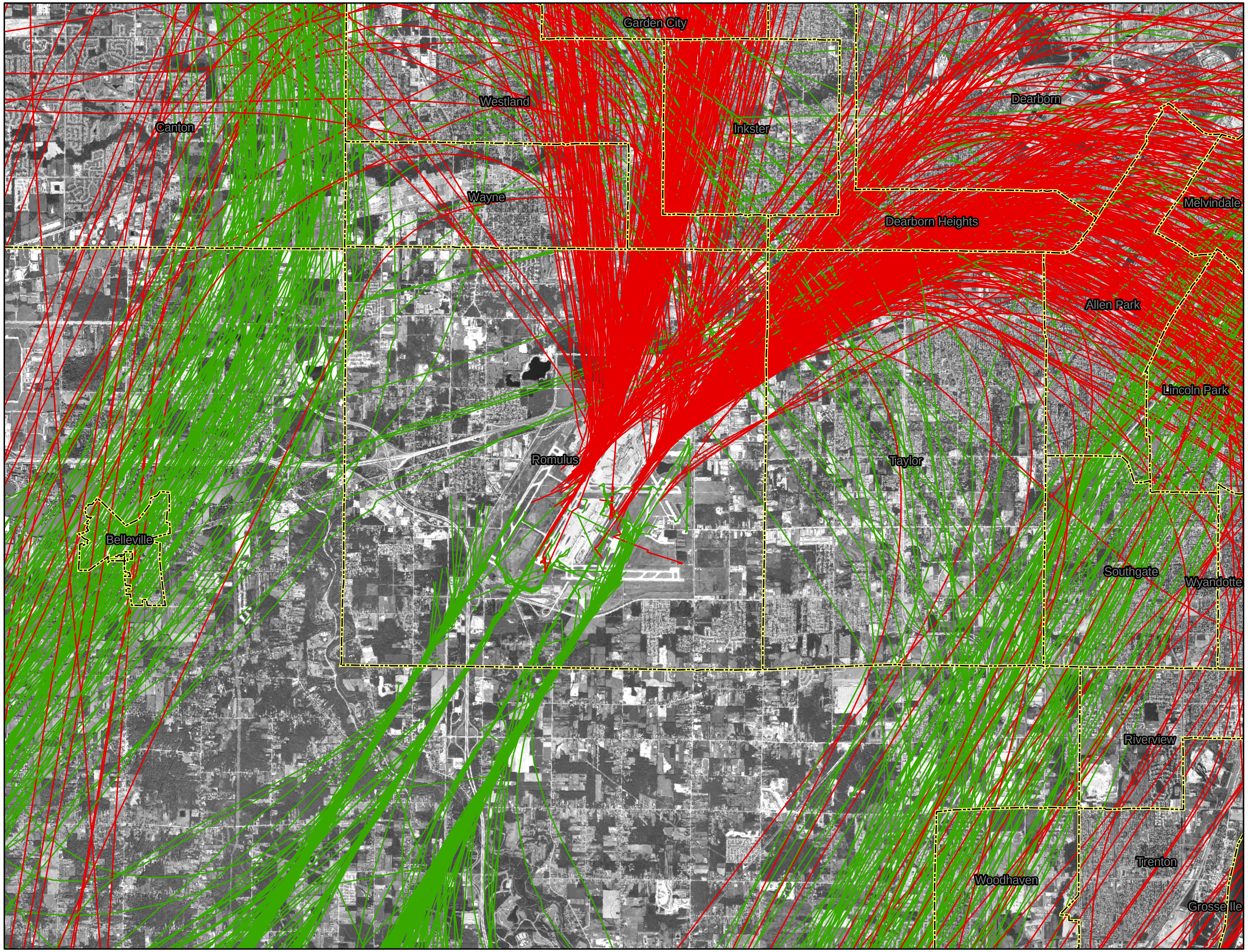
0 4,000 8,000 Feet

October 2004

Source: Michigan Department of Natural Resources, SEMCOG, Detroit Metropolitan Wayne County Airport files.

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT

Figure D19 **North Flow Jet Flight Tracks**

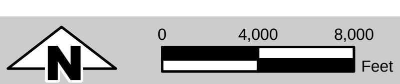


Legend

Jets North Flow

Arrivals

Departures

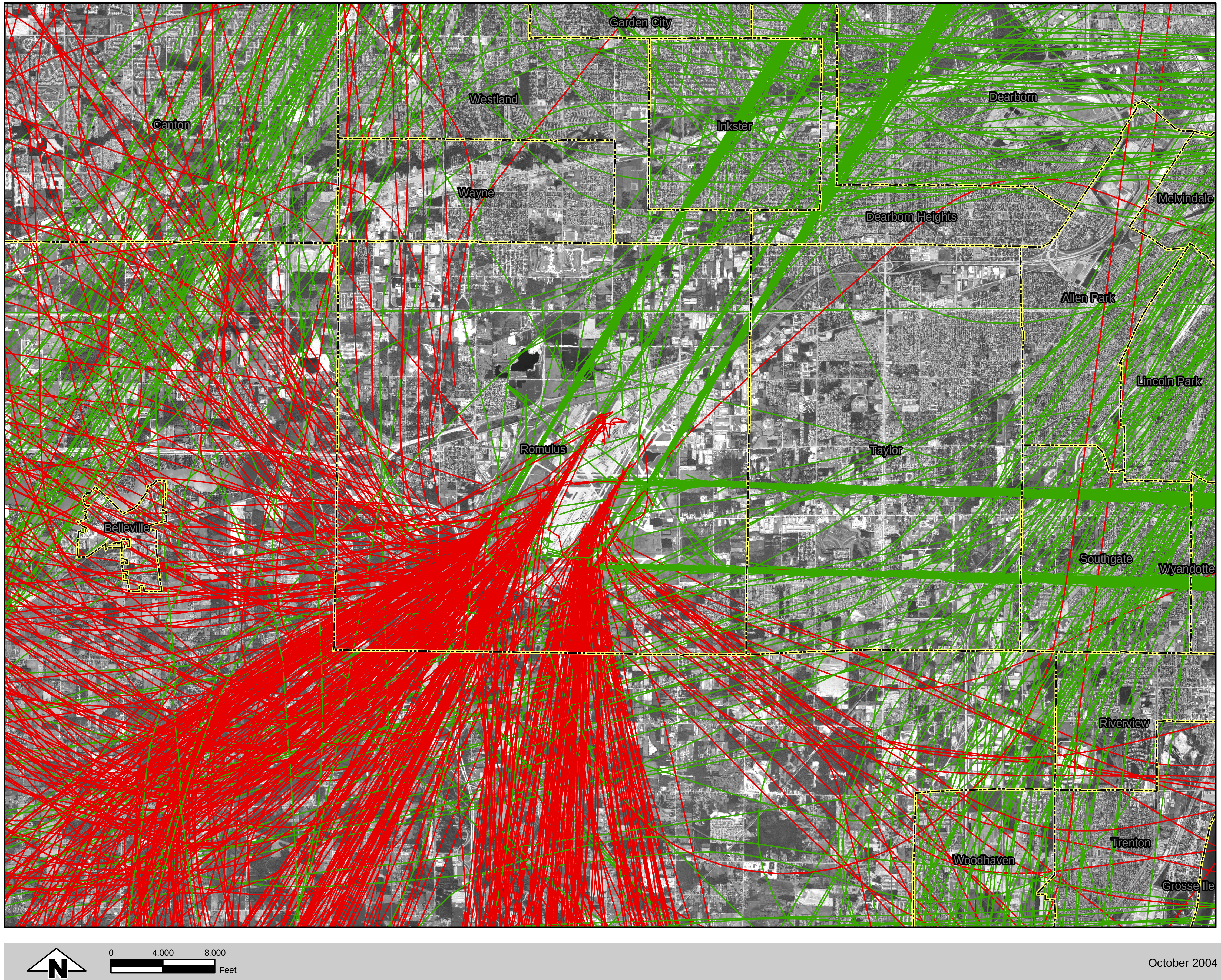


October 2004

Source: Michigan Department of Natural Resources, SEMCOG, Detroit Metropolitan Wayne County Airport files.

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT

Figure D20 **West Flow Jet Flight Tracks**



Legend

Jets West Flow

- Arrivals
- Departures

October 2004

Source: Michigan Department of Natural Resources, SEMCOG, Detroit Metropolitan Wayne County Airport files.

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT

In the development of the existing noise contours, the INM noise model requires aggregating the flight paths into a set of generalized flight tracks of aircraft operating at the Airport. In the INM noise model, a flight track consists of a backbone or center flight path, and the dispersion, or spread, of all flights that use that backbone. A computer program was used to develop the INM flight tracks from the actual radar flight data. The program first assigned each aircraft operation to an air traffic control procedure. The software then calculated the average path of all the aircraft that flew those procedures. The program also determined the dispersion of the flight tracks on that path. An example of the process used to calculate each of the flight paths was presented in the methodology section.

The modeling analysis for existing conditions included a total of 48 departure flight paths and 32 arrival flight paths at the Airport. The flight paths modeled in the study were those within approximately 15 miles of the noise contour study area.

To illustrate the different jet departure tracks for each runway quadrant, INM flight tracks overlaid on actual tracks have been prepared in graphic format. **Figure D21** presents sample jet departures for jets departing on Runway 4R. This is the primary departure runway for aircraft departing northward on the west runway complex. These actual tracks are presented in red. The modeled INM tracks are overlaid in blue, with the solid track showing the center path and the dashed tracks representing the dispersed tracks. The percentage of time each track is used is also shown on the figure. This same data is presented in **Figure D22** for departures on Runway 3L. This is the primary runway for departures northward on the east runway complex.

Figures D23 and **D24** present the same analysis for south flow jet departures. **Figure D23** presents the data for departures on Runway 22L (primary departure runway for the west runway complex), while **Figure D24** presents the data for departures on Runway 21R (primary departure runway for the east runway complex).

As can be seen from this flight track data, the Airport is divided into an east side and west side. This means that aircraft departing to eastern destinations primarily depart on the east runways; aircraft departing to western destinations primarily depart on the west runways. This approach enables the FAA to minimize the crossing of flights that operate from the east runway complex, departing to western locations, and vice versa.

Figure D21
ACTUAL AND INM JET DEPARTURE FLIGHT TRACKS (RUNWAY 4R)
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study

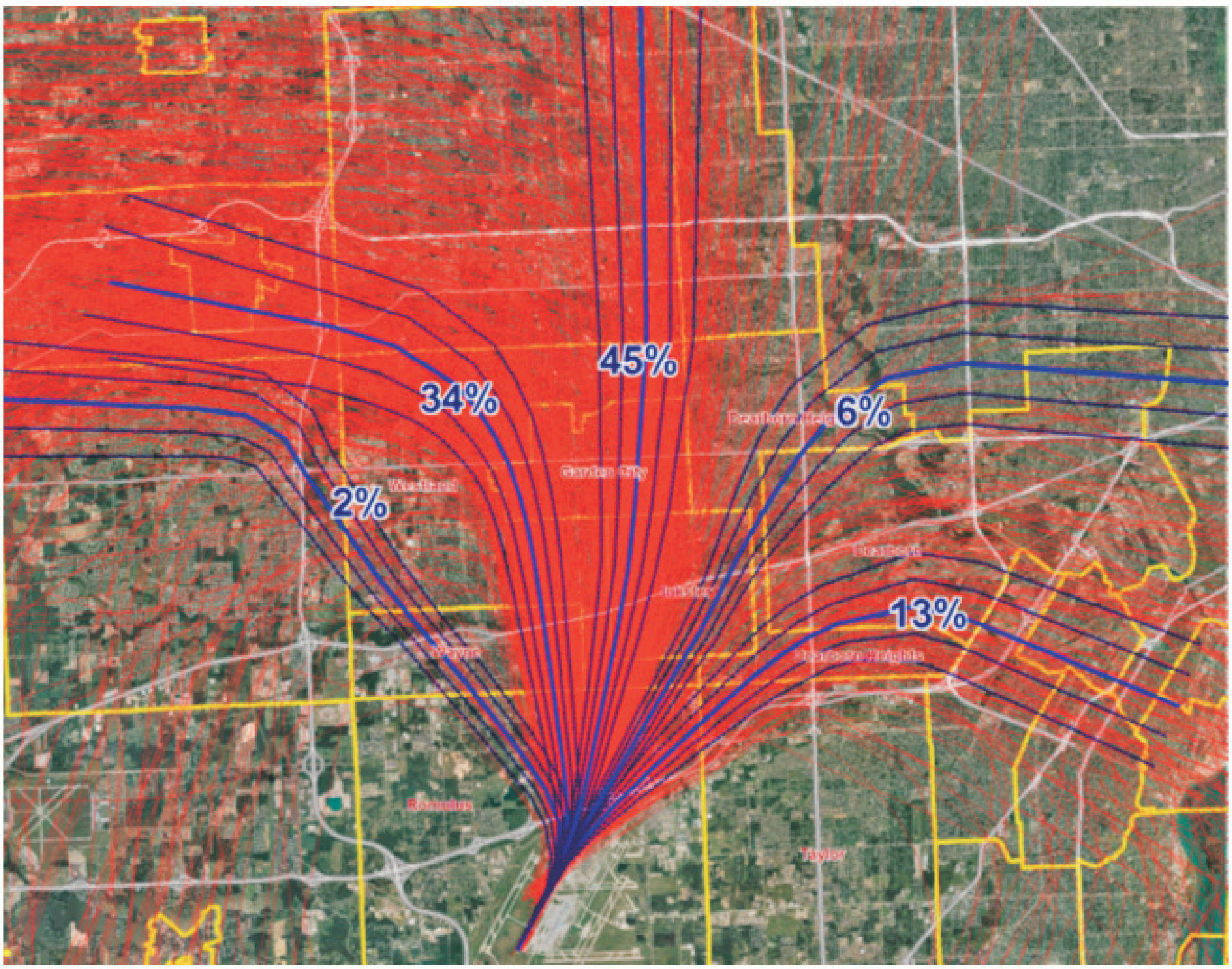


Figure D21 **Actual and INM Jet Departure Flight Tracks on Runway 4R**

Figure D22
ACTUAL AND INM JET DEPARTURE FLIGHT TRACKS (RUNWAY 3L)
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study

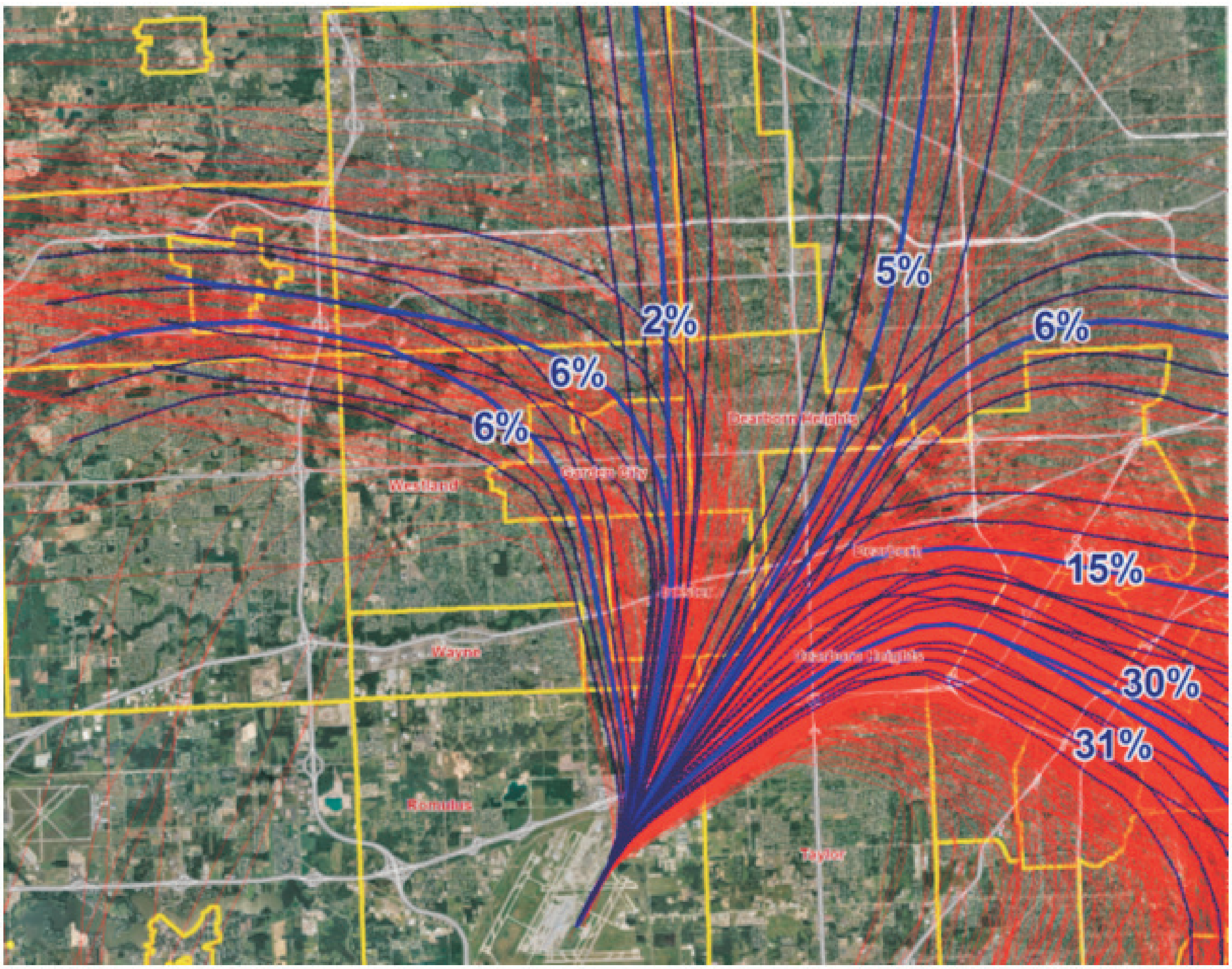


Figure D22 **Actual and INM Jet Departure Flight Tracks on Runway 3L**

Figure D23
ACTUAL AND INM JET DEPARTURE FLIGHT TRACKS (RUNWAY 22L)
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study

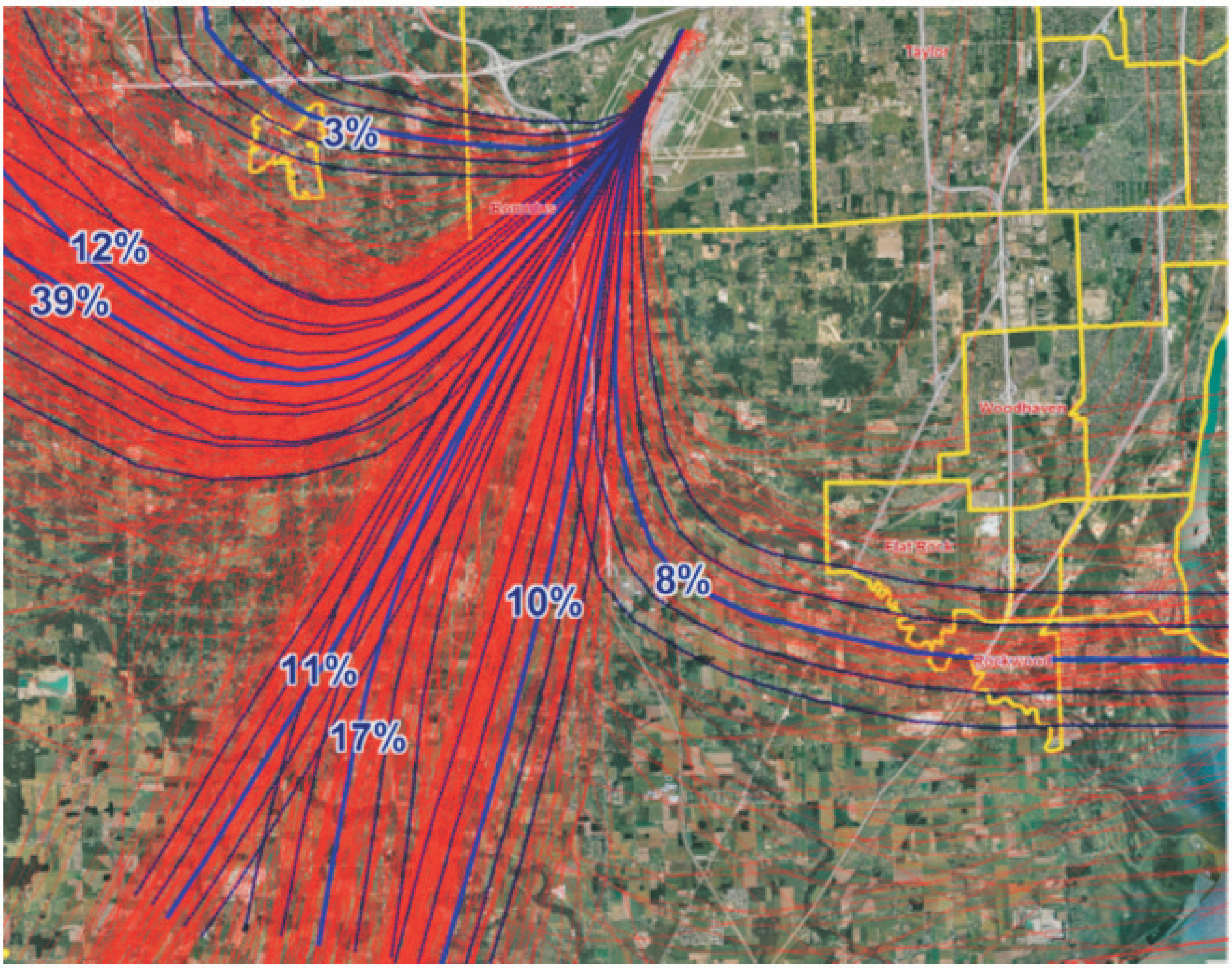


Figure D23 **Actual and INM Jet Departure Flight Tracks on Runway 22L**

Figure D24
ACTUAL AND INM JET DEPARTURE FLIGHT TRACKS (RUNWAY 21R)
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study

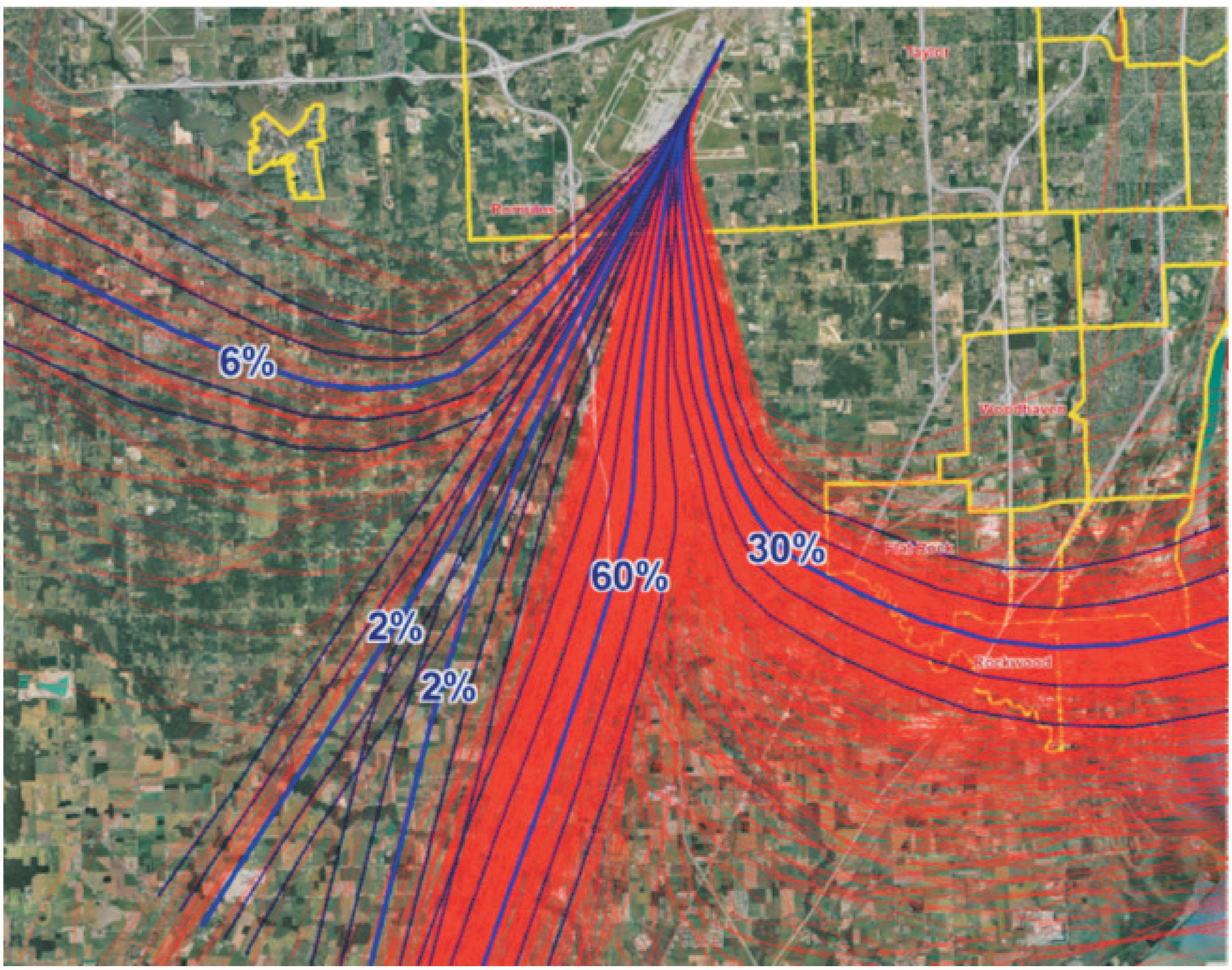


Figure D24 **Actual and INM Jet Departure Flight Tracks on Runway 21R**

Existing Baseline Noise Conditions

Noise exposure contours were developed using a variety of different noise metrics described in the background section of the report, including both cumulative noise levels (i.e., averaged over a period of time using the DNL) and single event noise levels (noise levels from one operation).

As required by the FAA, the primary noise criterion to describe the existing noise environment is DNL.

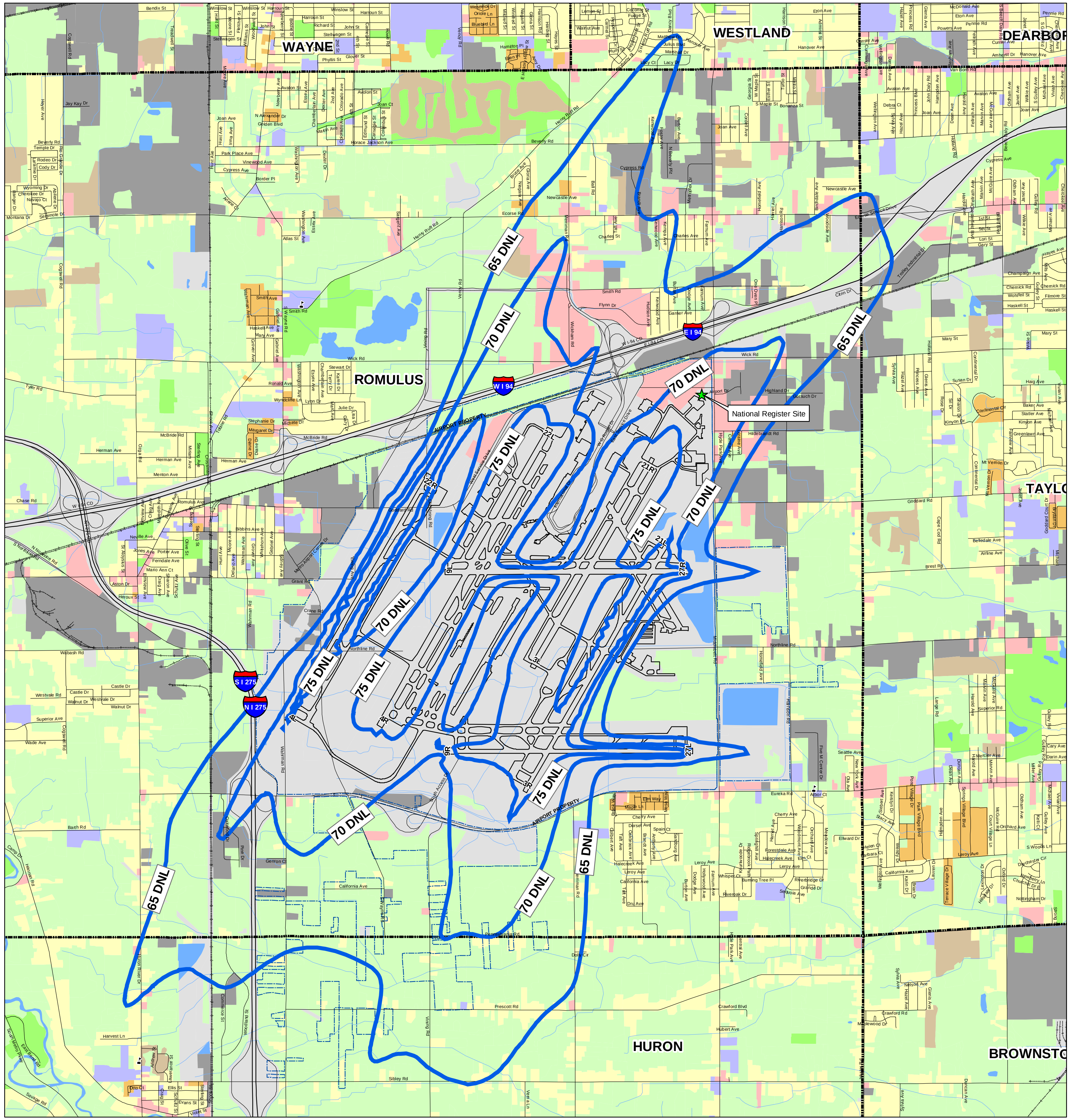
DNL Noise Contours. The existing (2004) DNL noise exposure contours for Detroit Metropolitan Wayne County Airport are presented in **Figure D25**. This figure shows the 65 DNL, 70 DNL, and 75 DNL noise exposure contours.

Single Event Noise Contours

Single event sound level contours for sample aircraft were also developed. These contours represent the single event noise levels for one (1) departure and one (1) arrival operation of a specific aircraft type. Sample single event noise exposure contours are presented in **Figures D26** and **D27** for the B747-400, DC9 (all series), A320, and CRJ700 aircraft, respectively. **Figure D26** shows noise exposure contours for south flow, arriving and departing on Runway 22L. **Figure D27** shows the SEL contours for north flow operations, arriving and departing on Runway 4R. The noise contours present the 90, 95, 100, and 105 SEL noise levels.

These data show a wide range in noise associated with the different types of aircraft. The new generation regional jets (CRJ700) are significantly quieter than the A320 aircraft, which in turn are also much quieter than the older hush kit DC9. The larger B747-400 aircraft tend to have more arrival noise than the smaller narrow-body aircraft.

Figure D25 **Existing (2004) Noise Exposure Map**



Land Use Legend

- Single-family residential
- Residential areas with 25% or more vacant land
- Multiple-family residential
- Commercial and office
- Industrial
- Institutional
- Transportation, communication, and utility
- Under development
- Cultural, outdoor recreation, and cemetery
- Woodland and wetland
- Active agriculture
- Extractive and barren
- Grassland, and shrub
- Vacant nonresidential
- Water
- City Limits Boundary
- Schools

	Existing (2004)	
	Population	Housing
65-70 DNL		
Huron Township	160	60
Romulus	1,060	490
Taylor	10	10
Westland	110	50
Subtotal	1,340	610
70-75 DNL		
Romulus	40	20
Subtotal	40	20
65 DNL & Greater		
Huron Township	160	60
Romulus	1,100	510
Taylor	10	10
Westland	110	50
Subtotal	1,380	630
60 DNL & Greater*		
Dearborn Heights	1,100	360
Huron Twp.	2,460	920
Inkster	4,420	1,870
Romulus	4,340	1,810
Sumpter Twp.	40	10
Taylor	3,860	1,500
Westland	2,970	1,250
Total	19,190	7,720

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater

The 65 DNL contour contains approximately 9,475 acres, 750 residential structures and 1,400 people.

The 70 DNL contour contains approximately 4,505 acres, 30 residential structures and 40 people.

The 75 DNL contour contains approximately 1,580 acres, no residential structures and no people.

Planning jurisdictions are shown on the map.

Noise measurement sites and flight tracks are depicted on the Noise Measurement Sites and Flight Tracks Maps.

Residential land use, as defined by FAR Part 150, is an incompatible use without proper sound attenuation within the 65 DNL or greater contour.

The Noise Exposure Maps and accompanying documentation for the Noise Exposure Map for Detroit Metropolitan Wayne County Airport, submitted in accordance with FAR Part 150 with the best available information, are hereby certified as true and complete to the best of my knowledge and belief.

In addition, it is hereby certified that the public was afforded the opportunity to review and comment on the document and its contents.

Signed________ Date 3-6-06

Based on 522,641 operations.

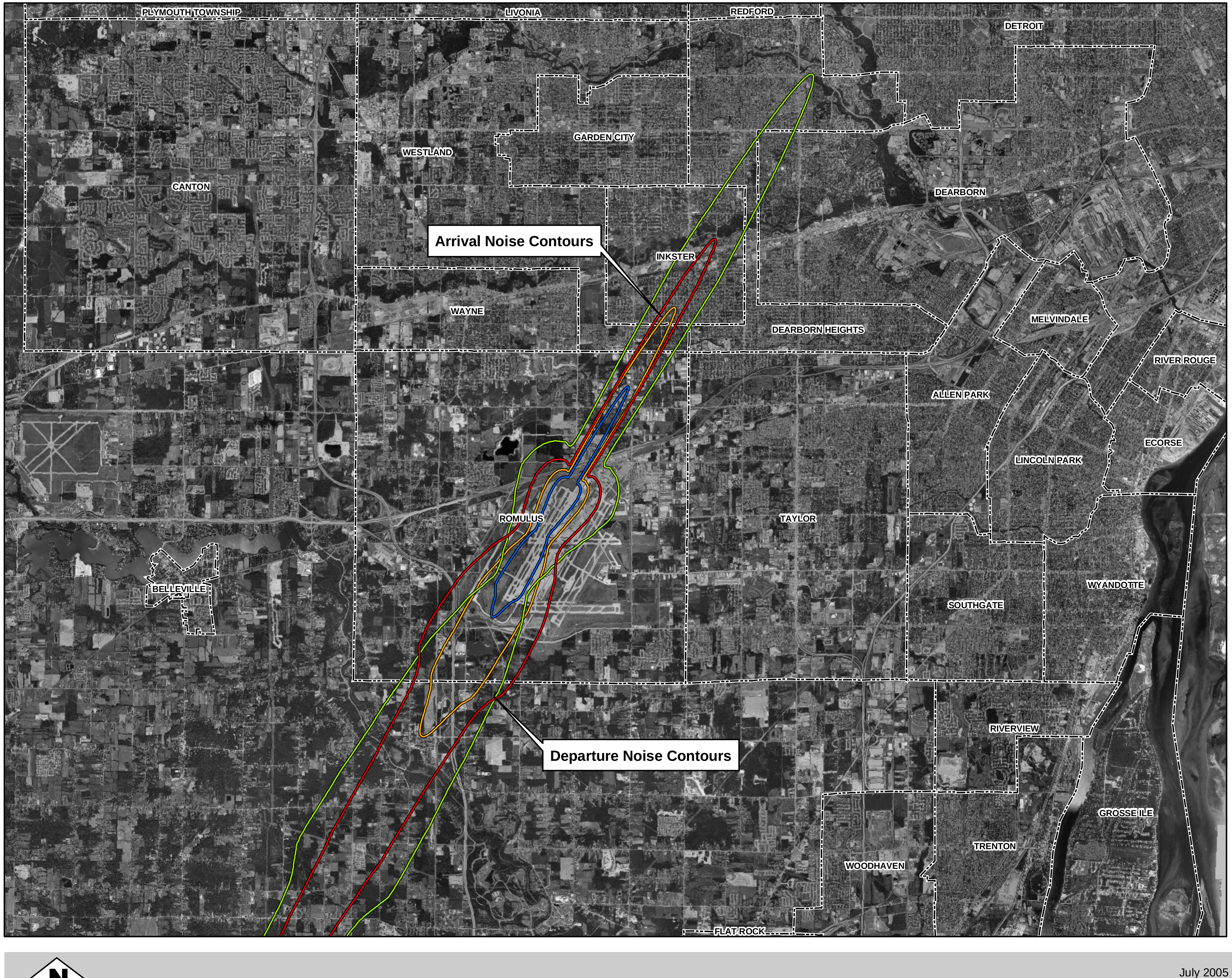
N 0 1,000 2,000 4,000 Feet

March 1, 2006

Source: Michigan Department of Natural Resources, SEMCOG

DETROIT
METROPOLITAN WAYNE COUNTY AIRPORT

Figure D26 **Example Single Event Noise Contours (South Flow)**



Legend

85 SEL Single Event Noise Contour

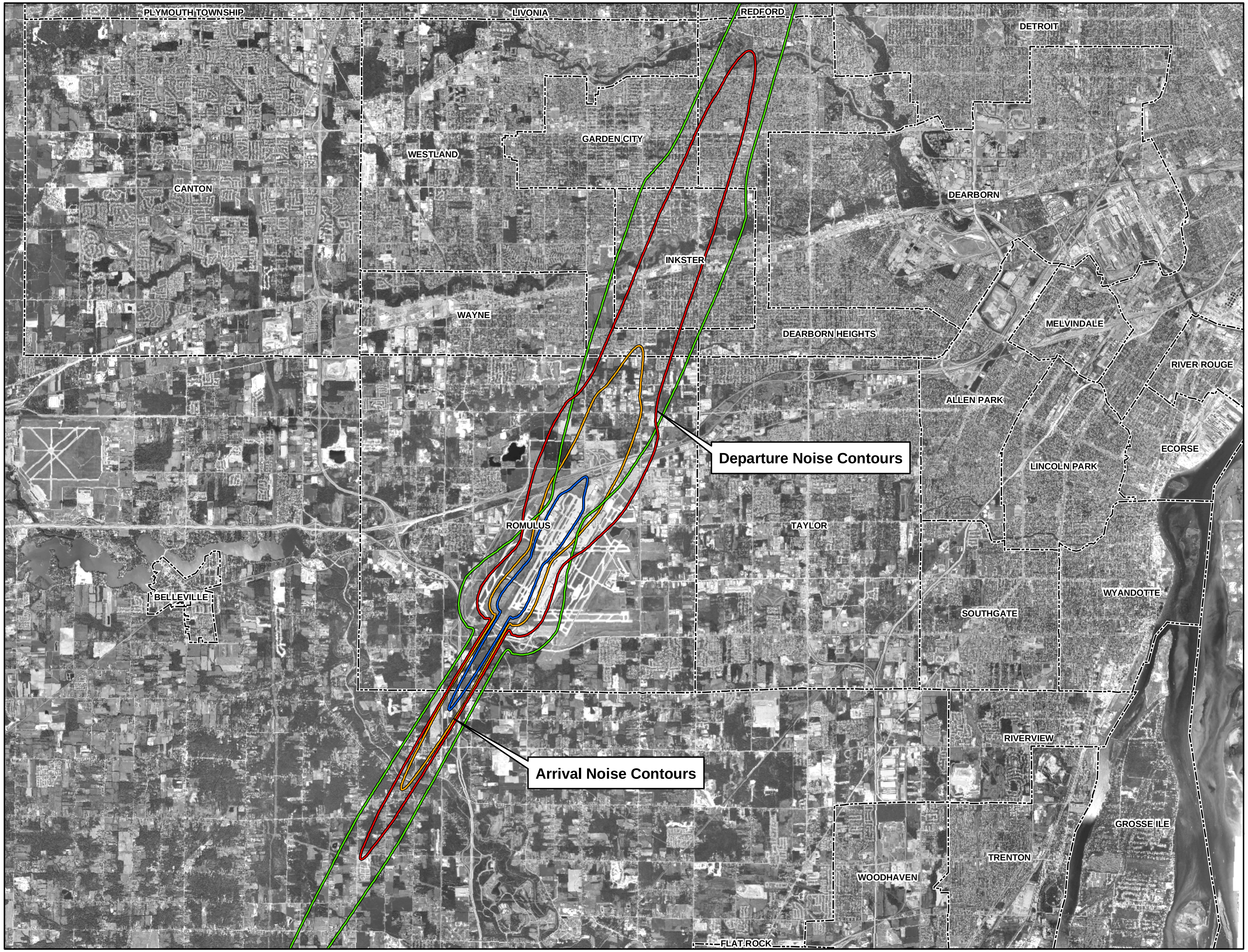
- B 747 400
- DC-9 Hush Kit
- A 320
- Regional Jet

July 2005

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT

Source: Michigan Department of Natural Resources, SEMCOG, Detroit Metropolitan Wayne County Airport files.

Figure D27 **Example Single Event Noise Contours (North Flow)**



Legend

85 SEL Single Event Noise Contour

- B 747 400
- DC-9 Hush Kit
- A 320
- Regional Jet

July 2005

Source: Michigan Department of Natural Resources, SEMCOG, Detroit Metropolitan Wayne County Airport files.

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METROPOLITAN WAYNE COUNTY AIRPORT

Value of Additional Noise Metrics

This FAR Part 150 Study expanded the required noise analysis in two significant ways: conducting sample noise monitoring in locations around the Airport and supplementing DNL contours with additional noise metrics, including the SEL noise metrics. Both of these tasks were initiated in response to community desire to view the noise data in different ways. Additionally, there was a very strong desire for noise information to be related to daily living activities, particularly speech and sleep.

Field noise measurement described previously allowed adjustment to be made to the INM model to more accurately reflect actual fleet and meteorological conditions in the Detroit metro area. Similarly, SEL contours are provided to describe the probable impact on sleep interference. Such additional measuring and metrics can aid in understanding the cost and benefits of various noise abatement alternatives. As a result, it is desired that discussion will not only be over simply the accuracy of the data, but also on the substance of the findings. The goal is to center the discussion on the relative alternatives and the desirability of those alternatives.

Future Baseline Noise Modeling Inputs

As noted in earlier sections, FAR Part 150 requires the development of existing and future aircraft noise exposure contours. FAR Part 150 requires that the future contour reflect conditions five (5) years into the future from the date the maps are submitted to the FAA. It was anticipated that the study will be finished in 2006, and thus, conditions in 2011 were evaluated.

2011 Aircraft Operations

The future noise environment for Detroit Metropolitan Wayne County Airport was analyzed based upon operational conditions in the year 2011. The aircraft operational levels come directly from the aviation forecasts presented in the *Forecasts* chapter of the Part 150 Study. The forecast data shows a total of 683,871 operations are anticipated to occur at the Airport in 2011. This equates to an average of 1,874 operations per day (an operation is either one takeoff or one landing) in that future time frame.

Aircraft Fleet Mix Categories. Categories of aircraft fleet mix were defined relative to type of aircraft (i.e., jet or propeller), size, and noise characteristics. The breakdown by these categories was determined from the aviation forecast. **Table D11** presents operations for the different categories of aircraft.

Table D11
OPERATIONS BY AIRCRAFT CATEGORY FOR FUTURE 2011 BASE CONDITIONS
Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Update

Operations Category	Daily Operations	Annual Operations	Percent Operations
Air Carrier Wide Body	77	28,015	4%
Air Carrier Narrow Body Louder	308	112,324	16%
Air Carrier Narrow Body Quieter	583	212,865	31%
Regional Jets	665	242,907	36%
Commuter Propeller	165	60,213	9%
General Aviation Jet	51	18,729	3%
GA/Air Taxi/Cargo Propeller	25	8,818	1%
TOTAL	**1,874**	**683,871**	**100%**

Source: BridgeNet International

Detailed Aircraft Fleet Mix. The mix of aircraft that operate at the Airport is one of the most important factors in terms of the noise environment. Fleet mix data were determined from all of the data described previously. The fleet mix assumptions are presented in **Table D12**. This table presents the average daily operations for each type of aircraft used in the Integrated Noise Model (INM), as well as a description of these aircraft.

The INM aircraft type assigned to each of the aircraft operating at Detroit Metropolitan Wayne County Airport was based upon aircraft in the INM database that most closely matched the aircraft each airline operated at the Airport. Some aircraft with smaller numbers of operations were grouped into the aircraft type that most closely represented those aircraft. Note that these are the same INM types shown more than once in the table. This is to identify the separate categories of operations. The percentage of operations for each of the aircraft types is also presented. The MD80 series aircraft are the dominant noise aircraft operating at Detroit Metropolitan Wayne County Airport during the future year study period.

Additional Operational Assumptions

Assumptions such as runway use, time of day, flight tracks and flight track usage, and departure procedures remain the same as with the existing conditions.

Table D12
Aircraft Fleet Mix Assumptions (2011)
Detroit Metropolitan (Wayne County) Airport

INM Type	Category	Daily Operations	Annual Operations
74720B	Widebody	0.15	54
747400	Widebody	9.91	3,617
767300	Widebody	5.23	1,909
777200	Widebody	2.00	731
A30062	Widebody	0.90	328
A310	Widebody	1.27	462
B787	Widebody	45.73	16,692
A340	Widebody	3.35	1,222
DC1030	Widebody	7.78	2,839
DC870	Widebody	0.08	31
A330	Widebody	0.07	26
MD11PW	Widebody	0.28	103
727EM1	Narrowbody Louder	0.30	108
727EM2	Narrowbody Louder	8.88	3,242
737N17	Narrowbody Louder	0.49	178
DC95HW	Narrowbody Louder	251.81	91,910
MD83	Narrowbody Louder	46.26	16,885
7373B2	Narrowbody Quieter	25.15	9,180
737400	Narrowbody Quieter	0.18	67
737500	Narrowbody Quieter	11.88	4,337
737700	Narrowbody Quieter	41.51	15,153
737800	Narrowbody Quieter	13.76	5,022
737900	Narrowbody Quieter	0.26	96
757300	Narrowbody Quieter	17.40	6,350
757PW	Narrowbody Quieter	73.22	26,724
757RR	Narrowbody Quieter	2.94	1,072
A319	Narrowbody Quieter	238.66	87,112
A320	Narrowbody Quieter	144.13	52,607
A32123	Narrowbody Quieter	10.21	3,726
F10065	Narrowbody Quieter	3.89	1,421
BAE300	Regional Jet	70.68	25,799
EMB145	Regional Jet	50.05	18,267
EMB14L	Regional Jet	428.39	156,363
F10062	Regional Jet	116.38	42,477
BEC190	Commuter Prop	1.94	708
BEC9F	Commuter Prop	0.84	307
DHC6	Commuter Prop	0.81	294
DHC8	Commuter Prop	10.39	3,792
SF340	Commuter Prop	150.99	55,111
CIT3	General Aviation Jet	3.19	1,165
CL600	General Aviation Jet	4.79	1,749
CNA55B	General Aviation Jet	6.80	2,482
CNA750	General Aviation Jet	6.42	2,343
FAL20	General Aviation Jet	2.06	751
GIIB	General Aviation Jet	1.35	493
GIV	General Aviation Jet	10.59	3,864
IA1125	General Aviation Jet	1.13	411
LEAR25	General Aviation Jet	1.83	666
LEAR35	General Aviation Jet	7.21	2,632
SABR80	General Aviation Jet	5.95	2,172
BEC58P	GA/Air Taxi Prop	5.17	1,888
CNA441	GA/Air Taxi Prop	7.79	2,844
GASEPV	GA/Air Taxi Prop	11.20	4,086
Total		**1,874**	**683,871**

Table D12 **Aircraft Fleet Mix Assumptions (2011)**

Future 2011 Baseline Noise Conditions

Future noise contours were developed using a variety of different noise metrics described in the background section of the report, including both cumulative noise levels (i.e., averaged over a period of time) and single event noise levels (noise levels generated by one operation). As required by the FAA, the primary noise criterion to describe the existing noise environment is the cumulative measure commonly referred to as DNL.

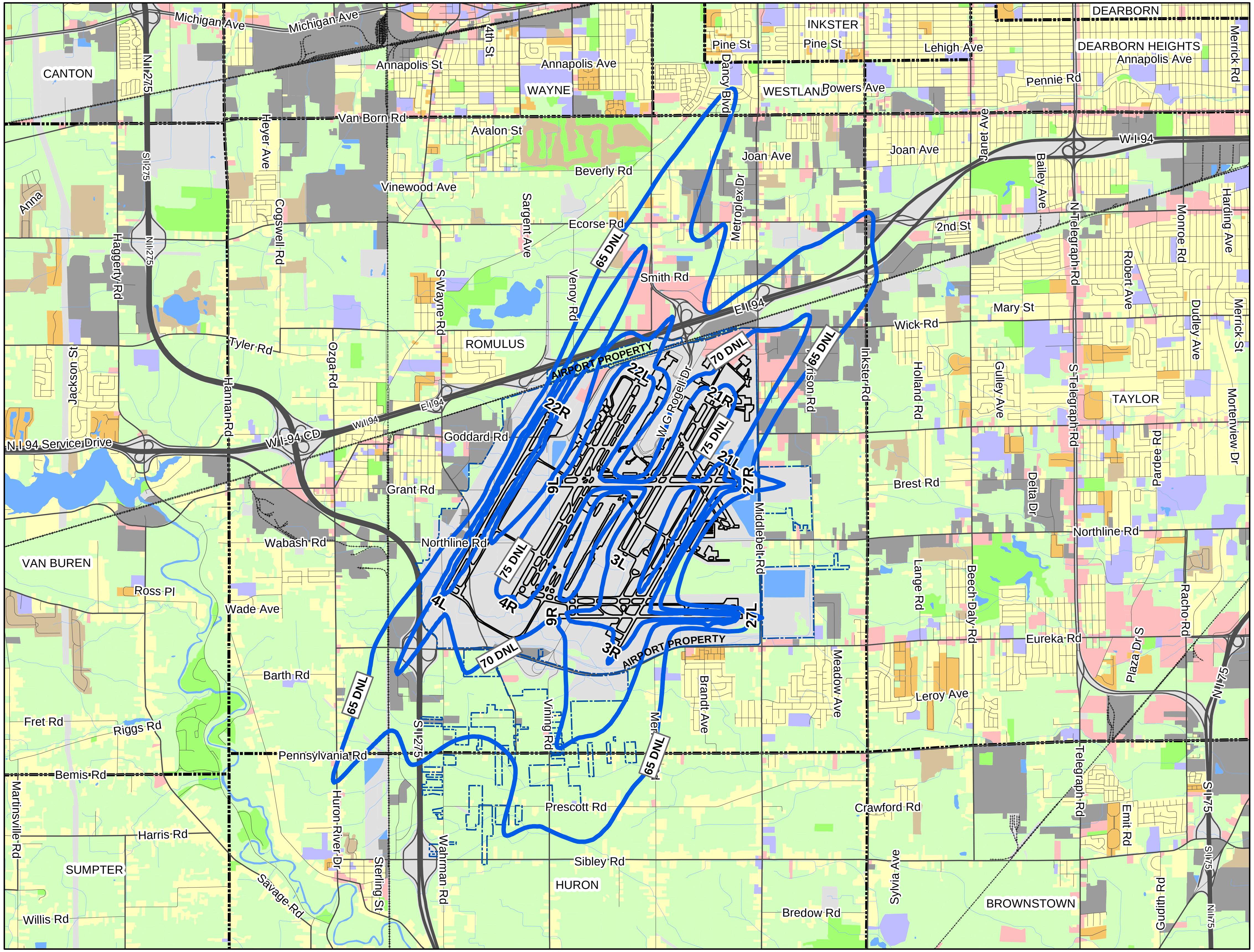
DNL Noise Contours. The future annual base period 2011 DNL noise exposure contours for Detroit Metropolitan Wayne County Airport are presented in **Figure D28**. This figure presents the 65 DNL, 70 DNL, and 75 DNL noise contours.

Single Event Noise Contours. Single event noise exposure contours for sample aircraft were developed and presented in the Existing Noise Environment section (**Figures D27** and **D28**). The same aircraft that exist today are assumed to be in operation in 2011; so, the single event analysis remains the same as with existing conditions.

2004 and 1992 Noise Contour Comparison

The following figure, **Figure D29**, shows the 65 DNL noise contour for both the 2004 existing contours and the 1992 noise contours used in the previous FAR Part 150 Study to identify sound attenuation eligibility boundaries. As can be seen, the 2004 65 DNL noise contour is approximately 35% smaller then the 1992 65 DNL noise contour; although, it does encompass and area of homes in the northwest portion of the contour that were not included in the previous program. Other than those homes, all of the homes within the 2004 65 DNL noise contour have either been offered sound attenuation or have received sound attenuation.

Figure D28 **Future (2011) Noise Contour**



Land Use Legend

- Single-family residential
- Residential areas with 25% or more vacant land
- Multiple-family residential
- Commercial and office
- Industrial
- Institutional
- Transportation, communication, and utility
- Under development
- Cultural, outdoor recreation, and cemetery
- Woodland and wetland
- Active agriculture
- Extractive and barren
- Grassland, and shrub
- Vacant nonresidential
- Water
- City Limits Boundary
- Future 2011 DNL Noise Contours

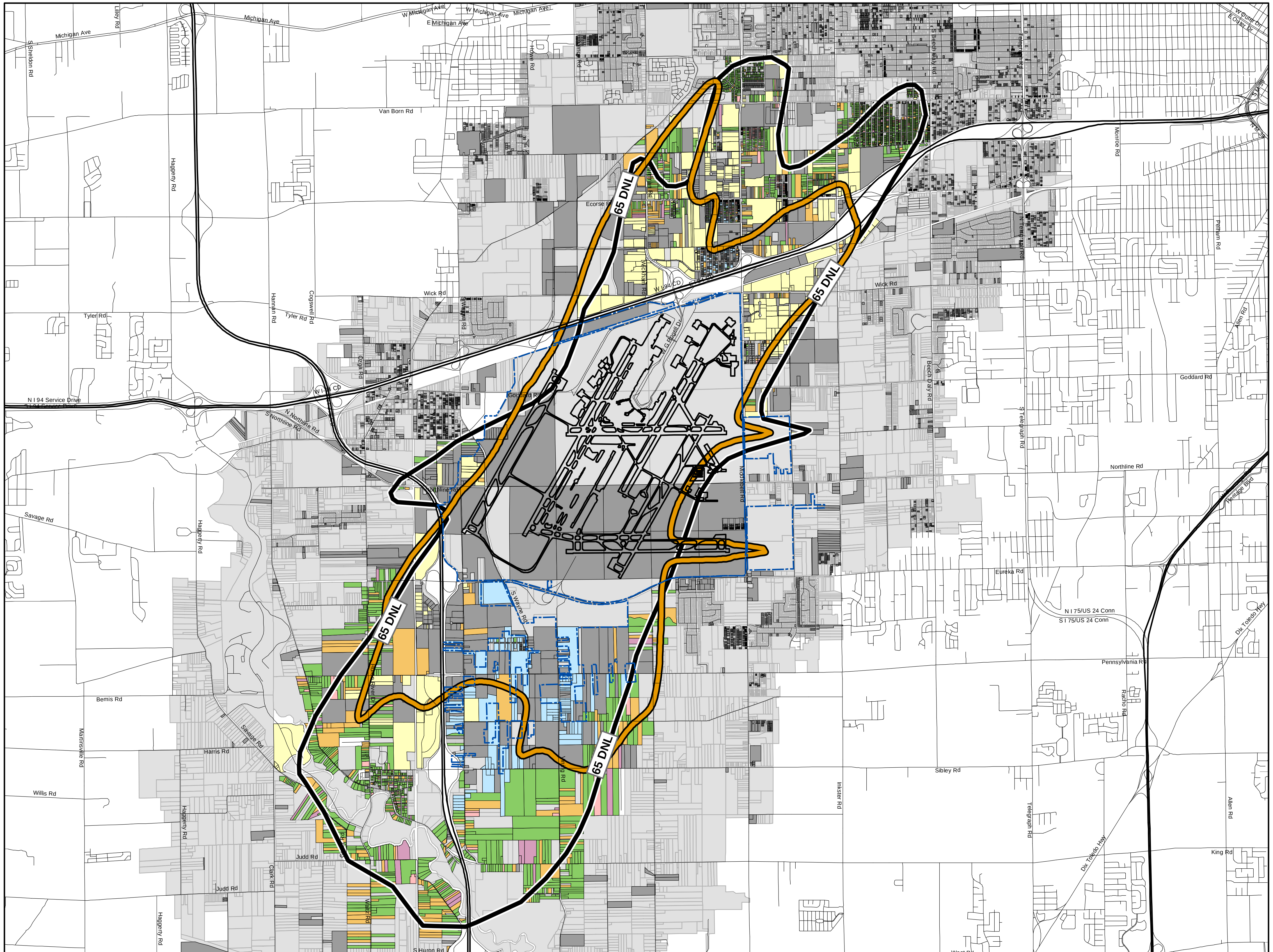
N 0 0.5 1 2 Miles

July 5, 2005

Source: Michigan Department of Natural Resources, SEMCOG

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT

Figure D29 **Noise Contour Comparison**



Residential Sound Insulation Program Legend

- In Program
- Ineligible Applicant
- Potential Applicant
- Sound Acquisition Parcel
- Withdrawn
- Commercial
- Vacant
- TaxParcels

Noise Contour Legend

- Existing (2004) 65 DNL
- Previous (1992) 65 DNL

N

0 3,000 6,000 Feet

May 16, 2005

Source: Michigan Department of Natural Resources, SEMCOG, C&S Companies

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FAR PART 150 NOISE COMPATIBILITY STUDY UPDATE

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WAYNE COUNTY AIRPORT AUTHORITY

CHAPTER E
LAND USE ANALYSIS

Land Use Analysis

Introduction

This section of the FAR Part 150 Noise Compatibility Study for Detroit Metropolitan Wayne County Airport summarizes the compatibility of various land uses with the existing (2004) and future (2011) base case noise exposure contours.

One of the first steps in evaluating land use compatibility is to identify the existing and future noise exposure impacts associated with the operation of Detroit Metropolitan Wayne County Airport. As the Part 150 Study begins to examine alternative noise abatement or land use compatibility actions, a direct comparison will be made with the information presented in this chapter to gauge the success of alternatives.

Methodology

The land use and population analysis for both the existing and future "base case" noise contours were derived from a variety of sources. The existing land use maps provided in the **Inventory** Chapter were used to determine the number of acres of different land use types. The noise contours were overlaid on these maps and a Geographical Information System (GIS) computer program was used to determine the number of acres of each land use type. Housing units and population numbers were determined from the 2000 Census (and most recent updates) using the same GIS program. The information was determined using the census block level data for each contour. In addition, specific parcel level maps provided by the Airport indicated the number of residential structures that have been sound attenuated.

Existing Land Use Analysis/Existing Noise Contours, 2004

This section discusses the land use types found within the existing noise exposure contours generated by aircraft at Detroit Metropolitan Wayne County Airport. The existing noise exposure is represented by three (3) contour bands, the 65 DNL, 70 DNL, and 75 DNL contours. A Part 150 Noise Compatibility Study uses the 65 DNL contour as the threshold contour for land use analysis, based on the FAA's land use compatibility guidelines. The

FAR Part 150 Land Use Guidelines are presented in the **Noise Methodology** Chapter, **Figure C10**.

The 65 DNL and greater contour[1] is the largest contour, containing approximately 9,475 acres. There are approximately 630 residential units representing approximately 1,400 people within the contour, contained on 420 acres of residential development. Of these, all but approximately 30 housing units or about 70 people are within the existing sound attenuation program boundaries. Table E1 summarizes the distribution of land uses within the noise contours. The greatest quantity of land within the 65 DNL and greater contour consists of open/agricultural lands and transportation/utilities uses (4,070 acres and 3,910 acres, respectively, for a total of 84% of the total area). There are no schools that have not been sound attenuated or churches within the 65 DNL noise contour. There are no historical sites listed on the National Register of Historic Places within the 65 DNL and greater contour.

Table E1 also shows the composition of each band of contour to enable a comparison of land uses relative to the FAA's land use compatibility guidelines. **Table E1** summarizes the land uses within each contour that occurred in 2004.

Existing Land Use Incompatibilities

The FAA, through FAR Part 150, has developed generalized guidelines for land use compatibility for land use planning purposes, as presented in the **Noise Methodology** Chapter, **Figure C10**. Within FAR Part 150, these land use compatibility guidelines are to be used unless the local communities have adopted local guidelines; in the case of the communities near Detroit Metropolitan Wayne County Airport, no aircraft noise specific land use guidelines have been adopted. Therefore, for purposes of this study, the FAA guidelines are used.

Based on FAA guidelines, residential land uses within the 65 DNL or greater noise contours are not compatible with the aircraft noise exposure unless the residence has sound attenuation features that reduce interior noise to requisite levels. Without such attenuation, the property would be considered incompatible with the noise exposure. All of the homes within the existing 65 DNL and greater noise contours have been attenuated or have been offered sound attenuation.

As noted earlier, no other noise non-insulated sensitive facilities were located within the 65 DNL or greater noise exposure contour for the existing base case.

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1 The impact analysis presented in this chapter notes the impacts between the 65 DNL and 70 DNL noise contour (referred to as 65-70 DNL), impacts between the 70 DNL and 75 DNL noise contour (70-75 DNL), those within the 75 DNL and greater noise contour. The total impact within the 65 DNL noise Contour includes these incremental contours.

Table E1
EXISTING LAND USE WITHIN EXISTING NOISE CONTOURS, 2004
Detroit Wayne County Metropolitan Airport FAR Part 150 Noise Compatibility Study Update

Land Use	65-70 DNL Contour	70-75 DNL Contour	75 DNL Contour	65 DNL and Greater Land Use	65 DNL and Greater % of Total
People	1,360	40	0	1,400	
Housing Units*	610	20	0	630	
Churches	0	0	0	0	
Schools	0	0	0	0	
Land Use (acres)					
Residential	410 Ac	10 Ac	0 Ac	420 Ac	4.4%
Transportation/Utilities	970 Ac	1,540 Ac	1,400 Ac	3,910Ac	41.3%
Commercial	300 Ac	180 Ac	0 Ac	480 Ac	5.0%
Industrial	445 Ac	55 Ac	0 Ac	500 Ac	5.3%
Water	55 Ac	30 Ac	0 Ac	85 Ac	0.9%
Institutional	10 Ac	0 Ac	0 Ac	10 Ac	0.1%
Open/Agriculture	2,780 Ac	1,110 Ac	180 Ac	4,070 Ac	43.0%
Total Acres	**4,970 Ac**	**2,925 Ac**	**1,580 Ac**	**9,475 Ac**	**100%**

SOURCE: Aerial Photography and Land Use Base Map, SEMCOG.
2000 Census Data, BDC Analysis.
The 65 and greater figures are cumulative. The contours contain the area within all smaller contours. Population and housing units rounded to nearest five. Percentages may not add due to rounding.
* All homes within the 65 – 75 contour band have been sound attenuated, or offered sound attenuation, which are considered compatible for purposes of this Study.

Existing Land Use Analysis/Future (Base Case, 2011) Noise Contours

A review was conducted of the existing land uses that could be affected five years into the future. **The Existing and Future Baseline Noise Conditions** Chapter, page D.52, discusses the noise exposure contour prepared for the year 2011. This "base case" assumes that no operational or facility modifications would occur at the Airport, and is reflective of the forecast operations and aircraft types explained previously in the **Forecast** Chapter. This is the noise exposure contour map that all future alternative scenarios will be measured against to quantify land use effects as compared with what would occur if no mitigation measures were implemented.

The future base case noise contours are slightly smaller than the existing noise contours as a result of continued noise reductions associated with the increase in quieter aircraft that are forecast to be operating in the future. The future contour is expected to decrease the impact from 9,470 acres within the 65 DNL noise contour to 8,700 acres in 2011 – an 8.1% reduction.

The 65 DNL and greater noise contour is expected to contain approximately 8,700 acres. Approximately 540 residential units with about 1,030 residents/people would be within the 65 DNL and greater noise contour, contained on approximately 330 acres of residential land. Similar to the existing conditions, the largest categories of land use that would be affected in 2011 consist of transportation/utilities and open space/agriculture land uses (3850 acres and 3,550 acres, respectively – or about 85% of the total area within the 65 DNL and greater noise contour). Table E2 lists the various existing land uses that are expected to be within the 2001 base case noise contour.

Future Base Case (2011) Land Use Incompatibilities

As noted in Table E2, residential homes are the only noise sensitive land uses that are located in the 65 DNL and greater noise contour that have not been previously sound attenuated. The majority of homes within the 2011 base case contour have been sound attenuated and are considered compatible. The noise contour to be used to identify eligibility boundaries will be determined after an evaluation of operational and facility alternatives. All of the homes within the 65 DNL and greater noise contours have been attenuated or offered sound attenuation, and considered compatible for purposes of this Study.

Table E2
EXISTING LAND USE WITHIN FUTURE BASE CASE NOISE CONTOURS, 2011
Detroit Wayne County Metropolitan Airport FAR Part 150 Noise Compatibility Study Update

Land Use	65-70 DNL Contour	70-75 DNL Contour	75 DNL Contour	65 DNL and Greater Land Use	65 DNL and Greater % of Total
People	990	40	0	1,030	
Housing Units*	520	20	0	540	
Churches	0	0	0	0	
Schools	0	0	0	0	
Land Use (acres)					
Residential	320 Ac	10 Ac	0 Ac	330 Ac	3.8%
Transportation/Utilities	980 Ac	1,510 Ac	1,360 Ac	3,850 Ac	44.3%
Commercial	310 Ac	150 Ac	0 Ac	460 Ac	5.3%
Industrial	380 Ac	50 Ac	0 Ac	430 Ac	4.9%
Water	40 Ac	30 Ac	0 Ac	70 Ac	0.8%
Institutional	10 Ac	0 Ac	0 Ac	10 Ac	0.1%
Open/Agriculture	2,430 Ac	940 Ac	180 Ac	3,550 Ac	40.8%
Total Acres	**4,470 Ac**	**2,690 Ac**	**1,540 Ac**	**8,700 Ac**	**100%**

SOURCE: Aerial Photography and Land Use Base Map, SEMCOG.
2000 Census Data, BDC Analysis.
The 65 and greater figures are cumulative. The contours contain the area within all smaller contours. Population and housing units rounded to nearest five. Percentages may not add due to rounding.
* All homes within the 65 – 70 contour band have been sound attenuated or offered sound attenuation, which are considered compatible for purposes of this Study.

Contours Larger Than 65 DNL and Supplemental Metrics

The 60 DNL contour, as well as the supplemental metrics are included as supplemental information in the following chapters for the sole purposes of identifying areas that may receive increased or decreases sound levels. The 60 DNL contours are generally less accurate than the higher intensity contours, but when comparing one noise abatement option to another, show the locations that could experience an increase or decrease in noise exposure.

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT
FAR PART 150 NOISE COMPATIBILITY STUDY UPDATE

DETROIT METRO • WILLOW RUN
WAYNE COUNTY AIRPORT AUTHORITY

CHAPTER F
POTENTIAL NOISE ABATEMENT MEASURES

Potential Noise Abatement Measures

Introduction

The purpose of this Chapter is to:

- **Provide a foundation for understanding the roles and responsibilities of various parties in noise abatement and abatement planning.**
- **Identify the range of noise reduction/abatement measures that are either required to be considered in a Part 150 Noise Compatibility Study or are suggested by the Consultant or public for consideration during the study process.**

This chapter provides an initial understanding of how each noise reduction measure might affect noise exposure conditions.

The measures presented in this chapter are general in nature. This chapter provides a broad perspective of how each measure could address specific noise issues and identifies any known issues with implementation. It is expected that the Study Advisory Committee (Appendix Five, Six & Seven) will assist the Airport Authority (Appendix Nine) and Consultants in identifying more specific noise abatement measures for consideration during this study.

This chapter identifies the following:

- The roles and responsibilities of the parties participating in the Part 150 Noise Compatibility Study;
- Measures available to the airport operator;
- Measures available to state and local agencies; and
- Measures dependent upon the federal government.

Roles and Responsibilities of the Parties

Before considering specific means of reducing aircraft noise and land use incompatibilities, the authority of various parties must be defined. The FAA's 1976 **Noise Abatement Policy** established the following policies regarding roles and responsibilities:

> "The **Federal Government** has the authority and responsibility to control aircraft noise by the regulation of source emissions, by flight operational procedures, and by management of the air traffic control system and navigable airspace in ways that minimize noise impact on residential areas, consistent with the highest standards of safety. The federal government also provides financial and technical assistance to airport proprietors for noise reduction planning and abatement activities and, working with the private sector, conducts continuing research into noise abatement technology."
>
> "**Airport Proprietors** are primarily responsible for planning and implementing action designed to reduce the effect of noise on residents of the surrounding area. Such actions include optimal site location, improvements in airport design, noise abatement ground procedures, land acquisition, and restrictions on airport use that do not unjustly discriminate against any user, impede the federal interest in safety and management of the air navigation system, or unreasonably interfere with interstate or foreign commerce."
>
> **State and Local Governments and Planning Agencies** provide for land use planning and development, zoning, and housing regulation that will limit the uses of land near airports to purposes compatible with airport operations.
>
> The **Air Carriers** are responsible for retirement, replacement, or retrofit of older jets that do not meet federal noise level standards, and for scheduling and flying airplanes in a way that minimizes the impact of noise on people.
>
> **Residents and Prospective Residents** in areas surrounding airports should seek to understand the noise problem and what steps can be taken to minimize its effect on people. Individual and community responses to aircraft noise differ substantially and, for some individuals, a reduced level of noise may not eliminate the annoyance or irritation. Prospective residents of areas impacted by airport noise thus should be aware of the effect of noise on their quality of life and act accordingly.

As such, when considering various means of reducing aircraft noise exposure, these roles must be considered. In addition, a substantial history of airport noise reduction precedent has accumulated over the last few decades nationally and at Detroit Metropolitan Wayne County Airport (DTW or Metro Airport). The following paragraphs briefly describe these activities and actions.

In the early 1980s, the FAA began issuing rules and regulations that control aircraft noise at the source, the aircraft engine. These aircraft noise standards established by the federal government must be met by aircraft manufacturers through newly-designed engines and aircraft. The government established timetables that the airlines must comply with noise standards, commonly known as Stage I, Stage 2, Stage 3, and Stage 4. Full compliance with Stage 2 standards was established in January 1, 1988 (FAR Part 36). Subsequent to this timeframe, Congress passed the Noise Act (The Airport Noise and Capacity Act of 1990

[ANCA], PL 101-508, 104 Stat. 1388), which established two broad directives for the FAA. The first directive established a method to review aircraft noise and airport use or access restrictions imposed by airport proprietors, and the second was to institute a program of phase-out of Stage 2 aircraft over 75,000 pounds by December 31, 1999. To implement ANCA, the FAA amended FAR Part 91 and issued a new FAR Part 161. Part 91 addresses the phase-out of large Stage 2 aircraft and the phase-in of Stage 3 aircraft. The airlines were responsible for meeting this deadline and they have all achieved full compliance.

FAR Part 161 was promulgated as a stringent review and approval process for implementing use or access restrictions by airport proprietors, such as curfews and caps on operations. This is in keeping with one of the major reasons for the Act, which was to discourage local restrictions more stringent than the Act's 1999 Stage 2 phase-out. Part 161 makes it more difficult for the Airport or any others to implement use or access restrictions, especially those associated with Stage 3 aircraft. These difficulties are so significant that to date there has been only one Part 161 plan approved by the FAA. This was approved for Naples Airport in Florida. Worth noting, airport/aircraft use restrictions in place at airports before the passage of ANCA were "grandfathered" and therefore allowed to remain in place as long as the airports did not modify the restrictions making them more stringent.

Airports and state and local governments are preempted from regulating the operations of aircraft, with one exception. They may exclude aircraft from an airport for noise reasons as long as the exclusion is reasonable and nondiscriminatory. In addition, it must comply with the provisions of the ANCA, through FAR Part 161, and it must not regulate military aircraft.

The outcome of a Part 150 Noise Compatibility Study is intended to define a balanced and cost-effective program for reducing existing and future noise exposure. The development of reasonable measures is the focus of the FAR Part 150 noise compatibility planning process. The objective is to explore a wide range of feasible measures of land use patterns, noise control actions and noise exposure patterns, seeking optimum accommodation of both airport users and airport neighbors within acceptable safety, economic and environmental parameters. Each measure should:

1) Have the potential of resolving the problem;
2) Be implementable within acceptable economic, environmental, and social costs; and,
3) Be implementable in compliance with federal, state, and local legislation, regulations, and ordinances.

This section contains a description of potential noise abatement and mitigation measures or actions that may be considered for Detroit Metropolitan Wayne County Airport. A general evaluation of each is made on the basis of the three factors listed above, and will be presented in three different categories: a) those measures available to the airport proprietor; b) those measures available to the state or local unit of government; and, c) those measures dependent on federal government concurrence for implementation.

In addition, FAR Part 150 identifies a number of measures that the FAA has determined must be considered in developing a Part 150 Noise Compatibility Plan. These required measures are:

- Acquisition of land or interest therein;
- Construction of barriers and acoustical shielding, including soundproofing of public buildings;
- The use of flight procedures (including modification of flight tracks) to control the operation of aircraft to reduce exposure to individuals;
- Implementation of any restriction on the use of airport by any type or class of aircraft based on the noise characteristics of those aircraft;
- Implementation of a preferential runway use system;
- Other actions or combination of actions which would have a beneficial noise control or abatement effect on the public; and
- Other actions as recommended by the FAA.

These measures are explained in greater detail in the following sections. Each measure is assigned to one of three categories identifying whether the airport operator, a state/local government, or the federal government is responsible for implementing the measure if it is included in the final Noise Compatibility Plan (NCP). The potential measures presented in the following paragraphs are general in nature. It is expected that the Study Advisory Committee (Appendix Seven) will assist the Airport Authority (Appendix Nine) and Consultant in identifying more specific measures to evaluate for noise abatement or mitigation. As these more specific measures are identified, they will be evaluated and presented in subsequent chapters Study Advisory Committee (Appendix Five) meetings, and public workshops.

Tables F1 and F2 list a range of noise abatement and land use compatibility measures that will be discussed, as well as specific noise issues these measures are designed to address.

General Measures Available to the Airport Proprietor

Denial of Use of Airport to Aircraft Not Meeting FAR Part 36 Standards.

This measure might be implemented by limiting access to the Airport for aircraft that do not meet certain noise standards (i.e., aircraft that do not conform with certain FAR Part 36, Stage 2, noise level requirements). Most turboprops and other large aircraft produced after 1964 were required to meet those FAR Part 36 standards. Older, non-complying (Stage 1) turbojets over 75,000 pounds maximum gross takeoff weight, which have standard airworthiness certificates, were required to be retrofitted or cease operating in U. S. airspace as of January 1, 1985 (Part 91, Subpart E). Effective December 31, 1999, all civilian aircraft weighing more than 75,000 lbs met Stage 3 noise levels. Aircraft types weighting less than 75,000 lbs are not required to be Stage 3.

Requiring aircraft to meet Stage 3 levels or levels more stringent than Stage 3 is an option only if the action is not unjustly discriminatory, does not constitute a burden on interstate and foreign air commerce, and does not conflict with any airport policy or requirement. To date, only one airport's new noise program that would affect Stage 2 aircraft weighing less than 75,000 lbs has met the FAR Part 161 regulatory requirements, and even that action has not been implemented for other regulatory reasons. In addition, military aircraft do not have to comply with these regulations.

This measure is feasible where the majority of the aircraft fall within the parameters of FAR Part 36. However, to restrict Stage 3 or Stage 2 aircraft less than 75,000 pounds, the provisions of Part 161 must be complied with. This includes a cost/benefit analysis of the proposed restriction (with FAA approval of the methodology or results) and proper notice must be given, not only to the public, but to all affected parties. This is a very difficult task, which can be very expensive and very time-consuming. As noted, to date, no such Part 161 plans addressing Stage 3 aircraft have been approved (only one addressing Stage 2 aircraft has been approved).

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TABLE F1 - Operational and Facility Measures

	Measures for Consideration	Ground noise	Departure flight noise	Approach Flight Noise	Landing Roll Noise	Mainte-nance Activity Noise	Ground Equip. Noise	Sample Implementation Measure
Airport Plan	Changes in Runway location, length or strength	◆	◆	◆	◆			New parallel runway. Runway extension. Pavement overlay.
	Displaced Thresholds[1]	◆		◆				Relocated existing runway threshold.
	High Speed Exit Taxiways	◆			◆			Examine locations of taxiway exits to reduce use of reverse thrust.
	Relocated Terminals	◆				◆	◆	Construct new terminal buildings and/or concourses.
	Isolating Maintenance Run-ups Use of Barriers	◆				◆	◆	Barriers. Hush House/Ground Run-up Enclosure.
Airport and Airspace Use	Preferential or Rotational Runway Use	◆	◆	◆	◆			Increased east flow or Increased west flow Balanced flow.
	Preferential Flight Tracks Use of Modification to Approach and Departure Procedures		◆	◆				Monitor compliance with existing corridors. Greater compliance with departure procedures. Develop "minimum" population flight tracks.
	Restrictions on Ground Movement of Aircraft	◆						Implement taxiway use restrictions.
	Restrictions on Engine Run-ups or Use of Ground Equipment					◆	◆	Minimize the number of nighttime run-ups.
	Limits on Number or Types of Operations or Types of Aircraft	◆	◆	◆	◆	◆	◆	Conduct a Part 161 Study. Minimize number of late night flights (10:00-7:00). Limit number of nighttime Stage 2 <75,000 lbs ops
	Use Restrictions	◆	◆	◆	◆		◆	Part 161 Studies.
	Raise Glide Slope Angle or Intercept			◆				Modify glide slope antennas
Aircraft Operation	Power and Flap Management		◆	◆				Identify appropriate departure climb profile to reduce noise.
	Limited use of Reverse Thrust				◆			Implement reverse thrust reduction procedures.
Noise Program Management	Noise-related Landing Fees	◆	◆	◆	◆			Charge increased fees for louder aircraft.
	Noise Monitoring		◆	◆		◆		Noise Monitoring upgrades.
	Establish Citizen Complaint Mechanism	◆	◆	◆	◆	◆	◆	Establish a noise complaint hotline
	Establish Community Participation Program	◆	◆	◆	◆	◆	◆	Host quarterly public airport workshops

[1] Displaced Threshold describes a situation where the actual landing area on a runway is not at the physical end of the runway, but at some distance on the runway from the physical end.

Table F2 - Land Use Measures

	Measure For Consideration	Sample Implementation Measure	Noise Issue: Ground noise	Departure flight	Approach Flight	Landing Roll	Training Flights	Maint. Activity	Ground Equip.
Corrective	Acquisition	Acquisition of single family residences Acquisition of vacant residential land Acquisition of multi-family residential	◆	◆	◆	◆	◆	◆	
	Sound Insulation	Insulation of single family residential Insulation of multi-family residential Insulation of public buildings Insulation of schools	◆	◆	◆	◆	◆	◆	
	Mobile Homes	Relocate mobile homes to another location	◆	◆	◆	◆	◆	◆	
	Identify Noise Remedy Boundaries	Areas of Eligibility	◆	◆	◆	◆	◆	◆	◆
Preventative	Zoning		◆	◆	◆	◆	◆	◆	◆
	Building Code Modifications		◆	◆	◆	◆	◆	◆	◆
	Comprehensive Plans		◆	◆	◆	◆	◆		
	Noise Overlay Zone		◆	◆	◆	◆	◆	◆	◆

Capacity Limits Based on Defined Noise Levels

The following measures are required to be addressed by FAR Part 150. However, they all would require a FAR Part 161 Cost/Benefit Study prior to adoption. One of the requirements of Part 161 is to explore all non-restrictive measures prior to adopting a restriction. Therefore, this Part 150 Noise Compatibility Study will evaluate the non-restrictive measures and a Part 161 restriction will only be evaluated subsequent to the submittal and approval of this study, if appropriate at that time.

Restrictions on airport use or airport access might be structured based on the desire to keep noise below some specific level. However, such restrictions often have varied economic consequences and should only be considered after all other attempts at noise reduction have been exhausted. The implementation of this type of restriction might take three broad forms:

Restrictions Based on Cumulative Impact. With this measure, a maximum cumulative impact (such as the total area within the existing DNL 65, 70 or 75 contour) would be established as the baseline cumulative impact and then an airport's operations and/or fleet mix (mix of aircraft types) would be adjusted or limited so as not to exceed that maximum in the future. This could be accomplished through "capacity limitations", whereas either the aircraft types, based upon their relative "noisiness", or the numbers and mix of aircraft, would be limited or adjusted so as not to exceed the existing noise impact. One variation of this measure can be referred to as a "noise budget".

Restrictions Based on Certificated Single-Event Noise Levels. Most aircraft today have been certificated by the FAA, as part of the FAR Part 36 process described earlier. The certificated noise levels are published as part of Advisory Circular 36. Based on the published noise levels, it might be possible to devise limitations that could prevent aircraft from operating that exceed those noise levels. This measure could be formulated so as to set a threshold noise level that cannot be exceeded at any time, or different noise levels can be implemented for either daytime or nighttime operations. An aircraft's compliance with this limit would be determined from the published FAA certification data. It should be noted that aircraft can be operated at less than certificated noise levels under certain operational conditions, which then becomes a means that air carriers continue to operate despite the noise level limit.

Restrictions Based on Measured Single-Event Noise Levels. Recognizing that aircraft noise levels vary widely, it might be possible to set limits based on actual, measured single-event noise levels. Aircraft that exceed this limit would be prohibited from using an airport. This does not mean that the airport, the community, or citizen groups can set up a microphone and noise level limit and challenge the pilots to "beat the box." Compliance with the single-event level would be measured over an extended period of time for many single events, and violation would then be determined from repeated excess noise.

The following are also types of restrictions that are under the jurisdiction of Part 161 and are historically used in place of a total Stage 2 aircraft restriction or ban. In all instances, military aircraft are exempt from noise restrictions.

Landing Fees Based on Noise.

This measure is based on the premise that all or part of the landing fee for each aircraft could be focused on the noise emitted by that individual aircraft. This would apportion the "cost" of producing the noise to those aircraft that contribute the most to it. This measure in theory would be designed to encourage the use of quieter aircraft and might actually generate additional revenue for the Airport. To avoid discrimination, the noise fee would need to be based upon a published standard for single event noise levels, such as those contained in Advisory Circular (AC) 36. The opposite strategy might also be used. In other words, quieter aircraft could be apportioned a lesser fee than noisier aircraft, thus serving as an incentive for quieter aircraft. In this manner, operators that reduce noise generated by their aircraft might be rewarded.

The cost of implementing this measure, in terms of manpower, finances and public relations, would not be offset by the revenue or benefit derived from it. The administrative cost involved in maintaining records of aircraft types and numbers, and billing statements would not be commensurate with the noise reduction achieved. In addition, this measure would not apply to military aircraft as they do not pay landing fees. The implementation of this measure would require a Part 161 Study.

Complete or Partial Curfews.

Airport curfews can be an effective but costly means of controlling noise intrusion into areas adjacent or close to an airport. However, curfews can have a significant negative effect on both aviation interests and the community, having economic impacts on airport users, those providing airport-related services, and on the community as a whole. In addition, other communities may also be impacted if flights are discontinued and passengers are unable to obtain the required air service. Thus, curfews can create an unreasonable burden to interstate or foreign commerce.

A curfew can take various forms, from restrictions on some or all flights during certain times of the day or night, or restrictions based upon noise levels or thresholds or based on certificated aircraft noise levels contained in AC 36. Curfews are usually implemented to restrict operations during periods when people are most sensitive to noise intrusion. This most often occurs during the nighttime hours, particularly between the hours of 11:00 p.m. and 7:00 a.m.; these measures can be effective if there are a significant number of night flights. Curfews have been upheld by a Federal District Court in California for a general aviation airport (Santa Monica Airport),[1] while at the same time, they have been denied by a Federal District Court in New York (Westchester County).[2] The implementation of a complete or partial curfew would require a Part 161 Study.

Ban All Jet Aircraft.

This measure is sometimes proposed at airports to relieve noise impacts, but it has been well settled and documented by case law that this is not legally possible. It not only puts an unreasonable burden on interstate commerce (which is an area of regulation reserved for the federal government) but it also results in a discriminatory regulation that violates the tenets of the U.S. Constitution. This measure also violates the equal protection clause. An outright ban on all jet aircraft cannot be legally implemented.

Acquisition of Land or Interest Therein.

The most complete method of controlling and mitigating noise is to purchase the impacted property (referred to as acquisition in fee simple). However, this method is also the most costly since it removes the property from the tax base of the community. Certain land areas are more impacted than others and it may be appropriate to purchase land to mitigate severe noise impact where the purchase of full or partial interest may be the only means of achieving compatibility. This is especially true for residences within the 75 DNL noise contour. However, in the case of Metro Airport there are no residences within the existing or future Base Case 75 DNL noise contours.

Instead of acquiring property, airports sometimes purchase an easement from the property owner that effectively purchases the right to create noise. An easement is sometimes preferred because it keeps property on the tax roll, but may cost as much as the entire fee (acquisition cost). There are two main types of easements associated with airports: 1) a Clear Zone Easement associated with the runway protection zone (RPZ); 2) a noise easement; and an avigation easement that combines portions of both. Easements can be purchased, condemned, or dedicated through the land use subdivision process. Easements are also acquired by airports when the airport provides sound insulation, which is discussed later.

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1 Santa Monica Airport Assoc. v. City of Santa Monica, 659 F. 2d. 100, [9th Cir., 1981

2 Westchester County v. United States of America, 571 F. Supp. 786 [Southern District of New York, 1983

Another method of keeping noise affected residential property on the tax rolls is to purchase the property and then resell it for a compatible use or to resell it for residential use but retain the rights to create noise (such as placing an easement on the property when it is sold). In other words, an airport operator could purchase a property and then resell it to the original homeowner or anyone else, but retain a covenant or easement which identifies the airport's right to fly over the property and to create noise. This would result in the property owner giving up his/her right to initiate litigation against the airport due to the specified noise impact. In addition, this method would allow the market to set the price and value of the noise easement which would be retained by the airport. An airport could also develop or resell the property to another government agency or private company to develop it as a compatible use (golf course, nature area, cemetery, public works, light industry, commercial, etc.), or the agency could purchase the property outright for its own use. This would have to be coordinated with the airport staff and management to ensure redevelopment with a compatible use.

Instead of purchasing land, sound attenuation (or insulation) is often recommended for areas near airports. Sound attenuation is the process of adding structural components, such as insulation, to a building to reduce the inside noise levels to a specific degree. Normally, a 25 to 30 dB(A) reduction from outside to inside noise levels is recommended. Such noise reductions are normally achieved by adding acoustically rated windows, installing solid core doors, installing special ventilation systems, and providing attic insulation. Many residents prefer this measure because it reduces the inside noise levels and allows the homeowner to remain in his/her home. Sound attenuation, when funded with public monies, often requires the granting of a noise easement in return. Detroit Metropolitan Wayne County Airport has had a successful sound attenuation program for several years and almost all of the homes within the existing and future base case noise contour have been sound attenuated or offered sound attenuation.

No matter what interest of land is purchased, if federal assistance is used, the provisions of the Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970 (also known as the Uniform Act) must be followed.

Noise Barriers (Shielding, including earth berms and walls).

Noise generated from ground-level sources on an airport can result from engine run-up and maintenance operations, aircraft movement on the runways and taxiways, and aircraft engine reverse thrust on landing. Noise intrusion from these sources is usually only significant to those areas close to an airport. One method of mitigating this type of noise is through the use of noise barriers or earthen berms. These can protect adjacent areas from unwanted noise by blocking the path of noise. Another method is through the strategic and well-planned location of airport buildings and structures that can provide shielding to adjacent areas to block noise. Run-up and maintenance areas can often be moved to locations which are away from noise-sensitive uses adjacent to an airport, and if necessary "hush houses" or “ground run-up enclosures” (GRE) can be constructed to redirect sound for specific run-up and maintenance operations.

Construct a New Runway in a Different Orientation.

Often the construction of a new runway with a different orientation will shift noise away from noise sensitive uses to either less populated areas or compatible areas (commercial lands, rivers etc). For instance, at airports that have a north-south runway orientation, perhaps an east-west orientation or slightly different angle might be considered. The orientation of a runway is dependent upon many factors, including prevailing winds, topography, obstacles and other conditions. A new runway cannot be constructed if wind direction and topographic conditions are such that safety criteria cannot be met. In addition, both existing and future land uses must be considered so that the noise is not shifted to other populated areas. This is an expensive measure that must be beneficial to both the airport users and the surrounding community.

Runway Extensions.

Often a runway extension can reduce noise impacts to areas close to an airport. A runway extension can allow aircraft to gain altitude sooner and produce less noise exposure relative to how the aircraft would operate without the extension. In addition, a runway extension may enable aircraft to fly certain flight paths (such as making turns after departure) that might not be possible with an existing runway length. However, there are tradeoffs with an extension that must be considered. With an extension, the area closest to the extended end can experience greater noise levels due to lower approach altitudes at this end of the runway, and aircraft beginning their departure roll closer to those areas. This can sometimes be corrected by establishing a displaced threshold so that aircraft land farther down the runway and maintain altitude over the area beyond the extension. Displaced thresholds are not generally recommended by the FAA.

An additional factor to consider with a runway extension is that many times a longer runway will enable heavier, larger aircraft to use the runway that were unable to operate previously.

This may be desirable since many of the larger, heavier aircraft are new generation aircraft and are actually quieter than smaller aircraft presently operating. Runway extensions can also be used as a noise abatement measure to help reduce the need for using reverse thrust upon landing, which can generate a considerable amount of ground-level noise for those areas close to an airport. The Airport Layout Plan for Detroit Metropolitan Wayne County Airport currently shows an extension to Runway 3L which is anticipated to be designed and built within the five-year timeframe of this FAR Part 150 Noise Compatibility Study. As such, the benefit of this measure as far as a noise abatement tool will be considered as part of this study.

Touch and Go Restrictions.

Restrictions on training flights performing touch-and-go operations can mitigate noise impacts at airports where there are a significant number of training operations, especially jet training. Touch-and-go operations occur where the pilot approaches the runway as if landing, the aircraft touches down on the runway and then lifts up for departure in a series of practice runs. Restricting touch-and-go training is particularly effective if the operations are occurring during the nighttime and early morning hours, when such operations can be most intrusive. However, such restrictions may not be legal as they are often found to limit access or be a capacity restriction. Capacity restrictions are different from access restrictions based on noise (which may be possible subsequent to a Part 161 Study) as they are beyond the ability of an airport operator to implement. They are pre-empted by federal regulation. There are very few touch-and-go operations occurring at Metro Airport and this is not a viable measure for this study.

High-Speed Exit Taxiways.

High-speed taxiway exits can help reduce noise impacts by allowing aircraft to exit the runway quicker and reduce the use of reverse thrust. Two types of taxiway exits typically are developed on an airport:

1) a high-speed exit that is typically angled; and,

2) a regular taxiway exit that is angled at 90 degrees (thereby requiring the aircraft to come to a near stop before turning).

This measure is viable only with runways of adequate length to allow aircraft the opportunity to slow down sufficiently to safely exit the runway and must be placed at locations convenient to the operations at that airport. High-speed taxiway exits do little good as an independent measure, and typically must be implemented along with other measures.

Noise Monitoring Program.

Noise monitoring or sound level measurement programs can enhance the effectiveness of noise abatement and compatibility programs. Airports use continuous sound level measurement devices (called noise monitoring systems) to demonstrate changes in aircraft noise exposure and to identify noise levels associated with specific aircraft events. Noise monitoring is often used as a means of showing progress toward reducing the problem. Most systems have several remote microphone units that sample the weighted sound level once or twice per second, record the samples, and transmit the data to a minicomputer system with printouts. Any FAA approved noise monitoring system would have the following minimum capabilities: continuous measurement of dBA at each site; hourly Leq data; daily Ldn data; and single-event; maximum A-weighted sound level data. Although this measure does not provide means to change noise exposure maps or provide actual noise reduction, it will be evaluated and recommendations made concerning the implementation of such a system at Metro Airport during this study.

Noise Complaint/Citizen Liaison Program.

Many airports in the U.S. provide staff in a Noise Office to receive and respond to citizen complaints of aircraft noise. A comprehensive noise complaint system has many advantages, including identification of unusual conditions based on citizen complaints that lead to a notice sent to an aberrant pilot, public accessibility of information about the airport operation and noise conditions, data collection to identify sensitive areas, and positive public relations. At most airports, one person is designated to receive and address noise complaints from citizens. The complaint officer keeps a file on each complaint, noting the time, place, type of complaint, type of aircraft and N-number or other identifying characteristics of the aircraft, if known. This gives citizens a central location to lodge noise complaints and to obtain information concerning aircraft operations or changes in flight procedures. Metro Airport currently has such a system in place and is keeping records of noise complaints. This system will be reviewed and recommendations made regarding program status, as necessary and appropriate.

Options Available to State or Local Governments

Land Use Controls.

Federal guidelines contained in FAR Part 150 indicate that residential development, along with other noise sensitive uses such as schools, churches, hospitals, rest homes, etc. should not be located with areas exposed to 65 DNL or greater noise levels. These guidelines are recognized not only by the FAA but also by the Department of Housing and Urban Development, Department of Defense, and the Environmental Protection Agency, as well as numerous state and local agencies. Land use and development controls are one method of ensuring such noise sensitive uses will be limited within the noise contours. It should be remembered that it is within the discretion and authority of the local unit of government to determine the types of lands that are incompatible with noise levels and to define their own threshold of sensitivity. In the case of the communities in the vicinity of Metro Airport, no local noise related controls have been established.

One of the primary tools used by local communities to guide development within the jurisdiction is through the Comprehensive Planning process. Land use and development controls which are based on a well-defined and thoroughly documented comprehensive plan are among the easiest and most powerful tools available to the local unit of government to ensure land use compatibility. It is the responsibility of the local unit of government having land use jurisdiction to implement these controls to protect its residents from aircraft noise impacts and to protect the airport from encroachment of incompatible land uses. This is particularly important where more than one unit of government has land use control authority for the area outside an airport's boundary. It is extremely critical that the local unit of government accept the responsibility for ensuring land use compatibility in their planning and development actions. It is also important that the state government provide the necessary enabling legislation that will allow the local unit of government to institute land use controls. The most common forms of land use controls available to the local governments include: zoning, easements, transfer of development rights, building code modifications, capital improvement programs, subdivision regulations, and comprehensive planning. These forms of land use controls will only be briefly outlined in the following paragraphs.

Zoning. Zoning is the most common and traditional form of land use control used in the United States today. It controls the type and placement of different land uses within designated areas. It is used to encourage land use compatibility while leaving property ownership in the hands of private individuals or business entities, thus leaving the land on the tax rolls. Zoning is not applied retroactively and is not necessarily permanent. It is most effective in areas that are not presently developed and that can be encouraged to develop with compatible uses. As stated earlier, all jurisdictions have typical zoning ordinances in effect concerning the way use districts are delineated.

Easements. An easement is a right held by one party to make use of the property of another for a limited purpose, as defined in the easement.

Transfer of Development Rights. The transfer of development rights involves separate ownership of the "bundle of rights" associated with property ownership. The concept involves the transfer of the right to develop a certain parcel of property to a certain density/intensity to another parcel of property under separate ownership. This would allow the property that obtains the added development rights to develop to an intensity/density that is beyond that which would normally be allowed. An airport operator could also purchase these rights from the landowner and retain them or sell them to another landowner. This concept can be used to retain property in compatible uses and still compensate the landowner for his loss of development. The idea depends upon market conditions of the area and (there is some disagreement on this point) upon the availability of state enabling legislation authorizing the development of the concept at the local level.

Building Code Modifications. This measure is to modify existing or potential building codes to include specific sound attenuation provisions for structures within areas affected by aircraft noise. Recommendations may be made to the various jurisdictions concerning sound attenuation, as appropriate.

Capital Improvements Program. This is a document that establishes priorities and costs on the funding and development of public facilities (roads, streets, sewers, libraries, etc.). It can be used very successfully, in concert with subdivision regulations and a comprehensive plan, to control not only the areas of development but also the timing of development, by controlling the timing and location of public facilities construction.

Subdivision Regulations. Subdivision regulations are used to control the design and placement of public and private facilities in the conversion of raw land to developed property. Many of the jurisdictions surrounding Metro Airport have adopted subdivision regulations.

Comprehensive Planning. Comprehensive future land use planning, when it is coordinated with the zoning ordinance, subdivision regulations and the capital improvements program, can reduce or avoid land use incompatibilities in the future. Many of the jurisdictions surrounding Metro Airport have adopted comprehensive plans for their areas of jurisdiction.

All of the land use controls mentioned above will be analyzed in greater depth as to their feasibility for implementation when the final noise contours are produced and a Future Noise Exposure Map is presented.

Options Dependent Upon the Federal Government Approval

Departure Thrust Cutback (Departure Climb Profile).

During initial takeoff, the power or thrust used by the aircraft to gain altitude is usually at its maximum. This measure would involve the application of thrust cutbacks at various stages of the take-off. Because of system-wide needs, each operator has developed its own standardized take-off procedure. This measure is recommended where aircraft operators have the opportunity to use a different departure thrust setting and still be within safety limits as per the particular type of aircraft they are flying, given the characteristics of the particular airport. Often it is better for aircraft to climb faster and turn earlier than to fly over noise-sensitive areas at lower power. In addition, this measure cannot be implemented without the direct concurrence of the FAA, taking into account operational, safety, and airspace considerations. The FAA's Advisory Circular (AC) 91-53A titled "Noise Abatement Departure Profile" defines two standard departure procedures for aircraft: a "close-in" departure and a "distant" departure. The close-in departure typically reduces noise, but may increase noise further from an airport (such as 8 to 10 miles away). Conversely, the distant procedure concentrates noise closer to an airport (such as within 3-5 miles), but reduces noise further away.

Flight Management (FMS)/Global Positioning System (GPS)/Required Navigation Procedures (RNP or RNAV).

Global positioning satellite (GPS) systems have enabled a wide range of new flight procedures at airports that effectively rely on computer technology to direct the flight of the aircraft. These systems use satellites to determine exact aircraft location, and with the addition of a ground unit, can very accurately determine altitude. Computers onboard the aircraft use this information to direct the flight. These types of systems are considered to be the precision instrument landing system of the future, and are less expensive than currently deployed systems to equip and maintain both onboard and ground facilities. The use of GPS for approaches, coupled with FMS (Flight Management Systems) or Required Navigation (RNAV or RNP) for departures will be explored as part of this study to assess whether flight tracks can be more accurately followed; and whether this would assist in reducing noise levels over noise sensitive areas.

Designated Noise Abatement Take-off/Approach Paths (Flight Tracks).

This measure is very similar to that described previously, except that it concerns designated paths that aircraft follow on approach or takeoff to minimize the overflight of noise sensitive residential areas. Such take-off/approach flight tracks specify the location relative to the ground of aircraft during certain altitude and turning procedures. These procedures are dictated by the relative location of noise-sensitive land uses and considerations of operational safety and air traffic control procedures. Generally, air traffic control procedures can be identified to avoid specific areas; however, the resolution may create unintended consequences that reduce airport and airspace capacity or increase noise to other areas that had not previously been overflown. Turns during the last three (3) to four (4) miles of the final approach in good weather, and within the final six (6) to seven (7) miles during poor weather, are undesirable for safety reasons because they do not allow pilots of large commercial airliners to establish and maintain a stabilized approach. Aircraft bank angles near the ground need to be restricted to no more than 15-20 degrees and are not be initiated when the aircraft is below 500 feet above ground level (AGL). These procedures cannot be implemented without the concurrence of the FAA, taking into account both operational, safety, and airspace considerations.

When evaluating noise abatement flight tracks, consideration should be given to the objective of:

- Equalizing or dispersion noise – this is often an approach when attempting to fairly distribute operations around an airport.
- Concentrating noise – this is the opposite of equalizing/dispersing noise. By concentrating noise, paths are established that result in consistent overflight of specific area(s) to concentrate noise over that area. This approach often provides predictability of overflight for nearby areas sought by residents. New technology, such as FMS, enables a greater ability to concentrate noise if desired. Concentrating noise typically enables land use compatibility actions (such as sound insulation) to remedy any residual incompatibilities.

- Concentrating noise within 3-4 miles, and dispersing noise further away – this approach would result in concentration of noise primarily in the 65 DNL contour, but would make attempts to disperse noise outside the 65 DNL.

When considering flight paths, the Study Advisory Committee should indicate its desires relative to the above approaches.

Preferential Runway Use System.

A preferential runway use system typically identifies the runway end(s) that for departures creates the least impact on the surrounding community and emphasizes the use of that runway(s). Such programs use these preferred runway end(s) the majority of the time, establishing operations in a certain direction, with operations occurring in the opposite direction held to a minimum. This measure is very closely related to wind direction and airspace safety considerations. The FAA has the responsibility to implement this measure through air traffic routing, with aircraft safety being the prime concern. This is only available for use during certain wind conditions and is only recommended when there is a severe noise compatibility problem directly off one end of the runway. At Metro Airport, south flow operations typically occur 70% of the time, with north flow occurring about 30% of the year. This study will examine alternative uses of the runway system that might result in reduced noise.

Power and Flap Settings.

A variety aircraft operating procedures are possible for implementation at an airport. These include minimum flap landings and delaying flap and gear deployment. On approach, an increasing level of noise is generated as flaps are applied to slow the aircraft. Similarly, noise levels typically increase when the landing gear is lowered. To help minimize fuel costs and flight time, most operators of large jet aircraft have adopted procedures for reduced flap settings and delaying flap and gear extension, consistent with safety and current aircraft and air crew capabilities. During VFR (good) weather conditions and low traffic conditions, large jet aircraft generally land with minimum flap settings.

Summary

The potential measures presented in this Chapter are general in nature and provide a broad perspective of actions that could be recommended for further study and implementation. It is expected that the Study Advisory Committee (Appendix Seven) will assist the Airport Authority (Appendix Nine) and Consultants in identifying more specific measures to evaluate for noise abatement or mitigation using the guidelines and information provided. As these more specific measures are identified, they will be evaluated and presented in subsequent chapters, Study Advisory Committee (Appendix.Five) meetings, and public workshops.

The Airport Authority (Appendix Nine) encourages members of the Study Advisory Committee (Appendix.Seven) to suggest additional measures that should be considered during this study.

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FAR PART 150 NOISE COMPATIBILITY STUDY UPDATE

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CHAPTER G
NOISE ABATEMENT OPTIONS ANALYSIS

Noise Abatement Options Analysis

Introduction

The following chapter summarizes all of the noise abatement options identified and considered in this Part 150 Noise Compatibility Study:

- **Flight Track Options**
  - Option 1 – **Concentrate Noise**
    - Option 1a – Concentrate Noise – Departures off Runway 4R
    - Option 1b – Concentrate Noise – Departures off Runway 3L following the I-94 freeway corridor
    - Option 1c – Concentrate Noise – Departures in South Flow
  - Option 2 – **Disperse Noise**
    - Option 2a – Fan Runway 4R Departures Between 350 and 030 Degrees
    - Option 2b – Fan Runway 03L to the north between 350 to 060 degrees
    - Option 2c – Fan Departures in South Flow
  - Option 3 – **Concentrate in some areas, Disperse in others**
  - Option 4 – **Concentrate Close-in, Disperse Further-away**
- **Runway Use Options**
  - Option 5 – **Runway Use – Concentrate noise**
    - Option 5a – Extend hours of Contra-Flow at night
  - Option 6 – **Runway Use – Disperse noise**
    - Option 6a – Off-set approach to Runway 4L during poor weather in north flow
    - Option 6b – Off-set approach to Runway 22R during poor weather in south flow
- **Departure Climb Procedures**
  - Option 7 – Close-in or Far-Out Procedure of AC 91-53a
- **Landing Procedures**
  - Option 8 - Continuous Descent Approach
- **Airfield/Airport Changes**
  - Option 9 – Extend Runway 3L/21R
  - Option 10 – Displaced landing thresholds
  - Option 11 – High Speed Taxiway Exits
  - Option 12 – Ground Run-up Procedures
  - Option 13 – Ground Run-up Enclosure (hush house)
  - Option 14 – Noise barriers
  - Option 15 – Noise Abatement Procedures for Use During Runway Maintenance
- **Other Measures**, including Noise Management
  - Option 16 - Install Noise Monitoring/Radar Tracking System

- Option 17 – Fly Quiet Report Card and Pilot Awareness Program
- Option 18 – Continuation of the Study Advisory Committee

It should be noted that the analysis documented in this Part 150 includes the 60 DNL contour. This contour, as well as the supplemental metrics (such as the single event sound exposure contours), are included as supplemental information for the sole purposes of identifying areas that may receive increased or decreased sound levels. The 60 DNL contours are generally less accurate than the higher intensity contours, but when comparing one noise abatement option to another, show the locations that could experience an increase or decrease in noise exposure. The 65 DNL contour is the threshold contour for determining land use compatibility per the Part 150 land use guidelines.

The options listed on the prior page were analyzed for this chapter and are documented herein. **Table G1** summarizes the effects of the options that have been completed to date. By the end of the study, the table will be completed with an analysis of the options identified for evaluation. Additional land use alternatives are evaluated in a subsequent chapter. It is important to note that each category of option is intended to stand alone – and thus, information is often repeated.

At the end of this chapter is a list of the options that were recommended by the Committee to be included in the Noise Compatibility Program as Recommendations.

TABLE G1 - Summary of Noise Abatement Options

Option	65 DNL & Greater Impact/Change (Net Change in affected Population)		60 DNL & Greater Impact/Change (Net Change in affected Population)		Locations That Would Experience Increased Noise	Locations That Would Experience Decreased Noise	Operational Issues/Comments
1a – Concentrate –North Flow – 4R Departures	-60	-6.1%	-770	-4.5%	Huron Twp (60), Taylor (60)	Dearborn Heights (60), Inkster, (60) Westland (60,65), Romulus (60,65)	FAA threshold of significant impact could result in preparing an EIS
1b – Concentrate – North Flow 3L (I-94 Corridor)	-10	-1.0%	-140	-0.8%	Taylor (60), Huron Twp (60).	Westland (60) Dearborn Heights (60), Inkster (60), Romulus (60,65)	FAA threshold of significant impact could result in preparing an EIS; could increase aircraft delay and ATC workload
1c – Concentrate – South Flow	0	0%	-650	-3.8%	Sumpter Twp (60), Taylor (60), Inkster (60), Huron Twp (65)	Dearborn Heights (60), Romulus (60,65), Huron Twp (60)	Could increase aircraft delay
2a – Fan 4R (320-025 headings)	-60	-6.1%	-510	-2.8%	Taylor (60), Huron Twp (60), Romulus (60)	Inkster (60), Westland (60,65), Dearborn Heights (60), Romulus (65)	Alterative would be designed with ATC input so delays would not be incurred.
2b – Fan 3L (350-060 headings)	0	0	-40	-0.2%	Dearborn Heights (60), Huron Twp (60), Inkster (60), Romulus (60)	Taylor (60), Westland (65)	Alterative would be designed with ATC input so delays would not be incurred.
2c – Fan South Flow Departures	-40	-4.0%	-440	-2.6%	Huron Twp (60), Taylor (60)	Romulus (60, 65). Dearborn Heights ((60)	Alterative would be designed with ATC input so delays would not be incurred.
3a – Runway 4R Departures – Concentrate South Turning Aircraft and Fan Others	+90	+9.1%	+600	+3.5%	Westland (65), Taylor (60,65), Romulus (65) Inkster (60), Dearborn Heights (60)	Westland (60), Romulus (60)	Could increase aircraft delay
3b - Runway 3L Departures – Concentrate South Turning Aircraft and Fan Others	+150	+15.2%	+610	+3.6%	Taylor (60,65), Inkster (60) Westland (60,65), Romulus (60,65)	Dearborn Heights (60)	Could increase aircraft delay
3c – Runway 4R Departures - Concentrate a Portion of South Turning Aircraft and Fan Others	+150	+15.2	+940	+5.5	Huron Twp (60, 65), Romulus (60,65), Westland (60,65), Taylor (60),Dearborn Heights (60,65)	No reductions	Could increase flight delays
3d – Runway 3L Departures Concentrate a Portion of South Turning Aircraft and Fan Others	-20	-2.0%	-230	-1.4%	Romulus (60,65), Westland (60), Inkster (60), Dearborn Heights	Huron Twp(60), Taylor (60)	Could Increase flight delays

Option	65 DNL & Greater Impact/Change (Net Change in affected Population)		60 DNL & Greater Impact/Change (Net Change in affected Population)		Locations That Would Experience Increased Noise	Locations That Would Experience Decreased Noise	Operational Issues/Comments
					(60)		
4 – Concentrate Close-in/Disperse Further Away	+30	+3.0%	0	0%	Westland (65), Huron Twp (65), Taylor (60,65), Inkster (60)	Romulus (60,65), Westland (60), Dearborn Heights (60)	
5– Runway Use – Concentrate - Increase Nighttime Contra Flow	-60	-6.1%	-720	-4.3%	Sumpter Twp (60), Huron Twp (60,65), Romulus (60)	Dearborn Heights (60), Taylor (60), Inkster (60), Westland (65), Romulus (65)	Could increase ATC workload
6a – Runway Use – Disperse Using Offset Approach to 4L/22R	-40	-4%	+160	+0.94%	Romulus (60,65), Westland (60), Huron Twp (60)	Westland (65), Inkster (60)	
7 – Departure Climb Procedure	Evaluated using SEL contours Close procedure increased 85, 90, 95 SEL Distant procedure decrease 85, 90 SEL, increased 95 SEL				Close procedure increased 85, 90, 95 SEL	Distant procedure decrease 85, 90 SEL, increased 95 SEL	With Close-In procedures aircraft would not climb are fast as they do today, potentially affecting airspace
8 – Continuous Descent Approach	SEL contours (for combined Rwy 22R & 21L Arrivals) 3% reduction 85 SEL, 7% reduction 80 SEL and 10% reduction 75 SEL.				None	Detroit, Redford, Dearborn, Inkster	Operates best with a homogeneous fleet
9a – Extend Runway 3L/21R – N&S	-60	-6.1%	-320	-1.9%	Huron Twp (65,60) Romulus (65,60), Westland (60), Inkster (60)	Westland (65), Taylor (60), Dearborn Hts (60)	
9b – Extend Runway 3L/21R – North	-60	-6.1%	-1,790	-10.6%	Huron Twp (65,60) Romulus (65,60), Westland (65,60), Inkster (60)	Taylor (60), Dearborn Hts (60)	
9c – Extend Runway 3L/21R - South	-70	-7.1%	-1,360	-8.0%	Romulus (65), Westland (65,60), Inkster (60), Dearborn Hts (60), Taylor (60)	Huron Twp (65, 60)	Potential taxiway congestion from increases queue
10 – Displaced landing thresholds	-80	-8.1%	-420	-2.5%	Westland (65), Dearborn Hts (60), Inkster (60), Taylor (60)	Huron Twp (60),Romulus (60), Westland (60)	
11 – High Speed Taxiway Exits	NA	NA	NA	NA	ND	ND	
12 – Ground Run-up Procedures	38% reduction in population affected by Lmax 70 dBA from noisiest aircraft				Huron Twp	Romulus	
13 – Ground Run-up Enclosure	Eliminate population affected by 70 Lmax				Huron Twp, Romulus, Taylor, Wayne		
14 – Noise barriers	ND	ND	ND	ND	ND	ND	No meaningful site available

Option	65 DNL & Greater Impact/Change (Net Change in affected Population)		60 DNL & Greater Impact/Change (Net Change in affected Population)		Locations That Would Experience Increased Noise	Locations That Would Experience Decreased Noise	Operational Issues/Comments
15 – Noise Abatement Procedures for Use During Runway Maintenance	Periodic runway/airfield maintenance is required and noise abatement procedures would vary according to the specific maintenance needs				Periodic runway/airfield maintenance is required and noise abatement procedures would vary according to the specific maintenance needs		
16 - Install Noise Management/ Radar Tracking System	ND	ND	ND	ND	ND	ND	This action could increase understanding and compliance with noise abatement procedures
17 – Fly Quiet Report Card and Pilot Awareness Program	ND	ND	ND	ND	ND	ND	This action could increase understanding and compliance with noise abatement procedures
18 – Continuation of the Study Advisory Committee	ND	ND	ND	ND	ND	ND	This action would continue for a short period to monitor the implementation of the Part 150 Recommendations

With location, the (60) indicates farther from the DTW (i.e. 60 DNL contour), and (65) indicates closer to the DTW (i.e., 65 DNL contour).

ND – Not detectable by the noise exposure contours

NA – Not evaluated, as option would not be expected to have noise reduction benefits

The 60 DNL contour, as well as the supplemental metrics (such as the single event sound exposure contours), are included as supplemental information for the sole purposes of identifying areas that may receive increased or decreased sound levels. The 60 DNL contours are generally less accurate than the higher intensity contours, but when comparing one noise abatement option to another, show the locations that could experience an increase or decrease in noise exposure

Option 1: Concentrate Noise by Using Satellite Based Technology Flight Paths

Discussion: In general noise abatement options either concentrate noise over a predefined area or attempt to disperse or equalize noise. A third option, discussed later, that combines the concentration with equalization is also possible. Concentrated noise provides a general predictability that noise would occur over specific areas, whereas dispersal generally results in less predictability, with flights being dispersed over an area.

Within the concept of concentrate noise, the goal of these options is to provide for more precise noise abatement flight paths for aircraft departing to both the north and south. These procedures would take advantage of satellite-based Global Positioning System (GPS) technology (such as Flight Management Systems - FMS and Required Navigation – RNAV) to concentrate aircraft along specific paths. In general aircraft departing to the northwest, west, and southwest operate from the western complex of runways (Runway 4L/22R and 4R/22L) while the northeast, east and southeast flights operate from the eastern complex (3L/21R and 3R/21L).

For departures due north, no clear corridor of lowest population density was identified. For departures to the east and southeast, a relatively narrow corridor was identified that generally follows the I-94 corridors from DTW to the east. For departures to the southwest, lower densities were identified south of Michigan Avenue. Based on these limited corridors, three sub-options to concentrate noise were identified:

- Option 1a: departures to the northwest off Runway 4R,
- Option 1b: departures to the northeast off Runway 3L following the I-94 corridor, and
- Option 1c: departures to the south off Runways 22L and 21R.

As the existing noise abatement procedure at DTW during the daytime hours consists of a fanning procedure that disperses flights, these options would change the philosophy of the existing program.

Option 1a: Concentrate Noise – Departures off Runway 4R

Noise Abatement Procedure Goal: The goal of this option is to provide for more precise flight paths for aircraft departing Runway 4R to concentrate noise over the lower density population. It is important to note that residences are located under some portion of all flight paths; however, attempts are made to concentrate noise over the areas that have the lowest densities, where possible.

Description of the Option: Aircraft would use satellite-based navigation technologies to fly multiple headings over land uses with lower population densities. The headings (similar to compass directions) would be used that correspond with the different routes that aircraft fly as they depart the Detroit airspace. North, northwest and west bound aircraft would follow existing tracks, while, southwest- and south-bound aircraft would turn sooner than the existing turns and either stay on course to the west or initially turn west and then to the south. Westbound aircraft that use Runway 4R are turned to the west and south before turning on their course, these flights would avoid the higher density population areas by turning south of Wayne and Westland. **Figure G1** shows the desired flight track corridors for this option along with existing flight tracks.

Comparable Existing Procedure(s): Aircraft currently depart from Runway 4R and fly a straight path (runway heading) until the aircraft reaches at least 500 feet above ground before turning west. This

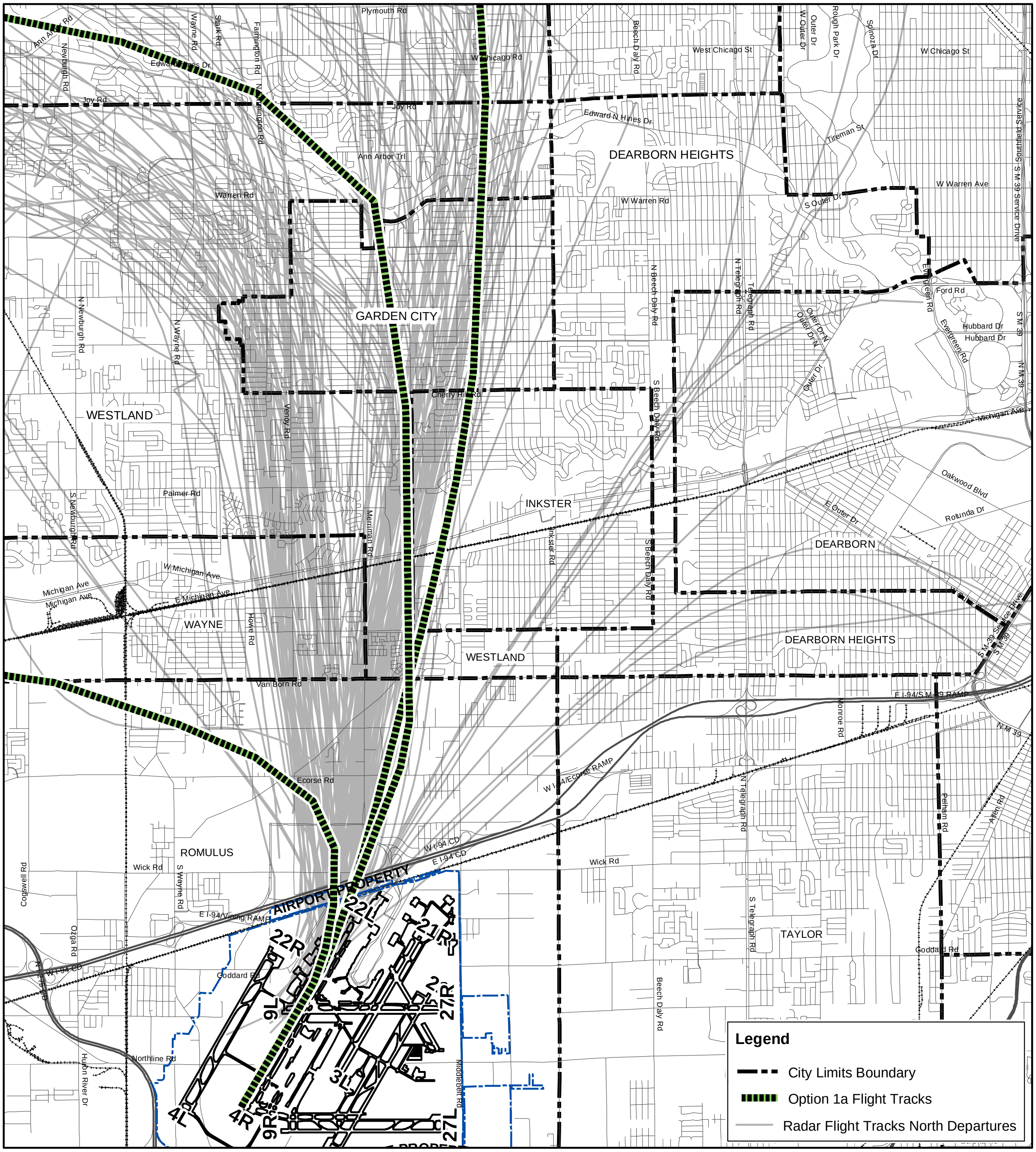

Figure G1 **Option 1a, Flight Tracks**

N

0 0.75 1.5 3 Miles

Source: US Census, 2000

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may occur before the runway end or up to one mile past the runway end, depending on the weight/performance of the aircraft. Aircraft are then assigned a westward heading between 355 and 030. The existing procedure essentially "fans" aircraft to three headings (355, 010 and 030), with more aircraft on two of the headings (355 and 010 headings). Aircraft fly this heading for 3 to 10 miles until ATC directs the aircraft to turn towards a navigational aid that provides a heading to exit the DTW airspace, approximately 50 miles from the Airport. An example of the existing jet flight paths for this runway is presented in **Figure G1**, which shows a density plot of seven months of actual flight tracks.

Modeling Assumptions/New Procedure: Using satellite-based navigation technology, aircraft would be flown on one of three headings, depending upon the city/destination. Aircraft with northern destinations, would fly northward on a path virtually the same as today's path. Aircraft with destinations to the west, the path would be similar to what is flown today. Departures to south destinations initially turn west before ultimately turning to the south over primarily undeveloped area. West departures go to the south over undeveloped areas. The southwest jet path would commence a turn to the west earlier than the current procedure, following a path along Michigan Avenue and then turning southward on a path north of Willow Run, effectively avoiding overflying Wayne and Westland. Turboprop aircraft currently occupy the space where the new track would be located, and thus, the turboprop aircraft would need to be turned sooner, enabling a 15 degree divergence from the southern jet path. The new jet path would be designed to fly over less densely populated areas south of Michigan Avenue**.** **Figure G1** also shows the proposed tracks.

It is estimated that 80% of the future aircraft fleet at DTW could use this satellite-based technology procedure. Older generation aircraft that are not equipped with satellite navigation could generally follow a track that follows this turn, with the development of an Instrument Flight Rule (IFR) overlay of the proposed procedure. The flight path would be similar to the satellite-based procedure, except that the precision of the flight track would not be as great, and for those not equipped with the newer technology, may drift outside the preferred path. In addition, some jets (an estimated 5%) may not be able to make such a quick turn on departure from Runway 4L. These aircraft would be expected to follow the existing flight path.

Analysis of New Procedure:

The analysis of this option considered the noise exposure, as well as possible operational effects.

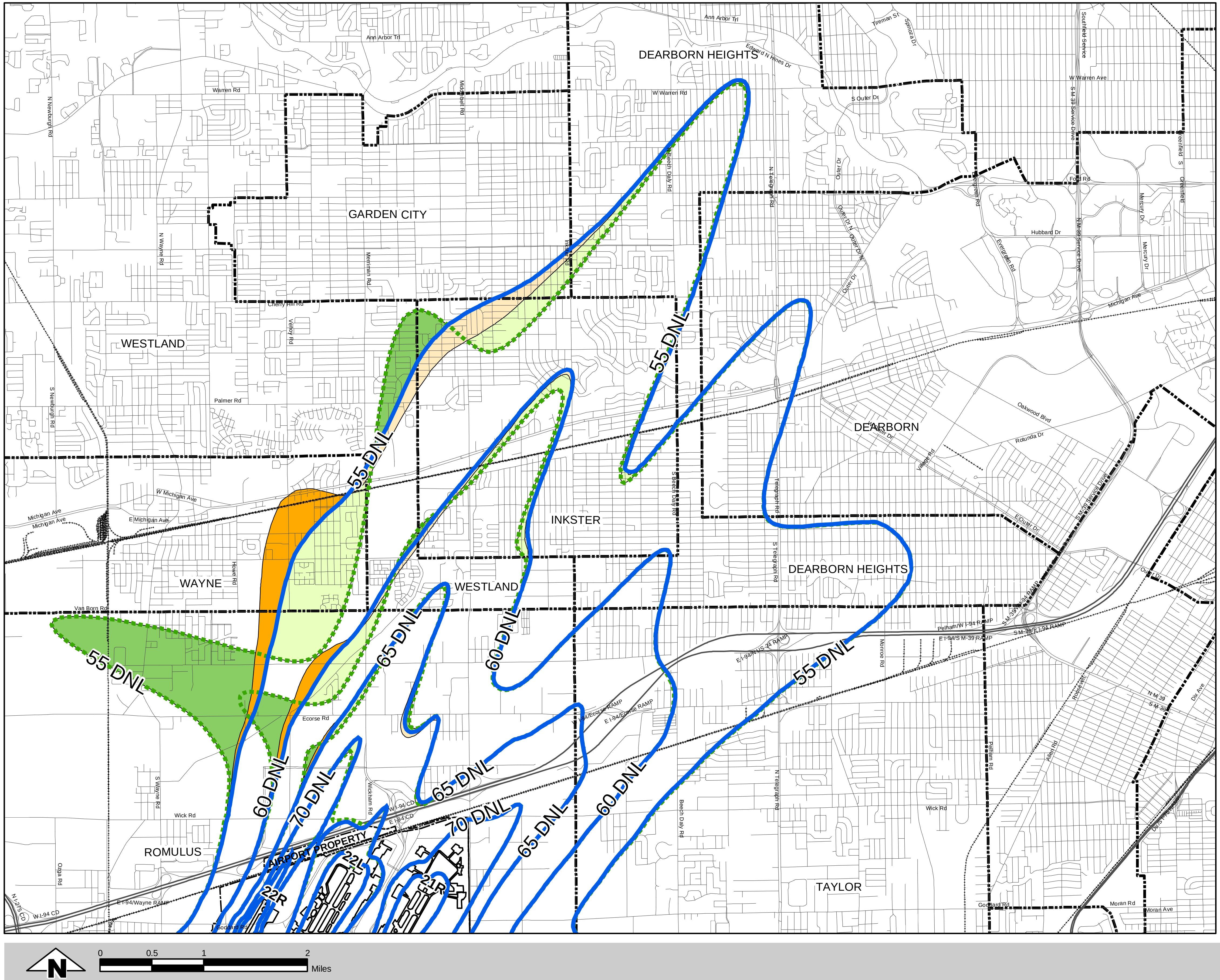
Noise Analysis:

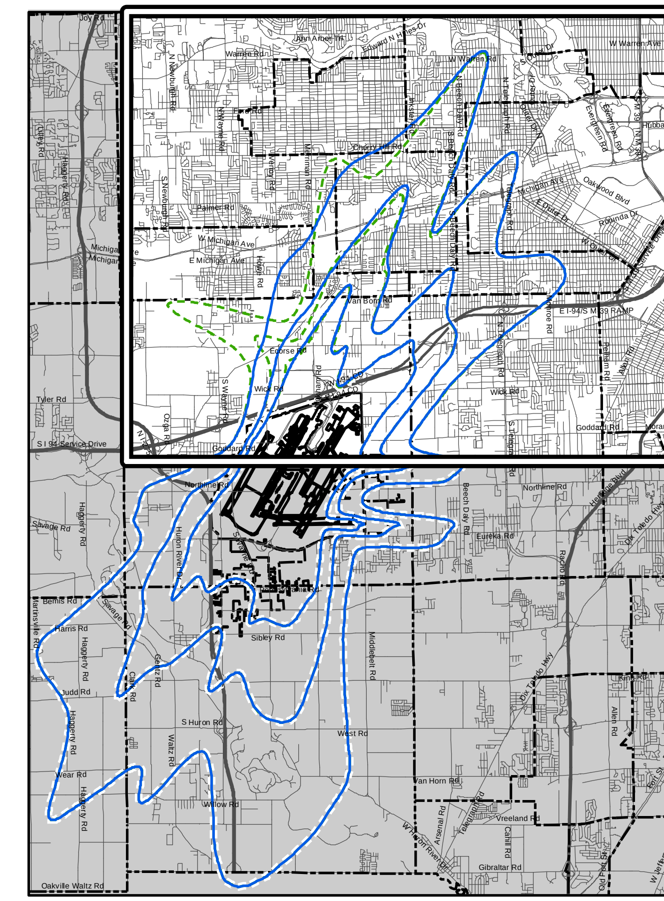
The study relied upon the use of the average annual DNL noise contours to consider possible noise exposure consequences of the option.

Impact on Annual DNL Contour: **Table G2** summarizes the impact on the 65 DNL and greater noise exposure contours from implementation of this option in comparison with the 2011 baseline. As this table notes, this option would reduce overall population and housing exposed to 65 DNL by 60 people/30 houses in comparison to the Baseline. **Figure G2 NE-1** shows the noise exposure contours relative to the No Action/2011 Baseline along with Option 2a (dispersal option) contours. All of the changes associated with this option would occur for properties located within the 65-70 DNL contour.

Within the 60 DNL contour, the changes would be more pronounced (a reduction of 4.5% in population and 6% reduction in housing units relative to the 2011 Baseline), with the contour moving in the direction of the new southbound track. Within the 65 DNL and greater contour, impact reductions would occur in Westland and Romulus relative to the baseline.

Figure G2 **Option 1a, FMS Departures to the Northwest off Runway 4R and Option 2a, Fan Runway 4R Departures Between 320 and 025 Degrees**





Legend

- City Limits Boundary
- 2011 Base Case
- Option 1a, FMS Departures Northwest Runway 4R
- Option 1a Area newly affected
- Option 1a Area no longer affected
- Option 2a, Fan Runway 4R Departures Between 320 and 025 Degrees
- Option 2a Area newly affected
- Option 2a Area no longer affected

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Source: US Census, 2000

FAA guidance for implementing the National Environmental Policy Act (NEPA) states that a 1.5 DNL increase in noise to noise sensitive uses (i.e., residences) within the 65 DNL due to federal action is considered a significant impact.

Operational Impacts

The following issues could arise from implementation of the option. Also identified are the agencies that would have a role in assisting in the implementation of this option.

Airport and ATC Operational Considerations (Safety and efficiency issues): FAA has ultimate responsibility for the control of aircraft flight. This option would not be expected to change FAA ATC workloads, as more aircraft would be flying precise tracks based on satellite navigation. This option would not be expected to increase flight delay, and could slightly reduce fuel burn as jet aircraft would be turned sooner toward their ultimate direction. Airport staff would work with the FAA to ensure the procedure would be implemented to achieve its intended goal(s).

Other Environmental Issues (NEPA, etc): Implementation of noise abatement flight procedures requires compliance with the National Environmental Policy Act (NEPA). FAA Order 1050.1E **Environmental Impacts: Policies and Procedures** outlines the documentation required based on the types of federal action. This option would likely require preparation of an Environmental Assessment to determine if the impacts would be significant; however based on the analysis prepared for this study, increased noise to residential uses within the 65 DNL contour is unlikely to trigger the 1.5 DNL threshold of significance, and warrant an Environmental Impact Statement. This option could produce a 3 DNL or greater change within the 60-65 DNL

Legal Issues: The option does not appear to have legal issues associated with its implementation.

Conclusions of Consultant Team:

This option would achieve a slight noise impact reduction within the 65 DNL contour, as well as lower level contours. At the lower levels, however, the contours result in substantial changes in noise which effectively shift noise from one area/neighborhood/community to another. No recommendation is made at this time, pending discussion among the Study Advisory Committee (Appendix Five, Six & Seven) concerning concentration versus dispersal.

TABLE G2
Comparison of DNL Effects of Option 1a to the Baseline

	Baseline (2011)/No Action		Option 1a- Concentrate – 4R Departures	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	90	40
Romulus	730	330	680	310
Taylor	0	0	10	10
Westland	120	60	100	40
Subtotal	940	430	880	400
70-75 DNL				
Romulus	50	30	50	30
Subtotal	50	30	50	30
65 DNL & Greater				
Huron Township	90	40	90	40
Romulus	780	360	730	340
Taylor	0	0	10	10
Westland	120	60	100	40
Subtotal	990	460	930	430
60 DNL & Greater*				
Dearborn Heights	1,000	310	990	310
Huron Twp.	2,000	780	2,050	780
Inkster	4,560	1,980	4,040	1,720
Romulus	4,000	1,680	3,770	1,590
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	3,040	1,190
Westland	2,360	990	2,260	940
Total	16,940	6,960	16,170	6,540

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater

Option 1b: Concentrate Noise – Departures off Runway 3L Following the I-94 Freeway Corridor

Noise Abatement Procedure Goal: The goal of this option is to provide for more precise flight paths for aircraft departing Runway 3L to concentrate noise over lower population densities. It is important to note that residences are located under some portion of all flight paths; however, attempts are made to concentrate noise over the areas that have the lowest densities, where possible.

Description of the Option: This procedure would create a more defined and narrow flight path to concentrate aircraft flight tracks for departures off Runway 3L along the I-94 corridor east of the Airport.

Comparable Existing Procedure(s): Aircraft currently depart to the northeast from Runway 3L and fly a straight path (runway heading) reaching up to three miles, depending on the weight/aircraft performance. Aircraft are then assigned a heading from Air Traffic Control between 350 and 050 magnetic degrees (north and northeastern headings). Aircraft then fly the heading for two to five miles until ATC directs the aircraft to turn towards a navigational aid that provides a heading leading out of the Detroit airspace. For aircraft with a destination to the east or south, this is either a due east or due south heading. The existing procedure essentially “fans” aircraft in a desired equal distribution between these headings.

An example of the existing jet flight paths is shown in **Figure G3** shows with a density plot of seven months of actual flight tracks. This figure graphically shows the distribution of aircraft flight tracks over the ground between 350 and 050. The current procedure provides for a dispersed track flow, with the greatest concentration of actual flight tracks occurring today just north of the I-94 corridor.

Modeling Assumptions/New Procedure: Aircraft bound for due north locations would follow existing flight tracks. Eastern and southeastern bound aircraft would depart Runway 3L and fly runway heading for one mile past the departure end of the runway, then turn eastward on an satellite-based heading that would be designed to follow the I-94 freeway corridor and the rail line corridor. At approximately eight miles from the Airport (Oakwood/I-94 Intersection), aircraft would diverge on two paths, either turning south or continuing east as they do today.

This new track would replace the existing two tracks that serve the same destinations, but which do not turn in an easterly direction as soon as the new option. This procedure would be designed for those aircraft that initially turn eastward for east or southern destinations. Today, about 80% of the departures on this runway are directed to the east and south. Some heavier aircraft might not be able to fly this new track, and thus, would follow the existing tracks.

It is estimated that 80% of the future aircraft fleet at DTW could use this satellite-based technology procedure. Older generation aircraft that are not equipped with satellite navigation could generally follow a track that follows this turn, with the development of an Instrument Flight Rule (IFR) overlay of the proposed procedure. The flight path would be similar to the satellite-based procedure, except that the precision of the flight track would not be as great, and those aircraft not equipped with the newer technology, may disperse.

Analysis of New Procedure:

The analysis of this option considered both the noise exposure impacts of the option, as well as the possible operational effects.

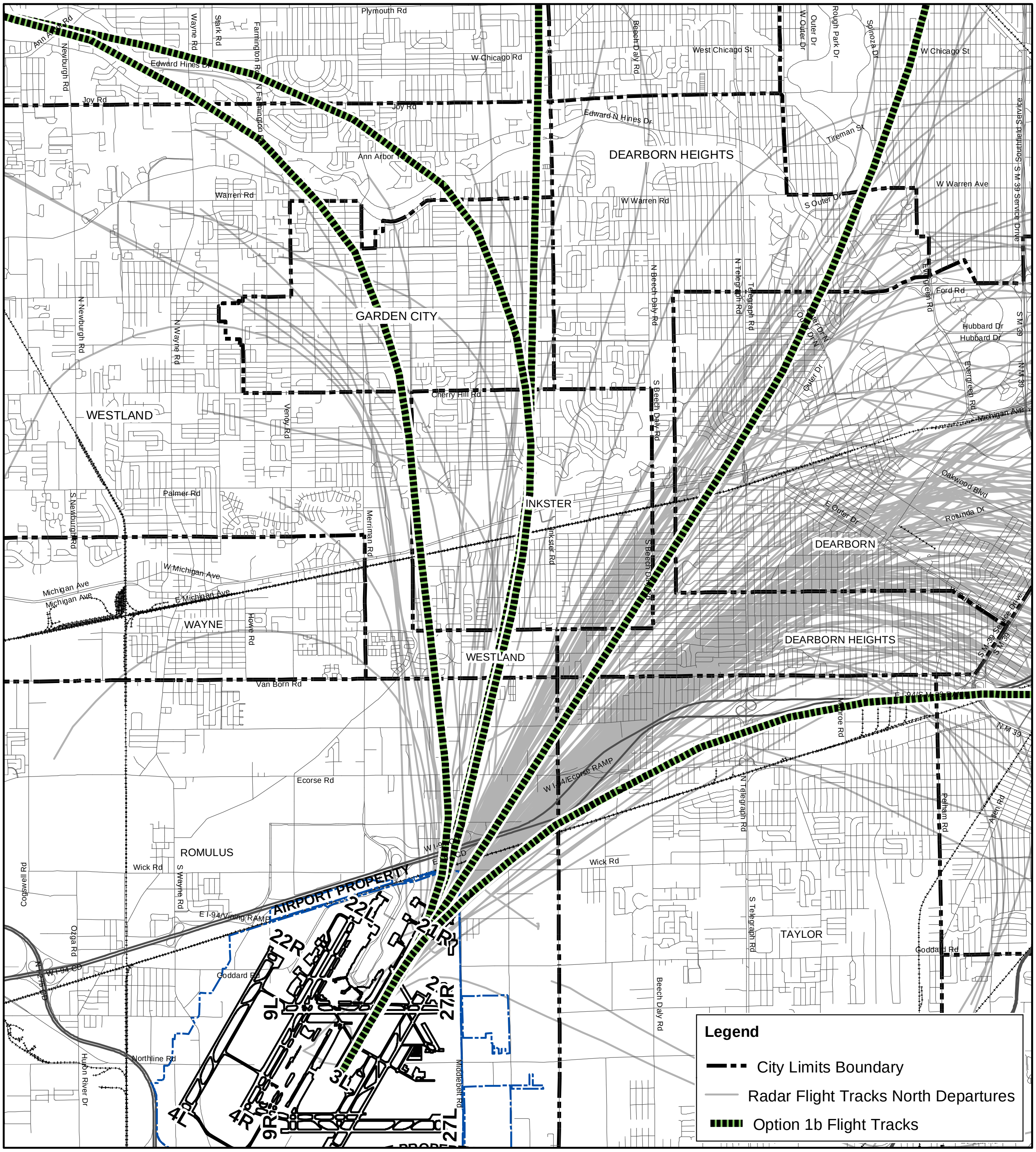


Figure G3 **Option 1b, Flight Tracks**

Source: US Census, 2000

Noise Analysis:

The study relied upon the use of the average annual DNL noise contours to consider possible noise exposure consequences of the option.

Impact on Annual DNL Contour: **Table G3** summarizes the impact on the 65 DNL and greater noise exposure contours from implementation of this option in comparison with the 2011 baseline. As this table notes, this option would produce a reduction in overall population and housing exposed to 65 DNL by 10 people and no change in housing in comparison to the Baseline. **Figure G4 NW-1** shows the noise exposure contours relative to the No Action/2011 Baseline and the Option 2b (dispersal option) noise contours. All of the changes associated with this option would occur for properties located within the 65-70 DNL contour.

Within the 60 DNL contour, the changes would be slightly more pronounced (a reduction of 0.8% in population and 0.6% reduction in housing units relative to the 2011 Baseline), with the contour moving in the direction of the new track. Within the 65 DNL and greater contour, impact reductions would occur in Romulus relative to the Baseline, with no changes in other locations.

FAA guidance for implementing the National Environmental Policy Act (NEPA) states that a 1.5 DNL increase in noise to noise sensitive uses (i.e., residences) within the 65 DNL due to federal action is considered a significant impact. A review of the noise exposure contour indicates that a 1.5 DNL increase in noise due to Option 1b could occur directly under the path of the new eastbound track. This option could also produce 3 DNL and greater changes within the 60-65 DNL.

Operational Impacts

The following issues could arise from implementation of the option. Also identified are the agencies that would have a role in assisting in the implementation of this option.

Airport and ATC Operational Considerations (Safety and efficiency issues): FAA has ultimate responsibility for the control of aircraft flight. This option would potentially increase FAA ATC workloads and increase operating delay, due to the dependency that would be created for flights headed to the east and south; flights to these locations would occur on the same track for some distance, before they divert, creating an in-trail separation requirement to safely separate aircraft. Airport staff would work with the FAA to ensure the procedure would be implemented to achieve its intended goal(s).

Other Environmental Issues (NEPA, etc): Implementation of noise abatement flight procedures requires compliance with the National Environmental Policy Act (NEPA). FAA Order 1050.1E **Environmental Impacts: Policies and Procedures** outlines the documentation required based on the types of federal action. This option would likely require preparation of an Environmental Assessment to determine if the impacts would be significant; however based on the analysis prepared for this study, increased noise to residential uses within the 65 DNL contour could trigger this 1.5 DNL threshold of significance, and warrant an Environmental Impact Statement. This option could produce a 3 DNL or greater change within the 60-65 DNL.

Legal Issues: The option does not appear to have legal issues associated with its implementation.

Figure G4 **Option 1b, FMS Departures to the Northeast off Runway 3L Following I-94 Corridor and Option 2b, Fan Runway 3L Departures Between 350 and 060 Degrees**

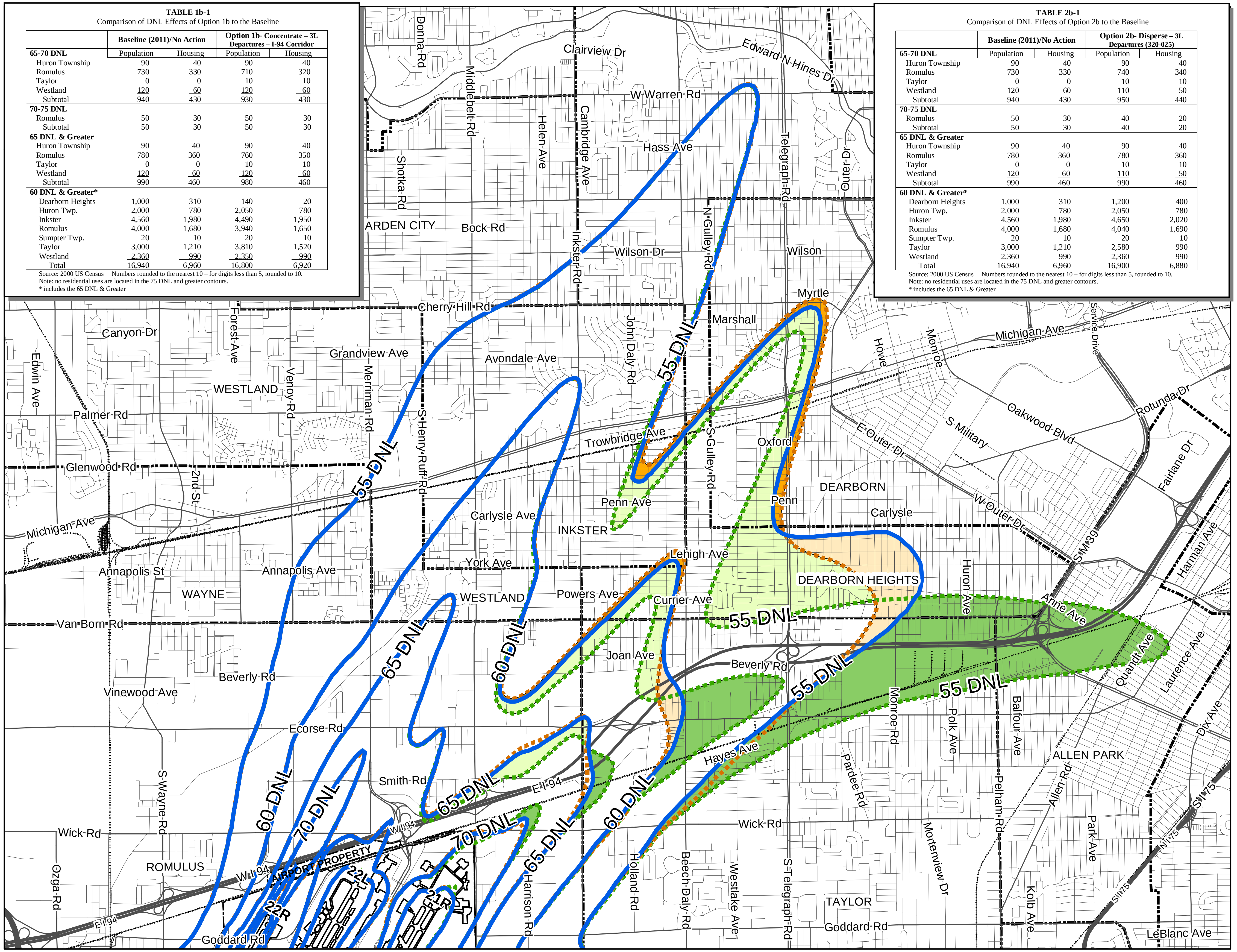


TABLE 1b-1
Comparison of DNL Effects of Option 1b to the Baseline

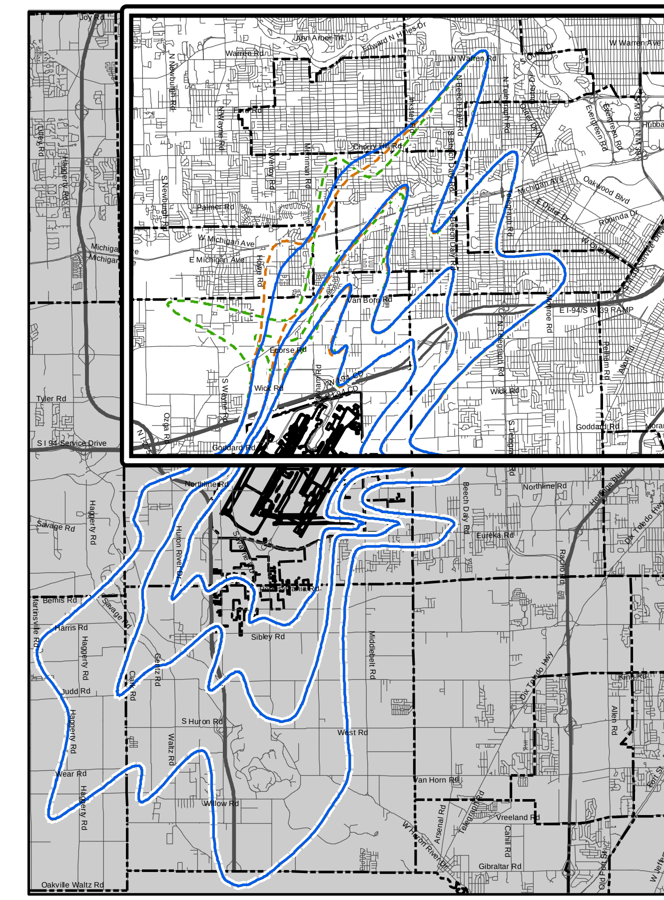
	Baseline (2011)/No Action		Option 1b- Concentrate – 3L Departures – I-94 Corridor	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	90	40
Romulus	730	330	710	320
Taylor	0	0	10	10
Westland	120	60	120	60
Subtotal	940	430	930	430
70-75 DNL				
Romulus	50	30	50	30
Subtotal	50	30	50	30
65 DNL & Greater				
Huron Township	90	40	90	40
Romulus	780	360	760	350
Taylor	0	0	10	10
Westland	120	60	120	60
Subtotal	990	460	980	460
60 DNL & Greater*				
Dearborn Heights	1,000	310	140	20
Huron Twp.	2,000	780	2,050	780
Inkster	4,560	1,980	4,490	1,950
Romulus	4,000	1,680	3,940	1,650
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	3,810	1,520
Westland	2,360	990	2,350	990
Total	16,940	6,960	16,800	6,920

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater

TABLE 2b-1
Comparison of DNL Effects of Option 2b to the Baseline

	Baseline (2011)/No Action		Option 2b- Disperse – 3L Departures (320-025)	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	90	40
Romulus	730	330	740	340
Taylor	0	0	10	10
Westland	120	60	110	50
Subtotal	940	430	950	440
70-75 DNL				
Romulus	50	30	40	20
Subtotal	50	30	40	20
65 DNL & Greater				
Huron Township	90	40	90	40
Romulus	780	360	780	360
Taylor	0	0	10	10
Westland	120	60	110	50
Subtotal	990	460	990	460
60 DNL & Greater*				
Dearborn Heights	1,000	310	1,200	400
Huron Twp.	2,000	780	2,050	780
Inkster	4,560	1,980	4,650	2,020
Romulus	4,000	1,680	4,040	1,690
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	2,580	990
Westland	2,360	990	2,360	990
Total	16,940	6,960	16,900	6,880

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater



Legend

- City Limits Boundary
- 2011 Base Case
- Option 1b FMS Departures Northeast Runway 3L Following I-94 Corridor
- Option 1b Area newly affected
- Option 1b Area no longer affected
- Option 2b, Fan Runway 3L Departures Between 350 and 060 Degrees
- Option 2b Area newly affected
- Option 2b Area no longer affected

0 0.5 1 2 Miles

Source: US Census, 2000

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Conclusions of Consultant Team:
This option would achieve noise impact reductions within the 65 DNL contour, as well as lower level contours. At the lower levels, however, the contours result in substantial changes in noise which effectively shift noise from one area/neighborhood/community to another. No recommendation is made at this time, pending discussion among the Study Advisory Committee (Appendix Five, Six & Seven) concerning concentration versus dispersal.

TABLE G3
Comparison of DNL Effects of Option 1b to the Baseline

	Baseline (2011)/No Action		**Option 1b- Concentrate – 3L Departures – I-94 Corridor**	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	90	40
Romulus	730	330	710	320
Taylor	0	0	10	10
Westland	120	60	120	60
Subtotal	940	430	930	430
70-75 DNL				
Romulus	50	30	50	30
Subtotal	50	30	50	30
65 DNL & Greater				
Huron Township	90	40	90	40
Romulus	780	360	760	350
Taylor	0	0	10	10
Westland	120	60	120	60
Subtotal	990	460	980	460
60 DNL & Greater*				
Dearborn Heights	1,000	310	140	20
Huron Twp.	2,000	780	2,050	780
Inkster	4,560	1,980	4,490	1,950
Romulus	4,000	1,680	3,940	1,650
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	3,810	1,520
Westland	2,360	990	2,350	990
Total	16,940	6,960	16,800	6,920

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.

- includes the 65 DNL & Greater

Option 1c: Concentrate Noise – South Flow Departure Procedures off Runways 22L/R and 21L/R

Noise Abatement Procedure Goal: The goal of this option is to provide for more precise flight paths for aircraft to concentrate noise over the lower density population areas to the south.

Description of the Option: This procedure would take the existing Instrument Flight Rule (IFR) procedure and translate it into satellite-based navigation to enable greater concentration along the existing tracks. This option would increase the precision of the track by including additional radar vectors and to keep the aircraft tracking the proper heading. Aircraft would fly the same paths as they do today, except that modern navigational technology would be used to reduce overflights of the more densely populated areas to the south by reducing drift from aircraft operations.

Comparable Existing Procedure(s): Aircraft depart to the south and fly a straight path (runway heading) until the aircraft reaches at least 500 feet above ground level. This generally occurs anywhere from before the runway end to about one mile past the runway end. ATC then assigns a heading that is determined based upon intended destination and the required separation between other departing aircraft. The existing procedure "fans" aircraft on essentially four headings (170, 190, 220, and 240). Aircraft fly this heading for 3 to 10 miles until ATC directs the aircraft to turn towards a navigational aid that provides a heading to exit the Detroit airspace, approximately 50 miles from the Airport.

An example of the existing jet flight paths is presented in **Figure G5** shows with a density plot of seven months of actual flight tracks along with proposed flight tracks of this option.

Modeling Assumptions/New Procedure: This option would result in the development of satellite-based navigation procedures to improve the effectiveness of the existing south flow procedures to avoid the more densely population areas. This option would change the existing paths to the south are described below:

- Eastern destinations: Aircraft departing on Runway 21R would fly runway heading to at least one-half mile past the end of the runway before commencing any turns to the east. Current procedures have some early turns flying near or over the southeastern portion of Romulus (south of Eureka Road and west of Middlebelt Road).
- Southern destinations: Aircraft departing on Runway 22L to southern destinations may use either a 220 or 190 heading. Option 1c proposes that the preferred procedure would be to only use the 190 heading to avoid overflying New Boston.
- North and western destinations: Aircraft departing on Runway 22L to western or northern destinations would turn westward over a wide range of possible headings, assigned based on destination, required aircraft separation, and ATC work load. Aircraft flying to northern destination would fly the northern portion of the existing turn on a heading of 240. Aircraft flying to western destinations would fly the southern portion of the existing turn on an initial heading of 240. The goal of the procedure would be to have all turns completed before reaching New Boston.

While the flight goals of this option are similar to those of Option 2c, this option would concentrate traffic along the defined corridors using satellite-based navigation; Option 2c would rely on existing navigation technology that by its nature is less precise, and results in dispersion.

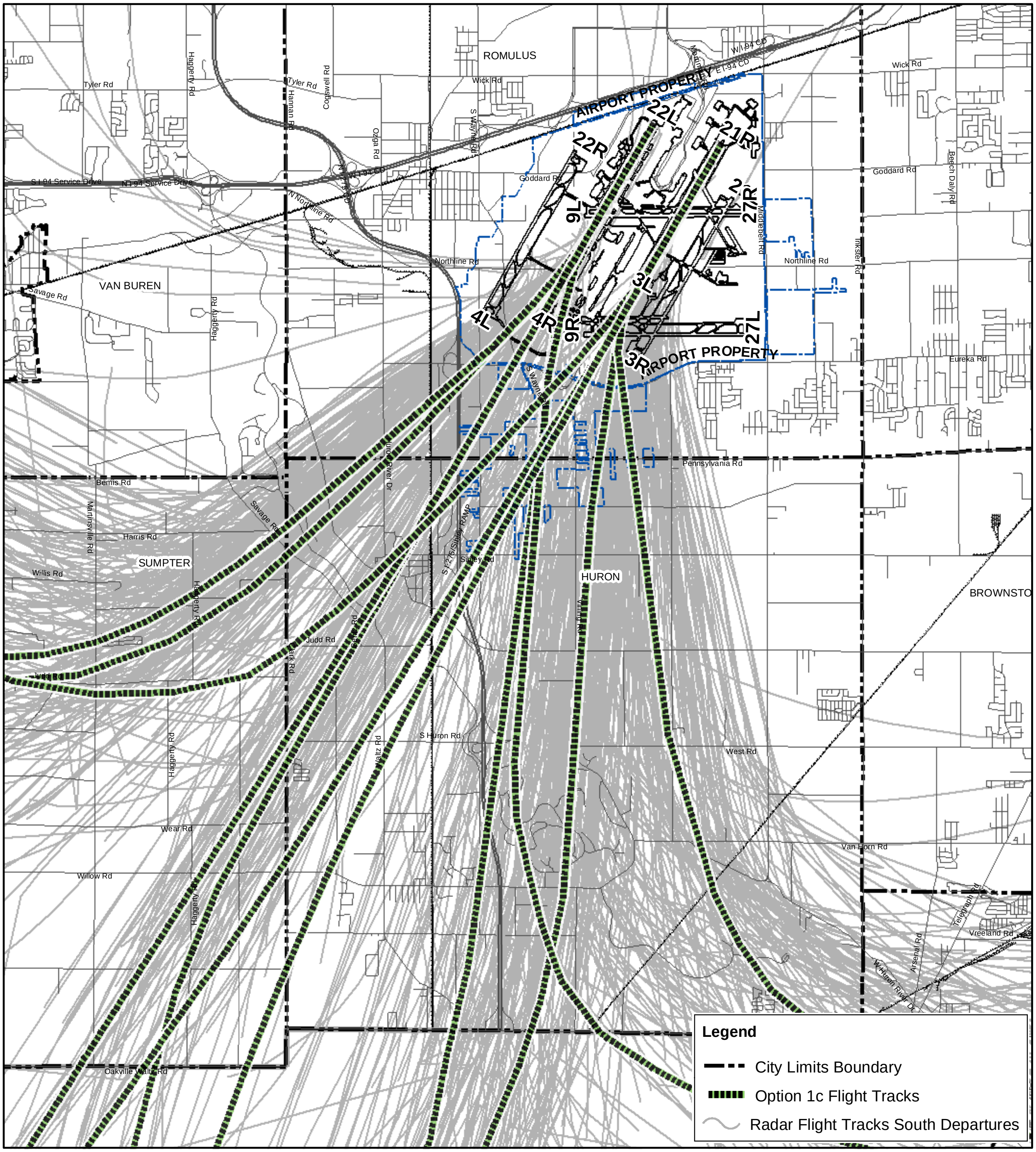

Figure G5 **Option 1c, Flight Tracks**

0 0.75 1.5 Miles

Source: US Census, 2000

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It is estimated that 80% of the future aircraft fleet at DTW could use this satellite-based technology procedure. Older generation aircraft that are not equipped with satellite navigation could continue to use the existing IFR procedure. The flight path would be similar to the satellite-based procedure, except that the precision of the flight track would not be as great, and those not equipped with the newer technology, would disperse.

Analysis of New Procedure:

The analysis of this option considered both the noise exposure impacts of the option, as well as the possible operational effects.

Noise Analysis:

The study relied upon the use of the average annual DNL noise contours to consider possible noise exposure consequences of the option.

Impact on Annual DNL Contour: **Table G4** summarizes the impact on the 65 DNL and greater noise exposure contour from implementation of this option in comparison with the 2011 Baseline. As this table notes, this option would not alter the total population/housing affected by 65 DNL and greater noise levels relative to the Baseline, although it would alter the location of those impacts. **Figure G6 S-1** shows the noise exposure contours for Option 1c – Concentrate Noise – South Flow along with the Option 2c (dispersal) noise contours. All of the changes associated with this option would occur for properties located within the 65-70 DNL contour.

Within the 60 DNL contour, the changes would be slightly more pronounced (a reduction of 3.8% in population and 4.2% reduction in housing relative to the 2011 Baseline), with the contour moving in the direction of the new track. Within the 65 DNL and greater contour, impact reductions would occur in Romulus (6.8% reduction) relative to the Baseline, with an increase in Huron Township of 44.4%.

Operational Impacts

The following issues could arise from implementation of the option. Also identified are the agencies that would have a role in assisting in the implementation of this option.

Airport and ATC Operational Considerations (Safety and efficiency issues): FAA has ultimate responsibility for the control of aircraft flight. This option would not be expected to alter FAA ATC workloads, as more aircraft would be flying precise tracks based on satellite navigation. The reduction of on heading for southern destinations would have an impact on delay; however, a replacement track could be developed by the FAA, keeping with the goal of avoiding New Boston. Airport staff would work with the FAA to ensure the procedure would be implemented to achieve its intended goal(s). This Option would not be used when it resulted in delays.

Other Environmental Issues (NEPA, etc): Implementation of noise abatement flight procedures requires compliance with the National Environmental Policy Act (NEPA). FAA Order 1050.1E **Environmental Impacts: Policies and Procedures** outlines the documentation required based on the types of federal action. This option would likely require preparation of an Environmental Assessment to determine if the impacts would be significant; however based on the analysis prepared for this study, increased noise to noise sensitive residential uses might be sufficient to trigger this 1.5 DNL threshold of significance. However, Option 1c would produce 3 DNL and greater changes within the 60-65 DNL.

Figure G6 **Option 1c, FMS For South Flow Departures and Option 2c, Fan South Flow Departures**

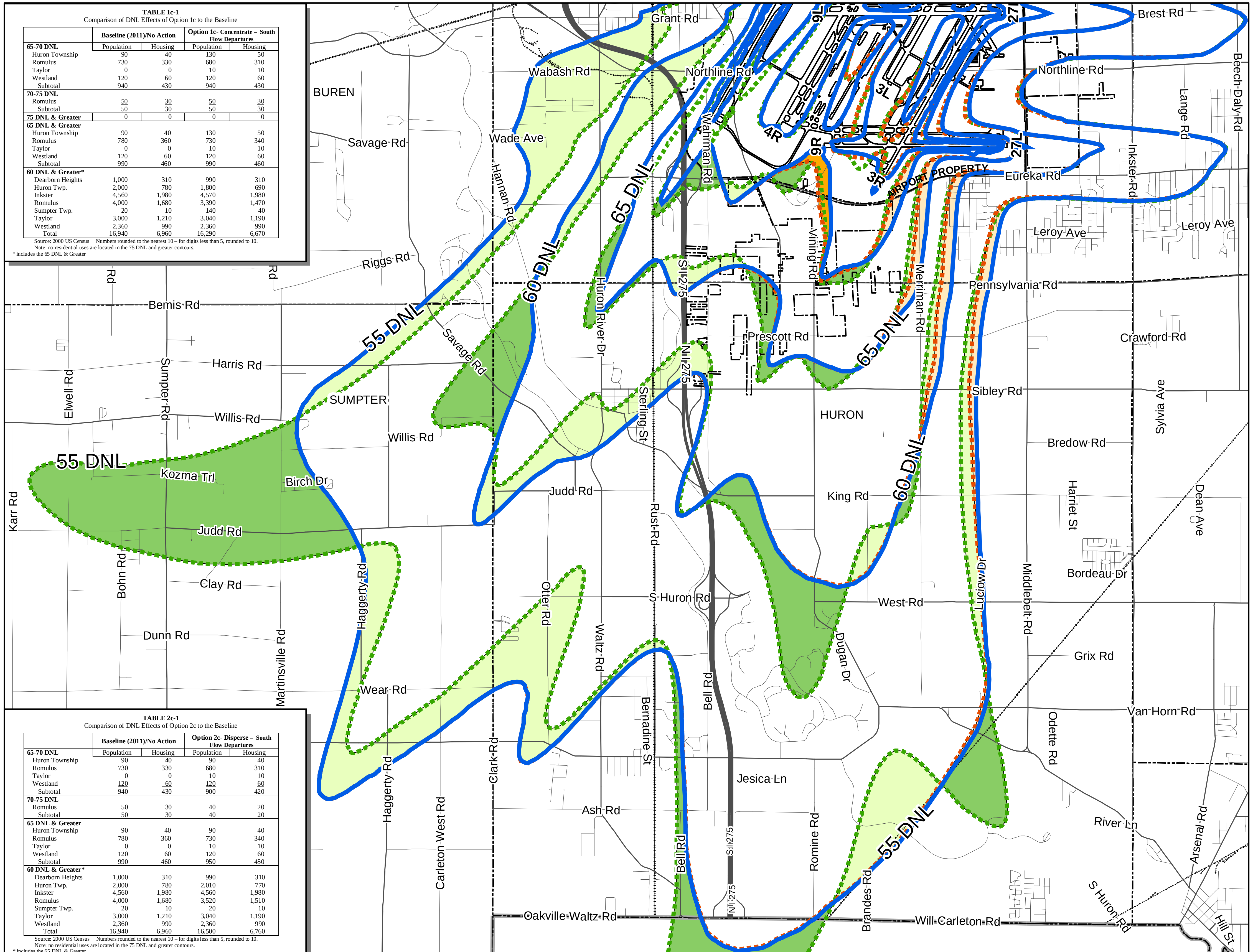


TABLE 1c-1
Comparison of DNL Effects of Option 1c to the Baseline

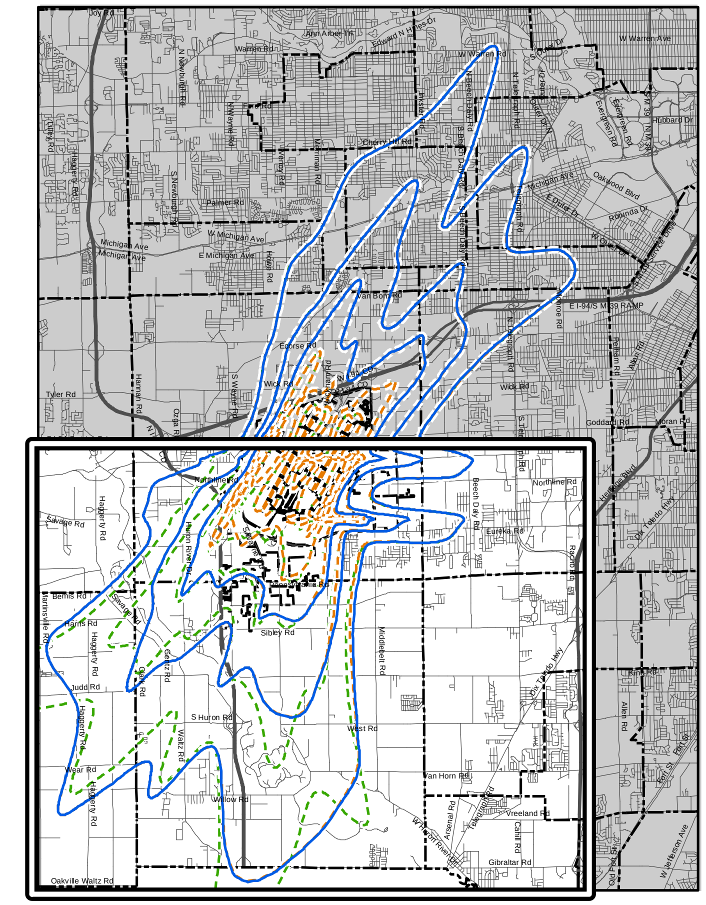
	Baseline (2011)/No Action		**Option 1c- Concentrate – South Flow Departures**	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	130	50
Romulus	730	330	680	310
Taylor	0	0	10	10
Westland	120	60	120	60
Subtotal	940	430	940	430
70-75 DNL				
Romulus	50	30	50	30
Subtotal	50	30	50	30
75 DNL & Greater	0	0	0	0
65 DNL & Greater				
Huron Township	90	40	130	50
Romulus	780	360	730	340
Taylor	0	0	10	10
Westland	120	60	120	60
Subtotal	990	460	990	460
60 DNL & Greater*				
Dearborn Heights	1,000	310	990	310
Huron Twp.	2,000	780	1,800	690
Inkster	4,560	1,980	4,570	1,980
Romulus	4,000	1,680	3,390	1,470
Sumpter Twp.	20	10	140	40
Taylor	3,000	1,210	3,040	1,190
Westland	2,360	990	2,360	990
Total	16,940	6,960	16,290	6,670

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater

TABLE 2c-1
Comparison of DNL Effects of Option 2c to the Baseline

	Baseline (2011)/No Action		**Option 2c- Disperse – South Flow Departures**	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	90	40
Romulus	730	330	680	310
Taylor	0	0	10	10
Westland	120	60	120	60
Subtotal	940	430	900	420
70-75 DNL				
Romulus	50	30	40	20
Subtotal	50	30	40	20
65 DNL & Greater				
Huron Township	90	40	90	40
Romulus	780	360	730	340
Taylor	0	0	10	10
Westland	120	60	120	60
Subtotal	990	460	950	450
60 DNL & Greater*				
Dearborn Heights	1,000	310	990	310
Huron Twp.	2,000	780	2,010	770
Inkster	4,560	1,980	4,560	1,980
Romulus	4,000	1,680	3,520	1,510
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	3,040	1,190
Westland	2,360	990	2,360	990
Total	16,940	6,960	16,500	6,760

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater



Legend

- City Limits Boundary
- 2011 Base Case
- Option 1c. FMS for South Flow Departures
- Option 1c Area newly affected
- Option 1c Area no longer affected
- Option 2c, Fan South Flow Departures
- Option 2c Area newly affected
- Option 2c Area no longer affected

Source: US Census, 2000

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Legal Issues: The option does not appear to have legal issues associated with its implementation.

Conclusions of Consultant Team:
This option would slightly change conditions within the 65 DNL contour. At the lower levels, however, the contours result in substantial changes in noise which effectively shift noise from one area/neighborhood/community to another. No recommendation is made at this time, pending discussion among the Study Advisory Committee (Appendix Five, Six & Seven) concerning concentration versus dispersal.

TABLE G4
Comparison of DNL Effects of Option 1c to the Baseline

	Baseline (2011)/No Action		**Option 1c- Concentrate – South Flow Departures**	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	130	50
Romulus	730	330	680	310
Taylor	0	0	10	10
Westland	120	60	120	60
Subtotal	940	430	940	430
70-75 DNL				
Romulus	50	30	50	30
Subtotal	50	30	50	30
75 DNL & Greater	0	0	0	0
65 DNL & Greater				
Huron Township	90	40	130	50
Romulus	780	360	730	340
Taylor	0	0	10	10
Westland	120	60	120	60
Subtotal	990	460	990	460
60 DNL & Greater*				
Dearborn Heights	1,000	310	990	310
Huron Twp.	2,000	780	1,800	690
Inkster	4,560	1,980	4,570	1,980
Romulus	4,000	1,680	3,390	1,470
Sumpter Twp.	20	10	140	40
Taylor	3,000	1,210	3,040	1,190
Westland	2,360	990	2,360	990
Total	16,940	6,960	16,290	6,670

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.

- includes the 65 DNL & Greater

Option 2: Disperse Noise by Using Multiple Flight Tracks

Discussion: As noted earlier, in general noise abatement options either concentrate noise over a predefined area or attempt to disperse or equalize noise. A third option, that combines the concentration with equalization is also possible. Concentrated noise provides a general predictability that noise would occur over specific areas, whereas dispersal generally results in less predictability, with flights being dispersed over an area.

Within the concept of dispersing noise, the goal of these options is to not affect the operational efficiency of DTW while dispersing overflights and reducing the population affected by aircraft noise. In general, dispersal results in less predictability of overflights in an attempt to equalize the areas affected. The goal of this option is to provide for an equal distribution of aircraft noise by using multiple and dispersed flight tracks for aircraft departing in both north and south flow conditions. There are three dispersal sub-options that have been identified:

- Option 2a: Fan Runway 4R Departures Between 350 and 030 Degrees,
- Option 2b: Fan Runway 3L Departures Between 350 and 060 Degrees, and
- Option 2c: Fan South Flow Departures.

As the existing noise abatement procedure at DTW during the daytime hours is a fanning procedure that disperses flights, these options are intended to improve the fan.

Figures G7 2a, G8 2b andG9 2c show the noise contours for these options.

Option 2a: Disperse Noise – Fan Runway 4R Departures Between 350 and 030 degrees

Noise Abatement Procedure Goal: The goal of this option is to create an equitable distribution of flight tracks of aircraft departing to the north from Runway 4R.

Description of the Option: This procedure would define the corridor in which aircraft would depart from Runway 4R to the north and northwest as between 350 and 030 degrees.

Comparable Existing Procedure(s): Today, departures from Runway 4R depart to the northwest and fly a straight path (runway heading) until reaching at least 500 feet above ground. This generally occurs anywhere from before the runway end to about one mile past the runway end. Aircraft are then assigned a heading from Air Traffic Control between 360 and 030. The existing procedure “fans” aircraft onto three headings (355, 010, and 030), with more aircraft on the 360 and 010 headings. The existing procedure headings are based on analysis of seven months of flight track data. Aircraft fly this heading for 3 to 10 miles until ATC directs the aircraft to turn towards a navigational aid that provides a heading to exit the Detroit airspace, approximately 50 miles from the Airport. An example of the existing jet flight paths is presented in **Figure G7** shows with a density plot of seven months of actual flight tracks, along with the proposed flight tracks.

The figure shows the percentage distribution of aircraft flight tracks over the ground between 350 and 035. The data show that the current procedure provides for a dispersed track flow. Where the aircraft actually flies over the ground varies by a number of factors, with the assigned heading being only one of the factors. Other factors are how long the aircraft flies before the initial turn occurs, how long the aircraft flies before it is directed toward a navigational aid and the speed and direction of the winds.

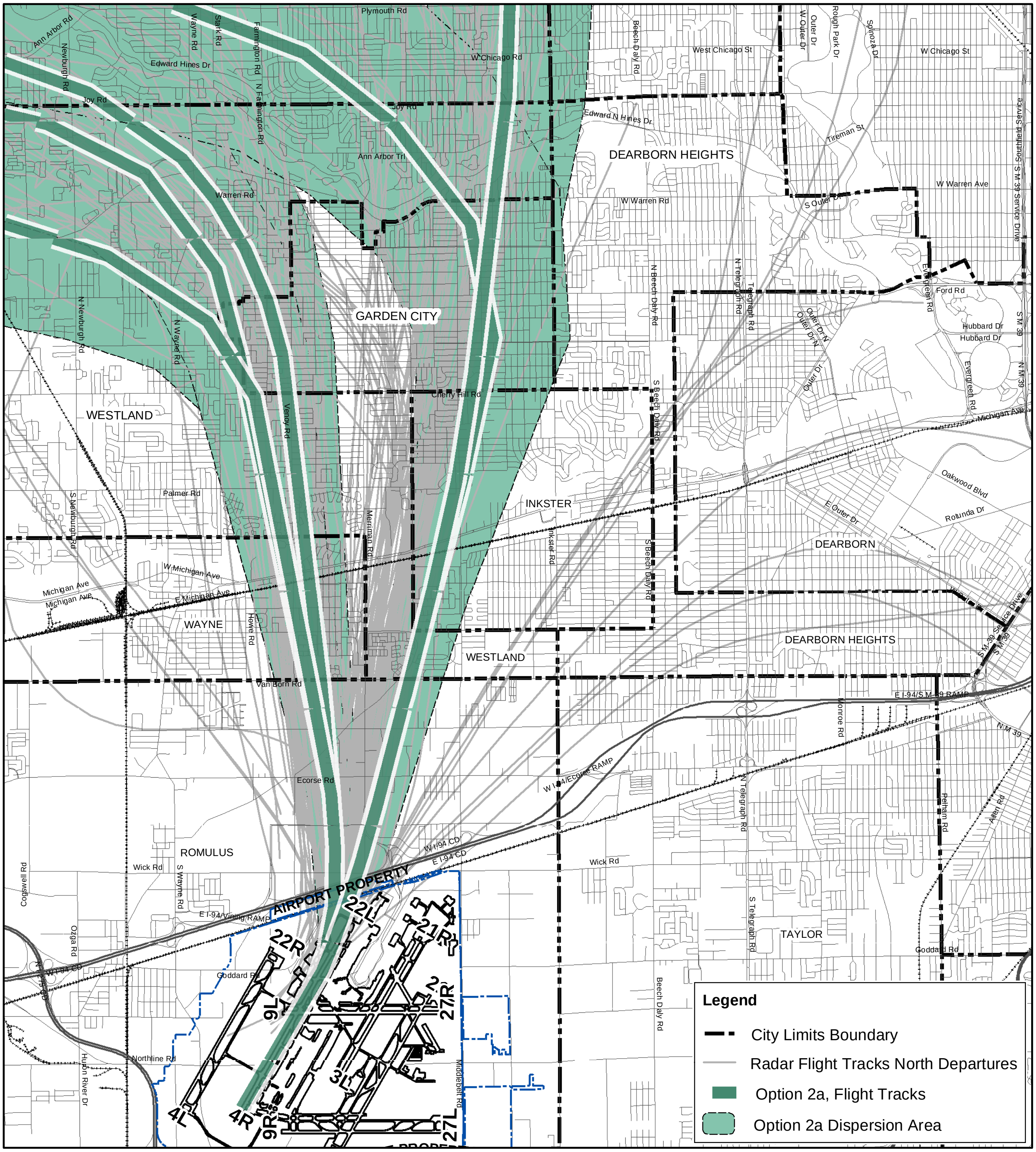

Figure G7 **Option 2a, Flight Tracks**

0 0.75 1.5 3 Miles

Source: US Census, 2000

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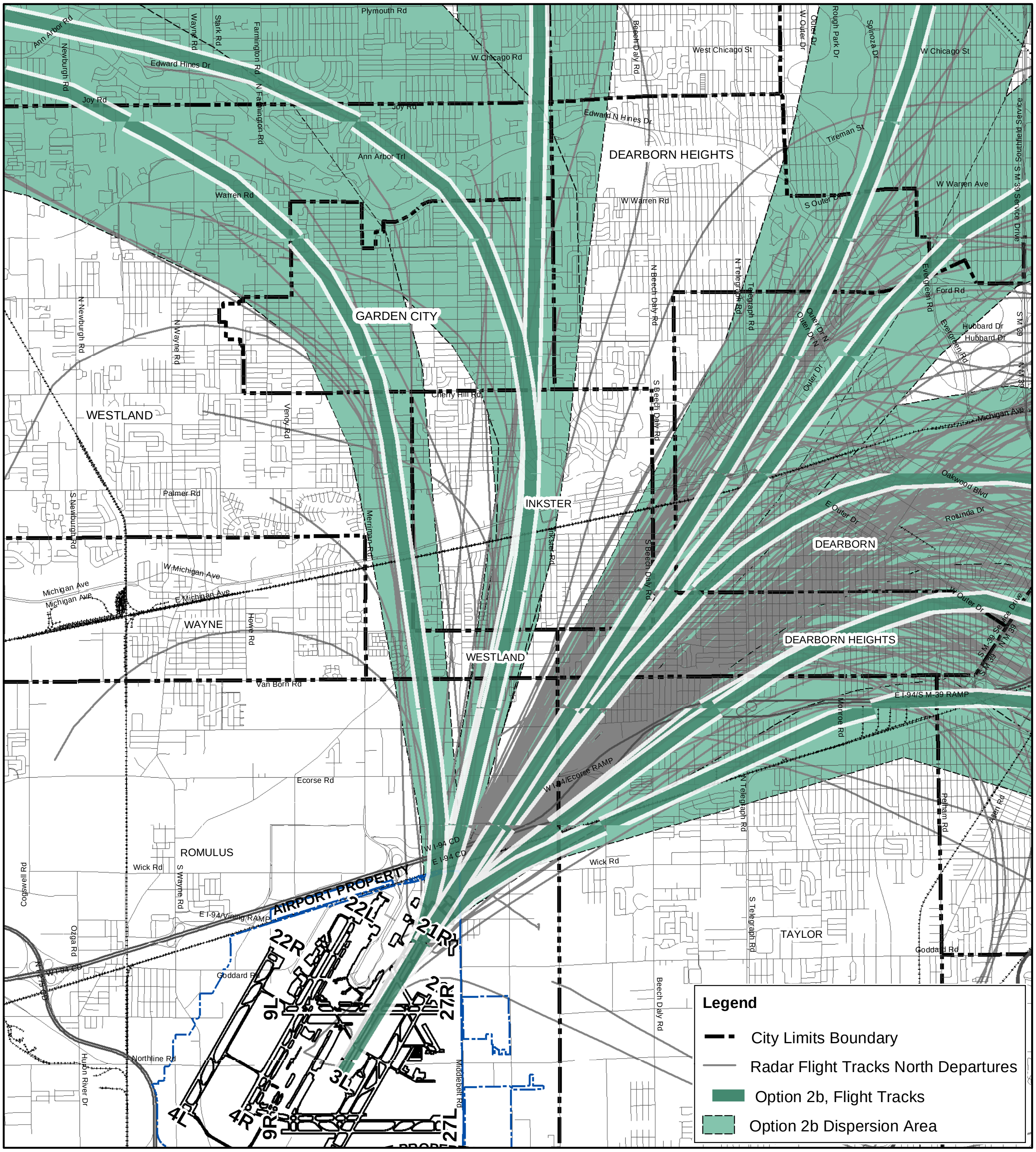
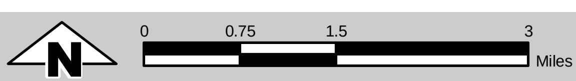


Figure G8 **Option 2b, Flight Tracks**



Source: US Census, 2000

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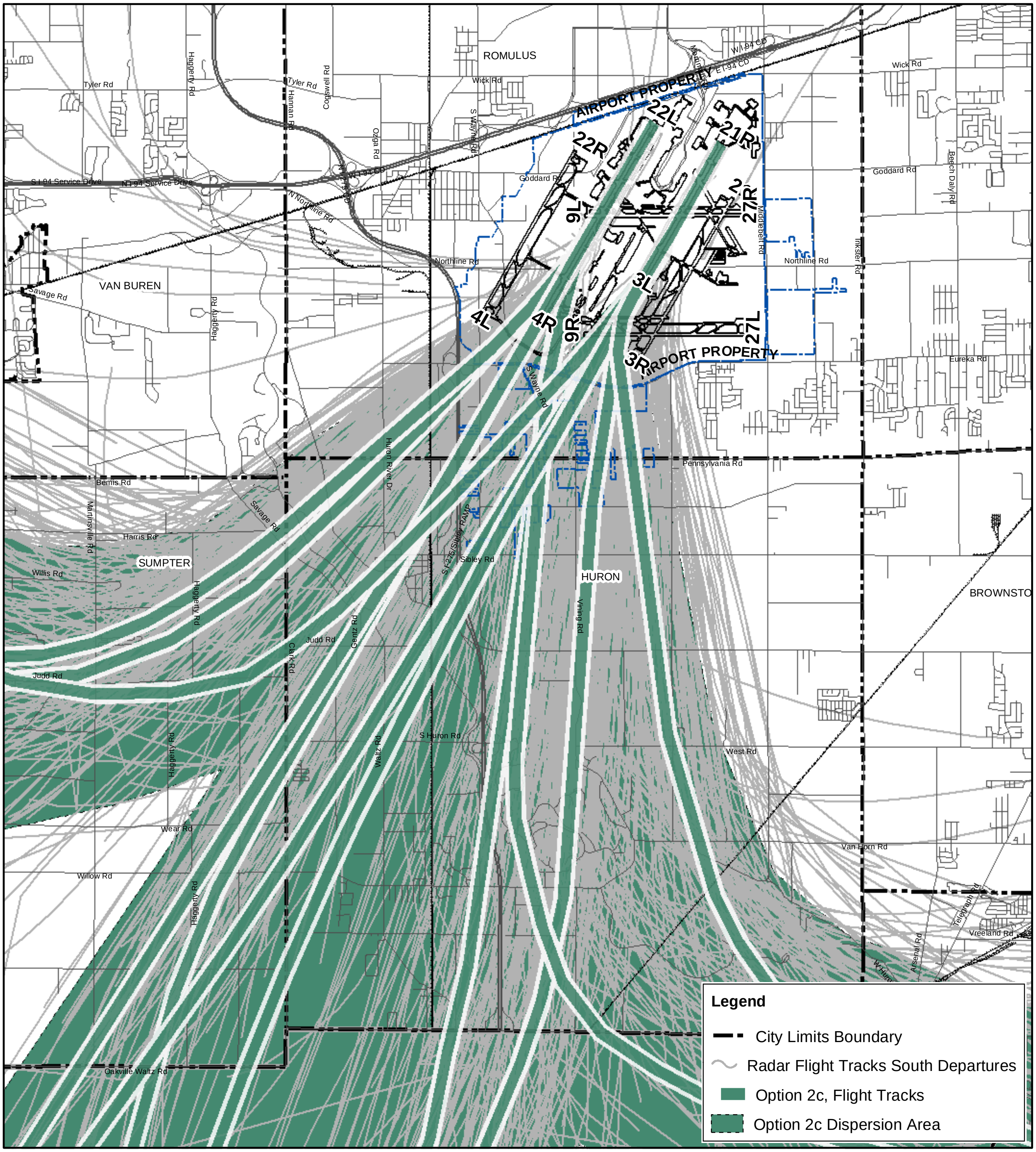

Figure G9 **Option 2c, Flight Tracks**

N

0 0.75 1.5 3 Miles

Source: US Census, 2000

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Modeling Assumptions/New Procedure: This option is similar to today's procedure, except for the addition of a fourth heading, located farthest to the west. Aircraft would depart Runway 4R and fly a straight path (runway heading) until reaching at least 500 feet above ground. At this point aircraft would be assigned a heading by ATC; the heading would be between 350 and 035 degrees; aircraft would fly this heading for three to six miles. This procedure would take advantage of the western flight tracks on the 350 heading, adding to an equitable distribution of aircraft flying to the north and northwest. Aircraft flying to southern destinations would predominately fly the 350 heading (the inside of the turn) while aircraft flying to western destinations would predominately fly the 010 and 035 headings. Aircraft flying to the north would fly the 035 heading. An example of these proposed flight paths is shown in **Figure G7**.

Analysis of New Procedure:

The analysis of this option considered both the noise exposure of the option, as well as the possible operational effects.

Noise Analysis:

The study relied upon the use of the average annual DNL noise contours to consider possible noise exposure consequences of the option.

Impact on Annual DNL Contour: **Table G5** summarizes the impact on the 65 DNL and greater noise exposure contour from implementation of this option in comparison with the 2011 Baseline. **Figure G2 NE-1** shows the noise exposure contours for Option 2a. Changes within the 65-70 DNL, as well as 70-75 DNL would occur with this option. As this table notes, this option would produce a reduction in overall population and housing exposed to 65-70 DNL by 60 people/30 houses in comparison to the Baseline. No change in would occur within the 70-75 DNL contour relative to the Baseline.

Within the 60 DNL contour, the changes would be slightly more pronounced (a reduction of 2.8% in population and 3.7% reduction in housing units relative to the 2011 Baseline), with the contour moving in the direction of the new track. Within the 65 DNL and greater contour, impact reductions would occur in Westland (41.7%), and Romulus (2.7%) relative to the Baseline, with no changes in other locations.

FAA guidance for implementing the National Environmental Policy Act (NEPA) states that a 1.5 DNL increase in noise to noise sensitive uses (i.e., residences) within the 65 DNL due to federal action is considered a significant impact. A review of the noise exposure contour indicates that a 1.5 DNL increase in noise due to Option 2a would not be expected.

Operational Impacts

The following issues could arise from implementation of the option. Also identified are the agencies that would have a role in assisting in the implementation of this option.

Airport and ATC Operational Considerations (Safety and efficiency issues): FAA has ultimate responsibility for the control of aircraft flight. This option would not be expected to alter FAA ATC workload, as fanning would continue. Airport staff would work with the FAA to ensure the procedure would be implemented to achieve its intended goal(s) and work with ATC so delays would not be incurred.

Other Environmental Issues (NEPA, etc): Implementation of noise abatement flight procedures requires compliance with the National Environmental Policy Act (NEPA). FAA Order 1050.1E **Environmental Impacts: Policies and Procedures** outlines the documentation required based on the types of federal action. This option would likely require preparation of an Environmental Assessment to determine if the impacts would be significant; however based on the analysis prepared for this study, increased noise to noise sensitive residential uses would not be expected to trigger this 1.5 DNL threshold of significance, and warrant an Environmental Impact Statement. Similarly, Option 2a would not be expected to produce 3 DNL and greater within the 60-65 DNL.

Legal Issues: The option does not appear to have legal issues associated with its implementation.

Conclusions of Consultant Team:

This option would achieve noise impact reductions within the 65 DNL contour, as well as lower level contours. At the lower levels, however, the contours result in substantial changes in noise which effectively shift noise from one area/neighborhood/community to another. No recommendation is made at this time, pending discussion among the Study Advisory Committee (Appendix Five, Six & Seven) concerning concentration versus dispersal.

TABLE G5
Comparison of DNL Effects of Option 2a to the Baseline

	Baseline (2011)/No Action		**Option 2a- Disperse – Fan 4R Departures**	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	90	40
Romulus	730	330	710	320
Taylor	0	0	10	10
Westland	120	60	70	30
Subtotal	940	430	880	400
70-75 DNL				
Romulus	50	30	50	30
Subtotal	50	30	50	30
65 DNL & Greater				
Huron Township	90	40	90	40
Romulus	780	360	760	350
Taylor	0	0	10	10
Westland	120	60	70	30
Subtotal	990	460	930	430
60 DNL & Greater*				
Dearborn Heights	1,000	310	990	310
Huron Twp.	2,000	780	2,050	780
Inkster	4,560	1,980	4,130	1,810
Romulus	4,000	1,680	4,040	1,690
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	3,040	1,190
Westland	2,360	990	2,190	910
Total	16,940	6,960	16,460	6,700

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater

Option 2b: Disperse Noise – Departures off Runway 3L between 350 and 060 Degrees

Noise Abatement Procedure Goal: The goal of this option is to create an equitable distribution of flight tracks of aircraft departing to the north from Runway 3L.

Description of the Option: This procedure would modify the existing east turn in north flow for departures from Runway 3L. The change is to increase the range of departure headings from the current 350 to 050 degrees to 350 to 060 degrees, an increase of 10 degrees to the east. The focus of this option is on flight tracks to the east, which comprises the majority of the flights departing Runway 3L; 86% of the existing flight tracks for aircraft departures off Runway 3L are to the east, and 14% of the flight tracks are to the west.

Comparable Existing Procedure(s): Aircraft depart to the northeast and fly a straight path (runway heading) until approximately reaching the runway end up to three miles past the runway end. Aircraft are then assigned a heading from Air Traffic Control between 350 and 050 magnetic degrees; the existing procedure headings are based on analysis of six months of flight track data. The majority, over 86% of departures, of the aircraft departing Runway 3L fly on headings between 025 – 055 degrees; the remaining 14% of departures fly on headings between 350-025 degrees. The existing procedure "fans" aircraft in a fairly equal distribution between these headings. Aircraft fly this heading for two to five miles until ATC directs the aircraft to turn towards a navigational aid that provides a bearing to exit the Detroit airspace. When aircraft turn to the east or south, they generally follow a flight path that is due east for eastern destinations and due south for southern destinations. An example of the existing jet flight paths is presented in **Figure G8** shows with a density plot of seven months of actual flight tracks, along with the proposed flight tracks.

Modeling Assumptions/New Procedure: This option would use the same navigational technology as is used today. Aircraft would depart Runway 3L and fly runway heading until reaching at least 500 feet above ground. Aircraft would then be assigned a heading by ATC; the heading would be between 350 and 060 degrees. This procedure would take advantage of the southern most flight tracks on the 060 heading, adding to the distribution of aircraft flying to the east. The new procedure would have aircraft turning earlier and later than is done today; this would more equally distribute aircraft within the entire 350 to 060 "corridor."

To achieve this equitable distribution, operations to the east would be divided between two flight tracks: one for those aircraft continuing on to the east and another for those aircraft that turn back toward the south. Aircraft flying to the north would be considered a separate path. For this option, aircraft with northern destinations would be assigned a heading between 350 and 000 degrees. Eastbound aircraft would be assigned a heading between 005 and 030 degrees. Eastbound aircraft whose routing results in the flying to the south would be assigned a heading between 035 and 060 degrees.

Analysis of New Procedure:

The analysis of this option considered both the noise exposure impacts of the option, as well as the possible operational effects.

Noise Analysis:

The study relied upon the use of the average annual DNL noise contours to consider possible noise exposure consequences of the option.

Impact on Annual DNL Contour: **Table G6** summarizes the impact on the 65 DNL and greater noise exposure contour from implementation of this option in comparison with the 2011 Baseline. **Figure G4 NW-1** shows the noise exposure contours for Option 2b along with the contours for Option 1b. As is shown, the total population affected within the 65 DNL and greater contour would not change with this option, although a shift of residences from the 70-75 DNL (higher noise contour), to the 65-70 DNL (lower noise contour) would occur. As this table notes, this option would produce a slight increase in overall population and housing exposed to 65-70 DNL by 10 people/10 houses in comparison to the Baseline. Within the 70-75 DNL contour, this option would affect 10 less people in 10 homes relative to the Baseline.

Within the 60 DNL contour, the changes would be slightly more pronounced (a reduction of 0.2% in population and 1.1% reduction in housing units relative to the Baseline), with the contour moving in the direction of the new eastbound track. Within the 65 DNL and greater contour, impact reductions would occur in Westland (8.3%), and Romulus (1.4%) relative to the Baseline.

FAA guidance for implementing the National Environmental Policy Act (NEPA) states that a 1.5 DNL increase in noise to noise sensitive uses (i.e., residences) within the 65 DNL due to federal action is considered a significant impact. A review of the noise exposure contour indicates that a 1.5 DNL increase in noise due to Option 2b would not be expected. This option would not be expected to result in a 3 DNL and greater changes within the 60-65 DNL.

Operational Impacts

The following issues could arise from implementation of the option. Also identified are the agencies that would have a role in assisting in the implementation of this option.

Airport and ATC Operational Considerations (Safety and efficiency issues): FAA has ultimate responsibility for the control of aircraft flight. This option would not be expected to change FAA ATC workload, as fanning is currently practiced for departures from this runway. Airport staff would work with the FAA to ensure the procedure would be implemented to achieve its intended goal(s) and work with ATC so delays would not be incurred.

Other Environmental Issues (NEPA, etc): Implementation of noise abatement flight procedures requires compliance with the National Environmental Policy Act (NEPA). FAA Order 1050.1E **Environmental Impacts: Policies and Procedures** outlines the documentation required based on the types of federal action. This option would likely require preparation of an Environmental Assessment to determine if the impacts would be significant; however based on the analysis prepared for this study, noise level increases to noise sensitive residential uses within the 65 DNL would be less than 1.5 DNL threshold of significance.

Legal Issues: The option does not appear to have legal issues associated with its implementation.

Conclusions of Consultant Team:
This option would not alter conditions within the 65 DNL contour, but would produce slight reductions in lesser contours. At the lower levels, however, the contours result in substantial changes in noise which effectively shift noise from one area/neighborhood/community to another. No recommendation is made at this time, pending discussion among the Study Advisory Committee (Appendix Five, Six & Seven) concerning concentration versus dispersal.

TABLE G6
Comparison of DNL Effects of Option 2b to the Baseline

	Baseline (2011)/No Action		**Option 2b- Disperse – 3L Departures (320-025)**	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	90	40
Romulus	730	330	740	340
Taylor	0	0	10	10
Westland	120	60	110	50
Subtotal	940	430	950	440
70-75 DNL				
Romulus	50	30	40	20
Subtotal	50	30	40	20
65 DNL & Greater				
Huron Township	90	40	90	40
Romulus	780	360	780	360
Taylor	0	0	10	10
Westland	120	60	110	50
Subtotal	990	460	990	460
60 DNL & Greater*				
Dearborn Heights	1,000	310	1,200	400
Huron Twp.	2,000	780	2,050	780
Inkster	4,560	1,980	4,650	2,020
Romulus	4,000	1,680	4,040	1,690
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	2,580	990
Westland	2,360	990	2,360	990
Total	16,940	6,960	16,900	6,880

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater

Option 2c: Disperse Noise – South Flow Departures

Noise Abatement Procedure Goal: The goal of this option is to create an equitable distribution of flight tracks of aircraft departing to the south over lower population density areas, while also avoiding flying near areas of higher population density.

Description of the Option: The current procedures to the south provide for basic dispersion. This option would provide for adjustments to those procedures, including reducing the fanning over populated areas, but continue to fan aircraft in general.

Comparable Existing Procedure(s): Aircraft depart to the south and fly runway heading until the aircraft reaches at least 500 feet above ground. This generally occurs anywhere from before the runway end to one mile past the runway end. Aircraft are then assigned a heading from Air Traffic Control that is determined based upon intended destination and separation between other departing aircraft. The existing procedure "fans" aircraft onto essentially four headings (170, 190, 220, and 240); the existing procedure headings are based on analysis of six months of flight track data. The aircraft flies on this heading for 3 to 10 miles until ATC directs the aircraft to turn towards a navigational aid that provides a heading to exit the DTW airspace, approximately 50 miles from the Airport.

An example of the existing jet flight paths is presented in **Figure G9** shows with a density plot of seven months of actual flight tracks along with the proposed flight tracks.

Modeling Assumptions/New Procedure: This option would have aircraft fly the same procedures that are used today, except for the following three changes to avoid the more densely populated areas. It is assumed that the procedures would continue use the same heading-based procedures as are used today.

- Aircraft departing on Runway 21R would fly runway heading to at least one-half mile past the end of the runway before commencing any turns to the east. Current procedures have some early turns flying near or over the community off southeastern Romulus.
- Aircraft departing on Runway 22L and flying to a southern destination should fly the 190 heading. Option 2c proposes that the preferred procedure would be to overlay the 190 heading which avoids overflying the community of New Boston, then aircraft could fly to the 220 heading after passing New Boston.
- Aircraft departing on Runway 22L and flying to western or northern destination currently turn westward over a wide range of possible headings. Some aircraft fly as far south as New Boston before turning to the west. This procedure would focus on turning the west bound aircraft before reaching New Boston.

While the flight goals of this option are similar to those of Option 1c, this option would disperse traffic along the defined corridors which are designed to avoid the more densely populated areas south of the Airport; Option 2c would rely on existing navigation technology that by its nature is less precise, and results in dispersion.

Analysis of the Option:

The analysis of this option considered both the noise exposure of the option, as well as the possible operational effects.

Noise Analysis:

The study relied upon the use of the average annual DNL noise contours to consider possible noise exposure consequences of the option.

Impact on Annual DNL Contour: **Table G7** summarizes the impact on the 65 DNL and greater noise exposure contour from implementation of this option in comparison with the 2011 Baseline. **Figure G6 S-1** shows the noise exposure contours for Option 2c along with the contours for Option 1c. As this table notes, this option would produce a reduction in overall population and housing exposed to 65 DNL and greater levels by 40 people/10 houses in comparison to the Baseline.

Within the 60 DNL contour, the changes would be slightly more pronounced (a reduction of 2.6% in population and 2.9% reduction in housing units relative to the 2011 Baseline), with the contour moving in the direction of the new eastbound track. Within the 65 DNL and greater contour, impact reductions would occur in Romulus (6.8%) relative to the Baseline with no changes occurring in other locations within this contour.

Operational Impacts

The following issues could arise from implementation of the option. Also identified are the agencies that would have a role in assisting in the implementation of this option.

Airport and ATC Operational Considerations (Safety and efficiency issues): FAA has ultimate responsibility for the control of aircraft flight. This option would not be expected to alter FAA ATC workloads, as more aircraft would be flying precise tracks based on satellite navigation. It would be anticipated that implementation of this action could come at the request of the Airport Authority. Airport staff would work with the FAA to ensure the procedure would be implemented to achieve its intended goal(s) and work with ATC so delays would not be incurred.

Other Environmental Issues (NEPA, etc): Implementation of noise abatement procedures requires compliance with the National Environmental Policy Act (NEPA). FAA Order 1050.1E **Environmental Impacts: Policies and Procedures** outlines the documentation required based on the types of federal action. This option would likely require preparation of an Environmental Assessment to determine if the impacts would be significant; however based on the analysis prepared for this study, increased noise to noise sensitive residential uses could exceed the 1.5 DNL significance criteria.

Legal Issues: The option does not appear to have legal issues associated with its implementation.

Conclusions of Consultant Team:

This option would result in a slight noise impact reduction within the 65 DNL contour, with slight reductions in lesser contours. At the lower levels, however, the contours result in substantial changes in noise which effectively shift noise from one area/neighborhood/ community to another. No recommendation is made at this time, pending discussion among the Study Advisory Committee (Appendix Five, Six & Seven) concerning concentration versus dispersal.

TABLE G7
Comparison of DNL Effects of Option 2c to the Baseline

	Baseline (2011)/No Action		**Option 2c- Disperse – South Flow Departures**	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	90	40
Romulus	730	330	680	310
Taylor	0	0	10	10
Westland	120	60	120	60
Subtotal	940	430	900	420
70-75 DNL				
Romulus	50	30	40	20
Subtotal	50	30	40	20
65 DNL & Greater				
Huron Township	90	40	90	40
Romulus	780	360	730	340
Taylor	0	0	10	10
Westland	120	60	120	60
Subtotal	990	460	950	450
60 DNL & Greater*				
Dearborn Heights	1,000	310	990	310
Huron Twp.	2,000	780	2,010	770
Inkster	4,560	1,980	4,560	1,980
Romulus	4,000	1,680	3,520	1,510
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	3,040	1,190
Westland	2,360	990	2,360	990
Total	16,940	6,960	16,500	6,760

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater

Option 3: Concentrate in Some Areas, Disperse in Others

Discussion: As noted earlier, in general, noise abatement options either concentrate noise over a predefined area or attempt to disperse or equalize noise. A third option that combines concentration with equalization is also possible. Concentrated noise provides a general predictability that noise would occur over specific areas, whereas dispersal generally results in less predictability, with flights being dispersed over an area.

In general, it is desirable to concentrate noise over compatible land use. However, while there are areas of compatible land uses around DTW, insufficient area exists to shift all of the operations. Aircraft will continue to fly over non-compatible land uses. Thus, these alternatives are designed to concentrate aircraft that fly over compatible land uses and to disperse flights that fly over non-compatible land use.

With this series of options, it might be desirable in north flow to concentrate the noise for the south turning aircraft and disperse noise for areas to the north/northeast, and north/northwest. For example, portions of option 1a might be combined with portions of option 2a. Two sub-options that have been identified:

- Option 3a – Runway 4R Departures – Concentrate South Turning Aircraft and Fan Others
- Option 3b – Runway 3L Departures – Concentrate South Turning Aircraft and Fan Others

As population densities north of the Airport are generally much greater than south of the Airport, an option for south flow in this category was not identified.

Option 3a: Runway 4R Departures – Concentrate South Turning Aircraft and Fan Others

Noise Abatement Procedure Goal: The goal of this alternative is to concentrate the flight paths over predominately compatible land uses and to disperse the flight paths when the aircraft are flying over predominately non-compatible (i.e., residential) land uses. Given that there are residential areas of various densities around DTW, it is not possible to avoid overflying residential areas. This alternative is designed to locate some flight paths over predominately compatible land uses, concentrate those paths, and disperse the rest of the paths that fly over non-compatible land uses.

Description of the Option: Pilots would use satellite-based navigation technologies to fly multiple headings using a combination of both concentrated and dispersed tracks, depending upon the underlying land use. The headings (similar to compass directions) would be used that correspond with the different routes that aircraft fly as they depart the Detroit airspace. Departures to locations to the north, east, and northwest would be fanned (dispersed) between 350 and 030 degrees similar to Option 2a, while, south-bound aircraft from Runway 4R would be turned sooner than the existing turns using a concentrated procedure and stay on course to the west and then to the south. As south-bound aircraft that use Runway 4R are turned to the west and south before turning on their southerly course, these southbound flights would avoid the higher density population areas by turning south of Wayne and Westland. **Figure G10** shows the desired flight track corridors for this option along with existing flight tracks.

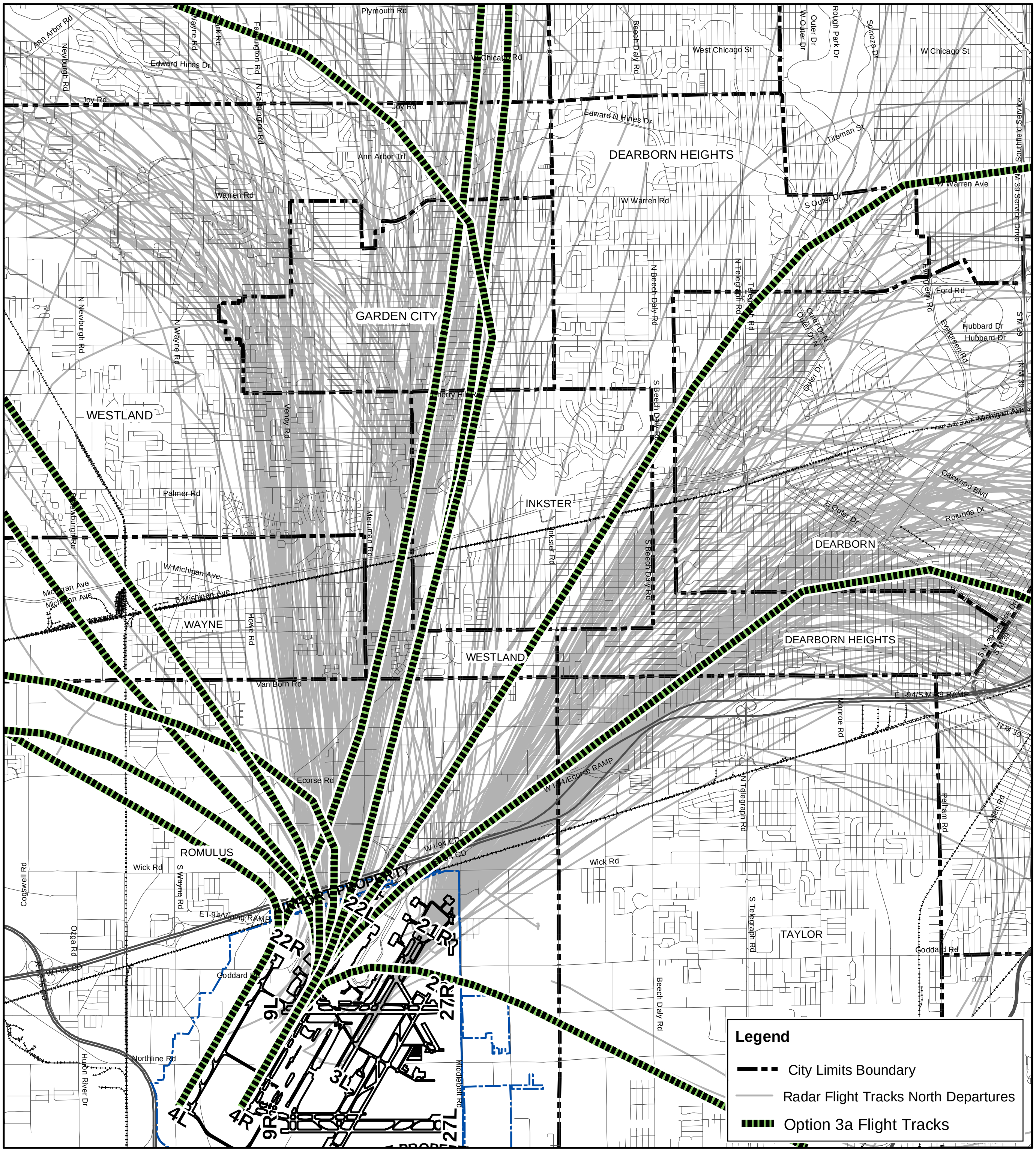

Figure G10 **Option 3a, Blend West Flight Tracks**

Tracks for Alternative 3a are the same as Alternative 3c.

0 0.75 1.5 3 Miles

Source: US Census, 2000

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Comparable Existing Procedure(s): Aircraft currently depart from Runway 4R and fly a straight path (runway heading) until the aircraft reaches at least 500 feet above ground before turning west. This generally occurs anywhere from before the runway end to one mile past the runway end, depending on the weight/performance of the aircraft. Aircraft are then assigned a westward heading between 355 and 030. The existing procedure essentially "fans" aircraft to three headings (355, 010 and 030), with more aircraft on two of the headings (355 and 010 headings). Aircraft fly this heading for three to 10 miles until ATC directs the aircraft to turn towards a navigational aid that provides a heading to exit the DTW airspace, approximately 50 miles from the Airport.

Modeling Assumptions/New Procedure: This alternative combines a portion of option 1a (Concentrate Noise – Departures off Runway 4R) and option 2a (Disperse Noise – Fan Runway 4R Departures between 350 and 030 Degrees). For aircraft with northern, eastern or western destinations, aircraft would depart Runway 4R and fly a straight path (runway heading) until reaching at least 500 feet above ground. At this point aircraft would be assigned a heading by ATC; the heading would be between 350 and 035 degrees; aircraft would fly this heading for three to 10 miles using 15-20 degree dispersed heading. The southern jet path is a new concentrated path that would start the turn to the west earlier than the current procedure, following a path along Michigan Avenue and then turning southward on a path north of Willow Run, effectively avoiding overflying Wayne and Westland. Turboprop aircraft currently occupy the space where the new track would be located, and thus, the turboprop aircraft would need to be turned sooner, enabling a 15 degree divergence from the southern jet path. The new jet path would be designed to fly over less densely populated areas south of Michigan Avenue**.** **Figure G10** also shows the proposed tracks.

About 80% of the future aircraft fleet at DTW are equipped with the necessary technology and could use this satellite-based technology procedure. Older generation aircraft that are not equipped with satellite navigation could generally follow a track that follows this turn, with the development of an Instrument Flight Rule (IFR) overlay of the proposed procedure. The flight path would be similar to the satellite-based procedure, except that the precision of the flight track would not be as great, and for those not equipped with the newer technology, would disperse. In addition, some jets (an estimated 5%) may not be able to make such a quick turn on departure from Runway 4L. These aircraft would be expected to follow the existing flight path.

Analysis of New Procedure:

The analysis of this option considered both the noise exposure, as well as the possible operational effects.

Noise Analysis:

The study relied upon the use of the average annual DNL noise contours to consider possible noise exposure consequences of the option.

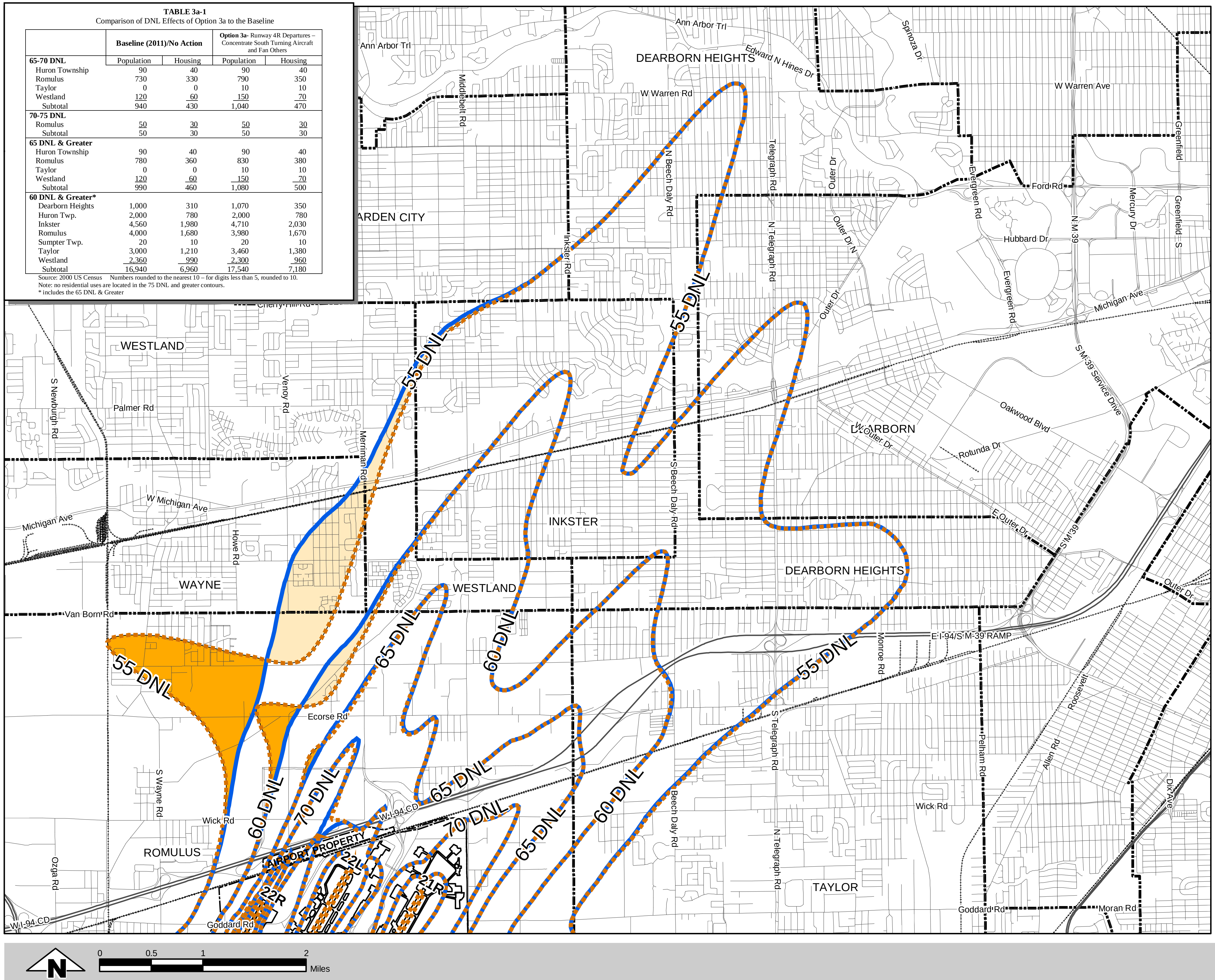
Impact on Annual DNL Contour: **Table G8** summarizes the impact on the 65 DNL and greater noise exposure contours from implementation of this option in comparison with the 2011 baseline. As this table notes, this option would increase overall population and housing exposed to 65 DNL by 90 people/40 houses in comparison to the Baseline (a 9.1% and 8.7% increase respectively). **Figure G11 NE-3** in Appendix B shows the noise exposure contours relative to the No Action/2011 Baseline. Within the 65 DNL, all of the changes associated with this option would occur for properties located within the 65-70 DNL contour. Within the 60 DNL contour, the changes would be less pronounced (an increase of 3.5% in population and 3.2% increase in housing units), with the contour moving in the direction of the new southbound track.

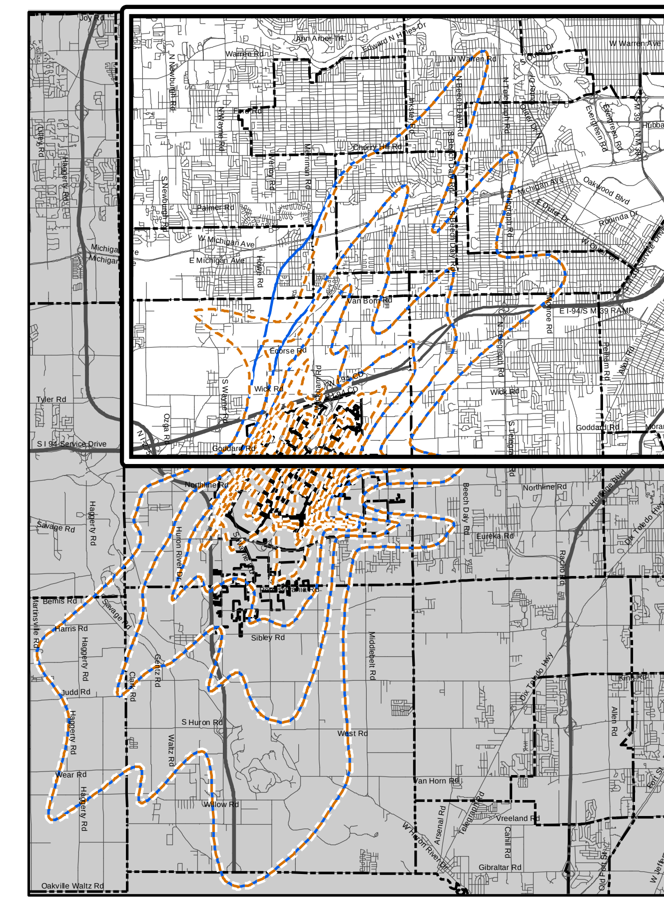
Figure G11 **Option 3a, Blend West**

TABLE 3a-1
Comparison of DNL Effects of Option 3a to the Baseline

	Baseline (2011)/No Action		Option 3a- Runway 4R Departures – Concentrate South Turning Aircraft and Fan Others	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	90	40
Romulus	730	330	790	350
Taylor	0	0	10	10
Westland	120	60	150	70
Subtotal	940	430	1,040	470
70-75 DNL				
Romulus	50	30	50	30
Subtotal	50	30	50	30
65 DNL & Greater				
Huron Township	90	40	90	40
Romulus	780	360	830	380
Taylor	0	0	10	10
Westland	120	60	150	70
Subtotal	990	460	1,080	500
60 DNL & Greater*				
Dearborn Heights	1,000	310	1,070	350
Huron Twp.	2,000	780	2,000	780
Inkster	4,560	1,980	4,710	2,030
Romulus	4,000	1,680	3,980	1,670
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	3,460	1,380
Westland	2,360	990	2,300	960
Subtotal	16,940	6,960	17,540	7,180

Source: 2000 US Census   Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater





Legend

- City Limits Boundary
- 2011 Base Case
- Option 3a, Blend West
- Option 3a Area newly affected
- Option 3a Area no longer affected

Source: US Census, 2000

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Within the 65 DNL and greater contour, a population noise impact increase would occur in Westland (25% increase) and Romulus (6.4%) relative to the Baseline. Within the 60 DNL contour, population impact reductions would occur in Westland (2.5%) and Romulus (0.5%) with increases to Taylor (15.3%), Dearborn Heights (7%), and Inkster (3.3%).

FAA guidance for implementing the National Environmental Policy Act (NEPA) states that a 1.5 DNL increase in noise to noise sensitive uses (i.e., residences) within the 65 DNL due to federal action is considered a significant impact. A review of the noise exposure contour indicates that a 1.5 DNL increase in noise due to Option 3a could occur directly under the path of the new southbound track.

Operational Impacts

The following issues could arise from implementation of the option. Also identified are the agencies that would have a role in assisting in the implementation of this option.

Airport and ATC Operational Considerations (Safety and efficiency issues): FAA has ultimate responsibility for the control of aircraft flight. This option would not be expected to change FAA ATC workloads, as more aircraft would be flying precise tracks based on satellite navigation. This option would not be expected to increase flight delay, and could slightly reduce fuel burn as jet aircraft would be turned sooner toward their ultimate direction. There could be some concern with aircraft following in-trail for a longer period then they do today. Airport staff would work with the FAA to ensure the procedure would be implemented to achieve its intended goal(s). There may be issue with respect to Willow Run airspace and the airspace currently reserved for propeller aircraft that now would be used for jet aircraft.

Other Environmental Issues (NEPA, etc): Implementation of noise abatement flight procedures requires compliance with the National Environmental Policy Act (NEPA). FAA Order 1050.1E **Environmental Impacts: Policies and Procedures** outlines the documentation required based on the types of federal action. This option would likely require preparation of an Environmental Assessment to determine if the impacts would be significant; however based on the analysis prepared for this study, increased noise to residential uses within the 65 DNL contour is unlikely to trigger the 1.5 DNL threshold of significance, and warrant an Environmental Impact Statement. This option would produce 5 DNL or greater increases in noise within the 55-60 DNL contour, and could produce a 3 DNL or greater change within the 60-65 DNL

Legal Issues: The option does not appear to have legal issues associated with its implementation.

Conclusions of Consultant Team:

This option would result in noise impact increases within the 65 DNL contour and therefore is not recommended.

TABLE G8
Comparison of DNL Effects of Option 3a to the Baseline

	Baseline (2011)/No Action		**Option 3a-** Runway 4R Departures – Concentrate South Turning Aircraft and Fan Others	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	90	40
Romulus	730	330	790	350
Taylor	0	0	10	10
Westland	120	60	150	70
Subtotal	940	430	1,040	470
70-75 DNL				
Romulus	50	30	50	30
Subtotal	50	30	50	30
65 DNL & Greater				
Huron Township	90	40	90	40
Romulus	780	360	830	380
Taylor	0	0	10	10
Westland	120	60	150	70
Subtotal	990	460	1,080	500
60 DNL & Greater*				
Dearborn Heights	1,000	310	1,070	350
Huron Twp.	2,000	780	2,000	780
Inkster	4,560	1,980	4,710	2,030
Romulus	4,000	1,680	3,980	1,670
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	3,460	1,380
Westland	2,360	990	2,300	960
Subtotal	16,940	6,960	17,540	7,180

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.

- includes the 65 DNL & Greater

Option 3b: Runway 3L Departures – Concentrate South Turning Aircraft and Fan Others.

Noise Abatement Procedure Goal: The goal of this alternative is to concentrate the flight paths over predominately compatible land uses and to disperse the flight paths when the aircraft are flying over predominately non-compatible (i.e., residential) land uses. Given that there are residential areas of various densities around DTW, it is not possible to avoid overflying residential areas. This alternative is designed to locate some flight paths over predominately compatible land uses, concentrate those paths, and disperse the rest of the paths that fly over non-compatible land uses.

Description of the Option: Aircraft would use satellite-based navigation technologies to fly multiple headings using a combination of both concentrated and dispersed tracks. Aircraft to southern destinations that turn eastward and then to the south would fly a track following the I-94 corridor to concentrate flights in this area. Aircraft flying to north, east and west destinations would fly along the same paths as they do today, using dispersed flight procedures. **Figure G12** shows the desired flight track corridors for this option along with existing flight tracks. Basically this option combines Option 1b with the dispersal options of 2a and 2c.

Comparable Existing Procedure(s): Aircraft currently depart to the northeast from Runway 3L and fly a straight path (runway heading) until the aircraft reaches at least 500 feet above ground before turning. This generally occurs anywhere from before the runway end to one mile past the runway end, depending on the weight/performance of the aircraft. Aircraft are assigned a heading from Air Traffic Control between 350 and 050 magnetic degrees (north and northeastern headings). Aircraft fly the heading for two to five miles until ATC directs the aircraft to turn towards a navigational aid that provides a heading leading out of the Detroit airspace. For aircraft with a destination to the east or south, this is either a due east or due south heading. The existing departure procedure essentially “fans” aircraft in a desired equal distribution between these headings. An example of the existing jet flight paths for this runway is presented in **Figure G12** which shows a density plot of seven months of actual flight tracks shown with light gray tracks in these figures. This figure graphically shows the distribution of aircraft flight tracks over the ground between 350 and 050. The current procedure provides for a dispersed track flow, with the greatest concentration of actual tracks occurring today just north of the I-94 corridor.

Modeling Assumptions/New Procedure: Aircraft bound for northern, western, and eastern locations would follow existing flight tracks using dispersed procedures. Southern bound aircraft would depart Runway 3L and fly runway heading for one mile past the departure end of the runway, then turning eastward on an satellite-based heading that would be designed to follow the I-94 freeway corridor and the rail line corridor. At approximately eight miles from the Airport (Oakwood/I-94 Intersection), aircraft would turn south.

This new track would replace the existing south turning track that serve the same destinations, but which do not turn in an easterly direction as soon as the new option. This procedure would be designed for those aircraft that initially turn eastward for southern destinations. Today, about 30% of the departures on this runway are directed to the south. Some heavier aircraft might not be able to fly this new track, and thus, would follow the existing tracks.

It is estimated that 80% of the future aircraft fleet at DTW could use this satellite-based technology procedure. Older generation aircraft that are not equipped with satellite navigation could generally follow a track that follows this turn, with the development of an Instrument Flight Rule (IFR) overlay of the proposed procedure. The flight path would be similar to the satellite-based procedure, except that the

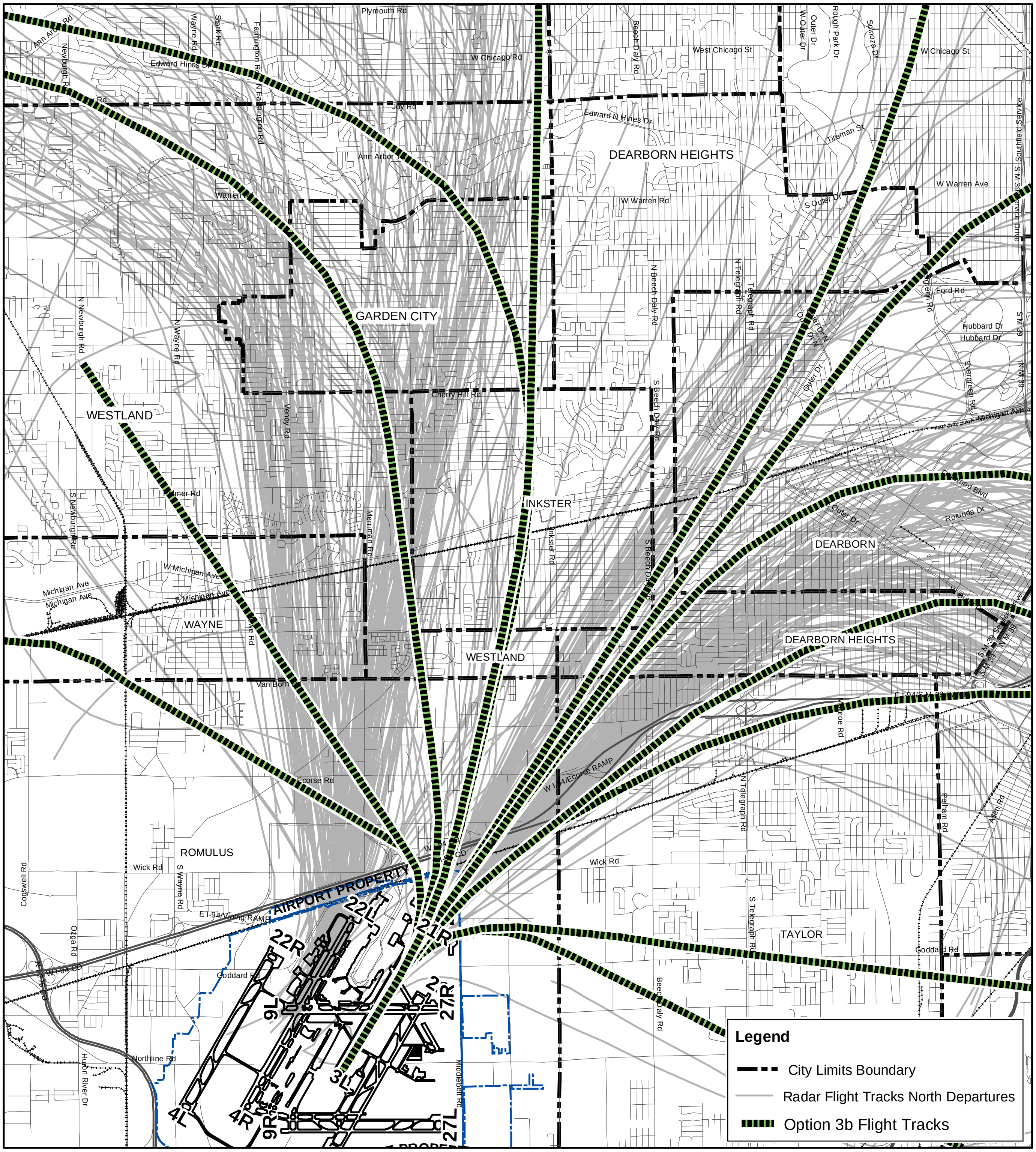
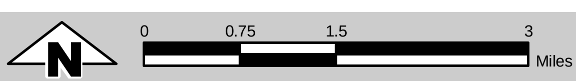


Figure G12 **Option 3b, Blend East Flight Tracks**

Tracks for Alternative 3b are the same as Alternative 3d.



Source: US Census, 2000

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precision of the flight track would not be as great, and for those not equipped with the newer technology, would disperse.

Analysis of New Procedure:

The analysis of this option considered both the noise exposure, as well as the possible operational effects.

Noise Analysis:

The study relied upon the use of the average annual DNL noise contours to consider possible noise exposure consequences of the option.

Impact on Annual DNL Contour: **Table G9** summarizes the impact on the 65 DNL and greater noise exposure contours from implementation of this option in comparison with the 2011 baseline. As this table notes, this option would increase overall population and housing exposed to 65 DNL by 150 people/60 houses in comparison to the Baseline, a 15.2% and 13.0% increase respectively. **Figure G13 NW-2** shows the noise exposure contours relative to the No Action/2011 Baseline. Within the 65 DNL, all of the changes associated with this option would occur for properties located within the 65-70 DNL contour. Within the 60 DNL contour, the changes would be less pronounced (an increase of 3.6% in population and 3.6% in housing units), with the contour moving in the direction of the new eastern/southbound track.

Within the 65 DNL and greater contour, impact increases would occur in Westland (33.3%) and Romulus (12.8%) relative to the Baseline. Within the 60 DNL contour, population impact reductions would occur only in Dearborn Heights (1% reduction), with increases to Taylor (9.7%), Inkster (4.4%), Westland (3.0%), and Romulus (1.5%).

FAA guidance for implementing the National Environmental Policy Act (NEPA) states that a 1.5 DNL increase in noise to noise sensitive uses (i.e., residences) within the 65 DNL due to federal action is considered a significant impact. A review of the noise exposure contour indicates that a 1.5 DNL increase in noise due to Option 3b could not be expected. Therefore, the FAA is likely to require completion of an Environmental Assessment (EA) that may be eligible for a Finding of No Significant Impact.

Operational Impacts

The following issues could arise from implementation of the option. Also identified are the agencies that would have a role in assisting in the implementation of this option.

Airport and ATC Operational Considerations (Safety and efficiency issues): FAA has ultimate responsibility for the control of aircraft flight. This option would not be expected to change FAA ATC workloads, as more aircraft would be flying precise tracks based on satellite navigation. This option would not be expected to increase flight delay, and could slightly reduce fuel burn as jet aircraft would be turned sooner toward their ultimate direction. Airport staff would work with the FAA to ensure the procedure would be implemented to achieve its intended goal(s). There may be issues with respect to entrail flight paths for an extended distance and the use of airspace for jets that currently is being used for propeller aircraft.

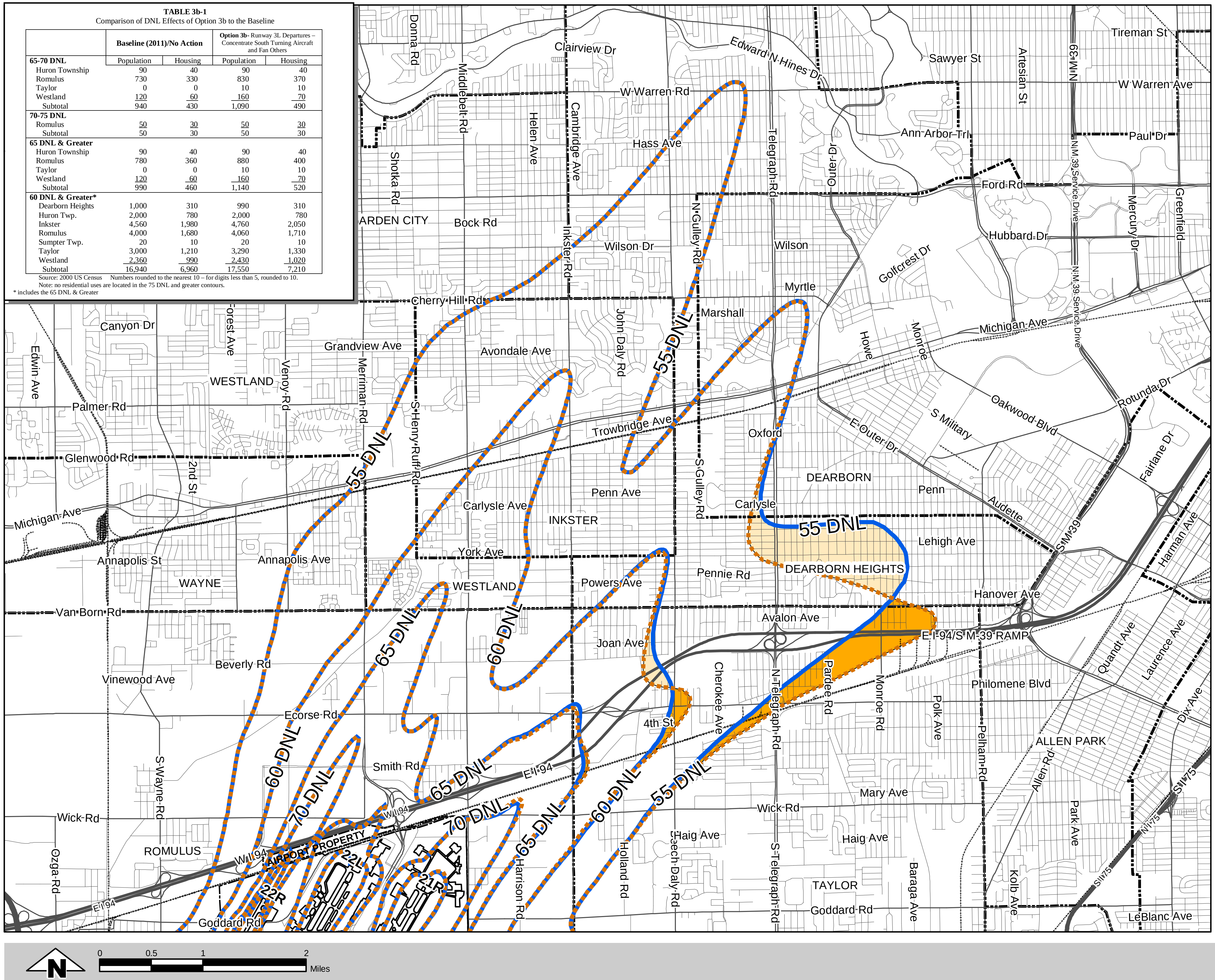
Other Environmental Issues (NEPA, etc): Implementation of noise abatement flight procedures requires compliance with the National Environmental Policy Act (NEPA). FAA Order 1050.1E **Environmental Impacts: Policies and Procedures** outlines the documentation required based on the types of federal action. This option would likely require preparation of an Environmental Assessment

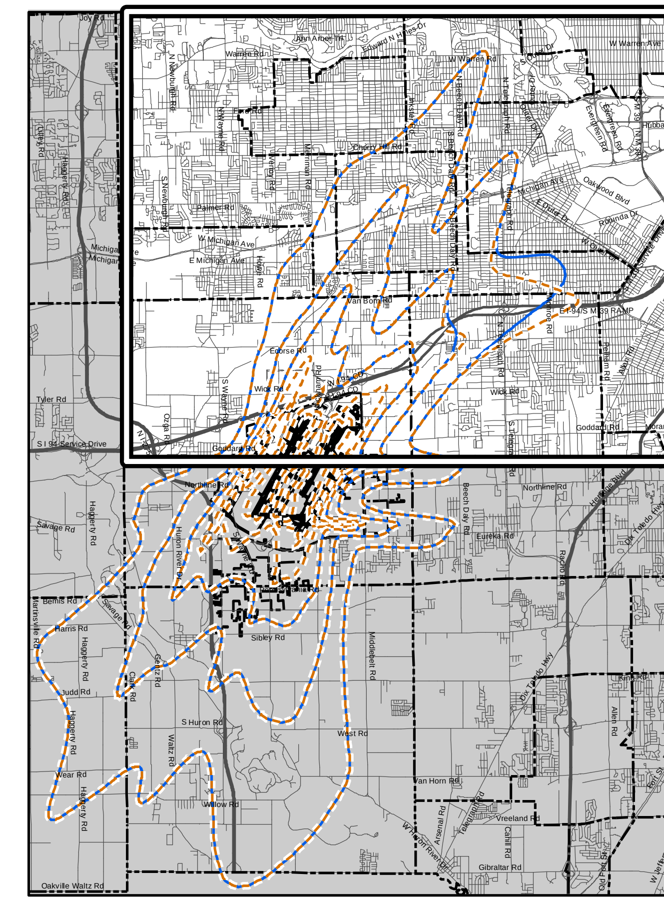
Figure G13 **Option 3b, Blend East**

TABLE 3b-1
Comparison of DNL Effects of Option 3b to the Baseline

	Baseline (2011)/No Action		Option 3b- Runway 3L Departures – Concentrate South Turning Aircraft and Fan Others	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	90	40
Romulus	730	330	830	370
Taylor	0	0	10	10
Westland	120	60	160	70
Subtotal	940	430	1,090	490
70-75 DNL				
Romulus	50	30	50	30
Subtotal	50	30	50	30
65 DNL & Greater				
Huron Township	90	40	90	40
Romulus	780	360	880	400
Taylor	0	0	10	10
Westland	120	60	160	70
Subtotal	990	460	1,140	520
60 DNL & Greater*				
Dearborn Heights	1,000	310	990	310
Huron Twp.	2,000	780	2,000	780
Inkster	4,560	1,980	4,760	2,050
Romulus	4,000	1,680	4,060	1,710
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	3,290	1,330
Westland	2,360	990	2,430	1,020
Subtotal	16,940	6,960	17,550	7,210

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater





Legend

City Limits Boundary
2011 Base Case
Option 3b, Blend East
Option 3b Area newly affected
Option 3b Area no longer affected

Source: US Census, 2000

to determine if the impacts would be significant; however based on the analysis prepared for this study, increased noise to residential uses within the 65 DNL contour is unlikely to trigger the 1.5 DNL threshold of significance, and warrant an Environmental Impact Statement. This option could produce 5 DNL or greater increases in noise within the 55-60 DNL contour, and could produce a 3 DNL or greater change within the 60-65 DNL.

Legal Issues: The option does not appear to have legal issues associated with its implementation.

Conclusions of Consultant Team:

This option would result in noise impact increases within the 65 DNL contour. This alternative is not recommended due to the increase within the 65 DNL.

TABLE G9
Comparison of DNL Effects of Option 3b to the Baseline

	Baseline (2011)/No Action		**Option 3b-** Runway 3L Departures – Concentrate South Turning Aircraft and Fan Others	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	90	40
Romulus	730	330	830	370
Taylor	0	0	10	10
Westland	120	60	160	70
Subtotal	940	430	1,090	490
70-75 DNL				
Romulus	50	30	50	30
Subtotal	50	30	50	30
65 DNL & Greater				
Huron Township	90	40	90	40
Romulus	780	360	880	400
Taylor	0	0	10	10
Westland	120	60	160	70
Subtotal	990	460	1,140	520
60 DNL & Greater*				
Dearborn Heights	1,000	310	990	310
Huron Twp.	2,000	780	2,000	780
Inkster	4,560	1,980	4,760	2,050
Romulus	4,000	1,680	4,060	1,710
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	3,290	1,330
Westland	2,360	990	2,430	1,020
Subtotal	16,940	6,960	17,550	7,210

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.

- includes the 65 DNL & Greater

<u>Option 3c</u>: Runway 4R Departures – Concentrate a Portion of South Turning Aircraft and Fan Others

Noise Abatement Procedure Goal: The goal of this alternative is to concentrate the flight paths over predominately compatible land uses and to disperse the flight paths when the aircraft are flying over predominately non-compatible (i.e., residential) land uses. Given that there are residential areas of various densities around DTW, it is not possible to avoid overflying residential areas. This alternative is designed to locate some flight paths over predominately compatible land uses, concentrate those paths, and disperse the rest of the paths that fly over non-compatible land uses. This option was designed to reduce impacts caused by Option 3a.

Description of the Option: This option is very similar to the Option 3a, Runway 4R Departures – Concentrate South Turning Aircraft and Fan Others**.** Relative to Option 3a, Option 3c would concentrate a smaller portion of the south turning departures instead of concentrating all south turning departures.

Pilots would use satellite-based navigation technologies to fly multiple headings using a combination of both concentrated and dispersed tracks, depending upon the underlying land use. The headings (similar to compass directions) would be used that correspond with the different routes that aircraft fly as they depart the Detroit airspace. Departures to locations to the north, east, and northwest would be fanned (dispersed) between 350 and 030 degrees similar to Option 2a, while, south-bound aircraft from Runway 4R would be turned sooner than the existing turns using a concentrated procedure and stay on course to the west and then to the south. As south-bound aircraft that use Runway 4R are turned to the west and south before turning on their southerly course, these southbound flights would avoid the higher density population areas by turning south of Wayne and Westland. **Figure G10** shows the desired flight track corridors for this option along with existing flight tracks, as Option 3c and Option 3a would use the same tracks.

Comparable Existing Procedure(s): Aircraft currently depart from Runway 4R and fly a straight path (runway heading) until the aircraft reaches at least 500 feet above ground before turning west. This generally occurs anywhere from before the runway end to one mile past the runway end, depending on the weight/performance of the aircraft. Aircraft are then assigned a westward heading between 355 and 030. The existing procedure essentially “fans” aircraft to three headings (355, 010, and 030), with more aircraft on two of the headings (355 and 010 headings). Aircraft fly this heading for three to 10 miles until ATC directs the aircraft to turn towards a navigational aid that provides a heading to exit the DTW airspace, approximately 50 miles from the Airport.

Modeling Assumptions/New Procedure: This option uses the same theory as Option 3a, combining a portion of option 1a (Concentrate Noise – Departures off Runway 4R) and option 2a (Disperse Noise – Fan Runway 4R Departures between 350 and 030 Degrees). For aircraft with northern, eastern or western destinations, aircraft would depart Runway 4R and fly a straight path (runway heading) until reaching at least 500 feet above ground. At this point aircraft would be assigned a heading by ATC; the heading would be between 350 and 035 degrees; aircraft would fly this heading for three to 10 miles using 15-20 degree dispersed heading. The southern jet path would be a new concentrated path that would start the turn to the west earlier than the current procedure, following a path along Michigan Avenue and then turning southward on a path north of Willow Run, effectively avoiding overflying Wayne and Westland. Turboprop aircraft currently occupy the space where the new track would be located, and thus, the turboprop aircraft would need to be turned sooner, enabling a 15 degree divergence from the southern jet path. The new jet path would be designed to fly over less densely populated areas south of Michigan Avenue**.**

About 80% of the future aircraft fleet at DTW are equipped with the necessary technology and could use this satellite-based technology procedure. Older generation aircraft that are not equipped with satellite navigation could generally follow a track that follows this turn, with the development of an Instrument

Flight Rule (IFR) overlay of the proposed procedure. The flight path would be similar to the satellite-based procedure, except that the precision of the flight track would not be as great, and for those not equipped with the newer technology, would disperse. In addition, some jets (an estimated 5%) may not be able to make such a quick turn on departure from Runway 4L. These aircraft would be expected to follow the existing flight path.

Analysis of New Procedure:

The analysis of this option considered both the noise exposure, as well as the possible operational effects.

Noise Analysis:

The study relied upon the use of the average annual DNL noise contours to consider possible noise exposure consequences of the option.

Impact on Annual DNL Contour: **Table G10** summarizes the impact on the 65 DNL and greater noise exposure contours from implementation of this option in comparison with the 2011 Baseline. As this table notes, this option would reduce overall population and housing exposed to 65 DNL by 10 people/10 houses in comparison to the Baseline (a 1.0% and 2.2% reduction respectively). **Figure G14 NW-4,** shows the noise exposure contours relative to the No Action/2011 Baseline. Within the 65 DNL, all of the changes associated with this option would occur for properties located within the 65-70 DNL contour. Within the 60 DNL contour, the changes would be less pronounced (a reduction of 0.9% homes and 0.2% population), with the contour moving in the direction of the new southbound track.

Within the 65 DNL and greater contour, a population noise impact reduction would occur in Romulus (2.6%) relative to the Baseline, and while impacted population would not change, the number of housing units affected in Westland would decrease by 10 homes (a 16.7% change). Within the 60 DNL contour, population impact increases would occur in Taylor (1.3%) and Huron Township (0.5%), with reductions in Westland (2.5%), and Dearborn Heights (1.0%).

FAA guidance for implementing the National Environmental Policy Act (NEPA) states that a 1.5 DNL increase in noise to noise sensitive uses (i.e., residences) within the 65 DNL due to a federal action is considered a significant noise impact. A review of the noise exposure contour indicates that a 1.5 DNL increase in noise would not be expected to occur due to Option 3c.

Operational Impacts

The following issues could arise from implementation of the option. Also the agencies are identified that would have a role in assisting in the implementation of this option.

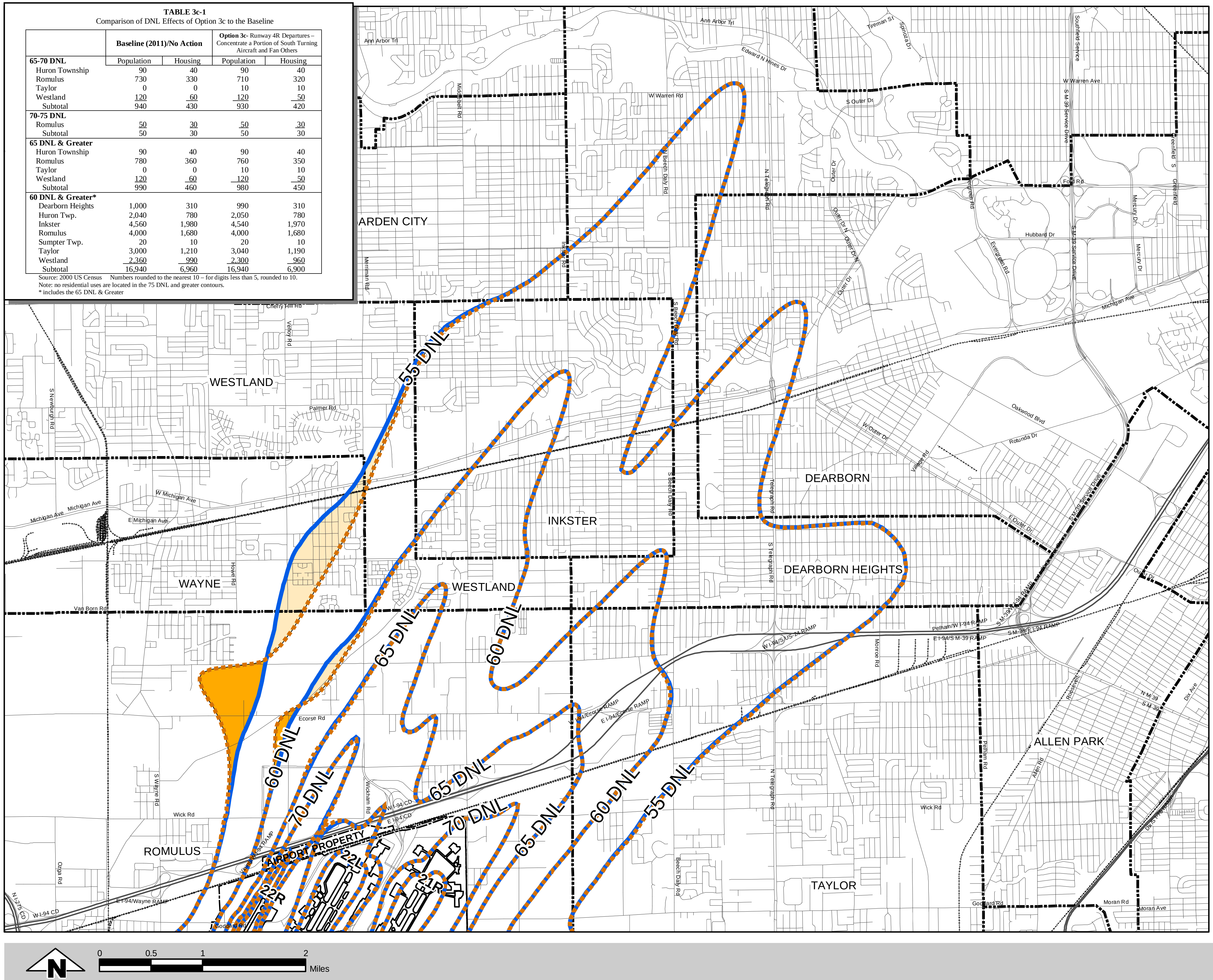
Airport and ATC Operational Considerations (Safety and efficiency issues): FAA has ultimate responsibility for the control of aircraft flight. This option would not be expected to change FAA ATC workloads, as more aircraft would be flying precise tracks based on satellite navigation. This option would not be expected to increase flight delay, and could slightly reduce fuel burn as jet aircraft would be turned sooner toward their ultimate direction. There could be some concern with aircraft following the precision tracks for a longer period then they do today. Airport staff would

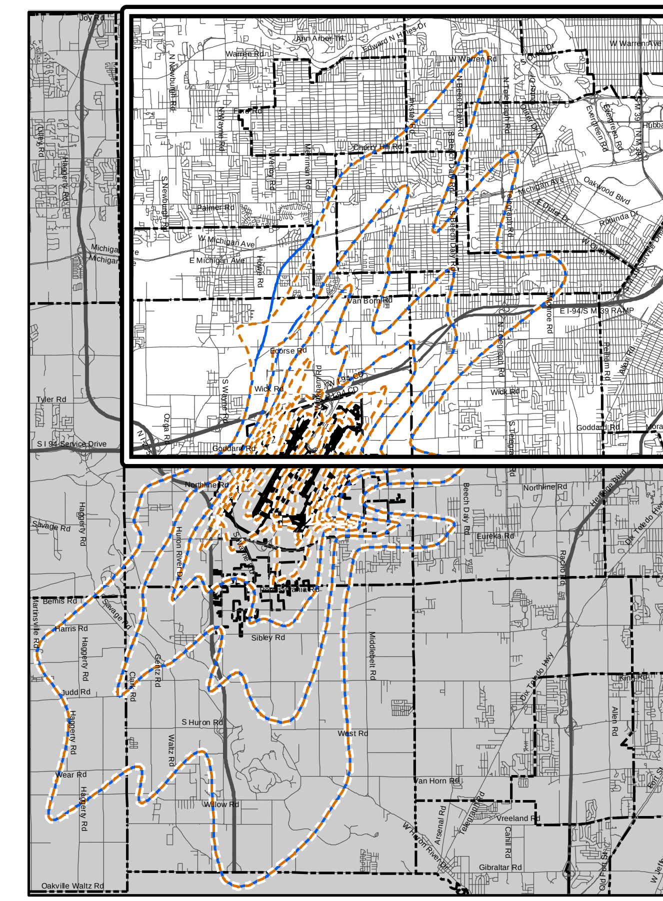
Figure G14 **Option 3c, Blend 15% West**

TABLE 3c-1
Comparison of DNL Effects of Option 3c to the Baseline

	Baseline (2011)/No Action		Option 3c- Runway 4R Departures – Concentrate a Portion of South Turning Aircraft and Fan Others	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	90	40
Romulus	730	330	710	320
Taylor	0	0	10	10
Westland	120	60	120	50
Subtotal	940	430	930	420
70-75 DNL				
Romulus	50	30	50	30
Subtotal	50	30	50	30
65 DNL & Greater				
Huron Township	90	40	90	40
Romulus	780	360	760	350
Taylor	0	0	10	10
Westland	120	60	120	50
Subtotal	990	460	980	450
60 DNL & Greater*				
Dearborn Heights	1,000	310	990	310
Huron Twp.	2,040	780	2,050	780
Inkster	4,560	1,980	4,540	1,970
Romulus	4,000	1,680	4,000	1,680
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	3,040	1,190
Westland	2,360	990	2,300	960
Subtotal	16,940	6,960	16,940	6,900

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater





Legend

City Limits Boundary

2011 Base Case

Option 3c, Blend 15% West

Option 3c Area newly affected

Option 3c Area no longer affected

Source: US Census, 2000

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work with the FAA to ensure the procedure would be implemented to achieve its intended goal(s). There may be issue with respect to Willow Run airspace and the airspace currently reserved for propeller aircraft that now would be used for jet aircraft.

Other Environmental Issues (NEPA, etc): Implementation of noise abatement flight procedures requires compliance with the National Environmental Policy Act (NEPA). FAA Order 1050.1E **Environmental Impacts: Policies and Procedures** outlines the documentation required based on the types of federal action. This option would likely require preparation of an Environmental Assessment to determine if the impacts would be significant; however based on the analysis prepared for this study, increased noise to residential uses within the 65 DNL contour is unlikely to trigger the 1.5 DNL threshold of significance, and warrant an Environmental Impact Statement. This option would produce 5 DNL or greater increases in noise within the 55-60 DNL contour, and could produce a 3 DNL or greater change within the 60-65 DNL

Legal Issues: The option does not appear to have legal issues associated with its implementation.

Conclusions of Consultant Team:

No conclusion is made at this time, pending discussion with the Study Advisory Committee. (Appendix Five, Six & Seven)

TABLE G10
Comparison of DNL Effects of Option 3c to the Baseline

	Baseline (2011)/No Action		**Option 3c-** Runway 4R Departures – Concentrate a Portion of South Turning Aircraft and Fan Others	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	90	40
Romulus	730	330	710	320
Taylor	0	0	10	10
Westland	120	60	120	50
Subtotal	940	430	930	420
70-75 DNL				
Romulus	50	30	50	30
Subtotal	50	30	50	30
65 DNL & Greater				
Huron Township	90	40	90	40
Romulus	780	360	760	350
Taylor	0	0	10	10
Westland	120	60	120	50
Subtotal	990	460	980	450
60 DNL & Greater*				
Dearborn Heights	1,000	310	990	310
Huron Twp.	2,040	780	2,050	780
Inkster	4,560	1,980	4,540	1,970
Romulus	4,000	1,680	4,000	1,680
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	3,040	1,190
Westland	2,360	990	2,300	960
Subtotal	16,940	6,960	16,940	6,900

Source: 2000 US Census   Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.

- includes the 65 DNL & Greater

Option 3d: Runway 3L Departures – Concentrate a Portion of South Turning Aircraft and Fan Others.

Noise Abatement Procedure Goal: The goal of this alternative is to concentrate a portion of the flight paths over predominately compatible land uses and to disperse the flight paths when the aircraft are flying over predominately non-compatible (i.e., residential) land uses. Given that there are residential areas of various densities around DTW, it is not possible to avoid overflying residential areas. This alternative is designed to locate some flight paths over predominately compatible land uses, concentrate half of those paths, and disperse the rest of the paths that fly over non-compatible land uses.

Description of the Option: This option is very similar to the Option 3b, Runway 3L Departures – Concentrate South Turning Aircraft and Fan Others. The difference is that Option 3d would concentrate a portion of the south turning departures instead of concentrating all departures, as was assumed with Option 3b. This is to reduce the potential for increases in new areas. Aircraft would use satellite-based navigation technologies to fly multiple headings using a combination of concentrated and dispersed tracks. Aircraft flying to southern destinations that turn eastward and then to the south, would fly a track following the I-94 corridor to concentrate flights in this area. Aircraft flying to north, east and west destinations would fly along the same paths as they do today, using dispersed flight procedures. **Figure G12** shows the desired flight track corridors for this option along with the existing flight tracks, as the tracks for Option 3d are the same as Option 3b.

Comparable Existing Procedure(s): Aircraft currently depart to the northeast from Runway 3L and fly a straight path (runway heading) until the aircraft reaches at least 500 feet above ground before turning. Generally, aircraft reach this altitude from anywhere before the runway end to one mile past the runway end, depending on the weight/performance of the aircraft. Aircraft are assigned a heading from Air Traffic Control between 350 and 050 magnetic degrees (north and northeastern headings). Aircraft fly the heading for two to five miles until ATC directs the aircraft to turn towards a navigational aid that provides a heading leading out of the Detroit airspace. For aircraft with a destination to the east or south, this is either a due east or due south heading. The existing departure procedure essentially "fans" aircraft in a desired equal distribution between these headings. An example of the existing jet flight paths for this runway is presented in **Figure G12**, which shows a seven month density plot of actual flight tracks shown with light gray tracks in these figures. This figure graphically shows the distribution of aircraft flight tracks over the ground between 350 and 050. The current procedure provides for a dispersed track flow, with the greatest concentration of actual tracks occurring today just north of the I-94 corridor.

Modeling Assumptions/New Procedure: Under this option, aircraft bound for northern, western, and eastern locations would follow existing flight tracks using dispersal procedures. Southern bound aircraft would depart Runway 3L and fly runway heading for one mile past the departure end of the runway, then turn eastward on a satellite-based heading designed to follow the I-94 freeway corridor and the rail line corridor. At approximately eight miles from the Airport (Oakwood/I-94 Intersection), aircraft would turn south.

This new track would replace the existing south turning track that serves the same destinations, but which does not turn in an easterly direction as soon as the new option. This procedure would be designed for those aircraft that initially turn eastward for southern destinations. Today, about 30% of the departures on this runway are directed to the south. Some heavier aircraft might not be able to fly this new track, and thus, would follow the existing tracks.

It is estimated that 80% of the future aircraft fleet at DTW could use this satellite-based technology procedure. Older generation aircraft that are not equipped with satellite navigation could generally follow a track that follows this turn, with the development of an Instrument Flight Rule (IFR) overlay of the proposed procedure. The flight path would be similar to the satellite-based procedure, except that the precision of the flight track would not be as great, and for those not equipped with the newer technology, would disperse.

Analysis of New Procedure:

The analysis of this option considered both the noise exposure and the possible operational effects.

Noise Analysis:

The study relied upon the use of the average annual DNL noise contours to consider possible noise exposure consequences of the option.

Impact on Annual DNL Contour: **Table G11** summarizes the impact on the 65 DNL and greater noise exposure contours from implementation of this option in comparison with the 2011 baseline. As this table notes, this option would reduce overall population and housing exposed to 65 DNL by 20 people/20 houses in comparison to the Baseline, a 2.0% and 4.3% reduction respectively. **Figure G15 NE-5** shows the noise exposure contours relative to the No Action/2011 Baseline. Within the 65 DNL, all of the changes associated with this option would occur for properties located within the 65-70 DNL contour. Within the 60 DNL contour, the changes would be slightly less pronounced (a reduction of 1.6% in population and 2.0% in housing units), with the contour moving in the direction of the new eastern/southbound track.

Within the 65 DNL and greater contour, noise impacts would decrease within Romulus. While population impacts within the 65 DNL in Westland would not change, housing impacts would decrease nearly 17% (10 homes) relative to the Baseline. This slight decrease in number of impacted homes is primarily due to the rounding of population and housing to the nearest 10 people/homes. Within the 60 DNL contour, population impact reductions would occur in Westland (5.1%), Romulus (3.5%), and Dearborn Heights (1% reduction), with an increase to Taylor (1.3%) and Huron Township (0.5%).

FAA guidance for implementing the National Environmental Policy Act (NEPA) states that a 1.5 DNL increase in noise to noise sensitive uses (i.e., residences) within the 65 DNL due to federal action is considered a significant impact. A review of the noise exposure contour indicates that a 1.5 DNL increase in noise due to Option 3d would not be expected. Therefore, the FAA is likely to require completion of an Environmental Assessment (EA) that may be eligible for a Finding of No Significant Impact.

Operational Impacts

The following issues could arise from implementation of the option. Also identified are the agencies that would have a role in assisting in the implementation of this option.

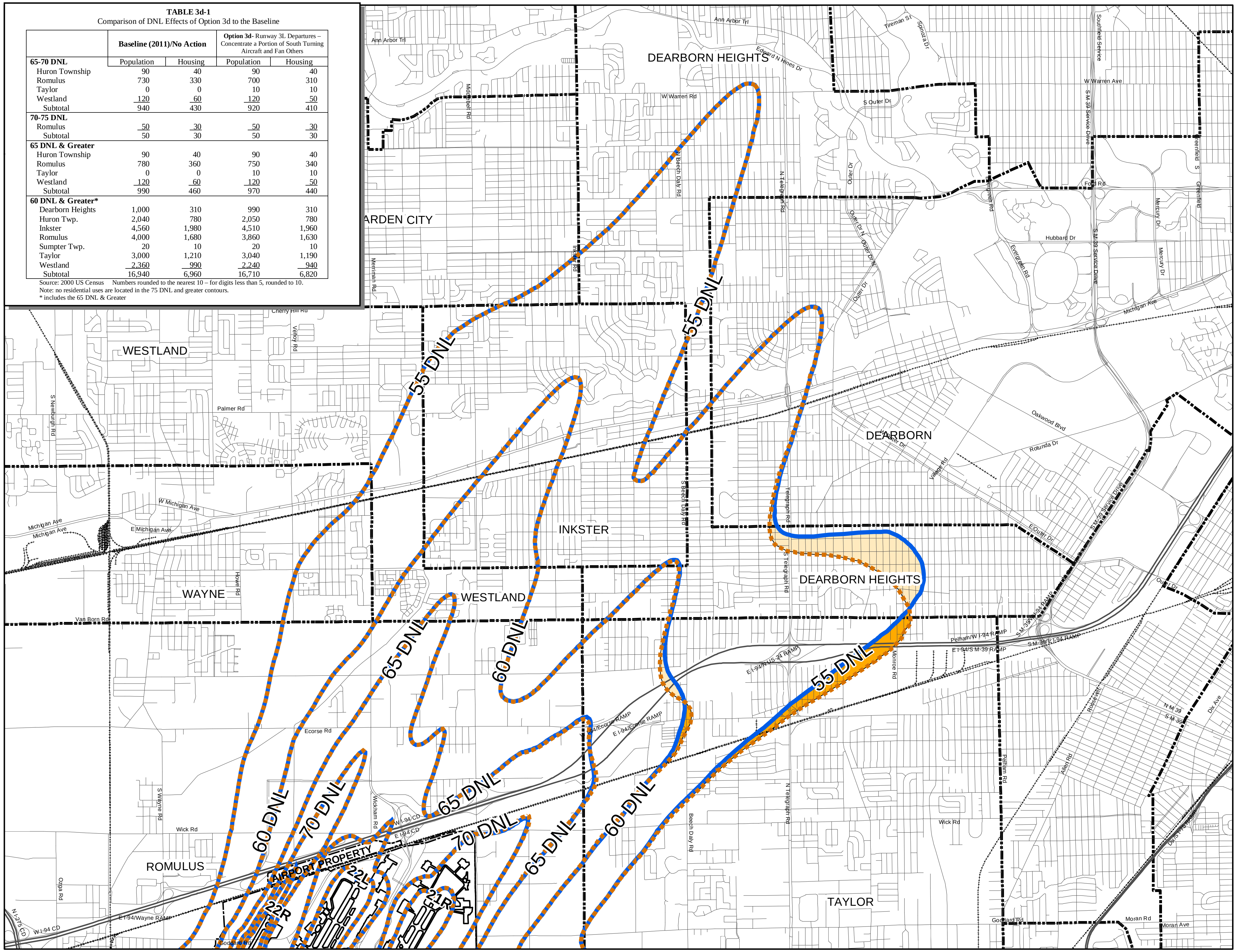
Airport and ATC Operational Considerations (Safety and efficiency issues): FAA has ultimate responsibility for the control of aircraft flight. This option would not be expected to change FAA ATC workloads, as more aircraft would be flying precise tracks based on satellite navigation. This option would not be expected to increase flight delay, and could slightly reduce fuel burn as jet aircraft would be turned sooner toward their ultimate direction. Airport staff would work with the

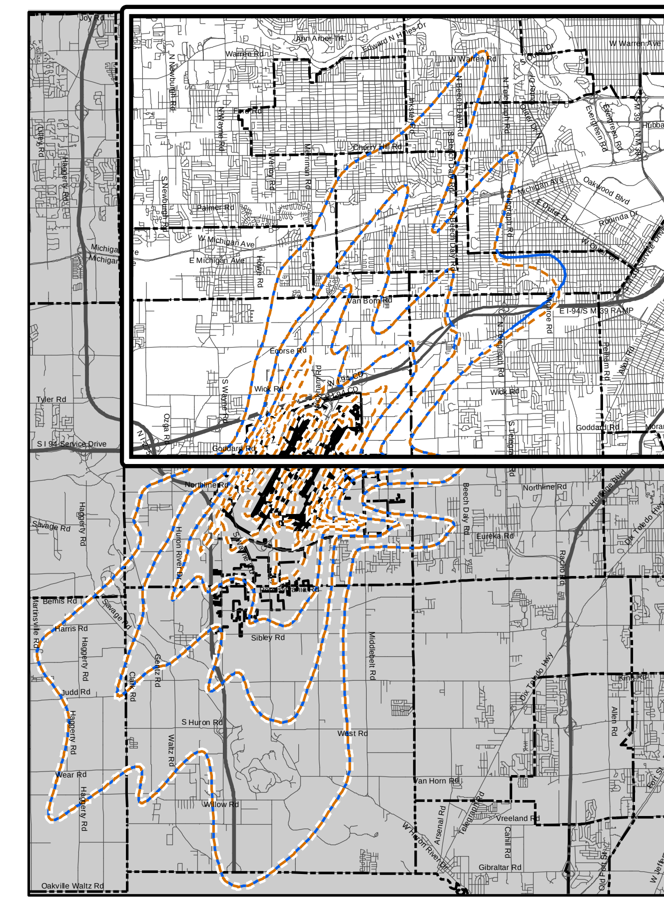
Figure G15 **Option 3d, Blend East**

TABLE 3d-1
Comparison of DNL Effects of Option 3d to the Baseline

	Baseline (2011)/No Action		Option 3d- Runway 3L Departures – Concentrate a Portion of South Turning Aircraft and Fan Others	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	90	40
Romulus	730	330	700	310
Taylor	0	0	10	10
Westland	120	60	120	50
Subtotal	940	430	920	410
70-75 DNL				
Romulus	50	30	50	30
Subtotal	50	30	50	30
65 DNL & Greater				
Huron Township	90	40	90	40
Romulus	780	360	750	340
Taylor	0	0	10	10
Westland	120	60	120	50
Subtotal	990	460	970	440
60 DNL & Greater*				
Dearborn Heights	1,000	310	990	310
Huron Twp.	2,040	780	2,050	780
Inkster	4,560	1,980	4,510	1,960
Romulus	4,000	1,680	3,860	1,630
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	3,040	1,190
Westland	2,360	990	2,240	940
Subtotal	16,940	6,960	16,710	6,820

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater





Legend

City Limits Boundary
2011 Base Case
Option 3d, Blend West
Option 3d Area newly affected
Option 3d Area no longer affected

0 0.5 1 2 Miles

Source: US Census, 2000

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FAA to ensure the procedure would be implemented to achieve its intended goal(s). There may be issues with respect to aircraft separation associated with these flight paths for an extended distance and the use of airspace for jets that currently is being used for propeller aircraft.

Other Environmental Issues (NEPA, etc): Implementation of noise abatement flight procedures requires compliance with the National Environmental Policy Act (NEPA). FAA Order 1050.1E **Environmental Impacts: Policies and Procedures** outlines the documentation required based on the types of federal action. This option would likely require preparation of an Environmental Assessment to determine if the impacts would be significant; however based on the analysis prepared for this study, increased noise to residential uses within the 65 DNL contour is unlikely to trigger the 1.5 DNL threshold of significance. Therefore, while an Environmental Assessment may be required, an Environmental Impacts Statement would not be expected. This option could produce 5 DNL or greater increases in noise within the 55-60 DNL contour, and could produce a 3 DNL or greater change within the 60-65 DNL.

Legal Issues: The option does not appear to have legal issues associated with its implementation.

Conclusions of Consultant Team:

No conclusion is made at this time, pending discussion with the Study Advisory Committee. (Appendix Five, Six & Seven)

TABLE G11
Comparison of DNL Effects of Option 3d to the Baseline

	Baseline (2011)/No Action		**Option 3d-** Runway 3L Departures – Concentrate a Portion of South Turning Aircraft and Fan Others	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	90	40
Romulus	730	330	700	310
Taylor	0	0	10	10
Westland	120	60	120	50
Subtotal	940	430	920	410
70-75 DNL				
Romulus	50	30	50	30
Subtotal	50	30	50	30
65 DNL & Greater				
Huron Township	90	40	90	40
Romulus	780	360	750	340
Taylor	0	0	10	10
Westland	120	60	120	50
Subtotal	990	460	970	440
60 DNL & Greater*				
Dearborn Heights	1,000	310	990	310
Huron Twp.	2,040	780	2,050	780
Inkster	4,560	1,980	4,510	1,960
Romulus	4,000	1,680	3,860	1,630
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	3,040	1,190
Westland	2,360	990	2,240	940
Subtotal	16,940	6,960	16,710	6,820

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater

Option 4: Concentrate Close-in, Disperse Further Away

Discussion: As noted earlier, in general, noise abatement options either concentrate noise over a predefined area or attempt to disperse or equalize noise. A third option, that combines the concentration with equalization is also possible. Concentrated noise provides a general predictability that noise would occur over specific areas, whereas dispersal generally results in less predictability, with flights being dispersed over an area. With the Option 4, it might be desirable to concentrate noise close-in where there is more compatible land use (within 2-4 miles of the Airport), and disperse flights further away (3 miles and beyond).

Noise Abatement Procedure Goal: The Airport generally has higher ratios of compatible land use close-in around the Airport. This includes open space, commercial, land acquisition, and home insulation. The goal of this alternative is to initially concentrate the flight paths close to the Airport and then disperse them at more distant locations that generally consist of non-compatible land use. The option is designed to take advantage of the compatible land use areas around the Airport.

Description of the Option: This option would result in aircraft flying the same paths as occur today, except that the initial departure paths would be concentrated using satellite-based technology. The pilots would fly the current paths that include multiple headings, but with FMS technology. With this technology, drift and dispersion (when aircraft stray from a desired path) would be reduced. At a distance of 3 to 5 miles from the Airport, the paths would disperse as occurs with the current procedures.

Comparable Existing Procedure(s): Aircraft currently depart from Runway 4R and fly a straight path (runway heading) until the aircraft reaches at least 500 feet above ground before turning west. This generally occurs anywhere from before the runway end to one mile past the runway end, depending on the weight/performance of the aircraft. Aircraft are then assigned a westward heading between 355 and 030. The existing procedure essentially "fans" aircraft to three headings (355, 010, and 030), with more aircraft on two of the headings (355 and 010 headings). Aircraft fly this heading for 3 to 10 miles until ATC directs the aircraft to turn towards a navigational aid that provides a heading to exit the DTW airspace, approximately 50 miles from the Airport. An example of the existing jet flight paths for this runway is presented in **Figure G16**, which shows a plot of seven months of actual flight tracks shown as light gray tracks.

Modeling Assumptions/New Procedure: This option would have aircraft fly the same general paths and headings as they do today, concentrating the paths close-in to the Airport. The concentration point is generally within areas of compatible land use. These locations are roughly 3 to 5 miles from the Airport, depending upon each runway. Further away, tracks would disperse using fanned headings provided by ATC. **Figure G16** presents the locations along each path were dispersion of the path would start to occur.

Analysis of New Procedure:

The analysis of this option considered both the noise exposure, as well as the possible operational effects.

Noise Analysis:

The study relied upon the use of the average annual DNL noise contours to consider possible noise exposure consequences of the option.

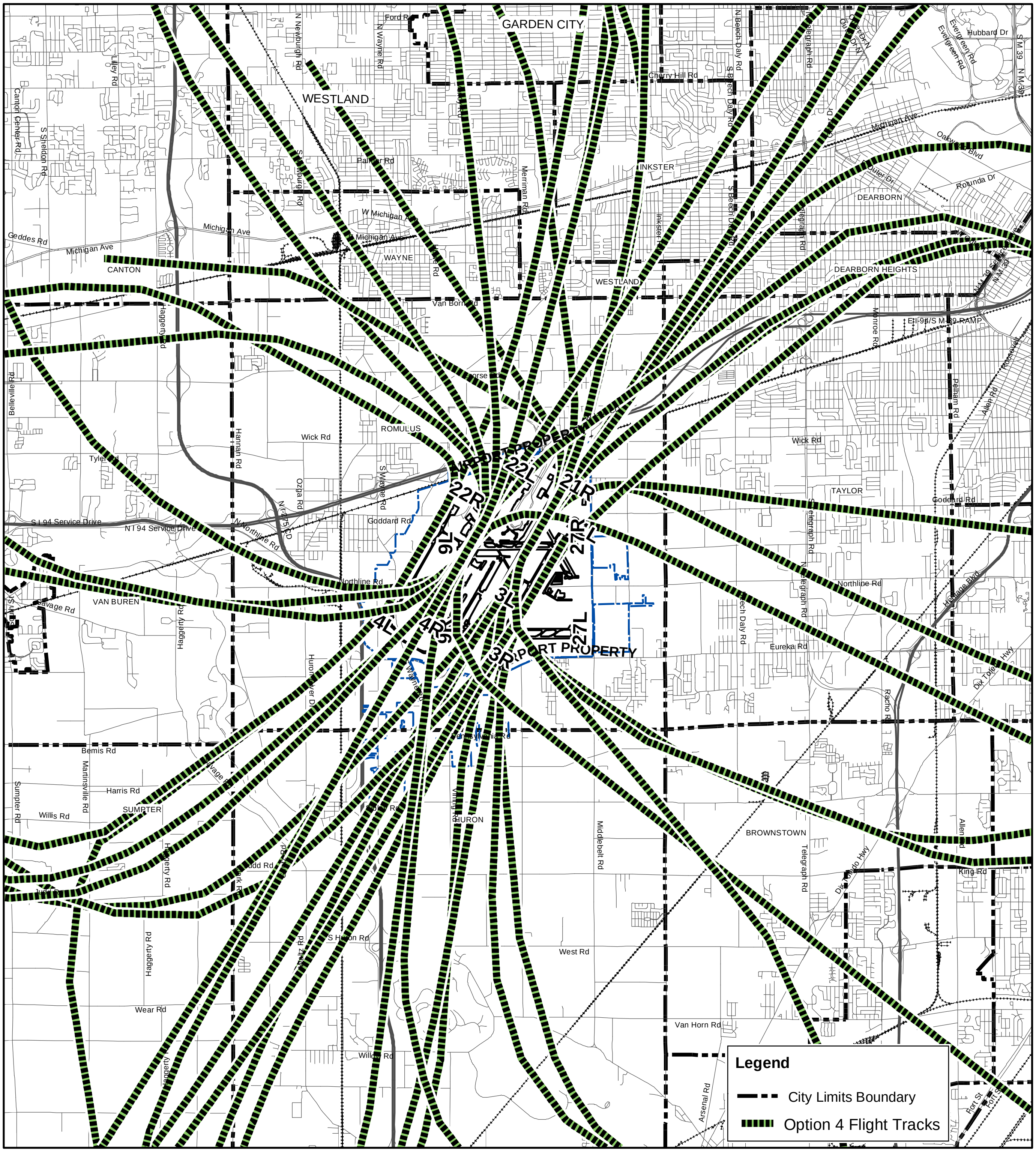

Figure G16 **Option 4, Concentrated Dispersion Flight Tracks**

N

0 1 2 4 Miles

Source: US Census, 2000

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Impact on Annual DNL Contour: **Table G12** summarizes the impact on the 65 DNL and greater noise exposure contours from implementation of this option in comparison with the 2011 baseline. As this table notes, this option would slightly increase overall population and housing exposed to 65 DNL; with an increase of 30 people/10 houses in comparison to the Baseline (3% and 2% respectively). **Figure G17 Full-2** shows the noise exposure contours relative to the No Action/2011 Baseline. Within the 65 DNL, a slight reduction in population and housing would occur. Within the 60 DNL contour, the changes would be less pronounced (with no change in population, but a slight reduction in housing – 50 homes/0.7%).

Within the 65 DNL and greater contour, a population impact reduction would occur in Romulus (5.1%) relative to the Baseline, with increases occurring in Westland (33.3%). Within the 60 DNL contour, population impact reductions would occur in Romulus (5.3%), Westland (2.1%), and Dearborn Heights (1.0%). Population impact increases would occur with Alternative 4 within the 60 DNL to Taylor (6%), and Inkster (2%).

FAA guidance for implementing the National Environmental Policy Act (NEPA) states that a 1.5 DNL increase in noise to noise sensitive uses (i.e., residences) within the 65 DNL due to federal action is considered a significant impact. A review of the noise exposure contour indicates that a 1.5 DNL increase in noise due to Option 4 could not be expected and thus, compliance with NEPA might be achieved with an Environmental Assessment.

Operational Impacts

The following issues could arise from implementation of the option. Also identified are the agencies that would have a role in assisting in the implementation of this option.

Airport and ATC Operational Considerations (Safety and efficiency issues): FAA has ultimate responsibility for the control of aircraft flight. This option would not be expected to change FAA ATC workloads, as more aircraft would be flying precise tracks based on satellite navigation. This option would not be expected to increase flight delay, and could slightly reduce fuel burn as jet aircraft would be turned sooner toward their ultimate direction. Airport staff would work with the FAA to ensure the procedure would be implemented to achieve its intended goal(s).

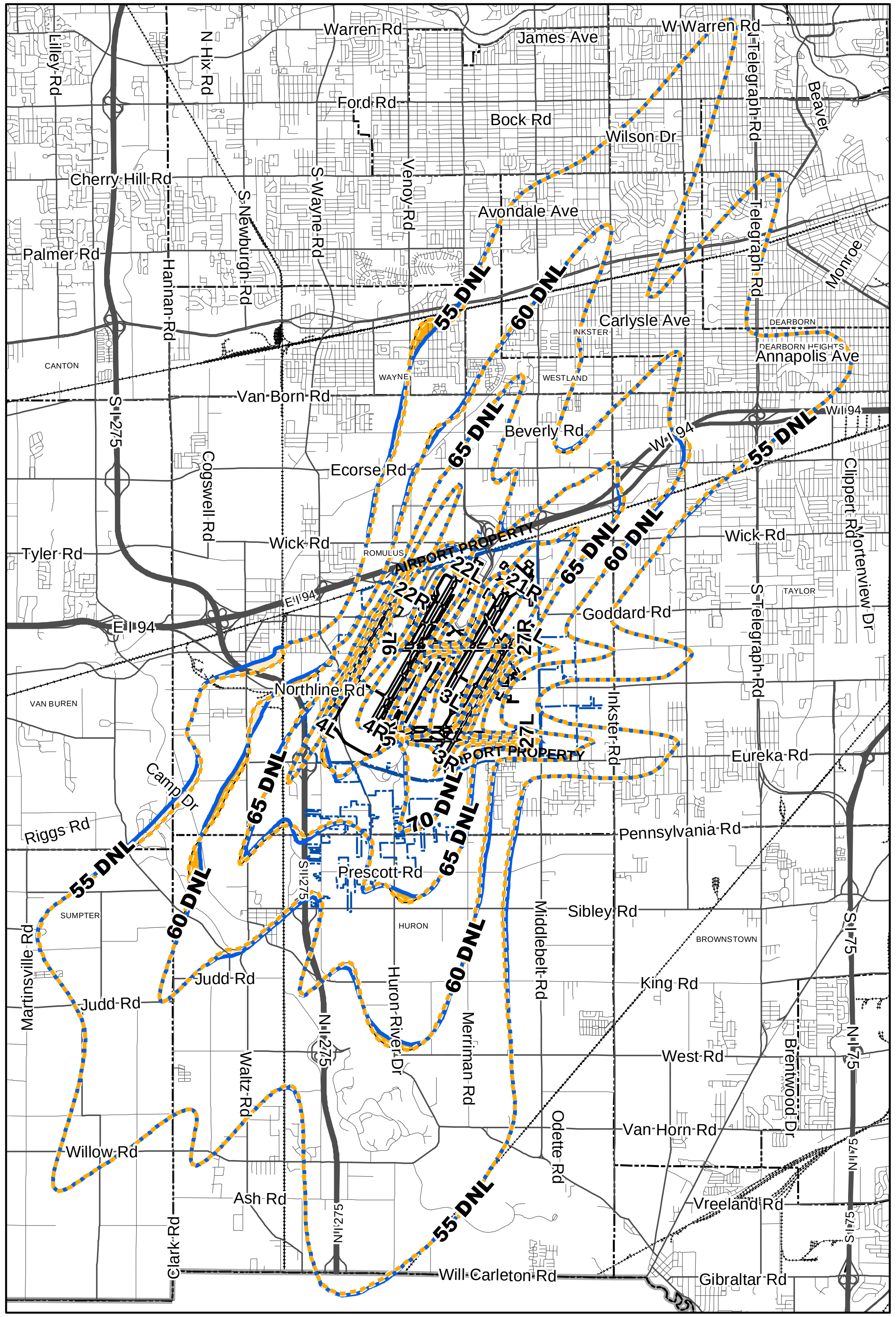
Other Environmental Issues (NEPA, etc): Implementation of noise abatement flight procedures requires compliance with the National Environmental Policy Act (NEPA). FAA Order 1050.1E **Environmental Impacts: Policies and Procedures** outlines the documentation required based on the types of federal action. This option would likely require preparation of an Environmental Assessment to determine if the impacts would be significant; however based on the analysis prepared for this study, increased noise to residential uses within the 65 DNL contour is not expected to trigger the 1.5 DNL threshold of significance, and warrant an Environmental Impact Statement.

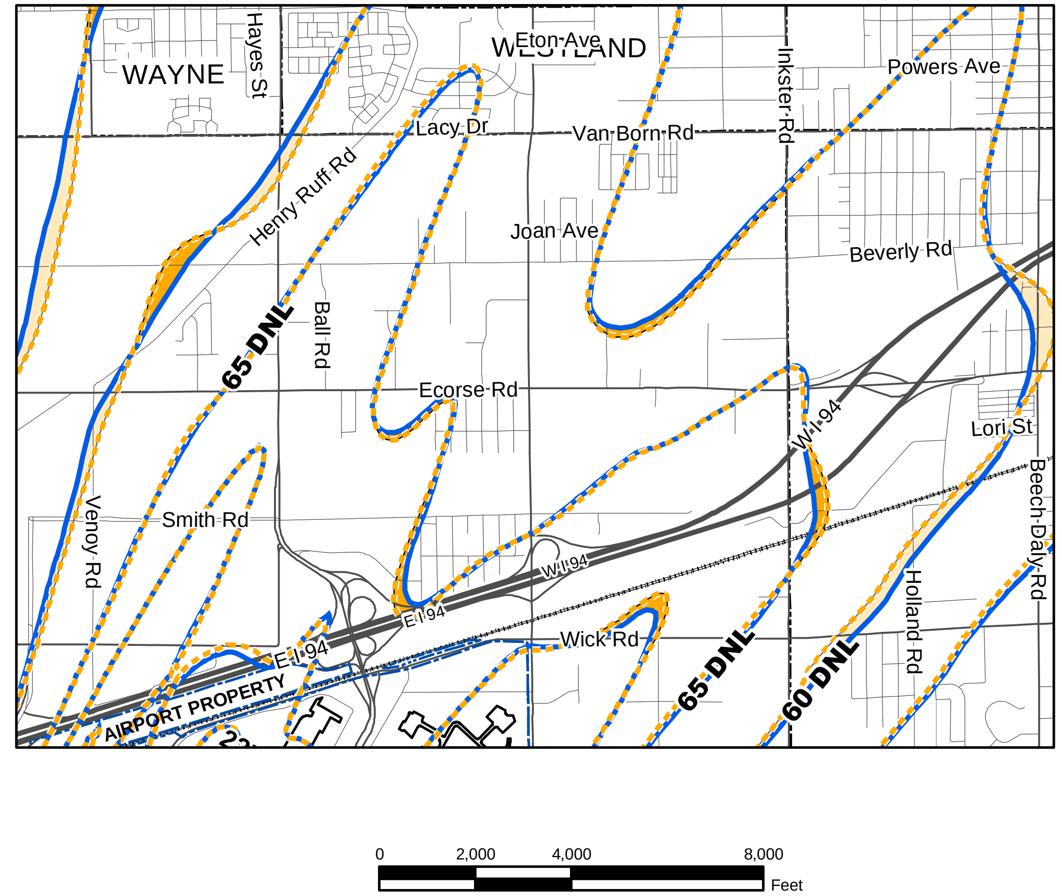
Legal Issues: The option does not appear to have legal issues associated with its implementation.

Conclusions of Consultant Team:

This option would result in noise impact increases within the 65 DNL contour. This alternative is not recommended due to the increase within the 65 DNL.

Figure G17 **Option 4, Concentrated Dispersion**





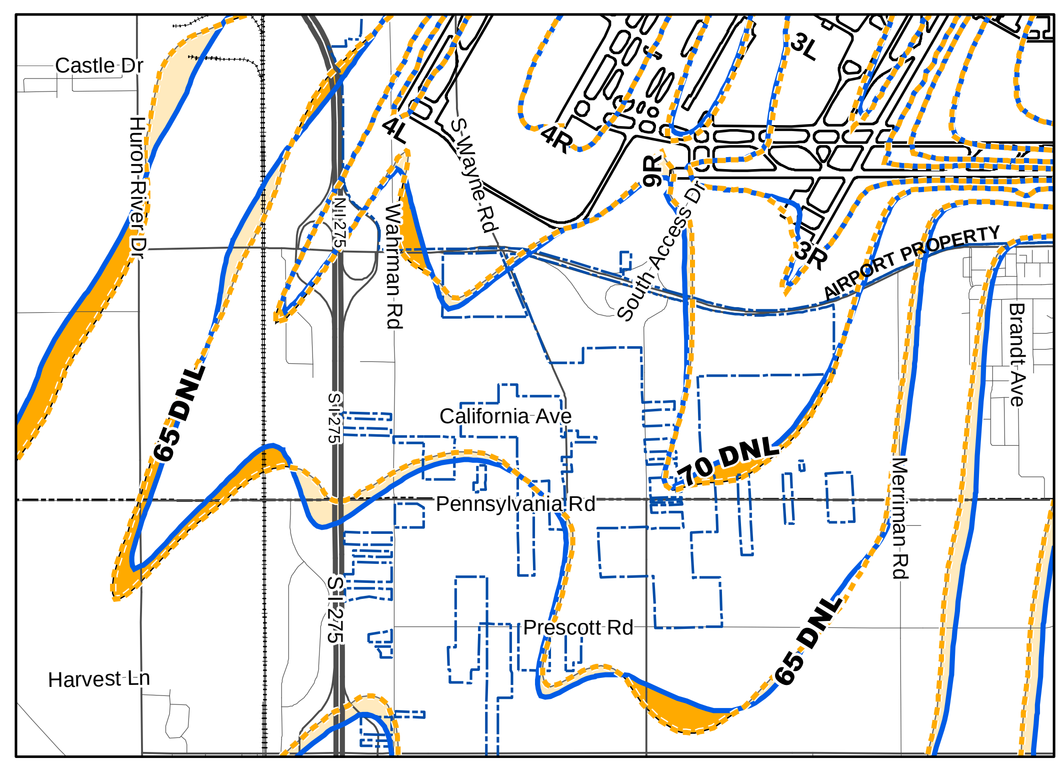


TABLE 4-1
Comparison of DNL Effects of Option 4 to the Baseline

	Baseline (2011)/No Action		Option 4.- Concentrate Close-in, Disperse Further Away	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	110	50
Romulus	730	330	700	320
Taylor	0	0	10	0
Westland	120	60	160	70
Subtotal	940	430	980	440
70-75 DNL				
Romulus	50	30	50	20
Subtotal	50	30	50	20
65 DNL & Greater				
Huron Township	90	40	110	50
Romulus	780	360	740	350
Taylor	0	0	10	0
Westland	120	60	160	70
Subtotal	990	460	1,020	470
60 DNL & Greater*				
Dearborn Heights	1,000	310	990	310
Huron Twp.	2,000	780	2,000	760
Inkster	4,560	1,980	4,650	2,000
Romulus	4,000	1,680	3,790	1,600
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	3,180	1,260
Westland	2,360	990	2,310	970
Subtotal	16,940	6,960	16,940	6,910

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater

Legend

- City Limits Boundary
- 2011 Base Case
- Option 4 Concentrated Dispersion
- Option 4, Area newly affected
- Option4, Area no longer affected

0 1 2 4 Miles

Source: US Census, 2000

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TABLE G12
Comparison of DNL Effects of Option 4 to the Baseline

	Baseline (2011)/No Action		Option 4.- Concentrate Close-in, Disperse Further Away	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	110	50
Romulus	730	330	700	320
Taylor	0	0	10	0
Westland	120	60	160	70
Subtotal	940	430	980	440
70-75 DNL				
Romulus	50	30	50	20
Subtotal	50	30	50	20
65 DNL & Greater				
Huron Township	90	40	110	50
Romulus	780	360	740	350
Taylor	0	0	10	0
Westland	120	60	160	70
Subtotal	990	460	1,020	470
60 DNL & Greater*				
Dearborn Heights	1,000	310	990	310
Huron Twp.	2,000	780	2,000	760
Inkster	4,560	1,980	4,650	2,000
Romulus	4,000	1,680	3,790	1,600
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	3,180	1,260
Westland	2,360	990	2,310	970
Subtotal	16,940	6,960	16,940	6,910

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater.

Option 5: Runway Use – Concentrate Noise

Discussion: As noted earlier, in general noise abatement options either concentrate noise over a predefined area or attempt to disperse or equalize noise. A third option, that combines the concentration with equalization is also possible. Concentrated noise provides a general predictability that noise would occur over specific areas, whereas dispersal generally results in less predictability, with flights being dispersed over an area.

The current noise abatement program at Detroit Metro consists of using Runways 21L/R and 22L/R with tail wind conditions up to 7-knots. This means that the south flow operation is the primary noise abatement procedure, whereas arrivals are more dominant on Runways 22R and 21L (the outer runways relative to the terminal), with departures more dominant on Runways 22L and 21R. This operational flow was identified in the 1992 Part 150 Study because departure noise was identified as the most intense and bothersome (relative to arrival noise), and population densities to the south (relative to the north) were lower. Visual inspection of the population density map indicates that the south remains with a lower population density relative to areas to the north. Therefore, the existing daytime runway use concentrates the most intense and bothersome noise conditions to the south over the relatively lower population.

During the nighttime, the 1992 Part 150 Study recommended that Contra-Flow (also referred to as opposite direction or head-to-head operation) runway use between midnight and 6am. Contra flow allows departures to occur to the south, with arrivals also occurring from the south. The purpose of this program is to concentrate nighttime noise over the lower density population areas.

As improvements to the daytime use were not identified, the review focused on improvements to the existing nighttime program. To increase the effectiveness of the existing nighttime (10pm-7am) noise abatement procedures, two options have been identified:

- Option 5a: Extend Hours of Contra-Flow at Night,
- Option 5b: Preferred Nighttime Use of Runways 22L/22R for Arrivals when Contra Flow is Not Feasible—to be developed based on input from the Study Advisory Committee (Appendix Five, Six & Seven)

Option 5a: Extend Hours of Contra-Flow at Night

Noise Abatement Procedure Goal: The goal of this option is to increase the number of hours at night that the Contra-Flow is used.

Description of the Option: This procedure would increase the hours of Contra-Flow operations at night when operationally feasible.

Comparable Existing Procedure(s): The Airport currently operates in Contra-Flow between the hours of midnight and 6 a.m. Contra-Flow operations involve aircraft arriving from the south and departing to the south, as activity during this period enables aircraft to safely operate these procedures under acceptable winds and/or weather.

The following table shows the average daily operations per hour for the hours between 10 pm and 7 am. The data also shows the percentage of the operations that either arrived from the south or departed to the south. On average, the airfield operated in south flow 67% of the time. The data shows that starting at midnight up until 6 am, there is an increase in south flow activity of about 5%, reflecting a reduction in south flow arrivals of more than 40%. This data shows that the contra-flow procedure is in effect, with a slight increase in the south flow departures and a large reduction in the south flow arrivals.

	Number of Operations by Nighttime Hour									
	10p-11p	11p-12a	12a-1a	1a -2a	2a- 3a	3a- 4a	4a- 5a	5a- 6a	6a- 7a	12a-6am
Daily Operations										
Arrivals	13	9	5	1	1	1	2	9	3	19
Departures	15	5	1	1	1	1	1	1	14	6
Percent South Flow										
Arrivals	66%	63%	36%	29%	29%	26%	34%	34%	61%	34%
Departures	64%	63%	67%	84%	77%	94%	80%	68%	64%	72%

Source- 7 months of radar data during 2004

Modeling Assumptions/New Procedure: Based on the current and forecast number of hourly arrivals and departures, consideration was given to the ability of the FAA to increase the number of hours when Contra-Flow can be used. It is important to note that Contra-Flow can be effective when the level of aircraft operations is low. As the table above shows, the greatest number of arrivals when Contra-Flow has occurred was 9 arrivals, with the greatest number of departures being 1 departure during the same hour. Therefore, it might be possible to increase the hours of use to the 11pm to midnight hour (where 9 arrivals have occurred, and possibly 6am); however consideration must also be given to the number of departures that would share the same airspace. Evaluation of the data indicates that it might be possible to accommodate up to the 11pm-6am period, but it would not be possible to accommodate a greater number of departures at the same time as accommodating arrivals. Therefore, it was recommended that the hours only be increased by 1 hour for program that would operate from 11pm until 6am. To model the effects, operations during the 11pm-midnight period would follow the existing nighttime percentage.

Analysis of the Option:

The analysis of this option considered both the noise exposure of the option, as well as the possible operational effects.

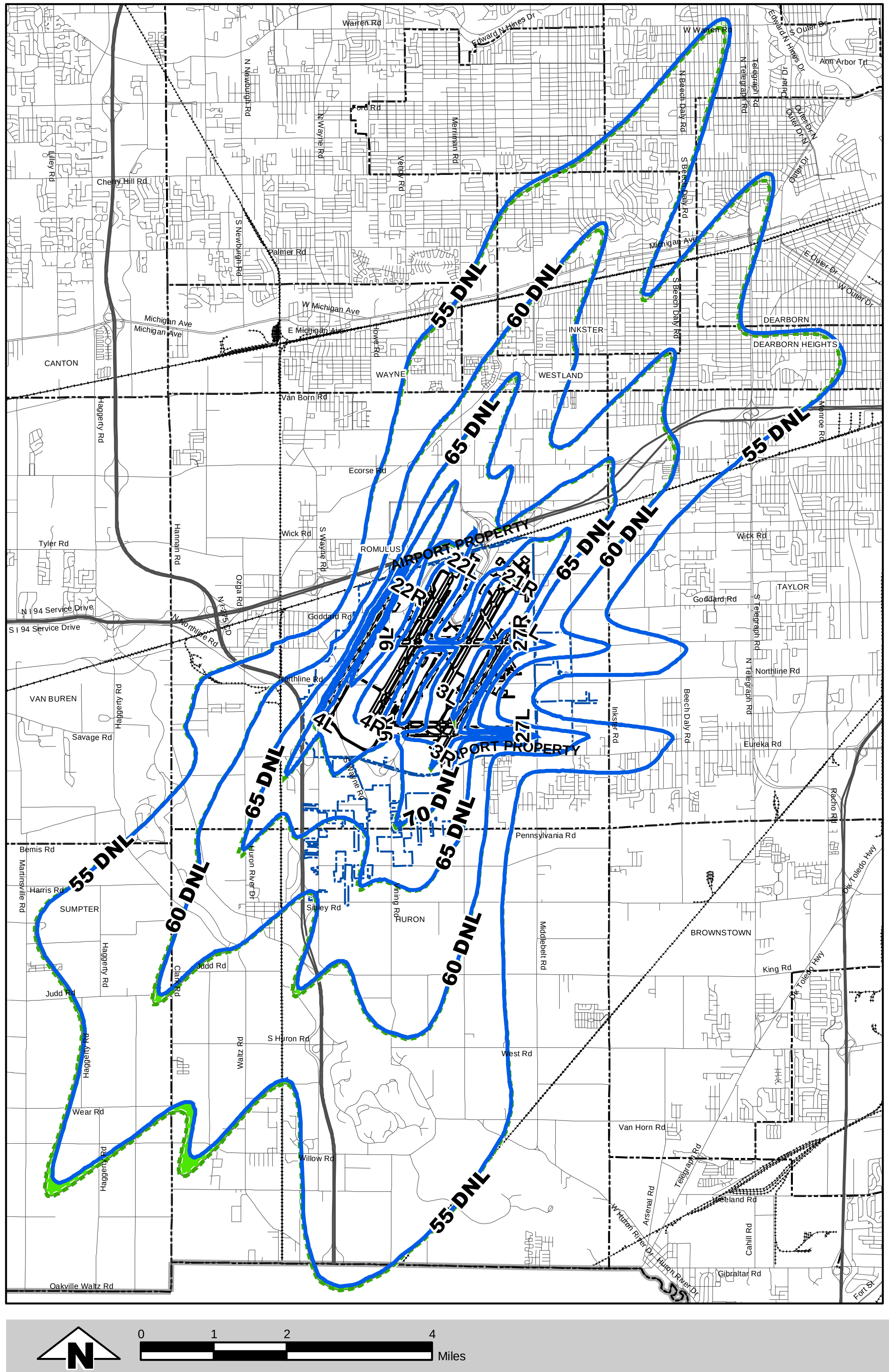
Noise Analysis:

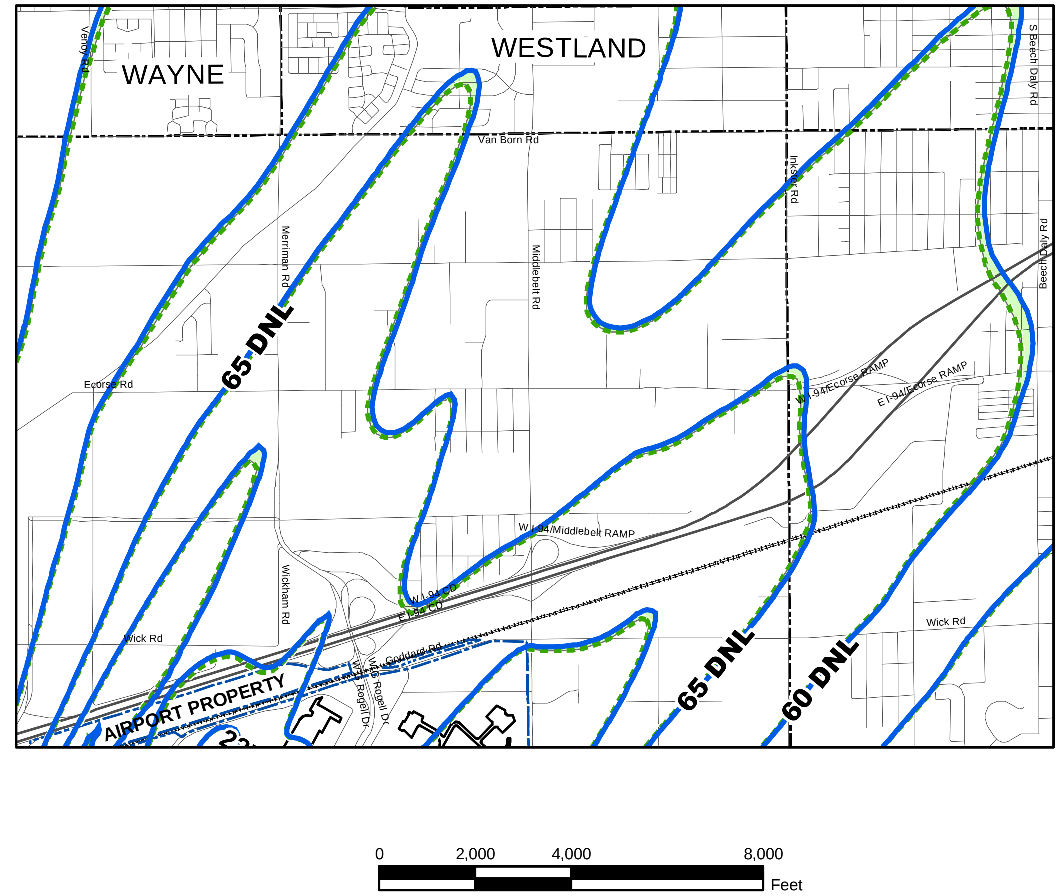
The study relied upon the use of the average annual DNL noise contours to consider possible noise exposure consequences of the option.

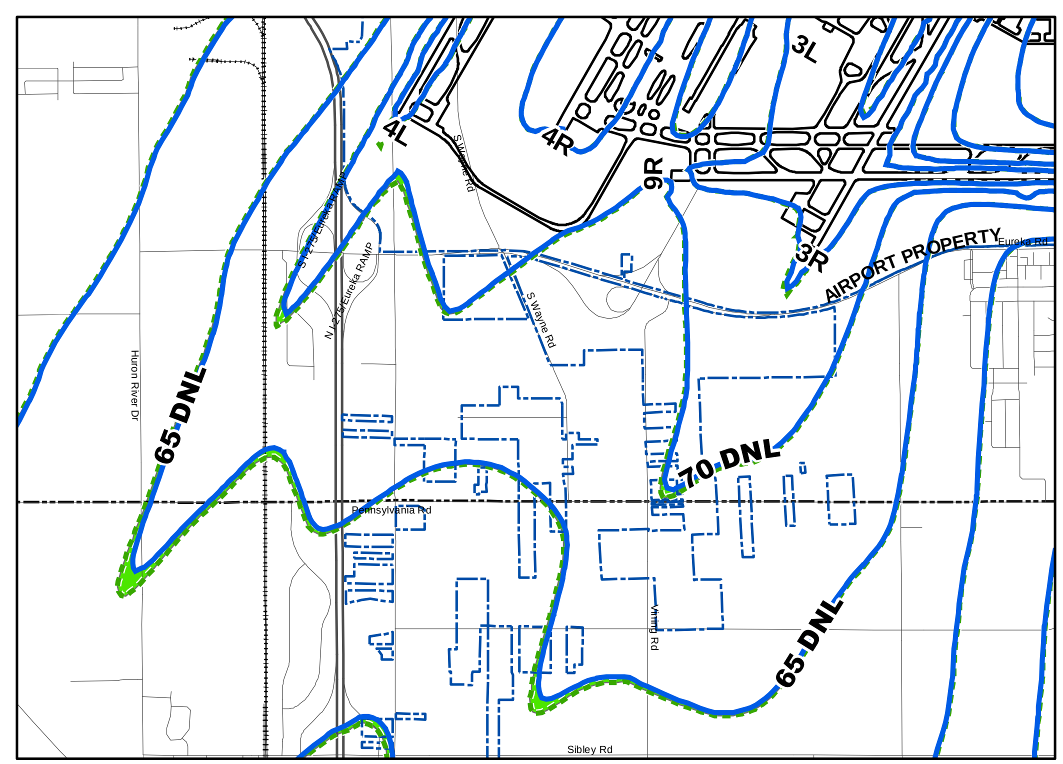
Impact on Annual DNL Contour: **Table G13** summarizes the impact on the 65 DNL and greater noise exposure contour from implementation of this option in comparison with the 2011 Baseline. **Figure G18 Full-1** shows the noise exposure contours for this option. As this table notes, this option would produce a reduction in overall population and housing exposed to 65 DNL and greater contour by 60 people/40 houses in comparison to the Baseline.

Within the 60 DNL contour, the changes would be slightly more pronounced (a reduction of 4.3% in population and 5.2% reduction in housing relative to the 2011 Baseline), with the contour moving in the direction of the new eastbound track. Within the 65 DNL and greater contour, impact reductions would occur in Westland (50%), and Romulus (2.7%) relative to the Baseline, with an increase of 11.1% in Huron Township.

Figure G18 **Option 5a, Increase Contra Flow**







Source: US Census, 2000

TABLE 5a-1
Comparison of DNL Effects of Option 5a to the Baseline

	Baseline (2011)/No Action		Option 5a- Increase Hours of Nighttime Conta-Flow	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	100	40
Romulus	730	330	710	320
Taylor	0	0	10	10
Westland	120	60	60	20
Subtotal	940	430	880	390
70-75 DNL				
Romulus	50	30	50	30
Subtotal	50	30	50	30
65 DNL & Greater				
Huron Township	90	40	100	40
Romulus	780	360	760	350
Taylor	0	0	10	10
Westland	120	60	60	20
Subtotal	990	460	930	420
60 DNL & Greater*				
Dearborn Heights	1,000	310	830	250
Huron Twp.	2,000	780	2,120	810
Inkster	4,560	1,980	4,140	1,800
Romulus	4,000	1,680	4,010	1,680
Sumpter Twp.	20	10	30	10
Taylor	3,000	1,210	2,800	1,100
Westland	2,360	990	2,290	950
Total	16,940	6,960	16,220	6,600

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater

Legend

- City Limits Boundary
- 2011 Base Case
- Increase Contra Flow
- Option 5a, Area newly affected
- Option 5a, Area no longer affected

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Operational Impacts

The following issues could arise from implementation of the option. Also identified are the agencies that would have a role in assisting in the implementation of this option.

Airport and ATC Operational Considerations (Safety and efficiency issues): FAA has ultimate responsibility for the control of aircraft flight. This option would potentially increase FAA ATC workloads because of the contra-flow operation. It would be anticipated that implementation of this action could come at the request of the Airport Authority (Appendix Nine). Airport staff would work with the FAA to ensure the procedure would be implemented to achieve its intended goal(s).

Other Environmental Issues (NEPA, etc): Implementation of noise abatement procedures requires compliance with the National Environmental Policy Act (NEPA). FAA Order 1050.1E **Environmental Impacts: Policies and Procedures** outlines the documentation required based on the types of federal action. This option would likely require preparation of an Environmental Assessment to determine if the impacts would be significant; however based on the analysis prepared for this study, increased noise to noise sensitive residential uses are expected to be less than the 1.5 DNL significance criteria.

Legal Issues: The option does not appear to have legal issues associated with its implementation.

Conclusions of Consultant Team:

The Consultant Team recommends increasing the hours of the nighttime Contra-Flow operation, when activity levels, wind, and weather allow.

TABLE G13
Comparison of DNL Effects of Option 5a to the Baseline

	Baseline (2011)/No Action		**Option 5a- Increase Hours of Nighttime Contra-Flow**	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	100	40
Romulus	730	330	710	320
Taylor	0	0	10	10
Westland	120	60	60	20
Subtotal	940	430	880	390
70-75 DNL				
Romulus	50	30	50	30
Subtotal	50	30	50	30
65 DNL & Greater				
Huron Township	90	40	100	40
Romulus	780	360	760	350
Taylor	0	0	10	10
Westland	120	60	60	20
Subtotal	990	460	930	420
60 DNL & Greater*				
Dearborn Heights	1,000	310	830	250
Huron Twp.	2,000	780	2,120	810
Inkster	4,560	1,980	4,140	1,800
Romulus	4,000	1,680	4,010	1,680
Sumpter Twp.	20	10	30	10
Taylor	3,000	1,210	2,800	1,100
Westland	2,360	990	2,290	950
Total	16,940	6,960	16,220	6,600

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.

- includes the 65 DNL & Greater

Option 6: Runway Use – Disperse Noise

Discussion: As noted earlier, in general, noise abatement options either concentrate noise over a predefined area or attempt to disperse or equalize noise. A third option, that combines the concentration with equalization is also possible. Concentrated noise provides a general predictability that noise would occur over specific areas, whereas dispersal generally results in less predictability, with flights being dispersed over an area.

The current noise abatement program at Detroit Metro consists of using Runways 21L/R and 22L/R with tail wind conditions up to 7-knots. This means that the south flow operation is the primary noise abatement procedure. With this runway use program, arrivals are most frequent on Runways 22R and 21L (outboard runways), with departures most frequent on Runways 22L and 21R (inboard runways). This operational flow (south flow) was identified in the 1992 Part 150 Study because departure noise was identified as the most intense and bothersome (relative to arrival noise), and population densities to the south (relative to the north) were lower. Visual inspection of the population density map indicates that the south currently has a lower population density relative to areas to the north. Therefore, the existing daytime runway use concentrates the most intense and bothersome noise conditions to the south over the relatively lower population.

During the 1992 Part 150 Study, consideration was given to a rotational runway use program. A rotation runway use program would attempt to equalize the use of all runways to more evenly distribute the noise exposure. That study noted that capacity constraints (i.e., increased aircraft delay) could arise from a true rotational runway use program, as capacity is reduced when only the crosswind runways are in use. Because of this capacity concern, the 1992 study did not consider rotational runway use further. However, since that time, additional runways have been completed at Detroit Metro (fourth parallel Runway 4L/22R and crosswind 9R/27L) which may enable the runway system to be used to assist with further dispersal of flights within the existing south flow runway use program.

Typically, the crosswind runways are used infrequently; their use is based on wind and weather conditions, or when airfield maintenance is being conducted. Consideration was given to changing the runway use program to increase use of the crosswind runways (9R/27L and 9L/278R). However, relative to areas to the south previously discussed, population density to the east is higher and similar to that to the north. Therefore, increased crosswind runway use would not be expected to result in reduced noise impacts.

Consideration was given to procedures that might alter the use of the existing parallel runways. One option was identified:

- Option 6a: Runway Use – Disperse: Off-Set Approach To Runway 4L/22R during poor weather

Option 6a: Off-Set Approach To Runway 4L/22R During Poor Weather

Noise Abatement Procedure Goal: The goal of this procedure is to spread or disperse arrival noise. By enabling aircraft to land more quickly, this option would reduce the duration of the arrival bank (periods of high levels of arrivals or departures associated with a single airline are called "banks"). From a noise perspective, this option would reduce the frequency of overflights occurring on the existing two arrival runways by providing for a third runway during poor weather.

Description of the Option: Today, during poor weather, to ensure safe separation among aircraft, only two runways can be used at the same time. The new procedure would allow three arrival runways during poor weather by using new navigation and radar technology that permits aircraft to operate more closely spaced then can occur with technology in place at DTW in 2006. In south flow conditions, aircraft would land straight-in on the east outboard runway (21L), straight-in on the west inboard runway (22L), and on a 3-degree offset (shifted to the west) to the west outboard runway (22R). In north flow conditions, aircraft would land straight-in on the east outboard runway (3R), straight-in on the west inboard runway (4R), and on a 3-degree offset (shifted to the west) to the west outboard runway (4L).

The 3-degree off-set means that aircraft would approach the runway not from straight-in, but at three degrees to the west of straight-in. When the aircraft is about 3 miles from the Airport and the pilot can visually see the runway, the aircraft would transition to the straight-in centerline approach for landing. The off-set allows for additional separation from aircraft landing on the adjacent runway so that a safe landing during poor weather can occur. An additional component to this procedure is a new radar technology that allows Air Traffic Controllers more precise information about the position of the landing aircraft**. Figure G19** shows the new 3-degree off-set approach track overlaid on a base map.

<u>Comparable Existing Procedure(s)</u>: The current procedures are primarily to land on the outboard runways (4L/22R and 3R/21L) on a straight in path to the runway. Landing on these runways can occur independently of each other. During busy arrival periods and good weather ATC will at times also land on the west inboard runway (4R/22L). This is referred to triple independent arrivals. During poor weather, independent approaches are restricted to only two runways at a time. All approaches to the runways occur on a straight in path that is typically 5 to 15 miles from the Airport.

<u>Modeling Assumptions/New Procedure</u>: This option would allow for triple independent approaches during poor weather conditions. To accomplish this, an offset approach of 3 degrees would be used for approaches to Runway 4L/22R during Instrument Meteorological Conditions (IMC), poor weather. Based on historic weather data, IMC conditions occur approximately 10% of the time at DTW.

In addition to the new approach path, the option would also alter the runway usage during poor weather conditions. Normally, during poor weather conditions south flow arrivals (arriving from the north heading south) occur on Runways 22R and 21L and north flow arrivals occur on Runways 4L and 3R. The offset approach to Runways 22R and 4L would allow triple simultaneous south flow arrivals on Runways 22R, 22L, and 21L and for north flow arrivals on Runways 4L, 4R, and 3R.

The option would allow a more evenly distributed use of the existing runways under IMC conditions. This would cause a decrease in the use of 22R/4L because DTW would be able to operate arrivals on three runways allowing more operations to use 22L/4R. This option assumes approximately 0.3% of all south flow arrivals would shift from Runway 22R to Runway 22L. It is expected that under Option 6a approximately one-tenth of one percent (0.1%) of all arrivals will shift from Runway 4R to Runway 4L.

<u>Analysis of New Procedure</u>:

The analysis of this option considered both the noise exposure, as well as the possible operational effects.

<u>Noise Analysis</u>:

The study relied upon the use of the average annual DNL noise contours to consider possible noise exposure consequences of the option.

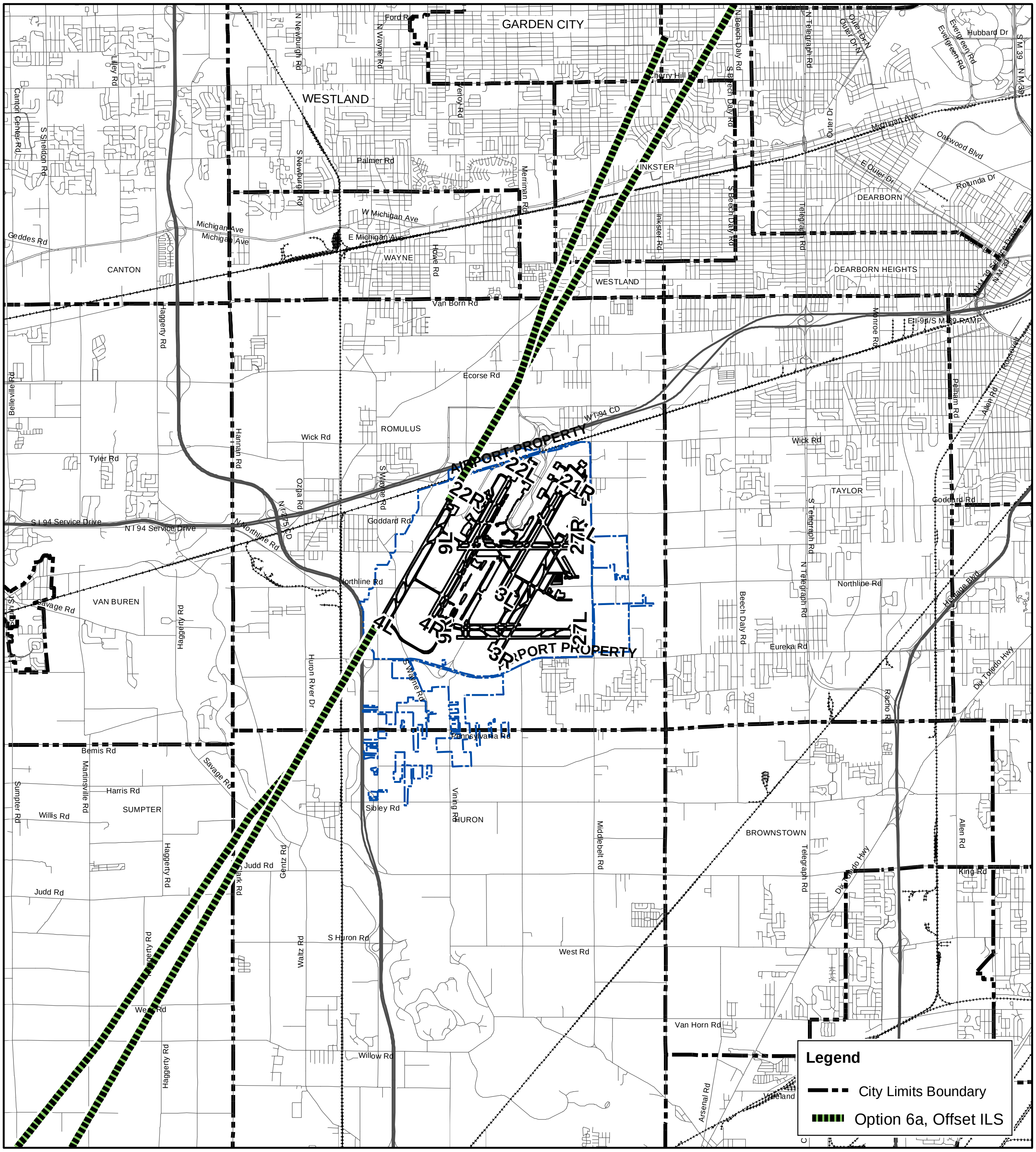

Figure G19 **Option 6a, Offset ILS Flight Tracks**

0 1 2 4 Miles

Source: US Census, 2000

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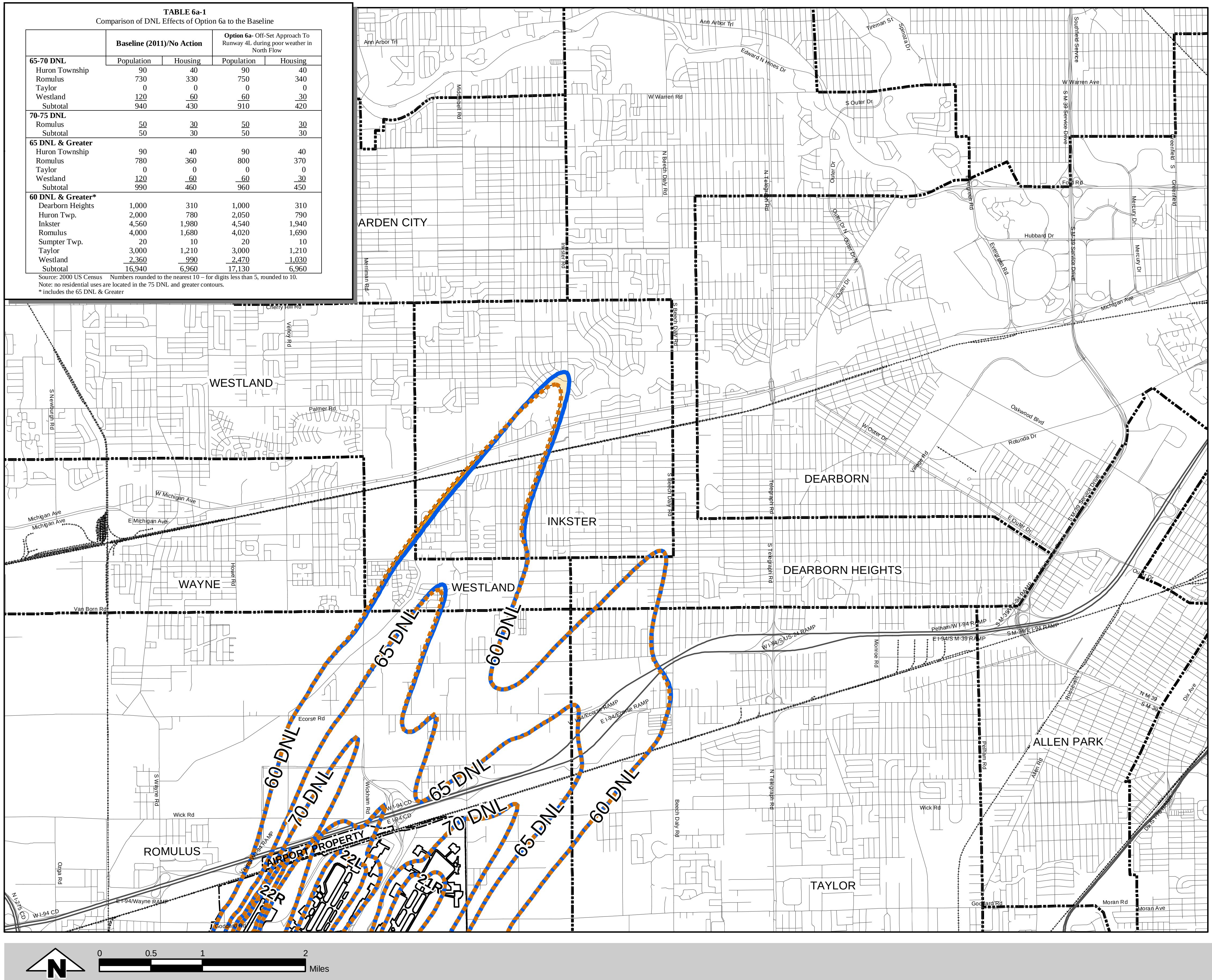
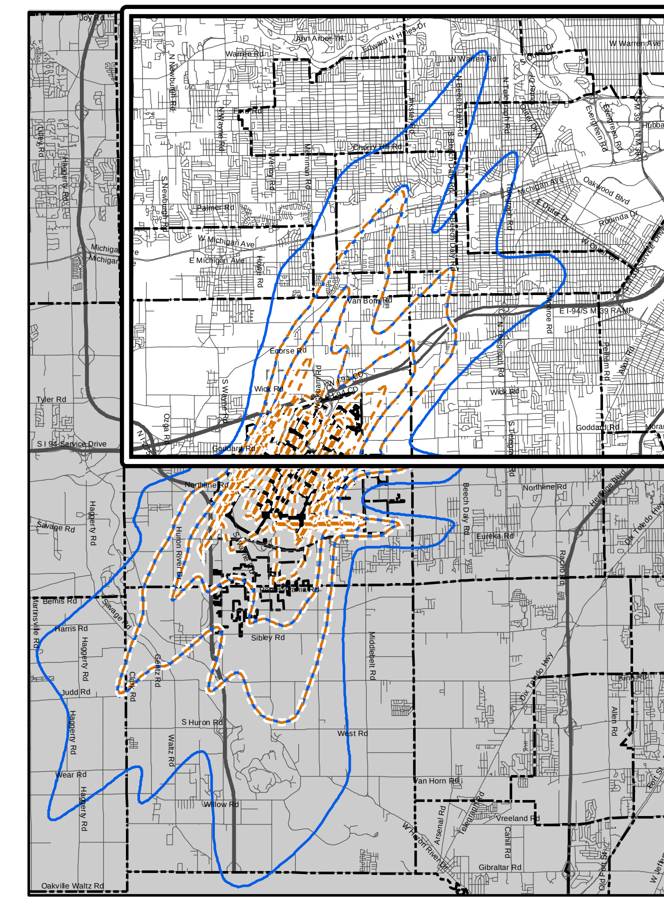
Figure G20 **Option 6a, Offset ILS**

TABLE 6a-1
Comparison of DNL Effects of Option 6a to the Baseline

	Baseline (2011)/No Action		**Option 6a-** Off-Set Approach To Runway 4L during poor weather in North Flow	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	90	40
Romulus	730	330	750	340
Taylor	0	0	0	0
Westland	120	60	60	30
Subtotal	940	430	910	420
70-75 DNL				
Romulus	50	30	50	30
Subtotal	50	30	50	30
65 DNL & Greater				
Huron Township	90	40	90	40
Romulus	780	360	800	370
Taylor	0	0	0	0
Westland	120	60	60	30
Subtotal	990	460	960	450
60 DNL & Greater*				
Dearborn Heights	1,000	310	1,000	310
Huron Twp.	2,000	780	2,050	790
Inkster	4,560	1,980	4,540	1,940
Romulus	4,000	1,680	4,020	1,690
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	3,000	1,210
Westland	2,360	990	2,470	1,030
Subtotal	16,940	6,960	17,130	6,960

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater





Legend

City Limits Boundary
2011 Base Case
Option 6a, Offset ILS
Option 6a Area newly affected
Option 6a Area no longer affected

Source: US Census, 2000

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Impact on Annual DNL Contour: **Table G14** summarizes the impact on the 65 DNL and greater noise exposure contours from implementation of this option in comparison with the 2011 baseline. As this table notes, this option would reduce overall population and housing exposed to 65 DNL by 40 people/20 houses in comparison to the Baseline. **Figure G21 Full-3** shows the noise exposure contours relative to the No Action/2011 Baseline. All of the changes associated with this option would occur for properties located within the 65-70 DNL contour. Within the 60 DNL contour, the changes would be more pronounced but would result in a slight increase in impacts (an increase of 0.94% in population and 0.29% increase in housing units.

Within the 65 DNL and greater contour, an impact reduction would occur in Westland (50%) relative to the Baseline, but with an increase to Romulus (2.6%). Within the 60 DNL contour, a slight population impact reduction would occur in Inkster (0.4%) with increases to Westland (4.7%), Huron Township (2.5%), Taylor (1%), and Romulus (0.5%).

Because this option would improve airport operational efficiency, FAA has prepared an Environmental Assessment (EA). A Draft EA was released in October 2006, and a public hearing was conducted in November 2006. As no significant adverse noise or other environmental effects were identified with this proposed procedure, it is expected that FAA will issue a Finding of No Significant Impact (FONSI). The noise contours presented for Option 6a were taken from the FAA's Draft EA titled **Environmental Assessment for the Proposed Runway 22R/4L Offset ILS** (Instrument Landing System).

Operational Impacts

The following issues could arise from implementation of the option. Also identified are the agencies that would have a role in assisting in the implementation of this option.

Airport and ATC Operational Considerations (Safety and efficiency issues): FAA has ultimate responsibility for the control of aircraft flight. This option could increase controller work load in that controllers must observe each landing to ensure sufficient aircraft separation is maintained. While overall capacity would not change with the option, the airfield could operate more efficiently during poor weather conditions. Airport staff would work with the FAA to ensure the procedure would be implemented to achieve its intended goal(s).

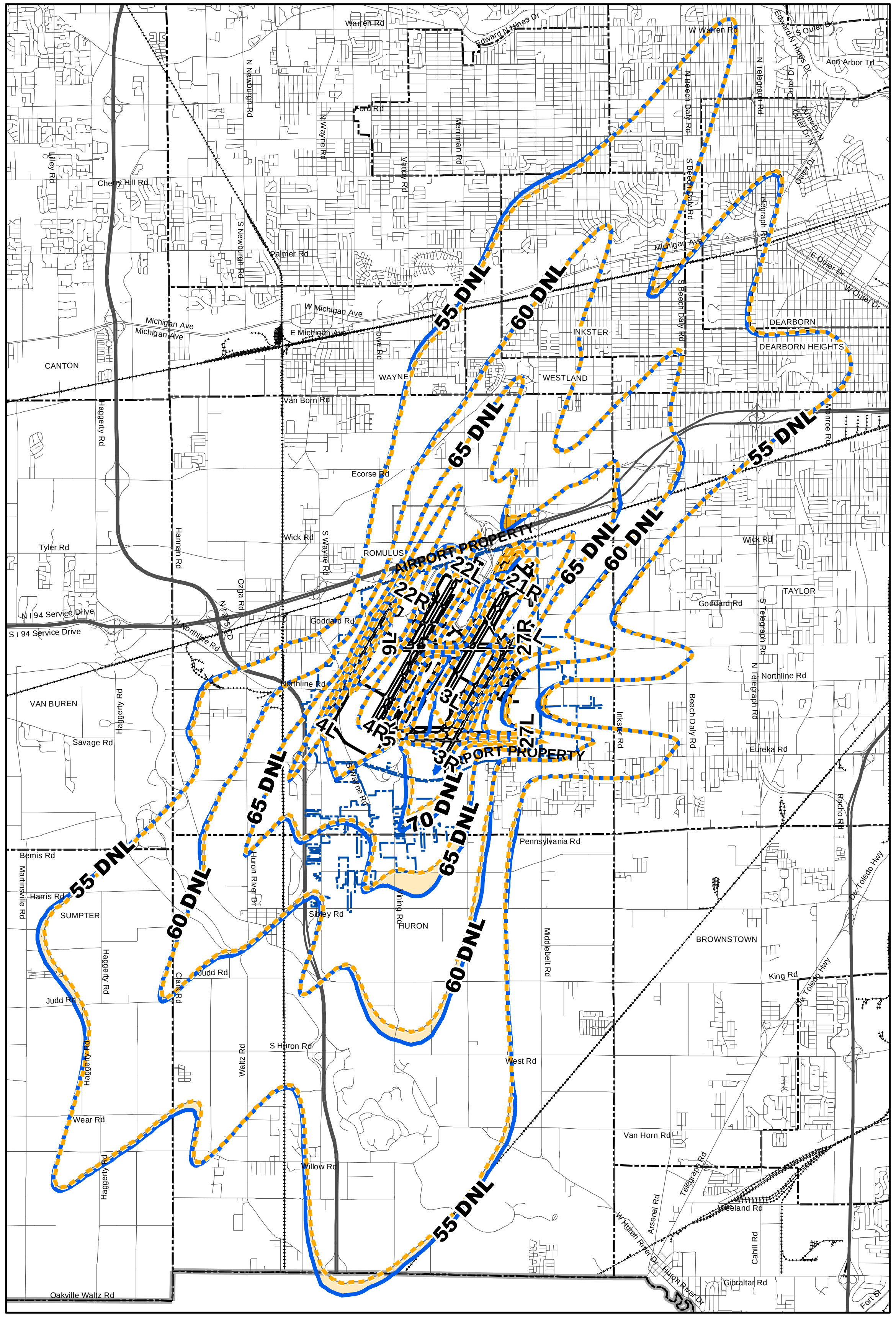
Other Environmental Issues (NEPA, etc): Implementation of noise abatement flight procedures requires compliance with the National Environmental Policy Act (NEPA). As noted, FAA has initiated the NEPA process and is expected to issue a Finding of No Significant Impact in early 2007.

Legal Issues: The option does not appear to have legal issues associated with its implementation.

Conclusions of Consultant Team:

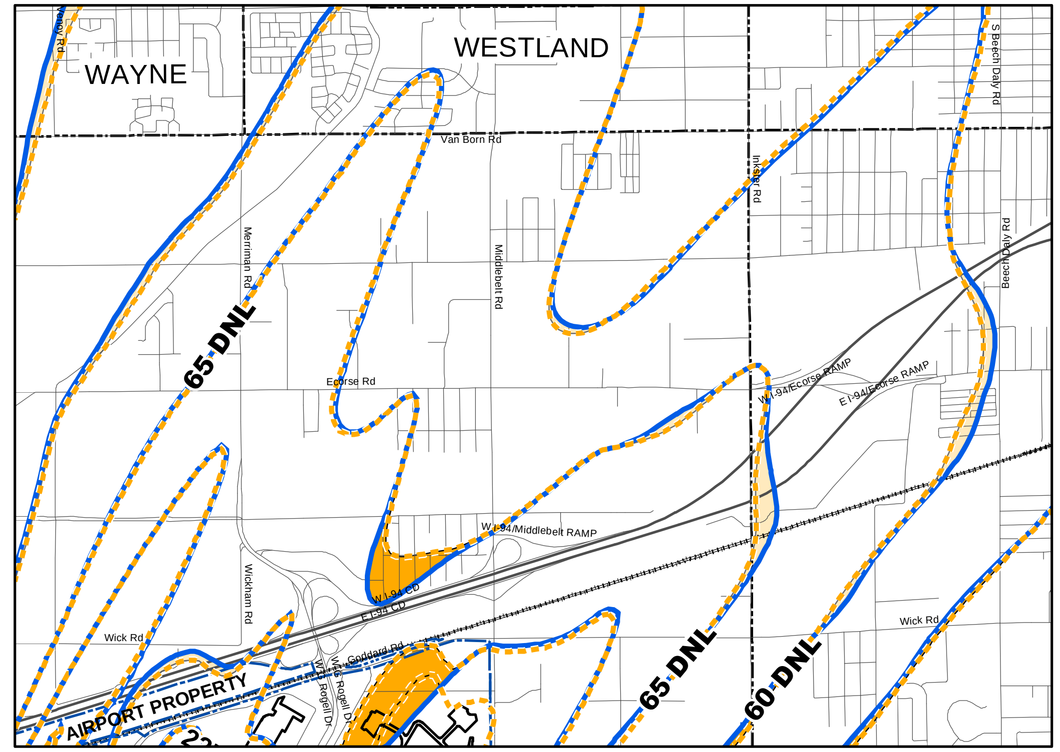
Due to the operational benefits, combined with the noise reduction within the 65 DNL contour, this option is recommended.

Figure G21 **Option 6a, Extend North & South**



0 1 2 4 Miles

Source: US Census, 2000



0 2,000 4,000 8,000 Feet

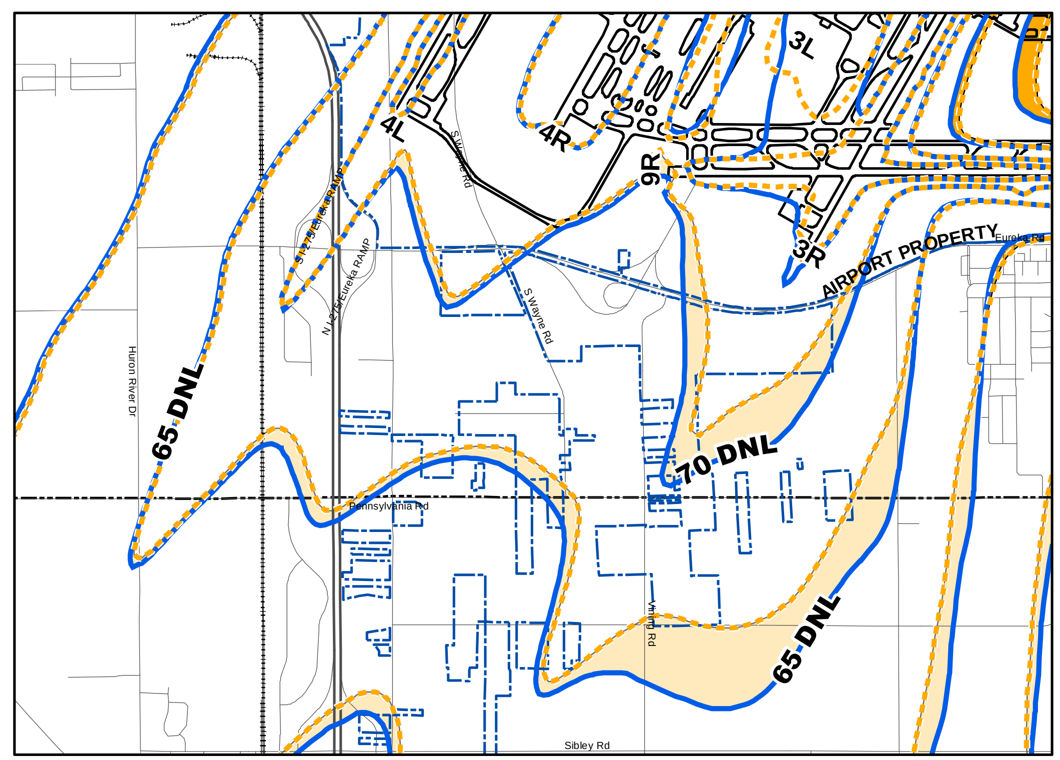


TABLE 9
Population Comparison within the DNL Noise Contours- Runway Extensions

	Baseline (2011)/No Action		Option 9a- North and South Extension		Option 9b-North Extension		Option 9c-South Extension	
65-70 DNL	Population	Housing	Population	Housing	Population	Housing	Population	Housing
Huron Township	90	40	70	30	40	20	100	40
Romulus	730	330	670	310	730	340	690	310
Taylor	0	0	10	10	10	10	0	0
Westland	120	60	130	60	100	50	90	40
Subtotal	940	430	880	410	880	420	880	390
70-75 DNL								
Romulus	50	30	50	30	50	30	40	20
Subtotal	50	30	50	30	50	30	40	20
65 DNL & Greater								
Huron Township	90	40	70	30	40	20	100	40
Romulus	780	360	720	340	780	370	730	330
Taylor	0	0	10	10	10	10	0	0
Westland	120	60	130	60	100	50	90	40
Subtotal	990	460	930	440	930	450	920	410
60 DNL & Greater*								
Dearborn Heights	1,000	310	1,010	320	1,110	360	920	280
Huron Twp.	2,040	780	1,820	700	1,790	690	2,040	780
Inkster	4,560	1,980	4,460	1,930	4,470	1,950	4,290	1,870
Romulus	4,000	1,680	3,840	1,620	2,020	1,700	4,000	1,670
Sumpter Twp.	20	10	20	10	10	10	20	10
Taylor	3,000	1,210	3,230	1,270	3,470	1,380	2,070	770
Westland	2,360	990	2,240	940	2,280	950	2,240	930
Subtotal	16,940	6,960	16,620	6,790	15,150	7,040	15,580	6,310

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater

Legend

- City Limits Boundary
- 2011 Base Case
- 2011 Alternative 9a
- Option 9a, Area newly affected
- Option 9a, Area no longer affected

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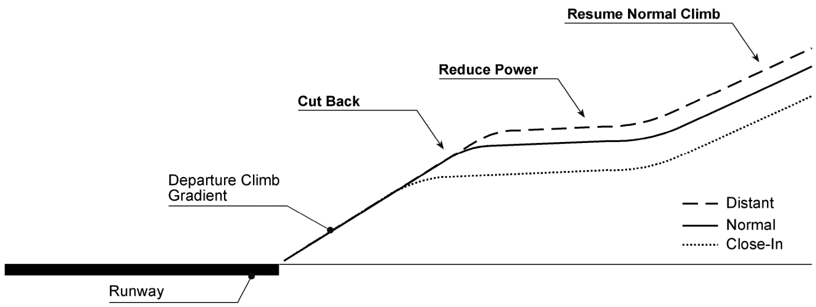
TABLE G14
Comparison of DNL Effects of Option 6a to the Baseline

	Baseline (2011)/No Action		**Option 6a-** Off-Set Approach To Runway 4L during poor weather in North Flow	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	90	40
Romulus	730	330	750	340
Taylor	0	0	0	0
Westland	120	60	60	30
Subtotal	940	430	910	420
70-75 DNL				
Romulus	50	30	50	30
Subtotal	50	30	50	30
65 DNL & Greater				
Huron Township	90	40	90	40
Romulus	780	360	800	370
Taylor	0	0	0	0
Westland	120	60	60	30
Subtotal	990	460	960	450
60 DNL & Greater*				
Dearborn Heights	1,000	310	1,000	310
Huron Twp.	2,000	780	2,050	790
Inkster	4,560	1,980	4,540	1,940
Romulus	4,000	1,680	4,020	1,690
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	3,000	1,210
Westland	2,360	990	2,470	1,030
Subtotal	16,940	6,960	17,130	6,960

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater

<u>Option 7</u>: Departure Climb Procedures

<u>Discussion</u>: Changes in departure climb procedure (the location relative to the ground where power is applied), can alter aircraft noise exposure, and can increase noise exposure in some areas and decrease it in others. Aircraft that climb quickly deliver a greater noise impact to these areas nearer an airport, while a more gradual climb may increase noise levels further from an airport.



<u>Noise Abatement Procedure Goal:</u> The goal of this option would be to reduce single event noise levels from jet departures over residential land uses by using the appropriate power (thrust) cutback, which would result in the lowest noise levels in the community.

<u>Description of the Option</u>: In response to communities desiring to consider noise reductions close to the airport, and locations wishing to consider reductions further away, the FAA adopted a new Advisory Circular (AC-91-53A **Noise Abatement Departure Procedures**) in 1993 allowing for two new options 1) a close-in procedure, and 2) and further away procedure. These departure profiles have the potential to minimize noise to specific areas by modifying distance and altitude for application of full takeoff power, engine thrust cutback, and re-application of normal climb thrust.

The close-in departure typically reduces noise closer to an airport, but may increase noise farther from an airport (8 to 10 miles away). Conversely, the distant procedure concentrates noise closer to an airport (within 3 to 6 miles), but reduces noise farther away.

<u>Comparable Existing Procedure(s)</u>: Radar data obtained for Detroit Metro Airport indicates that aircraft thrust cutback typically occurs at about 1,000 to 1,200 feet above field elevation (AFE). The current departure climb procedure is applicable to most jet aircraft. Takeoff power (full power) is applied until reaching about 1,000 feet above airfield elevation (AFE), at which point the power is cut back to a reduced climb power. Regular climb power is re-applied when reaching an altitude of 3,000 feet AFE.

<u>Modeling Assumptions/New Procedure</u>: At Detroit Metro, the re-application of normal climb thrust would occur in the vicinity of 3 to 6 statute miles from the beginning of takeoff. Locations where normal climb thrust is re-applied may experience an increase in noise above what would be experienced during a typical departure, due to lower aircraft altitude and the re-application of normal climb thrust. To test the noise implications of the possible procedures, single-event sound exposure level (SEL) contours were developed for a noisy aircraft (DC-9). The following describe the various procedures:

Close-In Departure Procedure: Full power is applied until reaching an altitude of 800 feet, and then the thrust is cut back until reaching 3,000 feet, where climb power would be re-applied. **FigureG22 NE-2** shows the points where a typical DC9 reaches 800 feet above ground, and then 3,000 feet above ground when using the close-in procedure.

Distant Departure Procedure: The "distant" departure procedure is a variant on the current Airport departure - the difference being that the initial full power would remain until aircraft reach an altitude of 1,500 feet above ground before thrust cut back. Similar to the previous procedures, full power would again resume at an altitude of 3,000 feet above ground. **Figure G22 NE-2** also shows the points where a typical DC9 reaches 1,500 feet, and then 3,000 feet above ground when flying this procedure.

Following is a summary of each Noise Abatement Departure Profile scenario:

1. Current Airport Departure Procedure: At present, pilots apply takeoff power until reaching about 1,000 to 1,200 feet above ground, when they cut back power to reduce noise levels on the ground. Regular climb power is re-applied when reaching an altitude of 3,000 feet above ground. With this procedure, no noise change would occur.

2. Close-In Departure Procedure: Using this procedure, aircraft would apply full power until reaching an altitude of 800 feet above ground when they cut back and re-apply regular power at 3,000 feet above ground. With this procedure, noise would be decreased for areas closest to the Airport, but would increase for areas at a distance, when the power is re-applied.

3. Distant Departure Procedure: This procedure is a variant on the current Airport departure - the only difference being that full power would remain until aircraft reach an altitude of 1,500 feet above ground before the cutting back. Regular power would again resume at an altitude of 3,000 feet above ground. A slight increase in noise would be expected to the area closer to the Airport, with a slight reduction in noise at more distant locations.

Analysis of Option:

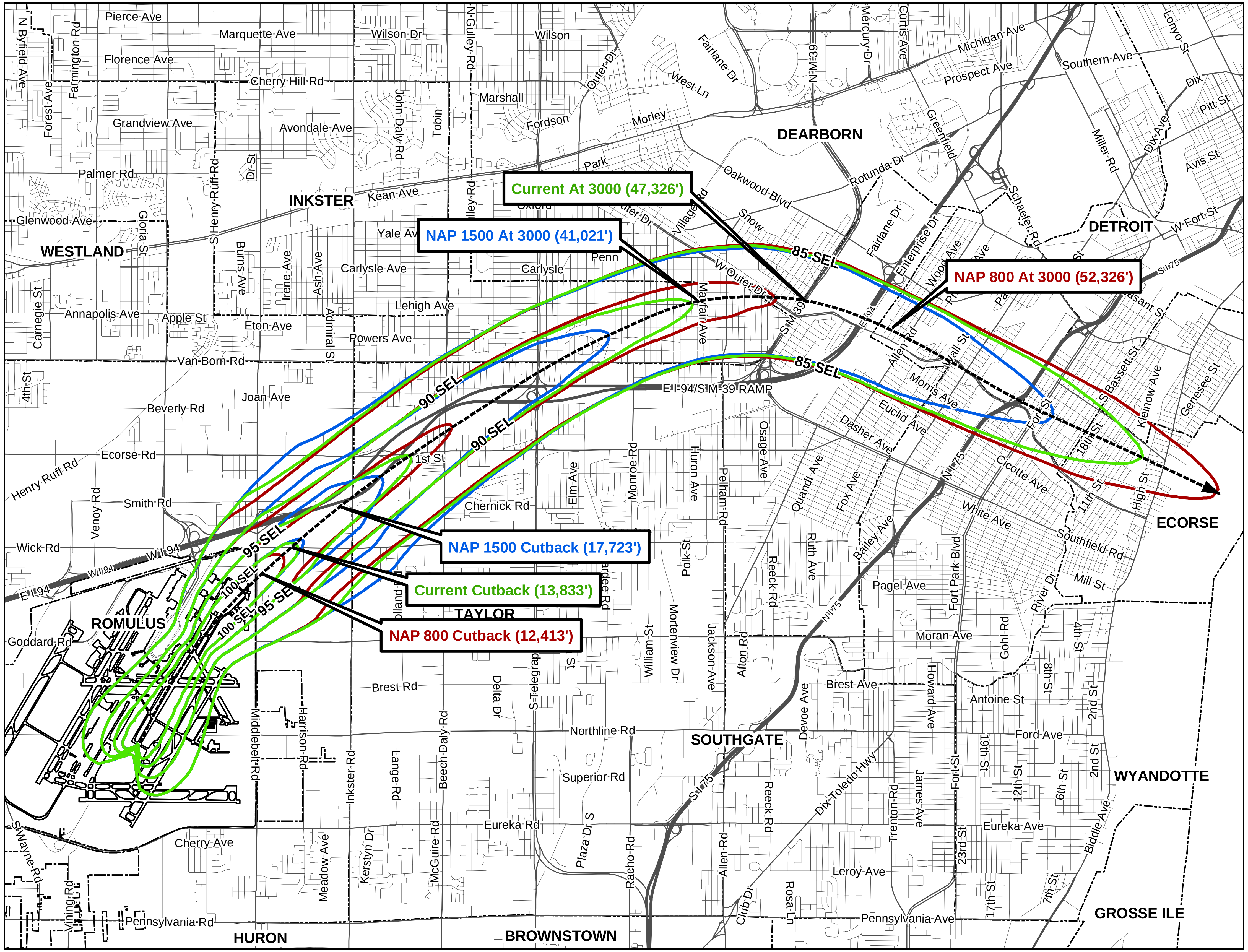
The analysis of this option considered both the noise exposure impacts of the option, as well as the possible operational effects.

Noise Analysis:

As required by FAR Part 150, the study relied upon the use of the average annual DNL noise contours to consider possible noise exposure consequences of the option.

Impact on Annual DNL Contour: Experience with evaluating this option at other airports indicates that it would not have a measurable effect on the annualized DNL noise exposure contours. Therefore, DNL contours were not generated for this option. However, SEL contours were evaluated to identify how the various procedures would affect single event noise. SEL contours represent the noise associated with an individual aircraft departure, and for this test case, we assumed to depart Runway 3L. SEL 80 dBA contours were developed for each procedure, as this SEL has often been identified as a sound level that individuals may be awakened at night.

Figure G22 **Option 7, Single Event Level Noise Contours (DC-9)**
85-100 SEL



Legend

- Standard Departure SEL
- Close In Departure SEL
- Distant Departure SEL

TABLE 7
Total Population Comparison within the 85, 90, 95 and 100 SEL
For Option 7 Departure Procedures

	Close-in Departure Procedure	Distant Departure Procedure	Standard Departure Procedure
85 SEL Population	50,600	38,030	45,300
90 SEL Population	10,590	4,420	7,170
95 SEL Population	390	60	50
100 SEL Population	0	10	10

Source: 2000 US Census

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Source: Michigan Department of Natural Resources, SEMCOG, Detroit Metropolitan Wayne County Airport files.

With the close-in procedure, a noise level reduction would be expected in the areas closer in to the Airport (within 2 miles), where noise levels would decline by 1 to 2 dBA. Those areas more distant from the Airport would experience an equivalent increase in noise.

With the distant procedure, a noise reduction would occur in the areas more distant from the Airport (about 5 miles) where the noise levels would decline by 1 to 2 dBA. The areas close-in to the Airport would experience an increase in noise of 1 to 2 dBA. The population analysis associated with each departure procedure for the 85, 90, 95 and 100 SEL is shown in **Table G15**.

Operational Impacts

The following issues could arise from implementation of the option. Also identified are the agencies that would have a role in assisting in the implementation of this option.

Airport and ATC Operational Considerations (Safety and efficiency issues): FAA has ultimate responsibility for the control of aircraft flight, whereas, the airlines/pilot control the fight procedures, such as departure climb. This option would not be expected to materially change FAA ATC workload. However, with the close-in procedure, aircraft would not climb as fast as they currently do and thus, there could be airspace issues to ensure proper separation of aircraft.

Other Environmental Issues (NEPA, etc): Implementation of noise abatement procedures requires compliance with the National Environmental Policy Act (NEPA). FAA Order 1050.1E **Environmental Impacts: Policies and Procedures** outlines the documentation required based on the types of federal action. This option would likely require preparation of an Environmental Assessment to determine if the impacts would be significant; however based on the analysis prepared for this study, this procedure is not expected to result in a 1.5 DNL change in noise exposure within the 65 DNL and greater noise contour.

Legal Issues: The option does not appear to have legal issues associated with its implementation.

Conclusions of Consultant Team:

The Consultant Team does not recommend implementation of this option for older generation narrow body jets. For the newer generation aircraft it would be recommended.

TABLE G15

Total Population Comparison within the 85, 90, 95 and 100 SEL

For Option 7 Departure Procedures

	Close-in Departure Procedure	**Distant Departure Procedure**	**Standard Departure Procedure**
85 SEL Population	50,600	38,030	45,300
90 SEL Population	10,590	4,420	7,170
95 SEL Population	390	60	50
100 SEL Population	0	10	10

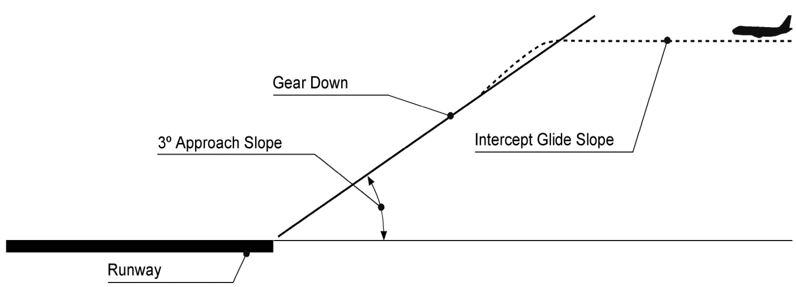
Source: 2000 US Census

Option 8: Continuous Descent Approach

Discussion: Approach noise has been a concern to communities directly north of DTW Airport. While approach noise typically is lower in magnitude then departure noise, approach noise occurs more often north of the Airport then departure noise. Measures to reduce the noise from landing aircraft are more difficult to implement because navigation technology require the aircraft to be on a stable approach path prior to landing so there are few options available to modify the landing procedures. For arrivals, keeping the arriving aircraft at their cruise altitude as long as possible before beginning a continuous descent to the runway at idle or near idle thrust (with no level flight segments) may reduce noise to areas at a distance from the Airport. Procedures with these features are commonly referred to as continuous descent approach (CDA) procedures.

Noise Abatement Procedure Goal: Provide for approach procedures that minimize the need for higher power settings or adjustment of power during the approach, and/or minimize level flight segments on approach. .

Description of the Option: Changes in approach/descent procedures are used to increase the altitude of aircraft over noise-sensitive areas under the arrival path without increasing engine power. Recently, the FAA, NASA, Boeing, MIT and UPS participated to test an approach procedure designed to reduce noise during approaches at Louisville Kentucky. The approach procedure tested is a called a "Continuous Descent Approach". This is contrasted with the common, but not exclusive, stepped down approach (see illustration below). To intercept the 3-degree glide slope, pilots fly under the glide slope or on a level flight segment until the aircraft intercepts the 3-degree radio signal that marks the glide slope. The aircraft may then be slightly above or below the signal beam as the aircraft adjusts to the correct angle. This "stepped down" approach is used at some airports to keep aircraft below an airway occupied by other aircraft. It is also used so that aircraft intercept the glide slope from below rather than above. Both of the reasons for 'stepped down' approaches are based on safety and separation considerations.



The Continuous Descent Approach (CDA) is an approach procedure that allows aircraft to approach and land at an airport with minimal changes in engine power/thrust. During a CDA approach, aircraft are not leveled out and the aircraft gradually descends from high altitude to reach the 3-degree glide slope. Generally, the aircraft should be established on a stable approach no less then 5 miles from the runway. This means that the aircraft flaps and landing gear are set, the aircraft speed is stable, and the aircraft is lined up with the runway. Beyond this distance, i.e., more that 5 miles from the runway, the difference between a stepped down approach and a continuous descent approach can be realized. It is clear that at distances farther than 5 miles from the runway, the continuous descent approach is potentially quieter because the aircraft is higher than for a stepped down approach. These areas are typically outside the 65

DNL noise exposure contour. Preliminary results from the test described earlier showed that the continuous descent approach resulted in 3 to 6 dB reductions in single event noise under the flight path.

At many airports, CDA procedures are used during low activity periods when there are few other aircraft in the sky. The noise measurement data shows that jet arrival single-event noise levels are somewhat quieter during the nighttime than those measured during the daytime (when standard approach procedures are used). This demonstrates that CDA approaches can result in lower noise levels than occur with standard approaches.

Comparable Existing Procedure(s):

Aircraft line up for final approach approximately 8-15 miles away from the Airport and during poor weather as much as 25 miles from the Airport. Example existing jet arrival flight tracks are presented in **Figure G23.** The aircraft descend to the Airport at varying altitudes, and intercept the glide slope along this path. When aircraft are intercepting the glide slope, they are between 2,500 and 5,500 feet above the air field elevation (AFE). Some aircraft approach the Airport at higher altitudes than 5,500 feet AFE in a manner similar to the CDA option. Aircraft altitudes are typically given by ATC to maintain proper aircraft separation on approach. Once aircraft intercept the glide slope, they fly the 3-degree approach to the Airport. Analysis shows that aircraft are on the 3-degree glide slope at least 5 miles away from the Airport. An example of the approach altitude of existing jet aircraft is presented **in Figure G23.**

Modeling Assumptions/New Procedure:

For this analysis two procedures were modeled:

- Typical existing approach procedure at DTW
- CDA approach procedure

This analysis was completed in terms of an assessment of the potential changes in the single-event noise levels (SEL) of aircraft during approach. The A320 aircraft was used as an example aircraft to illustrate the changes in single-event noise levels that might occur. All other commercial jet aircraft would experience a similar change in noise as occurs with this aircraft.

This option could be implemented through a number of potential methods. The three methods are listed below:

- Continuous Descent Approach (CDA) approach procedures are currently under study and evaluation by the FAA. The Airport Authority (Appendix Nine) should follow those evaluation programs to determine the feasibility and use at DTW.

- Work with the FAA and the airlines to develop, implement and use CDA-type approaches during the lower activity periods.

- The single-event noise levels for landing aircraft could also become an element of the Fly Quiet Program (Option 17).

Analysis of New Procedure:

The analysis of this option considered both the noise exposure, as well as the possible operational effects.

Noise Analysis:

The study relied upon the use of single event sound exposure level (SEL) contours to consider possible noise exposure consequences of the option. DNL noise contours were not developed for this alternative as the single event analysis best illustrates the potential benefits and location of benefits of this alternative.

The SEL analysis included noise contours. Two arrival tracks were analyzed to illustrate the potential changes: one from the south flow landing on Runway 22R and one from south flow landings 21L. The SEL contours for an arrival are presented in **Figure G24 NE-4** for both Runways**.** The existing standard approach is presented in red lines on this figure. The CDA approach is presented in blue lines.

Table G16
Total Population Comparison

Noise Exposure	Population within SEL contour	Percent change over Existing
90 SEL		
Existing Approach	50	
CDA Approach	50	0%
85 SEL		
Existing Approach	1,470	
CDA Approach	1,430	1.4%
80 SEL		
Existing Approach	19,200	
CDA Approach	17,820	7.2%

The population comparison table, **Table G16**, shows the number of people that would be affected by the use of CDA. These population numbers are the combined populations within the contours for landings on both Runways 22R and 21L. The analysis shows that the single-event noise levels are predicted to be lower with the CDA approach. This predicted change varies by location, but in general is greatest farther from the Airport (at lower SEL levels). In general, the reduction in single-event noise level is no change within 5 miles from the Airport and from 1 to 5 dBA at the greater distances away.

CDA can reduce both overall arrival noise and reduce the occasional extra loud arrival noise events. CDA procedures can reduce the number of times that extra loud arrival noise events occur when an aircraft is lower or using higher power than normal.

Operational Impacts

The following issues could arise from implementation of the option. Also identified are the agencies that would have a role in assisting in the implementation of this option.

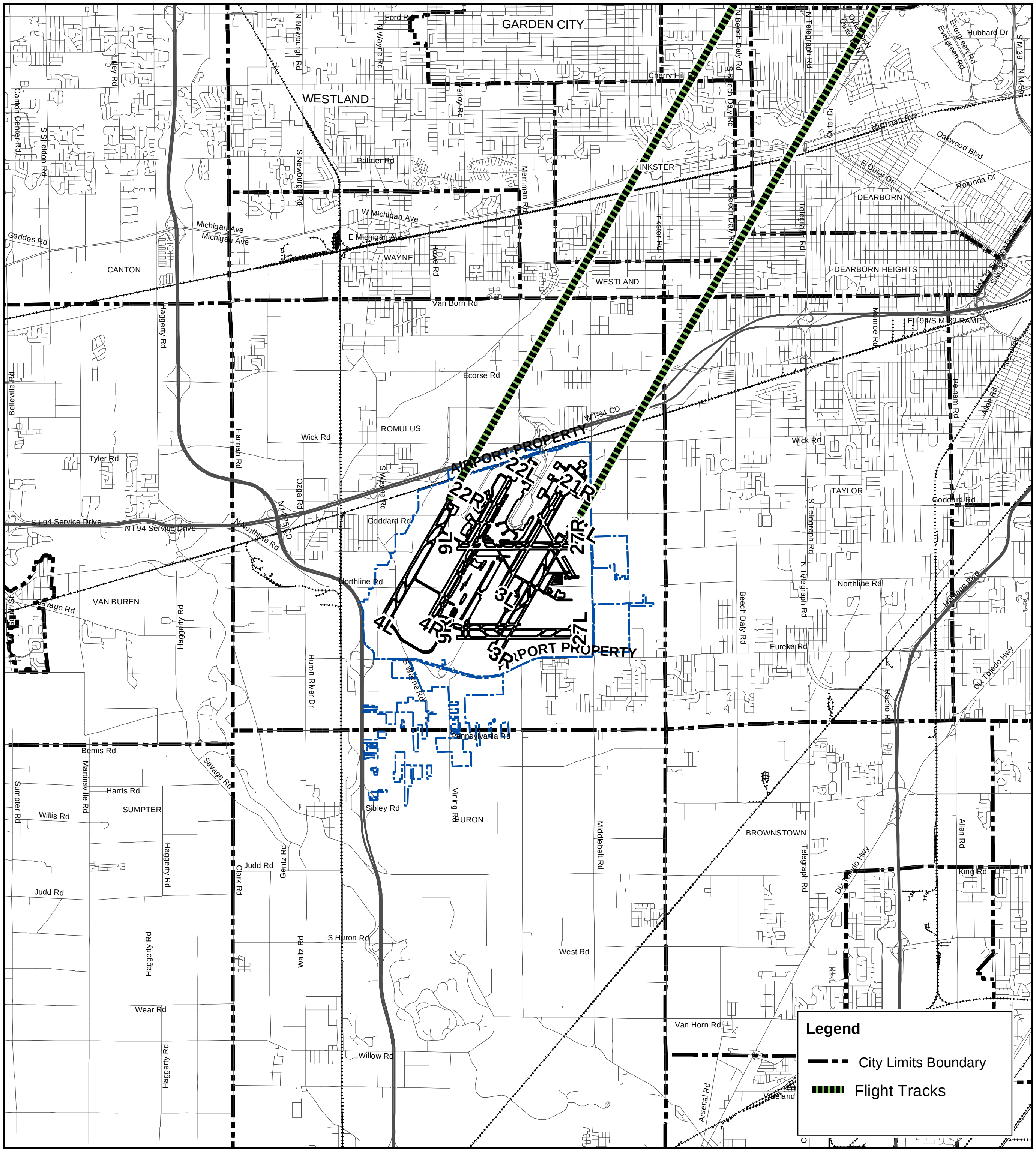


Figure G23 **Option 8, Continuous Descent Approach Flight Tracks**

0 1 2 4 Miles

Source: US Census, 2000

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Airport and ATC Operational Considerations (Safety and efficiency issues): FAA has ultimate responsibility for the control of aircraft flight. This option would not be expected to change FAA

ATC workloads, however, it is more complicated to implement during busy periods and may not be practical during peak times. This is due to aircraft needing increased separation to use CDA for approach and the added complexity of a variety of different aircraft types with different performance characteristics. This procedure is currently being reviewed by FAA at a national level and further review may be required to determine if it can be used at a major/large air carrier airport.

Other Environmental Issues (NEPA, etc): Implementation of noise abatement flight procedures requires compliance with the National Environmental Policy Act (NEPA). FAA Order 1050.1E **Environmental Impacts: Policies and Procedures** outlines the documentation required based on the types of federal action. This option would likely require preparation of an Environmental Assessment to determine if the impacts would be significant; however based on the analysis prepared for this study, increased noise to residential uses within the 65 DNL contour is not expected to generate a 1.5 DNL increase within the 65 DNL, and warrant an Environmental Impact Statement. This option could produce 5 DNL or greater increases in noise within the 55-60 DNL contour, and could produce a 3 DNL or greater change within the 60-65 DNL

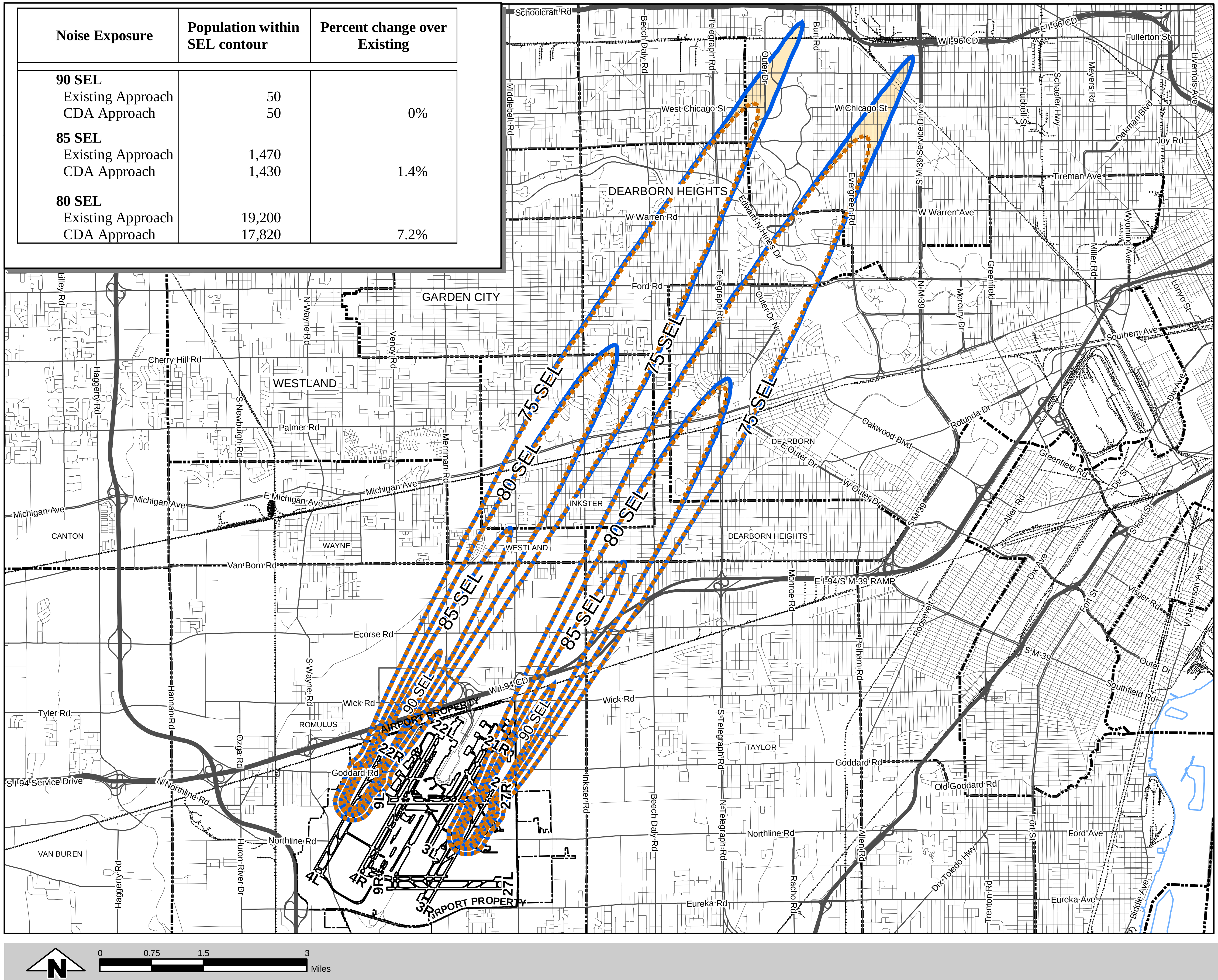
Legal Issues: The option does not appear to have legal issues associated with its implementation.

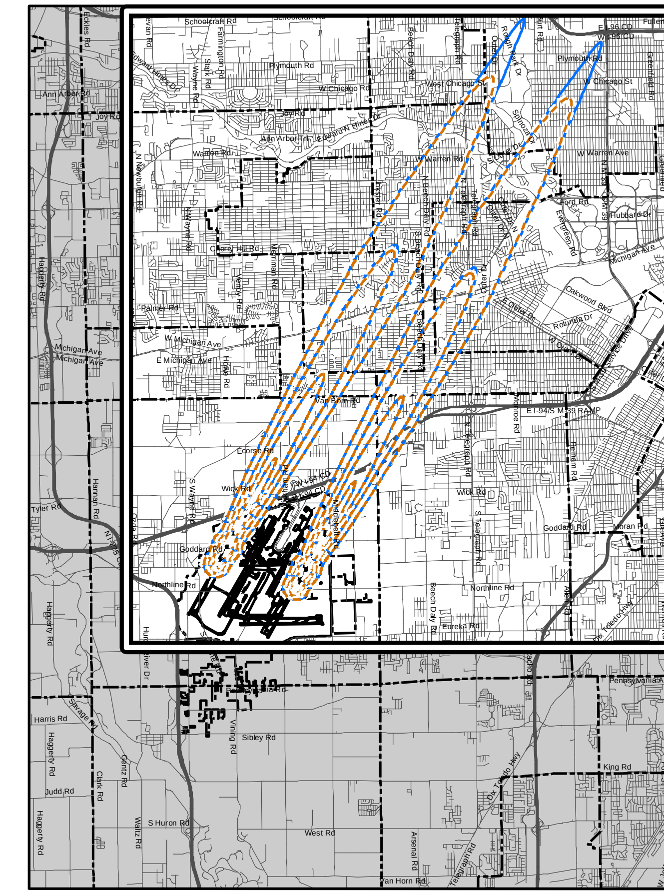
Conclusions of Consultant Team:

This option would result in a slight noise impact reduction within the 65 DNL contour, as well as lower level contours. At the lower levels, however, the contours result in substantial changes in noise which effectively shift noise from one area/neighborhood/community to another. No recommendation is made at this time, pending discussion among the Study Advisory Committee (Appendix Five, Six & Seven) concerning concentration versus dispersal.

Figure G24 **Option 8, CDA**

Noise Exposure	Population within SEL contour	Percent change over Existing
90 SEL		
Existing Approach	50	
CDA Approach	50	0%
85 SEL		
Existing Approach	1,470	
CDA Approach	1,430	1.4%
80 SEL		
Existing Approach	19,200	
CDA Approach	17,820	7.2%





Legend

- City Limits Boundary
- Airbus A320 Without CDA
- Airbus A320 With CDA
- Area no longer affected

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT

Source: US Census, 2000

Option 9: Runway Extensions

Discussion:

Runway extensions have the ability to alter aircraft noise exposure by:

- lengthing "shorter" runways so that they can be used by bigger aircraft, thus changing how frequently a runway is used for departures; and,
- placing the departure roll further away from residential areas, enabling aircraft to be higher over residential areas on departure. This is most effective for residences closest to the Airport.

The length of the runways at DTW are:

- Runway 4L/22R – 10,000 feet long.
- Runway 4R/22L – 12,001 feet long.
- Runway 3L/21R – 8,500 feet long.
- Runway 3R/21L – 10,000 feet long.
- Runway 9L/27R – 8,700 feet long.
- Runway 9R/27L – 8,500 feet long.

Figure G25 shows the airfield configuration. The primary runways used for jet departures are Runway 4R/22L and 3L/21R. As Runway 3L/21R is the shorter of the two primary departure runways; consideration was given to extending this runway.

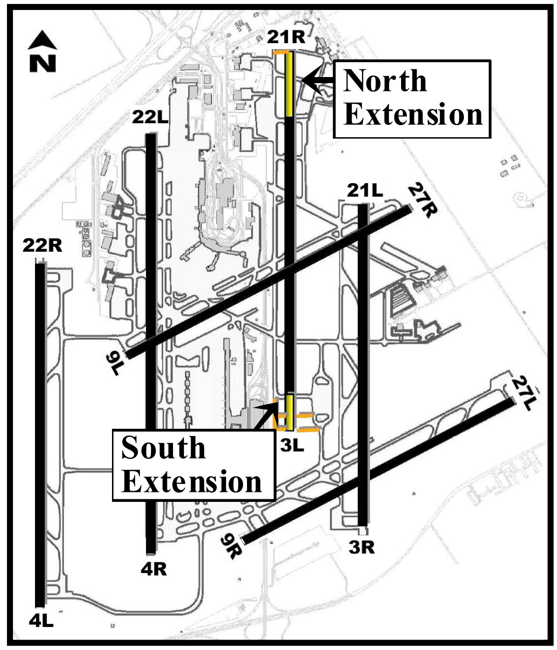
In this case, the extension(s) would be targeted at providing a 12,000 ft runway so that Runway 3L/21R would be virtually the same length as Runway 4R/22L. Extension of 3L/21R would allow larger, widebody aircraft (e.g. B-747) to use either of the two departure runways, spreading the activity, and thus noise, more evenly. Three options for the extension of Runway 3L/21R were evaluated:

- Option 9a – North & South Extension (900 feet to the south and 2,600 feet to the north);
- Option 9b – North Extension (3,500 feet); and
- Option 9c – South Extension (3,500 feet).

Noise Abatement Procedure Goal:

The goal of this option is to reduce the noise levels from jet departures over individual residential land uses by increasing the distance from the start of the departure roll to the point where departing aircraft reach residential land use. The aircraft would achieve higher altitudes, and thus lower noise as a result of the additional flight distance. In addition, if both runways are of equal length, the use of the runways could be equalized.

Option 9a – North & South Extension Runway 3L/21R



Description of the Option:

This option for extending Runway 3L/21R to 12,000 feet includes runway extensions of approximately 900 feet to the south and 2,600 feet to the north, with accompanying parallel taxiways. In terms of available runway length, this option would allow Runway 3L/21R to be used as frequently for departures as Runway 4R/22L.

Comparable Existing Procedure(s):

In general, departures occur on the two inner runways (Runway 3L/21R and Runway 4R/22L) and arrivals land on the two outer runways (Runway 3R/21L and Runway 4L/22R). Thus, Runway 3L/21R currently operates as a primary departure runway with only destination), primarily use Runway 4R/22L due to its greater runway length. Not all wide body operations require the full runway length, thus, Runway 3L/21R is still used by widebody aircraft. Based upon historic radar flight track data, Runway 3L/21R is currently used by departing wide body aircraft 22% of the time while Runway 4R/22L is used 70% of the time. For the other types of departing aircraft, these two runways are used roughly the same. Note that the destinations for widebody aircraft are generally split 50/50 for airports to the east or west of DTW.

Modeling Assumptions/New Procedure(s):

It is assumed that Runway 3L/21R would be used by all aircraft types at the Airport, as runway length would no longer be a limiting factor. By limiting the extension to the south, aircraft taxiing on Taxiways T and J would continue without imposing a mandatory hold position associated with the 3L end of the runway.

The following table presents the base case 2011 and Alternative 9a runway use assumptions for the widebody aircraft. The analysis assumes that the east complex (Runways 3L/21R and 3R/21L) and west complex (Runway 4R/22L and 4L/22R) would be used nearly equally. All other runway use and other assumptions are assumed to be the same with the proposed alternative.

	Departure Use of Runway-Widebody and Heavy Aircraft	
Runway	**Base Case**	**Alternative 9a**
Runway 4L/22R	<1%	<1%
Runway 4R/22L	70%	48%
Runway 3L/21R	22%	44%
Runway 3R/22L	5%	5%
Runway 9L/27R	<1%	<1%
Runway 9R/27L	<1%	<1%

Source: BridgeNet International, January 2007

The analysis assumes that the landing thresholds would be displaced, remaining at their existing locations (See Option 10 concerning displaced thresholds). As a result of the displaced thresholds, arrival aircraft would continue to land at the same ground point as they do with the current runway configuration. Thus, arrival noise would be unaffected by this alternative.

<u>Analysis of Option</u>:

The analysis of this option considered both the noise exposure impacts of the option and the possible operational effects.

<u>Noise Analysis</u>:

As required by FAR Part 150, the study relied upon the use of the average annual DNL noise contours to consider possible noise exposure consequences of the option.

Impact on Annual DNL Contour: **TableG17** shows the DNL noise contour results associated with this option in comparison to the No Action and to the other runway extension options. **Figure G21 Full-3** shows the noise contours for Option 9a. As this table notes, this option would reduce overall population and housing exposed to 65 DNL by 60 people/20 houses in comparison to the Baseline, a 6.1% and 4.3% reduction respectively. Within the 65 DNL, all of the changes associated with this option would occur for properties located within the 65-70 DNL contour. Within the 60 DNL contour, the changes would be less pronounced (a reduction of 2.1% in population and 2.4% in housing affected).

Within the 65 DNL and greater contour, impact reductions would occur in Huron Township (22.2%), and Romulus (7.7%) relative to the Baseline, and an increase to Westland (8.3%). Within the 60 DNL contour, population impact reductions would occur in Huron Township (10.8%), Westland (5.1%), Romulus (4%), and Inkster (2.2%), with increases in Taylor (7.7%) and Dearborn Heights (1%). While this option would increase the altitude of departures relative to the Baseline, the changes in runway use would result in increased impacts in some communities and reductions in others.

FAA guidance for implementing the National Environmental Policy Act (NEPA) states that a 1.5 DNL increase in noise to noise sensitive uses (i.e., residences) within the 65 DNL due to federal action is considered a significant impact. A review of the noise exposure contour indicates that a 1.5 DNL increase in noise due to Option 9a would not be expected. Therefore, the FAA is likely to require the completion of an Environmental Assessment (EA) that may be eligible for a Finding of No Significant Impact.

<u>Operational Impacts</u>:

The south extension (900 feet) would be designed to allow aircraft to depart to the north or south on Runway 3L/21R without restricting aircraft movement on Taxiways J or T. The north extension portion (2,600 feet) of the alternative would not be anticipated to result in any additional restrictions to aircraft movements on the ground.

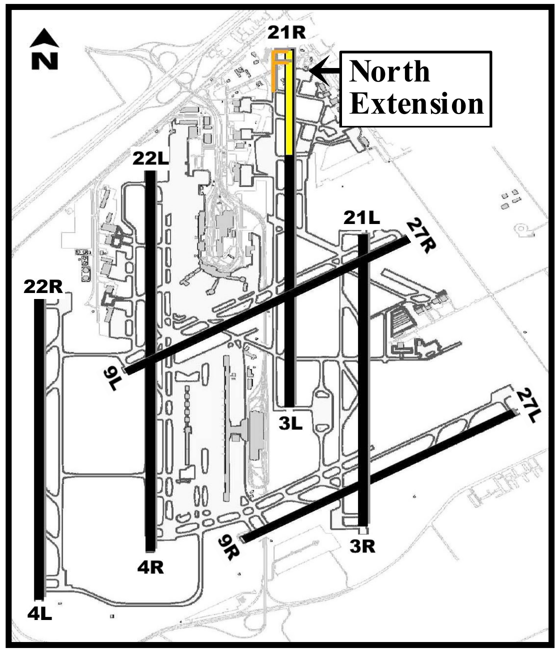
Departure activity would be impacted in that all aircraft types could use the runway, as opposed to the current restrictions on aircraft use due to the limited runway length. Although the FAA has ultimate responsibility for the control of aircraft flight, this alternative could potentially decrease FAA ATC workloads and overall aircraft delay by eliminating restrictions and the imbalance in departure demand experienced with the existing runway length.

The option does not appear to have any legal issues associated with its implementation. As noted earlier, this option is not expected to create a 1.5 DNL increase in aircraft noise and thus, compliance with NEPA could be expected with an Environmental Assessment.

Conclusions of Consultant Team:

Continue to study the feasibility of implementing a runway extension.

Option 9b – North Extension Runway 3L/21R



Description of the Option:

This option for extending Runway 3L/21R to 12,000 feet includes a 3,500 foot runway extension to the north with accompanying parallel taxiways.

Comparable Existing Procedure(s):

In general, departures occur on the two inner runways (Runway 3L/21R and Runway 4R/22L) and arrivals land on the two outer runways (Runway 3R/21L and Runway 4L/22R). Thus, Runway 3L/21R currently operates as a primary departure runway with only occasional arrival activity. Long-haul widebody departures (regardless of their east or west departure destination), have use Runway 4R/22L due to its greater runway length. Not all wide body operations require the full runway length, thus, Runway 3L/21R is still used by widebody aircraft. Based upon historic radar flight track data, Runway 3L/21R is currently used by departing wide body aircraft 22% of the time while Runway 4R/22L is used 70% of the time. For the other types of departing aircraft, these two runways are used roughly the same.

Modeling Assumptions/New Procedure:

In modeling the contours, it was assumed that Runway 3L/21R would be used by all aircraft types at the Airport, as runway length would no longer be a limiting factor. By limiting the extension to the north, aircraft taxiing on Taxiways T and J would continue without imposing a mandatory hold position associated with the 3L end of the runway.

The following table presents the base case 2011 and Alternative 9b runway use assumptions for the widebody aircraft. The analysis assumes that the east complex (Runways 3L/21R and 3R/21L) and west complex (Runway 4R/22L and 4L/22R) would be used nearly equal. All other runway use and other assumptions remain unchanged under the proposed alternative.

	Departure Use of Runway-Widebody and Heavy Aircraft	
Runway	**Base Case**	**Alternative 9b**
Runway 4L/22R	<1%	<1%
Runway 4R/22L	70%	48%
Runway 3L/21R	22%	44%
Runway 3R/22L	5%	5%
Runway 9L/27R	<1%	<1%
Runway 9R/27L	<1%	<1%

Source: BridgeNet International, January 2007

The analysis assumes that the landing thresholds would be displaced, remaining at their existing locations (See Option 10 concerning displaced thresholds). As a result of the displaced thresholds, arrival aircraft would continue to land at the same ground point as they do with the current runway configuration. Thus, arrival noise would be unaffected by this alternative.

Analysis of Option:

The analysis of this option considered both the noise exposure impacts of the option, as well as the possible operational effects.

Noise Analysis:

As required by FAR Part 150, the study relied upon the use of the average annual DNL noise contours to consider possible noise exposure consequences of the option.

Impact on Annual DNL Contour: **Table G17** shows the DNL noise contour results associated with this option in comparison to the No Action and to the other runway extension options. **Figure G25 Full-4** shows the noise contours for Option 9b. As this table notes, this option would reduce overall population and housing exposed to 65 DNL by 60 people/20 houses in comparison to the Baseline, a 6.1% and 2.2% reduction respectively. Within the 65 DNL, all of the changes associated with this option would occur for properties located within the 65-70 DNL contour. Within the 60 DNL contour, the changes would be more pronounced (a reduction of 10.8% in population and 1.1% in housing affected).

Within the 65 DNL and greater contour, impact reductions would occur in Huron Township (55.6%) and Westland (16.7%) relative to the Baseline. Within the 60 DNL contour, population impact reductions would occur in Sumpter Township (50%), Romulus (49.5%), Huron Township (12.3%), Westland (3.4%), and Inkster (2%) with increases in Dearborn Heights (11%) and Taylor (15.7%). While this option would increase the altitude of departures relative to the Baseline, the changes in runway use would result in increased impacts in to some communities and reductions in others.

FAA guidance for implementing the National Environmental Policy Act (NEPA) states that a 1.5 DNL increase in noise to noise sensitive uses (i.e., residences) within the 65 DNL due to federal action is considered a significant impact. A review of the noise exposure contour indicates that a 1.5 DNL increase in noise due to Option 9b would not be expected. Therefore, the FAA is likely to require completion of an Environmental Assessment (EA) that may be eligible for a Finding of No Significant Impact.

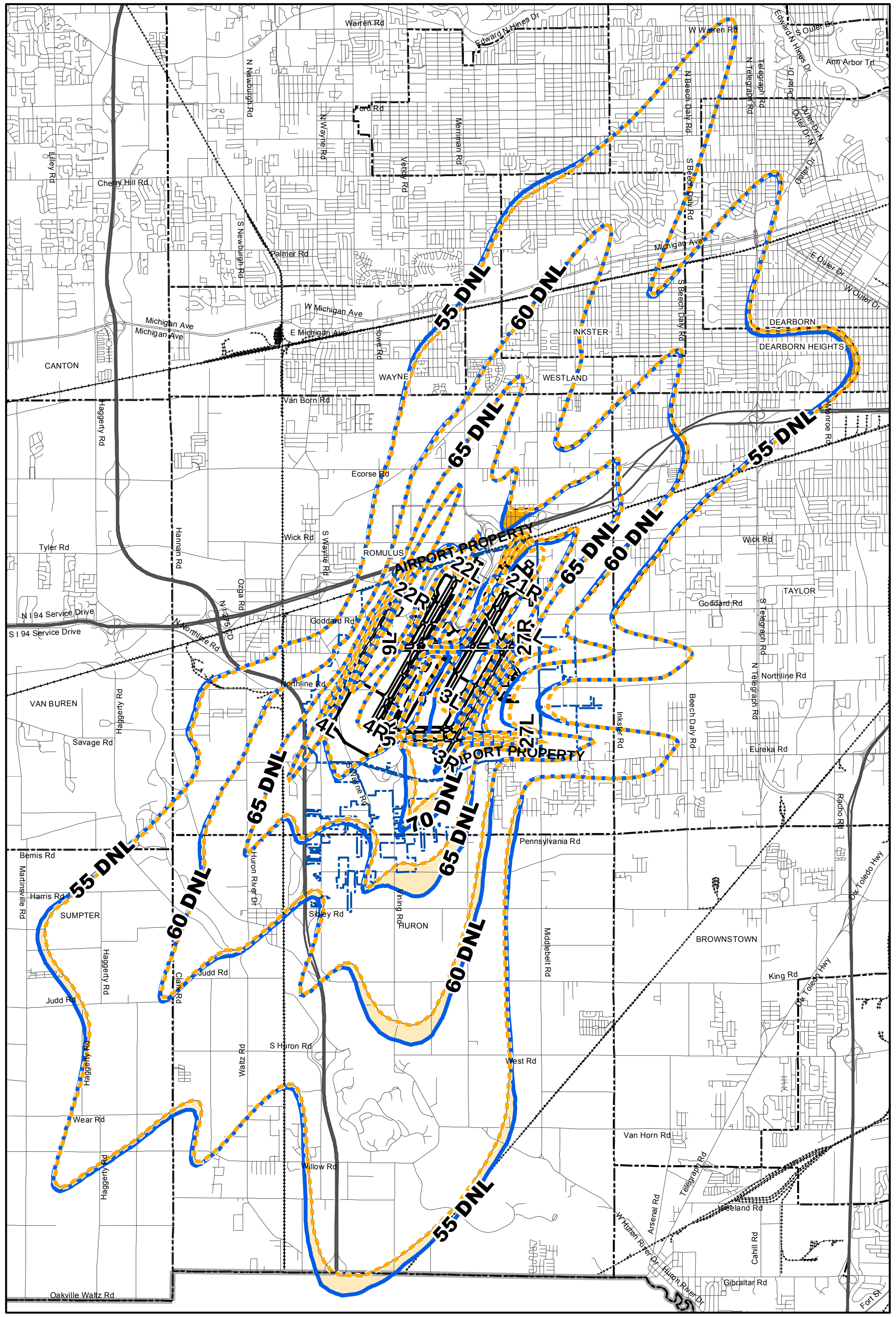
Operational Impacts:

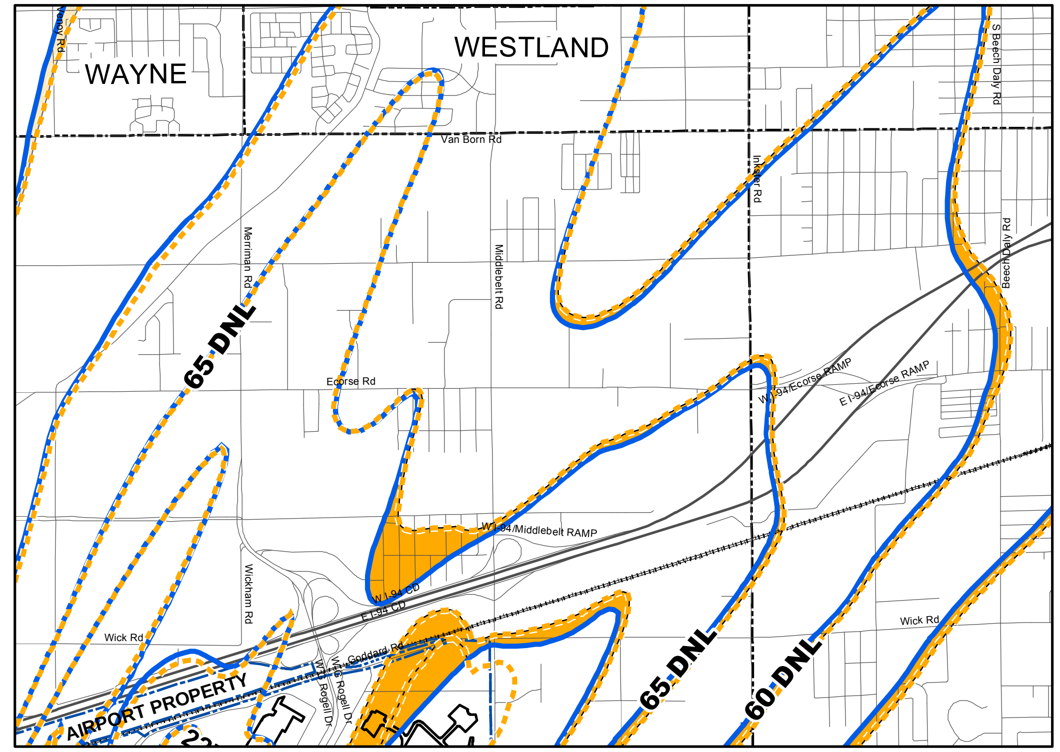
The north extension of 3,500 feet would be designed to allow aircraft to depart to the north or south on Runway 3L/21R without restricting aircraft movement on Taxiways J or T. The north extension is not anticipated to result in any additional restrictions to aircraft movements on the ground.

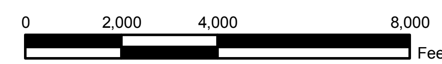
Departure activity would be impacted in that all aircraft types could use the runway, as opposed to the current restrictions on aircraft use due to the limited runway length. Although the FAA has ultimate responsibility for the control of aircraft flight, this alternative could potentially decrease FAA ATC workloads and overall aircraft delay, by eliminating restrictions and the imbalance in departure demand experienced with the existing runway length.

The option does not appear to have any legal issues associated with its implementation. As noted earlier, this option is not expected to create a 1.5 DNL increase in aircraft noise and thus, compliance with NEPA could be expected with an Environmental Assessment.

Figure G25 **Option 9b, Extend North**







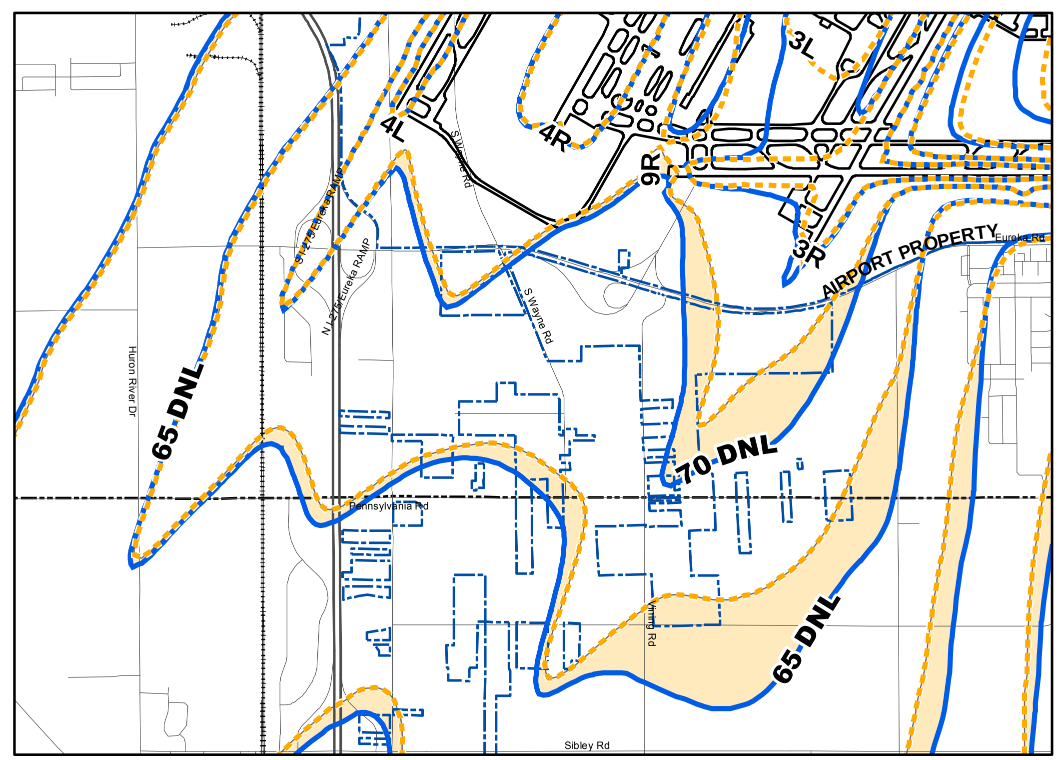


TABLE 9 Population Comparison within the DNL Noise Contours- Runway Extensions	Baseline (2011)/No Action		Option 9a- North and South Extension		Option 9b-North Extension		Option 9c-South Extension	
65-70 DNL	Population	Housing	Population	Housing	Population	Housing	Population	Housing
Huron Township	90	40	70	30	40	20	100	40
Romulus	730	330	670	310	730	340	690	310
Taylor	0	0	10	10	10	10	0	0
Westland	120	60	130	60	100	50	90	40
Subtotal	940	430	880	410	880	420	880	390
70-75 DNL								
Romulus	50	30	50	30	50	30	40	20
Subtotal	50	30	50	30	50	30	40	20
65 DNL & Greater								
Huron Township	90	40	70	30	40	20	100	40
Romulus	780	360	720	340	780	370	730	330
Taylor	0	0	10	10	10	10	0	0
Westland	120	60	130	60	100	50	90	40
Subtotal	990	460	930	440	930	450	920	410
60 DNL & Greater*								
Dearborn Heights	1,000	310	1,010	320	1,110	360	920	280
Huron Twp.	2,040	780	1,820	700	1,790	690	2,040	780
Inkster	4,560	1,980	4,460	1,930	4,470	1,950	4,290	1,870
Romulus	4,000	1,680	3,840	1,620	2,020	1,700	4,000	1,670
Sumpter Twp.	20	10	20	10	10	10	20	10
Taylor	3,000	1,210	3,230	1,270	3,470	1,380	2,070	770
Westland	2,360	990	2,240	940	2,280	950	2,240	930
Subtotal	16,940	6,960	16,620	6,790	15,150	7,040	15,580	6,310

Source: 2000 US Census   Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater

Legend

- City Limits Boundary
- 2011 Base Case
- 2011 Alternative 9b
- Option 9b, Area newly affected
- Option 9b, Area no longer affected

Source: US Census, 2000

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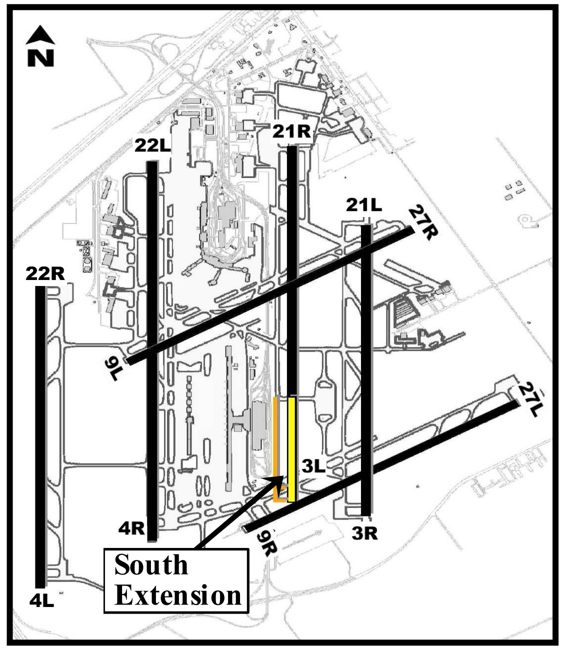
Conclusions of Consultant Team:

Continue to study the feasibility of implementing a runway extension.

Option 9c – South Extension of Runway 3L/21R



Description of the Option:

This option for extending Runway 3L/21R to 12,000 feet includes a 3,500 foot runway extension to the south with accompanying parallel Taxiway M.

Comparable Existing Procedure(s):

In general, departures occur on the two inner runways (Runway 3L/21R and Runway 4R/22L) and arrivals occur on the two outer runways (Runway 3R/21L and Runway 4L/22R). Thus, Runway 3L/21R currently operates as a primary departure runway with only occasional arrival activity. Long-haul widebody departures (regardless of their east or west departure destination), have used Runway 4R/22L due to its greater runway length. Not all wide body operations require the full runway length, thus, Runway 3L/21R is still used by widebody aircraft. Based upon historic radar flight track data, Runway 3L/21R is currently used by departing wide body aircraft 22% of the time while Runway 4R/22L is used 70% of the time. For the other types of departing aircraft, these two runways are used for roughly the same amount of time.

Modeling Assumptions/New Procedure:

It is assumed that Runway 3L/21R would be used by all aircraft types at the Airport, as runway length would no longer be a reason to favor the longer runway. By limiting the extension to the south, the extended runway would intersect with Taxiways T and J which serve the parallel runways. This crossing of the taxiways/extended runway, would likely require the establishment of a hold position so that ground control would have a location to hold aircraft from taxiing across the intersection when landing and takeoffs are occurring on the extended runway.

The following table presents the base case 2011 and Alternative 9 runway use assumptions for the wide body aircraft. The analysis assumes that the east complex (Runways 3L/21R and 3R/21L) and west complex (Runway 4R/22L and 4L/22R) would be used nearly equal. All other runway use and other assumptions are assumed to be the same with the proposed alternative.

	Departure Use of Runway-Widebody and Heavy Aircraft	
Runway	**Base Case**	**Alternative 9c**
Runway 4L/22R	<1%	<1%
Runway 4R/22L	70%	48%
Runway 3L/21R	22%	44%
Runway 3R/22L	5%	5%
Runway 9L/27R	<1%	<1%
Runway 9R/27L	<1%	<1%

Source: BridgeNet International, January 2007

The analysis assumes that arrival aircraft would continue to land at the same ground point as they do with the current runway configuration. Thus, arrival noise would be unaffected by this alternative.

This runway would be extended in an area currently served by taxiways that facilitate movement of arrivals from runway 3R/21L and 9R/27L taxiing to the terminal area. The extension of the runway to the south would require aircraft landing on these runways to "cross" the extended runway. Due to the introduction of additional runway crossings associated with the extended runway to the south, aircraft would be unable to use Taxiways T and J in a free-flow manner while aircraft are operating on Runway 3L/21R.

Analysis of Option:

The analysis of this option considered both the noise exposure impacts of the option, as well as the possible operational effects.

Noise Analysis:

As required by FAR Part 150, the study relied upon the use of the average annual DNL noise contours to consider possible noise exposure consequences of the option.

Impact on Annual DNL Contour: **Table G17** shows the DNL noise contour results associated with this option in comparison to the No Action and to the other runway extension options. **Figure G26 Full-5** shows the Option 9c noise contours. As this table notes, this option would reduce overall population and housing exposed to 65 DNL by 70 people/50 houses in comparison to the Baseline, a 7.1% and 10.9% reduction respectively. Within the 65 DNL, changes would occur in the 70-75 DNL as well as the 65-70 DNL contours. Within the 60 DNL contour, the changes would be slightly more pronounced (a reduction of 8.2% in population and 9.3% in housing affected).

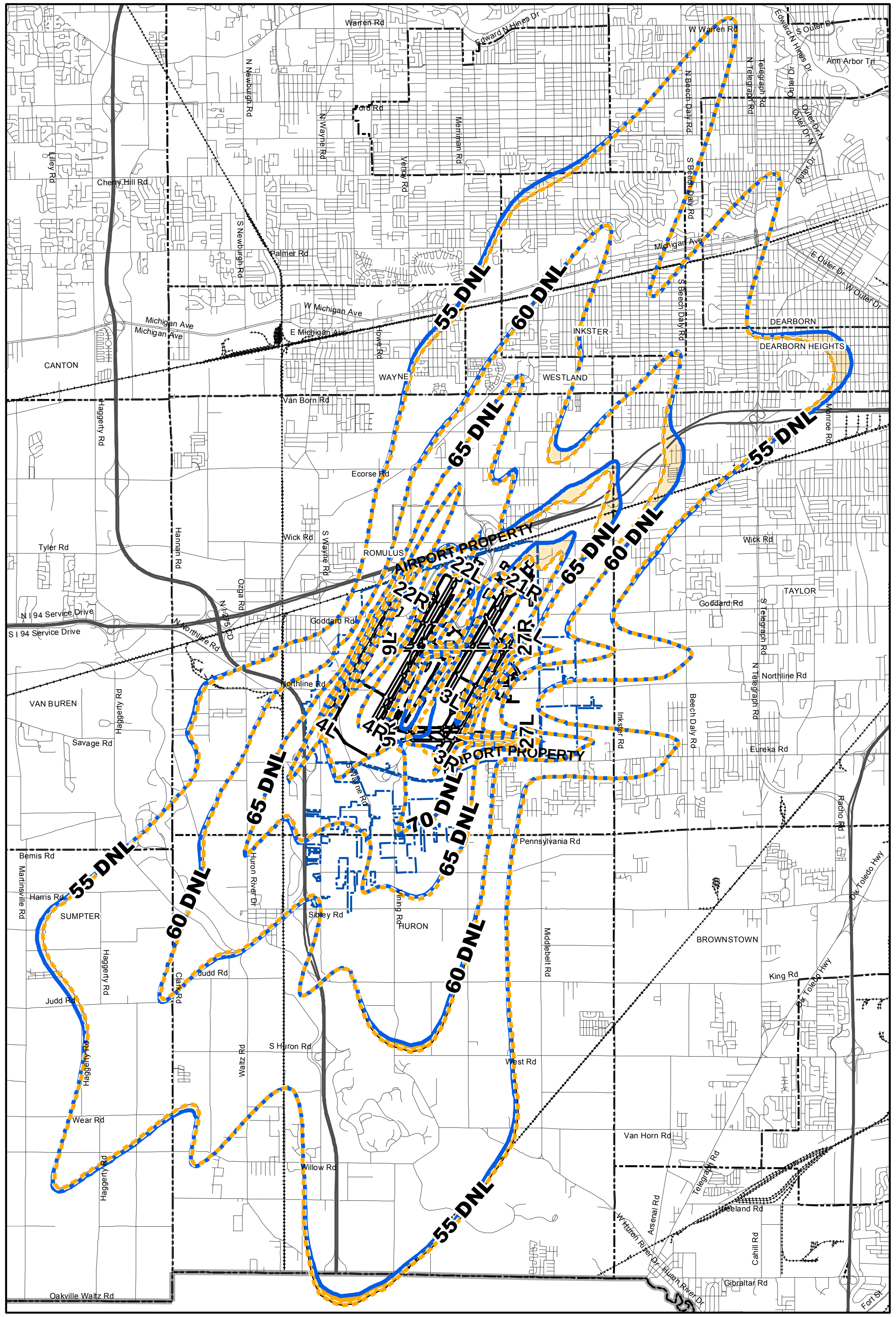
Within the 70 DNL contour, a reduction in impact would occur to Romulus (20% or a reduction of 10 people). Within the 65 DNL and greater contour, population impact reductions would occur in Westland (25%) and Romulus (6.4%) relative to the Baseline, with an increase in Huron Township (11.1%). Within the 60 DNL contour, population impact reductions would occur in Taylor (31%), Dearborn Heights (8%), Inkster (5.9%), and Westland (5.1%). While this option would increase the altitude of departures relative to the Baseline, the changes in runway use would result in increased impacts in to some communities and reductions in others.

FAA guidance for implementing the National Environmental Policy Act (NEPA) states that a 1.5 DNL increase in noise to noise sensitive uses (i.e., residences) within the 65 DNL due to federal action is considered a significant impact. A review of the noise exposure contour indicates that a 1.5 DNL increase in noise due to Option 9c would not be expected. Therefore, the FAA is likely to require the completion of an Environmental Assessment (EA) that may be eligible for a Finding of No Significant Impact.

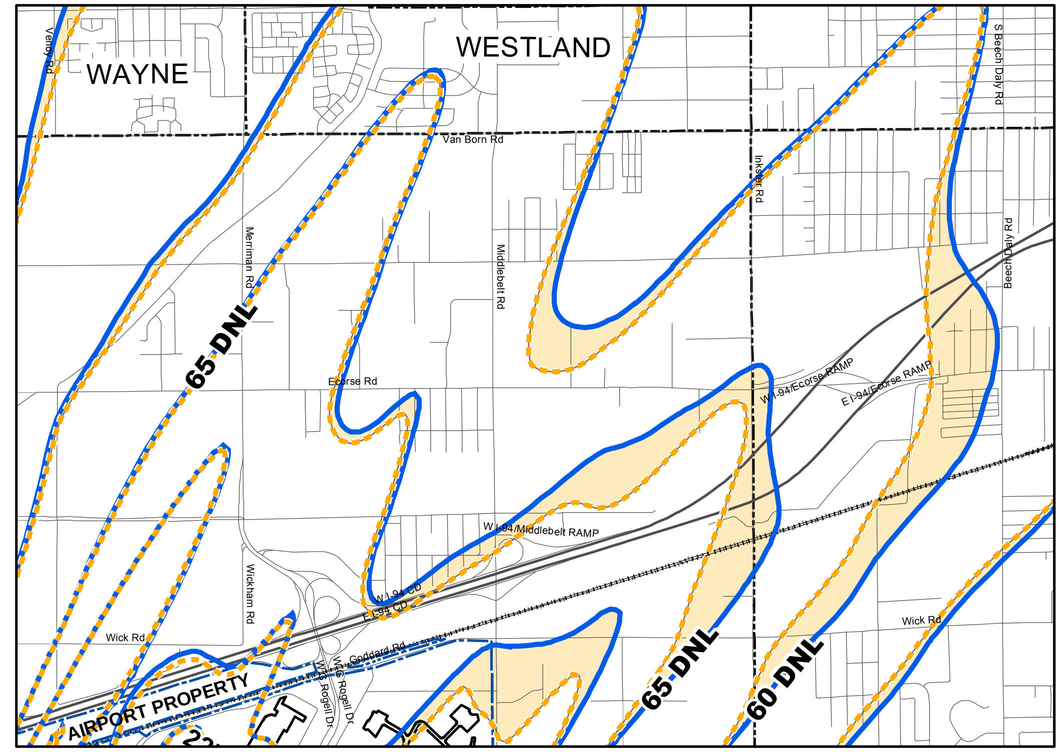
Operational Impacts:

The extension of the runway to the south would require aircraft to queue in a different location and because of its location, could result in an increase of air traffic controller workload. Additional restrictions to aircraft movements on the ground would occur because of the departure queue. However, departure flexibility would be improved in that all aircraft types would be enabled to use the runway, as opposed to the current restrictions on use due to the limited runway length.

Figure G26 **Option 9c, Extend South**



0 1 2 4 Miles



0 2,000 4,000 8,000 Feet

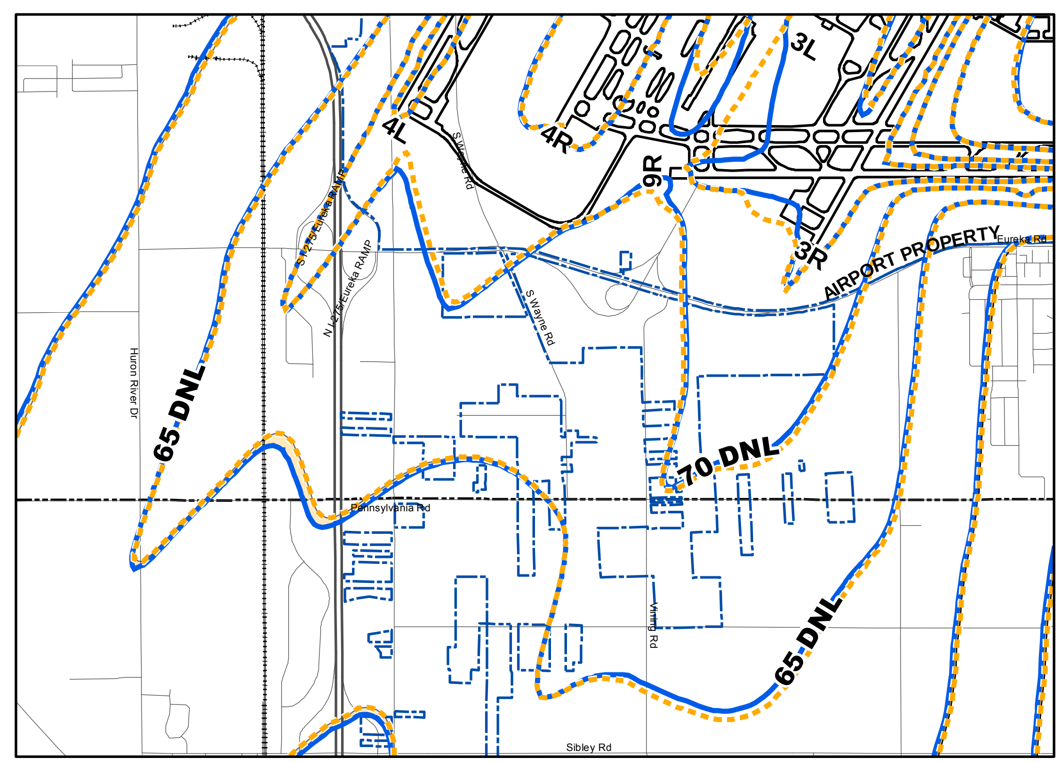


TABLE 9
Population Comparison within the DNL Noise Contours- Runway Extensions

	Baseline (2011)/No Action		Option 9a- North and South Extension		Option 9b-North Extension		Option 9c-South Extension	
65-70 DNL	Population	Housing	Population	Housing	Population	Housing	Population	Housing
Huron Township	90	40	70	30	40	20	100	40
Romulus	730	330	670	310	730	340	690	310
Taylor	0	0	10	10	10	10	0	0
Westland	120	60	130	60	100	50	90	40
Subtotal	940	430	880	410	880	420	880	390
70-75 DNL								
Romulus	50	30	50	30	50	30	40	20
Subtotal	50	30	50	30	50	30	40	20
65 DNL & Greater								
Huron Township	90	40	70	30	40	20	100	40
Romulus	780	360	720	340	780	370	730	330
Taylor	0	0	10	10	10	10	0	0
Westland	120	60	130	60	100	50	90	40
Subtotal	990	460	930	440	930	450	920	410
60 DNL & Greater*								
Dearborn Heights	1,000	310	1,010	320	1,110	360	920	280
Huron Twp.	2,040	780	1,820	700	1,790	690	2,040	780
Inkster	4,560	1,980	4,460	1,930	4,470	1,950	4,290	1,870
Romulus	4,000	1,680	3,840	1,620	2,020	1,700	4,000	1,670
Sumpter Twp.	20	10	20	10	10	10	20	10
Taylor	3,000	1,210	3,230	1,270	3,470	1,380	2,070	770
Westland	2,360	990	2,240	940	2,280	950	2,240	930
Subtotal	16,940	6,960	16,620	6,790	15,150	7,040	15,580	6,310

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater

Legend

- City Limits Boundary
- 2011 Base Case
- 2011 Alternative 9c
- Option 9c, Area newly affected
- Option 9c, Area no longer affected

Source: US Census, 2000

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The option does not appear to have any legal issues associated with its implementation. As noted earlier, this option is not expected to create a 1.5 DNL increase in aircraft noise and thus, compliance with NEPA could be expected with an Environmental Assessment.

Conclusions of Consultant Team:

Continue to study the feasibility of implementing a runway extension.

TABLE G17
Population Comparison within the DNL Noise Contours- Runway Extensions

	Baseline (2011)/No Action		Option 9a- North and South Extension		Option 9b-North Extension		Option 9c-South Extension	
65-70 DNL	Population	Housing	Population	Housing	Population	Housing	Population	Housing
Huron Township	90	40	70	30	40	20	100	40
Romulus	730	330	670	310	730	340	690	310
Taylor	0	0	10	10	10	10	0	0
Westland	120	60	130	60	100	50	90	40
Subtotal	940	430	880	410	880	420	880	390
70-75 DNL								
Romulus	50	30	50	30	50	30	40	20
Subtotal	50	30	50	30	50	30	40	20
65 DNL & Greater								
Huron Township	90	40	70	30	40	20	100	40
Romulus	780	360	720	340	780	370	730	330
Taylor	0	0	10	10	10	10	0	0
Westland	120	60	130	60	100	50	90	40
Subtotal	990	460	930	440	930	450	920	410
60 DNL & Greater*								
Dearborn Heights	1,000	310	1,010	320	1,110	360	920	280
Huron Twp.	2,040	780	1,820	700	1,790	690	2,040	780
Inkster	4,560	1,980	4,460	1,930	4,470	1,950	4,290	1,870
Romulus	4,000	1,680	3,840	1,620	2,020	1,700	4,000	1,670
Sumpter Twp.	20	10	20	10	10	10	20	10
Taylor	3,000	1,210	3,230	1,270	3,470	1,380	2,070	770
Westland	2,360	990	2,240	940	2,280	950	2,240	930
Subtotal	16,940	6,960	16,620	6,790	15,150	7,040	15,580	6,310

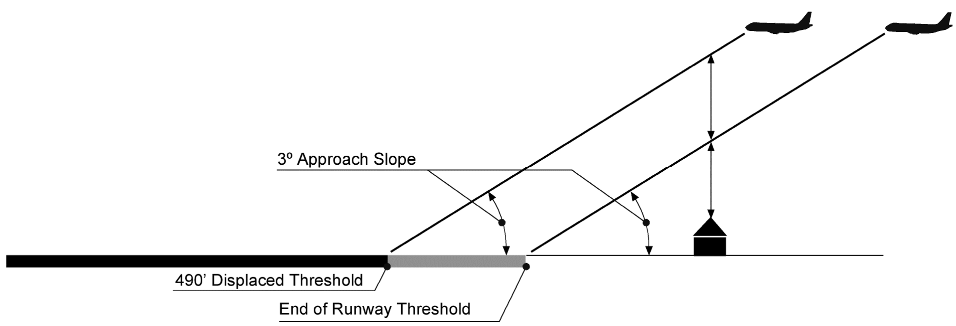
Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.

- includes the 65 DNL & Greater

Option 10: Displaced Landing Thresholds

Discussion:

The runway threshold is the marking on the runway that identifies the end of the runway available for landing or departure. A displaced threshold occurs when the runway marking is not at the physical end of the runway, but rather moved down the runway. Most displaced thresholds are in place to enable landing aircraft to clear tall structures or obstructions. Because the landing threshold is farther down the runway than the actual runway end, aircraft on approach must maintain a higher altitude to reach the extended touchdown point than would otherwise be necessary.



As this option is focused on increasing the altitude of arriving aircraft, its application was considered relative to arrival runways (3R/21L and 4L/22R).

Noise Abatement Procedure Goal:

The goal of this option would be to reduce noise levels from arrivals by increasing the altitude of arriving aircraft over noise sensitive areas. Displacing a landing threshold would slightly increase the altitude of the landing aircraft above residential areas immediately off the ends of the runway, as follows:

- For every 1,000 feet that the threshold is displaced, the aircraft would be about 50 feet higher on approach;
- A 50 foot increase in altitude on approach would reduce noise from each aircraft by about 1 dBA; and
- To achieve a sound level reduction that is perceptible to the human ear, a sound level reduction of 3 dBA or more would be required.

Description of the Option:

The average aircraft uses approximately 6,000 feet or less in runway length to safely land during good weather conditions. During poor weather conditions (including wet pavement), additional runway length may be required to stop; heavier aircraft require longer runways to stop. By displacing the threshold, the useable runway length is reduced.

Displaced threshold alternatives that were considered to reduce noise at DTW include:

1. To achieve a perceptible noise level reduction would require a displacement of 3,000 feet or more. Thus, Runway 4L/22R and 3R/21L (presently 10,000 feet in length) would be shortened to 7,000 feet. A reduction in runway length of 3,000 feet would adversely affect the operating capability of the runways at DTW. Thus, this sub-option was not considered further.
2. Alternatives that include displaced thresholds as well as runway extensions (See Options 9) would enable greater departure altitudes but not reduce arrival altitudes over noise sensitive areas.
3. While a displacement less than 3,000 feet would not provide an appreciable single event noise reduction benefit, some cumulative noise benefits could occur. Option 10 considered a 1,000 foot displaced threshold for Runway 22R and 21L.

Comparable Existing Procedure(s):

Current procedures have landing thresholds at runway ends with the maximum runway length available for arriving aircraft on all runways at DTW.

Modeling Assumptions/New Procedure:

The analysis assumed that the primary arrival runways from the north (Runway 22R and Runway 21L) are displaced 1,000 feet to the south. Displaced thresholds were not evaluated for arrivals from the south, due to the dominance of departure noise south of the Airport.

Analysis of Option:

The analysis of this option considered both the noise exposure impacts of the option, as well as the possible operational effects.

Noise Analysis:

As required by FAR Part 150, the study relied upon the use of the average annual DNL noise contours to consider possible noise exposure consequences of the option.

Impact on Annual DNL Contour: **Table G18** shows the DNL noise contour results associated with this option in comparison to the No Action and to the other runway extension options. **Figure G27 NW-5** shows the noise contours associated with displaced thresholds on Runway 22R and 21L (Option 10). As this table notes, this option would reduce overall population and housing exposed to 65 DNL by 80 people/40 houses in comparison to the Baseline, an 8.1% and 8.7% reduction respectively. Changes would occur in the 70-75 DNL contour as well as the 65-70 DNL contour. Within the 60 DNL contour, the changes would be less pronounced (a reduction of 2.7% in population and 3.3% in housing affected).

Within the 70 DNL contour, a reduction in population impact would occur to Romulus (20% or a reduction of 10 people). Within the 65 DNL and greater contour, population impact reductions would occur in Westland (75%) while impacts to other communities would remain the same relative to the Baseline. Within the 60 DNL contour, population impact reductions would occur in Dearborn Heights (22%), Inkster (5.7%), and Taylor (0.7%) with increases in Huron Township (0.5%), and Romulus (0.5%).

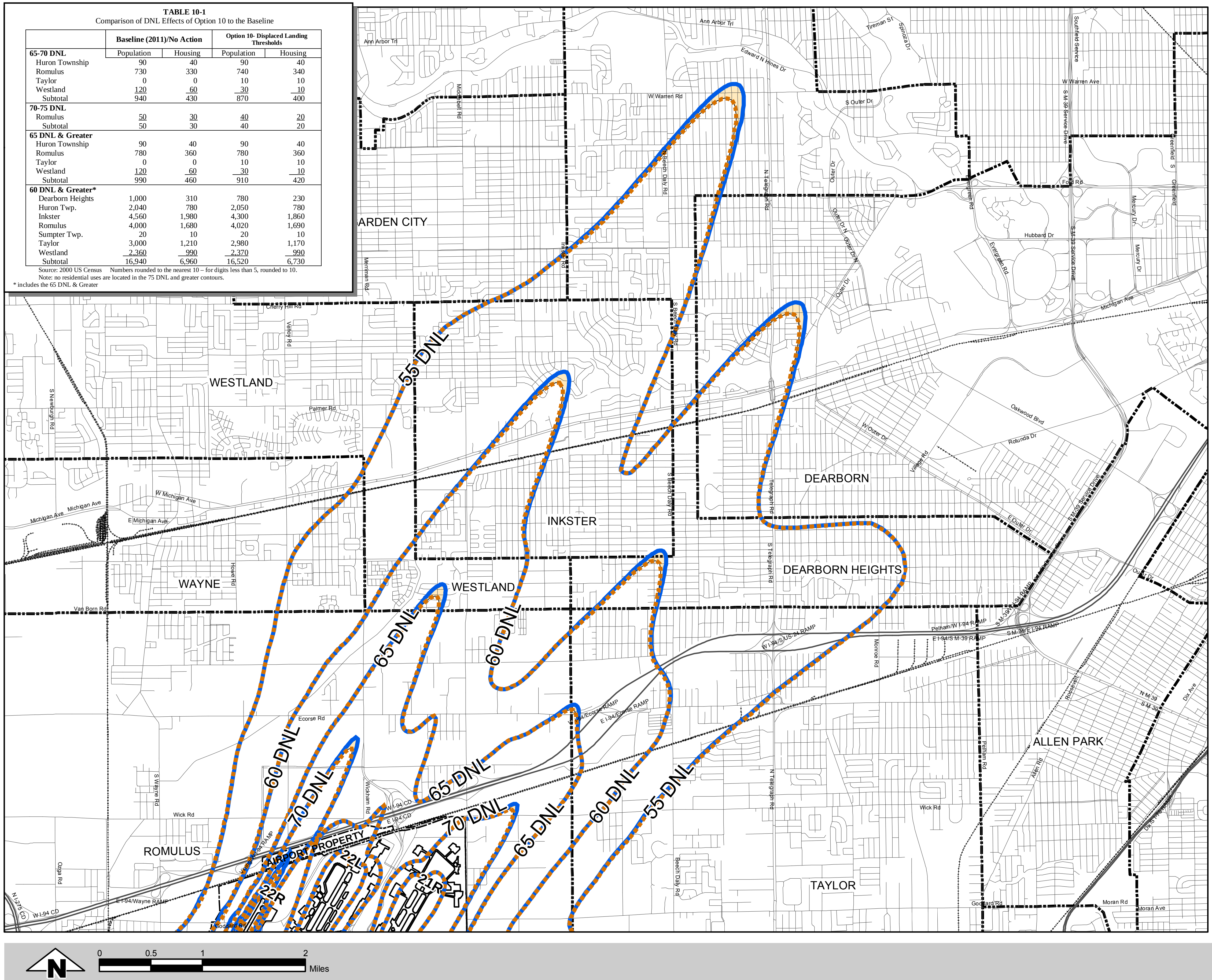
FAA guidance for implementing the National Environmental Policy Act (NEPA) states that a 1.5 DNL increase in noise to noise sensitive uses (i.e., residences) within the 65 DNL due to federal action is considered a significant impact. A review of the noise exposure contour indicates that a 1.5

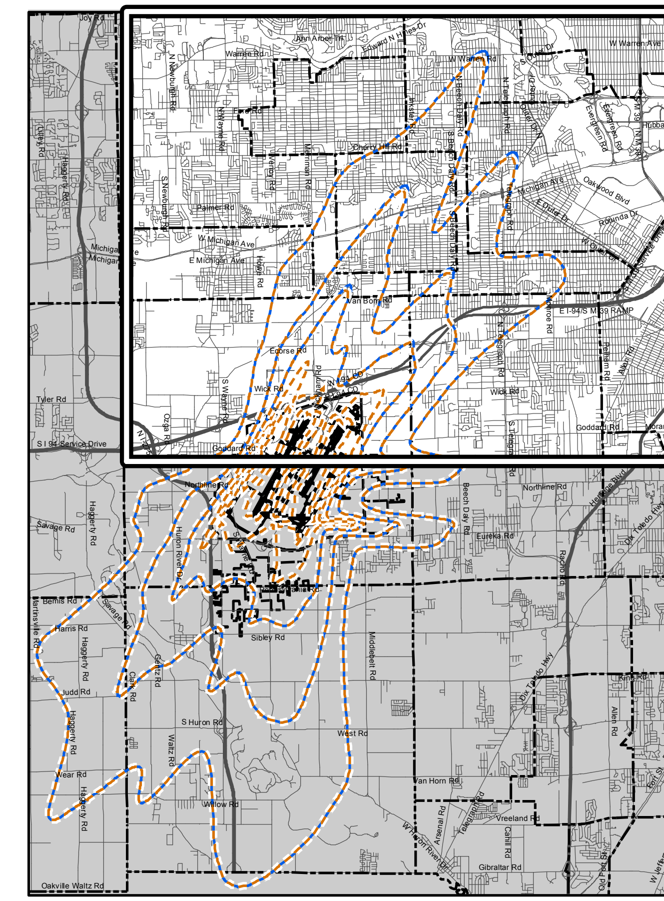
Figure G27 **Option 10, Displaced Threshold**

TABLE 10-1
Comparison of DNL Effects of Option 10 to the Baseline

	Baseline (2011)/No Action		Option 10- Displaced Landing Thresholds	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	90	40
Romulus	730	330	740	340
Taylor	0	0	10	10
Westland	120	60	30	10
Subtotal	940	430	870	400
70-75 DNL				
Romulus	50	30	40	20
Subtotal	50	30	40	20
65 DNL & Greater				
Huron Township	90	40	90	40
Romulus	780	360	780	360
Taylor	0	0	10	10
Westland	120	60	30	10
Subtotal	990	460	910	420
60 DNL & Greater*				
Dearborn Heights	1,000	310	780	230
Huron Twp.	2,040	780	2,050	780
Inkster	4,560	1,980	4,300	1,860
Romulus	4,000	1,680	4,020	1,690
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	2,980	1,170
Westland	2,360	990	2,370	990
Subtotal	16,940	6,960	16,520	6,730

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater





Legend

City Limits Boundary
2011 Base Case
Option 10, Displaced Threshold
Option 10 Area newly affected
Option 10 Area no longer affected

Source: US Census, 2000

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DNL increase in noise due to Option 10 would not be expected. Therefore, the FAA is likely to require completion of an Environmental Assessment (EA) that may be eligible for a Finding of No Significant Impact.

Operational Impacts:

Displaced threshold can alter the operational efficiency of an airport and can reduce the available stopping distance of a runway.

The option does not appear to have any legal issues associated with its implementation. As noted earlier, this option is not expected to create a 1.5 DNL increase in aircraft noise and thus, compliance with NEPA could be expected with an Environmental Assessment.

Conclusions of Consultant Team:

No conclusion is made at this time, pending discussion with the Study Advisory Committee. (Appendix Five, Six & Seven)

TABLE G18
Comparison of DNL Effects of Option 10 to the Baseline

	Baseline (2011)/No Action		**Option 10- Displaced Landing Thresholds**	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	90	40
Romulus	730	330	740	340
Taylor	0	0	10	10
Westland	120	60	30	10
Subtotal	940	430	870	400
70-75 DNL				
Romulus	50	30	40	20
Subtotal	50	30	40	20
65 DNL & Greater				
Huron Township	90	40	90	40
Romulus	780	360	780	360
Taylor	0	0	10	10
Westland	120	60	30	10
Subtotal	990	460	910	420
60 DNL & Greater*				
Dearborn Heights	1,000	310	780	230
Huron Twp.	2,040	780	2,050	780
Inkster	4,560	1,980	4,300	1,860
Romulus	4,000	1,680	4,020	1,690
Sumpter Twp.	20	10	20	10
Taylor	3,000	1,210	2,980	1,170
Westland	2,360	990	2,370	990
Subtotal	16,940	6,960	16,520	6,730

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.

- includes the 65 DNL & Greater

Option 11: High Speed Taxiway Exits

Discussion:

High-speed taxiway exits connect the runway to an adjoining taxiway at an angle of about 30-degrees enabling aircraft to exit the runway at higher than normal speeds and spend less time in the landing roll. Traditional taxiway exits are at a 90-degree angle to the runway, requiring the aircraft to slow to a near stop before making the turn onto the taxiway. High-speed taxiway exit use can reduce the amount of reverse thrust deployed by landing aircraft and can increase the capacity of the runway by reducing runway occupancy time. The ability to use high-speed taxiway exits depends on the runway length required by the landing aircraft. In general, larger/heavier aircraft require longer landing distances.

Noise Abatement Procedure Goal:

The goal of this option would be to reduce noise levels from landing jets, where pilots typically deploy reverse thrust to slow the aircraft. The high speed taxiway exits allow faster exiting of the runways with less need for reverse thrust.

Description of the Option:

High speed taxiway exits are typically used on primary arrival runways (3R/21L and 4L/22R) to maximize arrival efficiency and reduce the amount of reverse thrust required when landing, thus reducing noise generated in slowing aircraft. Currently, both primary arrival runways at DTW have high-speed taxiway exits, along with the primary arrival cross-wind Runway 9R/27L. Therefore, no further evaluation was conducted of this option.

Comparable Existing Procedure(s):

Existing primary arrival runways (4L/22R and 3R/21L) and the southern cross-wind runway (9R/27L) use high-speed taxiway exits.

Option 12: Ground Run-Up Procedures

Discussion:

Airlines must regularly conduct maintenance or repairs on aircraft systems and engines. For certain types of aircraft maintenance, engine run-up tests are conducted to demonstrate that the aircraft's in-flight systems are working properly before the aircraft can be put back into service. A run-up is a pre-flight test of the engine systems, where various levels of engine power are applied while the aircraft remains stationary. A substantial amount of noise can be created when run-up tests occur. As a result, airports often establish locations on the airfield for run-ups to minimize the impacts on nearby residences.

Noise Abatement Procedure Goal:

The goal of this option would be to reduce single event noise levels from aircraft maintenance engine testing.

Description of the Option:

The Airport Authority (Appendix Nine) has implemented ground run-up procedures for many years. A review was conducted of the existing procedures' effectiveness and consideration was given to improvements in the procedures. Run-up procedures could be developed for a number of locations adjacent to existing taxiways to enable aircraft to be oriented in a manner that directs aircraft noise away from populated areas and back towards the Airport. These procedures could serve as an updated program for conducting all run-ups.

Comparable Existing Procedure(s):

The Airport Authority (Appendix Nine) has established four (4) locations on the airfield where run-ups can be performed; each location has its own set of procedures to direct the aircraft in a position that would minimize noise exposure to the surrounding community. Below is a list of run-up locations and the allowed aircraft orientation (heading of the nose of the aircraft). Current locations approved for maintenance run-ups are located on **Figure G28.** These positions were identified during the 1992 Part 150 to minimize the noise impacts associated with conducting run-ups. Before conducting a run-up, the airline contacts the Airport Authority operations staff for a request to conduct the run-up and is then directed to one of the following locations.

Position	Allowed Aircraft Orientation
22R hold pad	Either 028° or 206°
27L hold pad	Between 135°-225°
3L deicing pad	Between 194°-211° or 014°-041°
Hold pad on Taxiway F	Between 081°-337°

A review of the historical noise complaint data shows that ground noise continues to be a concern to residents near the Airport. Community representatives on the Study Advisory Committee (Appendix Five & Six) have also expressed concerns about ground based noise.

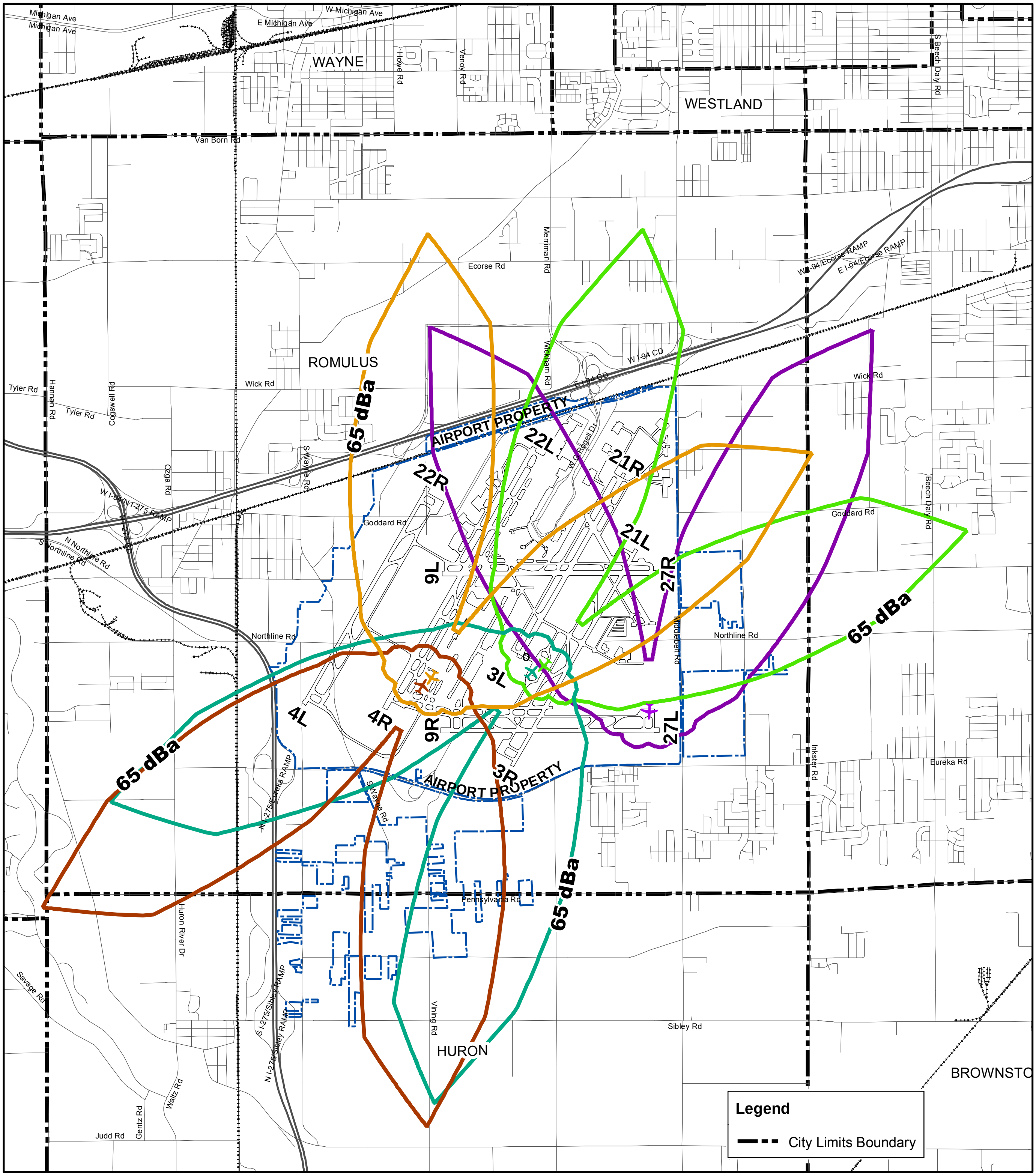

Figure G28 **Mitigated Single Event Ground Run Up**

0 3,000 6,000 12,000 Feet

Source: .

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Modeling Assumptions/New Procedure:

The assumptions related to ground run-up procedures focus on defining the use of a location in terms of type of aircraft, type of maintenance run-up, headings, and time of operation. All ground run-up activity would continue to occur at the current locations and noisier aircraft would use a new location. The specific uses of each run-up location would be more precisely defined so that the optimum location and orientation is used to direct the noise back toward the center of the Airport. These elements would be refined during the Fly Quiet Program (Option 17) or with Airport Operations personnel during the follow-up to this Study.

The proposed alternative would provide for an enhanced description of where and how each run-up can occur and then provide a means of tracking the compliance with these procedures. For instance, new vision detection systems can be used to cost-effectively track when and where run-up activities occur. This technology can also be used to detect when run-ups occur at un-authorized locations or orientations.

The proposed run-up locations are similar to the existing run-up locations, with the addition of one new position closer to the center of the Airport. This new location is more toward the center and south end of the Airport, where nearby population densities are less. This new location would be used specifically for only the loudest aircraft types that are performing a full power run-up.

Older generation jet aircraft (with low bypass ratio jet engines) generate notably higher run-up noise and require more run-up tests then new generation aircraft. At DTW, these are primarily DC9 aircraft along with some MD80s, 727 and B737-200 aircraft. Additionally an aircraft performing a full power run-up generates significantly greater noise then an aircraft performing a lower power run-up. Many new generation aircraft rarely require full power run-ups.

Analysis of Option:

The analysis of this option considered both the noise exposure impacts of the option, as well as the possible operational effects.

Noise Analysis:

DNL noise contours were not used to evaluate the noise impacts associated with ground run-up procedures. Noise from aircraft engine run-ups have varying characteristics depending upon the type of run-up procedure, the power level, the engine type, and the orientation of the plane. Full power run-ups present the greatest potential for noise impacts. The general characteristics of engine run-up noise are summarized below:

- Varying duration noise events that can last many minutes;
- Quick onset and drop-off of the noise;
- Dominant low-frequency characteristics that attenuate slowly;
- Magnitude of the noise is similar to departure ground roll;
- Some run-ups include a number of cycles at full power; and
- Greatest potential for impact is sideline to the Airport,

Run-up Noise Contours. Run-up noise contours were generated for the DC9 aircraft to represent the worst case aircraft. All other aircraft will generate less noise then this aircraft.

Figure G29 presents the Lmax 70 dBA contour for a DC9 aircraft run-up at full power at each of the existing run-up pad locations and permitted orientations. **Figure G30** presents the Lmax 70 dBA contour for a DC9 at the proposed centralized locations and orientation along with a new generation aircraft at each of the existing locations. **Table G19** presents a summary of the total population within all of the run-up locations combined. This table is a composite for the worst case run-up at each of the run-up locations. The results show up to a 38% reduction in the potential population exposed to Run-up noise greater than 70 dBA.

Operational Impacts

Outside of the revised run-up procedures and headings, no significant operational impacts resulting from development of centralized ground run-up procedures for the high noise event run-up activities were identified. There may be some increase in taxi time compared with the use of the current four locations.

The option does not appear to have any legal issues associated with its implementation either.

Conclusions of Consultant Team:

Consultants recommend this action as an interim improvement in run-up procedures until a GRE (Option 13) can be funded and constructed. However, if a GRE is not constructed, then the new run-up location should be permanent. Further development of this program could occur as part of the Fly Quiet Program (Option 17).

Table G19
Procedures for Ground Run-Ups

Noise Exposure	Population Affected		
	Existing Procedures	Proposed Procedures	% Change
65 Lmax			
Huron Township	200	240	+20%
Romulus	3,720	1,510	-68%
Taylor	1,130	0	-100%
Wayne	240	0	-100%
Subtotal	5,290	1,750	-49%

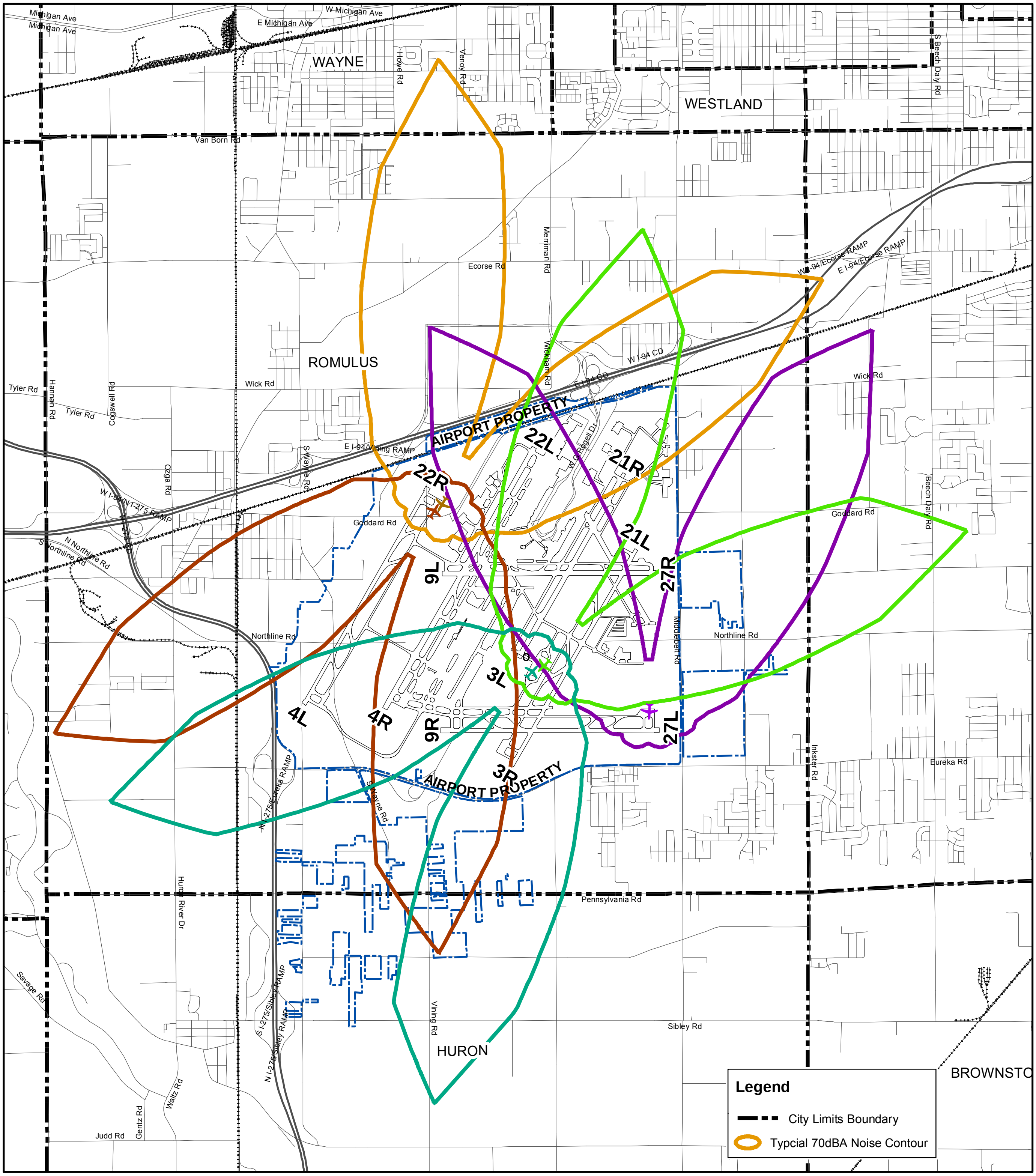

Figure G29 **Unmitigated Single Event Ground Run Up** (70 dBA)

0 3,000 6,000 12,000 Feet

N

Source: .

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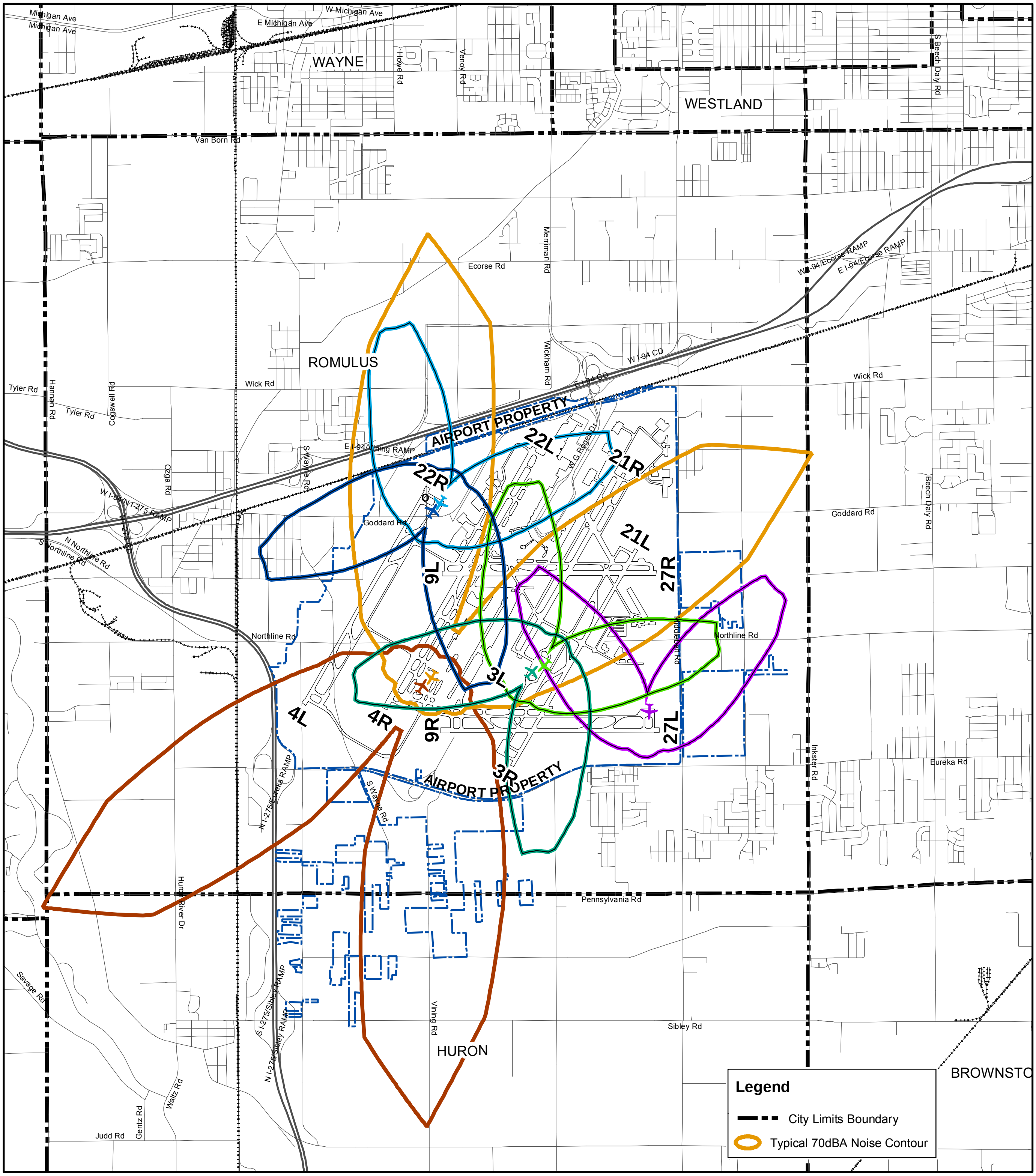

Figure G30 **Mitigated Single Event Ground Run Up** (70 dBA)

0 3,000 6,000 12,000 Feet

N

Source: .

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Option 13: Ground Run-up Enclosure (Hush House or GRE)

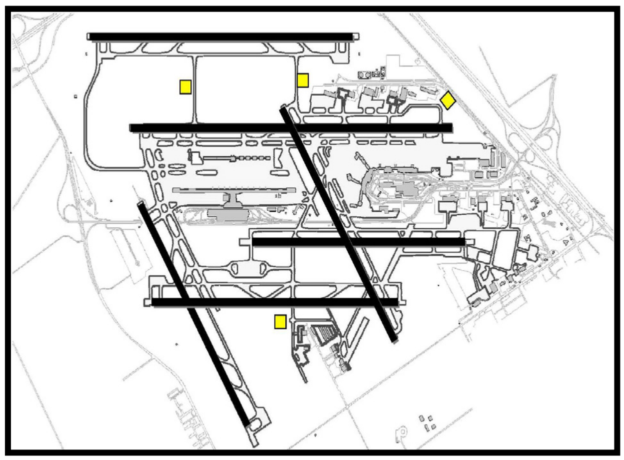
Discussion:

Airlines must regularly conduct maintenance or repairs on aircraft systems and engines. For certain types of aircraft maintenance, engine run-up tests are conducted to demonstrate that the aircraft's in-flight systems are working properly before the aircraft can be put back into service. A run-up is a pre-flight test of the engine systems, where various levels of engine power are applied while the aircraft remains stationary. A substantial amount of noise can be created when run-up testing occurs. As a result, airports often establish locations on the airfield for run-ups to minimize the impacts on nearby residences. An engine run-up enclosure (sometimes called a GRE or a Hush House) is a structure designed to deflect upward the noise from the run-up, thus reducing noise levels impacting areas surrounding the airport.

Noise Abatement Procedure Goal:

The goal of this option would be to reduce single event noise levels from aircraft maintenance engine run-up testing.

Description of the Option:



Aircraft ground run-ups are routine aircraft engine maintenance tests, which require the operation of an engine at high power for extended periods of time generating continuous elevated noise levels. GREs provide a location for such operations that minimizes engine noise to the surrounding community. A GRE could be sited in one of a number of locations adjacent to existing taxiways to enable aircraft to perform run-ups in a manner that minimizes aircraft noise for the surrounding populated areas.

Chicago O'Hare International Airport was the first large commercial service airport in the U.S. to developed a GRE. Pontiac/Oakland County Airport in Waterford, Michigan has also built a GRE. The O'Hare GRE cost $3 million (in 1999 dollars) and accommodates B-747 aircraft, whereas the smaller Oakland County GRE cost $3.5 million (2004 dollars) and accommodates general aviation aircraft, including business jets. One of the other variables in the cost of the GRE is if new pavement and access is needed to build the GRE facility. If a new pad is need, then the total costs can double.

- A GRE is a three-sided enclosure with no roof where aircraft taxi to for the purpose of conducting an engine run-up. The size of the facility is dependent upon the type of aircraft that would use the facility. An example of the cost vs. size of the facility is presented below.

Aircraft	% of Run-ups that could use facility of this size	Cost ($million)	Land Site (sq ft)
B-747	100%	$5.0	100,000
B-757	95%	$4.5	60,000
B-737/MD80	85%	$4.0	50,000

- The noise footprint for a DC9 aircraft run-up without a GRE at several locations was shown in **Figure G29**. The GRE would reduce noise levels by roughly 15 dBA. The DC9 aircraft is representative of the worst case aircraft in terms of run-up noise at DTW. Although smaller than a B747, older technology jets such as DC9's generate higher noise levels. The location shown on **Figure G31** is one of the possible locations for a GRE.
- No locations exist at DTW that would eliminate all run-up noise from every area adjacent to the Airport. However, several locations could be used to minimize effects.
- A GRE can not be used in all wind conditions. GRE facilities are aligned with the prevailing winds. Assuming a south orientation of the GRE, the facility could be used about 95% of the time.
- Given the meteorological conditions that are present at the Airport, there are times that a GRE is less effective. This is typically during inversions, which at night occurs about 5% of the time. Under these conditions, the benefits of a GRE are less.

Comparable Existing Procedure(s):

Currently DTW does not have a GRE; rather four locations on the airfield are designated where run-ups can be performed, as discussed in Option 12, with each location having its own set of procedures to direct the aircraft in a position that would minimize noise exposure to the surrounding community.

Modeling Assumptions/New Procedure:

As shown above, four locations were identified for possible location of a GRE. The assumptions related to a ground run-up enclosure include unrestricted use in terms of both the headings and time of operation. All ground run-up activity would occur in the enclosure, unless wind conditions precluded the use of the GRE. The existing locations would no longer be available for maintenance activities in order to maximize the use of the GRE.

Analysis of Option:

The analysis of this option considered both the noise exposure impacts of the option, as well as the possible operational effects.

Noise Analysis:

Impact on Annual DNL Contour: DNL noise contours were not used to evaluate the noise impacts associated with a ground run-up enclosure. Noise from aircraft engine run-ups have varying characteristics depending upon the type of run-up procedure, the power level, the engine type, and the orientation of the plane. Full power run-ups present the greatest potential for noise impacts. The characteristics of engine run-up noise are summarized below:

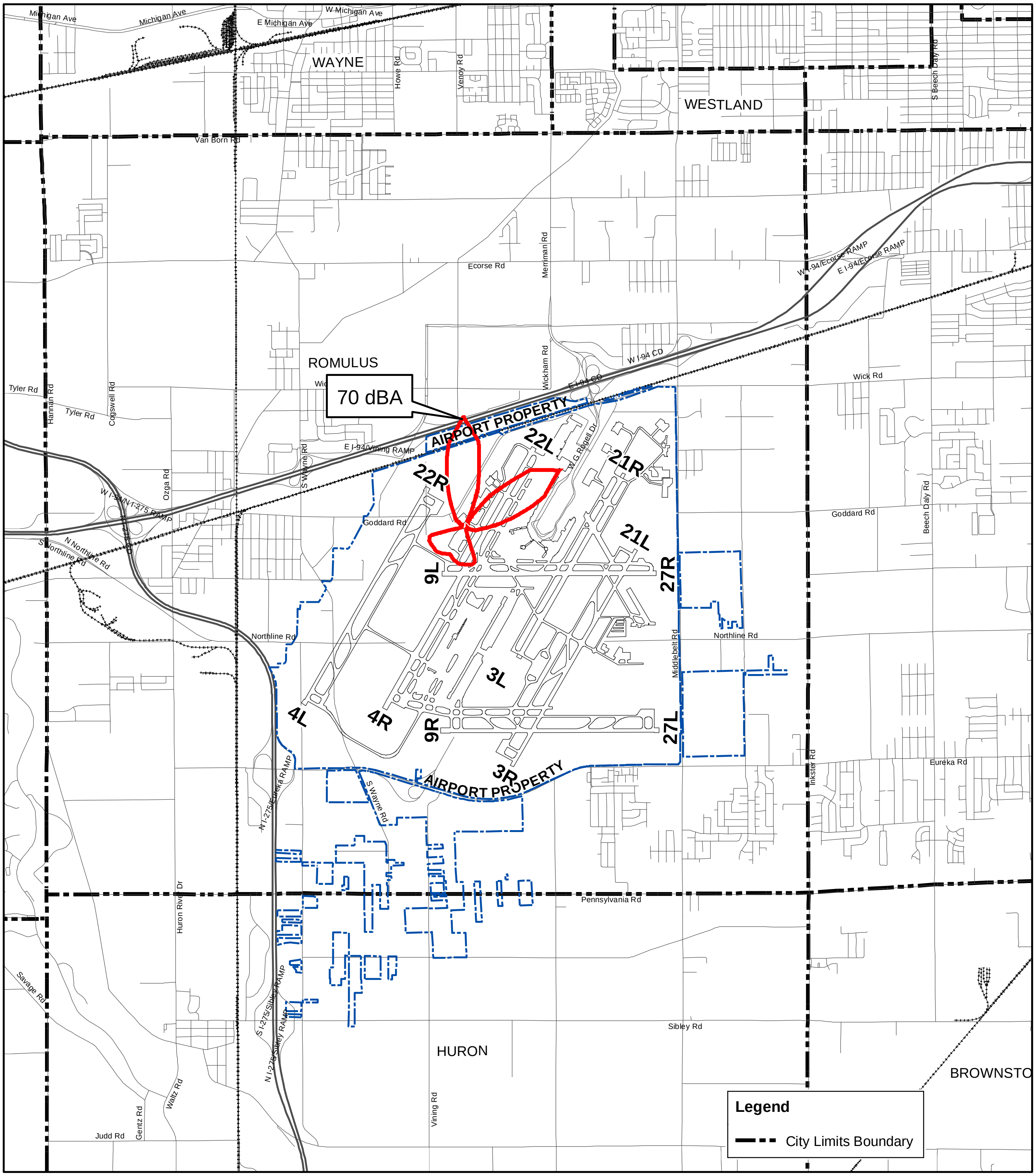


Figure G31 **Single Event Noise Contour**
Ground Run Up Enclosure

0 3,000 6,000 12,000 Feet

Source: .

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- ✓ Varying duration noise events that can last many minutes
- ✓ Quick onset and drop-off of the noise
- ✓ Dominant low-frequency characteristics that attenuate slowly
- ✓ Magnitude of the noise is similar to departure ground roll
- ✓ Some run-ups include a number of cycles at full power
- ✓ Greatest potential for impact is sideline to the Airport

Run-up Noise Contours. Run-up noise contours were generated for a DC9 (hush kited) aircraft. **Figure G31** presents the Lmax 70 dBA contour for a DC9 aircraft run-up at full power in the proposed GRE. The results show significant reductions in noise as a result of the use of a GRE and the centralization of all run-up activity. **Table G20** presents a summary of the total population within all of the run-up locations combined for the existing procedure and for the GRE alternative. The existing procedure table is a composite for the worst case run-up at each of the run-up locations. The results show for the GRE alternative up to a 100% reduction in the potential population exposed to Run-up noise greater than 70 dBA.

Operational Impacts

Outside of the use of the ground run-up enclosure for all maintenance activities, there are no significant operational impacts resulting from development of a centralized ground run-up enclosure. A GRE would require all run-ups to be conducted in a central location. Relative to current procedures, an increase in taxiing would be expected for aircraft to use the GRE, depending upon the location of the maintenance base with respect to the aircraft.

The option does not appear to have any legal issues associated with its implementation either. The development of a GRE may be categorically excluded under NEPA (FAA Order 1050.1e paragraph 310e), meaning that if extraordinary circumstances do not arise, an Environmental Assessment or an Environmental Impact Statement would not be required. No extraordinary circumstances are currently known, although it is suggested that a review of airport environmental conditions would be necessary to ascertain such conditions.

Conclusions of Consultant Team:

Recommended upon the identification of funding priorities.

Table G20
Ground Run-Up Enclosure (GRE)

Noise Exposure	Population Affected	
	Existing Procedures	**Proposed GRE**
65 Lmax		
Huron Township	200	0
Romulus	3,720	0
Taylor	1,130	0
Wayne	240	0
Subtotal	5,290	0

Note: The existing procedure Lmax is a composite for the worst case run-up at each of the run-up locations.

Option 14: Noise Barrier/Noise Wall

Discussion:

A noise barrier is an obstruction to the path of the sound, reducing noise to properties closest to the barrier. Once an aircraft becomes airborne, barriers have no further effect. Barriers include walls (those used along highways), earth mounds (berms), wall and berm combinations, or placement of buildings and landscaping. In the case of barriers, neighbors would be shielded from the noise source as long as the barrier is solid and sufficiently breaks the line-of-sight from the noise source to the listener. Barriers can potentially provide noise reduction benefits for communities near an airport from aircraft ground operations. The closer a barrier is to the noise source, the more effective the barrier.

The placement of barriers or berms is dictated by airport design guidelines and regulations, one of which is Federal Aviation Regulation (FAR) Part 77, which defines certain height restrictions at specified distances from runways. To ensure the safe operation of aircraft at the Airport, these restrictions would be followed, thereby making berms unfeasible in specific locations. Types of barriers include:

- Noise Wall – a wall, similar to that used along highways, that obstructs the view of the airfield, but also increases the distance noise is required to travel.
- Earth berm – Earth berms are generally composed of earth/soil with a ground cover such as grass, low-profile plants, small bushes, or trees. The height of the berm is dependent on its location on the airfield, its intended use, and proximity to airfield activities. Berms are generally located on airport property boundaries.
- Earth berm and wall combination – Earth berms can be combined with a wall to create a higher structure. Walls can be placed on top of an earthen berm to create a more aesthetically-pleasing noise barrier.
- Landscape – The placement of trees can be effective in breaking the line of sight between a noise source and the community. The density of the trees affects the dissipation of noise. At locations where aircraft noise levels are not substantially higher than the ambient neighborhood noise, landscaping can be a good alternative to reduce the line of sight. Landscaping is generally located on airport property boundaries. When placing landscaping at an airport, careful consideration must be made of the vegetation type relative to wildlife attraction that would be a hazard to aviation.
- Building placement – Airports can take advantage of existing buildings to shield communities from aircraft noise. If ground noise is an issue at an airport, the siting of new buildings can take into account how they can be used for noise reduction.
- Blast fence – Blast fences are used to deflect noise from engine start-up, run-up, and taxiing. Blast fences are located on apron areas, terminal areas, and airport property lines. Blast fences can vary in height and length depending on intended use.
- Ground Run-Up Enclosure (GRE) – A GRE is a three-sided structure that surrounds an area used for aircraft maintenance run-up. The aircraft backs into the GRE and then performs the run-up test. The walls of the GRE are relatively close to the engine, typically at least 20 feet high, and built of sound absorptive material; so, a GRE is very effective in reducing maintenance run-up noise.

The location of a barrier is dependent on its distance from the noise source, the orientation of the noise source, FAR Part 77 surface requirements, and the time of day. Noise propagation is louder in certain directions and during times of low ambient noise levels (generally nighttime hours). It is usually advantageous to locate a noise barrier as close to the noise source as possible; if this is not possible, aircraft should then be located as far away from non-compatible land uses as possible while still taking advantage of the noise barrier. In addition to locating an aircraft as far away as possible, the aircraft should be oriented so that noise will dissipate away from sensitive land use. For example, an idling jet should be parked with its tail pointed toward the community, because noise from an idling jet is louder at the front of the aircraft due to noise from the engine fans.

Comparable Existing Procedure(s):

Currently the noise barriers at the Airport consist of earth berms that are located along Eureka Road (the south border of the airfield), Middlebelt Road (on the east) from the northern retention pond to just north of Runway 9R-27L, and Wayne Road (on the west). **Figure G23** shows the locations of these existing earth berms.

Description of the Option:

To be effective in reducing noise, a barrier must either be close to the noise source or noise receiver. Given the layout of the Airport, existing berms, and the surrounding community, no new sites for barriers were identified.

Modeling Assumptions/New Procedure:

No new procedures would be implemented by the construction of the noise barriers/walls at the Airport.

Option 15: Noise Abatement Procedures for Use During Runway Maintenance

Discussion:

Noise from aircraft operations during runway/airfield maintenance can impact the surrounding communities to varying levels. Airfield maintenance includes closure of runways and taxiways for a defined time period. Closure of runways and taxiways at an airport due to maintenance creates similar conditions as occurs when highway maintenance occurs (delays and congestion, and temporary adverse environmental effects can arise). When runways are closed for maintenance, the traffic must be diverted to the available runways, which can increase the noise impact to the communities in the flight path of the open runways. To mitigate this unusual impact, noise abatement procedures could be implemented for use during runway maintenance.

Noise Abatement Procedure Goal:

The goal of this option is to minimize noise impacts during runway maintenance.

Description of the Option:

The development of a noise abatement procedure for runway/airfield maintenance involves; (1) establishment of a runway usage program specific to runway/airfield maintenance activities and (2) the development of a Community Outreach Program that brings affected members of the community together to raise awareness of any temporary changes in noise exposure occurring as a result of runway/airfield maintenance.

Keeping the surrounding residents informed of aircraft operations and estimates of noise pollution increases or decreases as a result of runway maintenance would not minimize the actual noise pollution, but would help keep relations between the Airport and the area residents consistent.

Comparable Existing Procedure(s):

Currently, no procedures exist to address noise abatement during runway maintenance.

Modeling Assumptions/New Procedure:

There are numerous possible runway maintenance activities that are needed at an airport. Because these maintenance conditions can include partial closure of taxiways and runways, as well as complete closure, the types of noise abatement procedures that would be considered vary according to the specifics of the maintenance. Therefore, it is recommended by the Consultant Team that the Airport identify its anticipated maintenance needs. Airports have a maintenance schedule that covers routine maintenance; in addition to scheduled maintenance, there is also emergency maintenance as a result of weather or aircraft activity, The Airport Authority (Appendix Nine) can then examine alternative noise abatement runway-use programs and coordinate these programs with the FAA and interested citizens. Option 18 of this study, Continuation of the Study Advisory Committee (Appendix Five, Six & Seven), recommends continuing the Study Advisory Committee to follow-up on the implementation of the recommendations of this study. The Study Advisory Committee would serve as a venue for presenting runway/airfield maintenance needs and discussing alternative noise abatement procedures, if possible, for use during the maintenance program.

Noise contours were not developed for this recommendation, as it is anticipated that if pursued, noise contours would be developed associated with each unique runway/airfield maintenance activity.

Analysis of Option:

The analysis of this option considered both the noise exposure impacts of the option, as well as the possible operational effects.

Noise Analysis:

As required by FAR Part 150, the study relied upon the use of the average annual DNL noise contours to consider possible noise exposure consequences of the option.

Impact on Annual DNL Contour: Noise contours were not developed as each runway/airfield maintenance project is unique. It is anticipated that the noise impact would vary based on the condition occurring at the time. However, if noise abatement procedures could be identified, noise contours could be prepared to show the effect relative to the runway/airfield maintenance conditions.

Operational Impacts

Operational impacts resulting from runway maintenance vary and would be the responsibility of the Air Traffic controllers to adjust traffic patterns for the interim.

The option does not appear to have any legal issues associated with its implementation.

Conclusions of Consultant Team:

The Consultant Team recommends implementation of this recommendation and further development of this program as part of the Fly Quiet Program (Option 17).

Option 16: Install Noise Monitoring/Radar Tracking System

Noise Abatement Procedure Goal: To install a state-of-the art flight tracking system, thereby enhancing Noise Management Office staff's ability to research and respond to public noise inquiries. This system could be connected to a noise monitoring system installed in the local community to record noise levels and monitor changes in noise over time.

Description of the Option: The purpose of a noise monitoring and flight tracking system is to gather reliable and consistent noise data over a considerable period of time. An integrated system includes many components, including a network of permanent noise monitors that measure the noise environment and a system directly connected to the FAA's air traffic control radar that collects aircraft flight tracks. This data is then used to evaluate any change in conditions over time, to identify specific problem flights or ground operations, to respond to citizen complaints, to monitor aircraft adherence to established flight tracks, and to keep a continuous record of noise levels in neighborhoods surrounding the Airport.

This action would consist of acquiring the required computer technologies and interfaces to enable collection of FAA radar data on a permanent basis. Such systems require agreements with the FAA on the collection and use of the data. A sound level measurement program could also be established with remote permanent sound level meters placed around the Airport. The sound level meters would connect to a central computer system. An integrated system allows for the correlation of noise measurements - where noise events are correlated with flight tracking data as well as weather and demographic data. The number of monitors varies from airport to airport, but for major commercial airports 20-30 stations are not unusual.

Comparable Existing Procedure(s): The Airport Authority (Appendix Nine) has periodically collected sound level measurements in the local community using portable equipment, and obtained FAA radar data as needed for studies.

Modeling Assumptions/Option: No modeling was conducted for this option.

Analysis of Option: A noise measurement system would cost approximately, $1 million for 25 permanent measurement stations. Implementation of just a flight tracking system would cost approximately $500,000. An integrated system that conducts measurements and correlates the measurements to flight operations would cost approximately $1.5 million.

Conclusions of Consultant Team:

The Consultant Team recommends implementation of this option subject to the availability of funding to acquire the required technology.

Option 17: Fly Quiet Report Card and Pilot Awareness Program

Noise Abatement Procedure Goal: Increase awareness and compliance concerning the use of various noise abatement procedures, including the performance of individual aircraft types or airlines. The Fly Quiet Report Card program is typically designed to provide a simple measure of compliance with the noise abatement programs at an airport.

Description of the Option: A Fly Quiet Report Card element could be included in many of the actions evaluated by the Part 150, but can be a stand-alone program as well. The Fly Quiet Report Card program is intended to monitor and evaluate the effectiveness and compliance with various noise procedures.

Comparable Existing Procedure(s): Detroit Metro Airport does not have a formal program for monitoring airline operations in the context of Fly Quiet. Currently, Detroit Metro Airport staff coordinates with the airline personnel regarding specific operational and noise abatement topics.

Modeling Assumptions: No modeling was conducted for this option. The following discuss the effects of the option.

Fly Quiet programs can take many forms. As a result, it is recommended that the full breadth of a Fly Quiet Report Card program be developed outside of the Part 150 process in consultation with citizen and airline input.

The Fly Quiet Report Card concept was first developed at Chicago O'Hare, and a similar program subsequently adopted at San Francisco International Airport. Several other airports have started to implement similar programs. These airports have found the Fly Quiet Program to create positive change in working with airlines to reduce annual and single event levels. The program is a reflection of the individual noise concerns and issues at each airport, as no two such programs are alike.

The purpose of Fly Quiet is measure/rank performance and then to motivate carriers by rewarding good noise abatement procedures and inspiring competition. The Fly Quiet Program can consist of a report card that monitors and evaluates the effectiveness and compliance with various noise procedures. The Fly Quiet Report Card is a program aimed at including air carriers and cargo carriers as active participants in noise abatement at Detroit Metro Airport. The reports are intended to be distributed to the airlines, other users, noise committee, and the local media outlets for positive coverage of the work being done at the Airport to abate noise.

The Fly Quiet Report Card program can be designed to consist of numerous categories that rate the performance of aircraft and/or aircraft operators pertinent to operations. Fly Quiet at Detroit Metro Airport could include current noise abatement procedures and new procedures from the Part 150 Study. The following describes the types of potential categories for the Fly Quiet Report Card program.

- **Airline Fleet Noise Quality**: Airlines are rated on the type of aircraft used, such as a marginal Stage 3 hush-kitted aircraft versus an aircraft that is designed as a Stage 3 aircraft.
- **Single Event Sound Exposure Level**: SEL ratings, based on the average certificated level for a type of aircraft, could be established for the permanent noise monitor locations. Aircraft could be rated by how many times they are over the set SEL limits. This rating category is typically used for departures.

- **Arrival and Departure Altitude Compliance**: This component of the program could measure how airlines comply with existing noise abatement procedures or existing and future goals relative to how aircraft should operate at Detroit Metro Airport:
  - **Departure Altitude**: Upon departure, aircraft would be graded based on their altitude at predetermined points, determined by the procedure in use. Good, marginal, and satisfactory altitudes are determined for specific locations based on procedures and historical data.
  - **Arrival Altitude**: Similar to the departure altitude grading, aircraft on arrival would be graded on the altitude the aircraft should be at for the particular arrival path used. Aircraft could also be graded along the arrival path, not at just one location.
- **Nighttime Procedures Compliance**: Aircraft operating at night would be graded on how well they fly existing or proposed nighttime noise abatement procedures.
- **Runway Use** Compliance with runway use targets.

The noise monitoring system is a key tool for the airport operator and citizens to keep track of unusual events as well as changes in the noise environment over time. It also is an important component to a new Fly Quiet Report Card program. The existing system should be reviewed and recommendations made for appropriate updating depending upon the final components of the Fly Quiet Report Card program.

Analysis of the Option:

No specific procedures would be implemented with a Fly Quiet Report Card program, but rather a program would be established for monitoring compliance with existing noise abatement procedures as outlined in the following discussion.

The following steps could be used to formulate a Fly Quiet Report Card program:

1. **Identify categories of aircraft for grading purposes:** The Fly Quiet Report Card program can be formulated with either one broad category or divided into subcategories of air carriers, turboprop carriers, and cargo carriers for purposes of grading or rating performance. The Fly Quiet Report Card program, regardless of how the categories are displayed, could grade aircraft performance based on the actual operations at Detroit Metro Airport.
2. **Identify Scoring System:** This Program is an excellent tool to explain aircraft noise to the public because of its easily understood scoring system. A methodology would be devised to score aircraft based on a 0-100% scale with the corresponding letter grade (A-F). While the Fly Quiet equations would be based on technical acoustical data, the scoring system would present the technical data in a report that translates the data into easy to understand terms.
3. **Determine components to be measured:** Sample categories have been outlined to show potential categories that could be used in a Fly Quiet Report Card program; it is ultimately the decision of the Airport Authority, in working with the public and the airlines, to identify which components are important to measure and report. The effectiveness of Fly Quiet comes from it rating the top four to five noise issues and giving airlines achievable goals rather than grading every published approach and departure.
4. **Rate importance of each component:** Once the components of the Fly Quiet Report Card are identified, its relative importance should then be determined.
5. **Identify method to publicize the results:** The Fly Quiet Report Card program is intended to be a positive tool for an airport to publish its noise abatement efforts. The Program results can be sent

to the local press, such as regional newspapers, community newsletters, and local television stations. Each quarter, a Fly Quiet Report Card press release would be sent to the press that covers airport events. In addition to the quarterly press release, the press would be invited to the annual Fly Quiet Awards.

Airport and ATC Operational Considerations: Would depend on the specific contents of the Fly Quiet Program, however, none are anticipated.

Effect on Aircraft Operators: Would depend on the specific contents of the Fly Quiet Program, however, none are anticipated.

Implementation Factors: None are anticipated. However, the Program cannot be used to force compliance of any specific procedure.

Legal Implications: None are anticipated. However, the Program cannot be used as a mechanism to fine or penalize operators in any manner.

Conclusions of Consultant Team:

The Consultant Team recommends that implementation of this option, subject to funding to enable installation of the necessary radar and monitoring technology (Option 16).

Option 18: Continuation of the Study Advisory Committee

Noise Abatement Procedure Goal: To utilize and preserve the body of knowledge developed through the Part 150 Study to review the progress of implementing the recommendations of this Noise Compatibility Program and provide feedback to the Airport Authority (Appendix Nine) on the effectiveness of the noise program.

Description of the Option: This action would result in continued meetings of the Study Advisory Committee for a 1 year period to monitor the Airport Authority's (Appendix Nine) implementation of the recommendations of the Part 150 Study.

Comparable Existing Procedure(s): The Study Advisory Committee consists of 38 volunteers appointed by the organizations they represent to participate in the Study Advisory Committee (Appendix Five, Six & Seven), whose purpose is to provide input to the Airport Authority (Appendix Nine) concerning noise abatement planning at Detroit Metro Airport. This committee was expected to sunset with the completion of the study.

Modeling Assumptions/Option: No modeling was conducted for this option, as it would not directly affect aircraft noise exposure.

Analysis of the Option: No analysis was conducted for this option. The Airport Authority (Appendix Nine) would hold committee meetings, on a regular basis, as a means of disseminating information and gathering input on noise abatement issues. The Committee could help the Airport Authority (Appendix Nine) in developing the Fly Quiet Program and provide input to the enhancement of the aircraft noise/flight track monitoring system.

Conclusions of Consultant Team:

The Consultant Team recommends that implementation of this option.

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT
FAR PART 150 NOISE COMPATIBILITY STUDY UPDATE

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CHAPTER H

POTENTIAL LAND USE & ADMINISTRATIVE ALTERNATIVES

Potential Land Use and Administrative Alternatives

The previous chapters presented the evaluation and analysis of airport operational noise abatement procedures. Included in those documents were the evaluation of approach and departure procedures, runway use alternatives/other operational procedures, and facility modifications. Those chapters addressed measures that could reduce the number of people affected by noise by changing the operational characteristics of aircraft flying into and out of Detroit Metropolitan Wayne County International Airport.

This chapter presents the evaluation, analysis, and recommendations of land use alternatives as well as administrative alternatives. Land use alternatives represent mechanisms that local land use officials can undertake to improve the compatibility of areas exposed to various noise levels. The analysis includes several measures that arose as a result of the public outreach process and discussions that have taken place at the Study Advisory Committee (SAC) meetings (Appendix Five, Six & Seven).

Summary of Land Use Alternatives

This alternatives analysis focuses on the evaluation of land use measures designed to reduce incompatible land use within specific noise exposure contours. Federal guidelines contained in FAR Part 150 indicate that residential development, along with other noise sensitive uses such as schools, religious facilities, hospitals, nursing homes, etc. should be discouraged from developing within areas exposed to 65 DNL and greater sound levels. These guidelines are recognized by the FAA and also by the Department of Housing and Urban Development, Department of Defense, and the Environmental Protection Agency, as well as numerous state and local agencies.

Land use compatibility actions can be placed in two groups:

- **Preventive**: prohibiting certain land uses from developing within the aircraft noise exposure contours. Preventive actions do not affect existing land uses but are targeted at preventing future noise sensitive uses. Preventive actions include zoning, building codes/subdivision regulation provisions, granting of avigation easements, sound attenuation requirements for new construction, buyer disclosure statements and comprehensive plan amendments.
- **Remedial or corrective**: Remedial or corrective actions are directed at correcting existing land use incompatibilities. Remedial actions may include sound insulation of single family structures, multi-family structures, sleeping portions of fire stations, hospitals, assisted living facilities, religious facilities, schools and libraries; purchase of non-compatible land uses within high noise contours; purchase of avigation easements; and sales assistance programs.

Preventative measures are within the authority of the local jurisdiction and usually of lesser concern to citizens living near the Airport because they apply only to new construction. Remedial measures are within the authority of the FAA to fund for existing homes inside the 65 DNL noise contour. Both types of land use alternatives were evaluated.

The Airport Authority (Appendix Nine) has been in the process of implementing remedial land use measures for the past several years, since the completion of the last Part 150 Study and the issuance of the Record of Approval in 1993. The Airport has sound attenuated approximately 2,510 houses at a cost of $79,000,000 dollars. About $5.4 million was spent to insulate schools. Homes most severely impacted (70 DNL and greater) were acquired -- about 275 homes in Romulus and Huron Township were acquired at a cost of about $35.7 million. Thus, the Airport Authority spent about $122 million from 1992-2007 to improve the compatibility of area land uses with aircraft noise exposure.

As was described in prior chapters, the following noise exposure impacts have been identified by this Part 150.

Table H.1
Summary of Existing and Future Baseline Noise Exposure Impacts

	Baseline (2004)/No Action		**Baseline (2011)/No Action**	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	160	60	90	40
Romulus	1,060	490	730	330
Taylor	10	10	0	0
Westland	110	50	120	60
Subtotal	1,340	610	940	430
70-75 DNL				
Romulus	40	20	50	30
Subtotal	40	20	50	30
65 DNL & Greater				
Huron Township	160	60	90	40
Romulus	1,100	510	780	360
Taylor	10	10	0	0
Westland	110	50	120	60
Subtotal	1,380	630	990	460
Schools	1		0	
Libraries	0		0	
Nursing Homes	0		0	
Hospitals	0		0	
Churches	0		0	

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours. No other noise sensitive uses are located in the 70 DNL and greater contour.

All of the noise sensitive uses[1] within the 2004 (existing conditions) and future (2011) 65 DNL noise contours have either been sound attenuated or have been offered, but refused, sound attenuation. **Because all noise sensitive uses within the 65 DNL contour have been offered/insulated, the emphasis of this chapter will concentrate on the preventative land use *measures*** that can be implemented by the various jurisdictions surrounding the Airport with land use control authority. Each of these measures is described in greater detail in the following pages. Land use measures recommended and approved in the previous FAR Part 150 Study, but not yet adopted or implemented by the entities having jurisdiction, remain as recommendations.

Evaluation Method:

The existing noise contour (2004) is the largest noise contour generated by aircraft operating at Detroit Metropolitan Wayne County Airport (DTW). For this reason, the existing contour will be used to quantify the number of structures and people eligible for participation for each of the land use measures.

For remedial land use measures (those eligible for Federal funding), the 65 DNL and greater contours will be used for evaluation. It is important to note that Federal policy precludes homes constructed after January 1998 within known noise contours from being eligible for Federal remedial land use funding associated with the recommendations. As previously noted, residential land use is considered compatible up to the 65 DNL and sometimes in higher contours, such as 70 DNL, if specific measures are taken such as additional sound insulation.

[1] Noise sensitive uses include: residences, schools, nursing homes, libraries, hospitals, and churches.

Land Use Alternative 1
Voluntary Sound Insulation of Noise Sensitive Structures Such as Single Family Homes, Multi-family Homes, Assisted-care Facilities, and Schools and Religious Facilities

Goal: To reduce the noise levels experienced inside noise sensitive uses. This would reduce aircraft-generated noise intrusion for sleeping, studying, and religious activities.

Description:

This alternative is a continuation of an existing program amended to include structures within the 65 DNL or greater noise levels of the 2004 contour. It proposes to voluntarily sound attenuate the habitable rooms in eligible structures to achieve an inside noise level of 45 dBA or less, with a minimum 5 dB reduction. The eligible structures include single family residences, multi-family residences, schools, and religious facilities. The sound attenuation costs would be borne by the FAA with Airport matching funds and would generally be an extension of the existing program. Previous sound attenuation work associated with Detroit Metro Airport has experienced costs upwards of $40,000 per unit, with additional administrative costs of about $10,000 per residential unit. To be eligible, the habitable rooms must currently be experiencing inside noise levels of 45 dBA or higher, and the house must have been constructed prior to 1998.

Based on the Existing Noise Exposure Map, there are approximately 630 housing units within the 65 DNL and greater noise contour and one school (Merriman Elementary). There are no hospitals or known religious facilities within the 65 DNL and greater noise contour. If sound insulation is determined to be a recommendation, then the feasible boundaries of such insulation must be identified. These boundaries are not necessarily required to follow the 65 DNL contour exactly, but can be determined by the closest **reasonable** physical boundary (major street, railroad track, highway, stream, etc.) beyond the contour so that neighborhoods are not separated, to the extent possible. This could slightly expand the number of housing units.

Discussion:

Sound insulation of specified units is eligible for Federal funding. However, the structure must be "brought up to code" prior to initiating sound insulation. Any structural changes or improvements required to bring the structure into compliance with existing codes is not eligible for Federal funding, and must be borne by the homeowner, or the local jurisdiction must waive the code requirements.

The implementation of this alternative is a continuation of the existing program that has been recently completed. As noted earlier, the Airport Authority has sound insulated 2,510 homes, and offered insulation to owners of 64 residences that declined participation. A review of the homes in the 2004 65 DNL contour indicates that all homes have been insulated, except 10 of the homes, all of which declined to participate in the earlier program.

Conclusions:

This alternative is a continuation of measures 10, 12b, and 13a approved by FAA in the 1993 Part 150 Noise Compatibility Plan for Detroit Metro Record of Approval. In preparing this Part 150 Study, updated noise exposure contours were prepared, as discussed in prior pages. The updated noise contours encompass fewer homes than the noise contours generated by the last Part 150 due to the continued introduction of quieter aircraft. Based on the completion of the prior sound insulation program, all but 10 homes in the 65 DNL contour have been insulated by the Airport Authority (Appendix Nine); these 10 homes in the 65 DNL declined participation in the sound insulation program. FAA funding priority below 65 DNL is very low, therefore no further analysis was conducted for this option.

Land Use Alternative 2
Acquisition of Non-compatible Land Uses or Undeveloped Land Zoned for Residential Use

Goal: To reduce the existence or potential of non-compatible land uses within the 65 DNL and greater noise contours.

Description:

This alternative would result in the voluntary purchase of non-compatible land uses within the 70 DNL contour, or the purchase of undeveloped property that is zoned (either existing or re-zoned in the future) for residential development within the 65 DNL or greater contour. This would be a continuation of the existing program at the airport, amended to include any additional areas within the new noise contours.

Discussion:

As noted earlier, the Airport Authority (Appendix Nine) acquired 275 homes in Romulus and Huron Township between 1997-2005 as part of the 1993 Part 150 Noise Compatibility Plan. As a result, there are no (0) noise sensitive land uses within the 75 DNL and greater noise contour and 20 homes within the 70-75 DNL existing baseline contour. All of the homes within the 70-75 DNL contour have been offered sound insulation. There are 610 homes in the 65-70 DNL contour, all of which have similarly been offered sound insulation (only 10 of the 610 homes have not been insulated, as these owners declined participation).

There are vacant residentially zoned properties that are within the 65 DNL and greater contours that could be developed into non-compatible land uses. Unless local jurisdictions put in place land use controls, land zoned for residential uses could eventually be developed for homes. The following table identifies the undeveloped land in the 2004 contour for DTW:

Table H.2
Existing Noise Contours

Existing Noise Contour	Acres
65-70 DNL	
Total land within the contour	4,970
Undeveloped residentially zoned	490
70-75 DNL	
Total land within the contour	2,925
Undeveloped residentially zoned	0
Total 65 DNL and greater	
Total land within the contour	9,475
Undeveloped residentially zoned	490

Source: Barnard Dunkelberg & Company, July 2007.

At an estimated cost of $70,000 per acre of undeveloped residentially developed land, the cost to acquire the area within the 65 DNL contour would be $9.2 million.

Conclusions:

Because of the cost associated with this alternative, and because it would remove lands from the tax roles of the local communities, the consultants recommend that preventive land use controls be pursued to prevent future residential uses from developing on these lands.

Land Use Alternative 3
Voluntary Acquisition of Avigation or Noise Easements Over Non-compatible Land Uses

Goal: To reduce the number of non-compatible land uses for residents wishing to remain in their homes but not participate in sound attenuation.

Description:

This alternative proposes to voluntarily purchase an avigation easement (right to fly over a property and make noise) from those owners of noise sensitive uses that do not desire to participate in the sound attenuation process.

Discussion:

The easement does not reduce or mitigate noise levels but does grant to the Airport the right of aircraft to fly over a particular piece of property and create noise or vibration. The purchase of an easement could be one of the options offered to the owner of a noise sensitive use in lieu of sound attenuation. The easement would be attached to the deed and "run with the land," meaning that it would be attached to the property title if the owner sells the property in the future. Some people do not feel comfortable with sound insulation, which places construction contractors inside their homes, replacing doors, replacing windows, etc. Sometimes, these residents prefer selling an easement to the Airport. The cost of the easement is usually in the range of $2,000 to $4,000 and is determined based on fair market value as ascertained by the rules of appraisal.

Approximately 10 owners that were offered sound insulation from 1997-2005 that are currently located in the 65 DNL contour, elected to not participate in the sound insulation program. The cost to acquire easements from these homeowners could be as high as $40,000.

Conclusions:

Because sound insulation is a more effective alternative to addressing noise in the 65 DNL contour, the consultants recommend that preventive land use controls not be pursued.

Land Use Alternative 4
Voluntary Sales Assistance (Assurance Program)

Goal: To reduce the number of non-compatible land uses and to provide a means for homeowners to sell their homes for fair market value without the Airport taking ownership.

Description:

This voluntary alternative would continue the Sales Assistance Program as one option for owners of residential uses to participate in if they are eligible for sound insulation. Many times homeowners desire to sell their homes and feel that they cannot receive fair market value for a home due to its proximity to the Airport. This option helps alleviate that situation, but it does not require the Airport to actually purchase the home. As a result, if fair market could not be obtained, the Airport would compensate the current owner for a sale that is verified to be less than the current fair market or appraised value. The 1993 Part 150 Study Record of Approval included this action, in exchange for an avigation easement, for areas inside the 70 DNL contour (action 12c and 13b).

Discussion:

Under the Sales Assurance Program, the homeowner is guaranteed fair market value for the property. In this type of program, the airport operator does not take title to the property, but rather compensates the property owner for the difference between fair market, and the value offered by a verified purchaser. Should the property sell for less than the appraised value, the Airport operator would compensate the selling owner for the shortfall. Property is appraised at its current fair market value of the homeowners' interest "as is" subject to airport noise. The property is listed and sold, subject to the Airport's avigation easement that is conveyed to the Airport at sale of the property.

Simply stated, the home is placed on the market for fair market value. If the home does not sell within the average time that it takes a home to sell in the area, then the price is reduced. This continues until the home sells. At the time of the sale, the Airport Authority would pay the homeowner the difference between the selling price and the appraised value, with an avigation (noise) easement granted to the Airport at the time of sale. This option is most successful with single family, as opposed to multi-family structures, because the sales price of most multi-family structures are not sensitive to aircraft noise levels. Further, in most cases, the difference between the appraised value and the verified offer typically must exceed 10 percent for a property to be eligible for participation in a sales assistance program.

As noted earlier, sound insulation was offered to all of the owners of homes in the existing 65 DNL contour during the 1997-2005 period. Those participating in the program granted the Airport Authority an avigation easement. Therefore, this program would only be available to the homeowners that chose to not participate in the prior program -- an estimated 10 homes.[2] Assuming an average house value of $175,000 and a 15% purchase assurance value, the cost of this program would be approximately $262,500 at $26,500 per home.

Conclusions:

Because of the cost associated with this alternative, and because sound insulation is a more effective alternative to addressing noise in the 65 DNL contour, the consultants recommend that preventive land use controls be pursued.

2 64 homeowners elected to not participate in the Residential Sound Insulation Program based on the last Part 150. 10 of these homes are located in the existing baseline 65 DNL and greater noise contour.

Land Use Alternative 5
Disclosure Statements/Buyer Notification

Goal: To reduce the annoyance of aircraft noise intrusion to prospective residents by providing direct notice of the possibility of such intrusion prior to home purchase.

Description:

This alternative is intended to inform potential homeowners/renters that they are purchasing a home in an area where they might experience aircraft noise levels that could cause varying levels of annoyance. Notification of this type would allow the buyer/renter to make a conscious decision prior to purchasing/renting a home and reduce the resultant complaints of aircraft over flights.

Discussion:

There are generally two methods of providing buyer notification: 1) through the title search/analysis process and 2) at the disclosure/closing time of purchase. The title search method is effective with new home construction/subdivisions. As a condition to subdivision approval or the issuance of a building permit, such notice is placed on the subdivision plat or deed for each individual lot. Such notice is recorded on the deed and is identified in a title opinion or title insurance report, as are other similar notices. When using the disclosure method, the seller is required to disclose, on a standard disclosure form, if certain conditions exist. Conditions can include, 1) if the seller has ever been annoyed by aircraft noise, and 2) if the property is within a certain distance from an airport or within identified noise contours that have been officially adopted by the local jurisdiction. It is up to the local jurisdiction, which may require state enabling legislation, to require such buyer disclosure prior to closing a sale.

Conclusions:

Implementation of these two actions requires adoption at the local or state level, depending upon which method is implemented. The local jurisdictions have the authority to require notice to be placed on plats or deeds for new subdivisions or as a condition of building permit approval. This would be most effective for such approvals within the 60 DNL noise contour. This is similar to the types of notice required for other public health, safety and welfare issues such as severe terrain, underground conditions, historic district, and tax assessment districts. Seller disclosure statements generally require the passing of state enabling legislation and place the burden on the seller of the property. This is usually very difficult to implement.

This action was recommended during the 1993 Part 150 Study, but has not been implemented.

Land Use Alternative 5 – Disclosure Statements/Buyer Notification

The consultant team recommends that it be implemented.

Land Use Alternative 6
Building Code Requirements

Goal: To reduce the number of future non-compatible land uses through mandatory sound attenuation requirements for new construction of noise sensitive uses.

Description:

This alternative is the first of the preventive land use controls. It would amend building code requirements to include sound attenuation standards for any new construction of noise sensitive uses within certain prescribed boundaries, such as the 65 DNL contour. This is not a remedial remedy, but a preventive remedy in that it requires noise reduction or sound attenuation for new construction. Prior to building permit or plat approval, noise sensitive uses would be required, through construction techniques, to achieve a pre-determined reduction in the amount of noise between outside noise levels and inside noise levels.

Discussion:

When modifying the building codes, the code would not specify the means to achieve this reduction only that such reduction is necessary and the builder is given the option of how to achieve such reduction. Normally, the plat or building plans are certified to provide for the necessary noise reduction. This certification by an engineer or architect licensed to practice in the State is typically required by the building official of a local jurisdiction prior to the issuance of a building permit. In most parts of the country, regular energy codes and modern construction techniques result in approximately 20 to 25 dB noise reduction. FAA guidelines suggest a 25 dB reduction within the 65 DNL, a 30 dB reduction within the 70 DNL, and a 35 dB reduction within the 75 DNL. However, aircraft noise annoyances are experienced at lower noise levels (beyond the 65 DNL) and it may be advisable to achieve higher levels of noise reduction then are suggested by Part 150 guidelines. Experience has shown that it may be desirable to achieve a 30 dB reduction within the 65 DNL and a 35 dB reduction within the 70 DNL contours. Noise sensitive land uses within the 75 DNL or greater contours should be prohibited as adequate internal sound attenuation is not possible.

Once enacted, building code requirements would result in a slight increase in the cost of construction, as homes are built with the appropriate insulation. At other airport sites, contractors have found that the cost of such insulation, performed at the time of construction is less than $10,000 in comparison to the cost of retrofitting an already build home (estimated at $30,000).

Building code requirements are implemented by the local jurisdiction having land use control authority. Such requirements do not change the outside noise levels but do require the inside noise levels of new noise sensitive structures to be reduced to a maximum of 45 dB, the same as remedial sound attenuation requirements for existing structures. The requirements are based on some definable boundary, usually the DNL noise contours, and apply only to new construction within those contours. Such measures have been successful for many communities near airports in helping achieve compatibility where housing is at a premium. In addition, FAA policy is that any new noise sensitive use constructed after January 1998 within a published noise contour is not eligible for remedial sound attenuation. Therefore, if sound attenuation is to be achieved, it must be part of the initial construction process.

Conclusions:

As part of the 1993 Part 150 Noise Compatibility Plan, the Airport Authority (Appendix Nine) "encouraged the local jurisdictions to implement one or more" preventive land use controls, including building code modifications. The consultant team encourages that this alternative be retained and that a discussion occurs with the Study Advisory Committee (Appendix Five, Six & Seven) to identify ways to ensure that local jurisdictions (Huron Township, Romulus, Taylor and Westland) enact such requirements.

Land Use Alternative 7
Comprehensive Plan Amendments

Goal: To prevent the introduction of new non-compatible land uses through the land use planning and development policy process.

Description:

Comprehensive Plans are prepared by local jurisdictions to 1) identify current conditions in a community, 2) identify community goals and policies, and 3) identify plans for that community to achieve the goals. This alternative proposes to amend existing adopted comprehensive plans to achieve long-term land use compatibility of the jurisdictions lands with aircraft noise exposure from Detroit Metropolitan Wayne County Airport.

Community comprehensive plans are policy guides for the future development of a particular jurisdiction. Plans provide guidance for future land use development and land use changes. These plans are particularly important in the area around the Airport that may experience noise levels that could impact certain types of residential structures or public buildings. It is desirable that each community develop its plans and policies to be compatible with existing and future aircraft noise levels. This approach will help ensure that compatible development occurs in the future, as it is much easier to avoid the creation of land use incompatibilities than it is to remedy incompatibilities in the future.

Discussion:

All of the jurisdictions with land use control around the Airport have comprehensive plans. Jurisdictions in the State of Michigan, including counties, townships, and cities, have authority, through multiple state acts, to develop and implement plans, policies, and programs for development activities, land uses, and zoning. However, counties, townships, and cities are in most instances not required to develop or update such plans. Many of the cities have developed planning programs and documents; however, many have not been updated in recent time (past 20 years) and few of the jurisdictions near the airport have developed planning, land use, or zoning guidelines specific to aviation or aviation noise. The following paragraphs describe each of the cities in the 65 DNL contour:

- **City of Romulus**: The City of Romulus has a City Master Plan which was adopted in 1989. An update to the city's master plan is currently underway. The adopted City Master Plan recognized the influence of the Detroit Metropolitan Wayne County Airport and identified how the city plans to accommodate and adapt to the changing characteristics of the Airport and its immediate surroundings. The City of Romulus has adopted zoning ordinances which were made effective in June 2002 with revisions periodically updated. The zoning ordinances and associated 20 zoning districts have been enacted for the entire city. The City of Romulus has specifically identified an Airport District; which is primarily comprised of airport property; although, portions of airport property are zoned Light Industrial and General Industrial. The Airport District is designated to permit those uses, activities, facilities, and structures necessary for the safe and efficient operation of aircraft and for providing the services and facilities required to accommodate Airport patrons and employees. The zoning code outlines uses within the Airport district and details area, height, and placement requirements for all structures near the Airport. The zoning code also specifies that all structures permitted within the Airport District, within 700 feet of the district boundary, or within 700 feet of a major or secondary thoroughfare traversing the Airport District a site plan must be submitted to the Planning Commission for review.

- **Huron Township**: Huron Township has a zoning ordinance and master plan; however, there are no provisions related to the Airport or its operation.
- **City of Taylor**: The City of Taylor Code of Ordinances includes height restrictions for developments within the City, including a regulation that states that all building heights shall be subject to review and approval in relation to flight patterns at Detroit Metropolitan Wayne County Airport. Additionally, the regulations state that the City or Taylor reserves the right to submit development plans to the Airport for their review, comments, and approval. The City of Taylor has enacted zoning ordinances and City Master Plan to guide their development. Neither documents airport-specific uses.
- **Westland**: The City of Westland has a planning and zoning ordinances in place; however, there are no provisions related to the Airport or its operation.

In preparing the chapter 1, **Inventory**, land use characteristic of all communities were reviewed. Other communities, located in the 60 DNL were also reviewed: Dearborn Heights, Inkster, and Sumpter Township. Each of the jurisdictions in the 60 DNL contour have adopted zoning ordinances, and a comprehensive plan/master plan. However no provisions for airport influences were found in these plans/ordinances

Conclusions:

As stated earlier, a comprehensive plan by itself does not reduce aircraft noise levels nor does it control the use of land, as it is just a policy statement of the intended future use of land. However, comprehensive plans do influence the development or change in use of any particular piece of property. They also serve as a guide for future development. One of the most influential uses of the comprehensive plan can be to officially adopt and present aircraft generated noise contours, and use those noise contours to help guide development.

As part of the 1993 Part 150 Noise Compatibility Plan, the Airport Authority (Appendix Nine) “encouraged the local jurisdictions to implement one or more” preventive land use controls, including building code modifications, compatible use zoning, noise overlay districts, and subdivision regulations. The consultant team encourages that this alternative be retained and that a discussion occur with the Study Advisory Committee (Appendix Five, Six & Seven) to identify ways to ensure that local jurisdictions enact such requirements.

Land Use Alternative 8
Zoning Code Changes

Goal: To protect the health, safety, and welfare of the public through the prevention of new non-compatible land uses within the vicinity of the Airport.

Description:

This alternative involves changes to local jurisdiction zoning codes to guide compatible development. A zoning code has more regulatory authority than a comprehensive plan. All development within a zoning district must be consistent with the designation assigned for any specific property. In other words, residential development can take place only in a district zoned for residential uses. Thus, the zoning ordinance and map are just as important, if not more so, than a comprehensive plan. The zoning code also prescribes development standards that new development must meet. This can include sound attenuation, granting of an avigation (noise) easement, disclosure notification and other related standards.

Discussion:

Existing zoning for the most part is compatible for residential uses with the higher (louder) DNL noise contours within the Airport environs. However, residential and other noise sensitive uses are allowed in the outer or quieter noise contours, the 55 DNL and 60 DNL contours. As experience has shown, and made clear in this study, noise complaints and concerns are common in those areas outside the 65 DNL noise contour. Thus, consideration should be given to restricting residential and other noise sensitive uses between the 55 DNL and 65 DNL contours, and not just within the 65 DNL and greater contours.

One dilemma of contemporary land use planning results from the desire to integrate mixed use development, which introduces residential development into higher density commercial, office, and retail development. While the majority of an area may be non-residential, the introduction of residential units can result in noise concerns that were not as prevalent with non-residential uses. Zoning code amendments can stimulate some desired community development changes while at the same time introduce new citizen concerns.

All of the jurisdictions with land use control around the Airport have comprehensive plans. Jurisdictions in the State of Michigan, including counties, townships, and cities, have authority, through multiple state acts, to develop and implement plans, policies, and programs for development activities, land uses, and zoning. However, counties, townships, and cities are in most instances not required to develop or update such plans. Many of the cities have developed planning programs and documents; however, many not been updated in recent time (past 20 years) and few of the jurisdictions near the airport have developed specific planning, land use, or zoning guidelines specific to aviation or aviation noise. The following paragraphs describe each of the cities in the 65 DNL contour:

- **City of Romulus**: The City of Romulus has adopted zoning ordinances which were made effective in June 2002 with revisions periodically updated. The zoning ordinances and associated 20 zoning districts have been enacted for the entire city. The City of Romulus has specifically identified an Airport District, which is primarily comprised of airport property; however, portions of airport property are zoned Light Industrial and General Industrial. The Airport District is designated to permit those uses, activities, facilities, and structures necessary for the safe and efficient operation of aircraft and for providing the services and facilities required to accommodate Airport patrons and employees. The zoning code outlines uses within the Airport district and details area, height, and placement requirements for all structures near the Airport. The zoning code also specifies that all structures permitted within the Airport District, within 700 feet of the district boundary, or within 700 feet of a major or secondary thoroughfare traversing the Airport District a site plan must be submitted to the Planning Commission for review.
- **Huron Township**: Huron Township has a zoning ordinance; however, there are no provisions related to the Airport or its operation.
- **City of Taylor**: The City of Taylor Code of Ordinances includes height restrictions for developments within the City, including a regulation that states that all building heights shall be subject to review and approval in relation to flight patterns at Detroit Metropolitan Wayne County Airport. Additionally, the regulations state that the City of Taylor reserves the right to submit development plans to the Airport for their review, comments, and approval. The City of Taylor has enacted zoning ordinances but does not document airport-specific uses.
- **Westland**: The City of Westland has planning and zoning ordinances in place; however, there are no provisions related to the Airport or its operation.

In preparing the first chapter, **Inventory,** land use characteristic of all communities were reviewed. Other communities located in the 60 DNL were also reviewed, including: Dearborn Heights, Inkster, and Sumpter Township. Each of the jurisdictions in the 60 DNL contour have adopted zoning ordinances. However no provisions for airport influences were found in the ordinances.

Conclusions:

Zoning can be a very effective means of controlling land use development and is the most widely used land use control. However, since it is the result of a political process, it can be changed or amended. Zoning codes and accompanying zoning district maps are accepted means to guide and control development within the vicinity of an airport. The local jurisdiction must determine what uses within which contours are considered to be non-compatible and can then pass reasonable measures to restrict such land uses within those contours.

As part of the 1993 Part 150 Noise Compatibility Plan, the Airport Authority (Appendix Nine) “encouraged the local jurisdictions to implement one or more” preventive land use controls, including building code modifications, compatible use zoning, noise overlay districts, and subdivision regulations. The consultant team encourages that this alternative be retained and that a discussion occur with the Study Advisory Committee (Appendix Five, Six & Seven) to identify ways to ensure that local jurisdictions enact zoning requirements.

The following summarizes the recommendations of the consultants and expands on the general discussion of potential land use measures just discussed. This discussion identifies first the recommendations for remedial actions, followed by preventive measures and administrative measures.

Remedial Measures - Consultant Recommendations

Goal: To provide remedial or corrective relief to those residents experiencing significant aircraft-related noise.

Description:

The Consultant's recommended remedial/corrective measures consist of the following:

- Disclosure statements/Buyer Notification.

As is noted, the Airport Authority has been in the process of implementing remedial land use measures for the past several years, since the completion of the last Part 150 Study and the issuance of the Record of Approval in 1993. The Airport has sound attenuated approximately 2,400 houses at a cost of $75,927,000 dollars. About $5.4 million was spent to insulate schools affected by 65 DNL. Homes most severely impacted (70 DNL and greater) were acquired -- about 275 homes in Romulus and Huron Township were acquired at a cost of about $32 million. Thus, the Airport Authority spent about $118 million between 1992-2005 to improve the compatibility of the area with aircraft noise exposure. All of the noise sensitive land uses in the 65 DNL contour have been offered participation in the sound insulation program.

Land Use/Administrative Recommendation 1: Implement a Disclosure Statement/Buyer Notification Program within 60 DNL. Implementation of these two actions requires adoption at the local or state level, depending upon which method is implemented. The local jurisdictions have the authority to require notice to be placed on plats or deeds for new subdivisions or as a condition of building permit approval. This would be most effective for such approvals within the 60 DNL noise contour. Seller disclosure statements generally require the passing of state enabling legislation and place the burden on the seller of the property.

Conclusion:

This **remedial** recommendation would not alter the number of existing noise sensitive uses within any contour, but could prevent additional incompatibilities and generate a buyer/renter awareness that the property is located in an area that could be exposed to annoying aircraft noise levels.

Preventive Measures - Consultant Recommendations

Goal:

To reduce the number of future/new non-compatible land uses within the 65 DNL and greater noise contours.

Description:

Preventive land use measures are solely within the authority of the local land use jurisdictions to implement; the Airport Authority has no land use control authority. Therefore, implementation of the preventive land use controls will rest with the local jurisdictions. The Consultant Recommendations consist of:

Land Use/Administrative Recommendation 2: Encourage the local jurisdictions to implement building code requirements. Building code requirements are implemented by the local jurisdiction having land use control authority. Such requirements do not change the outside noise levels but require the inside noise levels of new noise sensitive structures to be reduced to a maximum of 45 dB. The requirements are based on some definable boundary, usually the 60 DNL noise contours, and apply only to new construction within those contours. FAA policy is that any new noise sensitive use constructed after January 1998 within a published noise contour is not eligible for remedial sound attenuation. Therefore, if sound attenuation is to be achieved, it must be part of the initial construction process, and is best if reflected in the building codes.

Land Use/Administrative Recommendation 3: Encourage the local jurisdictions to implement Comprehensive Plan Amendments. As stated earlier, a comprehensive plan by itself does not reduce aircraft noise levels nor does it *control* the use of land, as it is just a policy statement of the intended future use of land. However, comprehensive plans do influence the development or change in use of any particular piece of property. They also serve as a guide for future development. One of the most influential uses of the comprehensive plan can be to officially adopt and present aircraft generated noise contours, and use those noise contours to help guide development.

Land Use/Administrative Recommendation 4: Encourage the local jurisdictions to implement compatible use zoning. Zoning can be a very effective means of controlling land use development and is the most widely used land use control. However, since it is the result of a political process, it can be changed or amended. Zoning codes and accompanying zoning district maps are accepted means to guide and control development within the vicinity of an airport. The local jurisdiction must determine what uses within which contours are considered to be non-compatible and can then pass reasonable measures to restrict such land uses within those contours.

Conclusion:

This set of preventive land use recommendations will reduce the number of new non-compatible land uses within the 65 DNL and greater noise contours. The overall cost to implement each of the recommendations is estimated to be approximately $30,000 in jurisdictional staff time through the normal plan and ordinance amendment process adopted by each jurisdiction. It is the responsibility of the local jurisdictions to develop and implement the recommendations. Airport Authority (Appendix Nine) staff can assist in the amendment process but the Airport Authority (Appendix Nine) has no authority to implement the recommendations.

Administrative Measures - Consultant Recommendations

Goal:

To assist in monitoring the success of the noise abatement recommendations, improve citizen liaison, promote citizen awareness and update the Part 150 Study when appropriate.

Description:

Administrative measures are those that the Airport Authority (Appendix Nine) can implement, with or without FAA funding, that are solely within their discretion. These measures will not result in noise reduction (as can be expected from the implementation of the operational noise abatement procedures), but will enable the Airport Authority to monitor the success of the program and to provide enhanced community response to issues of concern. They are not dependent upon other measures to be implemented prior to their implementation.

Land Use/Administrative Recommendation 5: Review and Update the Part 150 Study. A FAR Part 150 Study is intended to be a "living document," to be used as a tool to monitor and guide program development, and evaluate aircraft types and operations. The Study should be reviewed and updated as appropriate. The general guideline is whenever the actual operations are approximately 15% different from the forecast operations, the Noise Exposure Maps (NEMs) should be reviewed. In addition, anytime there are significant new non-compatible land uses within the 65 DNL or greater contours or if there are airport facility changes which may effect the contours, consideration should be given to reviewing the maps. At the end of the five-year study period (after date of Noise Compatibility Program [NCP] approval), the operations and mix should be re-evaluated to determine the extent to which they have changed and updated as appropriate.

In addition to the Recommendation to Review and Update the Part 150 Study, the following are Recommendations carried over from the last Working Paper that are Administrative in nature.

Option 16—Install Noise Monitoring/Radar Tracking System
Option 17—Fly Quiet Report Card and Pilot Awareness Program
Option 18—Continuation of the Study Advisory Committee (Appendix Five, Six & Seven)

Conclusion:

These administrative recommendations will ensure that the Noise Compatibility Plan is adjusted as conditions in the environs of the Airport change over time.

Draft Airport Part 150 Recommendations

The previous chapters presented the Consultants Draft Recommendations. After discussion with Airport Staff and Management, the following have been identified as the Draft Airport Recommendations. These may be refined subsequent to further study and public comment, but will be the basis for the Recommendations carried forward to public hearing. The Airport Authority will have final determination as to which Recommendations are presented to the FAA for approval as the Noise Compatibility Program.

Fight Track Recommendations

Option 3c—Runway 4R Departures-Concentrate a portion of South Turning Aircraft and Fan Others

Option 3d—Runway 3L Departures—Concentrate a portion of South Turning Aircraft and Fan Others

Option 1c—South Flow Option –Concentrate Noise Departures in South Flow Consideration of Dearborn Test (Similar to Option 2b)

Runway Use Recommendations

Continued South Flow Daytime

Option 5a—Extend Hours of Contra-Flow at Night

Option 6a—Off-set Approach to Runways 4L/22R

Arrival Descent/Departure Climb Recommendations

Option 8—Continuous Descent Approach

Airport Plans Recommendations

Option 9c—Further Study and Evaluate Extending Runway 3L/21 R South (or 9b-North)

Option 10—1,000 foot Displaced Thresholds for 21L & 22R

Option 12—Ground Run-up Procedures

Option 13—Ground Run-up Enclosure

Option 15—Nose Abatement Procedures for Use During Runway Maintenance

Noise Management Recommendations

Option 16—Install Noise Monitoring and/or Radar Tracking System

Option 17—Fly Quiet Report Card and Pilot Awareness Program

Option 18—Continuation of the Study Advisory Committee (Appendix Five, Six & Seven)

Land Use Recommendations

To be determined

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT
FAR PART 150 NOISE COMPATIBILITY STUDY UPDATE

DETROIT METRO • WILLOW RUN
WAYNE COUNTY AIRPORT AUTHORITY

CHAPTER I

ISSUES/ACTIONS & RECOMMENDATIONS

Issues/Actions and Recommendations

Introduction

This section presents the recommendations of this Part 150 Noise Compatibility Plan – herein referred to as the Noise Compatibility Plan (NCP), an update to the 1993 Plan. This recommendations chapter identifies the individual elements of the Plan, reflecting Noise Abatement or operational actions, land use compatibility actions, as well as program management/administrative actions. For each element of the Plan, this section identifies: the issue that the action is intended to address; comments concerning the recommendation; the cost of implementation; the parties responsible for the implementation; the role of the Airport Operator; and the probable implementation timeframe. This section also recommends which noise exposure contour should be used as the basis of the Noise Compatibility Program.

Future Noise Exposure Map

FAR Part 150 requires the evaluation of future noise conditions and the identification of a Future Noise Exposure Map. This study developed a future baseline noise exposure contour map that served as the basis for considering the effectiveness of each noise abatement action. The baseline contour reflects aircraft operations forecast for the year 2011, assuming that the existing noise abatement program is retained. As was noted in the prior chapter, the noise abatement options evaluated were shown to not significantly alter the future baseline noise contours, as the existing noise program has been in place and modified in the past to provide a balanced noise reduction. However, the recommended Noise Compatibility Plan elements would reduce the single event fly over activity that produces aircraft noise intrusion.

At this stage of the evaluation, as there is no guarantee that the recommendations of the plan can or will be implemented, the consultants recommended that the Future Noise Exposure Map (Future NEM) reflect the future baseline conditions with the off-set approach; thus the Future NEM reflects forecast activity levels in 2011, assuming that the existing noise abatement procedures are retained. However, it is the policy of the Detroit Metropolitan Wayne County Airport Authority (Airport Authority) to use the largest noise contour to define the boundaries for all remedial or land use programs recommended in this Study; the largest noise contours are represented by the Existing

Noise Exposure Map (Existing NEM). The following table lists the population, housing, and number of acres of different land use types that would be located within the Future NEM, based upon the existing land use.

The Future Noise Exposure Map is illustrated on **Figure I.1**, **FUTURE NOISE EXPOSURE MAP WITH EXISTING LAND USE, 2011**. **Table I1** shows the land use types and population within the Future Noise Exposure Map. **Figure I.2** shows the noise exposure contours assuming that the proposed recommendations of the Noise Compatibility Plan are implemented; this scenario is referred to as the "Future Combined Recommendation" noise exposure contours. **Table I2** shows the land use types and population with the Future Combined Recommendation contours. Following the noise contour maps are the specific noise abatement recommendations. Each element of the recommended Plan is noted as either "continued action" or "new action". "Continued actions" refers to elements of the Plan that are continued as they exist today, or with a slight modification to an existing action. New actions are those which would be implemented for the first time. Some are administrative in nature while others are land use or operational in nature. In addition, they are categorized as Noise Abatement Elements, Land Use Management Elements, and Program Management and Administrative Elements.

Future Combined Recommendation Noise Exposure Contours

The Future Combined Recommendation noise contour map reflects the 2011 forecast of activity and assumes implementation of the proposed noise abatement operational and facility recommendations, including the following six (6) actions:

- Option 3c, Runway 4R Departures-Concentrate a portion of south turning aircraft and fan others;
- Option 3d, Runway 3L Departures-Concentrate a portion of south turning aircraft and fan others;
- Option 1c, South Flow: Concentrate Departures
- Option 5a, Extend hours of contra-flow at night;
- Option 6a, Implement Off-Set approach to Runway 4L/22R;
- Option 8, Continuous Descent Approach; and

In addition, several other actions are recommended for implementation that do not alter the size or location of the DNL noise exposure contours: on-airport run-up and maintenance procedures along with a ground run-up enclosure, and administrative and land use recommendations.

Table I1

EXISTING LAND USE WITHIN FUTURE BASE CASE NOISE CONTOURS, 2011

Detroit Wayne County Metropolitan Airport FAR Part 150 Noise Compatibility Study

Land Use	65-70 DNL Contour	70-75 DNL Contour	75+ DNL Contour	65 DNL and Greater Land Use	65 DNL and Greater % of Total
People	940	50	0	970	
Housing Units*	430	30	0	460	
Churches	0	0	0	0	
Schools	0	0	0	0	
Land Use (acres)					
Residential	320 Ac	10 Ac	0 Ac	330 Ac	3.8%
Transportation/Utilities	980 Ac	1,510 Ac	1,360 Ac	3,850 Ac	44.3%
Commercial	310 Ac	150 Ac	0 Ac	460 Ac	5.3%
Industrial	380 Ac	50 Ac	0 Ac	430 Ac	4.9%
Water	40 Ac	30 Ac	0 Ac	70 Ac	0.8%
Institutional	10 Ac	0 Ac	0 Ac	10 Ac	0.1%
Open/Agriculture	2,430 Ac	940 Ac	180 Ac	3,550 Ac	40.8%
Total Acres	**4,470 Ac**	**2,690 Ac**	**1,540 Ac**	**8,700 Ac**	**100%**

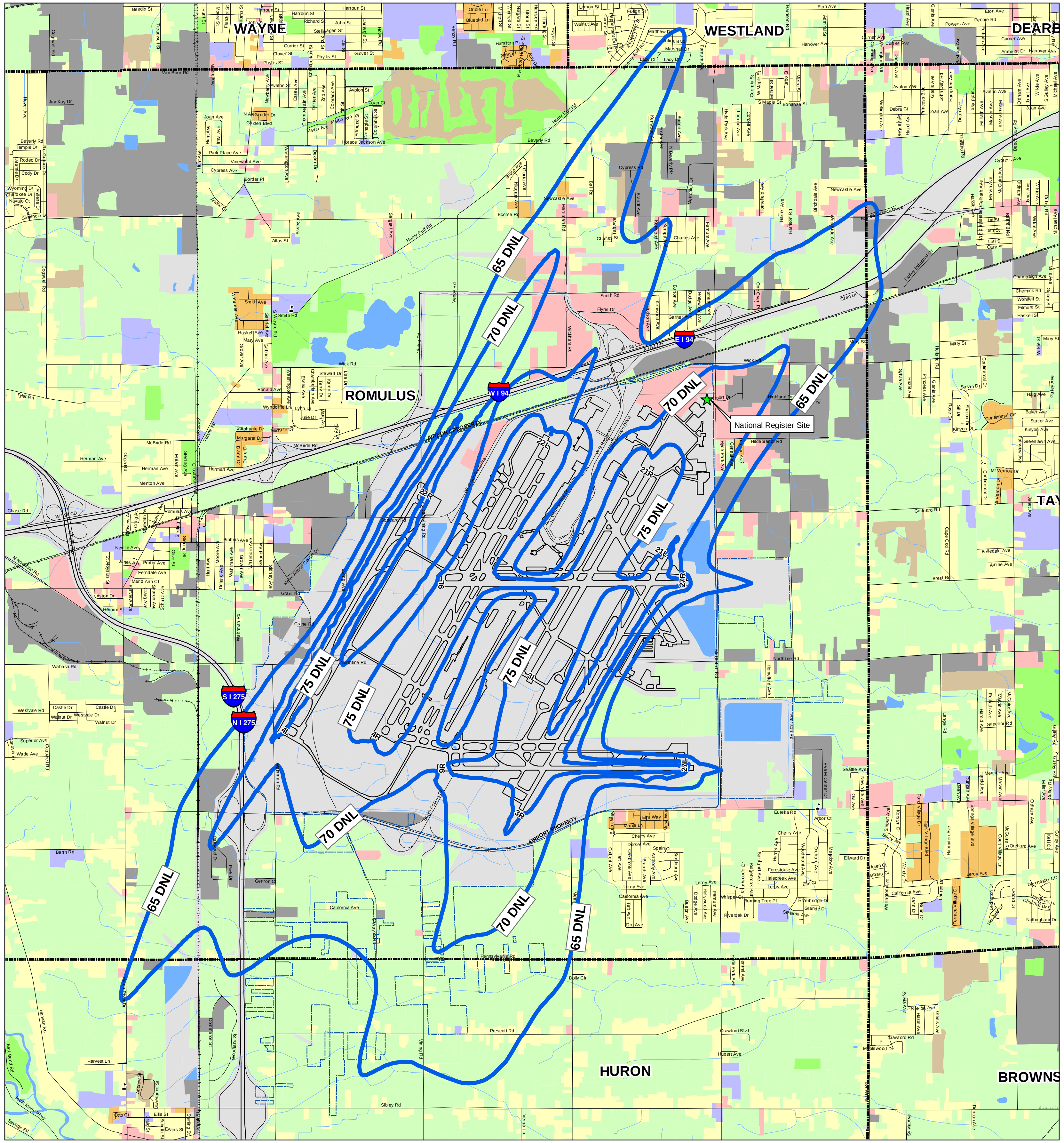
SOURCE: Aerial Photography and Land Use Base Map, SEMCOG. 2000 Census Data, BDC Analysis.
The 65 DNL and greater figures are cumulative. The contours contain the area within all smaller contours. Population and housing units are rounded to nearest five. Percentages may not add due to rounding.
* All but approximately 30 homes within the 65 – 70 contour band have been sound attenuated, which are considered compatible with noise above 65 DNL.

Table I2
EXISTING LAND USE WITHIN FUTURE COMBINED RECOMMENDATIONS NOISE CONTOURS, 2011
Detroit Wayne County Metropolitan Airport FAR Part 150 Noise Compatibility Study

Land Use	65-70 DNL Contour	70-75 DNL Contour	75+ DNL Contour	65 DNL and Greater Land Use	65 DNL and Greater % of Total
People	820	40	0	860	
Housing Units*	370	20	0	390	
Churches	0	0	0	0	
Schools	0	0	0	0	
Land Use (acres)					
Residential	270 Ac	10 Ac	0 Ac	280 Ac	3.3%
Transportation/Utilities	950 Ac	1,470 Ac	1,380 Ac	3,800 Ac	44.7%
Commercial	340 Ac	110 Ac	0 Ac	450 Ac	5.3%
Industrial	360 Ac	70 Ac	0 Ac	430 Ac	5.1%
Water	50 Ac	20 Ac	0 Ac	70 Ac	0.8%
Institutional	10 Ac	0 Ac	0 Ac	10 Ac	0.1%
Open/Agriculture	2,550 Ac	730 Ac	180 Ac	3,460 Ac	40.7%
Total Acres	**4,530 Ac**	**2,410 Ac**	**1,560 Ac**	**8,500 Ac**	**100%**

SOURCE: Aerial Photography and Land Use Base Map, SEMCOG. 2000 Census Data, BDC Analysis.
The 65 DNL and greater figures are cumulative. The contours contain the area within all smaller contours. Population and housing units are rounded to nearest five. Percentages may not add due to rounding.
* All but approximately 30 homes within the 65 – 70 contour band have been sound attenuated, which are considered compatible with noise above 65 DNL.

Figure I.1 **Future (2011) Noise Exposure Map**



Land Use Legend

- Single-family residential
- Residential areas with 25% or more vacant land
- Multiple-family residential
- Commercial and office
- Industrial
- Institutional
- Transportation, communication, and utility
- Under development
- Cultural, outdoor recreation, and cemetery
- Woodland and wetland
- Active agriculture
- Extractive and barren
- Grassland, and shrub
- Vacant nonresidential
- Water
- City Limits Boundary
- Schools
- Future 2011 DNL Noise Contours

	Baseline (2011)/No Action	
65-70 DNL	Population	Housing
Huron Township	90	40
Romulus	730	330
Taylor	0	0
Westland	120	60
Subtotal	940	430
70-75 DNL		
Romulus	50	30
Subtotal	50	30
65 DNL & Greater		
Huron Township	90	40
Romulus	780	360
Taylor	0	0
Westland	120	60
Subtotal	990	460
60 DNL & Greater*		
Dearborn Heights	1,000	310
Huron Twp.	2,000	780
Inkster	4,560	1,980
Romulus	4,000	1,680
Sumpter Twp.	20	10
Taylor	3,000	1,210
Westland	2,360	990
Total	16,940	6,960

Source: 2000 US Census Numbers rounded to the nearest 10 – for digits less than 5, rounded to 10.
Note: no residential uses are located in the 75 DNL and greater contours.
* includes the 65 DNL & Greater

The 65 DNL contour contains approximately 8,700 acres, 750 residential structures and 1,030 people.

The 70 DNL contour contains approximately 4,230 acres, 30 residential structures and 40 people.

The 75 DNL contour contains approximately 1,540 acres, no residential structures and no people.

Planning jurisdictions are shown on the map.

Noise measurement sites and flight tracks are depicted on the Noise Measurement Sites and Flight Tracks Maps.

Residential land use, as defined by FAR Part 150, is an incompatible use without proper sound attenuation within the 65 DNL or greater contour.

The Noise Exposure Maps and accompanying documentation for the Noise Exposure Map for Detroit Metropolitan Wayne County Airport, submitted in accordance with FAR Part 150 with the best available information, are hereby certified as true and complete to the best of my knowledge and belief.

In addition, it is hereby certified that the public was afforded the opportunity to review and comment on the document and its contents.

Signed [signature] Date 3-6-06

Based on 683,871 operations.

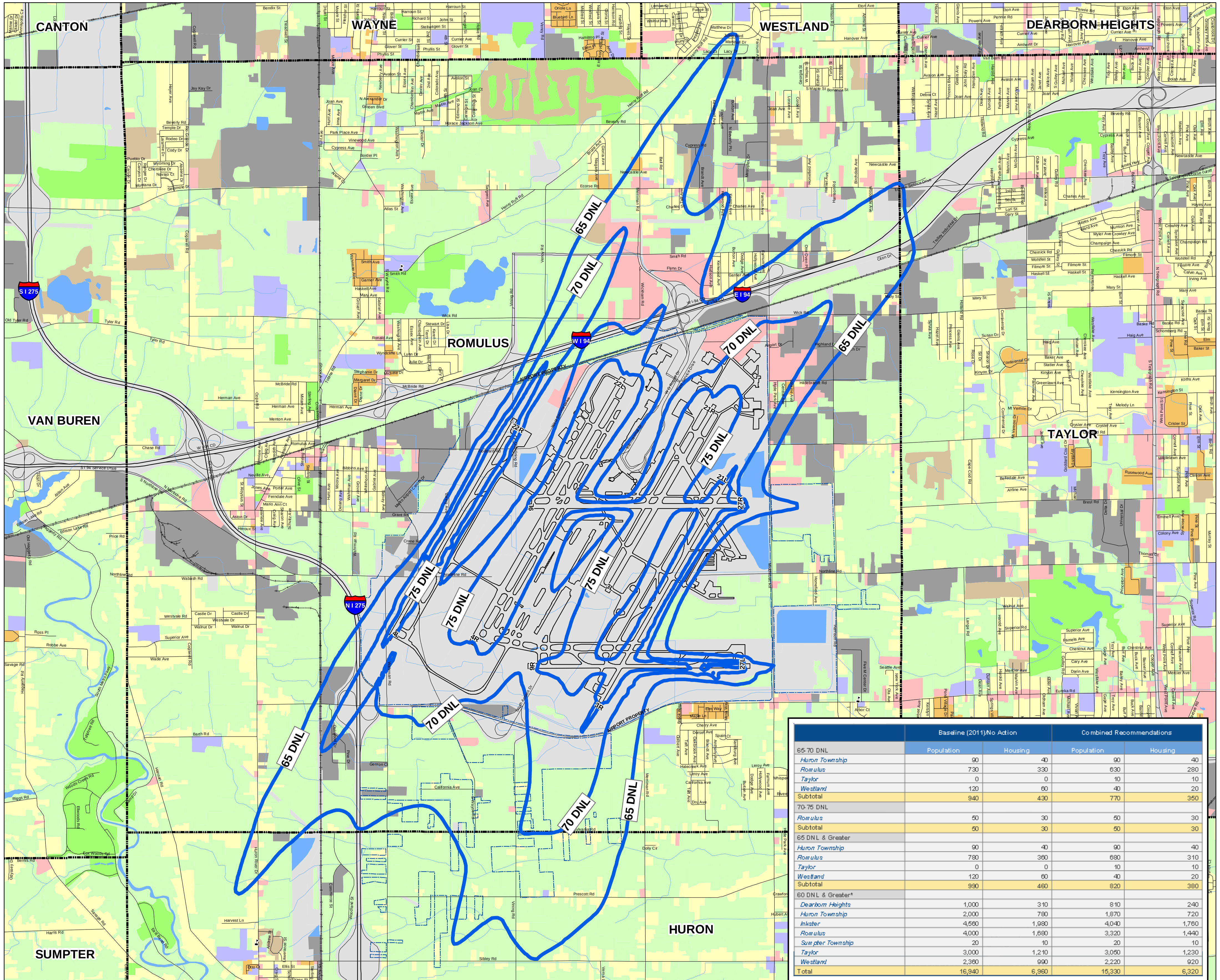
0 1,000 2,000 4,000 Feet

March 2006

DETROIT
METROPOLITAN WAYNE COUNTY AIRPORT

Source: Michigan Department of Natural Resources, SEMCOG

Figure I.2 **Future (2011) Combined Recommendations Map**



	Baseline (2011)/No Action		Combined Recommendations	
65-70 DNL	Population	Housing	Population	Housing
Huron Township	90	40	90	40
Romulus	730	330	630	280
Taylor	0	0	10	10
Westland	120	60	40	20
Subtotal	940	430	770	350
70-75 DNL				
Romulus	50	30	50	30
Subtotal	50	30	50	30
65 DNL & Greater				
Huron Township	90	40	90	40
Romulus	780	360	680	310
Taylor	0	0	10	10
Westland	120	60	40	20
Subtotal	990	460	820	380
60 DNL & Greater*				
Dearborn Heights	1,000	310	810	240
Huron Township	2,000	780	1,870	720
Inkster	4,560	1,980	4,040	1,760
Romulus	4,000	1,680	3,320	1,440
Sumpter Township	20	10	20	10
Taylor	3,000	1,210	3,050	1,230
Westland	2,360	990	2,220	920
Total	16,940	6,960	15,330	6,320

Land Use Legend

- Single-family residential
- Residential areas with 25% or more vacant land
- Multiple-family residential
- Commercial and office
- Industrial
- Institutional
- Transportation, communication, and utility
- Under development
- Cultural, outdoor recreation, and cemetery
- Woodland and wetland
- Active agriculture
- Extractive and barren
- Grassland, and shrub
- Vacant nonresidential
- Water
- City Limits Boundary
- Schools
- Future 2011 Combined Noise Contour

Based on 683,871 operations.

0 1,000 2,000 4,000 Feet

N

March 2008

Source: Michigan Department of Natural Resources, SEMCOG

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Recommendations

The recommendations are summarized and categorized as follows. Note that the remainder of this chapter no longer uses the numbering system employed to differentiate among the options in other chapters (i.e. Option 3c or Option 8). Rather, this chapter relies on a recommendation number, which is a sequential listing of recommendations based on the category (i.e. noise abatement, land use management, and program management/administrative). They are **not listed** in priority of implementation. Priorities may change as conditions change, and should be set each year along with the Airport's Capital Improvement Program. The original Options are shown in parenthesis.

Noise Abatement Elements

Recommendation 1	**Develop new ground run-up procedures (Option 12)**
Recommendation 2	**Construct ground run-up enclosure (Option 13)**
Recommendation 3	**Work with the FAA to develop Flight Management System (FMS) procedures to concentrate a portion of south turning aircraft and fan others for Runway 4R departures (Option 3c)**
Recommendation 4	**Work with the FAA to develop FMS procedures to concentrate a portion of south turning aircraft and fan others for Runway 3L departures (Option 3d)**
Recommendation 5	**Work with the FAA to develop FMS procedures to concentrate departures in south flow (Option 1c)**
Recommendation 6	**Extend hours of contra-flow operations at night (Option 5a)**
Recommendation 7	**Implement Continuous Descent Approach, when practicable (Option 8)**
Recommendation 8	**Continue to study the feasibility of an extension to Runway 3L/21R to reduce noise (Option 9)**
Recommendation 9	**Develop noise abatement procedures for use during runway maintenance operations (Option 15)**
Recommendation 10	**Continue to study the feasibility of implementing displaced thresholds to reduce noise (Option 10)**

Land Use Management Elements

Recommendation 1	**Voluntary acquisition of residential units within the 70 DNL noise contour (LU Alt. 2)**
Recommendation 2	**Recommend communities require disclosure statements/buyer notification (LU Alt. 5)**
Recommendation 3	**Work with communities to update comprehensive plans to discourage noise sensitive uses within the 65 DNL (LU Alt. 7)**
Recommendation 4	**Work with communities to update zoning ordinances to prohibit noise sensitive uses within the 65 DNL (LU Alt. 8)**

Recommendation 5	**Work with communities to update building codes to require sound attenuation of new residences (LU Alt. 6)**
Recommendation 6	**If federal funds become available at 80% funding, sound insulate residential units within the 60 DNL**

Program Management and Administrative Elements

Recommendation 1	**Install a noise monitoring/flight track monitoring system**
Recommendation 2	**Continuation of Study Advisory Committee**
Recommendation 3	**Develop Fly Quiet Report Card and Pilot Awareness Program**
Recommendation 4	**Operations Review and Part 150 Updates**

It is the intent of the Airport Authority to implement elements of the proposed Noise Compatibility Plan as quickly as possible. However, the timetable for implementation would depend very heavily on the availability of funding, especially federal funding and local funding. Land Use Recommendation 6 is contingent upon the availability of federal funds to match local funds for sound attenuating residential structures within the 60 DNL noise contour; in the past, FAA has prioritized and/or prohibited its release of funding to ensure that the most adversely affected are funded first. This recommendation would not be implemented until such funds are made eligible and available.

Existing Actions

The Airport completed the previous FAR Part 150 Study in 1992, and the FAA issued its Record of Approval for that Study in 1993. The FAA approved, and the Airport has implemented several noise abatement/mitigation measures contained in that document. The Record of Approval can be found in the Appendix. The Airport implemented four new noise abatement measures; preferential runway use for south flow, opposite direction nighttime operations from 12:00 am to 5:59 am when feasible (south flow), equitable dispersal of north flow departure flight tracks between 350 and 050 degrees and equitable dispersal of south flow departure between 185 to 235 degrees; along with the construction of earthen noise berms, and revised the ground run-up procedures. Two additional measures were approved for additional study only. A proposed restriction on flight training was not approved. Three program management measures were approved and two implemented; establishment of a noise complaint office and update the noise exposure maps when necessary. All remedial land use measures were approved and implemented and all preventive land use measures within the authority of the various jurisdictions were approved but not all implemented.

Noise Abatement Elements (NAE*)*

NOISE ABATEMENT ELEMENT RECOMMENDATION 1—GROUND RUN-UP PROCEDURES

ISSUE

Reduce engine maintenance noise intrusion to residents living close to the Airport.

NEW ACTION

This action would change existing run-up locations for the noisiest aircraft to more centralized locations on the Airport until a Ground Run-up Enclosure can be constructed.

COMMENTS

Airlines must regularly conduct maintenance or repairs on aircraft systems and engines. For certain types of aircraft maintenance, engine run-up tests are conducted to demonstrate that the aircraft's in-flight systems are working properly before the aircraft can be put back into service. A run-up is a pre-flight test of the engine systems, where various levels of engine power are applied while the aircraft remains stationary. A substantial amount of noise can be created when run-up tests occur. As a result, airports often establish locations on the airfield for run-ups to minimize the impacts on nearby residences.

The assumptions related to ground run-up procedures focus on defining the use of a location in terms of type of aircraft, type of maintenance run-up, headings, and time of operation. All ground run-up activity would continue to occur at the current locations and all except the noisier aircraft would use a new location. The specific uses of each run-up location would be more precisely defined so that the optimum location and orientation is used to direct the noise back toward the center of the Airport. These elements would be refined during the Fly Quiet Program or with Airport Operations personnel during the follow-up to this Study.

The proposed element would provide for an enhanced description of where and how each run-up can occur and then provide a means of tracking the compliance with these procedures. For instance, new vision detection systems can be used by Airport Authority operations staff to cost-effectively track when and where run-up activities occur. This technology can also be used to detect when run-ups occur at un-authorized locations or orientations.

The proposed run-up locations are similar to the existing run-up locations, with the addition of one new position closer to the center of the Airport. This new location is closer to the center and south end of the Airport, where nearby population densities are lower. This new location would be used specifically for the loudest aircraft types that are performing a full power run-up.

Older generation jet aircraft (with low bypass ratio jet engines) generate notably higher run-up noise and require more run-up tests then new generation aircraft. At DTW, these are primarily DC9 aircraft along with some MD80, 727, and B737-200 aircraft. For purposes of this element, these are the aircraft considered the noisiest and where the use of the existing sites result in off-airport noise impacts.

Based on a worst case condition at each run-up site, the new location could achieve a potential 38% reduction in population exposed to the 70 dBA.

COST

No additional cost is anticipated with the implementation of this alternative, although the Airport Authority could incur the cost associated with acquiring the night vision technology as well as notifying tenants of the use of the new run-up position.

RESPONSIBLE PARTIES

The Airport Authority is responsible for providing a location for the run-ups and notifying the operators of the procedures. The FAA is responsible for directing taxiing aircraft to the locations and the operators are responsible for using the locations.

AIRPORT ACTION

The Airport Authority would develop run-up location procedures, amend existing procedures as necessary, and provide information to users.

TIME FRAME

This action can be initiated immediately.

NOISE ABATEMENT ELEMENT RECOMMENDATION 2—CONSTRUCT GROUND RUN-UP ENCLOSURE

ISSUE

Reduce engine maintenance noise intrusion to residents living close to the Airport.

NEW ACTION

This action would construct a Ground Run-up Enclosure (GRE) in which to conduct maintenance ground run-up operations.

COMMENTS

Airlines must regularly conduct maintenance or repairs on aircraft systems and engines. For certain types of aircraft maintenance, engine run-up tests are conducted to demonstrate that the aircraft's in-flight systems are working properly before the aircraft can be put back into service. A run-up is a pre-flight test of the engine systems, where various levels of engine power are applied while the aircraft remains stationary. A substantial amount of noise can be created when run-up tests occur. A GRE can provide a location for such operations to occur that minimize engine noise intrusion on the surrounding community. A GRE could be sited adjacent one of the existing taxiways to enable aircraft to perform run-ups in a manner that minimizes aircraft noise for the surrounding community.

A GRE cannot be used under all wind conditions, as the facility is aligned with the prevailing winds. However, assuming a south orientation, the facility could be used approximately 95% of the time.

Using the DC-9 as an example, a GRE could reduce the noise levels associated with run-up operations by approximately 15 dBA which translates into a 100% reduction in the population exposed to 70 dBA Lmax or greater noise.

COST

The cost to implement this action is approximately $3 to $5 million. The Airport Master Plan is evaluating feasible locations and developing more definitive cost estimates.

RESPONSIBLE PARTIES

The Airport Authority is responsible for identifying a location for the GRE (which is being performed in the Master Plan), writing the request for a proposal for design and construction, and notifying the operators of the procedures after construction is complete. The FAA is responsible for directing taxiing aircraft to the GRE and the operators are responsible for using the GRE. FAA is responsible for compliance with the NEPA, but would likely seek the technical assistance of the Airport Authority in completing the technical analysis.

AIRPORT ACTION

The Airport Authority would identify an acceptable GRE location, apply for federal funding to hire consultants to design the structure, write the specifications and write the Request for Bid for contractors. Then, hire the contractor to construct the facility.

TIME FRAME

This action can be initiated immediately upon approval of: this Study; air space review of the location; compliance with NEPA; and receipt of funding.

NOISE ABAEMENT ELEMENT RECOMMENDATION 3—WORK WITH THE FAA TO DEVELOP FMS PROCEDURES TO CONCENTRATE A PORTION OF SOUTH TURNING AIRCRAFT AND FAN OTHERS FOR RUNWAY 4R DEPARTURES

ISSUE

Aircraft flying over residential development.

NEW ACTION

The Airport Authority would work with FAA Air Traffic Control (ATC) Division to develop and use satellite-based navigation technologies to fly multiple headings using a combination of procedures to concentrate noise in some areas, and disperse in others for departures on Runway 4R. The headings (similar to compass directions) used would correspond with the different routes that aircraft fly as they depart the Detroit airspace. Departures to locations to the north, east, and northwest would be fanned (dispersed) between 350 and 035 degrees, while south-bound aircraft from Runway 4R would be turned sooner than the existing flight patterns. Tracks designed to concentrate noise would be developed and used to stay on course to the west and then to the south. Currently, aircraft flying to southern destinations off Runway 4R are first turned to the west and then south to their southerly course. The general corridor proposed to concentrate noise would follow a path along Michigan Avenue and then turning southward at a point north of Willow Run. These southbound flights would avoid the higher density population areas by turning south of Wayne and Westland.

COMMENTS

This action is designed to locate some flight paths over predominately compatible land uses, concentrate those paths, and disperse the rest of the paths that fly over non-compatible land uses.

For aircraft with northern, eastern, or western destinations, aircraft would depart Runway 4R and fly a straight path (runway heading) until reaching at least 500 feet above ground. At this point aircraft would be assigned a heading by ATC; the heading would be between 350 and 035 degrees. Aircraft would fly this heading for three to 10 miles using 15-20 degree dispersed headings. The southern jet path would be newly concentrated and would start the turn to the west earlier than the current procedure, following a path along Michigan Avenue and then turning southward at a point north of Willow Run. This path would effectively avoid flying over Wayne and Westland. Turboprop aircraft currently occupy the space where the new track would be located, and thus, the turboprop aircraft would need to be turned sooner, enabling a 15 degree divergence from the southern jet path. The new jet path would be designed to fly over less densely populated areas south of Michigan Avenue.

About 80% of the future aircraft fleet expected at DTW will be equipped with the necessary technology to use this satellite-based procedure. Older generation aircraft not equipped with satellite navigation technology could generally follow an Instrument Flight Rule (IFR) overlay of the proposed procedure. This IFR based flight path would be similar to the satellite-based procedure, except that the precision of the flight track would not be as great; the path would disperse. In addition, some jets (an estimated 5%) may not be able to make such a quick turn on departure from Runway 4R. These aircraft would be expected to follow the existing flight path.

This Action would reduce overall population and housing exposed to 65 DNL and greater noise levels by 10 people/10 houses in comparison to the Baseline (a 1.0% and 2.2% reduction respectively). Within the 65 DNL and greater contour, the noise impacted population reduction would occur in Romulus (2.6%) relative to the Baseline. In Westland, while impacted population would not change (due to rounding), the number of housing units affected in Westland would decrease by 10 homes (a 16.7% change).

COST

The cost for implementing this Action is not considered significant, and would be associated with development of the specific procedures. To implement this action, FAA would be required to comply with the National Environmental Policy Act (NEPA). It is expected that this action could, along with other elements of the Plan, be evaluated in an Environmental Assessment that could cost approximately $100,000.

RESPONSIBLE PARTIES

The Airport Authority is responsible for working with the FAA Airport Traffic Control Tower (ATCT) staff to help develop and implement this procedure when conditions allow. FAA ATCT personnel are responsible for implementing this procedure, when conditions allow. Pilots are responsible for flying the procedure within given safety parameters.

AIRPORT ACTION

The Airport Authority would consult with FAA ATCT about evaluating and developing such a procedure. FAA would be required to comply with NEPA, and would likely seek the assistance of the Airport Authority to complete the technical analysis.

TIME FRAME

This Action can be initiated upon developing the procedures and subsequent to required environmental documentation. It is not contingent upon other recommendations.

NOISE ABATEMENT ELEMENT RECOMMENDATION 4—WORK WITH THE FAA TO DEVELOP FMS PROCEDURES TO CONCENTRATE A PORTION OF SOUTH TURNING AIRCRAFT AND FAN OTHERS FOR RUNWAY 3L DEPARTURES

ISSUE

Aircraft flying over residential development.

NEW ACTION

The Airport Authority would work with FAA ATCT personnel to develop FMS procedures that would concentrate a portion of the south turning departures only, instead of concentrating all departures. This is to reduce the potential for increases in new areas. Aircraft would use satellite-based navigation technologies to fly multiple headings using a combination of concentrated and dispersed tracks. Jet aircraft flying to southern destinations that turn eastward and then to the south, would fly a track generally following the I-94 corridor to the east of the Airport to concentrate flights in this area. Aircraft flying to north, east, and west destinations would fly along the same paths as they do today, using dispersed flight procedures.

COMMENTS

With this Action, aircraft bound for northern, western, and eastern locations would follow existing flight tracks using dispersal procedures. Southbound aircraft would depart Runway 3L and fly runway heading for one mile past the departure end of the runway, then turn eastward on a satellite-based heading designed to follow the I-94 freeway corridor and the rail line corridor. At approximately eight miles from the Airport (approximately at the Oakwood/I-94 Intersection), aircraft would turn south.

This new track would replace the existing south turning track that serves the same destinations, but that does not turn in an easterly direction as soon as the new option. This procedure would be designed for those aircraft that initially turn eastward for southern destinations. Today, about 30% of the departures on this runway are directed to the south. Some heavier aircraft might not be able to fly this new track, and thus, would follow the existing tracks.

It is estimated that 80% of the future anticipated aircraft fleet at DTW could use this satellite-based procedure. Older generation aircraft that are not equipped with satellite navigation could generally follow an Instrument Flight Rule (IFR) overlay of the proposed procedure. The flight path would be similar to the satellite-based procedure, except that the precision of the flight track would not be as great, and those not equipped with the newer technology would disperse. This would reduce the number of people within the 65 DNL or greater noise contour by approximately 20 residents.

COST

The cost for implementing this Action is not considered significant, and would be associated with development of the specific procedures. To implement this action, FAA would be required to comply with the National Environmental Policy Act (NEPA). It is expected that this action could, along with other elements of the Plan, be evaluated in an Environmental Assessment that could cost approximately $100,000.

RESPONSIBLE PARTIES

The Airport Authority is responsible for working with the FAA ATCT personnel to help evaluate and develop this procedure for use when conditions allow. The FAA ATCT personnel are responsible for implementing this procedure, when conditions allow, and for advising pilots to use it. Pilots are responsible for flying the procedure within given safety parameters.

AIRPORT ACTION

The Airport Authority would consult with FAA ATCT about evaluating and developing such a procedure. FAA would be required to comply with NEPA, and would likely seek the assistance of the Airport Authority to complete the technical analysis.

TIME FRAME

This Action can be initiated immediately after evaluation and development, subsequent to required environmental documentation, and is not contingent upon other recommendations.

NOISE ABATEMENT ELEMENT RECOMMENDATION 5—WORK WITH THE FAA TO DEVELOP FMS PROCEDURES TO CONCENTRATE DEPARTURES WHILE IN SOUTH FLOW

ISSUE

Aircraft flying over residential development.

NEW ACTION

The Airport Authority would work with FAA ATCT personnel to develop FMS procedures that would concentrate departures while in south flow. This procedure would take the existing Instrument Flight Rule (IFR) procedure and translate it into satellite-based navigation to enable greater concentration along the existing tracks. This would increase the precision of the track by including additional radar vectors and to keep the aircraft tracking the proper heading. Aircraft would fly the same paths as they do today, except that modern navigational technology would be used to reduce over flights of the more densely populated areas to the south by reducing drift from aircraft operations.

COMMENTS

With this Action, aircraft bound for eastern locations departing on Runway 21R would fly runway heading to at least one-half mile past the end of the runway before commencing any turns to the east. Current procedures have some early turns flying near or over the southeastern portions of Romulus. Aircraft departing on Runway 22L to southern destinations would use a 190 heading to avoid overlying New Boston. Aircraft departing from Runway 22L to western or northern destinations would turn westward over a wide range of possible headings, assigned based on destination, required aircraft separation, and ATC work load. Aircraft flying to northern destinations would fly the northern portion of the existing turn on a heading of 240 degrees. Aircraft flying to western destinations would fly the southern portion of the existing turn on an initial heading of 240 degrees. The goal of the procedure would be to have all turns completed before reaching New Boston.

It is estimated that approximately 80% of the future aircraft fleet at DTW could use this satellite-based technology procedure. Older generation aircraft that are not equipped with satellite navigation could continue to use the existing IFR procedure. The flight path would be similar to the satellite-based procedure, except that the precisions of the flight track would not be as great, and those not equipped with the newer technology, would disperse. This would not alter the total population/housing affected bye 65 DNL and greater noise levels relative to Baseline, although it would alter the location of those impacts increasing the population affected in Huron Township by 44.4% and decreasing those in Romulus by 6.8%. Within the 60 DNL contour, the changes would be slightly more pronounced (a reduction of 3.8% in population and 4.2% reduction in housing relative to the Baseline).

COST

The cost for implementing this Action is not considered significant, and would be associated with development of the specific procedures. To implement this action, FAA would be required to comply with the National Environmental Policy Act (NEPA). It is expected that this action could, along with other elements of the Plan, be evaluated in an Environmental Assessment that could cost approximately $100,000.

RESPONSIBLE PARTIES

The Airport Authority is responsible for working with the FAA ATCT personnel to help evaluate and develop this procedure for use when conditions allow. The FAA ATCT personnel are responsible for implementing this procedure, when conditions allow, and for advising pilots to use it. Pilots are responsible for flying the procedure within given safety parameters.

AIRPORT ACTION

The Airport Authority would consult with FAA ATCT about evaluating and developing such a procedure. FAA would be required to comply with NEPA, and would likely seek the assistance of the Airport Authority to complete the technical analysis.

TIME FRAME

This Action can be initiated immediately after evaluation and development, subsequent to required environmental documentation, and is not contingent upon other recommendations.

NOISE ABATEMENT ELEMENT RECOMMENDATION 6—EXTEND HOURS OF CONTRA-FLOW AT NIGHT

ISSUE

Concentrate nighttime operations, which are more intrusive, over less populated areas.

NEW ACTION

This procedure would increase the hours of voluntary Contra-Flow operations at night when operationally feasible, from 11:00 p.m. to 6:00 a.m. Currently, contra-flow is used from midnight until 6am.

COMMENTS

Contra-Flow operations involve aircraft arriving from the south and departing to the south, as activity during this period enables aircraft to safely operate these procedures under acceptable winds and/or weather.

On average, the airfield operates in south flow 67% of the time, meaning arrivals from the north take place approximately 67% of the time with corresponding departures to the south 67% of the time. Operations data shows that between midnight and 6 a.m., there is an increase in south flow departures of about 5% and a corresponding increase of north flow arrivals of approximately 40%. The data shows that the contra-flow procedure is in effect, with a slight increase in the south flow departures and a large reduction in the south flow arrivals.

Based on the current and forecast number of hourly arrivals and departures, consideration was given to the ability of the FAA to safely increase the number of hours when Contra-Flow can be used. It is important to note that Contra-Flow can only be effective when the level of aircraft operations is low. The greatest number of arrivals when Contra-Flow has occurred was nine arrivals. The greatest number of departures was one departure during the same hour. Therefore, it might be possible to increase the hours of use to the 11 p.m. to midnight hour (where 9 arrivals have occurred and were dispersed through the hour); however, consideration must also be given to the number of departures that would share the same airspace. Evaluation of the data indicates that it might be possible to add one hour (the 11pm to midnight hour) to the current procedure. To model the effects, operations during the 11 p.m.-midnight period would follow the existing nighttime percentage.

This Action would produce a reduction in overall population and housing exposed to 65 DNL and greater contour by 60 people/40 houses in comparison to the Baseline. Within the 65 DNL and greater contour, impact reductions would occur in Westland (50%), and Romulus (2.7%) relative to the Baseline, with an increase of 11.1% in Huron Township.

COST

The cost for implementing this Action is not considered significant as it is just an expansion of an existing program.

RESPONSIBLE PARTIES

The Airport Authority is responsible for working with the FAA ATCT to help expand this procedure when conditions allow. The FAA ATCT is responsible for implementing this procedure, when conditions allow. Pilots are responsible for flying the procedure within given safety parameters.

AIRPORT ACTION

The Airport Authority would consult with FAA ATCT to expand this existing procedure.

TIME FRAME

This Action can be initiated upon developing the procedure. It is not contingent upon other recommendations.

NOISE ABATEMENT ELEMENT RECOMMENDATION 7—IMPLEMENT CONTINUOUS DESCENT APPROACH, WHEN PRACTICABLE

ISSUE

Reduce aircraft noise levels on approach over noise sensitive land uses.

NEW ACTION

This action would result in the Airport Authority working with the FAA and the airlines to develop, implement, and use Continuous Descent Approach (CDA) type approaches during lower activity periods.

COMMENTS

The Continuous Descent Approach (CDA) is an approach procedure that allows aircraft to approach and land at an airport with minimal changes in engine power/thrust. During a CDA approach, aircraft are not leveled-out; rather aircraft gradually descend from high altitude to reach the 3-degree glide slope. Generally, aircraft should be established on a stable approach no less then five miles from the runway. This means that the aircraft flaps and landing gear are set, the aircraft speed is stable, and the aircraft is lined up with the runway. Beyond this distance, i.e., more that five miles from the runway, the difference between a stepped down approach and a continuous descent approach can be realized. It is clear that at distances farther than five miles from the runway, the continuous descent approach is potentially quieter because the aircraft is higher than for a stepped down approach. Areas located 5 miles away from the runway are typically outside the 65 DNL noise exposure contour. Preliminary analysis showed that the continuous descent approach could result in 3 to 6 dB reductions in single event noise under the flight path.

At many airports, CDA type procedures are already used by airlines to reduce fuel burn, and at other airports are used during low activity periods when there are few other aircraft in the sky. The noise measurement data collected for the DTW study shows that jet arrival single-event noise levels are somewhat quieter during the nighttime than those measured during the daytime (when standard approach procedures are used). This demonstrates that CDA approaches can result in lower noise levels than occur with standard approaches.

COST	The cost of implementing this action would mostly be borne by the FAA.
RESPONSIBLE PARTIES	The Airport Authority is responsible for working with the FAA ATCT personnel to help implement this procedure when conditions allow. FAA ATCT are responsible for implementing this procedure, when conditions allow, and for advising pilots to use it. Pilots are responsible for flying the procedure within given safety parameters.
AIRPORT ACTION	The Airport Authority would consult with ATCT to pursue implementation of CDA at the Airport.
TIME FRAME	This Action can be initiated as soon as feasible. Full implementation would take several years as aircraft enter the fleet, and would only be possible when conditions allow.

NOISE ABATEMENT ELEMENT RECOMMENDATION 8—CONTINUE TO STUDY THE FEASIBILITY OF AN EXTENSION TO RUNWAY 3L/21R TO REDUCE NOISE

ISSUE

Reduce noise intrusion to residents living north and south of the Airport.

NEW ACTION

This action is a recommendation that in the Airport Master Plan an extension to Runway 3L/21R be evaluated as an option to reduce noise, taking into consideration operational and economic costs associated with such an extension.

COMMENTS

Extension of Runway 3L/21R is recommended in the Airport Master Plan in an effort to balance the airfield to accommodate existing and forecast aircraft demand in a more efficient manner. As the runways would be closer in length, there would be less of an issue of heavier, bigger aircraft asking for the longer runway, and thus make it possible to have the runway use be more equal. An extension could result in noise reduction within the 65 and 70 DNL noise contours compared to the 2011 future contours. During the Study, three concepts were considered - extension to the south (9a), extension to the north (9b), and extension to the north and south (9c). That analysis found that at a maximum extended length to 12,000 feet, an extension to the north would provide the greatest noise reduction benefit for areas in the 60 DNL, whereas option 9c provided the greatest benefit within the 65 DNL. Adverse comments were received from some members of the Study Advisory Committee about extending the runway to the north.

Final determination of the exact runway extension is being evaluated in the Master Plan and will be finalized at a later date. The extension is not planned within the life of this FAR Part 150 Study.

COST

The Airport Master Plan will estimate the cost to extend the runway in the appropriate direction and length.

RESPONSIBLE PARTIES

The Airport Authority is responsible for studying, designing and constructing the runway extension. The FAA is responsible for providing funds, if such funds are available, and compliance with the NEPA. FAA may seek the assistance of the Airport Authority in preparing the analysis to support the NEPA environmental review.

AIRPORT ACTION

The Airport Authority would consider the design and construction of this extension in their airfield Capital Improvement Program.

TIME FRAME

This action can be initiated as the need arises; it is not anticipated within the next five years.

NOISE ABATEMENT ELEMENT RECOMMENDATION 9—DEVELOP NOISE ABATEMENT PROCEDURES FOR USE DURING RUNWAY MAINTENANCE OPERATIONS

ISSUE

Reduce noise intrusion to residents during runway construction, re-construction, or other routine maintenance activities.

NEW ACTION

This action would result in the development of noise abatement procedures that could be used for runway/airfield maintenance which involves; (1) establishment of a runway usage program specific to runway/airfield maintenance activities, and (2) the development of a Community Outreach Program that brings affected members of the community together to raise awareness of any temporary changes in noise exposure occurring as a result of runway/airfield maintenance.

COMMENTS

Keeping interested residents informed of aircraft operations and estimates of noise pollution increases or decreases as a result of runway maintenance would not minimize the actual noise pollution. But it would help residents understand what is occurring and provide for a "transparent" operating attitude at the Airport.

Airports have a maintenance schedule that covers routine maintenance. In addition to scheduled maintenance, there may also be emergency maintenance required as a result of damage caused by weather or aircraft activity. The Airport Authority should examine alternative noise abatement runway-use programs and coordinate these programs with the FAA and affected communities. Another recommendation of this study is the continuation of the Part 150 Study Advisory Committee (Appendix Five, Six, Seven). Continuing this Committee would allow interested individuals to follow-up on the implementation of the recommendations of this study. The Study Advisory Committee would serve as a venue for presenting runway/airfield maintenance needs and discussing alternative noise abatement procedures, if possible, for use during the maintenance program.

COST

The cost to implement this Action is within the operating budget of the Airport Authority.

RESPONSIBLE PARTIES The Airport Authority is responsible for identifying maintenance requirements and schedules and for developing the noise abatement procedures in conjunction with FAA ATCT personnel. They are also responsible for coordinating activities with the tower and the users, and for conducting community outreach activities to inform the public.

AIRPORT ACTION The Airport Authority would identify maintenance requirements and schedule, and develop noise abatement procedures to reduce noise intrusion.

TIME FRAME This action can be initiated immediately.

NOISE ABATEMENT ELEMENT RECOMMENDATION 10—CONTINUE TO STUDY THE FEASIBILITY OF IMPLEMENTING DISPLACED THRESHOLDS ON RUNWAYS 21L AND 22R TO REDUCE NOISE

ISSUE

Reduce noise intrusion to residents during approach to Runways 21L and 22R.

NEW ACTION

This action is a recommendation that the Authority continue to study the feasibility of implementing displaced thresholds on Runway 21L and 22R in an effort to reduce noise levels. It should be evaluated in the Master Plan in consideration of operational and economic costs associated with such an action.

COMMENTS

Although displaced thresholds are normally not considered economically feasible by the FAA except in the case of avoiding obstruction, a displaced threshold could result in aircraft arriving over residential areas at a higher altitude because the will be landing farther down the runway. Operational capabilities, contaminated runway criteria, replacement of navigation aids and other considerations should be evaluated in the decision making process. The implementation of displaced thresholds is not currently planned during the life of this FAR Part 150 Study.

COST

The Airport Master Plan will estimate the cost to implement this Action if found feasible.

RESPONSIBLE PARTIES

The Airport Authority is responsible for studying the feasibility of implementing displaced thresholds. The FAA is responsible for providing funds, if available, and for approving the Action.

AIRPORT ACTION

The Airport Authority would study the feasibility of the Action in the Airport Master Plan.

TIME FRAME

This action can be initiated as the need arises; it is not anticipated within the next five years.

Land Use Management Elements (LUME)

LAND USE MANAGEMENT ELEMENT RECOMMENDATION 1— VOLUNTARY ACQUISITION OF RESIDENTIAL UNITS WITHIN THE 70 DNL

ISSUE

Reduction of noise sensitive land uses within the airport environs.

CONTINUED ACTION

It is recommended that the Airport Authority voluntarily acquire homes within the 70 DNL noise contour. This is a continuation of the program the Airport Authority has had in effect for several years. There are approximately 3 homes along Meriman Road south of Ecorse Road that are either in the 70 DNL or adjacent to the 70 DNL noise contour. These are isolated homes that are not within a subdivision or other residential development area. The structures would be removed and the property sold for compatible development. There may be other homes as well.

This action would continue the previous measure Land Use Action 10 approved in the 1993 Record of Approval.

COMMENTS

This action would allow those homeowners within the 70 DNL noise contour to sell their homes to the Airport Authority, if they so desire.

COST

There are approximately 3 residential structures within the 70 DNL that could potentially be eligible. The cost to purchase these homes is estimated at approximately $300,000 per house, plus relocation expenses, resulting in an estimated cost of $1.2 million.

RESPONSIBLE PARTIES

The Airport Authority would apply to the FAA for the necessary funding to purchase those houses found eligible. Contingent upon availability of federal funds, the Airport Authority would institute the voluntary purchase program. Interested homeowners need to respond to the Airport Authority concerning acquisition.

AIRPORT ACTION

The Airport Authority would apply to the FAA for necessary funds to accomplish this action upon the approval of the FAR Part 150 Study.

TIME FRAME

This continued action would be initiated by the Airport Authority as soon as the FAR Part 150 Study is approved. It is estimated that it would take approximately one year to complete purchase program.

LAND USE MANAGEMENT ELEMENT RECOMMENDATION 2—REQUIRE BUYER NOTIFICATION WITHIN THE 60 DNL

ISSUE

Reduce annoyance of aircraft noise intrusion to prospective residents by providing direct notice of the possibility of such intrusion.

CONTINUED ACTION

It is recommended that the Airport Authority work with the surrounding communities to require notice of the noise to be placed on subdivision plats or deed for each individual lot. Such notice would be recorded on the deed and is identified in a title opinion or title insurance report, as are other similar notices

COMMENTS

This action would give direct notice to prospective home buyers that the home they are considering may be subject to aircraft noise intrusion. Many new home buyers are not aware of the proximity of the airport to the home they are considering. This would allow them to make an informed decision. Such plat or deed notice would require local jurisdiction adoption and implementation because the Airport Authority does not have land use control authority. The local jurisdictions have the authority to require notice to be placed on plats or deeds for new subdivision or as a condition of building permit approval. This would be most effective for such approvals within the 60 DNL and greater noise contour. This is similar to the types of notice required for other public health, safety, and welfare issues such as severe terrain, underground conditions, historic districts, and tax assessment districts.

This action would continue the previous measure Land Use Action 14 approved in the 1993 Record of Approval.

COST

The cost to implement this recommendation is within the normal subdivision and plat review of the local jurisdictions.

RESPONSIBLE PARTIES

The Airport Authority is responsible for coordinating with the local jurisdictions concerning location of properties for notice, and the local jurisdictions are responsible for implementing the notice requirements

AIRPORT ACTION The Airport Authority would coordinate with the local jurisdictions and ensure that they have the proper maps to identify the 60 DNL and greater noise exposure contour.

TIME FRAME This action could be initiated by the Airport authority and the jurisdictions immediately.

LAND USE MANAGEMENT ELEMENT RECOMMENDATION 3-WORK WITH COMMUNITIES TO UPDATE COMPREHENSIVE PLANS TO DISCOURAGE NOISE SENSITIVE USES WITHIN THE 65 DNL.

ISSUE

Reduce introduction of new noise sensitive uses within the 65 DNL noise contour.

CONTINUED ACTION

The Airport Authority would work with the communities to either amend comprehensive plans, as necessary, to prohibit the introduction of new noise sensitive uses within the 65 DNL noise contour or continue to use those plans which do discourage such development.

COMMENTS

All of the communities surrounding the Airport have adopted comprehensive plans, which are updated periodically as conditions change. The Airport Authority would work with the communities to ensure that the plans do not recommend the introduction or continuation of non-compatible land uses within the 65 DNL noise contour. There is concern to the amount of vacant property within the 65 DNL that could potentially be developed with additional non-compatible land uses, such as residences, schools, hospitals, or other noise sensitive uses. A comprehensive plan is one method to help discourage such development. In addition, it would be helpful if the noise contours were adopted as part of the comprehensive plan to help guide compatible development.

COST

As the communities update their existing comprehensive plans, airport compatibility issues should be taken into consideration as part of the normal updating process. As such there should be no additional cost associated with this action.

RESPONSIBLE PARTIES

The Airport Authority is responsible for coordinating with the communities during the update process and providing whatever information is needed. The communities are responsible for actually updating and implementing the plans.

AIRPORT ACTION

The Airport Authority would assist the communities in development of these plans as requested.

TIME FRAME This action can be initiated immediately.

LAND USE MANAGEMENT ELEMENT RECOMMENDATION 4--WORK WITH COMMUNITIES TO UPDATE ZONING ORDINANCES TO PROHIBIT NOISE SENSITIVE USES WITHIN THE 65 DNL.

ISSUE

Reduce introduction of new noise sensitive uses within the 65 DNL noise contour.

CONTINUED ACTION

The Airport Authority would work with the communities to either amend zoning ordinances, as necessary, to prohibit the introduction of new noise sensitive uses within the 65 DNL noise contour or continue to utilize those ordinances which do prohibit such development.

COMMENTS

All of the communities surrounding the Airport have adopted zoning ordinances, which are updated periodically as conditions change. Most of the property within the 65 DNL is currently zoned for non-residential uses. However, zoning is a creation of the political body and can be changed through the political process. In addition, one of the dilemmas of contemporary planning and zoning is to incorporate high density residential development in commercial, retail, and industrial zones. While the majority of an area may be non-residential, the introduction of residential units can result in noise concerns that were not as prevalent with non-residential uses. Zoning code amendments can stimulate some desired community development changes while at the same time introducing new citizen concerns.

Therefore, it is important that the Airport Authority work with the communities to review any amendments to the code that may unintentionally introduce non-compatible land uses, or amend those ordinances which may already permit such uses.

COST

As the communities update their existing comprehensive plans, airport compatibility issues should be taken into consideration as part of the normal update. As such there should be no additional cost associated with this action.

RESPONSIBLE PARTIES

The Airport Authority is responsible for coordinating with the communities during the update process and providing whatever information is needed. The communities are responsible for updating and implementing the plans.

AIRPORT ACTION The Airport Authority would assist the communities in plan development as requested.

TIME FRAME This action can be initiated immediately.

LAND USE MANAGEMENT ELEMENT RECOMMENDATION 5—WORK WITH COMMUNITIES TO UPDATE BUILDING CODES TO REQUIRE SOUND ATTENUATION OF NEW RESIDENCES WITHIN THE 65 DNL

ISSUE

Reduce the number of non-compatible residences within the 65 DNL.

CONTINUED ACTION

It is recommended that the Airport Authority work with the local jurisdictions to require sound attenuation for new residential structures within the 65 DNL and greater noise contour.

COMMENTS

This action would amend building code requirements to include sound attenuation standards for any new construction of noise sensitive uses within the 65 DNL contour. This action would not address existing residences, but would prevent future incompatibilities by requiring noise reduction or sound attenuation for new construction. Prior to building permit or plat approval, noise sensitive uses would be required, through construction techniques, to achieve a 30 dB noise reduction between outside noise levels and inside noise levels.

When modifying the building codes, local jurisdictions would not specify the means to achieve this reduction in the code, only that such reduction is necessary. The builder is given the option of how to achieve such reduction. Normally, the plat or building plans are certified to provide for the necessary noise reduction by an engineer or architect licensed to practice in the State. Although FAA guidelines suggest a 25 dB reduction within the 65 DNL, experience has shown that it may be desirable to achieve a 30 dB reduction within the 65 DNL since aircraft noise annoyances at DTW are experienced at lower nose levels (at noise levels less than 65 DNL).

Once implemented, building code requirements would result in a slight increase in the cost of construction, as homes are built with the appropriate insulation. At other airports, contractors have found that the cost of such insulation, performed at the time of construction is less than $10,000, compared to the cost of retrofitting an already built home (estimated at approximately $30,000).

The action would continue the previous measure Land Use Action 14 approved in the 1993 Record of Approval.

COST

As stated above, the approximate cost to sound attenuate a home during construction is less than $10,000 per home. The cost to administer the building code requirements would be part of the normal review and approval process of the various jurisdictions. The estimated cost to amend existing building codes would be approximately $30,000, and would be borne by the municipality.

RESPONSIBLE PARTIES

The Airport Authority and the jurisdictions are responsible for working together to identify areas that would require sound attenuation. The Airport Authority is responsible for coordinating and assisting the jurisdictions and the jurisdictions are responsible for implementation.

AIRPORT ACTION

The Airport Authority would coordinate with the jurisdictions in updating their building codes and would assist them to the extent possible.

TIME FRAME

This action can be initiated immediately.

LAND USE MANAGEMENT ELEMENT RECOMMENDATION 6--IF FEDERAL FUNDS BECOME AVAILABLE AT A REASONABLE EXCHANGE, SOUND INSULATE RESIDENTIAL UNITS WITHIN THE 60 DNL.

ISSUE

Reduction of noise sensitive uses within the airport environs.

CONTINUED ACTION

If FAA funds become available at a reasonable funding level, the Airport Authority would work with the communities to expand the existing sound insulation program to residential units within the 60 DNL and greater noise contour. The existing program elements would remain the same, but the area of eligibility would expand to include the 60 DNL. The actual eligibility boundary would be based on physical features beyond the 60 DNL, such as streets, highways, railroad tracks, etc. This would result in a "squaring off" of the boundary.

COMMENTS

There has been considerable community interest in expanding the sound insulation boundary beyond the 65 DNL noise contour. As a result, if FAA funding becomes available to insulate those homes to the same extent the existing program can, the Airport would like to take advantage of those funds. The existing program has completed insulating all homes willing to participate in the program within the 65 DNL contour. If deemed eligible for FAA funding, the Airport Authority would continue the same program to include homes within the 60 DNL. Currently, the FAA does not fund sound attenuation for noise sensitive uses (homes) beyond the 65 DNL. Even if this policy changes in the future, homes in the 60 DNL would still have to have an inside noise level of 45 DNL or higher to be eligible for FAA funding.

COST

There are approximately 6,000 residential units within the existing 60 and greater DNL noise contours that have not been sound insulated. Assuming that all of these residences are eligible and seek participation in the program, the cost would be approximately $198 million, based on an average of $33,000 per home. However, a reduced "package" of sound attenuation options could reduce this cost. It is anticipated that the 80% of the cost might be eligible for federal funding (about 158.4 million) with the remaining from local funding (nearly 40 million), although the funding source for the local match has not been identified. Again, the homes would have to meet other FAA criteria such as being "up to code" and having inside noise levels in excess of 45 DNL.

RESPONSIBLE PARTIES

The Airport Authority is responsible for identifying those properties that are eligible for insulation, contacting the eligible owners, applying to the FAA for funding, and hiring the contractors. The citizens are responsible for notifying the Airport Authority of their desire to take advantage of the program and the FAA is responsible for granting funds, if available.

AIRPORT ACTION

The Airport Authority would hire the contractors, notify the homeowners, and apply to the FAA for funding.

TIME FRAME

This action can not be initiated unless the structures become eligible for FAA funding. Due to the amount of funding required, this action would likely take over a decade to complete.

Program Management and Administrative Elements (PMAE)

PROGRAM MANAGEMENT AND ADMINISTRATIVE ELEMENT RECOMMENDATION 1—INSTALL NOISE MONITORING/ FLIGHT TRACK MONITORING SYSTEM

ISSUE

Monitoring the success of the noise abatement Actions, improving citizen liaison, and promoting citizen awareness.

NEW ACTION

It is recommended that the Airport Authority install a noise-monitoring system to provide an analysis of aircraft noise levels and real-time flight track information.

COMMENTS

This action would result in a noise monitoring system being installed at the Airport to help monitor aircraft noise levels. This system would include features to accurately track long-term compliance with noise abatement procedures (i.e. NAE Recommendations 1 through 9), including runway use and refined flight corridors. The noise monitors deployed around the Airport would have the ability to precisely separate aircraft noise from other noise sources in a high-background noise environment. Another useful feature of modern noise monitoring systems is the ability to make the noise and flight track data more readily available through the Airport Authority's Website.

COST

The cost for implementing this action is estimated to be in the range of $2 million.

RESPONSIBLE PARTIES

The Airport Authority would be responsible for hiring the consultant, identifying the sites, developing the specifications, budgeting for the equipment, and installing equipment through a contractor. The FAA would be responsible for assisting the Airport with funding if such funding is available.

AIRPORT ACTION

The Airport Authority would budget for monitoring, hire the consultant, prepare specifications, and initiate the process contingent upon funding. They would apply for Federal funds for the permanent system when such funds become available.

TIME FRAME

This action can be initiated immediately upon funding approval and is not contingent upon other recommendations. It would take approximately one year to acquire the equipment and become operational.

PROGRAM MANAGEMENT AND ADMINISTRATIVE ELEMENT
RECOMMENDATION 2—CONTINUATION OF STUDY ADVISORY COMMITTEE

ISSUE

Continuation of learning curve and "body of knowledge" developed during the Study process, and follow-up on the implementation of the recommendations.

NEW ACTION

The Study Advisory Committee (Appendix Five, Six & Seven) established for this Study has been instrumental in establishing these recommendations. It is recommended that a similar committee or the same committee continue to monitor programs implemented as a result of the Part 150 Study after its completion. This committee would also work to establish the Fly Quiet program guidelines.

COMMENTS

Considerable time an effort has been expended, by both the Airport Authority and the Committee members (Appendix Seven), in the development of this Study, especially the "learning curve" effort and the building of relationships. This committee is too valuable a tool for communication to risk losing at the end of this process. In addition, on-going aircraft operational procedures evaluation should be discussed through the Committee. It is very difficult to foster a feeling of trust in many Airport planning efforts. Such a feeling can be developed through the members of this or a similar Committee. Both sides of most issues are represented and all interests are heard. This is very important for the continued successful implementation of the noise compatibility program and operation of the Airport.

COST

The cost for organizing and conducting Committee meetings could be included in the normal operating expenses of the Airport Authority, with Federal funding, if available, approximately $30,000 per year.

RESPONSIBLE PARTIES

The Airport Authority would be responsible for the formulation of the Committee and Committee administration. Other parties may be responsible for appointing members of the Committee. Committee members are responsible for attending and participation in Committee functions.

AIRPORT ACTION

The Airport Authority would schedule and conduct the Committee meetings, on at least a quarterly basis, as a means of disseminating information and gathering input on noise compatibility issues. The Committee would help the Airport in developing a Fly Quiet Program.

TIME FRAME

This action can occur within the first few months of approval of the FAR Part 150 Study. It can also be implemented without regard to any other recommendation.

PROGRAM MANAGEMENT AND ADMINISTRATIVE ELEMENT RECOMMENDATION 3—DEVELOP FLY QUIET REPORT CARD AND PILOT AWARENESS PROGRAM

ISSUE

Reduce single event noise levels, encourage greater compliance with noise abatement procedures, and continue to raise awareness of citizens' noise concerns**.**

NEW ACTION

It is recommended that the Airport Authority use the follow-up committee (PMAE Recommendation 3) to develop a Fly Quiet Report Card and Pilot Awareness Program to "fine tune" voluntary noise abatement procedures, recognize operators who follow noise abatement procedures, and help educate pilots concerning noise abatement procedures and areas of noise sensitive land uses.

COMMENTS

Fly Quiet programs can take many forms. As a result, it is recommended that the full breadth of a Fly Quiet Report Card program be developed outside of the Part 150 process in consultation with citizen and airline input.

The purpose of Fly Quiet is to measure/rank performance and then to motivate carriers by rewarding good noise abatement procedures and inspiring competition. The Fly Quiet Program can consist of a report card that monitors and evaluates the effectiveness and compliance with various noise procedures. The Fly Quiet Report Card is a program aimed at including air carriers and cargo carriers as active participants in noise abatement at the Airport. The reports are intended to be distributed to the airlines, other users, the noise committee, and the local media outlets for positive coverage of the work being done at the Airport to abate noise.

The following steps could be used to formulate a Fly Quiet Report Card program:

Identify categories of aircraft for grading purposes: The Fly Quiet Report Card program can be formulated with either one broad category or divided into subcategories of air carriers, turboprop carriers, and cargo carriers for purposes of grading or rating performance. The Fly Quiet Report Card program, regardless of how the categories are displayed, could grade aircraft performance based on the actual operations at Detroit Metro Airport.

Identify Scoring System: This program is an excellent tool to explain aircraft noise to the public because of its easily understood scoring system. A methodology would be devised to score aircraft based on a 0-100% scale with the corresponding letter grade (A-F). While the Fly Quiet equations would be based on technical acoustical data, the scoring system would present the technical data in a report that translates the data into easy to understand terms.

Determine components to be measured: Sample categories have been outlined to show potential categories that could be used in a Fly Quiet Report Card program; it is ultimately the decision of the Airport Authority, in working with the public and the airlines, to identify which components are important to measure and report. The effectiveness of Fly Quiet comes from rating the top four to five noise issues and giving airlines achievable goals rather than grading every published approach and departure.

Rate importance of each component: Once the components of the Fly Quiet Report Card are identified, its relative importance should then be determined.

Identify method to publicize the results: The Fly Quiet Report Card program is intended to be a positive tool for an airport to publish its noise abatement efforts. The Program results can be sent to the local press, such as regional newspapers, community newsletters, and local television stations. A Fly Quiet Report Card press release would be sent to the press covering airport events. In addition to the press release, the press would be invited to the annual Fly Quiet Awards.

COST

The cost for implementing this action is estimated to be within existing staff functions, with additional time budgeted at approximately $30,000 per year.

RESPONSIBLE PARTIES

The Airport Authority would be responsible for setting up the program with the follow-up committee, working with the users in explaining the noise abatement procedures, and working with the FAA ATCT in evaluating the effectiveness of the procedures.

AIRPORT ACTION

The Airport Authority would initiate the program development, set up the committee, receive input from the committee, and guide the committee through the process.

TIME FRAME

This action can be initiated immediately upon development of the follow-up committee.

PROGRAM MANAGEMENT AND ADMINISTRATIVE ELEMENT RECOMMENDATION 4—OPERATIONS REVIEW AND PART 150 UPDATES

ISSUE

Update and review of the FAR Part 150 Study.

CONTINUED ACTION

The FAR Part 150 Study is a five-year program recommended to be re-evaluated at the end of the five-year period. In addition, if there is a significant change in either aircraft types or numbers of operations, or significant new facilities, then it is recommended that the Study be re-evaluated prior to the end of the five-year time frame.

COMMENTS

It is recommended that Airport Authority staff undertake a yearly review of the aircraft types and numbers, along with the actual number of operations occurring at the Airport and determine if they are consistent with the projections contained in the FAR Part 150 document. The various actions would also be reviewed to assess their ability to mitigate the projected noise intrusion and to rate the overall effectiveness of the program.

COST

The cost of monitoring the information set forth in this section would be borne out of the normal Airport Authority operating budget. Consultant assistance for various elements would be approximately $30,000. The cost to update the entire Part 150 Study would range from $800,000 to $1 million.

RESPONSIBLE PARTIES

The Airport Authority would be responsible for updating and monitoring the FAR Part 150 Study. The Federal Aviation Administration could help fund the update if there are funds available for such planning.

AIRPORT ACTION

Based on the monitoring activities described, the Airport Authority would reevaluate the program when there is a significant change in operations, aircraft types, or at the end of the five-year timeframe.

TIME FRAME

The Airport Authority would continue its monitoring program and consider the need for a full update at the end of the fifth-year after submittal or earlier if necessary as per FAR Part 150.

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT
FAR PART 150 NOISE COMPATIBILITY STUDY UPDATE

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WAYNE COUNTY AIRPORT AUTHORITY

CHAPTER J

CONSULTATION

Consultation

Introduction

The Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Study Update involved an extensive public participation process, with several components exceeding the requirements of the regulation. An inclusive tone was set by the Airport from the very beginning by requesting that the community and users be actively involved throughout the planning process. Many opportunities were presented to solicit public and key stakeholder input into the study process. The Kick-off meeting for the Part 159 Noise Study was held on October 24, 2003.

Study Advisory Committee

A Study Advisory Committee was developed to provide input during the Study process. The Committee met nine times during the course of the Study (see Committee membership list in the Appendix) on April 21, 2004; October 21, 2004; August 2, 2005; October 31, 2005; October 5, 2006; January 18, 2007; April 3, 2007; August 24, 2007 and March 11, 2008. The Committee was composed of airport users, aviation representatives, citizen representatives, elected officials, municipal planners, FAA representatives, State of Michigan representatives, business representatives and other interested parties. At each meeting a Working Paper was presented and discussed. The Committee meetings were open to the public and several members of the public attended each meeting. In addition to the Committee meetings, four public workshops were held to present information to the public and receive comments from the public. Each public workshop was preceded by a newsletter detailing the information that would be presented at the workshop, the location and other pertinent information which was mailed to all households within the 65 DNL noise contour. The public workshops were held on April 21, 2004; August 2, 2005; April 4, 2007; and April 30, 2008.

Public Hearing

A Public Hearing on the Recommendations was held on April 30, 2008. Approximately 14 people attended (attendance sheets are in the Appendix). Both verbal and written comments were received. The verbal comments were given before a Court Reporter and the written comments were accepted both at the Hearing and for two weeks subsequent to the Hearing. The Hearing transcript and a copy of all written comments are in the

Appendix, along with a Response to Comments section and Proof of Publication. The Public Hearing presented the forecasts of airport operations, the Existing and Future Noise Exposure Maps with affected population, the Recommendations and a map of proposed eligibility boundary area for voluntary land acquisition.

Authority Acceptance

The Wayne County Airport Authority held a special meeting on October 31, 2008 to consider the FAR Part 150 Study. The meeting notice and agenda were advertised and posted in accordance with all applicable requirements. After presentation and discussion, the Authority approved and accepted the Draft Part 150 Study. The Resolution is Appendix Nine.

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT
FAR PART 150 NOISE COMPATIBILITY STUDY UPDATE

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The **Barnard Dunkelberg** **Company** Team

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT
FAR PART 150 NOISE COMPATIBILITY STUDY UPDATE

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JUNE 2009

The preparation of this document was financed in part through a planning grant from the Federal Aviation Administration (FAA) as provided under Section 505 of the Airport and Airway Improvement Act of 1982 as amended by the Airway Safety and Capacity Expansion Act of 1987. The contents do not necessarily reflect the views or policy of the FAA.

The Barnard Dunkelberg Company Team

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FAR PART 150 NOISE COMPATIBILITY STUDY UPDATE

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CHAPTER A
INVENTORY

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CHAPTER B
FORECAST OF AVIATION ACTIVITY

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CHAPTER C

BACKGROUND INFORMATION ON NOISE & ITS MEASUREMENT

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NOISE ABATEMENT OPTIONS ANALYSIS

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CHAPTER H

POTENTIAL LAND USE & ADMINISTRATIVE ALTERNATIVES

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CHAPTER I
ISSUES/ACTIONS & RECOMMENDATIONS

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CONSULTATION

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT
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APPENDIX

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WAYNE COUNTY AIRPORT AUTHORITY

The **Barnard Dunkelberg** **Company** Team

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Appendix One

PROOF OF PUBLICATION

Detroit Media Partnership
Michigan's Information Leader

State of Michigan
County of Wayne

Affidavit of Publication

FEDERAL AVIATION COMMISSION
3041 E. NEWPORT COURT
MILWAUKEE WI 53211

NOTICE OF PUBLIC HEARING
Detroit Metropolitan Wayne County Airport FAR Part 150 Study

Metropolitan Hotel
31500 Wick Road
Romulus, Michigan

April 30, 2008
2:00 - 4:00 p.m. or
5:30 - 7:30 p.m.
(Two identical sessions)

Detroit Metropolitan Wayne County Airport is conducting a FAR Part 150 Aircraft Noise and Land Use Compatibility Study. The Study is in its final stages and represents a planning process that includes several entities that have an interest in the Airport.

These differing groups jointly participated in the formulation of specific proposals for noise abatement following a detailed review of noise impacts generated from the current Airport configuration. The public is invited to attend a Public Hearing concerning the Study, forecasts, the existing and future Noise Exposure Maps and the Recommendations of the Study. The Consultants preparing the Study will be available to answer questions in an Open House format, and both verbal and written comments will be accepted by a court reporter. No formal presentation will be made. Written comments will also be accepted for two weeks following the Hearing, until May 14, 2008. Written comments can be sent to the Noise Manager, Michelle Plawecki, at Detroit Metropolitan Wayne County Airport, LC Smith Terminal - Mezzanine, Detroit, MI 48242. A copy of the Recommendations Chapter is available for public review in the Airport Administrative offices at the above address and at the Airport Authority website www.metroairport.com. Pre-arranged appointments can be made by calling (734) 955-3280.

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in the Detroit Free Press/Detro... llowing dates: 3/30/08
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Linda Turner

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State of Michigan. Acting in Wayne County.

BARBARA R. BAD...
Notary Public, State o...
County of Ma...
My Commission Exp...
Acting in ...

On Th2i0s08TH day of APRIL 2008

Barbara Baddament

AFFIDAVIT OF PUBLICATION

True Copy of Notice Published

State Of Michigan.ss
County of Wayne

Gloria Fox, being duly sworn, deposes and says the annexed printed copy of notice was taken from DEARBORN TIMES-HERALD, a newspaper published and circulated in the City of Dearborn, in said State and County, and that said notice was published in said newspaper on the 5th day of M... A.D. 20...
That she i...
well the fa...

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FAR Part 150 Study

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STATE OF MICHIGAN
County of Wayne } SS. **Susan Willett**

being duly sworn, deposes and says that he is one of the printers and publishers of the Journal Newspapers, a newspaper printed, published and circulated in the County of Wayne in said state, that the annexed printed notice has been duly published in said newspaper at least 1 weeks successively, and that the first insertion therof was on the 3rd day of April A.D., 20 08 and the last insertion on the 3rd day of April A.D., 2008.

S. Willett

NOTICE OF PUBLIC HEARING

Detroit Metropolitan Wayne County Airport
FAR Part 150 Study

Metropolitan Hotel
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Romulus, Michigan

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Publish: April 3, 2008

AFFIDAVIT OF PUBLICATION

NOTICE OF PUBLIC HEARING
Detroit Metropolitan Wayne County Airport
FAR Part 150 Study
Metropolitan Hotel
31500 Wick Road
Romulus, Michigan
April 30, 2008
2:00 - 4:00 p.m. or 5:30 - 7:30 p.m.
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STATE OF MICHIGAN,
} ss.
County of Wayne

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A.D. 2008 ______ that __s he is the Representative of said newspaper and knows well the facts stated herein

Subscribed and sworn to before me this 9th

day of April A.D. 2008

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Appendix Two

SIGN IN SHEETS & HEARING TRANSCRIPT

WAYNE COUNTY AIRPORT AUTHORITY

DETROIT METRO AIRPORT
PART 150 PUBLIC HEARING
2:00 - 4:00

APRIL 30, 2008

NAME	BUSINESS/ ORGANIZATION NAME	ADDRESS	PHONE	EMAIL
Larry Webb		1315 N. S. Ivery Lane, Dearborn, MI, 48123	313-565-2493	larrywebb@iamd1143o

WAYNE COUNTY AIRPORT AUTHORITY

DETROIT METRO AIRPORT
PART 150 PUBLIC HEARING
2:00 - 4:00

APRIL 30, 2008

NAME	BUSINESS/ ORGANIZATION NAME	ADDRESS	PHONE	EMAIL
[illegible]		6776 Inkster	734-391-8300	
[illegible]		28537 [illegible]	313-377-1354	
Melvin Zilka		37256 Eureka Romulus	734 941-3338	
[illegible]		15423 [illegible] Romulus	734-229-0618	
[illegible]		15435 [illegible] Romulus	734-942-2262	

WAYNE COUNTY AIRPORT AUTHORITY

DETROIT METRO AIRPORT
PART 150 PUBLIC HEARING
5:30 - 7:30

APRIL 30, 2008

	NAME	BUSINESS/ ORGANIZATION NAME	ADDRESS	PHONE	EMAIL
1	George Moro	Homeowner	27019 Van Born Rd Taylor	313-291-5621	
2	Larry Webb	Homeowner	1315N. Silverybn. Dearborn MI 48128	313-565-2488	larrywebb@iamd1143.o
3					
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WAYNE COUNTY AIRPORT AUTHORITY

DETROIT METRO AIRPORT
PART 150 PUBLIC HEARING
2:OO - 4:00

APRIL 30, 2008

NAME	BUSINESS/ ORGANIZATION NAME	ADDRESS	PHONE	EMAIL
Cyndi Lyon	City of Romulus			
David Paul		37457 Walnut, Romulus	7344420978	grandpauls@sbc
Lora Fell		26208 Beverly, Taylor 48180		Hell@wowway.com
Ernest Guiday				
Peter J. McInerney	City of Wayne	3355 S Wayne Rd	(734) 722-2002	pmcinerney@ci.wayne.mi.us
George + Thelma Mood	Home owner	27019 Van Born Rd	313-291-5621	DARlouise@AOL
Paul Love		16433 Huron River Dr	734-941-4045	PwLove33@AOL.Com
Sheldon Chandler	Homeowner	9261 Ozga, Romulus	734-941-2678	sheldonchndlr@Aol.Com

PART 150 NOISE STUDY
PUBLIC HEARING - PUBLIC COMMENTS

Part 150 Noise Study Public Hearing held in the above-entitled action before Rose M. Bagnall, CER-6349, a notary public and certified court reporter/recorder in and for the County of Monroe, State of Michigan, at Metropolitan Hotel, 31500 Wick Road, Romulus, Michigan on the 30th day of April, 2008, pursuant to notice.

Recorded By: Rose M. Bagnall CER 6349
Rapid Court Reporters, LLC
P.O. Box 2272
Monroe, Michigan 48161
Phone: (734) 457-5944
e-mail: rbagnall@charter.net

Romulus, Michigan

Wednesday, April 30, 2008

Two sessions: 2:00 to 4:00 p.m. and 5:30 p.m. to 7:30 p.m.

PART 150 NOISE STUDY PUBLIC HEARING - PUBLIC COMMENTS

2:09 p.m.: **Michelle Plawecki, Wayne County Airport Authority Noise Manager:** This is Michelle Plawecki, Noise Manager for Wayne County Airport Authority, officially opening our public hearing on the Part 150 Study, April 30th at 2:00 p.m.

6:11 p.m.: **George Moro:** My name is George Moro. I reside at 27019 Van Born Road, which would be two blocks east of Inkster Road on the south side between Silvery and Daniels. My home was involved in the noise reduction and I had the work done but the work was never really completed. In the start of the program they first started working three days and then the two owners that were involved in the production of doing this job had a disagreement and the work halted for about 10 days. Upon numerous phones calls, I finally got a hold of somebody and that's what I was told. They came back out and proceeded with the work. It took approximately two months to do what they were supposed to do yet the inspector on final inspection says that there was items that were never completed and they needed to come back out. Upon me calling, I never got a response or I couldn't get a hold of anybody to do any follow up or investigate for me and when I did get a hold of somebody, they told me that it's been too long now and they can't do anything for me. What I want to know is how can I resolve these problems. That's what I have to say. Thank you.

6:52 p.m.: **Larry Webb:** Larry Webb, Dearborn, Michigan, 1315 North Silvery Lane, Dearborn, Michigan 48128. I'd like to make a comment on the DNL statistics. I believe that the 65 DNL threshold for -- is not really a realistic way to -- to judge the noise level. I know that it's -- that's the number used or the system used because it averages out annually but when you do a single -- I was told that there was some single events done, I forget what it was called, where the actual decibel level was off the charts. Meaning, you know, anywhere from over 70, 80, 90 in areas that were much farther out than the 65 DNL. So I just think that you need to rethink the 65 DNL in your -- when you are judging noise abatement. That's all I have.

CERTIFICATE OF COURT REPORTER/RECORDER

STATE OF MICHIGAN)
) ss:
COUNTY OF MONROE)

I certify that this transcript, consisting of 2 pages, is a complete, true and correct record of the public comments of the Part 150 Noise Study Public Hearing held on April 30, 2008.

I also certify that I am not a relative or employee of or an attorney for a party; or a relative or employee of an attorney for a party; or financially interested in the action.

Dated: May 1, 2008

Rose M. Bagnall CER-6349
Monroe County, Michigan
My Commission Expires: 11-15-2011

RAPID COURT REPORTERS, LLC
P.O. Box 2272
Monroe, Michigan 48161
(734) 457-5944

Appendix Three

WRITTEN COMMENTS TO HEARING

April 22, 2008

I received your pamphlet about the noise from the airport. I was one that has called about the noise. I am unable to come to the public hearing due to a family wedding.

I was hoping my area would benefit from the program and hope it will in some way. The noise at times is so bad if I'm on the phone I have to wait till the planes go over so I can hear and the TV is at a loss at that time. I can actually read the decals on the plane

I just wanted to give my comments. I live on Avondale west of Middlebelt.

Thank you for your time.
Dora Parker
29660 Avondale
Inkster Mi
48141

APRIL 25TH -08

I'M WAITING, TO HAVE MY HOUSE SOUND REPAIRED - NOTHING HAS BEEN DONE - I HAVE CALLED SEVERAL TIMES - BEEN TOLD IT'S TOO LATE FOR ME?

JOSEPH PEILET
6431 MIDDLEBELT
ROMULUS MI 48174
734-722-0803

LIVE BETWEEN - ECORSE & VAN BORN
NEAR BEVERLY

NOISE ABATEMENT - RECOMMENDATION #1
" " #10

LOOK AT YOUR (2011) NOISE EXPOSURE MAP

Appendix Four

RESPONSE TO COMMENTS

Hearing Comments Summary

Two people made verbal comments at the public hearing. One comment concerned sound attenuation work that had been previously completed and the other comment concerned the use of the 65 DNL contour to determine sound attenuation eligibility. In addition, one written comment was received at the hearing. It concerned the same house that had previously been sound attenuated. No other written comments were received subsequent to the hearing.

Hearing Verbal Comments/Responses

Comment from Mr. George Moro:

He testifies that he had work done on his house previously but it was never completed. An inspector came out and said work needs to be completed. He has not been able to get in touch with anyone to complete the work.

Response to Mr. Moro:

We have given your name and address to the proper representatives of the Airport and they will contact you.

Comment from Mr. Larry Webb:

I believe the 65 DNL threshold is not really realistic...you need to rethink the 65 DNL when you are judging noise abatement.

Response to Mr. Webb:

Thank you for your comment. The 65 DNL is a national threshold used to determine land use compatibility and the eligibility for federal funding for noise mitigation purposes. It is recognized that people may experience noise intrusion beyond the 65 DNL noise contour, but it has been chosen as the most reasonable contour to determined eligibility for federal funds.

Hearing Written Comments/Responses

Comment from Mr. George Moro:

He testifies that he had work done on his house previously but it was never completed. An inspector came out and said work needs to be completed. He has not been able to get in touch with anyone to complete the work.

Response to Mr. Moro:

We have given your name and address to the proper representatives of the Airport and they will contact you.

Appendix Five

MEETING NOTIFICATIONS & STUDY ADVISORY COMMITTEE MEETING SUMMARIES

DETROIT METRO • WILLOW RUN
WAYNE COUNTY AIRPORT AUTHORITY
L.C. Smith Terminal • Mezzanine
Detroit, MI 48242
ph 734 942 3550
fax 734 942 3793
www.metroairport.com

March 12, 2004

Honorable Michael A. Guido
Mayor, City of Dearborn
13615 Michigan Avenue
Dearborn, MI 48126

Dear Mayor Guido:

Attached please find a copy of the contract between the Wayne County Airport Authority and Barnard Dunkelberg Company for the completion of a Federal Aviation Regulation Part 150 Noise Study for Detroit Metropolitan Wayne County Airport.

I am also, at your request, including a current roster of the Study Advisory Committee (SAC). The roster will be updated and will be shared with all members at the first SAC meeting, tentatively scheduled for April 21, 2004. The role of the SAC, as mentioned in my earlier communications will be to provide input, review the work of the consultant team and provide comment on the study elements. The Committee meetings will be open to the public to observe, however participation will be limited to members of the SAC.

Public meetings will be scheduled throughout the Study process. The Scope of Services recommends five "Workshop Meetings", however the number of public meetings remains somewhat flexible.

I look forward to hearing from you regarding your designees for the Study Advisory Committee.

Sincerely,

Lester W. Robinson
Chief Executive Officer

Enc

Cc: Murphy
Economy
Conway
Roberts

DETROIT METRO • WILLOW RUN

WAYNE COUNTY AIRPORT AUTHORITY

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT
PART 150 NOISE COMPATIBILITY STUDY UPDATE
STUDY ADVISORY COMMITTEE MEETING
April 21, 2004 2:00PM – 4:00PM

MEETING SUMMARY

NAME	***AFFILIATION PRESENT √***
Staff and Consultants	
Lester Robinson	Wayne County Airport Authority √
Scott Roberts	Wayne County Airport Authority √
Michael Conway	Wayne County Airport Authority √
Steve Economy	Wayne County Airport Authority √
Ryk Dunkelberg	Barnard Dunkelberg & Co. √
Brad Rolf	Barnard Dunkelberg & Co. √
Paul Dunholter	BridgeNet International √
Mary Vigilante	Synergy Consultants, Inc. √
Helen Dixon	Dixon & Company √
Darryl Daniels	JacobsenDaniels Associates √
Wendy Sutton	JR Group LLC√
Jerry Rosenfeld	JR Group LLC √
Committee Members	
Lanny Hall	Wayne County Commission
Dave Kocsis	City of Garden City
Kristina Kramarz	City of Dearborn Heights √
Moussa Allouch	City of Dearborn Heights √
Hilliard Hampton	Mayor, City of Inkster √
Connie Mitchell	City of Inkster √
Alan Lambert	Mayor, City of Romulus
Tom Ellis	City of Romulus
Ed Buczkowski	City of Romulus √
Jack Engebretson	Mayor, City of Livonia √

Cathy Condon	City of Livonia
Greg Pitoniak	Mayor, City of Taylor √
Lora Fell	City of Taylor √
Abdul Haidous	Mayor, City of Wayne
Peter McInerny	City of Wayne √
Robert Boyles	City of Wayne √
John Mitchell	Supervisor, Huron Township √
David Glaab	Huron Township √
Toni Clark	Supervisor, Sumpter Township √
Sharon Claxton	Sumpter Township
Dan Swallow	Van Buren Township
Cindy King	Supervisor, Van Buren Township
Tony Gibson	Van Buren Township√
Jay Gilbert	City of Westland √
Keith Madden	City of Westland √
Thomas Fielder	Mayor, City of Belleville
Michael Guido	Mayor, City of Dearborn
Richard Huebler	Mayor, City of Allen Park √
Irene Porter	Federal Aviation Administration
Ernest Gubry	Federal Aviation Administration √
David Welhouse	Federal Aviation Administration √
Marcia Boliard	Detroit Metro Air Traffic Control Tower √
Dave Baker	Michigan Department of Transportation Aeronautics
Richard Blouse	Detroit Regional Chamber of Commerce
Tiffany Julian	Southeast Michigan Council Of Governments √
Dawn Hughes	Northwest Airlines √

Others Present

Michael Mahoney	Northwest Airlines – Planning & Design √
Debra Walling	City of Dearborn – Corporation Counsel √
John Nagy	City of Dearborn – Planner √

Hand –Outs: Meeting agenda, Public Involvement Plan

Lester Robinson called the meeting to order at 2:00pm and welcomed those in attendance. He explained that the purpose of the first Part 150 Study Advisory Committee (SAC) Meeting was to present a summary of what a Part 150 Study process entailed and answer any questions or concerns the committee may have. Mr. Robinson asked members of the committee to introduce themselves.

Lester Robinson then turned the meeting over to Part 150 Study consultant, Ryk Dunkelberg, who gave a power-point presentation to the committee. The presentation is attached to this meeting summary document. Mr. Dunkelberg outlined his presentation as follows:

- ***Who is Involved in a Part 150 Study*** – Role of the various entities involved in the Part 150 Study.

- ***Explanation of FAR Part 150 Study*** - What a Part 150 can accomplish and what it cannot accomplish; what a Part 150 is and what it is not.
  What is the Part 150 study process?

- ***Role of the Study Advisory Committee*** - to provide insight and input into the study process and to act as a resource for developing alternatives and making final recommendations to the Wayne County Airport Authority for inclusion in the Noise Compatibility Plan.

The following questions and comments were made during and after the presentation:

1. ***Is there anything in the future to quiet or curb ground engine run-ups?***
   Answer - New engine technology making engine run-ups quieter. The use of Ground Run-Up Enclosures (GRE) at many airports around the country has been shown to minimize the affect of ground run-up noise.

2. ***What types of changes will be reflected in the Part 150 Study?***
   Answer - Changes may included: operational changes – how and where aircraft fly; facilities changes – recommendation for a ground run-up enclosure (GRE) as an example; and land use changes to either reduce or minimize further non-compatible land use. Noise restrictions, such as noise curfews, are not currently accepted or approved by the FAA.

3. ***If DNL is the standard measure used in the Part 150 study, why are you using ancillary standards in addition to the DNL?***
   Answer – We are doing more supplementary noise analysis because it has been shown that the DNL metric may not totally represent what the average citizen hears. The use of additional metrics will provide a more understandable picture of the noise environment surrounding Detroit Metro airport, in terms that the layperson may better understand.

4. ***Will the Study Advisory Committee receive both the DNL and SEL maps?***
   Answer - Yes, committee members will receive notebooks with "working papers" containing all the pertinent information related to the study.

5. ***Is it possible for the Part 150 Study to end up with a smaller noise contour?***
   Answer - Yes, the noise contour could shrink based on many variables including a shift of noise as a result of a new runway, a change in the flight mix or a shift in aircraft operations.

6. ***Comment from Committee member:***
   It is understood that there may be changes as a result of the many variables that go into the Part 150 study. It is hoped that the purpose of the study is not to shift noise from one community to another.
   Response - One of the primary guidelines of the Part 150 study is not to shift noise from one community to another just for the sake of shifting noise.

7. ***If the noise contour does shrink, what affect will it have on people currently eligible under the old contour for sound insulation?***
   Answer - By the time the new contour is established, it is our goal that all homes within the old contour (the existing 65DNL) will have been through the design process and approved for sound insulation. The Sound Insulation Program has been aggressively working to meet that goal.

8. ***Will noise monitoring equipment distinguish noise that comes from aircraft verses noise from automobile traffic?***
   Answer - Yes

9. ***Will noise monitoring distinguish indoor from outdoor noise?***
   Answer - Only outdoor noise will be measured.

10. ***Are air traffic patterns going to stay the same while the Part 150 Study is being done?***
    Answer - Air traffic patterns are under the exclusive control of the FAA. The Wayne County Airport has no knowledge of plans for changes in air traffic patterns during the conduct of the Part 150 Study. There is no intention to change or alter traffic patterns while the Study is being conducted. In fact, we would hope and encourage that patterns do not change. The only exception to this would be if a "test" of a pattern change is conducted to determine its validity.

11. ***Will noise monitoring be done at several locations?***
    Answer - Yes, noise monitoring will be done at several locations around the airport. Specific monitoring locations have not yet been determined. This committee will help identify the locations.

12. ***Will the new terminal (Smith facility) be included in the Part 150 Study?***
    Answer - No, the proposed new terminal facility modifications should not result in changes to aircraft noise exposure.

13. ***Is there a pre-disposition on the results of the Study?***
Answer - There are no pre-dispositions on the outcome of the Part 150 Study. One of the primary goals of the study is to reduce the number of homes and other non-compatible land uses affected by significant aircraft noise (i.e. 65 DNL and greater).

14. ***Will Willow Run be included in the Part 150 study?***
Answer – No, aircraft operating to and from Willow Run Airport will not be included in the Part 150 Study.

The meeting adjourned at 3:30pm.

DETROIT METRO • WILLOW RUN
WAYNE COUNTY AIRPORT AUTHORITY
L.C. Smith Terminal • Mezzanine
Detroit, MI 48242
ph 734 942 3550
fax 734 942 3793
www.metroairport.com

September 30, 2004

Lanny Hall
Wayne County Commission
600 Randolph, Suite 450
Detroit, Michigan 48226

Dear Mr. Hall:

As you are aware from our first meeting in April, 2004, Detroit Metropolitan Wayne County Airport has begun the process of updating its Federal Aviation Regulation (FAR) Part 150 Noise Compatibility Study. The purpose of the initial meeting in April was to inform members of the Study Advisory Committee (SAC) about the purpose and elements of a Part 150 Study Update and to introduce the Study consultant team of Barnard Dunkelberg & Company.

The next meeting of the Part 150 Noise Study Advisory Committee will be held on Thursday, October 21, 2004 from 2:00pm – 4:00pm in the Airport Director's office on the mezzanine level of the L.C. Terminal. Barnard Dunkelberg & Company will be presenting the first in a series of working papers entitled the "Inventory of Existing Conditions."

The purpose of this airport facilities Inventory Section of the Part 150 Study Update is to establish a baseline of existing conditions information necessary to generate new aircraft noise exposure contours. This inventory has recently been completed by the consultant team and includes data concerning airport facilities, flight procedures, noise abatement procedures, noise complaints, and land use and policies at the airport. You will receive a copy of Working Paper #1 in the mail for your review prior to the meeting.

As a member of the Study Advisory Committee for the Part 150 Study Update, we encourage you to attend this informational meeting. For further information or if you are unable to attend the meeting, please give me a call at (734) 753-2205.

Sincerely,

Scott Roberts
Noise Program Manager

DETROIT METRO • WILLOW RUN

WAYNE COUNTY AIRPORT AUTHORITY

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT
PART 150 NOISE COMPATIBILITY STUDY UPDATE
STUDY ADVISORY COMMITTEE MEETING
October 21, 2004 2:00PM – 4:00PM

MEETING SUMMARY

NAME	*AFFILIATION*	*PRESENT* √
Staff and Consultants		
Lester Robinson	Wayne County Airport Authority	√
Scott Roberts	Wayne County Airport Authority	√
Michael Conway	Wayne County Airport Authority	
Steve Economy	Wayne County Airport Authority	
Ryk Dunkelberg	Barnard Dunkelberg & Co.	√
Brad Rolf	Barnard Dunkelberg & Co.	√
Paul Dunholter	BridgeNet International	√
Mary Vigilante	Synergy Consultants, Inc.	√
Helen Dixon	Dixon & Company	√
Matt Johnson	JacobsenDaniels Associates	√
Wendy Sutton	JR Group LLC	√
Jerry Rosenfeld	JR Group LLC	
Committee Members		
Lanny Hall	Wayne County Commission	√
Dave Kocsis	City of Garden City	
Kristina Kramarz	City of Dearborn Heights	√
Moussa Allouch	City of Dearborn Heights	
Hilliard Hampton	Mayor, City of Inkster	√
Connie Mitchell	City of Inkster	√
Cynthia Lyon	City of Romulus	√
Ed Buczkowski	City of Romulus	√
Jack Engebretson	Mayor, City of Livonia	√
Robert Bennett	City of Livonia	√

Greg Pitoniak	Mayor, City of Taylor √
Lora Fell	City of Taylor √
Abdul Haidous	Mayor, City of Wayne
Peter McInerny	City of Wayne √
Robert Boyles	City of Wayne √
John Mitchell	Supervisor, Huron Township √
David Glaab	Huron Township √
Toni Clark	Supervisor, Sumpter Township
Sharon Claxton	Sumpter Township
Cindy King	Supervisor, Van Buren Township
Dan Swallow	Van Buren Township √
Tony Gibson	Van Buren Township √
Jay Gilbert	City of Westland √
Keith Madden	City of Westland √
Thomas Fielder	Mayor, City of Belleville
Michael Guido	Mayor, City of Dearborn √
Debra Walling	City of Dearborn √
Richard Huebler	Mayor, City of Allen Park √
Irene Porter	Federal Aviation Administration √
Ernest Gubry	Federal Aviation Administration √
David Welhouse	Federal Aviation Administration √
Marcia Boliard	Detroit Metro Air Traffic Control Tower √
Dave Baker	Michigan Department of Transportation Aeronautics
Richard Blouse	Detroit Regional Chamber of Commerce
Tiffany Julian	Southeast Michigan Council Of Governments √
Dawn Hughes	Northwest Airlines √

Others Present

Lenora Ford	Citizen
James Herley	Citizen
Carleen Herley	Citizen
Melissa Roy	Citizen
Michael Mahoney	Northwest Airlines – Planning & Design

Hand –Outs: Meeting agenda, Working Paper binder

Lester Robinson called the meeting to order at 2:10pm and welcomed those in attendance. He explained that the purpose of the second Part 150 Study Advisory Committee (SAC) Meeting was to present a summary of Working Paper One and answer any questions or concerns the committee may have. Mr. Robinson asked members of the Committee to introduce themselves.

Lester Robinson then turned the meeting over to Part 150 Study consultant, Ryk Dunkelberg, who gave a power-point presentation to the committee. The presentation is attached to this meeting summary document. Mr. Dunkelberg outlined his presentation as follows:

Summary of Working Paper One

- Inventory of Existing Conditions
- Airside / Landside Facilities
- Air Traffic Operations
- Airspace and Navigational Aids
- Current Noise Mitigation Program
- Noise Complaint Evaluation
- Airport Environs

The following questions and comments were made during and after the presentation:

1. ***Please provide a definition of the Air Traffic Operations columns on the spreadsheet. Do all smaller planes now use Willow Run airport?***
   Answer: Mr. Dunkelberg explained the graphic. Many smaller planes now use the Willow Run airport; however, there are some small aircraft operating at Detroit Metropolitan Wayne County Airport.

2. ***Can aircraft touchdown start further into the airfield?***
   Answer: The touchdown point for arriving aircraft is normally at or near the threshold and all landing aids (lights, electronic glide slope, etc.) are designed to guide an aircraft to a specific area on the runway. In addition, it is always more advantageous to have as much runway in front of the landing aircraft as possible.

3. ***Is the glide slope fixed?***
   Answer: Yes. The glide slope is fixed at the standard three (3) degrees for all runway approaches.

4. ***Are you planning to include additional communities in the Part 150 Study?***
   Answer: All communities currently affected by significant noise levels and those which could be affected in the future will be included in the Study. Additionally, other communities may be included for the purpose of providing them information about airport operations.

5. ***What measures, if any, are not completed that were part of the 1993 Part 150 Study?***
   Answer: It is the Airport's understanding that all measures recommended in the 1993 Part 150 Study have been adopted and have either been completed, or currently underway.

6. ***Comment from Committee member: Referring to Page 18A – Dearborn would take issue with "sparsely populated area" language.***
   Response: The consultant will look at the language and make appropriate adjustments as warranted.

7. ***Under figure 8.6 it states that Dearborn has only made six complaints to the airport about noise. Are those numbers flawed? Dearborn residents feel they do not get timely responses to noise complaints.***
   Answer: Information collected from Airport logs indicates that approximately 20% of the complaints registered came from Dearborn. The exhibit referenced provides a reference to both location of complaints and number of complaints. Mr. Robinson stated that addressing complaints is very important to the Airport. Scott Roberts stated that the airport maintains a 24 hour manned Hotline to handle noise complaints and makes every attempt to respond in a timely manner to noise calls. Calls received that are out of the ordinary noise complaints are given priority attention.

8. ***Comment from Committee Member: Many people have given up calling or registering complaints with the noise office. The number of noise complaints should not be the sole criteria for determining the noise contour.***
   Answer: The noise complaint information is used primarily to identify changes in perceived noise as well as, to log reports of abnormal aircraft operations resulting in changes to noise. The complaint information is being analyzed in the Study to assist in the identification of community issues. The complaint information is not used for determining the noise contour.

9. ***Does weather have an effect on noise monitors? Will humidity affect noise monitoring?***
   Answer: Weather and humidity does not have a significant effect on noise monitoring results; however, weather conditions during monitoring will be logged and considered during the analysis of the data collected to ensure accuracy.

10. ***Will the noise study give us data on engine run-ups?***
   Answer: Yes, the Study will include analysis of noise generated by aircraft operating on the ground, both during maintenance run-ups and taxing.

11. ***How long will the noise monitors be in place and will the noise data determine the noise contours?***

Answer: Noise monitors will be in place for approximately two weeks in most locations. The information obtained from the noise monitors will not determine the noise contours. Noise contours will be generated using the FAA Integrated Noise Model (INM). Noise monitoring will be used to verify information generated by the model.

12. ***Will you be monitoring both take offs and landings?***

Answer: Yes. Aircraft noise within range of the monitors will be recorded and analyzed.

13. ***The original study involved 2800 homes. Am I right to assume that the new study will show that the noise contours have shrunk?***

Answer: Until noise contours are generated, the size of the contours is unknown. Newer noise contours at airports across the country have generally been smaller than those prepared in the early 1990's. This may occur at this airport as well.

14. ***Will the noise mitigation program be completed by the end of the study?***

Answer: The Airport is working toward having initiated the sound insulation process before completion of this Study for all eligible homes that have requested to be included in the program.

The meeting ended at 3:30pm.

DETROIT METRO • WILLOW RUN
WAYNE COUNTY AIRPORT AUTHORITY
L.C. Smith Terminal • Mezzanine
Detroit, MI 48242
ph 734 942 3550
fax 734 942 3793
www.metroairport.com

July 12, 2005

Lanny Hall
Wayne County Commission
600 Randolph, Suite 450
Detroit, Michigan 48226

Dear Mr. Hall:

Detroit Metropolitan Wayne County Airport continues the process of updating its Federal Aviation Regulation (FAR) Part 150 Noise Compatibility Study. The Study Advisory Committee (SAC) has met twice over the past year to establish a baseline of existing conditions information necessary to generate new aircraft noise exposure contours at Detroit Metropolitan Wayne County Airport.

The next meeting of the Part 150 Noise Study Advisory Committee will be held on Tuesday, August 2, 2005 from 1:30 pm – 3:30 pm in the Ontario room at the DoubleTree Hotel, 31500 Wick Road, Romulus, MI. Based on the information and data gathered thus far in the study, Barnard Dunkelberg & Company will be presenting the existing and future baseline noise contour maps to the Study Advisory Committee at this meeting.

In preparation for the meeting, Working Paper Two, *"The Forecast of Aviation Activity"* and Working Paper Three, *"Noise Methodology and the Existing and Future Baseline Noise Conditions"* will be mailed to you for your review prior to the meeting.

In addition, you are also invited to attend the next Public Information Meeting on the same day, August 2, 2005, from 5:30 pm – 7:30 pm at the DoubleTree Hotel. This meeting will allow the public to view how and where noise was measured surrounding the airport, radar flight tracks, the noise contour maps and related information.

I appreciate your commitment to serving on the Part 150 Noise Study Advisory Committee and look forward to seeing you at our next meeting on August 2, 2005 at 1:30 pm.

Sincerely,

Scott Roberts
Noise Program Manager

Barnard Dunkelberg & Company

TULSA | Cherry Street Building
1616 East Fifteenth Street
Tulsa, Oklahoma 74120

918 585 8844
918 585 8857

Memorandum

Date: July 25, 2005

To: Part 150 Noise Compatibility Study Advisory Committee

From: Ryk A. Dunkelberg
BARNARD DUNKELBERG & COMPANY

Reference: Third Committee Meeting—August 2, 2005

The third meeting of the Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study Advisory Committee will be held August 2, 2005 at 2:00 pm to 4:00 pm. Enclosed is Working Paper Two, *Forecasts and Noise Analysis Chapters*. This Working Paper should be placed in your Study notebook.

The meeting will be held in the Ontario Room at the DoubleTree Hotel, 31500 Wick Road, Romulus, MI. I look forward to seeing you at the meeting. Please do not hesitate to call me at 918/585-8844 if you have any questions.

Detroit Metropolitan Wayne County Airport
Announces Part 150 Noise Compatibility Study
Second Public Information Meeting

Public Information Meeting Scheduled for Tuesday, August 2, 2005
DoubleTree Hotel, 31500 Wick Rd. Romulus, MI. 48174
5:30 pm – 7:30 pm

Romulus, MI – July __, 2005 – Detroit Metropolitan Wayne County Airport (DTW) staff and the consultant team of Barnard Dunkelberg & Company will hold the second in a series of public information meetings on the Part 150 Noise Compatibility Study on Tuesday, August 2, 2005. Since there will be no formal presentations, the meeting will be held in a workshop format allowing the public the opportunity to attend at any time between 5:30 pm to 7:30 pm. The meeting will be held at the DoubleTree Hotel, 31500 Wick Rd. in Salon 1&2 of the hotel ballroom. People will be able to visit various informational work stations, each covering a different topic or aspect of the Part 150 Study process to date. Topics will include; how and where aircraft noise was measured at DTW, radar flight track maps and other related information. The public will also be able to view the new Existing and Future Baseline Noise Contour Maps which may have an impact on future noise attenuation and land use planning. Airport staff and the consultant team will be available at each work station to listen to citizen comments and answer questions about the Study.

"This informational workshop is important because it allows people to actually view, in graphic form, the results of the Part 150 Noise Study thus far", said Lester Robinson, CEO of the Detroit Metropolitan Wayne County Airport.

The federally-funded Part 150 Noise Compatibility Study, begun in 2004, is being conducted to identify and evaluate current and future noise effects caused by aircraft operations at Detroit Metropolitan Wayne County Airport. Changes in types of aircraft used by airlines and adjustments to the number of flights needed to meet passenger demand raise the possibility that the areas affected by aircraft noise may have changed, therefore necessitating this study. The ultimate goal of the Study is to work in conjunction with surrounding communities, aviation experts and airport neighbors to establish a balanced, cost effective and comprehensive Noise Compatibility Program for the airport and surrounding communities.

The next step in the Part 150 Study process will be to identify and evaluate feasible alternatives to reduce noise impacts. These will consist of various *operational, facilities and land use* alternatives. These alternatives will be studied by the Part 150 Study Advisory Committee and presented to the public at a future public information meeting.

The Part 150 Noise Compatibility Study Update is expected to be completed in 2006. Following adoption by the Wayne County Airport Authority, the Noise Compatibility Plan must be reviewed and approved by the Federal Aviation Administration (FAA) in order to make the Plan eligible for federal funding.

# # #

DETROIT METRO • WILLOW RUN
WAYNE COUNTY AIRPORT AUTHORITY

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT
PART 150 NOISE COMPATIBILITY STUDY UPDATE
STUDY ADVISORY COMMITTEE MEETING
August 2, 2005 - 2:00pm – 4:00pm Crown Plaza Hotel

MEETING SUMMARY

NAME	***AFFILIATION***	***PRESENT √***
Staff and Consultants		
Lester Robinson	Wayne County Airport Authority √	
Scott Roberts	Wayne County Airport Authority √	
Michael Conway	Wayne County Airport Authority √	
Thomas Naughton	Wayne County Airport Authority	
Bob Barnard	Barnard Dunkelberg & Co. √	
Ryk Dunkelberg	Barnard Dunkelberg & Co. √	
Brad Rolf	Barnard Dunkelberg & Co. √	
Paul Dunholter	BridgeNet International √	
Mary Vigilante	Synergy Consultants, Inc. √	
Helen Dixon	Dixon & Company √	
Darryl Daniels	Jacobsen Daniels Associates √	
Matt Johnson	Jacobsen Daniels Associates √	
Wendy Sutton	JR Group LLC √	
Committee Members		
Lanny Hall	Wayne County Commission √	
Dave Kocsis	City of Garden City	
Kristina Kramarz	City of Dearborn Heights √	
Moussa Allouch	City of Dearborn Heights √	
Hilliard Hampton	Mayor, City of Inkster √	
Connie Mitchell	City of Inkster √	
Cynthia Lyon	City of Romulus √	
Ed Buczkowski	City of Romulus √	

Jack Engebretson	Mayor, City of Livonia √
Robert Bennett	City of Livonia √
Greg Pitoniak	Mayor, City of Taylor √
Lora Fell	City of Taylor √
Abdul Haidous	Mayor, City of Wayne
Peter McInerny	City of Wayne √
Robert Boyles	City of Wayne √
John Mitchell	Supervisor, Huron Township
David Glaab	Huron Township √
Johnny Vawters	Supervisor, Sumpter Township
Sharon Claxton	Sumpter Township
Cindy King	Supervisor, Van Buren Township
Dan Swallow	Van Buren Township √
Tony Gibson	Van Buren Township √
Jay Gilbert	City of Westland √
Keith Madden	City of Westland
Thomas Fielder	Mayor, City of Belleville
Michael Guido	Mayor, City of Dearborn √
Debra Walling	City of Dearborn √
Richard Huebler	Mayor, City of Allen Park √
Irene Porter	Federal Aviation Administration
Ernest Gubry	Federal Aviation Administration
David Welhouse	Federal Aviation Administration √
Marcia Boliard	Detroit Metro Air Traffic Control Tower
Dave Baker	Michigan Department of Transportation Aeronautics
Richard Blouse	Detroit Regional Chamber of Commerce
Tiffany Julian	Southeast Michigan Council of Governments √
Dawn Hughes	Northwest Airlines √

Others Present

R Latane Montague	City of Dearborn
Mary Loeffelwitz	Northwest Airlines
Brian Ruppert	Northwest Airlines
Steve Pigsley	Van Buren Township
Kathleen Trent	City of Romulus
Kenneth Reeves	City of Westland
Winsome Lenfert	Federal Aviation Administration
Lynn Blumenberg	WCAA

Hand –Outs: Meeting agenda and Working Paper Two.

Lester Robinson, CEO Wayne County Airport Authority, called the meeting to order at 2:10pm and welcomed those in attendance. He explained that the purpose of the third Part 150 Study Advisory Committee (SAC) meeting was to present a summary of Working Paper Two and answer any questions or concerns. Mr. Robinson initiated introductions of the members in attendance.

Lester Robinson then turned the meeting over to Part 150 Study consultant, Ryk Dunkelberg, who provided a brief overview of the Part 150 Noise Study to date. Mr. Dunkelberg then introduced Matt Johnson of JDA and Paul Dunholter of BridgeNet International who gave a PowerPoint presentation relating to Working Paper Two. Matt and Paul discussed the following: (*Please note that the presentation is attached to this document).*

- Forecast Chapter—Matt Johnson
  1. Existing Operations
  2. Future Operations
- Noise Background Chapter—Paul Dunholter
  1. Noise Measurement Program
  2. Noise Measurement Results
  3. Flight Tracks
- Noise Analysis Chapter—Paul Dunholter
  1. Existing Noise Contour
  2. Future Noise Contour
  3. Contour Comparison

The following questions and comments were made during and after the presentation:

1. ***Has the DNL metric changed since 1992?***
   Answer: Mr. Dunkelberg stated that the DNL metric is still the same as it is required by the FAA in evaluating aircraft noise exposure. He noted that noise modeling technology has improved substantially since 1992.

2. ***What kinds of noise does noise monitoring pick up?***
   Answer: The noise monitors continuously measure all noise occurring at the time, including aircraft, vehicle traffic, and other background noise sources. Computer software is then used to separate the aircraft noise from other noise sources and enable the description of actual noise using the metrics described in the Working Paper.

3. ***Does noise measurement always correlate with the noise model?***
   Answer: No. There is always some degree of discrepancy and variability. However, as noted, the purpose of the measurements was to improve the prediction of the noise model.

4. ***Does the FAA allow an airport to do a noise study using only their data obtained from noise monitoring sites?***

Answer: No. The FAA will only allow INM (the FAA's model developed specifically to evaluate aircraft noise exposure) to be used for a Part 150 noise study.

5. ***Comment: The elderly and low-income people cannot afford to use their air-conditioners to muffle outside noise. It would be nice if there was a program designed to help them pay for their utility bill.***
   Response: There is no specific program available using Airport funds to provide a utility subsidy for low-income people.

6. ***Comment: The maps are very difficult to read. For future meetings, please have maps enlarged.***
   Response: Future meeting graphics will be enlarged to the largest size possible. In addition, the consultant team will improve on the readability of the legends in Working Paper Two.

7. ***It appears on the map that the 2011 contour is about 2 miles less on the south end than the 2004 contour.***
   Answer: It is actually about ½ mile less on the south end.

8. ***What happens if our five year forecast number of operations is either higher or lower than what actually happens?***
   Answer: When FAA developed its Part 150 Study guidance, FAA anticipated that over time actual activity could vary from forecasts. Built into the guidance is the ability of the activity to change as much as 15% (either increasing or decreasing) and still have the contours meet their objectives of defining noise conditions. Therefore, as long as actual activity is within 15% of the forecasts used in the study, the forecasts are acceptable for use and the contours are considered accurate illustrations of noise conditions. If there is significant change in facilities at the Airport or a difference in operational procedures that would result in a change in the contour, the contour would need to be updated. For example, if a new runway or a major runway extension were built, a new noise contour might be needed.

9. ***Is there a way to evaluate the cost of fuel 10 years from now?***
   Answer: No. Any analysis of fuel costs 10 years into the future would be purely speculative, although newer jets are expected to be more fuel efficient.

10. ***Will the Study be looking at the "fair distribution" of noise?***
    Answer: Yes. That issue is a policy concern and will be evaluated in the next steps of the study process when various alternatives are considered. When considering such policy issues, the "fair distribution" (also called equalization) will be compared with the policy of concentrating noise in specific areas. The Study Advisory Committee will provide guidance to the Airport Authority concerning these policy issues.

11. ***Are there mandatory requirements to upgrade aircraft equipment?***
   Answer: No. Such policies are established through the International Civil Aviation Organization (ICAO). In June 2001, ICAO adopted a new Chapter 4 (called Stage 4 in this country) noise standard. Effective January 1, 2006, the new standard will apply to newly manufactured aircraft engines. At this time, there is no requirement to phase out the Stage 3 aircraft that are currently flying.

12. ***Is there a connection between aircraft loudness and vibration?***
   Answer: Yes. There is a correlation because larger aircraft will generally cause more vibration. The Part 150 will not be addressing vibration.

13. ***Will future types of aircraft be considered in the study data?***
   Answer: Only aircraft currently in use at the Airport are included in the existing noise exposure contour. If aircraft are predicted to operate at the Airport in the future and there is noise data available, they are included in the future noise contour. No substantial changes in aircraft type are expected during the study time horizon of 2011.

14. ***Is it likely that we will build a Ground Run-Up Enclosure (GRE) at the Airport?***
   Answer: One of the alternatives to be considered will be building a GRE at the Airport.

Ryk Dunkelberg discussed the next steps in the Part 150 Study process. Mr. Dunkelberg stated that the existing and future base case noise contours have been prepared and were being presented at this meeting. The next step in the process is to develop alternatives that will ultimately meet the goal of reducing the number of people affected by noise. The future base case noise contour (2011 noise contour) is what will be used to measure the effectiveness of any of the operational, procedural, or facility alternatives that will be considered. After evaluating the 2011 noise contour, land use alternatives will be examined to determine the land use controls that could further reduce conflicts. In addition, for planning and land use purposes only, a 2016 noise contour will be prepared to assist the Airport Authority in longer-term planning.

Ryk Dunkelberg invited the Committee members to attend the 2nd Part 150 Noise Study Public Information Meeting that evening from 5:30 to 7:30pm. at the same location.

The meeting ended at 3:30 pm.

Barnard Dunkelberg & Company

TULSA | Cherry Street Building
1616 East Fifteenth Street
Tulsa, Oklahoma 74120

918 585 8844
918 585 8857

Memorandum

Date: October 19, 2005

To: Part 150 Noise Compatibility Study Advisory Committee

From: Ryk A. Dunkelberg
BARNARD DUNKELBERG & COMPANY

Reference: Fourth Committee Meeting—October 31, 2005

Attached for your review is Working Paper Three of the Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Compatibility Study. The Working Paper contains two chapters, Land Use Analysis and Potential Noise Abatement Measures. We will discuss these chapters at the Study Advisory Committee meeting which will be held on October 31, 2005. We would also like to discuss additional noise abatement measures suggested by the Committee.

I look forward to seeing you at the meeting. Please do not hesitate to call me at 918/585-8844 if you have any questions.

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT
FAR PART 150 NOISE COMPATIBILITY STUDY

MEETING NOTICE

Study Advisory Committee Meeting
Monday - October 31, 2005 – 3:00 pm to 5:00 pm

The next meeting of the Part 150 Noise Study Advisory Committee will be held on Monday, October 31st, 2005 from 3:00 pm – 5:00 pm at the *Marriott Dearborn Inn Hotel, 20301 Oakwood Boulevard, Dearborn MI.* Based on the information and data gathered thus far in the study, the Airport will be presenting to the Study Advisory Committee various noise abatement alternatives that could be implemented at Detroit Metropolitan Wayne County Airport.

In preparation for the meeting, Working Paper Four, containing the *"Noise Compatibility Alternatives and Land Use Analysis"* chapters will be mailed to you for your review prior to the meeting.

Your input in reviewing these operational alternatives is critical to the outcome of the Part 150 Noise Compatibility Study and we hope you will attend this important meeting. I appreciate your commitment to serving on the Part 150 Noise Study Advisory Committee and look forward to seeing you at our next meeting on October 31st, 2005 at 3:00 pm.

Ryk Dunkelberg
Barnard Dunkelberg & Company

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DETROIT METROPOLITAN WAYNE COUNTY AIRPORT
PART 150 NOISE COMPATIBILITY STUDY
STUDY ADVISORY COMMITTEE MEETING
October 31, 2005 - 3:00pm – 5:00pm – Dearborn Inn

MEETING SUMMARY

NAME	***AFFILIATION PRESENT √***
Staff and Consultants	
Lester Robinson	Wayne County Airport Authority √
Scott Roberts	Wayne County Airport Authority √
Michael Conway	Wayne County Airport Authority √
Michelle Plawecki	Wayne County Airport Authority √
Thomas Naughton	Wayne County Airport Authority
Steve Economy	Wayne County Airport Authority
Mary Lou Posa	Wayne County Airport Authority √
Ryk Dunkelberg	Barnard Dunkelberg & Co. √
Brad Rolf	Barnard Dunkelberg & Co. √
Paul Dunholter	BridgeNet International √
Mary Vigilante	Synergy Consultants, Inc. √
Helen Dixon	Dixon & Company √
Matt Johnson	Jacobsen Daniels Associates √
Wendy Sutton	JR Group LLC √
Jerry Rosenfeld	JR Group LLC √
Committee Members	
Lanny Hall	Wayne County Commission
David L. Harvey	City of Garden City √
Kristina Kramarz	City of Dearborn Heights √
Moussa Allouch	City of Dearborn Heights √
Hilliard Hampton	Mayor, City of Inkster

Connie Mitchell	City of Inkster √
Cynthia Lyon	City of Romulus √
Ed Buczkowski	City of Romulus √
Jack Engebretson	Mayor, City of Livonia √
Robert Bennett	City of Livonia √
Marilyn Weinstein	City of Taylor √ (Representing Mayor Pitoniak)
Lora Fell	City of Taylor √
Peter McInerny	City of Wayne √
Robert Boyles	City of Wayne √
John Mitchell	Supervisor, Huron Township √
David Glaab	Huron Township
Johnny Vawters	Supervisor, Sumpter Township
Sharon Claxton	Sumpter Township
Dan Swallow	Van Buren Township
Tony Gibson	Van Buren Township
Jay Gilbert	City of Westland
Keith Madden	City of Westland √
Thomas Fielder	Mayor, City of Belleville
Michael Guido	Mayor, City of Dearborn √
Debra Walling	City of Dearborn √
Andrea Mercatante	City of Allen Park √ (Representing Mayor Huebler)
Irene Porter	Federal Aviation Administration
Ernest Gubry	Federal Aviation Administration √
David Welhouse	Federal Aviation Administration √
Marcia Boliard	Detroit Metro Air Traffic Control Tower √
Dave Baker	Michigan Department of Transportation Aeronautics
Richard Blouse	Detroit Regional Chamber of Commerce
Michael Woods	SE Michigan Council of Governments √ (Representing Tiffany Julian)
Dawn Hughes	Northwest Airlines

<u>Others Present:</u>

R. Latane Montague	Legal Counsel representing City of Dearborn
Lynn Blumenberg	Wayne County Airport Authority
Tim Keyes	City of Romulus

<u>Hand –Outs:</u> Meeting agenda and Working Paper Three – *"Land Use Analysis and Potential Noise Abatement Measures"*.

Meeting Summary

Lester Robinson, CEO of the Wayne County Airport Authority, called the meeting to order at 3:00pm and welcomed those in attendance. He explained that the purpose of this Part 150 Study Advisory Committee (SAC) meeting was to present a summary of Working Paper Three; "*Land Use Analysis and Potential Noise Abatement Measures*". Mr. Robinson asked those in attendance to introduce themselves.

Mr. Robinson turned the meeting over to Part 150 Noise Compatibility Study consultant, Ryk Dunkelberg, who introduced the members of the Part 150 Noise Compatibility Study consultant team. Mr. Dunkelberg stated that a major objective of the meeting today was to begin the process of committee discussion regarding various noise abatement and mitigation alternatives that could be implemented at Detroit Metropolitan Wayne County Airport. Mr. Dunkelberg stressed the importance of this phase of the Part 150 Noise Compatibility Study as it relates to evaluating potential noise abatement alternatives. He encouraged input and discussion from the Study Advisory Committee in assisting the consultant team and airport staff_determine feasible alternatives for further study and evaluation.

Mr. Dunkelberg gave a power point presentation covering the following topics. (Please note that the presentation material was distributed to you at the meeting).

- Land Use Analysis
- Goals of Noise Abatement Planning
- Categories of Noise Abatement Actions
- Review of Initial Noise Abatement Actions
- Actions Recommended for Study

Questions and Comments:

Mr. Bennett: *Do you anticipate needing to do a Part 161 Study at Detroit Metro Airport?*
Response: Mr. Dunkelberg stated that a Part 161 Study would not be done at Detroit Metro Airport. He explained that a Part 161 Study refers to "any restriction to aircraft operations (such as noise curfews) at an Airport that are based on noise abatement". As a result of federal legislation passed in 1990, these restrictions are no longer unilaterally able to be implemented by an Airport.

Mr. Bennett: *Have you identified any "easy" solutions to reduce noise at the Airport?*
Response: Mr. Dunkelberg stated that the Detroit Metro Airport has a "mature" sound insulation program and nearly all the homes within the 65DNL have been offered sound attenuation modifications. Even if the new noise contour identified any additional homes within the 65DNL, it would be difficult to move forward with additional noise reduction changes that would constitute more than 5% of what has already occurred within the 65DNL to mitigate noise.

Mr. Gubrey: *Will you determined how much benefit the communities surrounding the airport have already received from previous noise mitigation efforts?*
Response: Mr. Dunkelberg stated that the effectiveness of current measures would be reviewed; although, he did not believe that any alternatives that will be studied will have an impact on noise within the current 65 DNL contour. The challenge is to look at measures beyond the 65 DNL contour that will address noise concerns. For example, the study will evaluate measures from a procedural, operational, or flight track perspective. It may not change the 65 DNL, but it may have an affect on how aircraft noise is perceived by people or lessen the overall noise obtrusiveness of those aircraft.

Mayor Guido: *Is there a separate technical committee for this Part 150 Study?*

Response: Mr. Dunkelberg stated that the Part 150 Noise Compatibility Study for Detroit Metro Airport does not have a separate technical committee. All technical issues and concerns will be addressed within the existing Study Advisory Committee.

Mr. Buczkowski: *It appears that some aircraft do not depart using the entire length of the runway. Why is that?*

Response: Mr. Dunkelberg stated that, for various reasons, some aircraft may not use the entire length of the runway. This procedure is known as an "intersection departure" and it is something that the Part 150 Noise Compatibility Study will review and evaluate.

Mr. Buczkowski: *There are approximately six homes on Harrison Avenue that are nearly adjacent to the fence boundary of the airport. How could those homes not be included in the Sound Insulation Program when the runway lights are shinning into their bedrooms at night?*

Response: Mr. Robinson stated that he had spoken directly with a homeowner on Harrison Avenue about this problem. Although he understands that the runway lights are irritating at night, it is not a noise problem and will not be part of this study. Mr. Robinson also stated that he is continuing to address this issue with residents of this neighborhood.

Mr. Allouch: *Why weren't noise measures taken before the new runway was built?*

Response: Mr. Robinson stated that an Environmental Impact Study (EIS) was completed prior to building the new runway. It is anticipated that other environmental studies may be taking place in the near future which could include the formation of a committee to review findings and make recommendations.

Response: Mr. Gubrey of the Federal Aviation Administration stated that the Airport is restricted from using federal monies to fund noise abatement mitigation measures beyond the 65DNL. Prior to allowing the existing terminals and runways to be built, the FAA required that an Environmental Impact Study (EIS) be completed. The study was completed with significant public input and participation. Mr. Gubrey stated that aircraft noise relief is needed in the area between the 65-70DNL, and that most of the area beyond the 70DNL is owned by the Airport. Mr. Gubrey reiterated that beyond the 65 DNL, only flight track changes and operational procedure changes may be able to provide some noise mitigation relief.

Mr. Mitchell: *What specifically are the goals of this Part 150 Study beyond the 65DNL?*

Response: Mr. Dunkelberg stated that several options will be studied that may affect noise intrusion beyond the 65DNL. These options include studying alternatives such as flight track changes, fanning of aircraft, and other operational and procedural changes. Mr. Dunkelberg stated that the "fanning out" or dispersement of aircraft noise over a large area, verses the concentration of aircraft noise over a single area, is a major policy issue that the Part 150 Noise Compatibility Study Advisory Committee will need to look at very closely when determining feasible alternatives.

Mr. Bennett: *Mr. Bennett stated that fanning has worked very well for communities to the north of the Airport such as Livonia and Westland.*

Ms. Walling: *Is concentrating or dispersing noise directly over I-94 being studied as an option?*

Response: Ms. Vigilante stressed the importance of committee members recommending policy for either dispersing aircraft noise over a larger area or concentrating noise over a smaller, targeted area such as I-94. She also stated that the consultant team will not recommend flight track and noise abatement options that strictly shift noise from one community to another. Shifting of noise between communities is not an acceptable option, unless it very substantially reduces the *total* number of people adversely affected by noise.

Mr. Montague: (non-committee member from Dearborn): *Mr. Montague stated that Dearborn would prefer to have noise concentrated over I-94 rather than fanned out over a larger area.*

Ms. Weinstein: *Ms. Weinstein stated that City of Taylor residents were negatively impacted by noise when flight tracks were concentrated over I-94. She also stated that if a plan were implemented to concentrate noise over I-94, other areas of Taylor might then be included in the 65DNL. This would result in making it very difficult for land use planning purposes.*

Mr. Gubrey: *Mr. Gubrey gave an example of how the Cleveland Airport attempted to concentrate noise over certain targeted areas. Although technical advancements have been made in recent years, he cautioned the Committee not to "oversell" the expectation that pilots are able to fly directly in line with flight paths. He stated that several* *conditions, such as weather and weight of the plane, will determine variances in how closely the plane follows a flight path line.*

Board Member: *How did the 65DNL originate as the standard for determining noise compatibility?*

Response: Mr. Dunkelberg stated that the 65DNL resulted from a series of social studies that were done in the early 1970's. It was determined from those studies that 13 to14 percent of the population surrounding airports would be highly annoyed by aircraft noise at the 65DNL or greater noise levels. As a result, the 65DNL was selected as the level to determine eligibility for sound insulation. Congress passed the Aviation Safety and Noise Abatement Act in 1979 whereby the 65DNL was adopted.

Mr. Robinson: *Mr. Robinson stated that there will be major runway maintenance activity in the future that will potentially have an impact on runway operations for years at a time. This will include temporary runway closures. This activity will most likely have an operational affect on the model used for the Part 150 Noise Compatibility Study and he wanted everyone to be aware of the issue.*

Mr. Buczkowski: *Mr. Buczkowski requested that additional microphones be placed on the tables for the Study Advisory Meetings.*

Mr. Dunkelberg stated that the next meeting of the Part 150 Noise Compatibility Study Advisory Committee will be held after the holidays. The next meeting will address noise contours and the evaluation of various flight track changes that are being studied.

The meeting adjourned at 4:45 pm.

Barnard Dunkelberg & Company

TULSA | Cherry Street Building
1616 East Fifteenth Street
Tulsa, Oklahoma 74120

918 585 8844
918 585 8857

September 27, 2006

Lester Robinson, Chief Executive Officer
Detroit Metropolitan Wayne County Airport
LC Smith Terminal - Mezzanine
Detroit, MI 48242

Dear Mr. Robinson:

The next meeting of the Part 150 Noise Study Advisory Committee will be held on Thursday, October 5, 2006 from 10:00 a.m. to noon at the Lakes of Taylor Golf Club, 25505 Northline Road in Taylor, Michigan.

In preparation for the meeting, Working Paper Four containing the ***"Noise Abatement Options Alternatives"*** chapter is enclosed. We have completed the evaluation of the initial alternatives that were discussed at our last meeting. This Working Paper presents the results of our analysis for your review and further discussion at the next meeting.

I appreciate your on-going commitment to serving on the Part 150 Noise Study Advisory Committee to assist Detroit Metropolitan Wayne County Airport in evaluating potential noise abatement and mitigation efforts associated with aircraft noise in the communities surrounding the Airport. I look forward to seeing you at our next meeting on October 5, 2006 at 10:00 a.m.

Sincerely,

Ryk A. Dunkelberg

Ryk A. Dunkelberg
Barnard Dunkelberg & Company

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DETROIT METROPOLITAN WAYNE COUNTY AIRPORT
PART 150 NOISE COMPATIBILITY STUDY
STUDY ADVISORY COMMITTEE MEETING
October 5, 2006 -10:00 a.m. – 12:00 p.m. – Lakes of Taylor Golf Club

MEETING SUMMARY

NAME	***AFFILIATION*** ***PRESENT √***
Staff and Consultants	
Lester Robinson	Wayne County Airport Authority √
Scott Roberts	Wayne County Airport Authority √
Michael Conway	Wayne County Airport Authority √
Michelle Plawecki	Wayne County Airport Authority √
Thomas Naughton	Wayne County Airport Authority
Steve Economy	Wayne County Airport Authority √
Ryk Dunkelberg	Barnard Dunkelberg & Co. √
Brad Rolf	Barnard Dunkelberg & Co. √
Paul Dunholter	BridgeNet International √
Mary Vigilante	Synergy Consultants, Inc. √
Helen Dixon	Dixon & Company √
Darryl Daniels	Jacobsen Daniels Associates √
Wendy Sutton	JR Group LLC √
Jerry Rosenfeld	JR Group LLC
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Lanny Hall	Wayne County Commission√
David L. Harvey	City of Garden City
Kristina Kramarz	City of Dearborn Heights √
Moussa Allouch	City of Dearborn Heights
Hilliard Hampton	Mayor, City of Inkster√
Connie Mitchell	City of Inkster √

Cynthia Lyon	City of Romulus
Ed Buczkowski	City of Romulus
Jack Engebretson	Mayor, City of Livonia √
Robert Bennett	City of Livonia √
Cameron Priebe	Mayor, City of Taylor √
Lora Fell	City of Taylor
Peter McInerny	City of Wayne √
Robert Boyles	City of Wayne √
John Mitchell	Supervisor, Huron Township √
David Glaab	Huron Township
Johnny Vawters	Supervisor, Sumpter Township
Sharon Claxton	Sumpter Township
Dan Swallow	Van Buren Township√
Tony Gibson	Van Buren Township
Jay Gilbert	City of Westland
Keith Madden	City of Westland √
Thomas Fielder	Mayor, City of Belleville
Michael Guido	Mayor, City of Dearborn
Debra Walling	City of Dearborn √
Richard Huebler	Mayor, City of Allen Park √
Irene Porter	Federal Aviation Administration
Ernest Gubry	Federal Aviation Administration √
David Welhouse	Federal Aviation Administration √
John Mayfield	Federal Aviation Administration√
Marcia Boliard	Detroit Metro Air Traffic Control Tower √
Dave Baker	Michigan Department of Transportation Aeronautics
Richard Blouse	Detroit Regional Chamber of Commerce
Tiffany Julian	S.E. Michigan Council of Governments √
Mary Loeffelholz	Northwest Airlines

Others Present

R. Latone Montague	Legal Counsel representing City of Dearborn
Robert Post	Resident
Suzette Easter	Resident of Inkster
Katherine Cooley	Resident of Inkster
Tim Keyes	City of Romulus
Jeff Purdy	Royal Oak resident

Hand –Outs: Meeting agenda and Working Paper Four: *"Noise Abatement Options Alternatives."*

Meeting Summary

The fifth meeting of the Detroit Metropolitan Airport Part 150 Noise Compatibility Study Advisory Committee was held at the Lakes of Taylor Golf Club in Taylor, MI. on Thursday, October 5, 2006.

Opening remarks were made by Steve Economy for Lester Robinson, who turned the meeting over to Scott Roberts. Mr. Roberts introduced Ryk Dunkelberg, Part 150 Noise Compatibility Study project consultant, who asked members of the Study Advisory Committee to introduce themselves.

The agenda for the meeting included the following topics:

- Noise abatement options
- Committee discussion of options
- FAA presentation of Off-set Approach Environmental Assessment
- Committee discussion of Environmental Assessment
- Next steps in the Part 150 Noise Study process

Mr. Dunkelberg began the presentation by giving a brief overview of the status of the Part 150 Study process and what topics will be discussed at future meetings. Future meetings will include further discussion of flight track actions and a review of operational actions and land use measures that could be implemented to mitigate noise at Detroit Metropolitan Wayne County Airport.

Mr. Dunkelberg explained that the actions or options to be considered in this Part 150 Noise Compatibility Study focus on two categories: noise abatement options and land use options. Noise abatement options include flight track procedures, runway use, and the layout of the airport. He stressed the importance of the committee's input into the public policy decision of whether to concentrate aircraft noise over a particular area or to disperse aircraft noise in a broader area and "share" aircraft noise. Mr. Dunkelberg also stated that because Detroit Metro has a fairly mature noise program, it would be accurate to assume that at most, a reduction of 3% to 5% in aircraft noise would be feasible when looking at aircraft noise abatement options.

Mr. Dunkelberg explained that the following categories of actions could be implemented to mitigate aircraft noise at Detroit Metro Airport:

Flight Track Options

- *Option 1 – Concentrate noise*
  Option 1a – Concentrate noise – Departures off Runway 4R
  Option 1b – Concentrate noise – Departures off Runway 3L following the I-94 freeway corridor
  Option 1c – Concentrate noise – Departures in south flow

- *Option 2 – Disperse noise*
  Option 2a – Fan Runway 4R departures between 350 and 030 degrees
  Option 2b – Fan Runway 03L to the north between 350 to 060 degrees
  Option 2c – Fan departures in south flow
- *Option 3 – Concentrate noise in some area;, disperse noise in other areas*
  (This option is to be developed)
- *Option 4 – Concentrate close-in; disperse further away*
  (This option is to be developed)

<u>Runway Use Options</u>

- *Option 5 – Runway use – Concentrate noise*
  Option 5a – Extend hours of Contra-Flow at night
- *Option 6 – Runway use – Disperse noise*
  Option 6a – Off-set approach to Runway 4L during poor weather in north flow
  Option 6b – Off-set approach to Runway 22R during poor weather in south flow

<u>Departure Climb Procedures</u>

- *Option 7– Close-in or far-out procedure of AC91-53a*

<u>Landing Procedures</u>

- *Option 8 – Continuous-descent approach*

<u>Airfield/Airport Changes</u>

- *Option 9 – Extend Runway 3L/21R*
- *Option 10 – Displaced landing thresholds*
- *Option 11 – High-speed taxiway exits*
- *Option 12 – Ground run-up procedures*
- *Option 13 – Ground run-up enclosure (Hush House)*
- *Option 14 – Noise barriers*
- *Option 15 – Noise abatement procedures for use during runway maintenance*

<u>Other Measures, including Noise Management</u>

- *Option 16 – Install noise monitoring/radar tracking system*
- *Option 17 – Fly Quiet report card and Pilot Awareness Program*
- *Option 18 – Continuation of the Study Advisory Committee*

Mr. Dunkelberg discussed the Detroit Metropolitan Airport Noise Abatement Policies, including the following:

- The Part 150 Noise Compatibility Program will improve the overall noise environment, not shift noise from one area to another.
- Programs that benefit a community without unduly adversely affecting another community will be given highest priority.

- Programs for reducing the highest noise levels affecting the most people will be given highest priority.
- Programs subject to FAR Part 161 will not be part of the study recommendations.
- Operating capacity of the airport must remain unconstrained.

Mr. Dunkelberg gave an overview of the noise abatement goals and alternatives that the Study Advisory Committee discussed in Working Paper Four. He stated that questions to be considered by the Study Advisory Committee include the following:

- How effectively does an action reduce noise impacts?
- Does the action shift noise without meaningful overall noise reduction?
- Does the action affect safety?
- Will the FAA approve and be able to implement the procedure?
- Does the procedure violate any existing statutes, rules, or regulations?

Mr. Dunkelberg then turned the meeting over to Mary Vigilante, who gave a more in-depth presentation using computer-generated maps and graphics to explain the various options discussed in detail in the working paper mailed in advance of committee members.

Questions and comments from Study Advisory Committee members and staff included the following:

Mr. Bennett: I have trouble with the concept of concentration of noise over just one area. This is what got us into trouble in 1992. Dispersal worked, but concentration of noise did not.

Mr. Priebe: It appears that there is more of an increase to Huron Township and Taylor. Flight tracks currently go over the northwest corner of Taylor. Using the I-94 corridor option would spread more noise to more residential areas in the center of Taylor.

Mr. Mitchell: We just sound-insulated over 600 homes in Huron Township. Now you want to move the flight tracks?

Mr. Priebe: Can you show the numbers that reflect the 55 DNL?

Mr. Gubrey: The FAA is very comfortable using the 65 DNL or the 60 DNL, but it is less comfortable using anything under the 60 DNL.

Mr. Priebe: Without the 55 DNL analysis, this does not appear to be a fair study.

Mr. Robinson: It is not that the information from the analysis of the 55 DNL would not be useful, but we believe that the 55 DNL is not tested technology.

Mr. Hall: How would the Close-In departure procedure benefit residents of Romulus who live near the airport?

Mr. Bennett: Could a Fly Quiet program be implemented at Detroit Metro Airport?

Mr. Keyes: Romulus is impacted more than any other community present today. We have significant footprints from I-94 on down. My concern is that we not change significantly the footprint currently in place. I want to be sure that Romulus residents who have not been affected will not be affected under any new procedures.

Ms. Walling: Dearborn has a very significant aircraft arrival issue. Is it possible to make assumptions on arrivals for these options as well as departures?

Mr. Priebe: Is it possible to combine options 1A and 1B and 1C to disperse aircraft noise even more?

Mr. Huebler: It appears that Option 1B would concentrate more noise over Taylor, Allen Park, and South Dearborn. I would want more information before I would be in favor of that option.

Mr. Gubrey: I just want to point out that aircraft are much quieter than they were when the last noise study was completed. The noisier planes, such as the DC 9s, have been phased out.

Mr. Robinson: From the Airport Authority's perspective, we are going to provide as much information for this study as possible. The DC 9 aircraft used by Northwest Airlines are "fuel hogs." Northwest is trying to retire them completely from its fleet. I also want to state that we would be happy to meet with any mayor or community representative who would like to discuss their particular community situation in more detail. In the summer of 2007, we will be doing maintenance on Runway 3R that will cause the use of a cross runway that will impact Taylor.

Mr. Mitchell: I would like people who live within the 60 DNL in Huron Township to be considered for sound insulation.

Mr. Engebretson: I would like to address the issue of concentration versus disbursement of aircraft noise. I think it is terribly unfair to concentrate noise over one particular area. My preference would be to disperse noise in a fair and equitable manner.

Mr. Bennett: From what I have heard today, I cannot support any of the concentration options.

Mr. Priebe: If we are leaning toward dispersing aircraft noise, I think we should also look at constructing a ground run-up enclosure. I live on the Allen Park boarder and am regularly awakened by the ground noise. Those on the west side of Taylor, Romulus, and in Huron Township have even worse ground noise than I do.

Mr. Dunkelberg: I want to reiterate what Mr. Robinson said before. We do want everyone's input, and these discussions are crucial in creating a successful noise program. Traditionally, a Part 150 Noise Compatibility Study only looks at just the 65 DNL. However, we talked about the fact that any changes that could occur in any of the operational procedures would probably not show up inside the 65 DNL. However, we showed the 55 DNL contour without any attached analysis to give you an idea of the overall noise picture.

Rob Adams of Landrum & Brown (the FAA's consultant) presented an overview of the results of an Environmental Assessment for Proposed Runway 22R/4L Off-Set Instrument Landing System (ILS). Mr. Adams discussed the purpose and need for the project, the various alternatives, and key findings of the Environmental Assessment.

Mr. Dunkelberg discussed the next steps in the Part 150 Noise Compatibility Study. The meeting ended at noon.

Barnard Dunkelberg & Company

January 3, 2007

TULSA | Cherry Street Building
1616 East Fifteenth Street
Tulsa, Oklahoma 74120

918 585 8844
918 585 8857

Mr. Ryk Dunkelberg
Barnard Dunkelberg & Company
1616 East Fifteenth Street
Cherry Street Building
Tulsa, Oklahoma 74120

Dear Mr. Dunkelberg:

Detroit Metropolitan Wayne County Airport continues the process of updating its Federal Aviation Regulation (FAR) Part 150 Noise Compatibility Study. The Study Advisory Committee (SAC) last met in October, 2006 to review and discuss various noise abatement options, including flight track and operational options that could be implemented to mitigate noise at Detroit Metropolitan Wayne County Airport.

The next meeting of the Part 150 Noise Compatibility Study Advisory Committee will be held on **Thursday, January 18, 2007 from 10:00 am. to 12:00 pm. at the Metropolitan Hotel (formerly the Doubletree Hotel), 31500 Wick Road, Romulus, MI.** Based on the information received from you at the last meeting and data gathered thus far in the study, we will continue our discussion of potential flight track and operational options.

In preparation for the meeting, Working Paper Five, a continuation of the noise abatement options chapters, will be mailed to you for your review prior to the meeting.

As always, I appreciate your continued commitment to serving on the Part 150 Noise Study Advisory Committee and look forward to seeing you at our next meeting on January 18, 2007.

Ryk A. Dunkelberg

Ryk A. Dunkelberg
Barnard Dunkelberg & Company

DETROIT METRO • WILLOW RUN
WAYNE COUNTY AIRPORT AUTHORITY

\DETROIT METROPOLITAN WAYNE COUNTY AIRPORT
PART 150 NOISE COMPATIBILITY STUDY
STUDY ADVISORY COMMITTEE MEETING
January 18, 2007 -10:00 a.m. – 12:00 p.m. – Metropolitan Hotel

MEETING SUMMARY

NAME	*AFFILIATION*	*PRESENT √*
Staff and Consultants		
Lester Robinson	Wayne County Airport Authority	√
Scott Roberts	Wayne County Airport Authority	√
Michael Conway	Wayne County Airport Authority	√
Michelle Plawecki	Wayne County Airport Authority	√
Thomas Naughton	Wayne County Airport Authority	
Steve Economy	Wayne County Airport Authority	√
Lynn Blumenberg	Wayne County Airport Authority	√
Ryk Dunkelberg	Barnard Dunkelberg & Co.	√
Brad Rolf	Barnard Dunkelberg & Co.	√
Paul Dunholter	BridgeNet International	√
Mary Vigilante	Synergy Consultants, Inc.	√
Helen Dixon	Dixon & Company	√
Darryl Daniels	Jacobsen Daniels Associates	√
Wendy Sutton	JR Group LLC	√
Jerry Rosenfeld	JR Group LLC	
Committee Members		
Lanny Hall	Wayne County Commission	
David L. Harvey	City of Garden City	
Kristina Kramarz	City of Dearborn Heights	
Moussa Allouch	City of Dearborn Heights	
Hilliard Hampton	Mayor, City of Inkster	
Connie Mitchell	City of Inkster	√

Cynthia Lyon	City of Romulus √
Ed Buczkowski	City of Romulus √
Jack Engebretson	Mayor, City of Livonia √
Robert Bennett	City of Livonia √
Cameron Priebe	Mayor, City of Taylor
Lora Fell	City of Taylor √
Peter McInerny	City of Wayne √
Robert Boyles	City of Wayne √
John Mitchell	Supervisor, Huron Township √
David Glaab	Huron Township √
Johnny Vawters	Supervisor, Sumpter Township
Sharon Claxton	Sumpter Township
Dan Swallow	Van Buren Township
Tony Gibson	Van Buren Township
Jay Gilbert	City of Westland
Keith Madden	City of Westland √
Thomas Fielder	Mayor, City of Belleville
Debra Walling	City of Dearborn √
Richard Huebler	Mayor, City of Allen Park √
Irene Porter	Federal Aviation Administration √
Ernest Gubry	Federal Aviation Administration √
David Welhouse	Federal Aviation Administration
John Mayfield	Federal Aviation Administration
Marcia Boliard	Detroit Metro Air Traffic Control Tower √
Dave Baker	Michigan Department of Transportation Aeronautics
Richard Blouse	Detroit Regional Chamber of Commerce
Tiffany Julian	S.E. Michigan Council of Governments √
Mary Loeffelholz	Northwest Airlines √

Others Present

R. Latone Montague	Legal Counsel representing City of Dearborn
Royal Gaines	Resident of Inkster
Virginia Gaines	Resident of Inkster
Brenda Charleston	Resident of Inkster
Delores Claybrooks	Resident of Inkster

Hand-Outs: Meeting Agenda and Working Paper Five: *"Noise Abatement Options Alternatives"*

Meeting Summary

The sixth meeting of the Detroit Metropolitan Wayne County Airport Part 150 Noise Compatibility Study Advisory Committee was held at the Metropolitan Hotel in Romulus, MI on January 18, 2007.

The agenda for the meeting included the following topics:

- Noise Abatement Options
  - Description of Option
  - Comparison to Baseline
- Committee discussion of Noise Abatement Options
- Runway 3R Maintenance Needs Discussion
- Committee Discussion
- Next Steps in the Part 150 Noise Study process

Mr. Dunkelberg began the presentation by stating that the purpose of this meeting is to continue the committee discussion of noise abatement actions, and to complete the review of eight flight track and runway use options. After the last meeting in October 2006, feedback and input from the Study Advisory Committee was reviewed by the consultant team. That feedback resulted in five additional flight track and runway use options for discussion at this meeting.

Mr. Dunkelberg discussed the goals the Detroit Metropolitan Wayne County Airport Noise Abatement Study will attempt to achieve during the study process. These goals include the following:

- Develop a balanced and cost effective program for reducing existing and future noise in communities surrounding the Airport.
- Develop policies that guide the recommendations.
- Policies discussed early in the study must be applied when considering noise abatement and land use compatibility.

Mr. Dunkelberg discussed the following Detroit Metropolitan Wayne County Airport Noise Abatement policies that will be used as a guide when making noise abatement recommendations:

- The Part 150 program will improve the overall noise environment, not simply move noise from one community to another.
- Programs which benefit a community without unduly adversely affecting another community will be given highest priority.
- Programs for reducing the highest noise levels affecting people will be given highest priority.
- Programs subject to FAR Part 161 will *not* be part of the study recommendations.
- Operating capacity of the Airport must remain unconstrained.

Mr. Dunkelberg then turned the meeting over to Mary Vigilante for further discussion of questions that need to be considered by the consultant team when looking at various noise abatement options. Those questions include the following:

- How effectively does the action reduce noise impacts?
- Does the action shift noise without meaningful overall noise reduction?
- Does the action affect safety?
- Does the action reduce airport capacity?
- Will the FAA approve and be able to implement the procedure?
- Does the procedure violate any existing statutes, rules or regulations?

Ms. Vigilante provided an overview of each option being considered; how the option will operate, what current conditions we would be changing; and what noise consequences would result from each option. Ms.Vigilante stated that the options being presented today were specifically studied as a result of input received from the Study Advisory Committee at their October 2006 meeting. At that meeting, the Study Advisory Committee was in general agreement that dispersing or equalizing noise may be a better option than concentrating noise over one particular area, but that there may be some areas that warrant concentration of noise. Ms. Vigilante also presented the concept of combining the two philosophies, using both concentration and dispersal. She continued to discuss each of the 18 options by categories showing the following: (See Working Paper Five)

- The net increase or decrease of noise impacts in the 65 DNL.
- The net increase or decrease of noise impacts in the 60 DNL.
- How either an increase or a decrease in noise impact would affect various communities.
- Any operations issues or concerns that would result from a particular option.

The following questions were asked and comments made during Ms. Vigilante's presentation:

Mr. Montague: A question regarding option 3b, figure 8 as it relates to keeping the dispersal pattern generally, but having one concentration option over I-94 for noise reduction over Dearborn.

Mr. Montague: I want to reiterate that with respect to arrival noise, option 3b is the alternative that works best for Dearborn. Secondly, this is the option that has the least negative implications for shifting noise.

Ms. Mitchell: In looking at the options presented, it appears that option 8 is the best option for reducing noise in Inkster. Did you say that this option is still in the study mode?

Mr. Buczkowski: When aircraft are using the continuous descent approach (CDA), why does the aircraft need to "power up" as they move closer to the runway?

Ms. Loeffelholz: My understanding is that the use of the Continuous Descent Approach (CDA) is still in development and aircraft modifications would need to occur before this could be implemented. None of the Northwest aircraft fleet today could use the CDA as it is contemplated by the FAA. We would be happy to work with the study team to further discuss this issue.

Mr. Buskowski: What about aircraft run-up noise? Could the Study Advisory Committee take a tour of the Ground Run-Up Enclosure (GRE) in Flint?

Mr. Robinson: Suggested that the Study Advisory Committee view a video of how the GRE facility in Pontiac operates.

Mr. Bennett: I agree with the conclusion that Option 6 is the most favorable option of those presented today.

Mr. Glaab: From the point of view of Huron Township, I would oppose Option 4 which would increase the amount of noise for more people. This is especially true in the future for Huron Township since the newly affected areas are where we are expecting our largest concentration of residential growth. Referring to Option 8 (CDA), Mr. Glaab asked, why has it taken the aviation industry so long to start exploring this as a noise abatement option?

Mr. Gubry: In the 1990's the aviation industry spent considerable amounts of money working on reducing noise on aircraft engines and phasing out louder Stage 2 aircraft. The industry is now beginning to look at refining other noise abatement concepts such as the CDA option.

Mr. Robinson: Our market dictates the use of many smaller aircraft like DC 9's, A320's, and regional jets and turbo props. Because of our market and economic strategy, we have a broad mixture of different size aircraft flying at different speeds.

Ms. Lyon: The City of Romulus would be opposed to Option 3A that would disperse noise into an area being considered in the Romulus Master Plan for continued residential growth and development in the future.

Mr. Mitchell: All of these options address arrivals. Are departure climb procedures in place for aircraft departures?

Ms. Walling: Are we going to be looking at any other alternatives for dispersing arrivals or is Option 8 the only alternative being studied?

Mr. Robinson stated that a change in operations will take place this summer because of Runway 3R/21L, the eastern most parallel runway, undergoing pavement rehabilitation. This construction project is anticipated to begin in May and will temporarily modify runway use at the airport. Mr. Robinson said that when construction begins we will have greater use of our most southern crosswind runway 9R/27L, which means that communities to the east of the Airport such as Taylor, Allen Park, Lincoln Park, Southgate and Wyandotte and other communities all the way to the river will receive an increase in noise as a result of the increased use of the runway. It is anticipated that the construction will last approximately 175 days. This also means that communities to the north, such as Inkster and Dearborn, will benefit from a decrease in noise during this period of time. Mr. Robinson stated that there is a desire by some people in aviation to test using runway 9R/27L more frequently than it is currently being used. We are being asked to hold a public meeting to make sure that communities know about this change, said Mr. Robinson. It is anticipated that the public meeting will take place within the next 60 days.

Mr. Robinson informed members of the Study Advisory Committee that the Detroit Regional Chamber of Commerce and other groups have an economic development initiative called an "Aerotropolis" in the concept phase that would add significantly to development in and around the Airport. Since this plan is receiving considerable public attention, Mr. Robinson stated he wanted the Study Advisory Committee members to be aware that they may be asked their opinion about this plan.

Mr. Robinson expressed his condolences for the loss of Dearborn Mayor Michael Guido.

Mr. Dunkelberg stated that the next Study Advisory Committee meeting will concentrate on ground noise and airport facility noise. The meeting ended at 11:45am.

Barnard Dunkelberg & Company

March 12, 2007

Darryl Daniels
Jacobsen Daniels
121 Pearl Street
Ypsilanti, MI 48197

TULSA | Cherry Street Building
1616 East Fifteenth Street
Tulsa, Oklahoma 74120

918 585 8844
918 585 8857

Dear Ms. Daniels:

Detroit Metropolitan Wayne County Airport continues the process of updating its Federal Aviation Regulation (FAR) Part 150 Noise Compatibility Study.

The next meeting of the Part 150 Noise Compatibility Study Advisory Committee will be held on **Tuesday, April 3, 2007 from 10:00 am. to 12:00 pm. at the Metropolitan Hotel, 31500 Wick Road, Romulus, MI.** Based on the information received from you at the last meeting and data gathered thus far in the study, we will continue our discussion of potential flight track and operational options.

In preparation for the meeting, Working Paper Seven, a continuation of the noise abatement options chapters, will be mailed to you for your review prior to the meeting.

Also, please note that the 3rd Part 150 Noise Study Public Information Meeting will be held on Wednesday, April 4th from 5:30pm. to 7:30pm. at the Metropolitan Hotel. This meeting is being held to give the public the opportunity to view the noise abatement alternatives being considered to reduce aircraft noise at Detroit Metropolitan Wayne County Airport.

As always, I appreciate your continued commitment to serving on the Part 150 Noise Study Advisory Committee and look forward to seeing you at our next meeting on April 3, 2007.

Ryk A. Dunkelberg

Ryk A. Dunkelberg
Barnard Dunkelberg & Company

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DETROIT METROPOLITAN WAYNE COUNTY AIRPORT
PART 150 NOISE COMPATIBILITY STUDY
STUDY ADVISORY COMMITTEE MEETING
April 3, 2007 -10:00 a.m. – 12:00 p.m. – Metropolitan Hotel

MEETING SUMMARY

NAME	***AFFILIATION PRESENT √***
Staff and Consultants	
Lester Robinson	Wayne County Airport Authority √
Scott Roberts	Wayne County Airport Authority √
Michael Conway	Wayne County Airport Authority √
Michelle Plawecki	Wayne County Airport Authority √
Thomas Naughton	Wayne County Airport Authority √
Steve Economy	Wayne County Airport Authority
Lynn Blumenberg	Wayne County Airport Authority
Ryk Dunkelberg	Barnard Dunkelberg & Co. √
Brad Rolf	Barnard Dunkelberg & Co. √
Paul Dunholter	BridgeNet International √
Mary Vigilante	Synergy Consultants, Inc. √
Helen Dixon	Dixon & Company √
Matt Johnson	Jacobsen Daniels Associates √
Wendy Sutton	JR Group LLC √
Jerry Rosenfeld	JR Group LLC √
Committee Members	
Lanny Hall	Wayne County Commission √
David L. Harvey	City of Garden City
Kristina Kramarz	City of Dearborn Heights
Moussa Allouch	City of Dearborn Heights √
Hilliard Hampton	Mayor, City of Inkster √

Connie Mitchell	City of Inkster √
Cynthia Lyon	City of Romulus √
Ed Buczkowski	City of Romulus
Jack Engebretson	Mayor, City of Livonia √
Robert Bennett	City of Livonia √
Cameron Priebe	Mayor, City of Taylor
Lora Fell	City of Taylor √
Peter McInerny	City of Wayne √
Robert Boyles	City of Wayne √
John Mitchell	Supervisor, Huron Township
David Glaab	Huron Township √
Johnny Vawters	Supervisor, Sumpter Township
Sharon Claxton	Sumpter Township
Dan Swallow	Van Buren Township √
Tony Gibson	Van Buren Township
Jay Gilbert	City of Westland
Keith Madden	City of Westland √
Thomas Fielder	Mayor, City of Belleville
John B. O'Reilly	Mayor, City of Dearborn √
Debra Walling	City of Dearborn √
Evelyn Boman	Assistant to the Mayor, City of Allen Park √
Irene Porter	Federal Aviation Administration
Ernest Gubry	Federal Aviation Administration √
David Welhouse	Federal Aviation Administration √
John Mayfield	Federal Aviation Administration √
Marcia Boliard	Detroit Metro Air Traffic Control Tower √
Dave Baker	Michigan Department of Transportation Aeronautics
Richard Blouse	Detroit Regional Chamber of Commerce
Tiffany Julian	S.E. Michigan Council of Governments √
Mary Loeffelholz	Northwest Airlines

Others Present

R. Latone Montague	Legal Counsel representing City of Dearborn
Hugh McDonald	Resident of Dearborn
Bob Post	Resident

Hand –Outs: Meeting Agenda and Working Paper Six: *"Noise Abatement Options Analysys A"*

Meeting Summary

The seventh meeting of the Detroit Metropolitan Wayne County Airport Part 150 Noise Compatibility Study Advisory Committee was held at the Metropolitan Hotel in Romulus, MI on April 3, 2007.

The agenda for the meeting included the following topics:

- Noise Abatement Options
  - Description of Option
  - Detailed Summary of Impact/Change and Operational Issues
- Committee discussion of Noise Abatement Options
- Runway 3R Maintenance Status
- Consultants Recommendations for Noise Abatement Options
- Next Steps in the Part 150 Noise Study process

Mr. Dunkelberg began the presentation by stating that the purpose of this meeting is to continue the committee discussion of noise abatement actions, and to complete the review of operational flight track and noise abatement options. He indicated that a review and recommendation will be made on the options that have been "modeled" or analyzed. In his review he stated that the working paper reflects that options 3, 9, 10, 11, 12, 13, 14 and 15 were analyzed and the results would be discussed. He reiterated that up until now the focus has been on operational options and indicated that the next meeting(s) will be focusing on land use, including remedial and preventive type options.

Mr. Dunkelberg discussed the goals the Detroit Metropolitan Wayne County Airport Noise Abatement Study will attempt to achieve during the study process. These goals include the following:

- Develop a balanced and cost effective program for reducing existing and future noise in communities surrounding the Airport.
- Develop policies that guide the recommendations.
- Policies discussed early in the study must be applied when considering noise abatement and land use compatibility.

Mr. Dunkelberg discussed the following Detroit Metropolitan Wayne County Airport Noise Abatement policies that will be used as a guide when making noise abatement recommendations:

- The Part 150 program will improve the overall noise environment, not simply move noise from one community to another.
- Programs which benefit a community without unduly adversely affecting another community will be given highest priority.
- Programs for reducing the highest noise levels affecting people will be given highest priority.
- Programs subject to FAR Part 161 will *not* be part of the study recommendations.

- Operating capacity of the Airport must remain unconstrained.

Mr. Dunkelberg then turned the meeting over to Mary Vigilante for further discussion of questions that need to be considered by the consultant team when looking at various noise abatement options. Those questions include the following:

- How effectively does the action reduce noise impacts?
- Does the action shift noise without meaningful overall noise reduction?
- Does the action affect safety?
- Does the action reduce airport capacity?
- Will the FAA approve and be able to implement the procedure?
- Does the procedure violate any existing statutes, rules or regulations?

Ms. Vigilante indicated she would be reviewing the detailed results for each option being considered; how the option will operate, what current conditions we would be changing; and what noise consequences would result from each option. Ms.Vigilante stated that the options that were analyzed were specifically studied as a result of input received from the Study Advisory Committee. She continued to discuss the analysis of each of the options using Table 1 – Summary of Noise Abatement Options – Working Paper Six which outlines the following:

- Options 3c, 3d, 5, 6a, 7, 8, 9a, 9b, 9c, 10, 11, 12, 13, 14, 15, 16, 17, 18
- The net increase or decrease of noise impacts in the 65 DNL.
- The net increase or decrease of noise impacts in the 60 DNL.
- How either an increase or a decrease in noise impact would affect various communities.
- Any operations issues or concerns that would result from a particular option.

The following questions were asked and comments made during Ms. Vigilante's presentation:

Mr. Bennett: How are the individual options for 9a, 9b and 9c better or different?

Mr. Glaab: What are the negative impacts at it relates to Option 10 – Displaced Threshold?

Mr. Glaab: This is a very appealing option.

Ms. Lyon: States that there is no graphic/map in the working paper that illustrates the Ground Run-Up Procedures/Enclosure.

Mr. Glaab: Can activities and procedures for Ground Run-Up be generalized?

Mr. Glaab: Are there time restrictions as it relates to the length of the Ground Run-Up's?

Ms. Lyon: Can the actual time of day be limited if the length of the Run-Up cannot be?

Mr. Bennett: Indicated he received something in the mail related to Ground Run-Up testing.

Mr. Bennett: It is important to make the Ground Run-Up a part of the recommended options.

Mr. Engebretson: Identifies that the information on Page G96 in the table is different that what is shown in the PowerPoint presentation.

Mr. Conway: What is the danger to workers in a Ground Run-Up Enclosure (GRE)?

Mr. Glaab: What is the size of a GRE?

Mr. Bennett: I was involved with noise abatement with MDOT related to concrete wall barriers.

Mr. Glaab: Are there other airports that utilize berms and acoustical panels?

Mr. Glaab: What is a potential location for a GRE ?

Mr. Johnson: Sites have been identified in the Airport's updated Master Plan.

Mr. O'Reilly: Please explain the Radar Tracking System.

Mr. O'Reilly: What is the cost of the Radar Tracking System?

Mr. Conway: What other airports utilize the Radar Tracking System?

Mr. Swallow: Can/will the FAA and the Airport distribute the Master Plan and Part 150 study information to local community planning departments?

Mr. Bennett : I feel that 9c needs to be reevaluated for extending runways both North and South.

Ms. Rosenfeld: If all of the options were implemented what would the noise reduction be?

Ms. Boman: I want to say that I am impressed with this presentation. Before I came here today I didn't know anything about this study. You have explained it very well and made it very easy to understand.

Mr. Glaab: How much of the runway extension options can be accomplished now?

Mr. Hampton: Are the Study Advisory consultants working with the technical advisory committee during the update of the Airport Master Plan?

Ms. Lyon: What is being tested for, in the 60 day test in Dearborn?

Mr. Montigue: As a result of the settlement agreement between the FAA and the City of Dearborn, this test is required. It is related to the feasibility of the previous Part 150 Study. It is testing North flow on 060 heading to evaluate the validity of the previous Part 150 Study results.

Mr. Dunkelberg reiterated that the 60 day test in Dearborn started in March of this year and results may be forthcoming 45 days following that. Those results will then be reviewed. He also discussed the status of maintenance on 3L/21R. There is an upcoming maintenance project scheduled to start at the end of May 2007 and run for approximately 175 days. He also said that this will change the noise conditions temporarily due to the use of the Crosswinds Runways.

Mr. Dunkelberg discussed the Public Meeting to be held April 4th from 5:00 to 7:00 p.m. He explained that there will be no presentation, rather "stations" with boards and graphics that identify all of the options and the attendees will be given an opportunity to voice their opinion on which options they would like to see implemented. The meeting ended at 11:45am.

Barnard Dunkelberg & Company

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1616 East Fifteenth Street
Tulsa, Oklahoma 74120

918 585 8844
918 585 8857

July 26, 2007

Ms. Kristina Kramarz
6045 Fenton
Dearborn Heights, MI 48127

Dear Ms. Kramarz:

Detroit Metropolitan Wayne County Airport continues the process of updating its Federal Aviation Regulation (FAR) Part 150 Noise Compatibility Study.

The next meeting of the Part 150 Noise Compatibility Study Advisory Committee will be held on **Thursday, August 23, 2007 from 10:00 a.m. to 12:00 p.m. at the Metropolitan Hotel, 31500 Wick Road, Romulus, MI.**

Working Paper Seven, *Land Use Alternatives*, will be mailed to you prior to the meeting to allow you an opportunity to review the materials that will be presented.

As always, I appreciate your continued commitment to serving on the Part 150 Noise Study Advisory Committee and look forward to seeing you at our next meeting on August 23, 2007.

Ryk A. Dunkelberg

Ryk A. Dunkelberg
Barnard Dunkelberg & Company

DETROIT METRO • WILLOW RUN

WAYNE COUNTY AIRPORT AUTHORITY

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT
PART 150 NOISE COMPATIBILITY STUDY
STUDY ADVISORY COMMITTEE MEETING
August 24, 2007 -10:00 a.m. – 12:00 p.m. – Metropolitan Hotel

MEETING SUMMARY

NAME	***AFFILIATION*** ***PRESENT √***
Staff and Consultants	
Lester Robinson	Wayne County Airport Authority √
Scott Roberts	Wayne County Airport Authority √
Michael Conway	Wayne County Airport Authority √
Michelle Plawecki	Wayne County Airport Authority √
Thomas Naughton	Wayne County Airport Authority √
Steve Economy	Wayne County Airport Authority
Lynn Blumenberg	Wayne County Airport Authority
Ryk Dunkelberg	Barnard Dunkelberg & Co. √
Brad Rolf	Barnard Dunkelberg & Co. √
Paul Dunholter	BridgeNet International √
Mary Vigilante	Synergy Consultants, Inc. √
Helen Dixon	Dixon & Company √
Matt Johnson	Jacobsen Daniels Associates √
Wendy Sutton	JR Group LLC √
Jerry Rosenfeld	JR Group LLC
Committee Members	
Lanny Hall	Wayne County Commission √
David L. Harvey	City of Garden City
Kristina Kramarz	City of Dearborn Heights √
Moussa Allouch	City of Dearborn Heights √
Hilliard Hampton	Mayor, City of Inkster √
Connie Mitchell	City of Inkster √

Cynthia Lyon	City of Romulus √
Ed Buczkowski	City of Romulus
Jack Engebretson	Mayor, City of Livonia √
Robert Bennett	City of Livonia √
Cameron Priebe	Mayor, City of Taylor
Lora Fell	City of Taylor √
Peter McInerny	City of Wayne √
Robert Boyles	City of Wayne √
John Mitchell	Supervisor, Huron Township
David Glaab	Huron Township √
Johnny Vawters	Supervisor, Sumpter Township
Sharon Claxton	Sumpter Township
Dan Swallow	Van Buren Township √
Tony Gibson	Van Buren Township
Jay Gilbert	City of Westland
Keith Madden	City of Westland √
Thomas Fielder	Mayor, City of Belleville
John B. O'Reilly	Mayor, City of Dearborn √
Debra Walling	City of Dearborn √
Evelyn Boman	Assistant to the Mayor, City of Allen Park √
Irene Porter	Federal Aviation Administration
Ernest Gubry	Federal Aviation Administration √
David Welhouse	Federal Aviation Administration √
John Mayfield	Federal Aviation Administration
Marcia Boliard	Detroit Metro Air Traffic Control Tower √
Dave Baker	Michigan Department of Transportation Aeronautics
Richard Blouse	Detroit Regional Chamber of Commerce
Tiffany Julian	S.E. Michigan Council of Governments √
Mary Loeffelholz	Northwest Airlines

Hand –Outs: Summary Notes from April 3, 2007 meeting, meeting agenda, and Working Paper Nine: *"Noise Abatement Options Analysis."*

Meeting Summary

The ninth meeting of the Detroit Metropolitan Wayne County Airport Part 150 Noise Compatibility Study Advisory Committee (SAC) was held at the Metropolitan Hotel in Romulus, Michigan on August 24, 2007.

The agenda for the meeting included the following topics:

- Land Use Options
  - Description of Option
  - Consultant Recommendations
- Committee discussion of Land Use Options
- Runway 3R Maintenance Status
- Dearborn/FAA Lawsuit Flight Procedure Test Status
- Airport Noise Abatement Recommendations
- Committee Discussion
- Next Steps in the Study Process

Mr. Dunkelberg opened the Study Advisory Committee with a review of the topics that have been covered thus far in the Part 150 Noise Compatibility Study. He reiterated that the goal of the Part 150 Noise Study at Detroit Metropolitan Wayne County Airport is to develop a balanced and cost effective program for reducing existing and future aircraft noise in areas surrounding the Airport that will improve the overall noise environment without shifting noise from one area to another. He also reminded the Study Advisory Committee members that the Federal Aviation Administration (FAA) has determined that the 65 DNL noise contour is the threshold of significance used by the FAA to determine land use compatibility and potential eligibility for federal funding. Based on that FAA requirement, the consultant recommends that the Airport use the existing 2004 noise contour to evaluate land use alternatives.

Mr. Dunkelberg discussed the two types of Land Use alternatives:

> **Preventive** – Prevents noise sensitive land uses from developing within the 65 DNL and greater noise contours using land use planning methods such as; zoning ordinances, subdivision regulations, and comprehensive planning. Various jurisdictions control these land uses.
>
> **Remedial/Corrective** – Corrects existing land use incompatibilities through methods such as; acquisition, sound attenuation, and purchase assurance or easements. Remedial controls are under the authority of the Airport.

Mr. Dunkelberg discussed the eight alternatives studied by the consultant for both preventive and remedial land uses.

Alternative 1 – Voluntary Sound Attenuate Noise Sensitive Structures.

The Airport has sound insulated 2,510 homes within the 65 DNL noise contour. Sixty-four homes were offered sound insulation and declined to take it for one reason or another. Ten of those 64 homes are within the 2004 existing noise contour. The consultant does not recommend a continuation of the sound insulation program because current law does not allow FAA funds to be used outside the 65 DNL contour; currently, all homes within the 65 DNL have been offered sound attenuation.

Alternative 2 – Acquisition of Non-compatible Land Use or Undeveloped Land Zoned as Non-compatible.
There are 490 acres of residentially zoned undeveloped property within the 65 DNL contour. It is recommended that in order to keep this property on the tax rolls, preventive land use controls should be adopted to change zoning codes from residential to commercial, office, or light industrial.

Alternative 3 – Voluntary Acquisition of Avigation or Noise Easements Over Non-compatible Land Uses.
All noise sensitive uses within the 65 DNL contour have been sound insulated or offered sound insulation. There are 10 homes in the 65 DNL that declined participation in the noise mitigation program. The total cost of easements for these 10 homes would cost about $40,000. It is recommended that preventive land use controls be adopted in lieu of purchasing easements.

Alternative 4 – Voluntary Sales Assistance (Assurance Program).
Under this program, the homeowner wishing to sell his home is guaranteed fair market value price for their property. It is recommended that preventive land use controls should be adopted in lieu of sales assistance.

Alternative 5 – Disclosure Statements/Buyer Notification.
It is recommended that full disclosure to potential buyers of homes within the 60 DNL and greater contours be made, stating that a home may be subject to annoying aircraft noise levels. This policy would require adoption at the local or state level. This disclosure would be made available to buyers at the time of title search and in the disclosure documents at the time of purchase.

Alternative 6 – Building Code Requirements.
This alternative would require that any new homes built within the 65 or 60 DNL contours be built to standards that achieve sound attenuation levels. FAA guidelines suggest a 25 dB reduction within the 65 DNL, a 30 dB reduction within the 70 DNL, and a 35 dB reduction within the 75 DNL. It is recommended that this alternative be implemented for all jurisdictions within the 65 DNL and greater contour.

Alternative 7 – Comprehensive Plan Amendments.
Comprehensive plans are prepared by local jurisdictions to identify current conditions in a community, identify community goals and policies, and identify plans for that community to achieve the goals. It is recommended that communities within the 65 DNL

amend their existing adopted comprehensive plans to achieve long-term land use compatibility with Detroit Metropolitan Wayne County Airport aircraft noise.

Alternative 8 – Zoning Code Changes.
Zoning is the most effective and most widely used method for governments to control the physical development of land, the uses for an individual's property, and the development standards for new development projects. It is recommended that zoning code changes be implemented for all jurisdictions within the 65 DNL.

Mr. Dunkelberg discussed the following noise abatement recommendations that have been studied and recommended for implementation:

Flight Tracks
- Option 3c – 4R Departures – Concentrate a portion of south turning aircraft and fan others.
- Option 3d – 3L Departures – Concentrate a portion of south turning aircraft and fan others.
- Option 1c – South Flow – Concentrate departures.
- Consider results of Dearborn/FAA lawsuit test.

Runway Use
- Continued daytime south flow.
- Option 5a – Extend hours of nighttime contra-flow.
- Option 6a – Off-set Approach 4L/22R.

Descent/Departure Climb Recommendations
- Option 8 – Continuous descent approach.

Airport Plan Recommendations
- Option 9c – Further study of extending 3L/21R.
- Option 10 – 1,000ft.displaced thresholds 21L & 22R.
- Option 12 – Ground run-up procedures.
- Option 13 – Ground Run-Up Enclosure.
- Option 15 – Noise abatement procedures for use during runway maintenance.

Noise Management Recommendation
- Option 16 – Install noise monitoring or radar tracking system.
- Option 17 – Fly Quiet Report Card and Pilot Awareness Program.
- Option 18 – Continuation of the Study Advisory Committee.

Mr. Dunkelberg discussed the status of the maintenance to Runway 3R.

Mr. Dunkelberg gave a status report on the Dearborn/FAA lawsuit flight procedure test of 055 and 060 heading north flow departures that was conducted in March and April of

2007. He stated that there has been very little public reaction to the test and that a report of the findings is in the process of being prepared.

The next steps in the Part 150 Noise Compatibility Study are to determine the Noise Compatibility Program, develop the Combined Alternatives Noise Contour, and present it to the Study Advisory Committee. A public hearing will be held to solicit verbal and written comments from the public. The Noise Compatibility Program will then be submitted to the Wayne County Airport Authority for their consideration and approval and, ultimately, to the FAA for Noise Exposure Map acceptance and Noise Compatibility Program approval.

Questions and Comments

What is the difference between an Airport Master Plan and a Part 150 Noise Compatibility Study?

An airport Master Plan is a long term policy guide of how an airport will develop over a long period of time (10-20 years). A Part 150 Noise Study is a short term, generally a five year planning horizon, on how to address noise issues caused by aircraft at an airport. If there is a capital improvement recommended in a Master Plan process to be implemented within a short term timeframe (5-8 years) the noise consultant should consider that fact in the noise study evaluation. There has been discussion in the Detroit Metro Airport Master Plan about a runway extension. That is the reason we have evaluated runway extensions in the current Part 150 Noise Study.

What factors will trigger a new Part 150 Noise Compatibility Study?

Major factors that would trigger a Part 150 Study update include a major capital improvement at the Airport such as a new runway or runway extension or an operational change which is fifteen percent (15%) different than the operation numbers we evaluated in the current Part 150 Study.

How much money are homeowners paid for noise easements?

The average payment across the country is between $2,500 and $3,000 per home.

When a home is for sale within the airport environs, do we let people know that aircraft noise is a problem or do we just "let the buyer beware?"

The question is, does a municipality fairly let people know who are moving into the community that they may be affected by aircraft noise and then take whatever consequence there may be out of the market value of the home, or do we just say " buyer beware". It really boils down to what the community feels it owes it citizens.

How can we address the noise problem of those people living in homes within the 60 DNL with federal funds?

The current law states that federal funding can only be used for homes within the 65 DNL contour is set to expire in September of 2008. One of the issues the Committee should look at now is the merits of expanding to the 60 DNL and including that request in this current Part 150 Noise Compatibility Study. If the law does change, the Airport would be required to go through the process of amending the current Part 150 Noise Study to make additional homes eligible for federal funding out to the 60 DNL.

If Congress adopted a new law allowing sound attenuation to go out to the 60 DNL, would the Airport begin the sound attenuation program again?

If federal funding became available to allow sound attenuation out to the 60 DNL, the recommendation would be to continue the existing sound attenuation program out to the 60 DNL contour taking into consideration "squaring off" of boundaries under the current noise contour. If federal statutes change we would then not need to go through the process of amending the Part 150 Noise Compatibility Program. It is also important to note that the FAA is considering sound attenuation down to the 60 DNL noise contour only if the local communities adopt land use controls to prohibit additional development within the 60 DNL noise contour.

How much money did the Airport spend to sound insulate 2,500 homes?

The total cost of the Detroit Metro Sound Insulation program was about $122 million.

Have other state legislatures adopted formal disclosure laws regarding aircraft noise exposure that would be on a disclosure document similar to land fills and railroads etc.

Some states disclose in general terms what is on their disclosure statements for all real estate transactions. Some communities do disclose this information without the state mandating that they do so. Mr. Dunkelberg stated that he is not aware of any state that specifically addresses airport disclosures.

The meeting ended at noon.

Barnard Dunkelberg & Company

TULSA | Cherry Street Building
1616 East Fifteenth Street
Tulsa, Oklahoma 74120

918 585 8844
918 585 8857

February 26, 2008

Mr. Robert D. Bennett
32210 Myrna
Livonia, Michigan 48154

Dear Mr. Bennett:

The next meeting of the Detroit Metropolitan Wayne County Airport Part 150 Noise Compatibility Study Advisory Committee will be held on ***Tuesday, March 11, 2008 from 10:00 a.m. to 12:00 p.m.*** at the Inkster Parks and Recreation Building located at 2025 Middlebelt Rd. in the City of Inkster.

The Detroit Metropolitan Wayne County Airport is nearing the end of the Federal Aviation Regulation (FAR) Part 150 Noise Compatibility Study. Since we will be reviewing the recommendations we have studied to reduce the impact of aircraft noise on the communities surrounding the Airport, I encourage you to attend this final meeting of the Part 150 Study Advisory Committee.

Working Paper Eight, " *Recommendations* ", will be mailed to you prior to the meeting to allow you an opportunity to review the materials that will be presented.

I appreciate your continued commitment to serving on the Part 150 Noise Study Advisory Committee and look forward to seeing you at our next meeting on March 11, 2008.

Ryk A. Dunkelberg

Ryk A. Dunkelberg
Barnard Dunkelberg & Company

DETROIT METRO • WILLOW RUN
WAYNE COUNTY AIRPORT AUTHORITY

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT
PART 150 NOISE COMPATIBILITY STUDY
STUDY ADVISORY COMMITTEE MEETING
March 11, 2008 -10:00 a.m. – 12:00 p.m. – Inkster Recreation Center

MEETING SUMMARY

NAME	***AFFILIATION*** ***PRESENT √***
Staff and Consultants	
Lester Robinson	Wayne County Airport Authority √
Scott Roberts	Wayne County Airport Authority √
Michael Conway	Wayne County Airport Authority √
Michelle Plawecki	Wayne County Airport Authority √
Thomas Naughton	Wayne County Airport Authority
Steve Economy	Wayne County Airport Authority
Robert Davis	Wayne County Airport Authority √
Lynn Blumenberg	Wayne County Airport Authority
Ryk Dunkelberg	Barnard Dunkelberg & Co. √
Brad Rolf	Barnard Dunkelberg & Co. √
Paul Dunholter	BridgeNet International
Mary Vigilante	Synergy Consultants, Inc. √
Helen Dixon	Dixon & Company √
Matt Johnson	Jacobsen Daniels Associates
Wendy Sutton	JR Group LLC √
Jerry Rosenfeld	JR Group LLC
Committee Members	
Lanny Hall	Wayne County Commission √
David L. Harvey	City of Garden City
Kristina Kramarz	City of Dearborn Heights
Moussa Allouch	City of Dearborn Heights
Dan Paletko	Mayor, City of Dearborn Heights √

Hilliard Hampton	Mayor, City of Inkster √
Connie Mitchell	City of Inkster √
Cynthia Lyon	City of Romulus √
Ed Buczkowski	City of Romulus √
Jack Kirksey	Mayor, City of Livonia
Robert Bennett	City of Livonia √
Cameron Priebe	Mayor, City of Taylor
Lora Fell	City of Taylor √
Peter McInerny	City of Wayne √
Robert Boyles	City of Wayne
John Mitchell	Supervisor, Huron Township
David Glaab	Huron Township
Johnny Vawters	Supervisor, Sumpter Township
Sharon Claxton	Sumpter Township
Dan Swallow	Van Buren Township √
Tony Gibson	Van Buren Township
Jay Gilbert	City of Westland
Keith Madden	City of Westland √
Richard Smith	Mayor, City of Belleville
John B. O'Reilly	Mayor, City of Dearborn √
Debra Walling	City of Dearborn √
Gary Burtka	Mayor, City of Allen Park
Ernest Gubry	Federal Aviation Administration √
David Welhouse	Federal Aviation Administration
John Mayfield	Federal Aviation Administration √
Marcia Boliard	Detroit Metro Air Traffic Control Tower
Dave Baker	Michigan Department of Transportation Aeronautics
Richard Blouse	Detroit Regional Chamber of Commerce
Tiffany Julian	S.E. Michigan Council of Governments √
Mary Loeffelholz	Northwest Airlines

Others

Latone Montague	City of Dearborn Aviation Consultant √

Meeting Summary

The tenth and final meeting of the Detroit Metropolitan Wayne County Airport Part 150 Noise Compatibility Study Advisory Committee (SAC) was held at the Recreation Center in Inkster, Michigan on March 11, 2008.

The agenda for the meeting included the following topics:

- Introduction
- Update on Master Plan
- Noise Compatibility Plan Recommendations
  - □ Operational Recommendations
  - □ Facility Recommendations
  - □ Administrative/Management Recommendations
  - □ Land Use Recommendations
- Committee Discussion of Recommendations
- Dearborn/FAA Lawsuit Flight Procedure Test Status
- Committee Discussion
- Next Steps

Mr. Dunkelberg opened the meeting stating that this would be the last meeting of the Study Advisory Committee for the Part 150 Noise Compatibility Study and extended his appreciation to all members of the Committee for their participation. He stated that this meeting will present the Combined Contour which reflects the noise contour with all of the noise abatement recommendations. It also presents the Future Noise Exposure Map (NEM).

Mr. Dunkelberg reviewed the goals of noise abatement that include developing a balanced and cost effective program for reducing existing and future noise at Detroit Metropolitan Wayne County Airport and enacting the policies that guide the recommendations made resulting from the Part 150 Study.

Mr. Dunkelberg reviewed all of the Noise and Land Use actions that have been analyzed during the Part 150 Noise Compatibility Study and summarized the Recommendations that have resulted from the study.

The following noise abatement recommendations were presented. Note that these recommendations will be prioritized for the final report.

Flight Tracks

1. 4R Departures – Concentrate a portion of south turning aircraft and fan others (Option 3c)
2. 3L Departures – Concentrate a portion of south turning aircraft and fan others (Option 3d)
3. South Flow – Concentrate Departures (Option 1c)

Runway Use

4. Extend hours of Nighttime Contra-Flow (Option 5a)

Descent/Departure Climb Recommendations

5. Continuous Descent Approach (Option 8)

Airport Plan Recommendations

6. Extend Runway 3L/21R North to 10,000 feet (Option 9c)
7. Ground Run-up Procedures (Option 12)
8. Ground Run-up Enclosure (Option 13)
9. Noise Abatement Procedures for Use during Runway Maintenance (Option 15)

Land Use Management Recommendations

1. Voluntary Acquisition of Residential Units in 70 DNL contour (Option 2)
2. Encourage Communities to Adopt Disclosure Statements/Buyer Notification (Option 5)
3. Work with Communities to Discourage Noise Sensitive Uses in 65 DNL (Option 6)
4. Work with Communities to require Sound Attenuation of Homes in 60 DNL (Option 7)
5. If federal funds become available at 80%, Sound Attenuate residences in 60 DNL

Program Management Recommendations

1. Install Noise Monitoring/Radar Tracking System (Option 16)
2. Continuation of the Study Advisory Committee (Option 18)
3. Fly Quiet Report Card and Pilot Awareness Program (Option 17)
4. Operations Review and Part 150 Update

Mr. Dunkelberg addressed the estimated costs to implement the Recommendations.

Noise Abatement Recommendations – Approximately $54 million – Runway extension and Ground Run-up Enclosure being the largest cost.
Land use Recommendations – Approximately $1.5 million – not including $198 M to sound attenuate out to the 60 DNL.
Program Management Costs – Approximately $3.5 million for Noise/Flight Track Monitoring.
Total Program Costs – Approximately $60 million

Mr. Dunkelberg gave an update on the Dearborn/FAA Lawsuit Flight Procedure Test status. He stated that the analysis is complete and the report has been reviewed by the Airport and the FAA. A copy of the report will be provided to Dearborn.

The next steps in the Part 150 Noise Compatibility Study process are as follows:

- Public Hearing – April 30, 2008 at the Metropolitan Hotel, 2:00pm – 4:00pm and again from 5:30pm – 7:30pm.
- Present Noise Compatibility Plan (NCP) to Wayne County Airport Authority for consideration and approval.
- Submit to FAA for Noise Exposure Map (NEM) acceptance and NCP approval.

A very lengthy discussion took place regarding how the extension of the north/south runway relates to the Part 150 Noise Study. Several Committee members voiced concern that the Master Plan could unduly influence the Part 150 Study. A representative from Romulus stated that they were surprised to see the information about an extended runway as part of the Part 150 Noise Study recommendations. The representative stated that Romulus would like to see this recommendation removed until further study is undertaken. The Mayor of Dearborn agreed that the recommendation should be removed. After considerable discussion, Mr. Dunkelberg stated that in light of new comments today a commitment would be made to re-evaluate the recommendation.

A discussion took place regarding the costs of implementing the noise abatement recommendations. Several members of the Committee questioned the cost/benefit analysis of spending 54 million when 49 million of the cost is related to the runway extension. Mr. Dunkelberg stated that there would need to be a cost/benefit analysis completed prior to FAA funding the runway extension. He also noted that there would have to be a significant reduction of noise within the 65 DNL for the runway extension to be funded and approved through a Part 150 Study.

Mr. Robinson discussed the Master Plan stating that the document is going to be presented to the Wayne County Airport Authority on March 20th. Mr. Robinson stated that the FAA forecasts 2.3 percent per year over the next 20 years. He noted that the study indicates passenger growth from 36 million per year to about 56 million per year and operations growing from about 580,000 to almost 900,000 a year. The Master Plan also assumes that we maintain our position as a major hub and major airport. The Plan also includes additional terminals and other Airport facilities. The runway extension is currently scheduled in the second five year phase of the Airport Master Plan twenty year horizon.

Questions and Comments from Committee Members

Wouldn't the proposed extension to the north have an impact on the current Airport noise footprint?

Mr. Dunkelberg stated that the reason the runway extension was evaluated was because it was on the existing Airport layout plan, although we understand it is no longer within the timeframe of this Part 150 Study. It is important to remember that whatever is in an airport Master Plan is a policy document of what the Airport would like to do. Prior to any construction of a runway extension, an environmental document would have to be prepared which would allow more time to evaluate this option with a more extensive noise analysis.

What are the chances of federal changes being made to allow federal funds for sound attenuation out to the 60 DNL?
Mr. Dunkelberg stated that one of the Part 150 Study recommendations is to sound attenuate residences in the 60 DNL if the FAA approves 80% funding out to the 60 DNL. This is something that Congress is currently considering. In addition, we would hope that local communities would prohibit additional noise sensitive uses inside the noise contour.

As a local enforcement agency for building codes, we are required to adopt Michigan residential and building codes. Is there an ordinance we can put in place to require more strict standards?
Some communities will adopt a specific airport overlay zone that is defined by the 60 DNL that will say that within that specific zone additional sound attenuation has to be built in to achieve specific inside noise levels.

Comment from FAA – We would certainly be interested in hearing from the building code people about your challenges and we could put you in touch with other communities that have gone through this process.

Are you aware of a recent case in Nevada with the takings claim for the airspace? Would that also transfer responsibilities to the local principalities?
Mr. Robinson stated that the problem in Nevada was that there was a gentleman that owned property at the end of the runway who wanted to build a casino over the height restrictions of the airport ---it was not a noise issue.

What is the likelihood of getting a homogenous fleet at Detroit Metro?
Mr. Robinson stated that Detroit Metro Airport, we have aircraft from DC9's up to 747's. We have a whole mix of aircraft here. As the DC9's are phased out and we get a newer generation of airplanes it will be easier to implement a Continuous Descent Approach. I also suspect that based on fuel cost there may be more pressure to do it sooner than later.

A representative from Dearborn stated that it appears that Option 10 is missing from the list of recommendations? Option 10 was the displaced arrivals threshold for 21 left and 21 right that made it clear that there is a significant noise benefit for Dearborn and Romulus because arriving planes would land a little bit further down the runway which would significantly increase the altitude of arriving flights over people's homes.
Mr. Dunkelberg stated that Option 10 was looked at and showed some benefits, but it was determined that the option should be evaluated as part of the Master Plan. Mr. Robinson stated that Option 10 essentially shortens the runway and has significant operational impacts association with it.

How many of the 36 million passengers coming through the Airport are actually just connecting passenger verses how many passengers are coming to Detroit to improve commerce etc.

Mr. Robinson stated that he was assuming the question implies that the transit connecting passenger has no benefit to the community. He stated that connecting passengers spend money in the terminal which adds to employment in the community. Fifty percent of passengers are connecting passengers, and while they do not come outside the terminal to spend money in the neighborhoods, they are employing about 30,000 people and adding about 7.6 billion dollars to the economy.

Mr. Montague and Mayor O'Reilly expressed appreciation to the Consultant team for an excellent job on the Part 150 Noise Study and for their responsiveness to the concerns of the community.

The meeting ended at noon.

Appendix Six

WRITTEN COMMENTS ON WORKING PAPERS

City of Romulus

ALAN R. LAMBERT
Mayor

ADMINISTRATIVE and LEGISLATIVE OFFICES
11111 Wayne Road · Romulus, MI 48174-1485
Telephone (734) 942-7571 · FAX (734) 941-2122

LINDA R. CHOATE
Clerk
(734) 942-7540 FAX (734) 942-7592

PAMELA MORRISON-KERSEY
Treasurer
(734) 942-7580 FAX (734) 941-5541

April 10, 2008

RECEIVED

APR 14 2008

Barnard Dunkelberg

Barnard Dunkelberg & Company
Mr. Ryk Dunkelberg
Cherry Street Building
1616 East 15th Street
Tulsa, OK 74120

Re: Detroit Metropolitan Airport Part 150 Study

Dear Mr. Dunkelberg:

On behalf of the City of Romulus I want to thank you for the way that your firm has conducted the Part 150 Study Advisory Committee (SAC) in conjunction with the Airport staff. The information presented as part of each working paper and your firm's ability to respond to our community's requests for additional information and clarification should be commended.

Romulus has reviewed the information presented as part of the last working paper (working paper 8) and Study Advisory Committee meeting discussion held on March 11, 2008. As requested, we are providing our comments.

In general, we support the recommendations being carried forward as a result of this study. However, we reiterate our concerns with any proposal or recommendation that will alter (expand) the existing noise contours DNL and local SEL experienced within our community. Our community will be significantly impacted with any noise associated with the airport operations, as we are home to the airport. Therefore, Romulus will not support any recommendation(s) that results in an increase in noise levels experienced by our community. The City of Romulus was as surprised as other members of the SAC to see, upon review and discussion of the last working paper, that several of the committee's recommendations had been altered in what appears to be an attempt to support expansion plans as part of the Airport Master Plan.

Specifically, we are concerned with Noise Abatement Elements recommendation #6 (extension of Runway 3L/21R to the north). Previous discussion by the committee and

WILLIAM J. WADSWORTH
Councilman

RANDOLPH GEAR
Mayor Pro Tem

LEROY D. BURCROFF
Councilman

WILLIAM A. CROVA
Councilman

ELLEN CRAIG-BRAGG
Councilwoman

JOHN BARDEN
Councilman

HARRY CROUT
Councilman

information from the last working paper supported former option 9c (extension of Runway 3L/21R to the south), which would decrease noise levels in our community and other surrounding communities. This change is puzzling as it was not something discussed or committee consensus reached and the information in working paper 8 states it would be "initiated when the need arises". We question what determines "need" from a Part 150 standpoint? We must insist that former option 9c be considered and item #6 be removed as an implementation recommendation. It should be noted that we would not be opposed to having further discussion and analysis of this option as part of the continuation of the Part 150 SAC.

With respect to recommendations 7, 8 and 9 (ground run up procedures; construct ground run up enclosure; and develop noise abatement procedures for use during runway maintenance operations), we continue to request that these three items be given top priority and labeled as recommendations 1 – 3. These were items that were included but not completed as part of the previous Part 150 Study and will have the greatest positive impact on quality of life for the residents of Romulus and surrounding communities. We have raised this concern on several previous occasions both verbally and in writing (8/30/07). Mr. Robinson agreed these items were significant (letter dated 9/25/07) and repeated that this change could be included in the final study at the meeting held March 11, 2008. Please provide, in writing, confirmation of the numerical re-prioritization of recommnedations 7, 8 and 9.

After considering Land Use Management Elements (LUME) #1 (Voluntary Acquisition of Residential Units within the 70 DNL), we do not oppose the acquisition of properties within the 70 DNL. However, we request that they be aggressively marketed and returned to the tax rolls. We also continue to request written assurances from the Wayne County Airport Authority that they will not acquire land outside the current foot print of the airport other than these few properties noted, as part of this recommendation.

We cannot support LUME recommendations #2 – #5, which deal primarily with community initiated changes, such as, deed restrictions, buyer notifications, zoning and building changes. Significant further evaluation of the impact and potential liability to the community for implementing these recommendations must be conducted before we can even consider these recommendations. That evaluation must include the local communities, at the table, through the whole process. We must also insist that the Wayne County Airport Authority fund the evaluation of these recommendations, include an indemnity instrument to the City from any future legal actions that may arise from implementation of these recommendations plus reach an agreement on the primacy of adopted Master Plans (WCAA vs. Communities).

We can support LUME #6 (if Federal funds become available at 80% funding or greater, sound insulate residential units within 62 DNL) and Program Management and Administrative Elements #1 – #4.

At the last Study Advisory Committee meeting the minutes from the August 24, 2007 Study Advisory Committee meeting were discussed. It was agreed by the Wayne County Airport Authority staff that the minutes would be revised/amended to include more detail and be in the same format as all previous meetings. We have not received these revised/amended meeting minutes.

Due to the nature of some of our concerns and the continuing changes to the study recommendations, we request the following: 1) a full copy of the study prepared for Public Hearing purposes; 2) a copy of the power point presentation from March 11, 2008 SAC; 3) the revised/amended August 24, 2007 minutes; and 4) the minutes from the March 11, 2008 meeting be provided in advance of the April 30, 2008 Public Hearing. This material will permit us to comment on the most complete study before it is submitted to the FAA. In addition, we also continue to request all of the documentation supporting any changes made to the study by the Airport Authority staff and/or Board prior to its submission to the FAA for approval.

If you have any questions regarding this request please contact me at (734) 955-4530 or via email at clyon@ci.romulus.mi.us.

Sincerely,

Cynthia I. Lyon, AICP
City Planner
Economic Development Department

vf

cc: Mayor Lambert
Timothy Keyes, Economic Development Director
David Treadwell, Chair Airport Authority Board
Lester Robinson, Chief Executive Officer Wayne County Airport Authority
Ernest Gubry, FAA Airport District Office

CITY OF INKSTER
26215 TROWBRIDGE
INKSTER, MI 48141
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Hilliard L. Hampton, II
Mayor

November 8, 2007

Lester W. Robinson
Chief Executive Officer
Detroit Metro Wayne County Airport Authority
L.C. Smith Terminal – Mezzanine Level
Detroit, MI 48242

Ryk Dunkelberg
Barnard Dunkelberg & Co.
Cherry Street Building
1616 East 15th Street
Tulsa, OK 74120

Re: Detroit Metro Part 150 Noise Compatibility Program – Comments Consultant Recommendations and Study Advisory Committee Meeting #9

Dear Mr. Robinson and Mr. Dunkelberg:

This letter provides the City of Inkster's comments on the important Noise Abatement Actions recommended by Detroit Metro's Part 150 consultant which were presented and discussed at the August 24, 2007 Part 150 Study Advisory Committee Meeting. The City of Inkster believes that it is critical to immediately adopt a number of the significant noise abatement actions recommended by the consultant and Part 150 Study Advisory Committee. As detailed below, Inkster supports implementation of most of the noise abatement recommendations made by the consultant at the August 24, 2007 Part 150 SAC meeting. Inkster defers to other SAC members with respect to measures that would not impact Inkster directly (such as ground run-up procedures and enclosures).

We appreciate this opportunity to provide input on the process. Our comments are set forth below:

November 8, 2007

I. Flight Tracks

- **Options 3c and 3d - Enhanced North-flow Departure Procedures**

The Part 150 process identified a number of techniques for improving the net noise exposures associated with departures during north-flow on runways 4R and 3L. Inkster strongly supports procedures that combine both partial concentration of aircraft over less noise sensitive areas, and enhanced fanning that uses a wider departure area than currently used for dispersing aircraft. Options 3c and 3d, which were recommended by the consultants, show significant net improvements in noise exposures and illustrate the merits of such an approach. Thus, Inkster supports immediate implementation of Options 3c and 3d. Inkster also suggests that the consultants review whether additional improvements can be achieved through these options by optimizing the departure fan to 060, and making corresponding improvements to Option 3d in particular by maximizing the scope of fanning to the east-northeast.

II. Runway Use

- **Continued Primary South Flow Operations**

There was a clear consensus with the SAC that DTW should continue to utilize south-flow operations as the primary mode for day-time operations, and Inkster strongly recommends that this procedure remain in effect.

- **Option 5a – Extend Hours of Nighttime Contra-flow**

There was a clear consensus with the SAC that DTW should extend the period of night-time contra-flow operations. The consultant has recommended a one hour increase in the hours of contra-flow operation. Currently, contra-flow is used from Midnight to 6:00 AM, and an increase in contra-flow was recommended by one hour from 11:00 PM to 6:00 AM. Inkster strongly supports this increase in the use of contra-flow operations, which will reduce the level of noise over the more densely populated regions to the north of the airport during the hours where residents are more sensitive to aircraft noise.

III. Descent/Departure Climb Recommendations

- **Option 8 - Continuous Descent Approach**

The Continuous Descent Approach (CDA) procedures **(Option 8)** were very positively received by all participants in the SAC, and were embraced by all communities as a clear win-win solution. CDA could reduce arrival related noise exposure for all neighborhoods under the existing arrival flight-paths and should be a point of emphasis in DTW's new NCP. Arrival noise has become an increasingly significant source of community concern and noise-related complaints in recent years because arrival traffic is necessarily concentrated over a single flight-path for a given runway. The noise modeling for CDA showed very significant noise exposure improvements at the 80 SEL of 7.2% and a reduction of exposed population of nearly 1,400, which would make this one of the most effective noise reduction strategies investigated to date. Inkster strongly encourages DTW to implement CDA procedures to the maximum extent feasible, as soon as possible. Inkster understands that CDA is a relatively new concept and we encourage DTW to develop a team and process for pioneering the application of this technique at DTW. If a full CDA can't be implemented initially, a partial CDA approach would be preferable to the existing stepped approach procedures.

IV. Airport Plan Recommendations

- **Option 9C- Extend Runway 3L/21R South**

This option may also have some potential net noise reduction benefits, but the overall benefits and negative noise impacts associated with extending Runway 3L/21R are unclear from the analysis done so far. Working Paper #6 presented three variations of the runway 3L extension option: 9a, 9b, and 9c. Inkster objects to both Option 9a (north and south extensions of 3L) and Option 9b (north-only extension). Options 9a and 9b increase the total wide-body traffic over communities to the northeast which will simply shift more noise to these communities, which DTW stated would not be acceptable for the Noise Compatibility Program. Moreover, in addition to the shift in operations, Options 9a and 9b move the ground point for rotation or lift-off of departing aircraft to the north, which would lower the altitude of departing aircraft and increase noise over communities to the north and northeast. Thus, Options 9a and 9b are unacceptable.

In contrast to Options 9a and 9b, **Option 9c** may off-set noise increases associated with addition wide-body operations on 3L by allowing departing aircraft to start their take-off roll sooner and thus achieve a greater altitude prior to over-flying the densely populated noise sensitive areas to the north-northeast of the airport. Option 9c may also allow for more even distribution of departing wide-body aircraft between RWY 4R and 3L. Option 9c may also allow for greater displacement of the threshold for landings on 21R to the south which could reduce arrival noise associated with south-flow operations on runway 21R. Thus, of the three proposed alternatives for extending runway 3L, only 9c, the south extension, is acceptable for further review.

- **Option 10 – 1,000 ft Displaced Thresholds for 21L and 22R**

Inkster enthusiastically supports adding displaced landing thresholds to runways 21L and 22R. This option would provide significant cumulative DNL noise reductions by increasing the altitude of arriving aircraft above the current approach path to the existing runway thresholds. This is especially true for areas further from the airport that currently experience a high level of noise disturbance and a high level of noise complaints in connection with aircraft arrivals. The Part 150 consult has recommended permanent adoption of this measure, which can be adopted without lengthening any runway, and we agree that doing so is critical to addressing the increased number of arrival related complaints that are being experienced in areas to the north and northeast of the airport.

November 8, 2007

V. Noise Management Measures

Inkster also supports each of the three noise management measures recommended by the consultant, including: **Option 16** - Installing Noise Monitoring/Radar Tracking; **Option 17** - Fly Quiet Report Card and Pilot Awareness Program; and **Option 18** - Continuing the Study Advisory Committee. Noise Monitoring/Radar Tracking and Fly-Quiet programs have been proven to be very effective tools at other airports in monitoring and enhancing compliance with flight procedures and identifying problem aircraft and aircraft operating practices. Finally, the current Part 150 Study Advisory Committee has proven to be an effective and responsive source of feedback to the airport in its noise mitigation program, and there are a number of long-term NCP proposals, such as the Continuous Decent Approach initiative that would benefit from the continuing and ongoing community input that can best be provided by the SAC.

VI. Home Noise Insulation

At the most recent SAC meeting, the DTW management expressed support for including home noise insulation for homes beyond the 65 DNL in the updated Noise Compatibility Plan. Inkster strongly supports including noise insulation beyond the 65 DNL in this NCP. Although FAA grants may not be currently available for projects beyond the 65 DNL, it is critical for the DTW Part 150 NCP to include those measures as a recommendation in the final NCP, so that if grant availability is increased under future FAA authorization legislation, those projects can be pursued. If DTW does not include a recommendation for home insulation beyond the 65 DNL, then communities surrounding DTW will not be eligible for such funding in the future without going through another Part 150 update process, even if it is made available to other communities at other major airports who did include such recommendations.

In summary, Inkster urges DTW to adopt the win-win noise abatement recommendations referenced above immediately, and subject to Option 9C to further study if DTW is considering pursuing it. We appreciate this opportunity to work with you to develop real improvements to the noise environment surrounding Detroit Metro.

Sincerely,

Hilliard L. Hampton, II
Mayor

cc: Mary Vigilante, Synergy Consultants, Inc.
Irene Porter, FAA
Ernest Gubry, FAA
Inkster City Council
Connie Mitchell

City of Romulus

ALAN R. LAMBERT
Mayor

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August 30, 2007

RECEIVED
SEP - 4 2007
Barnard Dunkelberg

Barnard Dunkelberg & Company
Mr. Ryk Dunkelberg
Cherry Street Building
1616 East 15th Street
Tulsa, OK 74120

Re: Detroit Metropolitan Airport Part 150 Study

Dear Mr. Dunkelberg:

Having attended the meeting held August 23, 2007 regarding the land use recommendations for the DTW Part 150 study (Working Paper 7), I would like to request the following:

1. A map be provided of the 60 DNL contours as discussed at the meeting. The City would like to fully understand the land area impacted by a potential change in the noise contour map.

2. An explanation be provided as to how the recommendations of the Part 150 study will be prioritized, what the committees influence will be on the priority of those recommendations and who oversees the recommendations to ensure they are implemented. The City of Romulus is concerned that recommendations from the last Part 150 Study, such as the hush house, have not been complete. The recommendation for a hush house is of significant priority to the City.

3. Clarification on the next steps of the process. It was stated that the next step would be a formal public hearing on the recommendations and that written comments are encouraged. Then, as I understand it, the Airport Authority reviews the public hearing comments and makes changes before submission to the FAA. The City of Romulus is requesting to review and comment on any changes the Airport Authority makes to the recommendations after the public hearing and before submittal to the FAA.

If you have any questions regarding this request please contact me at (734) 955-4530 or via email at clyon@ci.romulus.mi.us.

Sincerely,

Cynthia I. Lyon

Cynthia I. Lyon, AICP
City Planner
Economic Development Department

vf

cc: Mayor Lambert
Timothy Keyes, Economic Development Director
Lester Robinson, Chief Executive Officer Wayne County Airport Authority
Earnest Guby, FAA Airport District Office

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FAX: (734) 753-3333

August 23, 2007

RECEIVED
AUG 27 2007
Barnard Dunkelberg

Mr. Barnard Dunkelberg
Barnard Dunkelberg & Company
Cherry Street Building
1616 East Fifteenth Street
Tulsa, Oklahoma 74120

Re: Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Study Advisory Committee Meeting on Today's Date;

My Letter dated November 10, 2004

Dear Mr. Dunkelberg:

Thank you and your staff for an informative meeting this morning.

The purpose of this letter is to address some perceived inaccuracies in Working Paper Seven/August 2007, more specifically the following Sections:

Land Use Alternative 7 Comprehensive Plan Amendments
Land Use Alternative 8 Zoning Code Changes

On pages H.16 and H.18, Huron Township is characterized as not having provisions in its master plan or ordinance relating the Airport or its operation. Page H.16 specifically states in pertinent part:

> "Huron Township has a zoning ordinance and master plan; *however, there are no provisions related to the Airport or its operation* [emphasis added]" (

I addressed this very issue in my letter dated November 10, 2004 (a copy of which is enclosed herewith); however it may have fallen through the cracks. Therefore, I wished to bring it to your attention for correction one more time.

(over please)

Huron Township, through its elected officials, planners and appointed board representatives have been and continue to be keenly aware of the need to incorporate the proximity of Detroit Metro Airport into our planning and zoning considerations.

Supervisor Mitchell and I continue to look forward to working with you and your staff as we strive to provide accurate information to assist in the conducting of an effective Part 150 Study.

Sincerely,

David A. Glaab, Esquire
Huron Township Trustee

DAG/tpn

Cc.

Mr. John Mitchell, Supervisor, Huron Township
Mrs. Dawnette Bowers, CFC, Clerk
Mr. Larry O'Kelly, Treasurer
Mr. Ted Pappas, Trustee
Mr. R.P. Lilley, Trustee, Board Representative to Planning Commission
Mrs. Linda Spangler, Trustee
Mr. John Enos, Director of Municipal Services
Ms. Jennifer Coe, Planning and Zoning Director
Ms. Karen Bentley, Huron Township Planning and Zoning

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November 10, 2004

Mr. Barnard Dunkelberg
Barnard Dunkelberg & Company
Cherry Street Building
1616 East Fifteenth Street
Tulsa, Oklahoma 74120

Re:

Detroit Metropolitan Wayne County Airport FAR Part 150 Noise Study Advisory Committee Meeting Dated October 21, 2004

Dear Mr. Dunkelberg:

Thank you and your staff for an informative and productive second meeting of October 21, 2004 in connection with the above referenced matter.

I am writing to you as the citizen representative of Huron Township. The purpose of this letter is to inform you of a desired noise monitoring site and to provide you with relevant information regarding Airport Environs beginning on page A.27 of Working Paper One/October 2004.

With the introduction of the new fourth parallel runway, the very northwest quadrant of Huron Township and the southwest quadrant of Romulus have experienced a noticeable change in air traffic patterns and accompanying noise. In light of several past conversations with an effected homeowner as well as new residential development in the aforementioned area, I would suggest a noise monitoring device be installed at or near the below address located in the vicinity south of Barth Road and north of Pennsylvania Road:

Mr. William & Joanne Glaab
15961 Hannan Rd.
Romulus, MI 48174
(734) 941- 7727

As to the Airport Environs section of the working paper under the heading Future Land Use and subheading Huron Township, page A.35 states in pertinent part:

> "Huron Township has a zoning ordinance and master plan; *however, there are no provisions related to the Airport or its operation* [emphasis added]" (see Exhibit A).

I have included herewith pertinent sections of Huron Township's current Master Plan adopted 1992 (see Exhibit B) and the anticipated soon to be adopted revised Master Plan (see Exhibit C). Both documents acknowledge and address the existence of Detroit Metropolitan Airport and its impact on land use.

As the immediate former Supervisor of Huron Township (1998-2000) I made revising the Township's Master Plan a major priority in large part due to the anticipated impact of the Airport on the Township. Our current Supervisor, John Mitchell, together with whom I represent Huron Township on this Advisory Committee, has long understood the impact of the Airport on Township land use. He is currently ushering the revised Master Plan through its final stages of adoption with an anticipated passage of late 2004, early 2005. Based on the foregoing information, a revision to page A.35 of the Working Paper may be advisable.

I hope this information is helpful to you. If you have any questions or require additional information, I recommend you contact the very capable Karen Bentley in the Planning and Zoning Department of Huron Township at (734) 753-4466. It is with Ms. Bentley's research and assistance that I am able to share this information with you.

Supervisor Mitchell and I look forward to working with you and your staff as we strive to provide accurate information to assist in the conducting of an effective Part 150 Study.

Sincerely,

David A. Glaab

DAG/tpn

Cc.
The Honorable John Mitchell, Supervisor, Huron Township
Karen Bentley, Huron Township Planning and Zoning
Mr. William P. Glaab

CITY OF DEARBORN

Home Town of Henry Ford

MAYOR PRO TEM JOHN B. O'REILLY, JR.

RECEIVED
APR - 2 2007
Barnard Dunkelberg

March 27, 2007

Lester W. Robinson
Chief Executive Officer
Detroit Metro Wayne County Airport Authority
L.C. Smith Terminal – Mezzanine Level
Detroit, MI 48242

Ryk Dunkelberg
Barnard Dunkelberg & Co.
Cherry Street Building
1616 East 15th Street
Tulsa, OK 74120

Re: Detroit Metro Part 150 Noise Compatibility Program – Comments on Working Paper Five

Dear Mr. Robinson and Mr. Dunkelberg:

This letter provides the City of Dearborn's comments on the Noise Abatement Options set forth in Working Paper Five, which was presented at the January, 2007 Detroit Metro Part 150 Study Advisory Committee Meeting. The issues presented below are the same ones discussed at the Part 150 SAC meeting and shortly afterwards, but we thought it would be helpful to memorialize our concerns and comments to insure that they are looked into further and fully addressed. We appreciate this opportunity to provide input on the process. Our comments are set forth below:

- **Option 3b: Hybrid Northeast Departure Option Requires Additional Analysis**

In Dearborn's November 17, 2006 letter commenting on Working Paper #4, Mayor Guido suggested that an additional hybrid northeast departure option be evaluated which would combine the best elements of the Option 1b (I-94 concentration) and Option 2b (wider northeast departure fan dispersal).

(more)

Specifically, Dearborn suggested an additional hybrid northeast departure option that would use both the wider northeast dispersal fan discussed under Option 2b, and a limited concentration of an optimized volume of departures to the southeastern most destinations over the I-94 corridor, originally proposed under Option 1b. If done properly, this would result in a substantial reduction in the total number of flights over any one residential area to the northeast. This would result in a more significant net reduction in noise exposure when compared to the current procedures, and when compared to Options 1b and 2b.

DTW's Part 150 consultants appeared to accept this recommendation by evaluating new option "3b" in Working Paper #5. Option 3b was described on page G.51under "Description of the Option" as one in which:

> "[a]ircraft would use satellite-based navigation technologies to fly multiple headings using a combination of both concentrated and dispersed tracks. Aircraft to southern destinations that turn eastward and then to the south would fly a track following the I-94 corridor to concentrate flights in this area. Aircraft flying to the north, east and west destination would fly along the same paths as they do today, using dispersed flight procedures."

As described above, this is essentially a combination of Options 1b and <u>2b</u>, which is exactly what Dearborn suggested in its November, 2006 letter, and is what we believe should be tested, and is what would, if properly modeled, show an improvement in net noise exposure greater than either 1b or 2b for northeastern departures.

As discussed at the last SAC meeting, a hybrid option <u>optimizing the benefits</u> of Options 1b and 2b should show even greater net noise reductions than found for either of those options alone. In a worst case, combining these options should have the same net benefits as Options 1b and 2b. But after modeling Option 3b, the consultants concluded that there would be a small net noise <u>increase</u> by combining the two options, which when modeled individually, had both shown net noise <u>decreases</u>. These findings don't make sense and we think that clearly a harder look needs to be taken at Option 3b and it needs to be re-modeled after confirming, verifying, and optimizing the data inputs.

While we have not been provide all of the data inputs necessary to determine what went wrong with the modeling of Option 3b, there are a number of clear inconsistencies and errors in the text of Working Paper #5 that may help you determine what went wrong with the modeling.

(more)

If these errors are not corrected by the next SAC meeting, we request electronic copies of the underlying data files so that our consultants can analyze the data and results independently. The inconsistencies noted in the text are described below:

The Descriptions of Option 3b in Working Paper #5 Are Inconsistent

- *Option 3b refers to the wrong dispersal options:* After first describing Option 3b as what is essentially a combination of Option 1b and 2b, Working Paper #5 then goes on to confusingly describe Option 3b under "Description of the Option" as one that "combines Options 1b with the dispersal options of 2a and 2c."(underlining added). This does not make sense since neither 2a nor 2c are northeast departure options. Option 2a is a northwest departure option.[1] Option 2c is a south-flow departure option.[2] Dearborn suggested combining 1b with 2b, which would be logical since they both represent the same range of north-flow departures.[3] Combination with 2b appears to be what the Part 150 consultants intended, based on other parts of the description on Option 3b. Regardless of what was intended, this is what should be modeled for Option 3b. To do anything less would be to sabotage what may be the most effective option for reducing departure noise to the northeast.

- *Option 3b May Not Have Utilized Enhanced Dispersal At All:* There is also a major inconsistency between the specific description the new departure procedures for Option 3b on page G.51, under "Modeling Assumptions/New Procedures" and the way the option is described under "Description of the Option." Under "Modeling Assumptions/New Procedures" the new procedure is described as one in which "Aircraft bound for northern, western, and eastern locations would follow existing flight tracks using dispersed procedures." (emphasis added). As described here, option 3b does not appear to be taking advantage of the noise reduction benefits of the increased departure fan that were identified in dispersal Option 2b, as promised by the initial description of Option 3b. Option 2b reflected an increase in width of the east side of the departure fan from the existing limit of 050 by 10 degrees to 060.

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1 As depicted in Figure 4, of Appendix A.4 of Working Paper 4.

2 As depicted in Figure 6, of Appendix A.4 of Working Paper 4.

3 The existing northeast departure fan is described as between 350 and 050 degrees on page G.20 of Working Paper #4, which appears to cover the same range of departures as depicted for Option 1b at Figure 2, Appendix A2, of Working Paper 4.

As described under "Modeling Assumptions/New Procedures", Option 3b would use "existing flight tracks using dispersed procedures" where it should be modeled using enhanced dispersal flight tracks out to 060 (in combination with concentration of I-94).

The Depictions of Option 3b In Figure 8 Don't Match the Descriptions In the Text

The depiction of Option 3b in Figure 8, in Appendix A.2. of Working Paper #5 is also not consistent with what Dearborn requested, or the way Option 3b is described in the body of the working paper. For example, Figure 8 depicts the exact same primarily north and northeast flight track locations as presented under Option 2b from Working Paper #4, rather than redesigning and optimizing a new set of flight tracks to take full advantage of the enhanced departure fan and the concentration over I-94. The description of the Option on page G.51 indicates that a new flight track would be modeled. Specifically, the text states that: "Southern bound aircraft would depart Runway 3L and fly runway heading for one mile past the departure end of the runway, then turning eastward on a satellite–based heading that would be designed to follow the I-94 freeway corridor and the rail line corridor." "This new track would replace the existing south turning track[s] that serve the same destinations, but which do not turn in an easterly direction as soon as the new option."

Additionally, Figure 8 shows four new flight tracks to the east and west at approximately 90 and 80 degrees to runway 3L. These tracks are not depicted in earlier Figures of Option 1b or 2b and could certainly account for the noise increases modeled. Moreover, four additional flight tracks to the east and west at 90 and 80 degrees to the runway centerline are not consistent with the description of Option 3b which mentions only one new flight track, which is to the northeast over I-94 and the rail corridor.

Comparative Noise Effects Data Contradicts Description of Flight Tracks

The comparison of the noise effects of Option 2b to the baseline in Table 3b-1 show noise increases in communities to the west and northwest of the airport. This would be impossible if in fact the only changes to existing flight tracks were being made for "southern bound aircraft" flying to the north east of the airport "follow[ing] the I-94 freeway corridor and the rail line corridor" as indicated in the description of flight tracks on page G.51.

(more)

<u>The Flight-Frequency Assumptions for Each Modeled Flight Track Are Suspect</u>

Finally, in addition to questioning whether the flight tracks used match what was proposed and intended, Dearborn questions the relative loading or flight frequency used for each flight track in Option 3b. Because the results are worse than Options 1b and 2b modeled alone, we assume that the relative loading of each track has simply not been optimized to minimize net noise exposure, and we reiterate our request for the underlying data, in the event that a significant correction is not made by the next SAC meeting.

As explained in our November 2006 letter, with a hybrid option, a smaller number of planes could be routed over the I-94 corridor than assumed in Option 1b, which would reduce air traffic control work-load and safety concerns generally associated with departure concentrations. This reduced volume over I-94 would also reduce noise equity concerns generally associated with flight concentrations. Second, in this hybrid option, the northeast departures that are not routed over I-94 would be dispersed in a departure fan similar to Option 2b rather than over just three concentrated northeast and north bound departure tracks (as in Option 1b and in contrast to the existing departure fan procedures between 350 and 050). This hybrid option would allocate more flights over the interstate than over any single departure track located over residential neighborhoods, and combine this advantage with the advantages of increased departure dispersal. Accordingly, this hybrid option should result in a more significant net improvement in noise exposure than was shown by any of the northeast flight path options reviewed to date (including 1b and 2b). And it should certainly not result in a net noise increase as initially found in Working Paper #5.

- **<u>Options 6 and 6a: Use of Cross Wind Runways and Off-set Approach to 4L/22R</u>**

At the last SAC meeting it was noted that the air traffic conflicts from the former City of Detroit airport to the east that had previously limited the use of the cross wind runways no longer exist, and that some airport users had indicated a desire to increase use of these runways due to prevailing winds and operational considerations. Since the Part 150 SAC has indicated a general preference for noise dispersal rather than noise concentration, incorporation of the crosswind runways into normal operation procedures for certain weather conditions would be a logical way to further distribute noise over areas other than those under the current north-flow and south-flow traffic patterns.

(more)

Increased dispersal as discussed under both Option 6 and 6a regarding the offset approach to runway 4l/22R would certainly be a positive development, and would help address noise concerns related to arrival traffic, which Dearborn believes should be given further consideration.

- **Option 8: Continuous Descent Approach**

The Continuous Descent Approach (CDA) procedures **(Option 8)** were very positively received by all participants at the last SAC meeting, and were embraced by all communities as a clear win-win solution. CDA could reduce arrival related noise exposure for all neighborhoods under the existing arrival flight-paths and should be a point of emphasis in DTW's new NCP. Arrival noise has become an increasingly significant source of community concern and noise-related complaints in recent years because arrival traffic is necessarily concentrated over a single flight-path for a given runway. According to Working Paper #5 the noise modeling for CDA showed very significant noise exposure improvements at the 80 SEL of 7.2% and a reduction of exposed population of nearly 1,400, which would make this one of the most effective noise reduction strategies investigated to date. We strongly encourage you to investigate the CDA option further. Dearborn understands that CDA is a relatively new concept and we encourage DTW to develop a team and process for pioneering the application of this technique at DTW and would be happy to assist in doing that. As indicated at the SAC meeting, if a full CDA can't be implemented initially, a partial CDA approach would be preferable to the existing stepped approach procedures.

We appreciate this opportunity to work with you to develop real improvements to the noise environment surrounding Detroit Metro. Please feel free to share these comments and recommendations with any and all other members of the SAC as you deem appropriate.

Sincerely,

John B. O'Reilly

John B. O'Reilly, Jr.
Mayor

Enclosure

cc: R. Latane Montague, Hogan & Hartson
Mike Cheston, Aviation Management Associates
Mary Vigilante, Synergy Consultants, Inc.
Irene Porter, FAA
Ernest Gubry, FAA

City of Romulus

ALAN R. LAMBERT
Mayor

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January 31, 2007

RECEIVED
FEB 05 2007
Barnard Dunkelberg

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RE: DTW Part 150 Study
Working Papers 4 & 5

We have reviewed and considered the proposed options for arrivals and departures as part of the part 150 Airport Noise Compatibility Study. As requested at the last Study Advisory meeting, we are providing our comments in writing on the proposed options presented as part of working papers 4 and 5.

As you are aware, the City of Romulus if significantly impacted by the airport due to the fact that it occupies 10 +/- square miles completely within our boundaries. It is expected that our community will be impacted by noise associated with the airport activity. However, the residents are constantly exposed to high levels of noise from the airport as a result of arrivals, departures and engine ground run-up activity. We have significant concerns with any proposal that will alter (expand) the existing noise contours DNL and local SEL experienced within our community.

Specifically, we oppose the Options 1A, 2A and 3A. These three options create new impacts on the northwest portion of the City that is minimally impacted by the current flight patterns. Any future impact in this area of our community will limit our ability to grow our residential base. Virtually all other quadrants of the city are affected by the current airport operations limiting our ability to grow the communities population. We also reserve the right to comment further on Option 8 once a map indicating the current SEL contours can be reviewed in conjunction with the proposed to determine the extent of the impact on our residents.

We continue to support the current policy of concentration/equalization and dispersion further out. We will continue to support any options or proposals, which maintain the current noise contours within our community. As stated in your presentation, concentrated flight patterns are more predicable than dispersed options. Predictability will ensure that the City of Romulus can continue to plan for the future development within the community and coexist with the use of the airport.

At this time we must also raise concern for the simultaneous processing of the airport Master Plan while this study is being conducted. What are the impacts of the Part 150 on the Master Plan and what will the impact of the Master Plan be on the Part 150 study? It calls to question the need to coordinate these processes. Completing a noise study after an expansion can only address the direct impact of the expansion. How can this tool be used to predict the proposed impacts of the alternatives presented in the Master Plan?

We look forward to review and discussion on working paper 6 at the next Noise Study Advisory meeting.

Sincerely,

Cynthia I. Lyon, AICP
City Planner

CC: Mayor Alan Lambert, City of Romulus
Timothy Keyes, Director Economic Development City of Romulus
Romulus City Council
Lestor Robinson, Chief Executive Officer Wayne County Airport Authority
Ernest Gubry, FAA, Airports Districts
Edward Boike, Wane County Commission
Raymond Basham, State Senator
Hoon-Yung Hopgood, State Representative
Mayor HaidousCity of Wayne
Mayor Wild, City of Westland
Mayor Priebe, City of Taylor
Mayor Pro-Tem Jack O'Riley, City of Dearborn
Mayor Poletko, City of Dearborn Heights
Mayor Engebretson, City of Livonia
Mayor Huebler, City of Allen Park
Supervisor Mitchell, Huron Township

CITY OF DEARBORN

MAYOR MICHAEL A. GUIDO

DEC - 4 2006

November 30, 2006

Mr. Lester W. Robinson
Chief Executive Officer
Detroit Metro Wayne County Airport Authority
L.C. Smith Terminal – Mezzanine Level
Detroit, MI 48242

Ryk Dunkelberg
Barnard Dunkelberg & Co.
Cherry Street Building
1616 East 15th Street
Tulsa, OK 74120

Re: Detroit Metro Part 150 Noise Compatibility Program – Comments on Working Paper Four

Dear Mr. Robinson and Mr. Dunkelberg:

This letter provides the City of Dearborn's comments on the Noise Abatement Options set forth in Working Paper Four, which was presented at the October 5, 2006 Detroit Metro Part 150 Study Advisory Committee Meeting. Overall, the Part 150 process appears to be making progress towards identifying feasible and effective measures to reduce noise exposure for all areas surrounding DTW and we appreciate this opportunity to provide input on the process. Our comments are set forth below:

- **Expanded Night Time Operational Hours**

With respect to the specific noise abatement options recommended in Working Paper Four, we strongly concur with the report's conclusion that Expanded Night Time Operational hours (**Option 5a**) should be adopted. As found by the Consultant Team, increasing the hours of nighttime Contra-Flow operation, when activity, wind, and weather allow, will result in a significant improvement in noise exposure during the hours of operation when residents are most sensitive to noise disturbances. Accordingly, we recommend permanent adoption of this measure.

MORE

- **Continuous Descent Approach**

In addition, there were a number of very promising options referenced in Work Paper Four, which have not yet been analyzed and presented. With respect to those, we agree that a number of additional measures warrant additional study and review as proposed. This is especially true of the Continuous Descent Approach procedures (Option 8) which we believe could reduce arrival related noise exposure for all neighborhoods under the existing arrival flight-paths. Arrival noise has become an increasingly significant source of community concern and noise-related complaints in recent years, and this aspect of airport operations must be addressed. We strongly encourage you to investigate the Continuous Descent Approach option further.

- **General Comments on Flight Path Options**

Flight Path Options for Reducing Noise Beyond 65 DNL Should Be Pursued: At the SAC meeting preceding Working Paper Four, there was a clear understanding and consensus that at this point, the most promising areas for additional noise exposure improvement lie well beyond the airport, beyond the current 65 DNL contour. It was agreed that the improvements closer to the airport have already been implemented by the 1992 Part 150 NCP, and that a primary purpose of *this* study is to look for ways to improve noise exposure beyond the 65 DNL. While the 65 DNL plays an important role in a Part 150 study, and is a mandatory benchmark for certain noise mapping purposes, there is no legal prohibition on considering and adopting flight procedures which will improve noise exposure beyond the 65 DNL where appropriate.[1] As you know, impacts below 65 DNL have serious health, quality of life and economic impacts. Airport communities elsewhere have focused on reducing noise impacts beyond the 65 DNL contour, and DTW needs to do the same.

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1 14 C.F.R. Part 150, App. B. Sec. B150.7(4) describes the criteria for evaluating noise abating flight procedures as those that would "reduce exposure of individuals to noise in the area around the airport" and are not limited the area within a certain DNL.

Analysis of All Flight Path Options Generally Underestimate Total Benefit of Alternate Procedures: The tables in Working Paper Four summarizing the noise impact reductions for alternate flight path options only look at population exposure reductions in the 60 DNL and greater contours, and show modest improvements for flight path alternatives. The attached figures with Noise Exposure Maps for these same options show more significant improvements than the tables because they look beyond the 60 DNL to the 55 DNL.

Working Paper Four makes it clear that the closer you get to the airport, the less difference there is between the existing flight-paths and the proposed alternatives. Conversely, the farther you get from the airport the greater difference there is between the location and distribution of planes under the current procedures, versus the alternative procedures. Accordingly, the level of reduced net noise exposure will increase the further you get from the airport. Quantifying impacts only close to the airport simply ignores these improvements. This point was made by a number of participants at the October 5, 2006 meeting, and the FAA proposed using grid-point analysis to document noise improvements further from the airport. Since the overall benefits to the surrounding communities are more significant than initially presented in Working Paper Four, we believe that flight path options, such as the one proposed below, warrant additional review and discussion.

- **Specific Recommendations On Flight Path Options**

We believe that Detroit Metro should carefully consider an additional northeast departure option, which has not yet been reviewed or identified in this Part 150. This additional option combines the best elements of the Option 1b (I-94 concentration) and Option 2b (wider northeast departure fan dispersal). Specifically, this additional hybrid northeast departure option would use both the wider dispersal fan discussed under Option 2b, and a limited concentration of a specific volume of departures to the southeastern most destinations over the I-94 corridor. If done properly this would result in a substantial reduction in the total number of flights over any one residential area to the northeast. This would result in a more significant improvement in noise exposure when compared to the current procedures, and when compared to Options 1b and 2b.

During the October 5th SAC meeting, representative from neighborhoods from the south and northwest sides of the airport indicated that dispersal-based noise abatement options were inherently more equitable given the demographics of those regions. We agree that where the population is essentially evenly distributed over a given area, that flight dispersal is more fair than concentration.

MORE

However, with respect to flight paths over the areas to the northeast of the airport, there is an opportunity to consider a partial flight-path concentration option that reduces the net noise exposure compared to the existing procedures, and compared to the procedures that have been reviewed so far. In contrast to areas to the south and northwest, there is a major interstate highway and railroad corridor in the northeast that represents a well defined area under a potential departure corridor which has a low population density, and which is an area that already has a high level of ambient noise, due to the highway and railroad traffic.

The use of the I-94 corridor for departure traffic was considered fifteen years ago during the 1992 Part 150 process and rejected, because at that time, it would have resulted in excessive noise concentration over neighborhoods adjoining the interstate corridor. An I-94/railroad right-of-way departure concentration was reevaluated in Working Paper Four, as Option 1b. The noise modeling for this option demonstrated a net noise exposure reduction of 60 houses or 140 people within the 60 DNL contour. But even more significant than the net noise exposure reduction is that this modeling shows that the today's quieter, faster climbing aircraft have a smaller noise foot-print that can more reliably be placed over the width of the interstate corridor. Moreover, today's more precise navigation technology enables planes to be more precisely and consistently concentrated over an interstate corridor than in the past. In short, we were encouraged by certain aspects of Option 1b, and think a hybrid variant of this option warrants further evaluation.

This hybrid option would differ from Option 1b in two ways. First, a smaller number of planes could be routed over the I-94 corridor than assumed in Option 1b, which would reduce air traffic control work-load and safety concerns generally associated with departure concentrations. This reduced volume over I-94 would also reduce noise equity concerns generally associated with flight concentrations. Second, in this hybrid option, the northeast departures that are not routed over I-94 would be dispersed in a departure fan similar to Option 2b rather than over just three concentrated northeast and north bound departure tracks (as in Option 1b). This hybrid option would allocate more flights over the interstate than over any single departure track located over residential neighborhoods, and combine this advantage with the advantages of departure dispersal. Accordingly, this hybrid option should result in a more significant net improvement in noise exposure than was shown by any of the northeast flight path options reviewed to date.

We appreciate this opportunity to work with you to develop real improvements to the noise environment surrounding Detroit Metro. Please feel free to share these comments and recommendations with any and all other members of the SAC as you deem appropriate.

Sincerely,

Michael A. Guido

Michael A. Guido
Mayor

cc: R. Latane Montague, Hogan & Hartson
Mike Cheston, Aviation Management Associates
Mary Vigilante, Synergy Consultants, Inc.
Irene Porter, FAA
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CITY OF DEARBORN

MAYOR MICHAEL A. GUIDO

RECEIVED

DEC 27 2005

Barnard Dunkelberg

December 21, 2005

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Re: **Detroit Metro Part 150 Noise Compatibility Program**

Dear Mr. Robinson and Mr. Dunkelberg:

At the last Part 150 Study Advisory Committee (SAC) meeting, held on October 31, 2005, you requested input and discussion from the SAC to assist the consultant team and airport staff in identifying feasible noise abatement alternatives for additional study and consideration. Pursuant to that request, the City of Dearborn has conferred with its own consultants, Hogan & Hartson and Aviation Management Associates, Inc., which have compiled the recommended actions identified in the enclosed document. The City of Dearborn has reviewed and strongly supports inclusion of these measures in the Part 150 Study. These noise abatement measures would reduce the overall noise exposure for the communities neighboring the Detroit Metro Airport (DTW) and should therefore be included in the study. Our consultants are awaiting additional data from the DTW Study Team that will enable us to describe in more detail the positive impact of these measures, and will provide that analysis when that data becomes available.

more

Please feel free to share these recommendations with any and all other members of the SAC as you deem appropriate.

Sincerely,

Michael A. Guido
Mayor

Enclosure

CC: David Newmann, Hogan & Hartson
R. Latane Montague, Hogan & Hartson
Mike Cheston, Aviation Management Associates
Gary Church, Aviation Management Associates
Irene Porter, FAA
Ernest Gubry, FAA

City of Dearborn
Noise Abatement Action Recommendations
For DTW Part 150 Study

I. Enhancements to Existing Noise Compatibility Plan Measures

DTW should evaluate the following enhancements to the existing noise abatement procedures:

1. **Expanded Nighttime Hours**: Expanding the window of nighttime hours/opposite direction southerly operations by two hours, from 10:00 AM to 5:59 AM would have a significant positive impact on noise exposure for all neighboring jurisdictions. The level of sleep disturbance for children and a large portion of the population could be positively impacted by expanding the defined nighttime window by two hours.

2. **Preferred Nighttime Use of Runway 22 System When Contra-Flow Is Not Feasible**: During nighttime operational hours, but when south flow arrivals from the north are unavoidable due to weather, the Runway 22 system should be the preferred runways, coupled with constant descent approach procedures (discussed in more detail below) to reduce impact to higher density population areas to the west near metropolitan Detroit.

3. **Enhanced Dispersal of Departure Flight Tracks**: Implementation of the existing north-flow departure dispersal program has resulted in a disproportionate concentration of north-flow departures over Dearborn. As discussed below II.2. below, the current technologies and circumstances warrant careful consideration of low population/high-ambient noise corridors to alleviate this problem. However, to the extent that DTW retains a north-flow departure dispersal program, the Part 150 Study should include modification of that program: (a) to ensure that departures are in fact dispersed evenly throughout the dispersal area and (b) to expand the easterly departure fanning heading from 050 to 060.[1] Implementing an increased turn angle (060 degrees) would reduce the concentration of over-flights for any single location in the north-flow departure noise foot print, including Dearborn and adjacent high-density neighborhoods. According to analysis conducted previously for Wayne County by Landrum & Brown, these additional easterly departure headings would reduce total population impacts from airport noise by 10-20 percent in areas of Wayne County near the airport. The same analysis based on current data would almost certainly result in higher percentage reductions. The total benefit would be even greater since this analysis does not account for the additional benefits to others communities in the noise footprint such as Dearborn.

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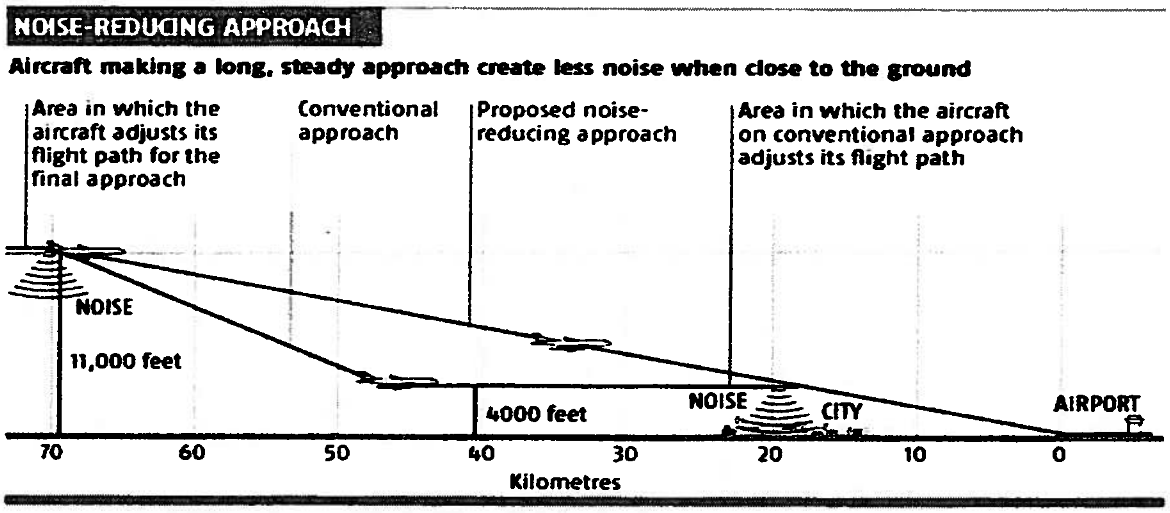
[1] See letters from Lester Robinson dated October 11, 2005 and the City of Dearborn dated October 20, 2005, to FAA/ Annette Davis requesting a 60-day test of 055 and 060 headings to the Runway 3 Noise Dispersal Area.

II. New Measures Identified by Airport Noise Team

DTW should evaluate the following new noise abatement procedures that were identified by the Airport's Part 150 Consultant team at the last SAC meeting:

1. **Continuous Descent Approach**: The use of Continuous Decent Approach procedures should be investigated. This concept, also referred to as a "tailored approach" would allow for a more gradual descent from an enroute altitude to a runway final approach fix, usually at low power settings and with "clean" configuration (flaps, slats and gear retracted) which reduces airframe and engine noise. This procedure avoids the standard stair-step approach to the runway and the considerably noisier approach at low altitude and speed, in landing configuration, (See figure below). We believe this to be a win-win for everyone involved, as the aircraft burns less fuel and creates less noise and pollution over the region.



2. **Low Population/High-Ambient Noise Departure Corridors**

As indicated during the last SAC meeting, the Airport's technical team is investigating opportunities to direct flight tracks over established interstate corridors, while further analyzing population/census tract information for the committee to consider. We support the investigation of the feasibility of concentrating departure flight tracks over areas of *low population density - high ambient noise* as a general matter, and support the investigation of the use of established interstate corridors specifically as an example of such corridors. The flight dispersing program as it exists today places a significant portion of Runway 3R departures over Dearborn, clearly a densely populated/noise sensitive portion of the greater Detroit Metropolitan region. The use of low-density/high ambient noise corridors, such as interstate corridors may be an effective solution to this inequity. In addition, the best approach may be to adopt some combination of concentration and dispersal approaches. For example, dispersal may be the best approach for south flow operations, while the utilization of concentrated departure corridors to the north, for some or all departures may be the best overall approach for the more limited north-flow operations.

We would like to receive any available technical analysis considering the concept of concentrating aircraft operations over areas where there is the least population density and the highest existing ambient noise. We understand that a different approach was taken in the 1992 NCP, but considering the emergence of new technologies (quieter aircraft, better navigational systems, better air traffic management systems) and new procedures (constant descent approach, tailored approaches, SIDs, STARs, RNAV and FMS approaches and departures, for example) there may be an opportunity to develop a more sophisticated plan resulting in major benefits to the entire region.

3. **Flight Management System (FMS) or RNAV arrival and departure profiles:** In coordination with its identification of low-population and high-ambient noise corridors, the SAC should consider the establishment of Flight Management System (FMS) or RNAV arrival and departure profiles that would allow aircraft to intercept routes over-flying these corridors (potentially I-275 to the south, I-94 to the east, and I-96 west, among other potential choices of established noise corridors). We believe this has merit as the interstate corridors can be assumed as already experiencing high levels of ambient noise. Again, this measure supports an overarching goal of concentrating noise over specific high-noise or low-density population areas and/or a broader general fanning area.

III. New Measures To Consider:

DTW should evaluate the following additional measures:

1. **Increase North Departure Dispersal to From 050 to 060:** If the Airport does not identify feasible low-density/high-ambient noise corridor procedures for all north-flow departures, departure fanning should be increased to 060 as discussed above under enhancements to existing procedures. The airport should encourage the FAA to test the planned increased turn proposal as soon as possible– allowing up to a 060 degree turn – and investigate using new departure procedures (FMS, RNAV, etc.) to take advantage of these turning maneuvers. Knowledge of the feasibility of the 060 heading, will help the SAC more accurately weigh the relative merits of dispersal vs. concentration of north-flow departure traffic.

2. **Preferred Use of RWY 3R For RJ Operations During North Flow**: The Airport should evaluate a new north-flow departure procedure when Runway 3 is in use, assigning Runway 3R for all regional jet (RJ) aircraft. This will direct the RJ (quicker & quieter) to fly the departure route most likely to impact more densely populated areas closer to Detroit, but would do so with the quietest aircraft in the industry[2]. These smaller aircraft may also be capable of more precisely following a course which would over-fly low-population/high-ambient noise areas such as interstate corridors and industrial areas, as discussed above.

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2 Regional jet aircraft have some of the quietest noise footprints in the industry, rivaling turboprop aircraft in most cases.

3. **"Turn-on-Course Procedures for North-flow RJs:** The Airport should investigate the feasibility of allowing RJ aircraft to "turn on course" beyond 060 "*when able*" during north-flow operations. By allowing the pilot to turn the aircraft based upon its operational characteristics, further benefit can be derived in turning away from densely populated areas. It may also be beneficial to the FAA/ATC because it allows a more rapid "traffic handoff," (reducing workload), allows the airline to head to their destination more quickly while potentially reducing the noise footprint to the surrounding communities.

   The current procedure requires the pilot to make an "on course" turnout (intercepting the intended departure heading on flight plan) only after the aircraft has reached 1,100 feet AMSL (Above Mean Sea Level) before making the final turn[3]. Considering the field elevation, (645 AMSL), that altitude is one the RJ's can reach fairly quickly after departure, allowing a safe early turn to the east to further distribute departure traffic noise.

4. **Support Past FAA/ATC Requests for Precision Runway Monitor (PRM) Installation at DTW:** PRM would provide significant improvement to air traffic approach flow to DTW during periods of poor weather and could provide for an increased utilization of the Runway 22 system (longer runways), further distancing arriving traffic from the most densely populated areas closer to Detroit and allowing aircraft be more evenly dispersed on arrivals. While increased aircraft operations at DTW would not be appropriate, these measures would enhance the safety and efficiency and create the potential for more accurately disbursing flight tracks over less populated areas during periods of instrument meteorological conditions (IMC). Furthermore, installation of a PRM may also reduce hold times, pollution and cost of fuel burn for airline operations which is a win-win for all involved. Used in conjunction with a continuous descent approach (CDA), this could provide significant benefits to the SEL noise impacts of those communities geographically located under approach corridors.

* * *

The 1992 DTW Noise Compatibility Plan (1992 NCP) approved by the Federal Aviation Administration (FAA) in December, 1992 is outdated but contains certain critically important noise abatement actions and procedures which <u>should</u> remain in force. These elements include: 1) preferential runway use maximizing south-flow operations up to a 7-kt. tail-wind component; 2) opposite direction nighttime operations when feasible; 3) restrictions on flight training; 4) special procedures to minimize off-airport noise impacts from ground run-ups; 5) maintenance of a permanent noise monitoring system and noise complaint office; and 6) encouraging local jurisdictions to preserve existing compatible land uses in existing low-population/high ambient noise areas by implementing compatible-use zoning, noise overlay districts, subdivision regulations, and real property purchaser notification programs. Certain other elements of the 1992 NCP may no longer be valid because of substantial changes in the neighboring communities and air traffic that has occurred since the data for that NCP

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[3] DTW Standard Instrument Departure (SID), ST. CLAIR TWO DEPARTURE, "TAKE-OFF RUNWAYS 4R AND 3L: Climb runway heading to 1100 feet before turning."

was gathered. However, our analysis indicates that the above measures remain valid based on current conditions.

In addition to these clearly beneficial elements and procedures, the 1992 NCP also established a program of "Equitable Dispersal of Departure Flight Tracks." As discussed above, and as suggested at the last SAC meeting, we agree that the question of dispersal vs. concentration of departures should be subjected to closer scrutiny to determine which approach or combination of approaches to departure noise is most appropriate given the latest circumstances and technology. If the departure dispersal procedures are maintained they must include the additional departure headings previously requested for testing by both DTW and the City of Dearborn, if established as feasible by the FAA.

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October 11, 2005

Ms. Annette Davis
FAA Great Lakes Regional Office
2300 East Devon Street, Room 274
Des Plaines, IL 60018

RE: Flight Dispersal Test
Detroit Metropolitan Wayne County Airport

Dear Ms. Davis:

In accordance with Section 1 of the April 2002 Settlement Agreement reached between the FAA and the City of Dearborn (attached), the Wayne County Airport Authority (Authority) requests that the Federal Aviation Administration (FAA) conduct a 60-day test of additional departure headings for Runway 3 as described within the agreement.

Upon acceptance of this request, please keep the Authority informed as to when and how the test will be conducted. The Wayne County Airport Authority is currently in the process of updating the FAR Part 150 Noise Compatibility Study for Detroit Metropolitan Wayne County Airport. As such, coordination between the FAA and the Airport's consultant, Barnard Dunkelberg & Company should be initiated to ensure consistency between the FAA testing and consultant's modeling of the flight procedures.

The Wayne County Airport Authority strives to be a good neighbor to all surrounding communities, and supports the testing and implementation of measures that could result in lower noise levels for every community, within the parameters established by the FAA. Please do not hesitate to call me at (734) 942-3563, or Scott Roberts, Noise Mitigation Program Manager at (734) 576-9660 if you have questions. I look forward to working with you throughout this process.

Sincerely,

Lester W. Robinson
Chief Executive Officer

CC: Mayor Guido, City of Dearborn
Michael Conway
Mary Lou Posa
Ryk Dunkelberg
Scott Roberts
Steve Economy

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Joyce A. Parker
City Manager

September 27, 2006

Ms. Connie Mitchell
1414 Magnolia Drive
Inkster, MI 48141

Dear Ms. Mitchell:

On behalf of the residents of the City of Inkster, I am requesting that the Airport Advisory Committee consider holding some of their future committee meetings in the City of Inkster. If this is feasible, please contact my secretary, Kim Sledge, at (313) 563-4234 with potential dates.

Should you have any questions or wish to discuss this request further, please do not hesitate to contact me. Thank you for your assistance.

Sincerely,

Joyce A. Parker

JOYCE A. PARKER
City Manager

JAP/ks

CITY OF DEARBORN

MAYOR MICHAEL A. GUIDO

RECEIVED

MAY 15 2006

Barnard Dunkelberg

May 11, 2006

Mr. Lester W. Robinson
Chief Executive Officer
Wayne County Airport Authority
L.C. Smith Terminal, Mezzanine
Detroit, MI 48242

Re: Flight Dispersal Test – Detroit Metropolitan Wayne County Airport

Dear Mr. Robinson:

I am writing in response to our meeting on April 13, 2006. At that meeting, you indicated that the Detroit Metropolitan Wayne County Airport Authority ("DTW") was amenable to the commencement of the flight dispersal testing of additional departure headings of 055 and 060 degrees (the "Dispersal Area Test") at any time, and you suggested that we inform you and the FAA of our preference after discussing this with our consultants.

After further discussion, our preference remains that the Dispersal Area Testing be initiated as soon as possible, since we believe that the increased departure fan testing could yield valuable information for the ongoing Part 150 process, and result in important new noise abatement procedures that should be implemented as soon as possible. Accordingly, we suggest that the testing be commenced in June, and continue for as long as necessary for the FAA to establish the technical feasibility of these headings as a part of the permanent DTW departure procedures. As explained by the FAA, and the DTW Part 150 consultants, the primary concern about commencing the Dispersal Area Testing this summer, rather than in the fall, is that prevailing weather patterns typically reduce the number of north flow operations experienced during the Summer months. All stakeholders certainly want the Dispersal Area Test to include a sufficient number of North-flow operations to determine the feasibility and safety of the new headings. Accordingly, we suggest that the testing be commenced in June, but continue beyond 60-days, if necessary, and continue for as long as the FAA needs to monitor a sufficient number of north-flow departures and collect the other information it needs to determine the feasibility of the new headings. Our consultants have discussed this open-ended approach with the Tower Manager at DTW who did not see any problem with it.

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As we discussed during our meeting, we look forward to continuing to work actively with DTW on the Part 150 Update process and are confident that this Dispersal Area Test will provide valuable information to that process that will result in an improved Noise Compatibility Plan for the Airport.

Sincerely,

Michael A. Guido

Michael A. Guido
Mayor

cc: Debra A. Walling
R. Latane Montague
Mike Cheston
Ryk Dunkelberg
Steve Economy
Scott Roberts
Nancy L. Kort
Annette Davis

Appendix Seven

STUDY ADVISORY COMMITTEE MEMBERS LIST

DETROIT METRO • WILLOW RUN
WAYNE COUNTY AIRPORT AUTHORITY

DETROIT METRO PART 150 NOISE COMPATIBILITY STUDY UPDATE STUDY ADVISORY COMMITTEE

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Federal Aviation Administration (FAA) Air Traffic Control Tower
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Appendix Eight

CITY OF DEARBORN/FAA SETTLEMENT

DETROIT METRO • WILLOW RUN
WAYNE COUNTY AIRPORT AUTHORITY
L.C. Smith Terminal • Mezzanine
Detroit, MI 48242
ph 734 942 3550
fax 734 942 3793
www.metroairport.com

October 11, 2005

Ms. Annette Davis
FAA Great Lakes Regional Office
2300 East Devon Street, Room 274
Des Plaines, IL 60018

RE: Flight Dispersal Test
Detroit Metropolitan Wayne County Airport

Dear Ms. Davis:

In accordance with Section 1 of the April 2002 Settlement Agreement reached between the FAA and the City of Dearborn (attached), the Wayne County Airport Authority (Authority) requests that the Federal Aviation Administration (FAA) conduct a 60-day test of additional departure headings for Runway 3 as described within the agreement.

Upon acceptance of this request, please keep the Authority informed as to when and how the test will be conducted. The Wayne County Airport Authority is currently in the process of updating the FAR Part 150 Noise Compatibility Study for Detroit Metropolitan Wayne County Airport. As such, coordination between the FAA and the Airport's consultant, Barnard Dunkelberg & Company should be initiated to ensure consistency between the FAA testing and consultant's modeling of the flight procedures.

The Wayne County Airport Authority strives to be a good neighbor to all surrounding communities, and supports the testing and implementation of measures that could result in lower noise levels for every community, within the parameters established by the FAA. Please do not hesitate to call me at (734) 942-3563, or Scott Roberts, Noise Mitigation Program Manager at (734) 576-9660 if you have questions. I look forward to working with you throughout this process.

Sincerely,

Lester W. Robinson
Chief Executive Officer

CC: Mayor Guido, City of Dearborn
Michael Conway
Mary Lou Posa
Ryk Dunkelberg
Scott Roberts
Steve Economy

09/29/2005 21:10 7347532209 WCAA PAGE 02

SETTLEMENT AGREEMENT

This Settlement Agreement is entered into effective April 2, 2002 (the "Effective Date"), by and between the City of Dearborn, Michigan (the "City"), and the Federal Aviation Administration, an administration in the United States Department of Transportation (the "FAA").

WHEREAS, the City filed a Petition for Review styled City of Dearborn v. Hinson et al., No. 93-4124 (6th Cir.) (the "Petition"), seeking review of the FAA's September 1992 Final Environmental Impact Statement for Air Traffic Control Noise Abatement Procedures at Detroit Metropolitan Wayne County Airport (the "1992 FEIS") and the FAA's November 16, 1992 Record of Decision for the Permanent Implementation of Air Traffic Control Noise Abatement Procedures at Detroit Metropolitan Wayne County Airport (the "1992 ROD"); and

WHEREAS, the parties hereto desire to stipulate to dismissal of the Petition subject to the terms and conditions set forth below;

NOW, THEREFORE, the City and the FAA agree as follows:

1. Conditional upon receiving written requests from Detroit Metropolitan Wayne County Airport (the "Airport") and the City, the FAA will conduct a 60-day test (the "Dispersal Area Test") to add headings 055 and 060 to the Runway 3 Noise Dispersal Area described on pages I-5 to I-6 and Appendix E of the 1992 FEIS. The FAA will begin the Dispersal Area Test within a reasonable time after receiving the written requests and shall conduct the test in accordance with applicable law and applicable labor/management bargaining requirements.

2. The FAA will give advance notice of the Dispersal Area Test to the affected communities, by notices in local newspapers and by letters to local government bodies, including the City. As part of such notice, or in a separate written notice to the City and the Airport, the FAA will describe the manner in which the test will be conducted and the data that will be gathered as part of the test. The test will be conducted in such a manner as to enable the FAA to determine the consequences of implementation of headings 055 and 060.

08/29/2005 21:10 7347532209 WCAA PAGE 03

3. To the extent permitted by applicable laws, including the National Environmental Policy Act, 42 U.S.C. 4332(2)(C) ("NEPA") and associated regulations and FAA Orders 1050.1D and 5050.4A, the FAA will deem the Dispersal Area Test to be "categorically excluded" for purposes of NEPA and associated regulations.

4. Upon completion of the Dispersal Area Test, the FAA will determine whether the results of the test indicate that the 055 and 060 headings may be appropriately implemented and will give written notice of that determination and the reasons therefor to the City and the Airport. If, based on its analysis of the test, the FAA determines that the 055 and 060 headings may be appropriately implemented, within six months after receiving written requests from the Airport and the City that the headings be implemented, the FAA will initiate all actions that would be necessary to implement the headings, including performing any required environmental analyses in accordance with NEPA and other applicable law. Nothing in this agreement shall operate to diminish the FAA's capacity or obligation to fulfill and comply with the entire panoply of laws, policies, regulations and executive orders applicable to the agency. In the event that the FAA ultimately determines that the 055 and 060 headings may not be appropriately implemented, the FAA shall give written notice of that determination and the reasons therefor to the City and the Airport.

5. Prior to conducting any environmental analyses, the non-federal parties will be required to arrive at an agreement for financing the environmental analyses for testing or implementation of the new procedures.

6. The FAA will not be limited by this document to the primary use of any specific departure heading.

7. To the extent that this Settlement Agreement is predicated upon the Airport's requesting testing or implementation of the broader departure fan, the FAA will use reasonable efforts, at the request of the City or the Airport, to provide information to the Airport.

08/29/2005 21:10 7347532209 WCAA PAGE 04

8. Neither the FAA nor the City is presently aware of any operational condition, policy or requirement of law that would prevent the FAA from testing the 055and 060 headings, but the FAA makes no such representations as to any future date.

9. On or before 14 days after the Effective Date, the City will dismiss its petition for review, with prejudice.

10. This Settlement Agreement is entered into on mutually agreeable terms to avoid the expense and inconvenience of litigation. Nothing herein shall be construed as an admission by any party as to any claim, defense or allegation of any other party.

11. By entering into this Settlement Agreement, the City does not waive or release any claims, actions, causes of actions or rights it may have against any person or entity, excluding any claim, action, cause of action or right against the respondents for judicial review of the 1992 FEIS and the 1992 ROD.

12. All parties shall bear their own costs and fees in connection with the Petition for Review and this Settlement Agreement.

13. The undersigned warrant that they have full authority to enter into this Settlement Agreement and by their signatures bind the party or parties on whose behalf they have signed to the terms of this Settlement Agreement.

CITY OF DEARBORN MICHIGAN

As authorized by CR 7-8-01C

By: Debra A. Walling

Name: Debra A. Walling
Corporation Counsel
City of Dearborn, Michigan

Date: 4/8/02

FEDERAL AVIATION ADMINISTRATION

By: Nancy D. LoBue

Name: Nancy LoBue
Assistant Chief Counsel
Airports and Environmental
Law Division, FAA

Date: 4/1/02

U.S. Department of Transportation
Federal Aviation Administration

Federal Aviation Administration
Central Terminal Operations

2300 East Devin Avenue
Des Plaines, IL 60018

RECEIVED
FEB 09 2006

February 3, 2006

Mr. Lester W. Robinson
Chief Executive Officer
Wayne County Airport Authority
L.C. Smith Terminal, Mezzanine
Detroit, MI 48242

Dear Mr. Robinson:

Thank you for your letter of October 11, 2005, requesting conduct of a 60-day test of additional departure headings as described in the April 2002 Settlement Agreement between the Federal Aviation Administration (FAA) and the City of Dearborn. The FAA agrees to conduct the test. We will begin immediately to prepare the necessary environmental documentation in the form of a categorical exclusion for conduct of the test.

Before beginning the test, however, the FAA, Wayne County, and the City of Dearborn need to effect pre-planning. First we need to come to consensus as to what constitutes adequate public notification and the entity that would be responsible for financing the test. Second, we need to establish a method to gather, analyze, and report noise impact data from the test. Perhaps Wayne County would be willing to provide the services of its aviation consultant, Barnard Dunkelberg and Company, in this endeavor. This information will be vital to determine the success of the test, if permanent implementation of the additional departure headings is appropriate, and the type of environmental study that will be necessary for permanent implementation. If the services of Barnard Dunkelberg and Company cannot be made available, another method to finance the environmental analysis will be necessary.

The FAA is eager to begin the test. Please contact my staff specialist, Ms. Annette Davis, at 847-294-8091 so that we can move forward.

Sincerely,

for Nancy L. Kort
Area Director, Central Terminal Operations

cc: R. Latane Montague

5116-5148

Appendix Nine

AIRPORT AUTHORITY APPROVAL

RESOLUTION
No. 08 – 130

Federal Aviation Regulation (FAR)
Part 150 Noise Capability Planning Study Update
for Detroit Metropolitan Wayne County Airport

By Board Member David Treadwell

WHEREAS, the Wayne County Airport Authority, pursuant to the Michigan Public Airport Authority Act, being MCL 259.108 – 259.125c, operates and manages the Detroit Metropolitan Wayne County Airport and Willow Run Airport and is vested with the powers and authority to undertake such management and operation pursuant to the Aeronautics Code of the State of Michigan; and

WHEREAS, the Wayne County Airport Authority is governed by the Wayne County Airport Authority Board; and

WHEREAS, the Wayne County Airport Authority Board desires to approve the **Federal Aviation Regulation (FAR) Part 150 Noise Capability Planning Study Update**, to be submitted to the Federal Aviation Administration (FAA) for acceptance.

NOW THEREFORE, BE IT RESOLVED that the Wayne County Airport Authority Board hereby approves the **Federal Aviation Regulation (FAR) Part 150 Noise Capability Planning Study Update**, to be submitted to the FAA for acceptance in order to receive any available future grant funding, for costs relative to the implementation of the Noise Study Update recommendations at Detroit Metropolitan Airport. [See attached Memorandum]

This Resolution was supported by board Member Charlie Williams and carried by the following vote:

AYES: Parker, Settles, Treadwell, Williams

NAYS: None

DATE: October 31, 2008

DETROIT METRO • WILLOW RUN
WAYNE COUNTY AIRPORT AUTHORITY

Detroit Metropolitan Wayne County Airport
L. C. Smith Terminal - Mezzanine
Detroit, Michigan 48242

MEMORANDUM

TO: Wayne County Airport Authority Board Members

FROM: Lester W. Robinson, Chief Executive Officer

DATE: October 20, 2008

RE: Request for Approval to Accept the Detroit Wayne County Metropolitan Airport's FAR Part 150 Noise Capability Planning Study Update

---

This is a request for the Airport Authority Board to approve the Detroit Metro Airport (DTW) Federal Aviation Regulation (FAR) Part 150 Noise Capability Planing Study Update so that it may be submitted to the Federal Aviation Administration (FAA) for acceptance.

The FAR Part 150 Noise Compatibility Study, which was conducted by Barnard Dunkelberg and Company, is an update of a 1992 study that was adopted by Wayne County and approved by the FAA in 1993. The Airport Authority has implemented many of the recommendations contained in the previous FAR Part 150 Study. However, since completion of the previous Study, there have been changes to the airfield, types of aircraft, and the number of aircraft operating at the Airport. As such, many of these factors have resulted in changes to noise exposure and therefore warrants an update to the previous Study.

The Part 150 Study Update and its recommendations are a voluntary effort initiated by the Airport Authority in order to be a good neighbor to the surrounding communities. The FAR Part 150 Study Update required the evaluation of future noise conditions and the creation of a future Noise Exposure Map which served as the basis for considering the effectiveness of each noise abatement action. The noise abatement options evaluated did not appear to significantly impact the current noise baseline, as the existing noise program has been in place and modified previously to provide balanced noise reduction.

In an effort to garner input from key stakeholders, a Study Advisory Committee (SAC) made up of representatives from the neighboring cities of Taylor, Inkster, Dearborn, and Romulus was established. The SAC met nine (9) times in the aforementioned cities wherein final recommendations made by the Airport Authority and Barnard Dunkelberg and Company were presented to the SAC and overwhelmingly accepted.

In addition, over the course of the Study, three (3) separate newsletters were mailed to the communities inside of the 65 decibel noise level (DNL), which is the area in which homes are located qualify to participate in the DTW's Residential Sound Insulation Program. The communities within this area, Romulus, Huron Township, Taylor, Westland, and Inkster were provided up-to-date information about the Study Update. As part of the Study, the Airport Authority also held four (4) public information workshops and two (2) public hearings to address any public concerns.

The future Noise Exposure Map forecasts airfield activities/operations through 2011 with assumed implementation of the following proposed noise abatement operational and facility recommendations.

Noise Abatement Elements:

Recommendation 1	Develop new procedures for ground run-up (throttling of aircraft engines after maintenance)
Recommendation 2	Construct ground run-up enclosure
Recommendation 3	Work with the FAA to develop Flight Management System (FMS) procedures to concentrate a portion of south turning aircraft and fan others for Runway 4R departures
Recommendation 4	Work with FAA to develop FMS procedures to concentrate a portion of south turning aircraft and fan others for Runway 3L departures
Recommendation 5	Work with the FAA to develop FMS procedures to concentrate departures while in south flow
Recommendation 6	Extend hours of contra-flow operations at night (all air traffic departs and arrives from the south)
Recommendation 7	Implement Continuous Descent Approach, when practicable
Recommendation 8	Continue to study the feasibility of an extension to Runway 3L/21R to reduce noise
Recommendation 9	Develop noise abatement procedures for use during runway maintenance operations
Recommendation 10	Continue to study the feasibility of implementing displaced thresholds to reduce noise

Land Use Management Elements:

Recommendation 1	Voluntary acquisition of remaining residential units within the 70 decibel noise level (DNL) noise contour
Recommendation 2	Recommend communities require disclosure statements/ buyer notification when the subject residential property is located near DTW

Recommendation 3	Work with communities to update comprehensive plans to discourage noise sensitive uses within the 65 DNL
Recommendation 4	Work with communities to update zoning ordinances to prohibit noise sensitive uses within the 65 DNL
Recommendation 5	Work with communities to update building codes to require sound attenuation of new residences
Recommendation 6	If federal funds become available at 80% funding, sound insulate residential units within the 60 DNL

Program Management and Administrative Elements:

Recommendation 1	Install a noise monitoring/flight track monitoring system
Recommendation 2	Continuation of Study Advisory Committee for on-going community outreach
Recommendation 3	Develop Fly Quiet Report Card and Pilot Awareness Program
Recommendation 4	Perform Operations review and renew Part 150 Updates if necessary

The Airport Authority intends to implement elements of the proposed Noise Compatibility Plan as quickly as possible. However, the timetable for implementation would depend heavily on the availability of federal and local funding. Specifically, Land Use Recommendation 6 is contingent upon the availability of federal funds to match local funds for sound insulation of residential structures within the 60 DNL noise contour. This recommendation would not be implemented until such funds are available. The Airport Authority would like to have the FAR Part 150 Study Update already submitted and accepted by the FAA in order to receive any available future funding.

I hereby request that the Airport Authority Board approve the DTW FAR Part 150 Study Update to allow future acceptance of grant funding, should and when federal or other funding becomes available for costs relative to the implementation of the Noise Study Update recommendations at Detroit Metro Airport.

Appendix Ten

1993 RECORD OF APPROVAL

U.S. Department of Transportation
Federal Aviation Administration

Memorandum

Airports District Office
Willow Run Airport, East
8820 Beck Road
Belleville, MI 48111

Subject: ACTION: Approval of Noise Compatibility Program Detroit Metropolitan Wayne County Airport, Detroit, MI

Date: MAR 09 1993

From: Manager,
Detroit Airports District Office, DET ADO-600

Reply to Attn of: Gubry: 313-487-7281

To: Assistant Administrator for Airports, ARP-1
ATTN: APP-600
THRU: AGL-610

On December 16, 1992, the FAA determined that the Noise Exposure Maps (NEMs) for Detroit Metropolitan Wayne County Airport in Detroit, Michigan, are in compliance with applicable requirements of Section 103(c) of the Aviation Safety and Noise Abatement Act of 1979 ("The Act"). Also, on December 16, 1992, the FAA determined that the Noise Compatibility Program conforms to the requirements of FAR Part 150 and is acceptable for detailed review. Therefore, December 16, 1992, marked the start of the formal 180-day review period for Detroit Metropolitan Wayne County Airport's proposed Noise Compatibility Program (NCP) under Section 104(a) of the Act. According to the Act, the NCP must be approved or disapproved by the FAA within 180 days; or it shall be deemed approved. The last date for such approval or disapproval is June 14, 1993.

The proposed NCP has been reviewed and evaluated by the Detroit Airports District Office; the Flight Standards, Airway Facilities, and Air Traffic Divisions; and the Assistant Chief Counsel. We have concluded that the NCP is consistent with the intent of the Act and that it meets the standards set forth in FAR Part 150 for such programs. The standard Part 150 NCP checklist was reviewed to ensure that all required items were included in the proposed program. That checklist is attached.

As part of the formal 180-day review, each proposed action in the NCP has undergone further review and evaluation on the basis of effectiveness and potential conflict with federal policy and prerogatives. These include safe and efficient use of the nation's airspace, undue burden on interstate commerce, unjust discrimination, and interference with a federal regulatory compliance schedule (i.e. FAR Part 91, Subpart E).

On December 16, 1992, the FAA notified the sponsor by letter (copy attached) that the FAA had determined that the NEMs were in compliance with applicable requirements of 14 CFR Part 150. The letter also stated that the FAA had began its formal review of the NCP. No comments were received during the public review period.

Our recommendation on each of the proposed actions is described in the attached Record of Approval. Each measure is described in detail in Detroit Metropolitan Wayne County Airport's NCP.

Dean C. Nitz

Dean C. Nitz, Manager
Detroit Airports District Office
FAA Great Lakes Region

Attachments

NEM/NCP
NEM/NCP Acceptance Letter
Federal Register Notice
Record of Approval
NEM/NCP Checklist

cc:
AGL-610

FEDERAL AVIATION ADMINISTRATION

RECORD OF APPROVAL

FAR PART 150 NOISE COMPATIBILITY

PROGRAM

Detroit Metropolitan Wayne County Airport

Detroit, Michigan

		CONCUR	NONCONCUR
Dale E. McDaniel Assistant Administrator for Policy, Planning, and International Aviation, API-1	4/29/93 Date	✓	
for Chief Counsel, AGC-1	Date 4/30/93	✓	
		APPROVED	DISAPPROVED
Quentin S. Taylor Assistant Administrator for Airports, ARP-1	4/30/93 Date	✓	

RECORD OF APPROVAL

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT

NOISE COMPATIBILITY PLAN

The Noise Compatibility Plan (NCP) for Detroit Metropolitan Wayne County Airport, located in Romulus, Michigan, describes the current and future noncompatible land uses based upon the parameters as established in FAR Part 150, Airport Noise Compatibility Planning. Detroit Metropolitan Wayne County Airport is owned and operated by Wayne County. Wayne County proposes fifteen (15) measures in their NCP to remedy existing noise problems and to prevent future ones from occurring. These measures are grouped into three categories: Noise Abatement Plan (Actions 1 through 6), Program Management Measures (Actions 7 through 9), and Land Use Management Plan (Actions 10 through 15). Each measure of the proposed Noise Abatement Plan, Land Use Management Plan, and Program Management is identified below. Included is a summary of the airport operator's recommendations and a cross reference to page numbers in the NCP where each measure can be found.

The current Noise Exposure Map (Existing 1992) and forecast Noise Exposure Map (Future 1997 Noise Compatibility Plan) are found in Exhibits 1 and 4, on pages xxvii and xxx, respectively, of the Executive Summary, in the Noise Compatibility Plan document. They replace the Noise Exposure Maps: Existing (1988) Noise Exposure Map and Forecast (1993) Noise Exposure Map, found on pages 7 and 8, respectively, of the 1989 Part 150 NEM submission. Also, Exhibits 2 and 3, pages xxviii and xxix of the Executive Summary of the 1992 submittal, present the future 1997 unabated, and the Existing 1992 abated noise contours, respectively. Tables 1, 2, 3, and 4 of the Executive Summary of the 1992 submission present the Population and Housing Impacts for the abated and unabated conditions for 1992 and 1997. A summary of the implementation actions and responsibilities is outlined in Table 5, page xxv, and Table V-1, page V-19. Exhibit V-1 on page V-22 presents the implementation schedule for the Noise Compatibility Plan.

The approvals listed herein include approvals of actions that the Airport Sponsor proposes be taken by the FAA. It should be noted that these approvals indicate only that the actions would, if implemented, be consistent with the purposes of Part 150. These approvals do not constitute decisions to implement the actions. Additionally, later decisions concerning implementation of these actions, or actions requiring further study, may be subject to applicable environmental or other procedures or requirements.

The Record of Approval summarizes the Airport Operator's proposals in the Noise Compatibility Plan. The statements contained within the summarized recommendations and before the indicated FAA approval, disapproval, or other determination do not represent the opinions or decisions of the FAA.

NOISE ABATEMENT PLAN MEASURES (ACTIONS 1-6)

1. **Preferential Runway Use Maximizing The Use Of South Flow.** Wayne County seeks to impact the fewest people by concentrating overflights over the least developed areas located to the south of the Airport. Two runway use measures that emphasize overflights south of the Airport are proposed by Wayne County:

a. **Use Runways 21 L/R/C as the Runway Noise Abatement Configuration with Wind Conditions up to a 7-knot Tail Wind Component** (NCP on pages x, I-10, I-11, I-13; III-4; III-35, III-42, V-2, V-21, and V-24; Exhibit III-2 on page III-5; Table 5 on page xxv; Table III-2 on page III-36; Table III-5 on page III-43; Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22).

This action calls for aircraft to depart to the south and arrive from the north as long as the tail wind component does not exceed 7 knots. Based upon a review of meteorological conditions, the south flow use could be increased from 72 to 74 percent between 6:00 a.m. to 11:59 p.m., and to 79 percent during specific night hours (12:00 a.m. to 5:59 a.m.). Preferential departure use of Runways 21 would concentrate aircraft noise over areas south of the Airport with the lowest population densities and, therefore, produce the smallest total population exposed to DNL 65 and greater noise levels. This procedure was assessed in the October 1992 Final Environmental Impact Statement for the Implementation of Air Traffic Control Noise Abatement Procedures at Detroit Metropolitan Wayne County Airport. The FAA issued a Record of Decision approving implementation of the procedure on November 16,1992. This procedure was implemented on November 29,1992.

Approved

b. **Opposite Direction Nighttime Operations From 12:00 a.m. to 5:59 a.m. When Feasible** (NCP on pages x, I-10, I-11, I-13, III-6, III-35, III-42, V-2, and V-21; Exhibit III-2 on page III-5; Table 5 on page XXV; Table III-2 on page III-36; Table III-5 on page III-43; Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22).

In an effort to further concentrate aircraft noise over the least developed areas south of the Airport, a second runway use procedure is proposed by Wayne County. The opposite direction or reverse flow nighttime operations procedure establishes a nighttime preferential runway use program that maximizes departures on Runway 21 and arrivals on Runway 3. This procedure is proposed for use only during periods of reduced aircraft activity between midnight and 5:59 a.m. South flow use could be increased from 72 to 79 percent during the night hours. Approximately nine arrivals and four departures occur on an average day during these hours. Due to this low level of activity, the FAA determined that the procedure is operationally feasible and can be implemented safely.

This procedure was assessed in the October 1992 Final Environmental Impact Statement for the Implementation of Air Traffic Control Noise Abatement Procedures at Detroit Metropolitan Wayne County Airport. The FAA issued a Record of Decision approving implementation of the procedure on November 16, 1992. This procedure was implemented on November 29, 1992.

Approved.

2. Equitable Dispersal of Departure Flight Tracks. Wayne County proposes a program focusing on the dispersal of flight tracks within a defined area. Two actions are proposed by Wayne County to implement the equitable dispersal of departure flight tracks within defined areas to the north and south of the airport as follows:

a. Retain all North Flow Departures in a More Equitable Dispersal area on Headings Between 350 Degrees Clockwise to 050 Degrees (NCP on pages x, xi, I-11, I-12, I-13, III-7, III-35, III-42, V-3, V-21, and V-24; Exhibit III-3 on page III-8; Exhibit III-9 on page III-39; Exhibit III-11 on page III-45; Table 5 on page xxv; Table III-3 on pages III-37 and III-38; Table III-6 on pages III-46 and III-47; Table III-5 on page III-43; Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22).

The primary noise abatement philosophy of the proposed dispersal of departures is the institution of dispersal areas to the north. The dispersal theory tends to even out, as opposed to concentrating, traffic within a defined departure area. This philosophy involves minimizing aircraft overflights along specific departure corridors within a specified range of departure headings. Departures would be fanned within these headings to minimize concentrating overflights within a particular area. Departing aircraft cannot be fanned further due to conflicts with existing arrival patterns and safety.

This procedure was assessed in the October 1992 Final Environmental Impact Statement for the Implementation of Air Traffic Control Noise Abatement Procedures at Detroit Metropolitan Wayne County Airport. The FAA issued a Record of Decision approving implementation of the procedure on November 16, 1992. This procedure was implemented on November 29, 1992.

Approved.

b. **Retain All South Flow Departures in a More Equitable Dispersal Area on Headings Between 185 Degrees to 235 Degrees** (NCP on pages x, xi, I-11, I-12, I-13, III-7, III-35, III-42, V-3, V-21, and V-24; Exhibit III-3 on page III-8; Exhibit III-9 on page III-39; Exhibit III-11 on page III-45; Table 5 on page xxv; Table III-3 on pages III-37 and III-38; Table III-6 on pages III-46 and III-47; Table III-5 on page III-43; Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22).

The primary noise abatement philosophy of the proposed dispersal of departures is the institution of dispersal areas to the south. The dispersal theory tends to even out, as opposed to concentrating, traffic within a defined departure area. This philosophy involves minimizing aircraft overflights along specific departure corridors within a specified range of departure headings. Departures would be fanned within these headings to minimize concentrating overflights within a particular area. Departing aircraft cannot be fanned further due to conflicts with existing arrival patterns and safety.

This procedure was assessed in the October 1992 Final Environmental Impact Statement for the Implementation of Air Traffic Control Noise Abatement Procedures at Detroit Metropolitan Wayne County Airport. The FAA issued a Record of Decision approving implementation of the procedure on November 16, 1992. This procedure was implemented on November 29, 1992.

Approved.

3. **Restrictions on Flight Training** NCP on pages xi, III-20, and V-3; Table 5 on page xxv; Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22.

Wayne County proposes, as a preventive action, that it revise its Airport Rules and Regulations Manual to restrict flight training activity, with regard to "touch and go" flight activity. During flight training, pilots learn the performance characteristics of aircraft and typically practice landings and takeoffs at an airport. Such training activity is usually referred to as "touch and go" activity, which results in low overflights. At present, no regular "touch and go" flight training activity occurs at Detroit Metropolitan Wayne County Airport; and none are planned. However, because of the large volume of air carrier activity at the Airport and the potential effect on safety, such restrictions are proposed. This action would not affect "point-to-point" flight training activity (i.e. routine arrival and departure procedures). Additionally, Wayne County encourages flight training activity at Willow Run Airport, located eight miles west of Metro Airport, which is also operated by the County.

Disapproved pending submission of additional information. At such time as Wayne County can demonstrate that this measure is reasonably related to noise reduction at Detroit Metro Wayne County Airport, the measure may be resubmitted to the FAA under Part 150 with supporting analysis. At this time, the measure does not meet Part 150 standards of approval because it is not needed to reduce existing noise and incompatible land uses or to prevent the introduction of noise or incompatible land uses.

Wayne County is also advised that airport noise and access restrictions are subject to the provisions of the Airport Noise and Capacity Act of 1990 and FAR Part 161.

4. <u>Establishment of Ground Run-Up Procedures</u> NCP on pages xii, III-17, III-18, V-4, and V-21; Exhibit III-7 on page III-19; Table 5 on page xxv; Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22.

Wayne County proposes to modify the Airport's Rules and Regulations Manual to formally adopt the ground run-up procedures. The procedures would be revised to include use of a hush house if such a facility were to be constructed.

During the public information meetings, Airport neighbors indicated that the primary nighttime noise nuisance is the conduct of aircraft maintenance ground run-ups. Ground run-ups are aircraft engine maintenance tests conducted as part of regular maintenance procedures. Four locations were identified for conducting this type of activity which would minimize off-airport impacts. To further concentrate noise, headings for positioning the aircraft were also identified. The proposed locations and headings are:

Proposed Ground Run-Up Locations	Airfield Location Orientations
Runway 3L Pad	210° heading
Taxiway U Pad	340° heading
Runway 21C Pad	030° heading
Runway 3C Pad	210° heading

Additionally, between the hours of 7:00 a.m. and 7:00 p.m., the hold pads for Runways 3R and 27 would be available without restrictions; between 7:00 p.m. and 7:00 a.m., these locations would be closed for run-ups.

Approved: The designation of routine aircraft engine run-up locations and aircraft orientation are within the discretion of the Airport Operator and may be instituted at any time provided they do not limit operations so as to qualify as an airport noise and access restrictions or create an undue burden on interstate or foreign commerce. Based on the availability of four of the six pads for run-ups at night, the restriction on the availability of two pads does not appear to constitute an airport noise or access restriction within the meaning of the Airport Noise and Capacity Act and 14 C.F.R. Part 161.7(a). Since the pads are used on an average of once per night, the restriction on the availability of two during that timeframe does not limit the total number of Stage 2 or 3 aircraft operations, or limit the hours of operation of Stage 2 or 3 aircraft operations at the airport. Additionally, based on the number of users affected and the estimated annual cost of $10,900, this measure does not appear to impose an undue burden on interstate commerce. This approval is subject to recission based on unforseen impacts on air commerce.

5. Additional Study of Extending Runway 3C and Constructing a Hush House. Wayne County proposes two operational actions for additional study. These actions are proposed due to the potential noise reduction benefits associated with each. Included are:

a. Study the Noise Reduction Benefits of Extending Runway 3C (NCP on pages xii, III-21, III-22, III-32, V-5, V-21, V-24, C-10, and C-20; Exhibit C-10 on page C-19; Table 5 on page xxv; Tables V-1 and V-2 an pages V-19 and V-25; and Exhibit V-1 on page V-22).

The extension of Runway 3C may aid departures from Runway 3C in obtaining additional altitude before overflying noise-sensitive land uses to the north and northeast of the Airport. The extension of Runway 3C would increase the altitude of aircraft departing to the north by several hundred feet and likely would result in a reduction of single event noise levels in immediately adjacent areas by as much as 3 dBA. However, such an extension would also result in lower flying aircraft when landing on Runway End 3C. Therefore, while the extension to Runway 3C was identified as having noise reduction potential, it could also increase noise impacts slightly to the south. Wayne County therefore, proposes the preparation of an additional study to determine the benefits of extending Runway 3C.

Approved as a Study Only.

b. **Study the Noise Reduction Benefits of a Ground Run-Up Hush House**: (NCP on pages xiii, III-23, III-24, V-5, V-6, V-21, and V-24; Table 5 on page xxv; Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22).

A hush house is an open air, hangar like facility used to partially enclose commercial aircraft when an engine maintenance check or run-up is performed. Wayne County proposes performing an additional study to determine the benefit of installing a ground runup hush house at the Airport. Construction would be subject to a determination of noise reduction benefit and economic and operational feasibility.Due to the variety of aircraft types in use at the Airport, consideration of a hush house capable of accommodating up to a DC-10 sized aircraft is proposed. Such a facility would accommodate approximately 99 percent of the aircraft operating at the Airport. The facility would require about an acre af land and would be at least 270 feet in length, 180 feet wide, and up to 40 feet high. Upon identification of a suitable location, the future Airport Layout Plan would be modified to reflect the hush house and FAA approval sought.

Approved as a study only.

6. **Construction of Earth Berms Using Fill From Airport Development** NCP on pages xiii, xiv, III-22, III-23, V-6, V-23, and V-24; Exhibit III-7 on page III-19; Table 5 on page xxv; Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22.

Wayne County proposes that earth berms be developed along the perimeter of the Airport property using fill excavated from airport development. Earth berms provide a mechanism of blocking the path of noise transmitted from aircraft operations while on or near the ground. Three locations for the earth berms have been identified. The proposed sites of these berms and their sizes are:

Berm Locations on Airport	Height	Length	Noise Level Reduction
Southeast Corner: Along Eureka Rd. at MiddleBelt Rd.	50ft.	6,500ft.	9dB
East Side:	50ft.	5,500ft.	7-8dB

Along MiddleBelt Rd.

West Side: Parallel to Runway 4/22	50ft.	11,700ft.	7-9dB

As indicated by the above data, the construction of earth berms could reduce noise from aircraft ground operations by 7 to 9 decibels. The size and precise length of each earth berm will be subject to further study and engineering during the completion of the proposed Master Plan Development, a substantial amount of excavated earth will be available. Therefore, Wayne County proposes that this fill be used to construct earth berms on airport property. The proposed noise berms along Eureka Road and MiddleBelt Road are currently under construction, using fill made available from the construction of the second crosswind runway. Wayne County proposes that the berm located west of the fourth parallel runway will be initiated as runway construction starts. Wayne County will establish procedures for maintaining the noise berms.

Construction of the earth berms was described in the Final Environmental Impact Statement covering master plan development which was issued in December 1989. A Record of Decision documenting environmental approval of construction of the berms was issued on March 15,1990.

Approved.

PROGRAM MANAGEMENT MEASURES (ACTIONS 7-9)

7. Installation of a Permanent Noise Monitoring System NCP on pages xiv, III-24, V-26; Table 5 on page xxv; V-19 and V-25; and EXHIBIT III-25, V-7, V-8, V-21, and Tables V-1 and V-2 on pages V-1 on page V-22.

Wayne County proposes the installation of a permanent noise monitoring system to quantify future noise levels and to monitor progress of the Noise Compatibility Plan. The system would consist of at least 20 permanently installed noise measurement devices that are connected to a central processing station for data analysis. Wayne County will also investigate connecting the system to an automated aircraft tracking system to correlate aircraft overflights with noise levels. Noise level analysis reports would be generated and made available to the general public. To provide flexibility in response to changing needs and citizen concerns, this action also proposes performing mobile noise monitoring. Wayne County could purchase two mobile units to conduct in-the-field noise monitoring. Both short-term attended and longer-term unattended monitoring could be performed.

Approved: This measure would enable the Airport Operator to monitor the effectiveness of the Noise Compatibility Plan. **NOTE**: For reasons of aviation safety, this approval does not extend to the use of monitoring equipment for enforcement purposes by in-situ measurement of any pre-set noise thresholds (The FAA notes that the DTW NCP does not include such thresholds).

8. **Establishment of a Noise Complaint Office** (NCP on pages xiv, III-25, III-26, V-8, V-21, and V-26; Table 5 on page xxv; Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22).

Wayne County proposes the establishment of a permanent noise complaint and noise reporting office. Permanent staffing of a noise complaint and reporting office enables an airport operator to compile accurate records on noise issues. Prior to the Part 150 process, complaints were registered with numerous places in Wayne County ranging from the FAA and the Airport to County officials and municipal officials. A Noise Office and 24-hour noise complaint "hotline" were established during the 1991 test of air traffic control operational procedures, and currently remains in operation. The hotline phone number is (313) 942-3222. This action proposes that Wayne County formally establish the Noise Office, provide permanent staffing, and develop a funded work program to guide the activities of the Noise Office.

Approved.

9. **Update Noise Exposure Maps** (NCP on pages xiv, XV, III-27, V-8, V-9, and V-26; Table 5 on page xxv; Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22).

Wayne County proposes preparing updated noise exposure contours to show changing noise impacts and to monitor the effectiveness of the proposed Noise Compatibility Plan. This action is proposed because it supports the objective of achieving a quieter airport environment by monitoring the effectiveness of the noise abatement actions. Such a review would allow modification or a reevaluation of the noise abatement actions in pursuit of the program goals and objectives established during the Part 150 Study. With this action, new Noise Exposure Maps will be prepared in light of the then current and forecast operations and noise performance levels of the operating fleet. The new noise exposure contours would be evaluated in relation to the noise exposure patterns anticipated from implementation of the noise abatement actions specified by the Noise Compatibility Plan.

Approved.

LAND USE MANAGEMENT PLAN (ACTIONS 10-15)

10. **Sound Insulation of Schools Affected by DNL 65 and Greater Sound Levels** (NCP on pages xvii, xix, IV-7, IV-16, IV-17, IV-29, V-9, V-23, and V-27; Exhibit IV-4 on page IV-30; Table 5 on page xxv; Table IV-3 on page IV-19, Table IV-5 on page IV-26, Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22)

Wayne County proposes that a school sound insulation program be implemented within DNL 65 and greater. Wayne County will coordinate the school sound insulation program to reduce interior noise levels to 45 dBA or less. Seven schools are affected by DNL 65 and greater sound levels after completion of the approved Master Plan development and implementation of the Noise Compatibility Plan.

Schools Eligible For Sound Insulation

School	Jurisdiction
Federal	Dearborn Heights
Miller Elementary	Huron Township
St. Stephen Elementary	Huron Township
Hayti Elementary	Romulus
Merriman Elementary	Romulus
Treadwell Elementary	Taylor
Peoples Community Baptist	Westland

Through the school sound insulation program, these noise-sensitive institutions will undergo appropriate acoustical treatment to reduce interior sound levels to 45 dBA. Wayne County has initiated the school sound insulation program.

Approved.

11. **Acquisition of property Affected by DNL 75 and Greater Sound Levels** (NCP on pages xix, IV-6, IV-13, IV-14, IV-16, V-10, V-11, V-23, and V-26; Exhibit IV-3 on page IV-28; Table 5 on page xxv; Table IV-1 on page IV-15; Table IV-5 on page IV-26; Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22).

Wayne County proposes for residences affected by DNL 75 and greater noise exposure levels that their property be acquired and that they be relocated to an area not affected by noise. This action involves the fee simple purchase of noise-impacted residential properties. The primary objective of this action is to remove incompatible land uses or convert them to compatible uses. Once the property is acquired, it can be rezoned and returned to private ownership for development as a compatible (i.e. commercial, industrial, etc.) use. In coordination with the local jurisdiction, Wayne County will avoid disrupting neighborhoods and return the property to the tax rolls as soon as possible. Although the program will focus on residential

b. **Sound Insulation in Exchange for an Avigation Easement** (NCP on Pages xix, xx, IV-7, IV-16, IV-17, V-11, V-12, V-13, V-23, V-26, and D-27 through D-29; Exhibit IV-3 on page IV-28; Table 5 on page xxv; Table IV-2 on page IV-18; Table IV-5 on page IV-26; Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22).

Wayne County proposes, as an option, that residents in those neighborhoods within DNL 70-75 which have been determined to be viable for continued residential use may choose to remain in their home and add sound insulation materials. This action consists of adding sound insulating materials to existing structures in order to reduce interior noise levels to an acceptable level. The recommended interior level is 45 dBA, as indicated by the Part 150 Land Use Compatibility Guidelines. Sound insulating measures that can be used to achieve this sound level include the installation of air handling systems, upgrading windows and doors, adding insulation to walls and ceilings, and the installation of baffling devices on all exterior vents. Homeowners that select sound insulation will be required to agree to an avigation easement that recognizes that aircraft overflights do occur within this area. Participation in the sound insulation program will be limited to those residents choosing to remain in their homes and not seek purchase assurance to move out of the neighborhood, and whose neighborhood have been determined to be viable for continued residential use. Subsequent owners would not be eligible for purchase assurance.

Approved.

c. **Purchase Assurance in Exchange for an Avigation Easement** (NCP on pages xix, xx, IV-7, IV-17, IV-20, V-11, V-12, V-13, V-23, V-26, and D-27 through D-29; Exhibit IV-3 on page IV-28; Table 5 on page xxv; Table IV-4 on page IV-21; Table IV-5 on page IV-26; Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22).

Wayne County proposes as an option in neighborhoods in the 70-75 DNL noise contour which have been determined to be viable for continued residential use, that residents may choose to participate in a purchase assurance/transaction assistance program to allow them to move out of their homes with the assurance that they will receive fair market value for their home. Participation in the program would be based on the November 29, 1992, implementation of air traffic control noise abatement procedures. Residents that acquired their homes prior to that date would be eligible to participate. This date was chosen due to the widespread controversy and awareness of the air traffic actions.

An avigation easement would be required on all properties participating in the program. Participation in the purchase assurance program will be limited to those residents electing to move out of their homes and not use the sound insulation program, and whose neighborhoods are not considered eligible for acquisition because the neighborhoods have been determined to be viable for continued residential use.

Approved.

13. **Provide Residents affected by DNL 65-70 With the Option of Selecting one of the Following**: Wayne County proposes that residents within the DNL 65-70 noise-impacted area would be offered the option of sound insulating their home or being assured fair market value for their home if they desire to sell. Approximately 2,600 homeowners within 5 jurisdictions may be eligible for participation including: 40 homes in Dearborn Heights, 440 homes in Huron Township, 890 homes in Romulus, 860 homes in Taylor, and 370 homes in Westland. Two resident options programs will be offered within the DNL 65-70 as follows:

a. **Sound Insulation in Exchange for an Avigation Easement** (NCP on pages xxi, IV-7, IV-16, IV-17, IV-20, IV-22, V-14, V-15, V-23, V-26, and D-27 through D-29; Exhibit IV-3 on page IV-28; Table 5 on page xxv; Table IV-2 on page IV-18; Table IV-5 on page IV-26; Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22).

Similar to the sound insulation program offered to residents within the DNL 70-75 noise-impacted area, Wayne County proposes that residents may choose to sound insulate their homes. Sound insulating measures may include the installation of air handling units, upgrading windows and doors, adding insulation to walls and ceilings, and the installation of baffling devices on all exterior vents. Homeowners who select sound insulation will be required to agree to an avigation easement that recognizes that aircraft overflights do occur within this area. Participation in the sound insulation program will be limited to those residents choosing not to participate in the purchase assurance program. Subsequent owners would not be eligible to participate in the purchase assurance program.

Approved.

b. **Purchase Assurance/Transaction Assistance in Exchange for an Avigation Easement** (NCP on pages xxi, IV-7, IV-17, IV-20, IV-22, V-14, V-15, V-23, V-26, and D-27 through D-29; Exhibit IV-3 on page IV-28; Table 5 on page xxv; Table IV-4 on page IV-21; Table IV-5 on page IV-26; Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22)

Wayne County also proposes that residents may choose to participate in a purchase assurance/transaction assistance program to allow them to move out of their homes with the assurance that they will receive fair market value for their homes. Participation in the program would be based on the November 29, 1992, implementation of air traffic control noise abatement procedures. Residents that acquired their home prior to that date would be eligible to participate. This date was chosen due to the widespread controversy and awareness of the air traffic actions. An avigation easement would be required on all properties participating in the program. Participation in the purchase assurance program will be limited to those residents electing to move out of their home and not utilize the sound insulation program.

Approved.

14. **Encourage the Local Jurisdictions to Implement One or More of the Following Land Use Actions**: Wayne County proposes that jurisdictions affected by DNL 65 and greater noise levels enact preventive measures to help reduce the development of additional incompatible land uses within noise-impacted areas. These actions typically focus on revisions to local development regulations and increasing land use controls. The following summarizes the five proposed preventive actions:

a. **Building Code Modifications** (NCP on pages xxii, IV-9, IV-23, V-15, V-16, V-23, V-27, and D-12 through D-14; Table 5 on page xxv; Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22).

Wayne County proposes that each of the noise impacted communities amend their existing building code regulations to include sound insulation so that interior noise levels are reduced for noise sensitive structures within the DNL 65 and greater area. Building codes are municipal ordinances that control the structural requirements for development within a jurisdiction. Building codes require specific types of construction materials to be used during initial and subsequent development to protect residents from significant aircraft noise impacts. The building codes could be modified to require insulation during construction. As indicated by the Part 150 Land Use Compatibility Guidelines, the recommended interior level is 45 dBA. This action would apply to new or remodeled homes, apartment buildings, schools, or other noise sensitive structures within the DNL 65 and greater noise contour.

b. Compatible Use Zoning (NCP on pages xxii, IV-8, IV-9, IV-23, V-16, V-23, V-27, and D-6 through D-11; Table 5 on page xxv; Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22).

Wayne County proposes that each of the noise impacted communities amend existing local zoning ordinances to re-zone properties from incompatible to compatible uses. Zoning is a tool used by local communities to ensure the compatibility of individual land uses with adjoining lands. Local communities can prevent the construction of new noise-sensitive land uses within noise-impacted areas through local zoning ordinances. These ordinances could be revised to reflect the noise conditions associated with aircraft operations and to ensure that additional incompatible (residential) development does not occur in an affected area or that, as an area transitions, incompatible development does not increase.

c. Establish Noise Overlay Districts (NCP on pages xxii, IV-8, IV-22, V-16, V-17, V-23, V-27, and D-18 through D-25; Table 5 on page xxv; Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22).

Wayne County proposes that the noise-affected communities institute provisions for a Noise Overlay District. The purpose of a Noise Overlay District would be to control the development of incompatible land use in areas within the noise exposure areas defined by the noise contours. All new development within the district intended for human use or habitation would be subject to review. The review would be guided by the exterior-to-interior Day-Night Average Noise Level (DNL or Ldn) guidelines defined in 14 CFR Part 150 Appendix A, Land Use Guidelines. Requirements for development could be appropriate zoning or, through the building code, the addition of sound insulation. Existing non-conforming uses would not be required to change in order to comply with the regulations, but would be re-zoned to compatible uses as an area transitions and the use of the property changes.

d. Subdivision Regulation: (NCP on Pages xxiii, IV-9, IV-10, IV-23, IV-24, V-17, V-23, V-27, and D-15 through D-17; Table 5 on page xxv; Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22).

Wayne County proposes that each of the noise affected communities implement subdivision regulations that include sound insulation requirements for all new incompatible development. Currently, most of the communities around Detroit Metro Airport do not have plans to develop subdivisions. Therefore, subdivision regulations are not in place. However, substantial undeveloped land exists south and southwest of the Airport. Instituting subdivision regulations would serve as a protective mechanism to prevent future incompatible uses from being built in noise-affected areas. Structures built on newly subdivided land within the noise-impacted area would be constructed in accordance with the sound insulation requirements of the modified Building Code, as proposed above.

e. <u>Real Property Noise Notice</u> (NCP on pages xxiii, IV-10, IV-11, IV-22, V-17, V-18, V-23, V-27, and D-26; Table 5 on page xxv; Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22)

Wayne County proposes that each of the noise impacted communities adopt ordinances requiring real property noise notice. A real property noise notice would inform prospective buyers or renters of noise-sensitive properties located within a noise-impacted area prior to its purchase or lease. The means of notification could be through the Realtor, the county records, or the stamping of a deed to show that the parcel of land is noise impacted.

<u>Paragraphs a through e are Approved</u>: It should be understood, however, that sound insulation alone will not insure noise compatibility above DNL 75 dB, according to the Part 150 Land Use Compatibility Guidelines.

15. <u>Prepare a Land Use Implementation and Development Plan</u> (NCP on pages xxiii, IV-11, IV-24, V-18, V-23, and V-27; Table 5 on page xxv; Tables V-1 and V-2 on pages V-19 and V-25; and Exhibit V-1 on page V-22).

Wayne County proposes that an additional study be prepared to aid in the implementation of the preventative land actions. Because substantial potential exists for increased land use and aircraft noise conflicts, additional land use compatibility coordination and analysis were suggested during the Part 150 process. Through the development of a Land Use Implementation and Development Plan, Wayne County will continue the coordination efforts initiated during the Part 150 process for implementation of the preventive land use actions. The plan would also include the development of plans for the conversion of acquired and undeveloped land into compatible uses that enhance the economic welfare of the overall community.

Approved.

Appendix Eleven

DEARBORN TEST CONTOUR COMPARISON

Dearborn/FAA Flight Track Test Contour

Introduction

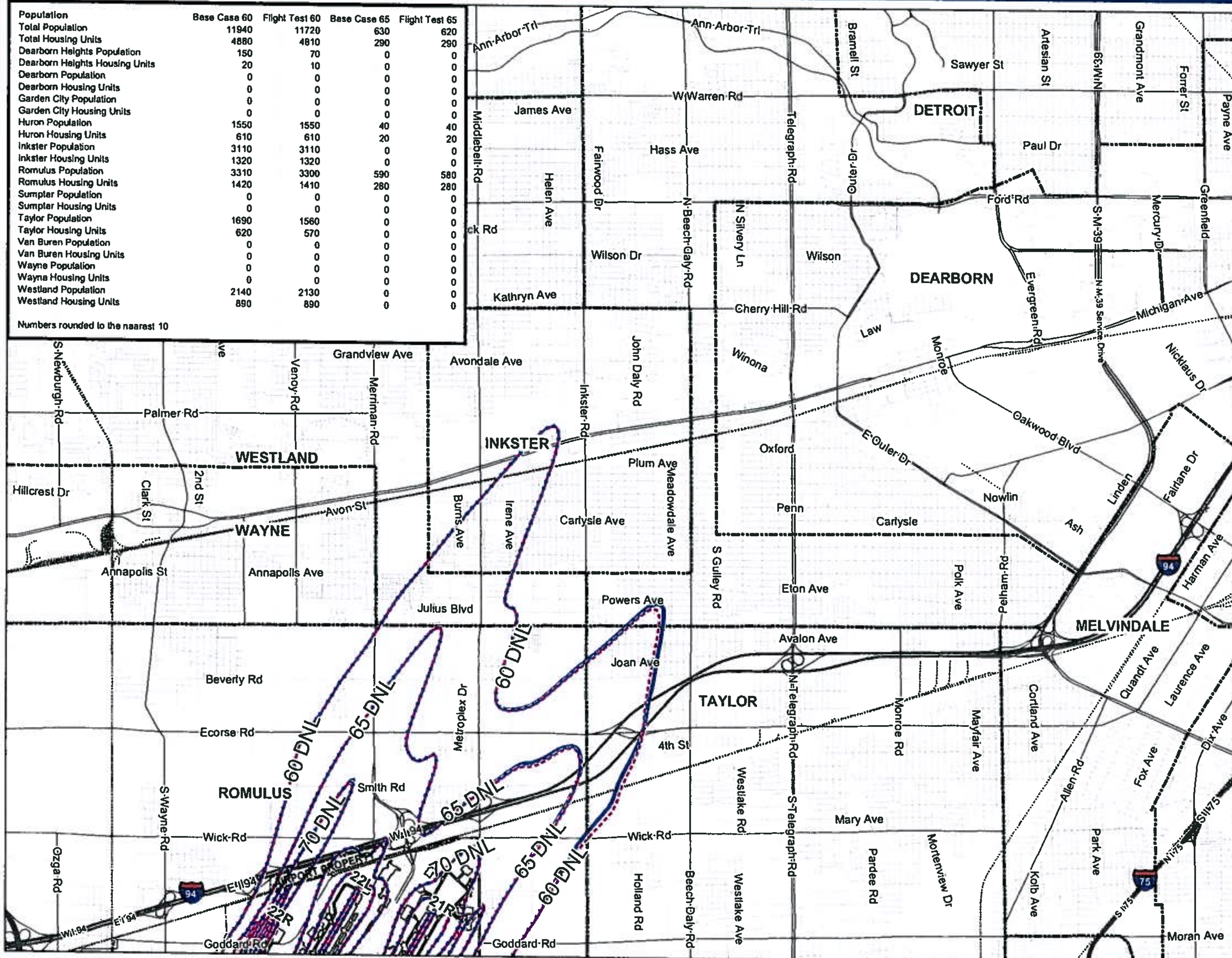
Pursuant to a settlement agreement between the Federal Aviation Administration (FAA) and the City of Dearborn, the FAA tested two new north-bound flight headings for departures from Detroit Metropolitan Wayne County Airport. The test occurred in March and April, 2007. During this period, conditions existed[1] that enabled the FAA to test the procedures during about 37days. During the test, two headings (055 and 060) were added to the Airport's existing northeast departure traffic procedures, as permitted by weather and operating conditions. The current most eastern heading is 050 degrees. The purpose of the test was to enable FAA to determine the appropriateness of implementing the 055 and 060 degree departure flight headings as part of the Noise Dispersal Area. The test was designed to alter flight tracks for aircraft operating generally under 3,000 feet altitude. As a result, the noise analysis considered the effects in the local airport environment, using the Integrated Noise Model (INM). The analysis confirmed that the most notable changes in aircraft noise levels were confined to the areas closest to the Airport. The noise contour containing the test tracks is compared to the Future Noise Exposure Map and is presented in the following illustration. As can be seen, there is very minor difference between the future noise contour with and without the test. The text procedures, evaluation and contour were presented to the FAR Part 150 Study Advisory Committee as part of the Part 150 Study. In addition, the FAA approved off-set approach was also included in the future noise contour as shown on the following page. The FAA issued a Finding of No Significant Impact on the off-set approach in April, 2007.

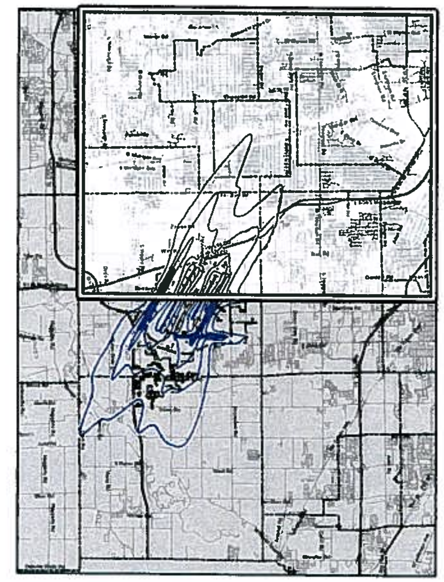
[1] The procedures were to be tested when wind and weather allowed. Wind conditions include periods when north flow (departures to the north) can be operated.

Figure 6-1 **2007 Base Case & 2007 Flight Test Noise Contour Comparison**

Population	Base Case 60	Flight Test 60	Base Case 65	Flight Test 65
Total Population	11940	11720	630	620
Total Housing Units	4880	4810	290	290
Dearborn Heights Population	150	70	0	0
Dearborn Heights Housing Units	20	10	0	0
Dearborn Population	0	0	0	0
Dearborn Housing Units	0	0	0	0
Garden City Population	0	0	0	0
Garden City Housing Units	0	0	0	0
Huron Population	1550	1550	40	40
Huron Housing Units	610	610	20	20
Inkster Population	3110	3110	0	0
Inkster Housing Units	1320	1320	0	0
Romulus Population	3310	3300	590	580
Romulus Housing Units	1420	1410	280	280
Sumpter Population	0	0	0	0
Sumpter Housing Units	0	0	0	0
Taylor Population	1690	1560	0	0
Taylor Housing Units	620	570	0	0
Van Buren Population	0	0	0	0
Van Buren Housing Units	0	0	0	0
Wayne Population	0	0	0	0
Wayne Housing Units	0	0	0	0
Westland Population	2140	2130	0	0
Westland Housing Units	890	890	0	0

Numbers rounded to the nearest 10





Source: US Census, 2000

Legend

City Limits Boundary

2007 Dearborn Base Case 06202007

2007 Dearborn Flight Test 06202007

DETROIT
METROPOLITAN WAYNE COUNTY AIRPORT

Appendix Twelve

REFERENCES

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