

# Waterbury-Oxford Airport FAA FAR Part 150 Noise Study



## Executive Summary



Prepared for:  
**Connecticut Department of Transportation**  
(ConnDOT)



Prepared by:



CLOUGH HARBOUR & ASSOCIATES LLP

October 2008

## EXECUTIVE SUMMARY

### *Airport Overview*

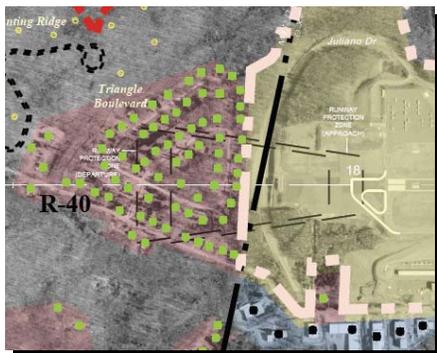
The Waterbury-Oxford Airport (OXC) is one of six airports owned by the Connecticut Department of Transportation (ConnDOT), and is situated on approximately 430 acres in the Towns of Oxford and Middlebury. During the past several years, OXC has become one of the fastest growing corporate aviation centers in the Northeast, serving as an attractive alternative to the congested New York Metropolitan area airports. At the beginning of 2008, there were approximately 80 based jets at OXC. As shown on Figure ES-1, OXC has one 5,800-foot long runway (Runway 18-36) aligned north-south, a full-parallel taxiway on the west side of the runway, and several large corporate hangars. The airport property is zoned industrial. However, areas directly north and approximately a half-mile south of the runway ends are zoned residential, with existing residential properties.



### *Federal Aviation Regulations (FAR) Part 150 Noise Study*

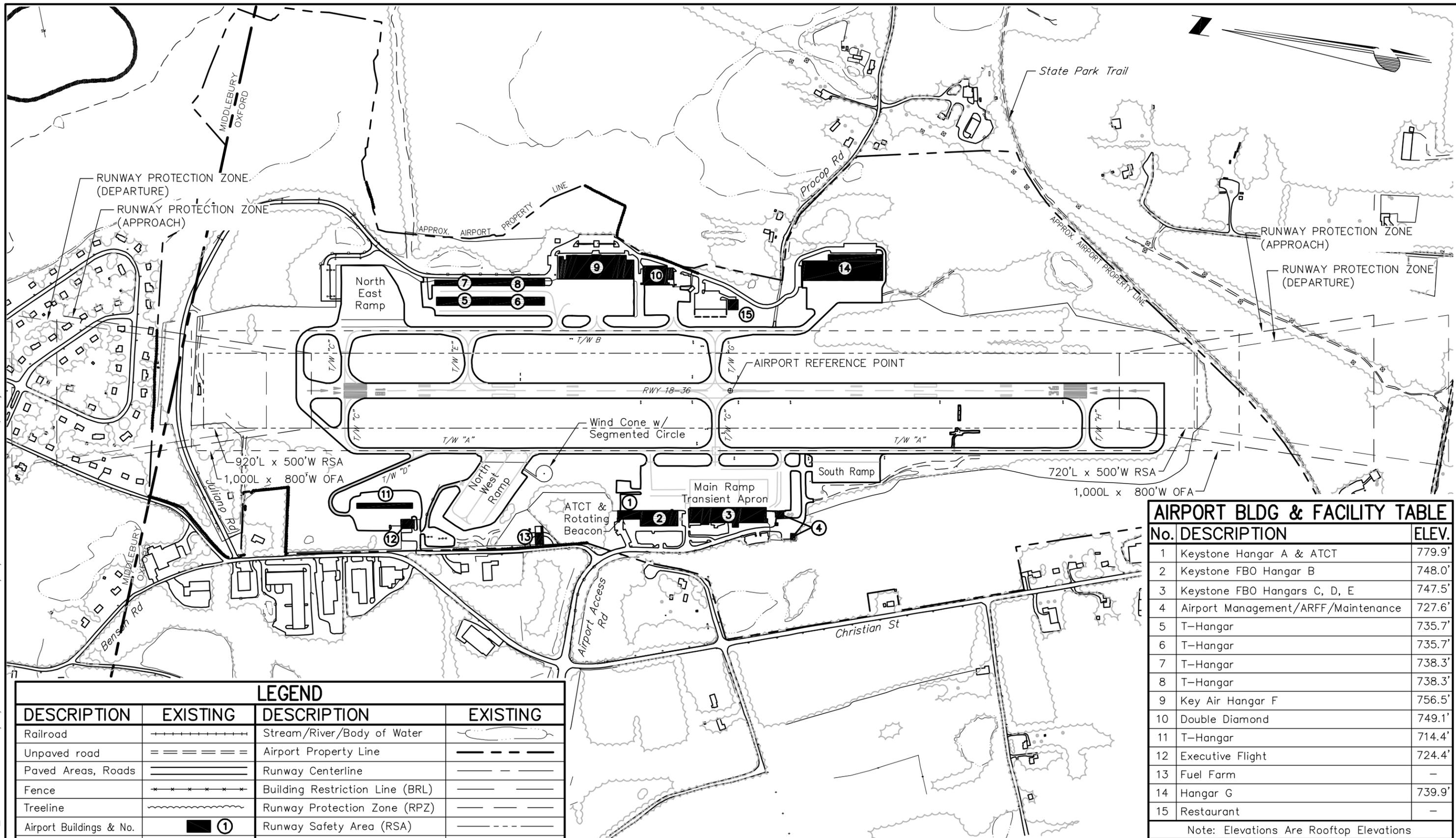
This project involves the preparation of the first Federal Aviation Regulations (FAR) Part 150 Noise Study for OXC. Previous environmental studies determined that OXC generates off-airport noise that exceeds federal significance levels in noise sensitive areas (e.g., residential areas). To evaluate and address noise impacts, ConnDOT committed to the Federal Aviation Administration (FAA) and local communities that further noise analysis would be conducted. This effort was integrated with the findings and activities of the OXC Airport Master Plan Update (AMPU), which was completed in September 2007.

The OXC Noise Study provides a comprehensive analysis of airport operations as they relate to noise compatibility. The study investigates potential airport operational procedures and land use planning measures to reduce noise exposure. The overall objective is to prepare a detailed Noise Compatibility Program (NCP) to manage airport noise and the associated impacts.



The FAA requires the use of the Day-Night Average Noise Level (DNL) metric to evaluate airport noise. DNL represents the total accumulation of aircraft noise spread out uniformly throughout the day (i.e., over a 24-hour period). It is an annualized metric that represents the noise of a typical day of the year. To compensate for the added annoyance created by nighttime aircraft activity, DNL adds a 10-decibel (dB) weighting (i.e., a “penalty”) to nighttime operations (between 10:00 p.m. and 7:00 a.m.). The weighting equates one operation at night to 10 daytime operations.

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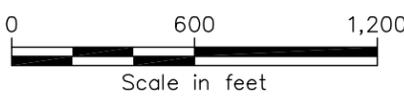


AIRPORT BLDG & FACILITY TABLE		
No.	DESCRIPTION	ELEV.
1	Keystone Hangar A & ATCT	779.9'
2	Keystone FBO Hangar B	748.0'
3	Keystone FBO Hangars C, D, E	747.5'
4	Airport Management/ARFF/Maintenance	727.6'
5	T-Hangar	735.7'
6	T-Hangar	735.7'
7	T-Hangar	738.3'
8	T-Hangar	738.3'
9	Key Air Hangar F	756.5'
10	Double Diamond	749.1'
11	T-Hangar	714.4'
12	Executive Flight	724.4'
13	Fuel Farm	-
14	Hangar G	739.9'
15	Restaurant	-

Note: Elevations Are Rooftop Elevations

LEGEND			
DESCRIPTION	EXISTING	DESCRIPTION	EXISTING
Railroad	—+—+—+—+—+—+—	Stream/River/Body of Water	~~~~~
Unpaved road	=====	Airport Property Line	-----
Paved Areas, Roads	=====	Runway Centerline	-----
Fence	* * * * *	Building Restriction Line (BRL)	-----
Treeline	~~~~~	Runway Protection Zone (RPZ)	-----
Airport Buildings & No.	■ ①	Runway Safety Area (RSA)	-----
Other Buildings	□	Runway Object Free Area (OFA)	-----
Tiedowns	T T T		
Potential Wetland	∇ ∇ ∇ ∇ ∇ ∇ ∇ ∇		
Utility Poles	⊙		

Note: Some Features In The Legend May Not Have Been Used



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DATE: JULY 2006      SCALE: AS NOTED

Figure ES-1  
**EXISTING AIRPORT LAYOUT**  
Connecticut Department of Transportation  
Waterbury-Oxford Airport Master Plan  
Oxford, Connecticut

Federal regulations require the use of the DNL, rather than other noise metrics, to determine if aircraft noise impacts are “significant.” The FAA uses a DNL of 65 dB to determine if incompatible land uses exist in the vicinity of an airport. The FAA’s Integrated Noise Model (INM) computer program is used to generate the DNL noise contours for an airport’s activity. The INM requires inputs of the following operational characteristics:

- Aircraft Fleet Mix
- Runway and Aircraft Flight Track Geometry
- Runway and Flight Track Utilization
- Number and Type of Operations (arrivals and departures) by Aircraft Type
- Number of Daytime (7 a.m. to 10 p.m.) and Nighttime (10 p.m. to 7 a.m.) Operations

For OXC, the operational characteristics were based on the findings of the AMPU, data from the Air Traffic Control Tower (ATCT), review of FAA Flight Plan databases, and discussions with airport tenants. Overall, it was estimated that approximately 10 percent of all operations occur during nighttime hours, and Runway 36 handles approximately 73 percent of all operations.

Throughout the Noise Study, there is a discussion of jet aircraft certification standards, specifically identified as “Stage II” and “Stage III.” Stage II jets are older and noisier aircraft that are no longer in production. Operations by Stage II jets are extremely loud and irritating, and create the largest increase in the size of an airport’s DNL noise contours. Current production jets are all Stage III, and they must comply with stringent federal noise certification standards. At OXC, as more and more Stage II jets are retired from service each year, the size of the DNL noise contours have been decreasing, even as total jet activity levels have been increasing.



As the OXC Noise Study began in 2003, an update of the noise contours for the most current full-year of activity (2007) and forecast five-year period (2012) was necessary. A comparison of operations by aircraft type for 2003, 2007, and forecast 2012 conditions is provided in Table ES-1. As shown, Stage II jet operations decreased approximately 26 percent from 2003 to 2007. It is anticipated that a similar, if not greater, decrease in Stage II jet operations would occur from 2007 to 2012.

<b>TABLE ES-1 – COMPARISON OF OPERATIONS</b>					
Aircraft Type	Year			Change (2003-2007)	Change (2007-2012)
	2003	2007	2012 (forecast)		
<b>Single-Engine Piston</b>	49,445	45,348	47,908	(8.3%)	5.6%
<b>Multi-Engine Piston</b>	9,255	9,288	9,812	0.4%	5.6%
<b>Turboprop</b>	3,100	3,196	3,627	3.1%	13.5%
<b>Jet (Stage III)</b>	2,583	4,968	6,993	92.3%	40.7%
<b>Jet (Stage II)</b>	1,117	832	620	(25.5%)	(25.5%)
<b>Helicopter</b>	500	500	525	0.0%	5.0%
<b>Total Operations</b>	66,000	64,132	69,485	(2.8%)	8.3%

### **Baseline 2007 & 2012 Noise Exposure**

Table ES-2 summarizes OXC noise exposure impacts for the most current year of activity (2007) and a forecast five-year period (2012). As shown, it is anticipated that the number of homes exposed to noise levels greater than DNL 65 dB is expected to decrease – 51 homes in 2007 and 42 homes in 2012. The reduction in noise exposure is caused by the anticipated decrease in Stage II jet operations. The associated noise contours are illustrated on Figure ES-2.

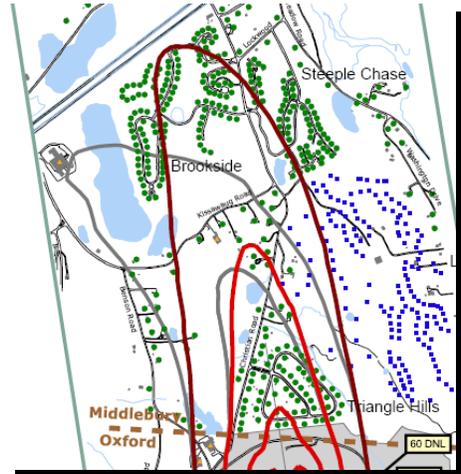
<b>TABLE ES-2 – 2007 BASELINE versus 2012 BASELINE</b>					
<b>2007 Baseline Scenario</b>					
<b>Category</b>	<b>60-65 DNL</b>	<b>65-70 DNL</b>	<b>70+ DNL</b>	<b>65+ DNL</b>	<b>60+ DNL</b>
Housing Units					
Existing	47	51	0	51	98
Planned	4	0	0	0	4
<i>Total</i>	<i>51</i>	<i>51</i>	<i>0</i>	<i>51</i>	<i>102</i>
Population*					
Existing	115	124	0	124	239
Planned	10	0	0	0	10
<i>Total</i>	<i>125</i>	<i>124</i>	<i>0</i>	<i>124</i>	<i>249</i>
<b>2012 Baseline Scenario</b>					
<b>Category</b>	<b>60-65 DNL</b>	<b>65-70 DNL</b>	<b>70+ DNL</b>	<b>65+ DNL</b>	<b>60+ DNL</b>
Housing Units					
Existing	52	42	0	42	94
Planned	2	0	0	0	2
<i>Total</i>	<i>54</i>	<i>42</i>	<i>0</i>	<i>42</i>	<i>96</i>
Population*					
Existing	127	102	0	102	229
Planned	5	0	0	0	5
<i>Total</i>	<i>132</i>	<i>102</i>	<i>0</i>	<i>102</i>	<i>234</i>
Note: No noise sensitive facilities are located in the noise contour.					
*Based on 2.44 persons per household for New Haven County, US Census 2000.					



### Noise Abatement Alternatives

A comprehensive analysis of potential noise abatement alternatives was conducted for OXC. As required by the FAA, the Noise Study considers noise abatement alternatives under each of the following six categories:

1. **Flight Tracks** – Evaluates potential changes to the existing approach and departure tracks. Five flight track alternatives were evaluated for OXC, all of which were determined to have no noise reduction benefit compared to the existing approach and departure tracks.
2. **Flight Management** – Consists of aircraft operating procedures that can be performed to reduce noise exposure in specific areas. Two flight management alternatives were evaluated, including Area Navigation (RNAV) Overlay Procedures and National Business Aviation Association (NBAA) Noise Abatement Procedures, both of which are recommended in the OXC NCP.
3. **Runway Use** – Most departures at OXC currently occur to the north (from Runway 36) and fly over the Triangle Hills neighborhood. The runway use alternatives evaluate departures to the south (from Runway 18) to reduce incompatible noise levels in the Triangle Hills neighborhood. Two runway use alternatives were evaluated, one of which is recommended in the OXC NCP.
4. **Facility Development** – Consists of the construction of physical structures that are designed to reflect or absorb noise, such as noise berms/walls or ground run-up barriers. The facility development alternatives were determined to have no immediate noise reduction benefit for surrounding residential areas.
5. **Flight Restrictions** – Include airport operating curfews and fines, or specific aircraft type restrictions. These types of flight restrictions can only be implemented following FAA approval of a FAR Part 161 Airport Noise and Access Restrictions Study, which has only occurred at one airport (Naples, FL).
6. **Miscellaneous (Noise Attenuating Standards)** – Consist of designing airport facilities to reflect/absorb aircraft ground noise. Noise attenuating standards were not recommended, due to limited opportunities for new development at OXC.



A total of 14 noise abatement (NA) alternatives were identified and evaluated for OXC, three of which were ultimately recommended in the NCP, as summarized below.

- **NA-1** – Create Area Navigation (RNAV) overlay procedures for existing and proposed departure procedures on Runway 18 (for all RNAV equipped aircraft).
- **NA-2** – Implement National Business Aviation Association (NBAA) noise abatement close-in departure procedures (see <http://web.nbaa.org/public/ops/quietflying>).
- **NA-3** – Establish Runway 18 (i.e., operations towards the south) as the preferential nighttime (10:00 p.m. to 7:00 a.m.) runway.

**Potential Land Use Alternatives**

The ultimate implementation of any potential land use alternative (described below) should be based on a five-year forecast of activity levels, combined with any recommended noise abatement measures. For OXC, this is represented by the 2012 Mitigated or NCP scenario. The 2012 NCP noise contours are similar in size and shape to the 2012 Baseline noise contours (see Figure ES-2). However, due to the implementation of NCP Measure NA-3 (i.e., Runway 18 as the preferential nighttime runway), the NCP contours are smaller to the north and larger to the south of the Airport. Overall, with the implementation of the NCP, there would be a reduction of 26 homes exposed to noise levels greater than DNL 65 dB in the Town of Middlebury (see Table ES-3). However, there would be an increase in the number of proposed homes within the DNL 60-65 dB within the Glendale development (currently under construction) in the Town of Oxford.

<b>TABLE ES-3 – 2012 BASELINE versus 2012 NCP</b>					
<b>2012 Baseline Scenario</b>					
<b>Category</b>	<b>60-65 DNL</b>	<b>65-70 DNL</b>	<b>70+ DNL</b>	<b>65+ DNL</b>	<b>60+ DNL</b>
Housing Units					
Existing	52	42	0	42	94
Planned	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>2</u>
<b>Total</b>	<b>54</b>	<b>42</b>	<b>0</b>	<b>42</b>	<b>96</b>
Population*					
Existing	127	102	0	102	229
Planned	<u>5</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>5</u>
<b>Total</b>	<b>132</b>	<b>102</b>	<b>0</b>	<b>102</b>	<b>234</b>
<b>2012 NCP Conditions</b>					
<b>Category</b>	<b>60-65 DNL</b>	<b>65-70 DNL</b>	<b>70+ DNL</b>	<b>65+ DNL</b>	<b>60+ DNL</b>
Housing Units					
Existing	65	16	0	16	81
Planned	<u>33</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>33</u>
<b>Total</b>	<b>98</b>	<b>16</b>	<b>0</b>	<b>16</b>	<b>114</b>
Population					
Existing	159	39	0	39	198
Planned	<u>80</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>80</u>
<b>Total</b>	<b>239</b>	<b>39</b>	<b>0</b>	<b>39</b>	<b>278</b>
Note: No noise sensitive facilities are located in the noise contour.					
*Based on 2.44 persons per household for New Haven County, US Census 2000.					

The FAA also requires the evaluation of potential land use alternatives, consisting of either preventative or corrective measures to reduce noise exposure. Preventative measures include strategies to restrict, limit, or impose requirements on new residential development in areas exposed to high airport noise levels (e.g., through changes in zoning, building codes, or other methods). Corrective measures include strategies to resolve existing residential noise exposure impacts (e.g., through voluntary property acquisition or insulation).

***Preventative Land Use Alternatives Include:***

- Compatible Use Zoning
- Large-Lot Zoning
- Building Codes
- Preventative Property Acquisition (voluntary acquisition of undeveloped properties)
- Fair Disclosure Regulations
- Noise and Avigation Easements
- Subdivision Regulations
- Noise Overlay Zoning

***Corrective Land Use Alternatives Include:***

- Voluntary Property Acquisition
- Voluntary Purchase Assurance
- Voluntary Sound Insulation

A total of 17 land use (LU) alternatives were identified and evaluated for OXC, five of which were ultimately recommended in the NCP, as summarized below.

- **LU-1** – All proposed zoning changes in the vicinity of OXC should be forwarded to a ConnDOT representative for comment.
- **LU-2** – Establish fair disclosure regulations for residential property transfers.
- **LU-3** – Establish noise related subdivision regulations for new residential development.
- **LU-4** – Voluntary acquisition of all homes within the DNL 65-70 dB contour, plus a select number of homes outside the DNL 65 dB contour for neighborhood continuity and equitable planning purposes.
- **LU-5** – Voluntary sound insulation of all homes within the DNL 65-70 dB contour, plus a select number of homes outside the DNL 65 dB contour for neighborhood continuity and equitable planning purposes, except those located within the Runway Protection Zone (RPZ).

***Next Steps – Implementation Timeframe & Actions***

This Executive Summary describes the recommended measures for the OXC NCP. The implementation actions and schedule are shown in Table ES-4.

Note that the schedule in Table ES-4 assumes that all of the measures would be approved and implemented by the appropriate party. The measures that do not require environmental analysis can begin immediately. The other measures must receive environmental approval before they can begin implementation. The voluntary acquisition program would take several years to fund and implement.

**TABLE ES-4 – IMPLEMENTATION ACTIONS AND SCHEDULE**

<i>Measure</i>	<i>(Year) Action 1</i>	<i>(Year) Action 2</i>	<i>(Year) Action 3</i>
<b>NA-1</b> Create RNAV overlay procedure on Runway 18	(2008) Conduct NEPA environmental analysis (CATEX)	(2009) FAA development and review of procedure	(2009-2010) Procedure is implemented/published for use
<b>NA-2</b> Implement the NBAA noise abatement procedures	(2008) ConnDOT publishes use of NBAA procedures at OXC		
<b>NA-3</b> Establish Runway 18 as the preferential nighttime (10:00 p.m. to 7:00 a.m.) runway	(2008) Conduct NEPA environmental analysis (CATEX)	(2009) Procedure is implemented/published for use	
<b>LU-1</b> All proposed zoning changes should be forwarded to a ConnDOT representative for comment	(2008) ConnDOT requests that the towns allow an OXC representative to comment on proposed zoning changes	(2009) The towns implement or reject ConnDOT's request	
<b>LU-2</b> Establish fair disclosure regulations	(2008) ConnDOT requests that the towns implement fair disclosure regulations	(2009) The towns implement fair disclosure regulations or reject ConnDOT's request	
<b>LU-3</b> Establish noise related subdivision regulations for new residential development	(2008) ConnDOT requests that the towns implement subdivision regulations	(2009) The towns implement subdivision regulations or reject ConnDOT's request	
<b>LU-4</b> Voluntary property acquisition	(2008-2009) Conduct NEPA environmental analysis (EA)	(2009-2010) Prepare implementation plan and initial property appraisals	(2010-2015) Acquisition program is implemented
<b>LU-5</b> Voluntary sound insulation	(2009-2010) Conduct implementation study	(2010) Design sound insulation program	(2010-2015) Sound insulation program is implemented
<b>IM-1</b> Establish Noise Abatement Committee	(2008) ConnDOT establishes a noise abatement committee		
<b>IM-2</b> Develop a website for public outreach	(2008) ConnDOT develops a public outreach website		
<b>IM-3</b> Publish recommended noise abatement measures in pilot guides	(2009) ConnDOT develops documentation for approval	(2009-2010) NA-1 and NA-3 are published in pilot guides and airfield signs are posted at OXC	
<b>IM-4</b> Provide for updates to NCP measures and noise contours	(2008) ConnDOT begins annual reviews of the NCP implementation		
Note: For LU-4, ConnDOT has initiated a request for funding of this measure in 2009. Actual funding would be dependent upon FAA approval of the subsequent EA study and availability.			