Martin County Airport / Witham Field

ANAC Briefing for the 14 CFR Part 150 Noise Exposure Map Update

April 22, 2021

Part 150 Overview

Overview of 14 CFR Part 150

What is a Part 150 Noise Study?

- Establishes the methodology to be followed when preparing aircraft noise exposure maps and developing airport/airport environs land use compatibility programs.
- Interim Rule on Federal Aviation Regulations (FAR) Part 150, *Airport Noise Compatibility Planning* issued in 1981 and finalized in 1985, later recodified as Title 14 Code of Federal Regulations (CFR) Part 150.
- Issued in response to provisions contained in the *Aviation Safety and Noise Abatement Act of 1979.*
- Part 150 studies must adhere to 14 CFR Part 150 guidelines to be considered, accepted, and approved by FAA.

Main Components of a Part 150 Study

Noise Exposure Maps (NEMS)

- NEMs identify compatible and non-compatible land uses around an airport.
- These maps help communities understand areas affected by different levels of noise.
- Enables better land-use planning and noise mitigation efforts in the NCP.

Noise Compatibility Program (NCP)

- NCP identifies specific measures to reduce incompatible land uses.
- Identifies and evaluates noise abatement alternatives, compatible land use alternatives, and administrative measure to reduce noise.

Public Outreach

* SUA is performing an NEM Update as a part of this Part 150 Study

Overview of 14 CFR Part 150

Why perform a Part 150 NEM Update?

- Report information on existing and future aircraft operations and the associated noise conditions in the vicinity of an airport
- Evaluate land use compatibility within the updated NEM
- Bring stakeholders together to improve understanding of the current and future noise impacts in the vicinity of the airport
- Educate communities on the Federal process and what can and cannot be done to address aircraft noise concern.
- Report updated existing and future noise exposure to FAA for their review and comment

SUA's Part 150 Efforts:

2004
First Part 150 Study

2010
Updated NEMs submitted to FAA

2014
Updated NCP Accepted by FAA

Overview – Regulation of Airport Noise

Framework

Federal law sets aircraft noise standards, prescribes operating rules, establishes the compatibility planning process, and limits an airport's ability to restrict aircraft operations

State law sets forth compatibility planning guidelines and noise standards, but aircraft are exempt

Local noise ordinances set noise standards and provide for compatible land use planning, but aircraft are exempt

Federal Aviation Administration

Local Governments and States

Airport Operators

Stakeholders

The FAA: (1) Controls aircraft while in flight; (2) Responsible for controlling noise at its source (i.e., aircraft engines); (3) Certifies aircraft and pilots

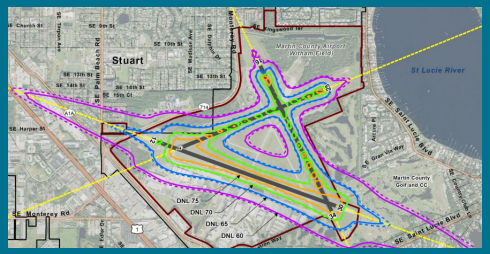
Local Governments and States:
(1) Promote compatible land use through zoning; (2) Require real estate disclosure; (3) Mandate sound-insulating building materials

Airport Operators: (1) Very limited authority to adopt local restrictions; (2) Responsible for capital improvement projects and infrastructure

FEDERAL LAW PREEMPTS STATE AND LOCAL REGULATIONS

Part 150 Terminology

Noise Exposure Contours



A noise exposure contour identifies areas of equal noise exposure around an airport. Noise exposure contours are similar to contours on topographic maps which show areas of equal elevation.

Noise Exposure Maps

A noise exposure map is a map showing noise exposure contour lines (or footprints) which identify areas of specific noise levels around an airport. NEMs also include a graphic depiction of geographical features and land uses that surround an airport.

Noise Compatibility Program

A noise compatibility program report includes descriptions and a detailed evaluation of noise abatement and noise mitigation options applicable to an airport.

Understanding Noise and Sound Level Metrics

Compatible Land Use Guidelines

Land Use Compatibility

- Table 1 in Appendix A of 14 CFR Part 150 provides noise and land use compatibility guidelines to airport sponsors.
- The FAA considers a DNL of 65 dB as the noise exposure level above which is considered noncompatible for noise sensitive land uses because this noise exposure level "create[s] a significant annoyance for most residents."
- The City of Stuart uses the DNL 65 dB contour while unincorporated Martin County has adopted the DNL 60 dB contour as the threshold for compatibility.

Land Use	Yearly Day-Night Noise Level (DNL) in decibels					
	Below 65	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)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.

Key to Table 1

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.

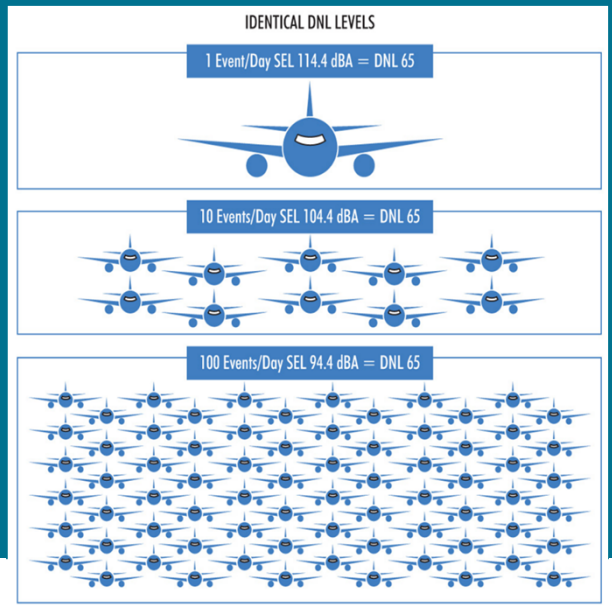
(7) Residential buildings require an NLR of 30.

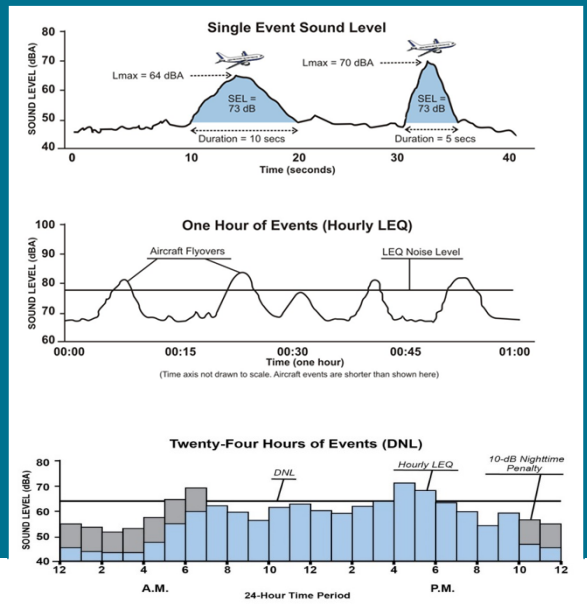
(8) Residential buildings not permitted.

* The 14 CFR Part 150 process is the Airport Sponsor's mechanism to improve the compatibility between the Airport and surrounding communities

Day-Night Average Sound Level

- 24-hour time weighted energy average noise level based on A-weighted decibels (dBA)
- Noise occurring between 10 p.m. to 7 a.m. is adjusted by 10 dB to account for the higher sensitivity to noise during nighttime hours
- Average Annual Day aircraft noise exposure is calculated over a broad area and then depicted using contour lines of equal noise levels
- FAA requires the use of DNL for all airport noise assessments and environmental studies conducted nationally





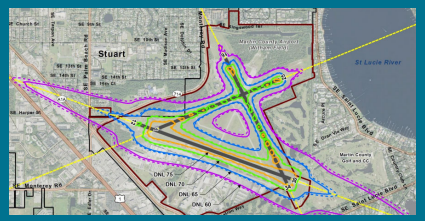
Noise Modeling Inputs

Noise Modeling

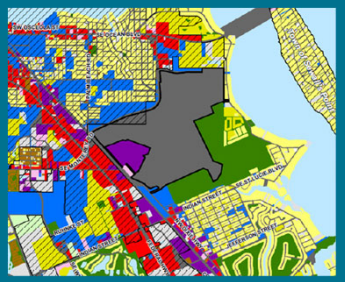
Aircraft noise modeling allows:

- Calculation of noise exposure at any point
- Depicting annual average day aircraft noise exposure
- Predicting future aircraft noise exposure
- Assessing changes in noise impacts resulting from runway configuration changes or new runways
- Assessing changes in fleet mix and/or number of operations
- Evaluating operational procedures

Noise Contours of Aircraft Operations



Land Use Map



Noise Exposure Map

Noise Modeling Methodology

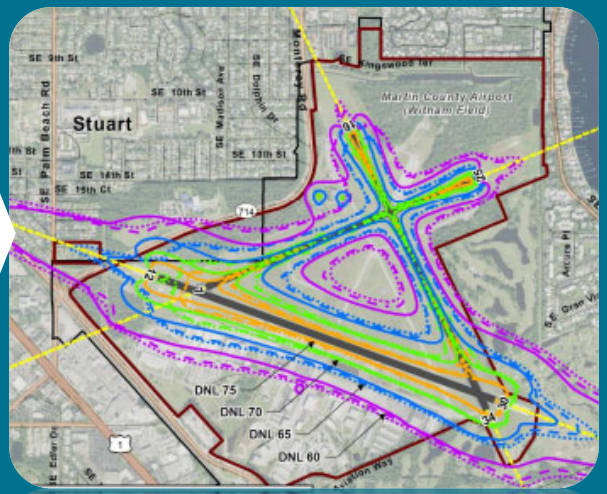
Example Modeling Inputs

- Flight Track Location and Use
- Meteorological conditions
- Time of Day
- Stage Length
- Detailed Fleet Mix
- Runway Use

Modeling Program

Aviation Environmental Design Tool (AEDT) Version 3b

Contour Results



Annual Operations by Aircraft Type

- Operational Data was collected from SUA over 12 months to assemble Fleet Mix for NEM Analysis
  - July 1, 2017- June 30, 2018
- Technical memorandum sent to FAA December 17, 2020 in light of the effects of COVID-19.
  - Memo concluded that the forecast approved on August 26th, 2019 remains reasonable for use in the development of the SUA NEMs.

Annual Aircraft Operations by AEDT-Specific Aircraft Type

Aircraft Category	2020 Operations	2025 Operations
Helicopter	389	446
Jet	24,142	27,648
Piston	88,604	101,469
Turboprop	4,391	5,029
Grand Total	**117,527**	**134,591**

NOTE: An aircraft operation is equivalent to one arrival/landing or one departure/takeoff. Operations may not sum exactly due to rounding.
SOURCE: Environmental Science Associates, 2020.

* The NEM update went into a holding pattern for much of 2020 due to COVID-19 to gain insight into the effect on aircraft activity.

Annual Operations by Time of Day

- Aircraft operations are modeled in the AEDT as either occurring during daytime or nighttime
- The 2018/2019 VNOMS data served as the primary source for the operational splits and time of day information because it captures actual arrival and departure times.

Annual Aircraft Operations (All Aircraft) by Time of Day

Study Year	Arrivals		Departures		Touch & Go	
	Day	Night	Day	Night	Day	Night
2020	96.96%	3.04%	97.83%	2.17%	98.03%	1.97%
2025	96.96%	3.04%	97.66%	2.34%	98.03%	1.97%

Runway Use - Arrivals

SUA Arrival Runway Percentages

Arrivals (Time of Day)	Runway					
	7	12	16	25	30	34
2020						
Daytime Arrivals	12.11%	53.38%	1.72%	3.73%	28.19%	0.87%
Nighttime Arrivals	0.24%	75.12%	0.24%	0.54%	23.86%	0.00%
2025						
Daytime Arrivals	12.11%	53.38%	1.72%	3.73%	28.19%	0.87%
Nighttime Arrivals	0.24%	75.12%	0.24%	0.54%	23.86%	0.00%

NOTE: Values may not add to 100 percent due to rounding.
SOURCE: Environmental Science Associates, 2018; Martin County Airport, VNOMS data for July 2017-June 2018

Runway Use - Departure

SUA Departure Runway Percentages

Departures (Time of Day)	Runway					
	7	12	16	25	30	34
2020						
Daytime Departures	10.44%	49.19%	4.86%	2.63%	29.05%	3.83%
Nighttime Departures	3.68%	46.59%	3.50%	1.10%	42.54%	2.58%
2025						
Daytime Departures	10.44%	49.19%	4.86%	2.63%	29.05%	3.83%
Nighttime Departures	3.68%	46.59%	3.50%	1.10%	42.54%	2.58%

NOTE: Values may not add to 100 percent due to rounding.
SOURCE: Environmental Science Associates, 2018; Martin County Airport, VNOMS data for July 2017-June 2018

Aircraft Operations

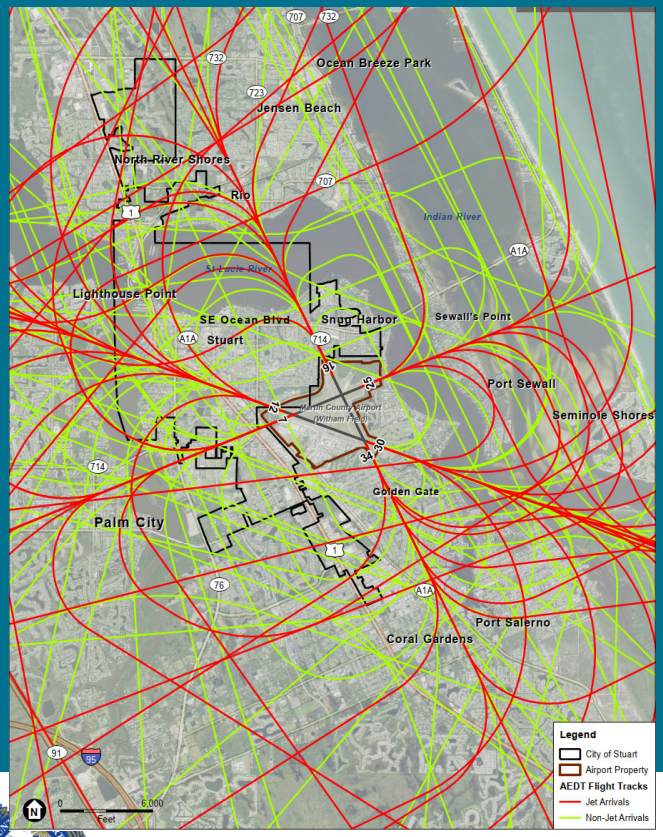
SUA Touch-and Go Runway Percentages

Arrivals (Time of Day)	Runway					
	7	12	16	25	30	34
2020						
Daytime Touch-and-Gos	10.87%	39.38%	18.00%	3.87%	25.63%	2.26%
Nighttime Touch-and-Gos	4.00%	72.00%	5.33%	0.00%	18.67%	0.00%
2025						
Daytime Touch-and-Gos	10.87%	39.38%	18.00%	3.87%	25.63%	2.26%
Nighttime Touch-and-Gos	4.00%	72.00%	5.33%	0.00%	18.67%	0.00%

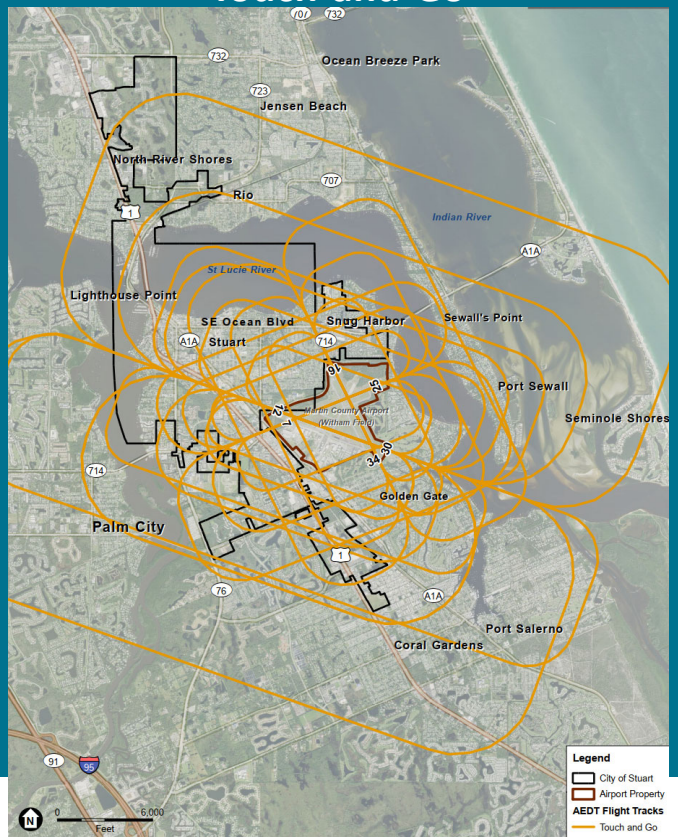
NOTE: Values may not add to 100 percent due to rounding.
SOURCE: Environmental Science Associates, 2018; Martin County Airport, VNOMS data for July 2017-June 2018

Flight Tracks – All Arrivals

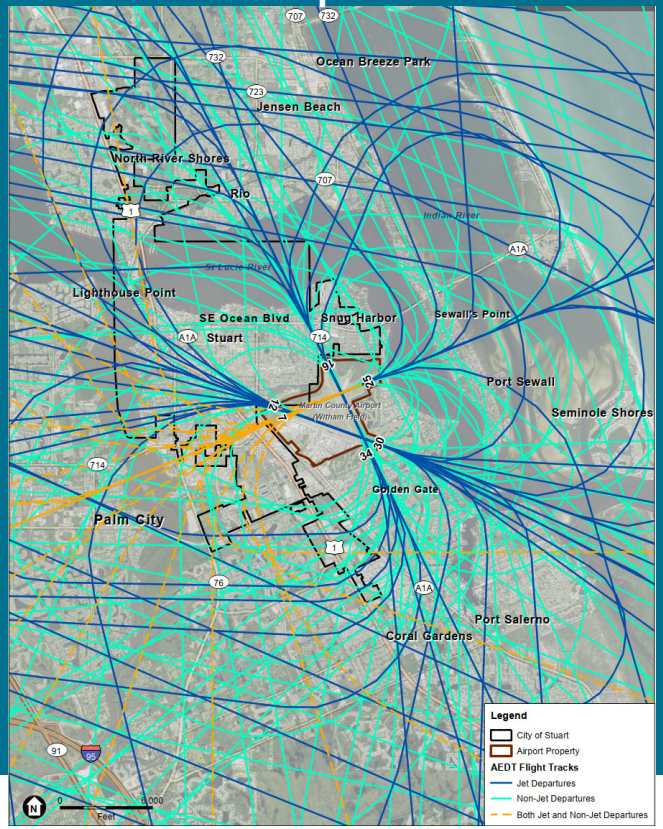
All Arrivals



Touch-and-Go

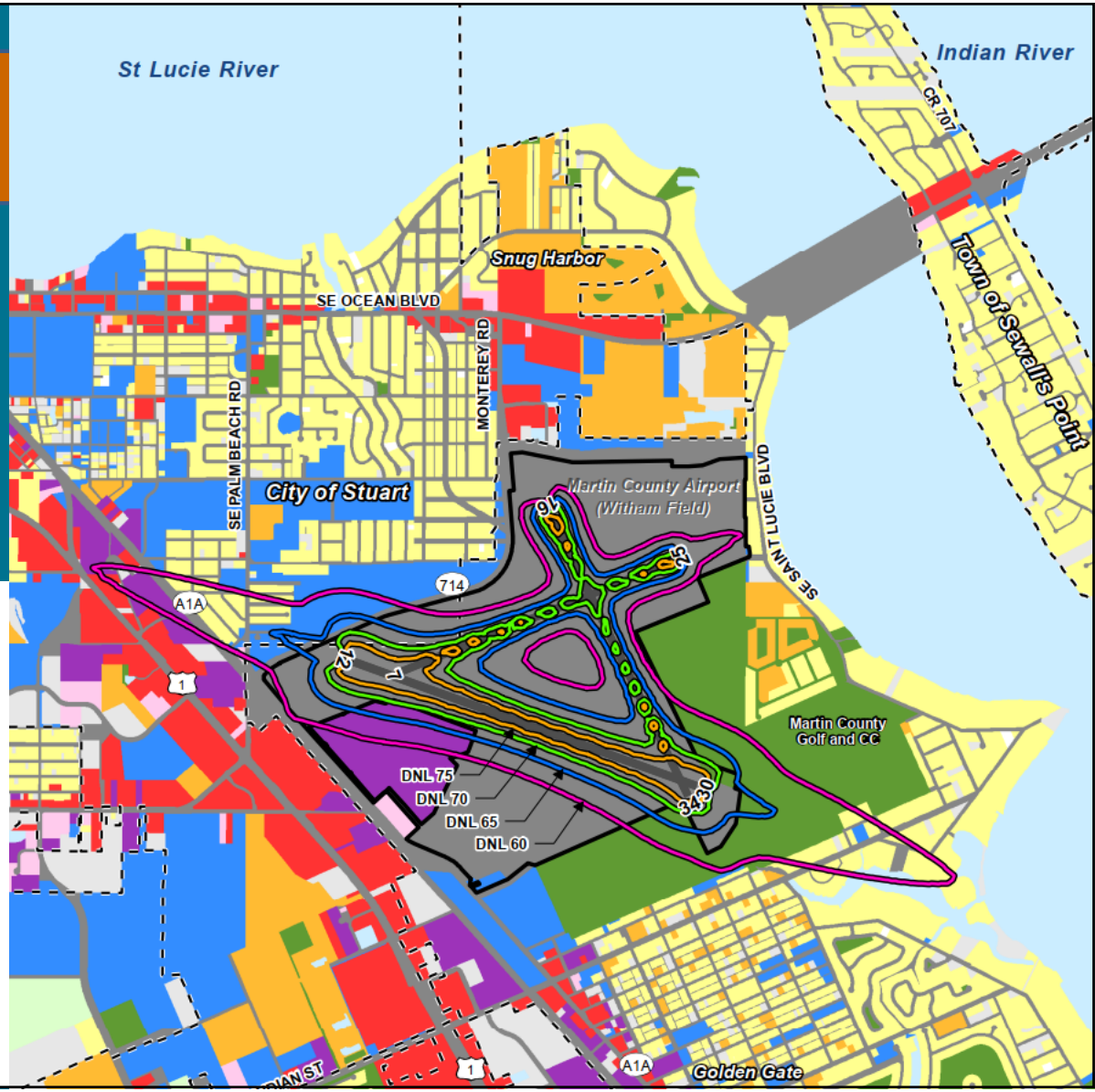


All Departure



Noise Modeling Results

2020 DNL 60, 65, 70, and 75 Noise Contours



Legend

- Municipal Boundaries
- Airport Boundary and Airfield Pavement

2020 DNL Contours

- 60 dB
- 65 dB
- 70 dB
- 75 dB

Land Uses

- Conservation
- Recreation
- Agriculture
- Single Family, Mobile Home & Duplex
- Multi-Family Residential
- Retail and Office
- Mixed Use
- Industrial & Manufacturing
- Transportation & Utilities
- Public Facilities and Institutions
- Vacant
- Water Bodies

Noise Sensitive Sites Exposed to DNL 60 and Higher - 2020

Noise Level[1]	Total Area of Contours (Acres)	Housing Units[2]	Population[3]	Religious	Schools[4]	Hospitals	Historic Resources	Day Cares	Group Care	Libraries	Nursing Homes
DNL 60-65	341.03	139	316	0	0	0	0	0	0	0	0
DNL 60-65 (Unincorporated Martin County)	267.93	*43*	*107*	0	0	0	0	0	0	0	0
DNL 65-70	143.34	0	0	0	0	0	0	0	0	0	0
DNL 70-75	75.43	0	0	0	0	0	0	0	0	0	0
DNL 75+	54.76	0	0	0	0	0	0	0	0	0	0
Total in Noncompatible Areas	**267.93**	**43**	**107**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

SOURCES:

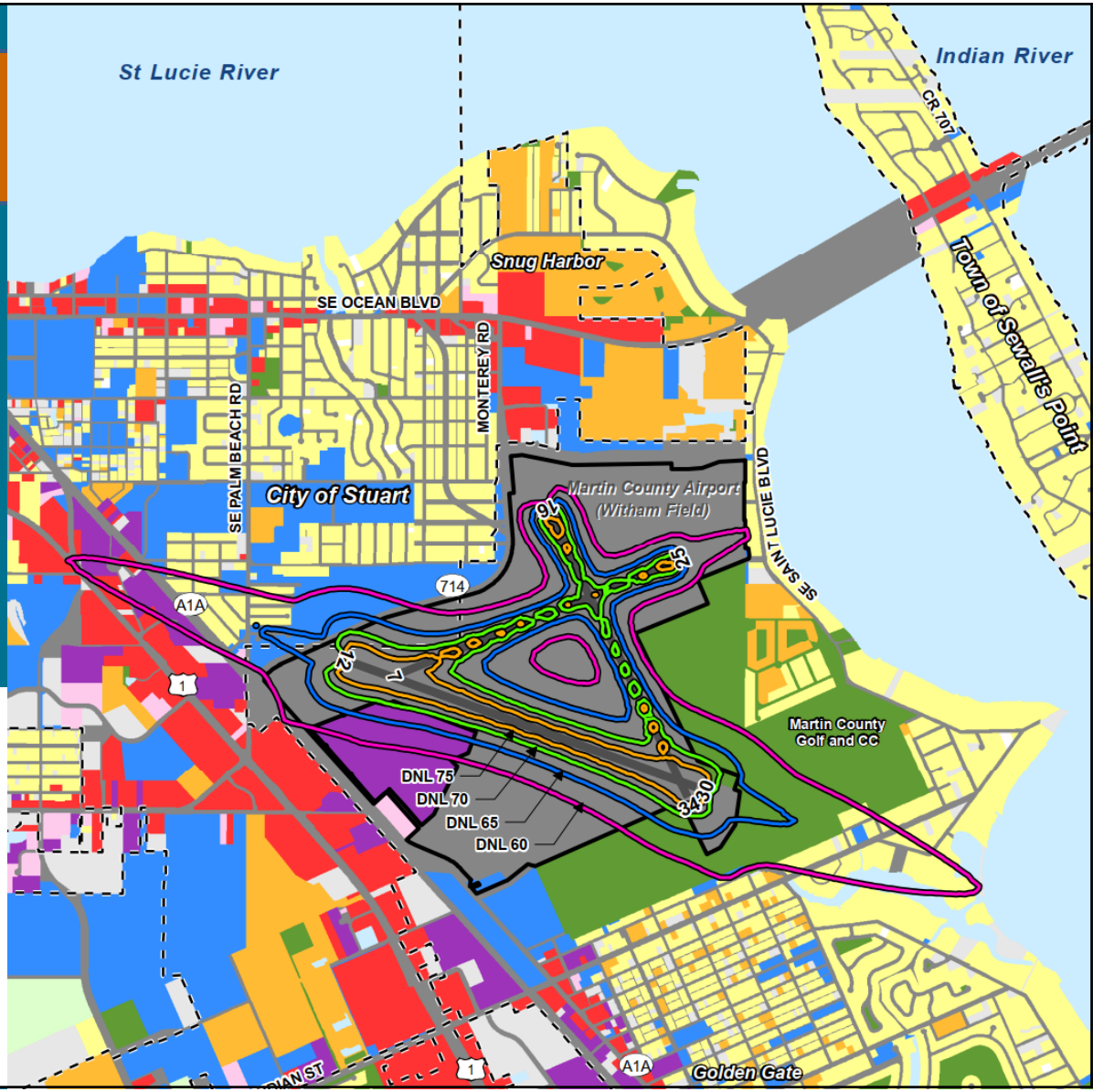
[1] Noise contours from Environmental Science Associates (ESA)

[2] Housing unit counts derived from Martin County Property Appraiser (Aug. 2018) and St. Lucie County Property Appraiser (Aug. 2018)

[3] Population estimates derived from 2013-2017 American Community Survey 5-Year Estimate (Population per Occupied Housing Units): 2.18 (City of Stuart); 2.49 (Unincorporated Martin County)

[4] School locations obtained from Martin County School Board and St. Lucie County School Board

2025 DNL 60, 65, 70, and 75 Noise Contours



Legend

- City of Stuart
- Airport Property

2025 DNL Contours

- 60 dB
- 65 dB
- 70 dB
- 75 dB

Land Uses

- Conservation
- Recreation
- Agriculture
- Single Family, Mobile Home & Duplex
- Multi-Family Residential
- Retail and Office
- Mixed Use
- Industrial & Manufacturing
- Transportation & Utilities
- Public Facilities and Institutions
- Vacant
- Water Bodies

Noise Sensitive Sites Exposed to DNL 60 and Higher - 2025

Noise Level[1]	Total Area of Contours (Acres)	Housing Units[2]	Population[3]	Religious	Schools[4]	Hospitals	Historic Resources	Day Cares	Group Care	Libraries	Nursing Homes
DNL 60-65	387.84	167	384	0	0	0	0	0	0	0	0
DNL 60-65 (Unincorporated Martin County)	295.53	*63*	*157*	0	0	0	0	0	0	0	0
DNL 65-70	155.59	0	0	0	0	0	0	0	0	0	0
DNL 70-75	82.40	0	0	0	0	0	0	0	0	0	0
DNL 75+	60.85	0	0	0	0	0	0	0	0	0	0
Total in Noncompatible Areas	**295.53**	**63**	**157**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

SOURCES:

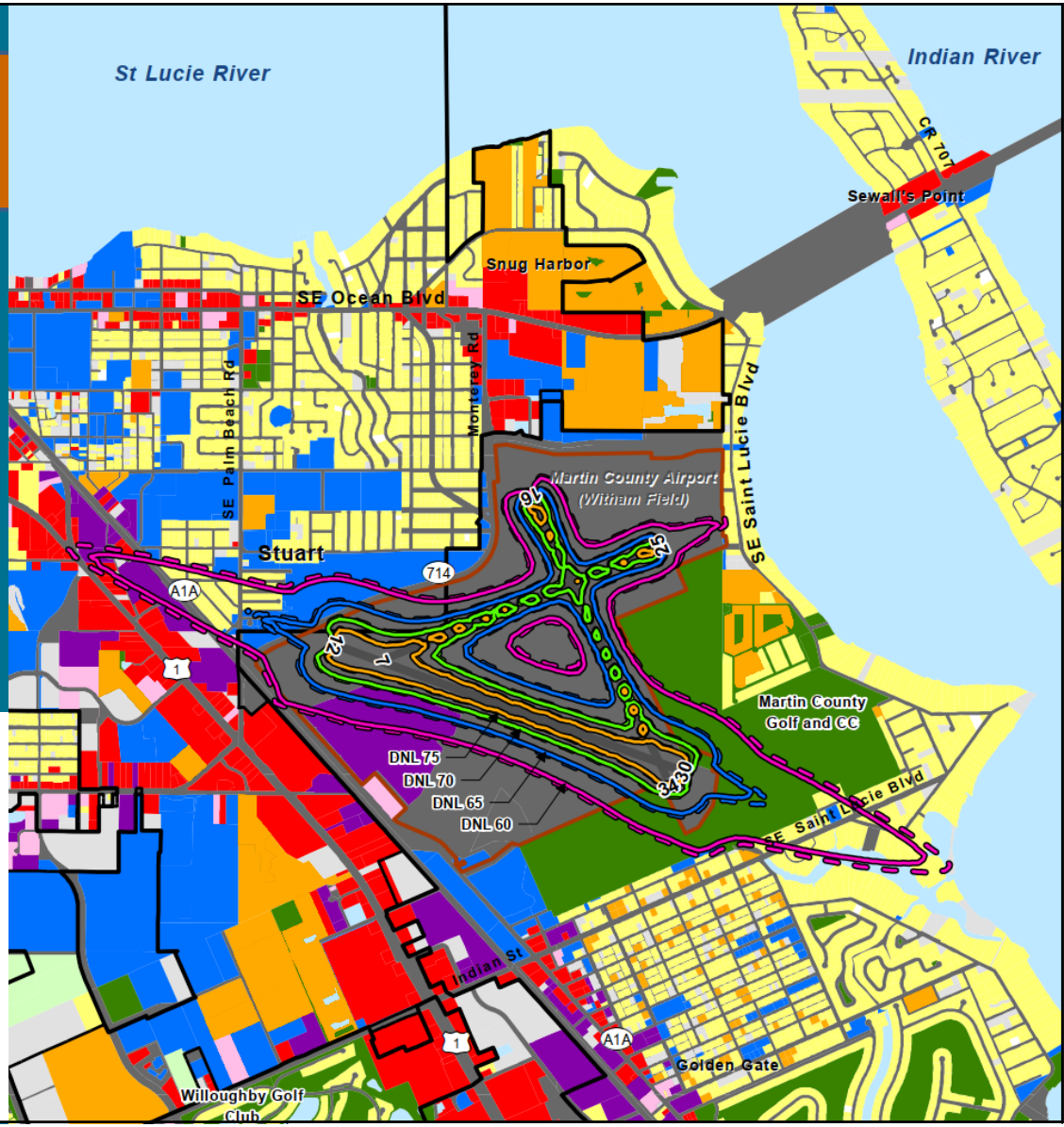
[1] Noise contours from Environmental Science Associates (ESA)

[2] Housing unit counts derived from Martin County Property Appraiser (Aug. 2018) and St. Lucie County Property Appraiser (Aug. 2018)

[3] Population estimates derived from 2013-2017 American Community Survey 5-Year Estimate (Population per Occupied Housing Units): 2.18 (City of Stuart); 2.49 (Unincorporated Martin County)

[4] School locations obtained from Martin County School Board and St. Lucie County School Board

2020 and 2025 DNL 60, 65, 70, and 75 Noise Contours



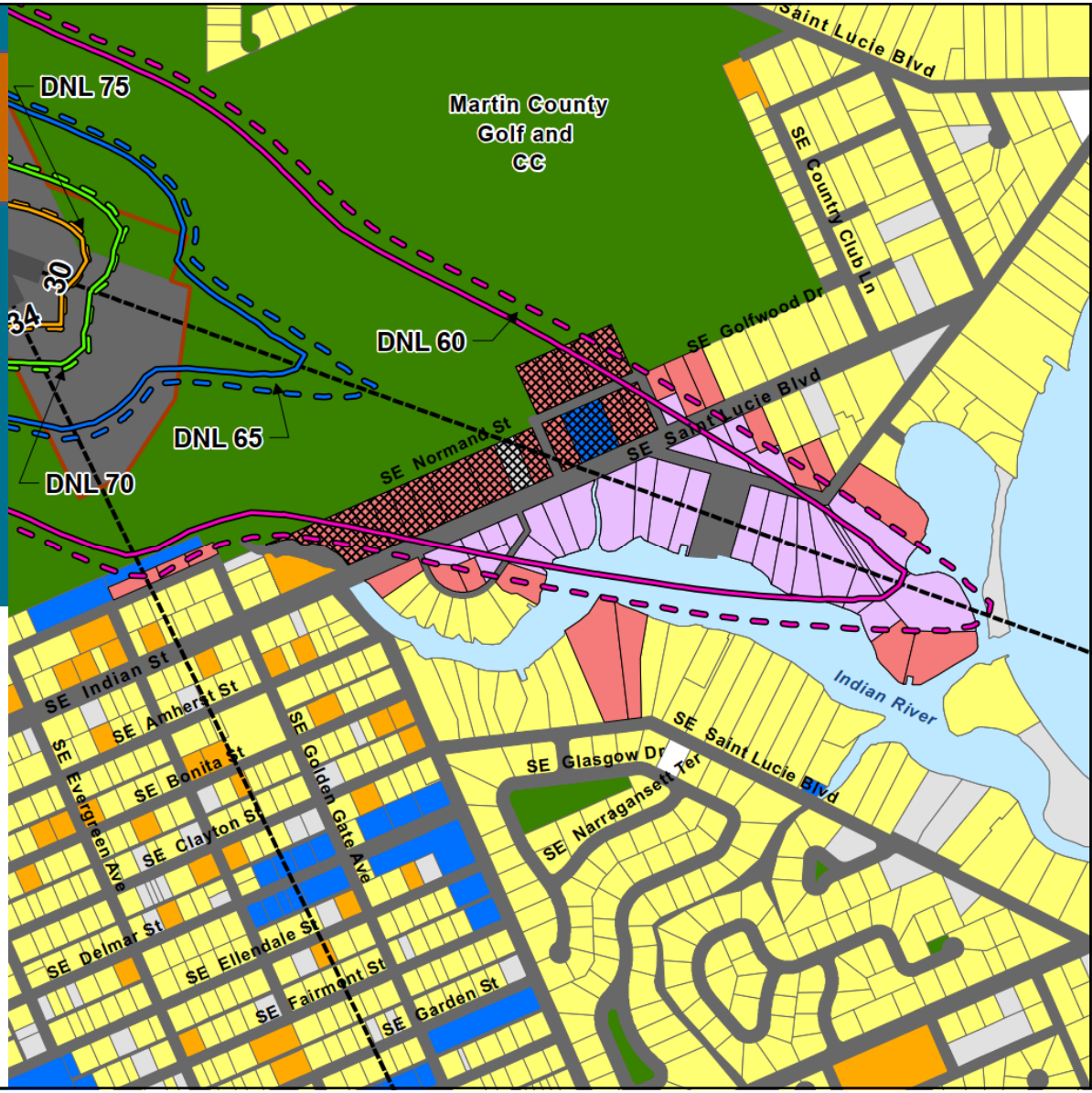
Legend

Land Uses

- Conservation
- Recreation
- Agriculture
- Single Family, Mobile Home & Duplex
- Multi-Family Residential
- Retail and Office
- Mixed Use
- Industrial & Manufacturing
- Transportation & Utilities
- Public Facilities and Institutions
- Vacant
- Water Bodies
- Airport Property
- City of Stuart

2020 DNL Contours	2025 DNL Contours
60 dB	60 dB
65 dB	65 dB
70 dB	70 dB
75 dB	75 dB

2020 and 2025 – Runway 30



Legend

- Extended Centerlines
- Airport Property
- Residential Parcels With Dwellings Intersected By the 2020 DNL 60 Contour
- Residential Parcels With Dwellings Intersected By the 2025 DNL 60 Contour
- Residential Parcels With Dwellings Insulated During Previous Noise Mitigation Program

Land Uses

- Recreation
- Single Family, Mobile Home & Duplex
- Multi-Family Residential
- Transportation & Utilities
- Public Facilities and Institutions
- Vacant
- Water Bodies

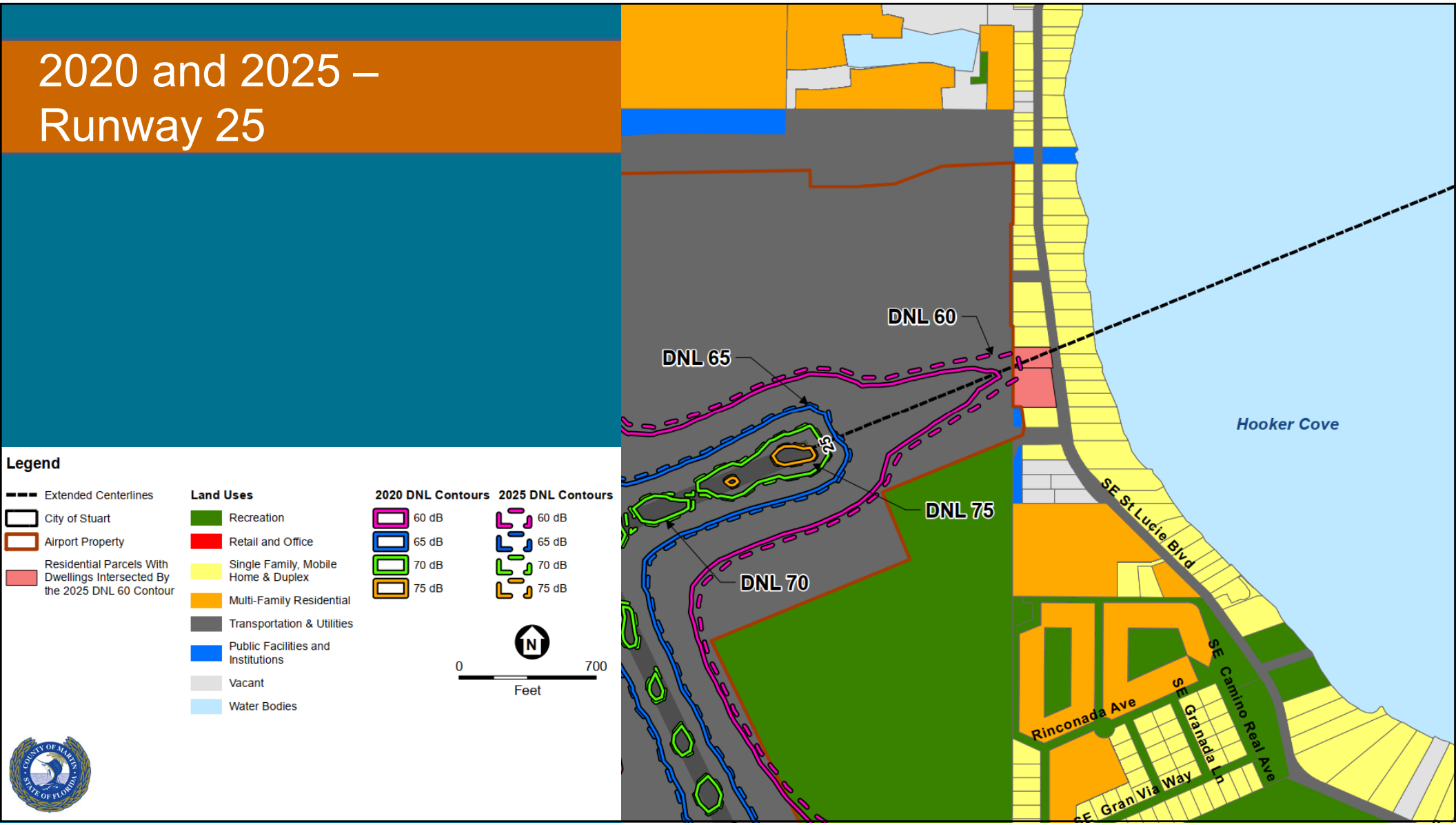
2020 DNL Contours	2025 DNL Contours
60 dB	60 dB
65 dB	65 dB
70 dB	70 dB
75 dB	75 dB

N

0 750

Feet

2020 and 2025 – Runway 25



Comparison of 2020 and 2025 NEMs

Noise Level[1]	Total Area of Contours (Acres)	Housing Units[2]	Population[3]	Religious	Schools[4]	Hospitals	Historic Resources	Day Cares	Group Care	Libraries	Nursing Homes
DNL 60-65	46.81	28	67	0	0	0	0	0	0	0	0
DNL 60-65 (Unincorporated Martin County)	*27.61*	*20*	*50*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
DNL 65-70	12.25	0	0	0	0	0	0	0	0	0	0
DNL 70-75	6.98	0	0	0	0	0	0	0	0	0	0
DNL 75+	6.08	0	0	0	0	0	0	0	0	0	0
Total in Noncompatible Areas	**27.61**	**20**	**50**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

SOURCES:

[1] Noise contours from Environmental Science Associates (ESA)

[2] Housing unit counts derived from Martin County Property Appraiser (Aug. 2018) and St. Lucie County Property Appraiser (Aug. 2018)

[3] Population estimates derived from 2013-2017 American Community Survey 5-Year Estimate (Population per Occupied Housing Units): 2.18 (City of Stuart); 2.49 (Unincorporated Martin County)

[4] School locations obtained from Martin County School Board and St. Lucie County School Board

Project Schedule

Anticipated Schedule

- Due to COVID-19, the Project Schedule has been updated to reflect delays in public outreach and comment.
- Public workshop materials will be provided on the Part 150 Project webpage located at: **www.martin.fl.us/Airport**.

June 2021
- Conduct Public Workshop

August 2021
- Address Comments and Submit to FAA

October 2021
- FAA issues Compliance determination

December 2021
- Initiate Noise Compatibility Program Amendment