



Department of Planning and Community and Economic Development
Building Inspection Division

Website: www.cityofmadison.com

Madison Municipal Building
215 Martin Luther King, Jr. Boulevard
P.O. Box 2984
Madison, Wisconsin 53701-2984
TDD 608 266 4747
FAX 608 266 6377
PH 608 266 4551

Dear Applicant:

In this packet you will find the variance application and standards by which the Zoning Board of Appeals will base their decision. You must complete the application fully, submit all materials requested with the application, and specifically address how the project meets all variance standards.

The Zoning Board of Appeals consists of seven citizen members, appointed by the Mayor and approved by the City Council, who give their time without compensation. Normally there are five members present at the hearing and it takes a majority of votes to approve a variance. The meetings are low key and only as formal as is necessary. Cases are generally heard in the order as they appear on the agenda. A member of City staff will explain the details of your case to the Board and present photographs, taken by a staff member during an outside inspection of your property. You will then be invited to present information explaining how your request meets the standards for the granting of a variance. All owners and occupants of neighboring properties within 200 feet will be notified of your project, and any interested party will be allowed an opportunity to speak on your variance request.

It is strongly encouraged that you contact Zoning Staff to discuss your project and the variance process before you submit your application. If you have questions regarding the preparation of your presentation, please feel free to contact our office to set up an appointment. A quality submittal and thoughtful presentation increases the probability of a favorable decision by the Board.

IMPORTANT – The Zoning Board of Appeals reviews variance requests using standards adopted by the City Council and provided by law. A complete submittal should specifically address each standard and be prepared in consideration of these standards. Please be aware that any statements made in the application or at the meeting require evidentiary support in order to be considered fact. The variance standards may be found on the following pages of this packet.

Sincerely,

Matt Tucker
Zoning Administrator
266-4569

Patrick Anderson
Assistant Zoning Administrator
266-5978

Jenny Kirchgatter
Zoning Inspector
266-4429

Gregory Patmythes
Zoning Inspector
261-9662

Sarah Anderson
Zoning Inspector
266-6554

Jacob Moskowitz
Zoning Inspector
266-4560

Standards for Variance: The Zoning Board of Appeals shall not grant a variance unless the applicant shows and the Board finds that the following standards have been met:

1. There are conditions unique to the property of the applicant that do not apply generally to other properties in the district.
2. The variance is not contrary to the spirit, purpose, and intent of the regulations in the zoning district and is not contrary to the public interest.
3. For an area variance, compliance with the strict letter of the ordinance would unreasonably prevent use of the property for a permitted purpose or would render compliance with the ordinance unnecessarily burdensome.
4. The alleged difficulty or hardship is created by the terms of the ordinance rather than by a person who has a present interest in the property.
5. The proposed variance shall not create substantial detriment to adjacent property.
6. The proposed variance shall be compatible with the character of the immediate neighborhood.

– IMPORTANT –

Your presentation and submitted materials must address all of the above conditions, as the Zoning Board of Appeals must find that all of the standards are met for a variance to be approved. **Any statements made must be supported by competent evidence in order to be considered as fact.**



**CITY OF MADISON
ZONING BOARD OF APPEALS
VARIANCE APPLICATION**

\$300 Filing Fee

Ensure all information is **typed** or legibly **printed** using blue or black ink.

Address of Subject Property: _____

Name of Owner: _____

Address of Owner (if different than above): _____

Daytime Phone: _____ Evening Phone: _____

Email Address: _____

Name of Applicant (Owner's Representative): _____

Address of Applicant: _____

Daytime Phone: _____ Evening Phone: _____

Email Address: _____

Description of Requested Variance: _____

(See reverse side for more instructions)

FOR OFFICE USE ONLY

Amount Paid: _____

Hearing Date: _____

Receipt: _____

Published Date: _____

Filing Date: _____

Appeal Number: _____

Received By: _____

GQ: _____

Parcel Number: _____

Code Section(s): _____

Zoning District: _____

Alder District: _____

Standards for Variance

The Zoning Board of Appeals shall not grant a variance unless it finds that the applicant has shown the following standards are met:

1. There are conditions unique to the property of the applicant that do not apply generally to other properties in the district.

2. The variance is not contrary to the spirit, purpose, and intent of the regulations in the zoning district and is not contrary to the public interest.

3. For an area (setbacks, etc) variance, compliance with the strict letter of the ordinance would unreasonably prevent use of the property for a permitted purpose or would render compliance with the ordinance unnecessarily burdensome.

4. The alleged difficulty or hardship is created by the terms of the ordinance rather than by a person who has a present interest in the property.

5. The proposed variance shall not create substantial detriment to adjacent property.

6. The proposed variance shall be compatible with the character of the immediate neighborhood.

Application Requirements

Please provide the following Information (Please note any boxes left unchecked below could result in a processing delay or the Board's denial of your application):

<input type="checkbox"/>	Pre-application meeting with staff: Prior to submittal of this application, the applicant is strongly encouraged to discuss the proposed project and submittal material with Zoning staff. Incomplete applications could result in referral or denial by the Zoning Board of Appeals.
<input type="checkbox"/>	Site plan , drawn to scale. A registered survey is recommended, but not required. Show the following on the site plan (Maximum size for all drawings is 11" x 17"): <ul style="list-style-type: none"> <input type="checkbox"/> Lot lines <input type="checkbox"/> Existing and proposed structures, with dimensions and setback distances to all property lines <input type="checkbox"/> Approximate location of structures on neighboring properties adjacent to variance <input type="checkbox"/> Major landscape elements, fencing, retaining walls or other relevant site features <input type="checkbox"/> Scale (1" = 20' or 1' = 30' preferred) <input type="checkbox"/> North arrow
<input type="checkbox"/>	Elevations from all relevant directions showing existing and proposed views, with notation showing the existing structure and proposed addition(s). (Maximum size for all drawings is 11" x 17")
<input type="checkbox"/>	Interior floor plan of existing and proposed structure , when relevant to the variance request and required by Zoning Staff (Most additions and expansions will require floor plans). (Maximum size for all drawings is 11" x 17")
<input type="checkbox"/>	Front yard variance requests only. Show the building location (front setback) of adjacent properties on each side of the subject property to determine front setback average.
<input type="checkbox"/>	Lakefront setback variance requests only. Provide a survey prepared by a registered land surveyor showing existing setbacks of buildings on adjacent lots, per MGO 28.138.
<input type="checkbox"/>	Variance requests specifically involving slope, grade, or trees. Approximate location and amount of slope, direction of drainage, location, species and size of trees.
<input type="checkbox"/>	CHECK HERE. I acknowledge any statements implied as fact require supporting evidence.
<input type="checkbox"/>	CHECK HERE. I have been given a copy of and have reviewed the standards that the Zoning Board of Appeals will use when reviewing applications for variances.

Owner's Signature: _____ **Date:** _____

------(Do not write below this line/For Office Use Only)-----

DECISION

The Board, in accordance with its findings of fact, hereby determines that the requested variance for _____ **(is) (is not)** in compliance with all of the standards for a variance. Further findings of fact are stated in the minutes of this public hearing.

The Zoning Board of Appeals: **Approved** **Denied** **Conditionally Approved**

Zoning Board of Appeals Chair:

Date:

Description of Requested Variance:

The Dane County Regional Airport (Airport) is seeking a variance to the City of Madison parking lot/site plan approval checklist (checklist) as it pertains to landscaping requirements.

The Airport is planning the construction of a (relocated) employee parking lot. Due to the new location of the parking lot within the Runway 3 approach, these unique constraints exist: 1) site features are limited to 15' in height, and 2) wildlife attractants are prohibited. Due to these constraints, the Airport requests a variance to all of the City's landscaping requirements detailed in the checklist:

1. *Development Frontage Landscaping*

- a. Trees 15' or taller at present or future height would exceed the height limitation, as the project is within the Runway 3 approach. Objects taller than 15' would penetrate the Runway 3 approach surface and therefore be obstructions as defined by the Federal Aviation Administration (FAA), and presumed to be hazards to airport operations. Shrubs and ornamental trees in this area are a potential wildlife attractant and should be avoided.
- b. Not applicable, as this project does not involve proposed structures.
- c. An existing, well-landscaped berm lies between the proposed parking lot and International Lane. The zoning administrator is encouraged to consider the berm as satisfying the requirements of this section.
- d. A black, vinyl-coated decorative chain-link fence will be installed between the parking lot and the existing berm. The Airport is open to ornamental fencing where the parking lot fronts International Lane, to satisfy this requirement.

2. *Interior Parking Lot Landscaping*

- a. Planted islands present the potential for attracting wildlife *because they provide isolated nesting habitat for wildlife and thus attract predatory birds*. Included in Appendix A is a letter from Mr. John Weller, the FAA National Wildlife Biologist, in which he explicitly disapproves of the landscaping islands, as they "would provide a wildlife attractant and would not be compatible to the safe operation of the Runway 3 approach."

To mitigate the "hot island effect" as the planted islands normally would, the Airport proposes removing the existing asphalt that currently serves as the employee parking lot and replacing with turf grass. Although turf grass areas can be attractive to a variety of wildlife species, the Airport manages the wide expanse of airfield turf in accordance with the FAA approved Wildlife Hazard Management Plan (WHMP). However, the small, isolated grassed areas that would be provided by the curb islands are not recommended by the FAA, as alluded to in the previous paragraph.

- b. See 1(a).
- c. Stormwater will be treated via bioretention cells which will have draw-down times of 24 hours or less.

3. *Foundation Plantings:* This requirement does not apply, as this project does not involve proposed structures.

4. *Screening along District Boundaries:* Complying with this requirement would be unnecessarily burdensome, as the Airport property boundary is approximately 380' from the project site (the nearest private building on land leased from the Airport is approximately 240' from the project site). It would not be feasible, nor in our opinion would it be in the spirit of the requirement, to provide screening along the property boundary.

5. *Screening of Other Site Elements*

- a. This requirement does not apply, as there will not be a refuse disposal area.
- b. This requirement does not apply, as there will not be an outdoor storage area.
- c. This requirement does not apply, as this project does not involve proposed structures.
- d. This requirement does not apply, as this project does not involve proposed structures.

The following sections of this application and the supporting appendices will expand on the paragraphs above to make the case that landscaping in the area of the project site should not be required, because doing so would oppose FAA guidance and requirements meant to protect the safety of airport operations. The following will explain more in-depth the unique conditions of working in close proximity to an airfield, and FAA guidance and requirements which dictate such work.

Standards for Variance

1. *There are conditions unique to the property of the applicant that do not apply generally to other properties in the district.*

The proposed project is on Airport property and abuts the airfield perimeter fence. The project is located within the Runway 3 approach and therefore poses unique conditions including height limitation requirements, per FAA Advisory Circular (AC) 150/5190-4A (Appendix B) and the need to deter wildlife, per AC 150/5200-33B (Appendix A).

AC 150/5190-4A prohibits the installation of any structure or growth which height is taller than the controlling airspace surface, as such "obstructions" would pose a threat to safe aircraft takeoff and landing operations. The FAA provides guidance in AC 150/5200-33B to reduce and mitigate wildlife and their effects on aircraft safety. For example, the FAA recommends the use of underground stormwater treatment, or other devices that have standing water for 48 hours or less, so as to reduce the potential for attracting wildlife. To comply with this guidance, the stormwater from the proposed site will be treated via bioretention cells and will have standing water for 24 hours or less.

The AC also identifies landscaping as a potential wildlife attractant. *The curb islands required by the checklist would provide isolated nesting habitat for wildlife and thus a food supply for predatory birds.* According to FAA National Wildlife Biologist, Mr. John Weller, "Aircraft wildlife strikes are the second leading cause of aviation-related fatalities, 92% occurring at or below 3000 feet." (The full letter is included in Appendix A). The need to safeguard the airspace against wildlife strikes is paramount to the protection of aircraft and human life. These unique conditions exist when working in the areas of the airport associated with aircraft movements, i.e. the Airport Operations Area (AOA).

Lastly, the Airport in and of itself is unique due to its large area; the nearest property boundary is approximately 380' from the project site and the nearest private building on land leased from the Airport is approximately 240' from the project site. Therefore, some of the requirements do not apply or are unfeasible (e.g. providing screening along the property line).

2. *The variance is not contrary to the spirit, purpose, and intent of the regulations in the zoning district and is not contrary to the public interest.*

The Airport has strived to maintain a progressive conservational relationship with the City of Madison, and continues to do so. The Airport landscaping presents a positive appearance that is reflective of the greater Madison area, however, it is confined to airport areas not associated with aircraft movements. The variance is being requested to emphasize the importance of maintaining operational safety requirements as previously mentioned in the Description of Requested Variance, Section 2, *Interior Parking Lot Landscaping*.

The Airport has a positive track record of complying with City of Madison landscaping requirements. The landscaping along International Lane is one example. The median, terraces and berm are well-vegetated, including native plantings as well as several trees. The surrounding parking lots in the vicinity of the proposed project also met or exceeded the City's landscaping standards. These landscaped areas are well maintained by the Airport and the curbed islands in the existing parking lots are plowed around in the winter. In other words, the variance is not being requested to reduce maintenance at the Airport.

The proposed project is unique in two (2) ways: 1) the AC regarding wildlife attractants is relatively recent (issue date 8/28/2007), predating when the landscaping along International Lane was installed, and 2) the mentioned surrounding parking lots are outside of the airspace which dictates the height limitations, making them irrelevant. In summary, the variance is not meant to contradict City standards, nor is its intention to disregard public opinion, but rather, to comply with FAA requirements and guidelines regarding the safety of the traveling public and airport operations.

3. *For an area (setbacks, etc.) variance, compliance with the strict letter of the ordinance would unreasonably prevent use of the property for a permitted purpose or would render compliance with the ordinance unnecessarily burdensome.*

Compliance with the strict letter of the ordinance would unreasonably prevent the **safe** use of the Airport for airport operations by violating height limitations and by potentially attracting wildlife, according to FAA AC's 150/5190-4A and 150/5200-33B, respectively. The FAA prohibits structures or growths which penetrate the approach surface (in this case, objects 15' or taller). The FAA discourages the installation of wildlife attractants within 10,000' of the Airport Operations Area (see letter from FAA wildlife biologist Mr. John Weller included in Appendix A). According to AC 150/5200-33B, landscaping can be a wildlife attractant.

4. *The alleged difficulty or hardship is created by the terms of the ordinance rather than by a person who has a present interest in the property.*

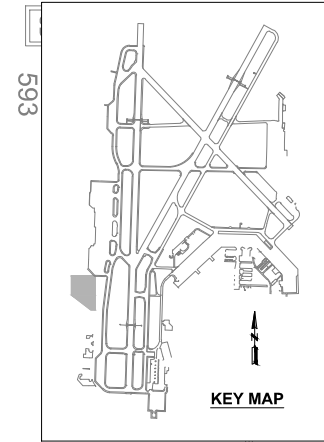
The hardship with complying with the ordinance is that by doing so, the Airport would be in non-compliance with certain FAA AC's regarding safety guidelines and requirements. For example, planting canopy trees over 15' in height would violate the height limitation imposed by AC 150/5190-4A. Planting ornamental trees, shrubs, ornamental grasses or other landscaping identified in the City checklist would present the potential for attracting wildlife, which would oppose the guidance set forth in AC 150/5200-33B. (Refer to the letter from FAA included in Appendix A.) According to AC 50/5200-33B, geese rank 3rd of all species in terms of "relative hazard to aircraft;" only vultures and deer rank higher. A paper published by the United States Department of Agriculture (USDA) titled "Managing Conflicts in Illinois Created by Canada Geese," describes the changing nesting habits of geese due to urbanization (see Appendix A). The paper describes the increasing frequency of geese selecting unusual nesting sites and specifically identifies parking lot islands as such. Geese and other wildlife are prevalent in Wisconsin and are a safety concern at the Airport, therefore, creating additional plantings could potentially attract wildlife and should be avoided.

X:\2309936\161532.01\TECH\CAD\DRAWINGS\C-053 DEMOLITION PLANS - CELL PHONE LOT.DWG
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MATCHLINE - SHEET C-051

MATCHLINE - SHEET C-053

- GENERAL NOTES:
1. REMOVING AND RELOCATING TREES SHALL BE PAID FOR UNDER BID ITEM "CLEARING FOR ISOLATED TREES."
 2. NEW LOCATION FOR RELOCATED TREES SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER.
 4. PROTECT ALL TREES AND OTHER LANDSCAPING NOT BEING REMOVED THROUGHOUT CONSTRUCTION.



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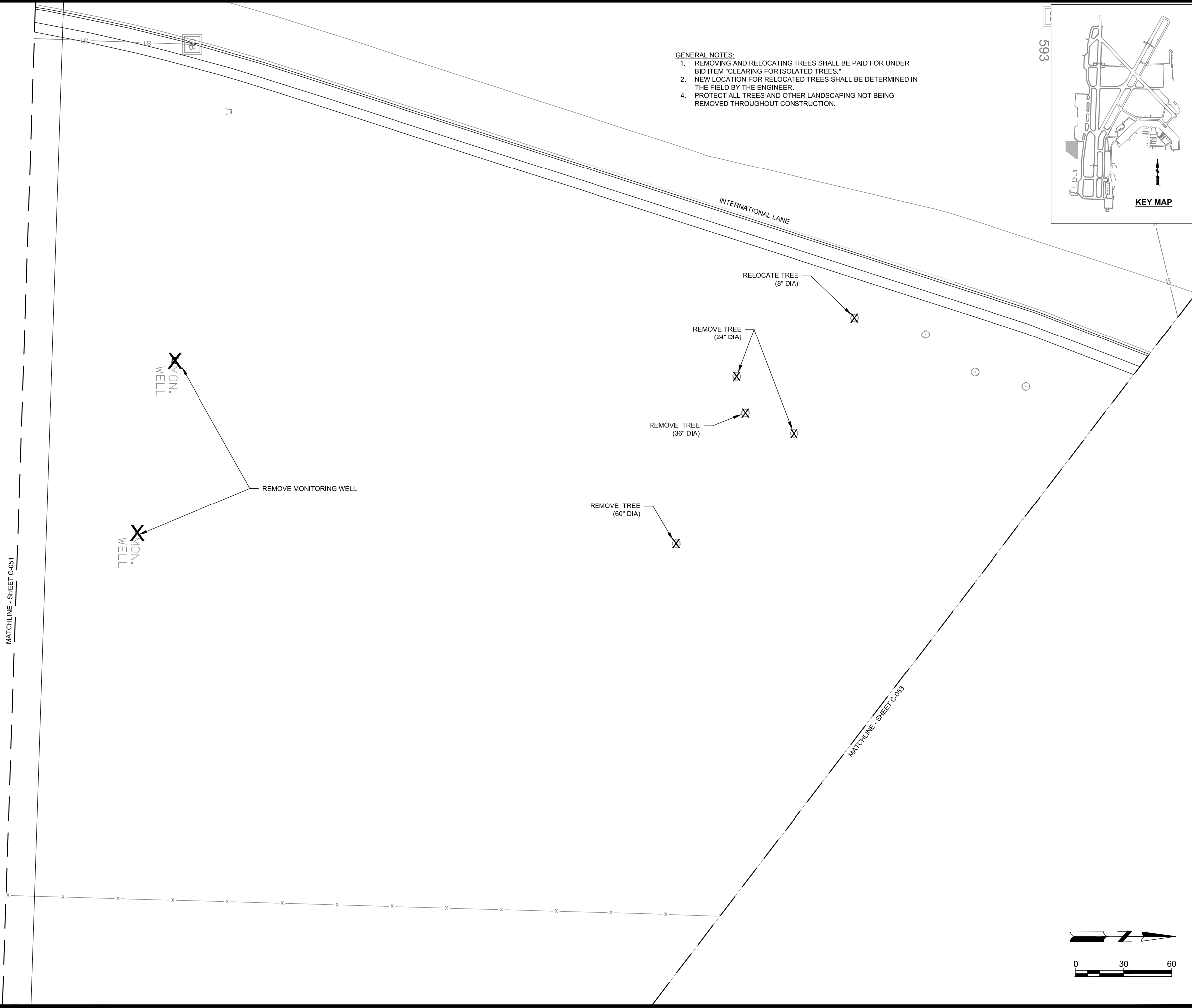
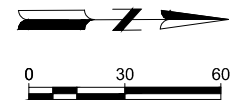
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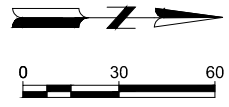
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 MSH NO.: 2309936-161532.01
 DATE: February 21, 2017
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 DRAWN BY: DLU
 CHECKED BY: CAR
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SHEET CONTENTS
 DEMOLITION PLANS -
 EMPLOYEE PARKING
 LOT

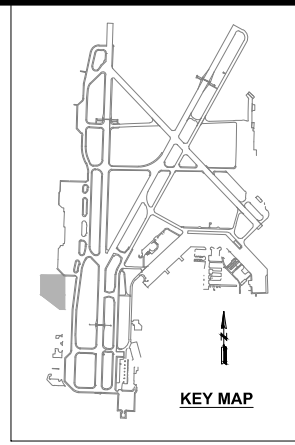
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C-052





- GENERAL NOTES:**
1. REFER TO E-101 FOR ELECTRICAL REMOVALS.
 2. REMOVING AND RELOCATING TREES SHALL BE PAID FOR UNDER BID ITEM "CLEARING FOR ISOLATED TREES." NEW LOCATION FOR RELOCATED TREES SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER.
 3. PROTECT ALL TREES AND OTHER LANDSCAPING NOT BEING REMOVED THROUGHOUT CONSTRUCTION.



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 DEMOLITION PLANS -
 CELL PHONE LOT

SHEET NO. 1 of X

C-053

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MATCH-LINE - SHEET C-052

UNDERGROUND CONCRETE STORAGE TANKS. PROTECT THROUGHOUT PROJECT

REMOVE BITUMINUS PAVEMENT

SAW AND REMOVE EXISTING CONCRETE SIDEWALK

REMOVE STORM SEWER

SAW AND REMOVE EXISTING CONCRETE CURB

RELOCATE CATCH BASIN SEE C-401

BITUMINOUS SAWCUT

REMOVE EXISTING SIGN

SAW AND REMOVE EXISTING CONCRETE CURB

RELOCATE TREE (4" DIA)

RELOCATE TREE (5" DIA)

RELOCATE TREE (6" DIA)

RELOCATE TREE (4" DIA)

ADJUST HYDRANT
 EG=859.30
 FG=861.08

ADJUST WATER VALVE
 EG=859.28
 FG=859.83

REMOVE EXISTING CONCRETE SIDEWALK

CONCRETE SAWCUT

CHILLER PLANT
 90'X60'

REMOVE EXISTING SIGN

RAISE STRUCTURE
 EX RIM ELEV=867.66
 PROP RIM ELEV=868.62

EXISTING CONCRETE BARRICADES, TYP. TO BE REMOVED BY OTHERS

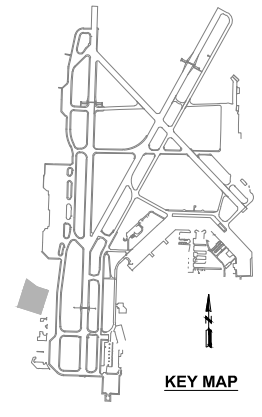
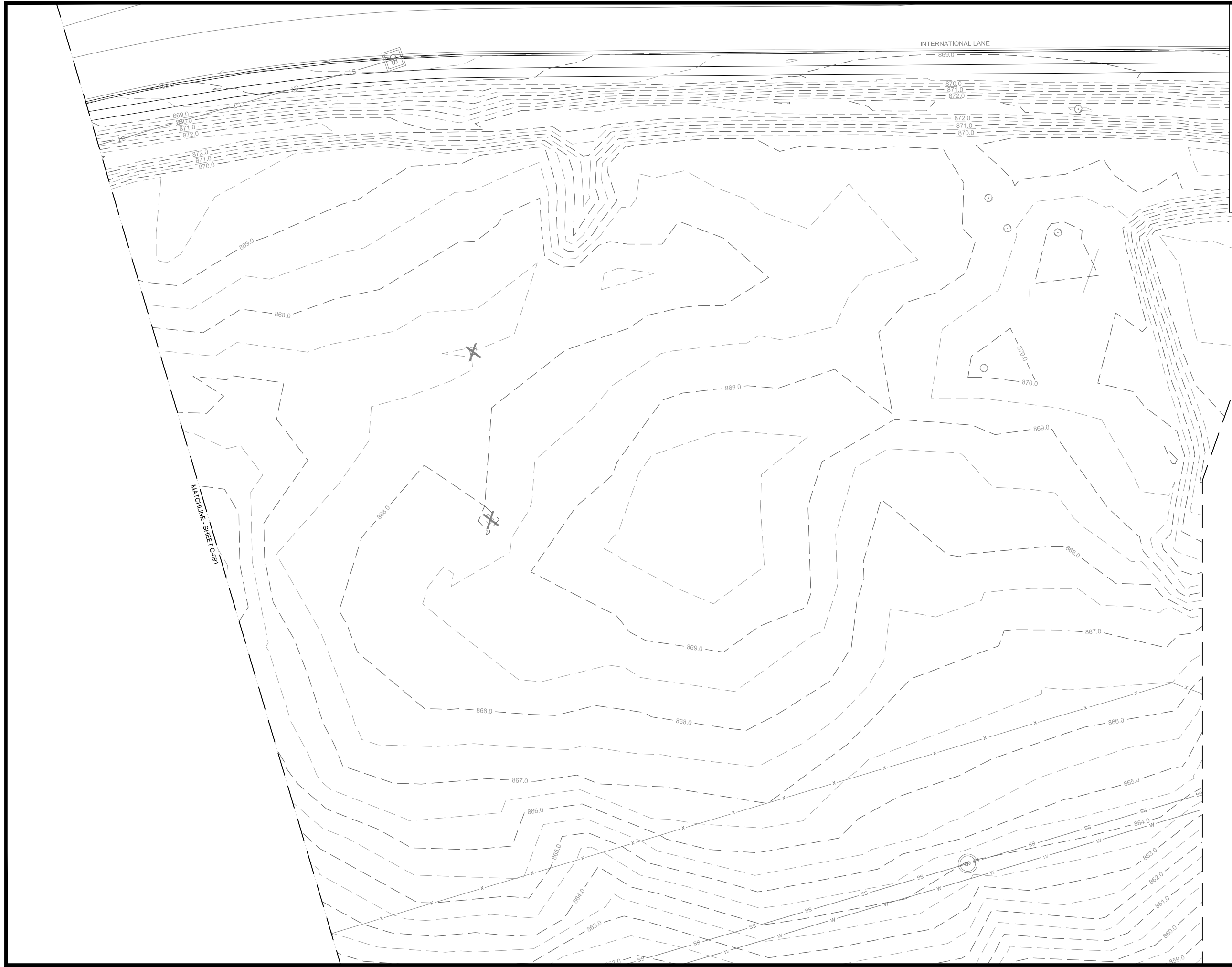
BITUMINOUS SAWCUT

AIR CARGO BUILDING
 250'X60'

EXISTING FUEL TANK
 TO BE REMOVED BY OTHERS

BITUMINOUS SAWCUT

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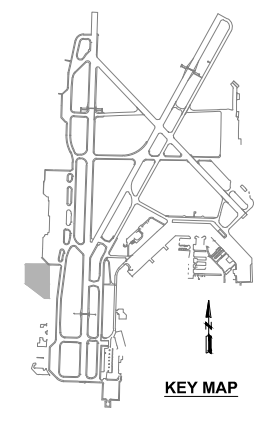
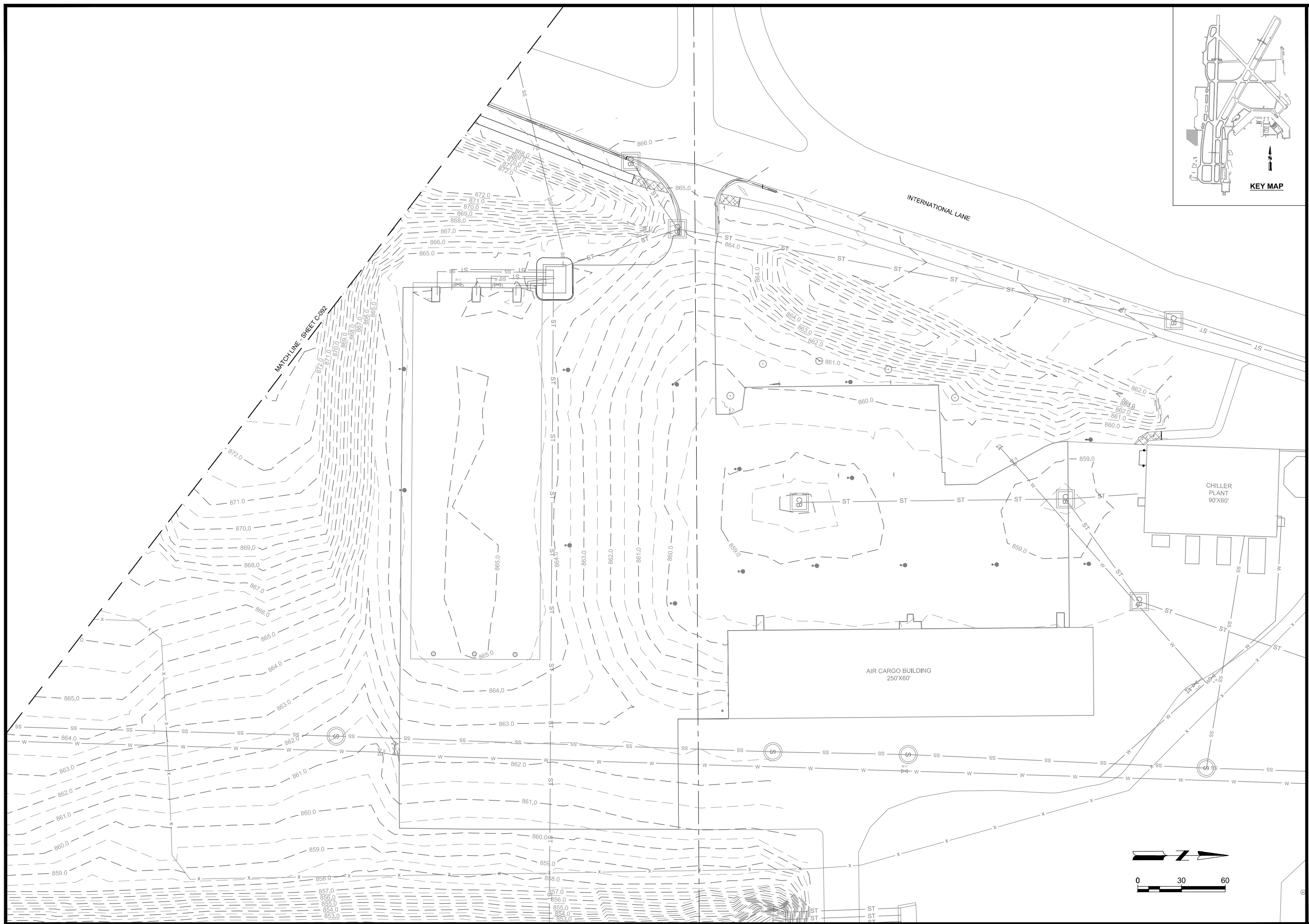
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- EMPLOYEE PARKING
LOT

SHEET NO. 1 of X

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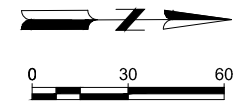
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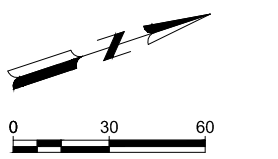
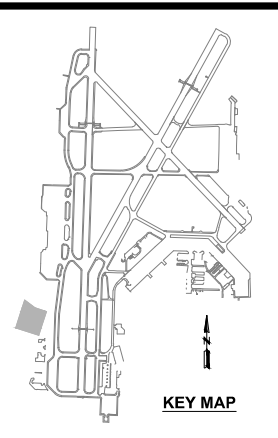
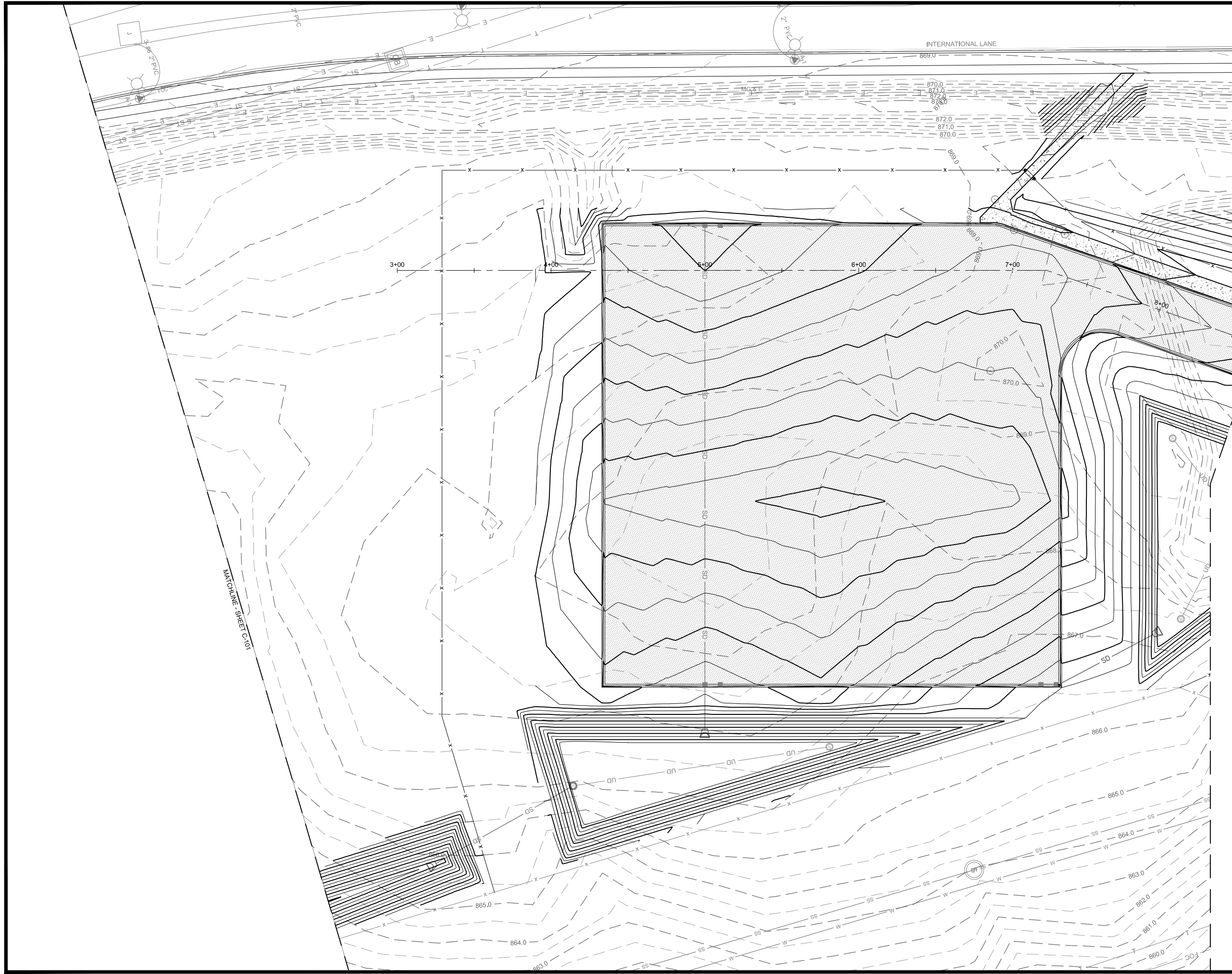
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SHEET CONTENTS
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 - CELL PHONE LOT

SHEET NO. 1 of X
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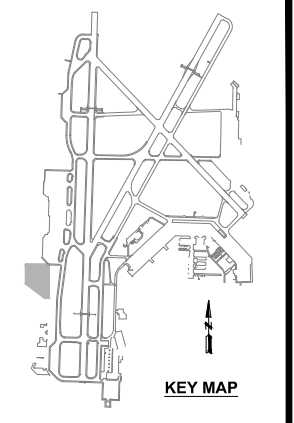
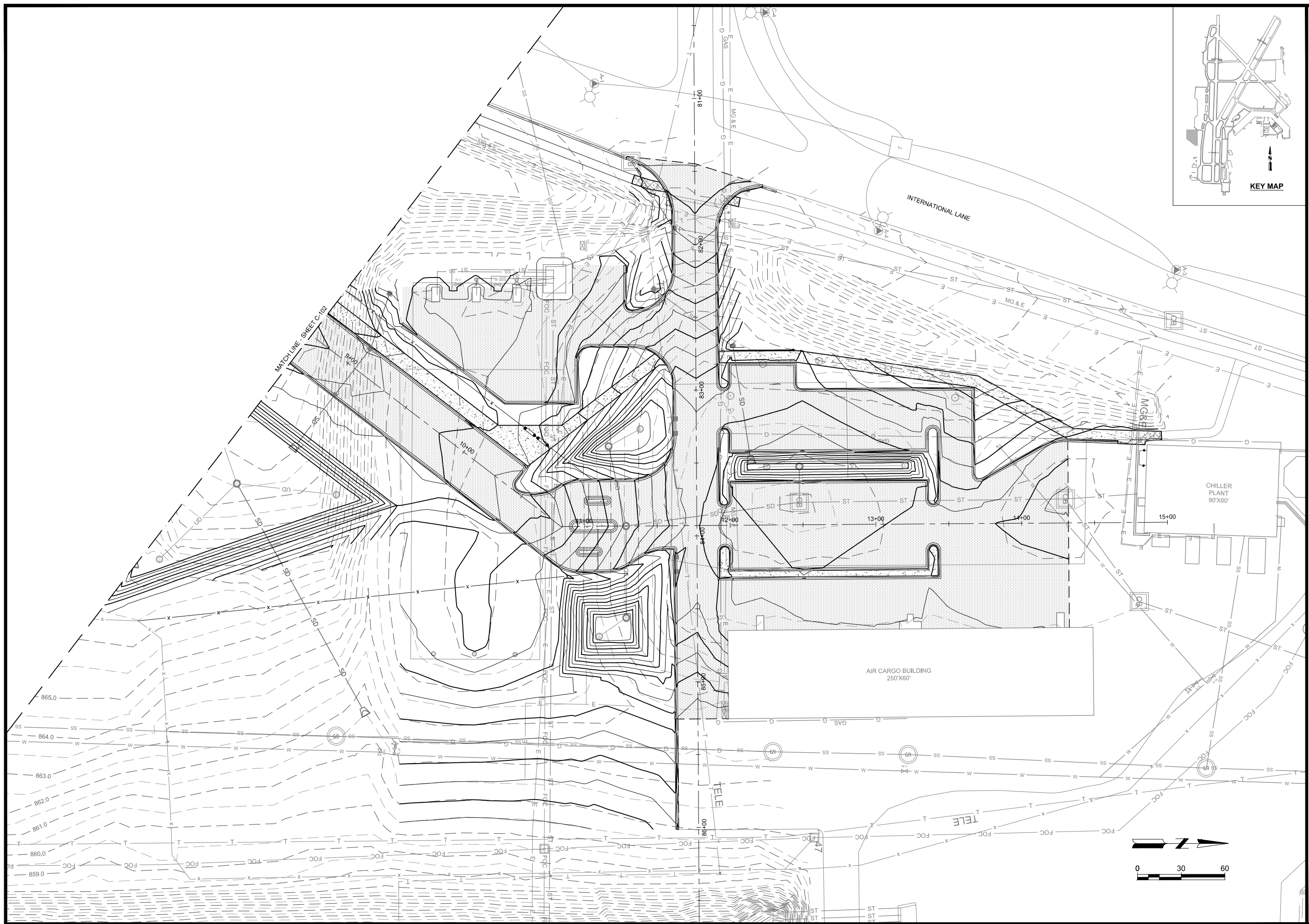
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SHEET CONTENTS
GRADING AND
DRAINAGE PLAN -
EMPLOYEE PARKING
LOT

SHEET NO. 1 of X

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MADISON, WI 53704

ISSUED

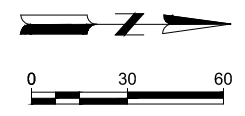
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PROJ. NO.: MSN 1002
MSH NO.: 2309936-161532.01
DATE: February 21, 2017
DESIGNED BY: LJN
DRAWN BY: DLU
CHECKED BY: CAR

DO NOT SCALE DRAWINGS

SHEET CONTENTS
**GRADING AND
DRAINAGE PLAN -
CELL PHONE LOT**

SHEET NO. 1 of X
C-103



DANE COUNTY REGIONAL AIRPORT CONSTRUCT EMPLOYEE PARKING LOT AND MISC. IMPROVEMENTS 4000 INTERNATIONAL LANE MADISON, WI 53704

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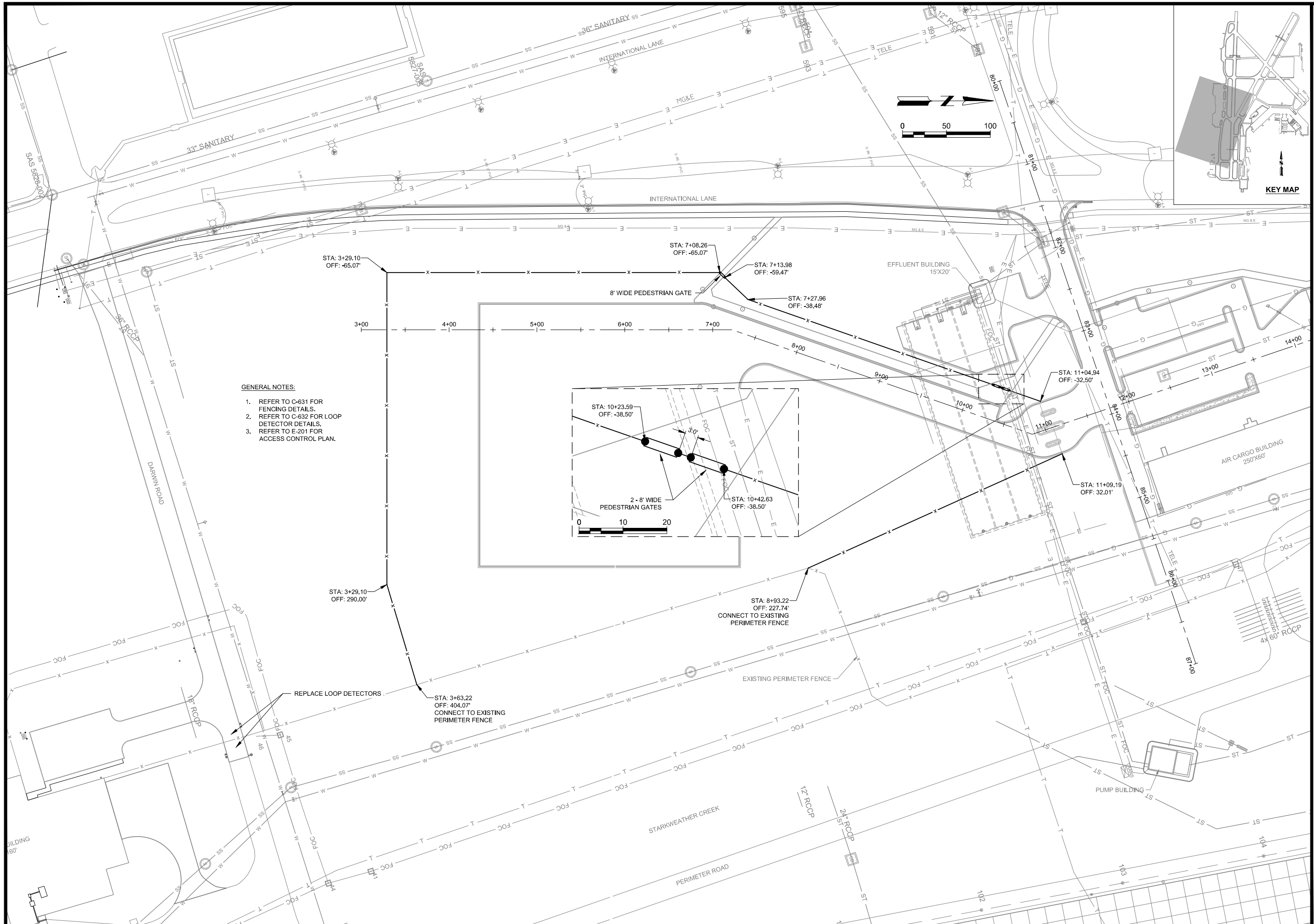
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M&H NO.: 2309936-161532.01
DATE: February 21, 2017
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SHEET CONTENTS
FENCING PLAN

SHEET NO. 1 of X

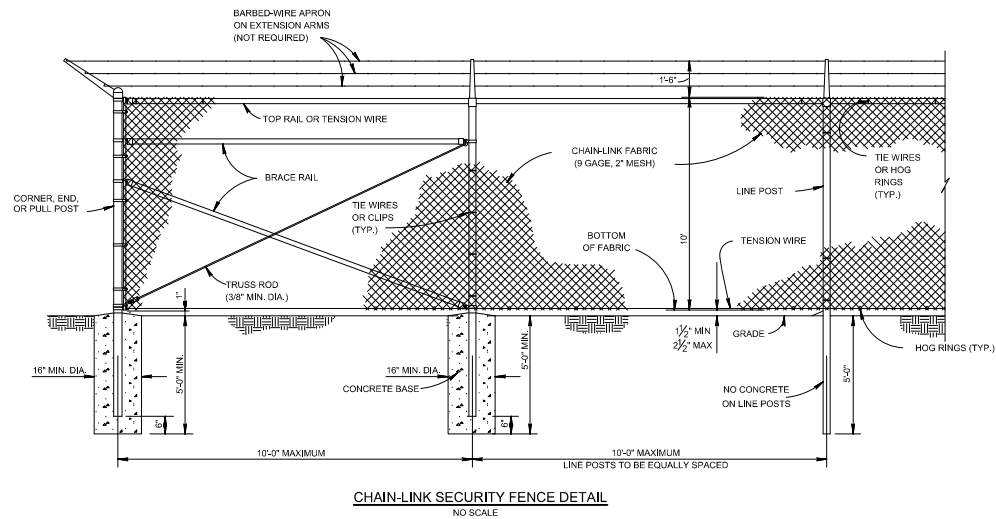
C-601



GENERAL NOTES:

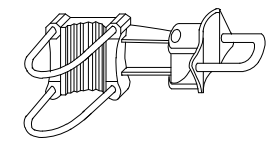
1. REFER TO C-631 FOR FENCING DETAILS.
2. REFER TO C-632 FOR LOOP DETECTOR DETAILS.
3. REFER TO E-201 FOR ACCESS CONTROL PLAN.

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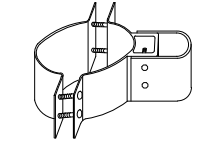


CHAIN-LINK SECURITY FENCE DETAIL
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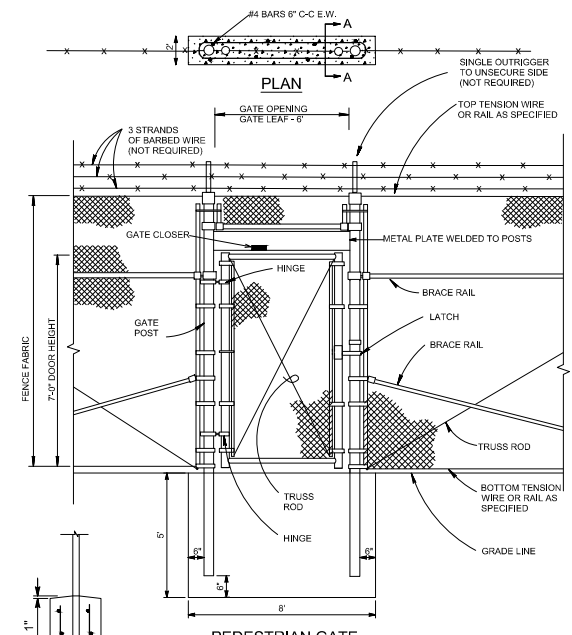
- NOTES:**
1. DETAILS SHOWN ARE TO CLARIFY REQUIREMENTS AND ARE NOT INTENDED TO LIMIT OTHER TYPES OF FENCE SECTIONS AND METHODS OF INSTALLATION THAT COMPLY WITH THE SPECIFICATIONS.
 2. WIRE TIES, RAILS, POSTS, AND BRACES SHALL BE CONSTRUCTED ON THE SECURE SIDE OF THE FENCE ALIGNMENT. CHAIN-LINK FABRIC.
 3. UNLESS SPECIFICALLY SHOWN OR SPECIFIED, ALL FENCE SHALL HAVE APRON EXTENDED OUTWARD FROM THE AREA BEING PROTECTED.
 4. C-SECTION POSTS SHALL BE INSTALLED SO THAT THE VOID INSIDE THE POST IS COMPLETELY FILLED WITH CONCRETE UP TO THE TOP OF THE FOUNDATION.
 5. NEW FENCE FABRIC AND POSTS TO MATCH EXISTING.
 6. WHERE NEW PERIMETER FENCE MEETS EXISTING PERIMETER FENCE, NEW CORNER POST SHALL BE WITHIN 1' OF EXISTING FENCE LINE. NO EXISTING POST SUPPORTS SHALL BE AFFECTED DURING INSTALLATION.



OFFSET HINGE

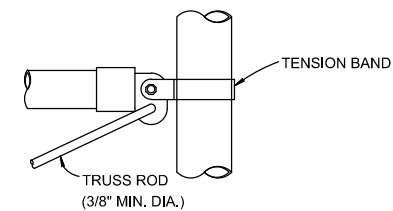


STANDARD HINGE

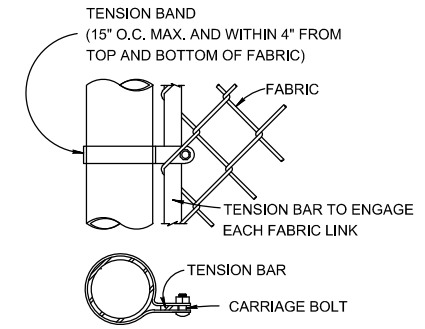


PEDESTRIAN GATE
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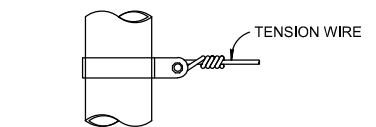
- NOTES:**
1. FOR NON-SENSORED FENCES, DETAILS SHOWN ARE TO CLARIFY REQUIREMENTS AND ARE NOT INTENDED TO LIMIT OTHER TYPE OF FENCE SECTIONS AND METHODS OF INSTALLATION WHICH COMPLY WITH THE SPECIFICATIONS.
 2. SWING GATES SHALL BE CONSTRUCTED WITH DROP RODS, PADLOCKS, LATCH ASSEMBLY AND GATE KEEPERS EXCEPT AS NOTED.
 3. ALL GATE FRAMES SHALL BE A MINIMUM 1.90\"/>



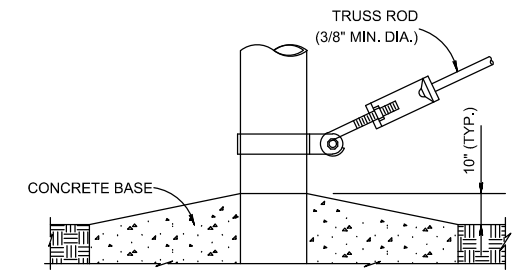
BRACE RAIL CLAMP DETAILS



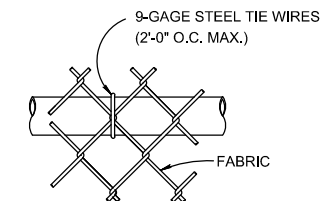
END OR GATE POST DETAIL



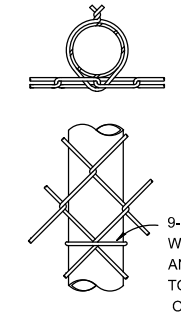
TENSION BAND DETAIL



TRUSS ROD AND BAND



TOP OR BRACE RAIL ATTACHMENT



LINE POST ATTACHMENTS
NO SCALE

Appendix A

WILDLIFE
ATTRACTANT
SUPPLEMENTARY
INFORMATION



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

February 22, 2017

Mr. Bradley S. Livingston, AAE
Airport Director
Dane County Regional Airport
4000 International Lane
Madison, WI 53704

Dear Mr. Livingston:

The Federal Aviation Administration (FAA) is in receipt of information regarding a proposed landscape plan for the newly designed employee parking lot at the Dane County Regional Airport (DCRA). It is our understanding that the City Of Madison has landscape island requirements which include the use of trees, shrubs, grasses, stone or mulch. This letter intends to provide important information for DCRA and the City of Madison to consider as these plans develop.

The use of trees, shrubs, grass, stone or mulch in the area of the proposed parking lot would provide a wildlife attractant and would not be compatible to the safe operation of the Runway 3 approach. FAA Advisory Circular (AC) 150/5200-33B, Hazardous Wildlife Attractants On or Near Airports, establishes a separation distance of 10,000 feet between Air Operations Area (AOA) and hazardous wildlife attractants for airports serving turbine-powered aircraft. Section 2 of this AC identifies land use practices on or near airports that potentially attract hazardous wildlife. Section 2-7 b, Landscaping and landscape maintenance, states “the FAA recommends that airport operators approach landscaping with caution and confine it to airport areas not associated with aircraft movements.” In addition, Section 2-7 d, states that “regardless of the source of the attraction, when hazardous wildlife is noted on a public-use airport, airport operators must take prompt, remedial action(s) to protect aviation safety.”

In accordance with 14 CFR Part 139.337, Wildlife Hazard Management, Dane County has conducted a Wildlife Hazard Assessment (WHA), which was used to develop a Wildlife Hazard Management Plan (WHMP) As a Certificate Holder, DCRA is required to comply with the WHMP. Therefore, the County is required to protect the airspace surrounding the AOA from wildlife hazards and wildlife hazard attractants as outlined in the WHA and WHMP. Section 7.9 of the WHA states that DCRA “should be cautious of any new landscape plantings around buildings on the airfield. New construction should also be bird-proofed to reduce the attraction for nesting and loafing sites.” The installation of islands in this area with the proposed landscaping would be considered a wildlife attractant and potential hazard to flight.

The FAA has heightened its awareness to wildlife hazards in light of the US Airways Flight 1549 bird strike accident in the Hudson River. Aircraft wildlife strikes are the second leading cause of aviation-related fatalities, 92% occurring at or below 3000 feet. Globally, over 400 fatalities are a result of these strikes and have destroyed more than 420 aircraft. It is paramount that all parties to aviation adequately assess and mitigate wildlife hazards to aircraft operations. The potential for catastrophic loss of human life resulting from one incident is substantial. We thank you for your cooperation and consideration in this matter.

Sincerely,

John R Weller

John R Weller
National Wildlife Biologist



U.S. Department
of Transportation

**Federal Aviation
Administration**

Advisory Circular

**Subject: HAZARDOUS WILDLIFE
ATTRACTANTS ON OR NEAR
AIRPORTS**

Date: 8/28/2007

AC No: 150/5200-33B

Initiated by: AAS-300

Change:

1. PURPOSE. This Advisory Circular (AC) provides guidance on certain land uses that have the potential to attract hazardous wildlife on or near public-use airports. It also discusses airport development projects (including airport construction, expansion, and renovation) affecting aircraft movement near hazardous wildlife attractants. Appendix 1 provides definitions of terms used in this AC.

2. APPLICABILITY. The Federal Aviation Administration (FAA) recommends that public-use airport operators implement the standards and practices contained in this AC. The holders of Airport Operating Certificates issued under Title 14, Code of Federal Regulations (CFR), Part 139, Certification of Airports, Subpart D (Part 139), may use the standards, practices, and recommendations contained in this AC to comply with the wildlife hazard management requirements of Part 139. Airports that have received Federal grant-in-aid assistance must use these standards. The FAA also recommends the guidance in this AC for land-use planners, operators of non-certificated airports, and developers of projects, facilities, and activities on or near airports.

3. CANCELLATION. This AC cancels AC 150/5200-33A, *Hazardous Wildlife Attractants on or near Airports*, dated July 27, 2004.

4. PRINCIPAL CHANGES. This AC contains the following major changes, which are marked with vertical bars in the margin:

- a. Technical changes to paragraph references.
- b. Wording on storm water detention ponds.
- c. Deleted paragraph 4-3.b, *Additional Coordination*.

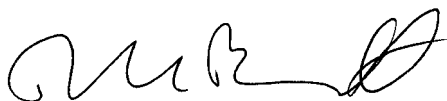
5. BACKGROUND. Information about the risks posed to aircraft by certain wildlife species has increased a great deal in recent years. Improved reporting, studies, documentation, and statistics clearly show that aircraft collisions with birds and other wildlife are a serious economic and public safety problem. While many species of wildlife can pose a threat to aircraft safety, they are not equally hazardous. Table 1

ranks the wildlife groups commonly involved in damaging strikes in the United States according to their relative hazard to aircraft. The ranking is based on the 47,212 records in the FAA National Wildlife Strike Database for the years 1990 through 2003. These hazard rankings, in conjunction with site-specific Wildlife Hazards Assessments (WHA), will help airport operators determine the relative abundance and use patterns of wildlife species and help focus hazardous wildlife management efforts on those species most likely to cause problems at an airport.

Most public-use airports have large tracts of open, undeveloped land that provide added margins of safety and noise mitigation. These areas can also present potential hazards to aviation if they encourage wildlife to enter an airport's approach or departure airspace or air operations area (AOA). Constructed or natural areas—such as poorly drained locations, detention/retention ponds, roosting habitats on buildings, landscaping, odor-causing rotting organic matter (putrescible waste) disposal operations, wastewater treatment plants, agricultural or aquaculture activities, surface mining, or wetlands—can provide wildlife with ideal locations for feeding, loafing, reproduction, and escape. Even small facilities, such as fast food restaurants, taxicab staging areas, rental car facilities, aircraft viewing areas, and public parks, can produce substantial attractions for hazardous wildlife.

During the past century, wildlife-aircraft strikes have resulted in the loss of hundreds of lives worldwide, as well as billions of dollars in aircraft damage. Hazardous wildlife attractants on and near airports can jeopardize future airport expansion, making proper community land-use planning essential. This AC provides airport operators and those parties with whom they cooperate with the guidance they need to assess and address potentially hazardous wildlife attractants when locating new facilities and implementing certain land-use practices on or near public-use airports.

6. MEMORANDUM OF AGREEMENT BETWEEN FEDERAL RESOURCE AGENCIES. The FAA, the U.S. Air Force, the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, and the U.S. Department of Agriculture - Wildlife Services signed a Memorandum of Agreement (MOA) in July 2003 to acknowledge their respective missions in protecting aviation from wildlife hazards. Through the MOA, the agencies established procedures necessary to coordinate their missions to address more effectively existing and future environmental conditions contributing to collisions between wildlife and aircraft (wildlife strikes) throughout the United States. These efforts are intended to minimize wildlife risks to aviation and human safety while protecting the Nation's valuable environmental resources.



DAVID L. BENNETT
Director, Office of Airport Safety
and Standards

Table 1. Ranking of 25 species groups as to relative hazard to aircraft (1=most hazardous) based on three criteria (damage, major damage, and effect-on-flight), a composite ranking based on all three rankings, and a relative hazard score. Data were derived from the FAA National Wildlife Strike Database, January 1990–April 2003.¹

Species group	Ranking by criteria			Composite ranking ²	Relative hazard score ³
	Damage ⁴	Major damage ⁵	Effect on flight ⁶		
Deer	1	1	1	1	100
Vultures	2	2	2	2	64
Geese	3	3	6	3	55
Cormorants/pelicans	4	5	3	4	54
Cranes	7	6	4	5	47
Eagles	6	9	7	6	41
Ducks	5	8	10	7	39
Osprey	8	4	8	8	39
Turkey/pheasants	9	7	11	9	33
Hérons	11	14	9	10	27
Hawks (buteos)	10	12	12	11	25
Gulls	12	11	13	12	24
Rock pigeon	13	10	14	13	23
Owls	14	13	20	14	23
H. lark/s. bunting	18	15	15	15	17
Crows/ravens	15	16	16	16	16
Coyote	16	19	5	17	14
Mourning dove	17	17	17	18	14
Shorebirds	19	21	18	19	10
Blackbirds/starling	20	22	19	20	10
American kestrel	21	18	21	21	9
Meadowlarks	22	20	22	22	7
Swallows	24	23	24	23	4
Sparrows	25	24	23	24	4
Nighthawks	23	25	25	25	1

¹ Excerpted from the *Special Report for the FAA, "Ranking the Hazard Level of Wildlife Species to Civil Aviation in the USA: Update #1, July 2, 2003"*. Refer to this report for additional explanations of criteria and method of ranking.

² Relative rank of each species group was compared with every other group for the three variables, placing the species group with the greatest hazard rank for ≥ 2 of the 3 variables above the next highest ranked group, then proceeding down the list.

³ Percentage values, from Tables 3 and 4 in Footnote 1 of the *Special Report*, for the three criteria were summed and scaled down from 100, with 100 as the score for the species group with the maximum summed values and the greatest potential hazard to aircraft.

⁴ Aircraft incurred at least some damage (destroyed, substantial, minor, or unknown) from strike.

⁵ Aircraft incurred damage or structural failure, which adversely affected the structure strength, performance, or flight characteristics, and which would normally require major repair or replacement of the affected component, or the damage sustained makes it inadvisable to restore aircraft to airworthy condition.

⁶ Aborted takeoff, engine shutdown, precautionary landing, or other.

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SECTION 1.

GENERAL SEPARATION CRITERIA FOR HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS.

1-1. INTRODUCTION. When considering proposed land uses, airport operators, local planners, and developers must take into account whether the proposed land uses, including new development projects, will increase wildlife hazards. Land-use practices that attract or sustain hazardous wildlife populations on or near airports can significantly increase the potential for wildlife strikes.

The FAA recommends the minimum separation criteria outlined below for land-use practices that attract hazardous wildlife to the vicinity of airports. Please note that FAA criteria include land uses that cause movement of hazardous wildlife onto, into, or across the airport's approach or departure airspace or air operations area (AOA). (See the discussion of the synergistic effects of surrounding land uses in Section 2-8 of this AC.)

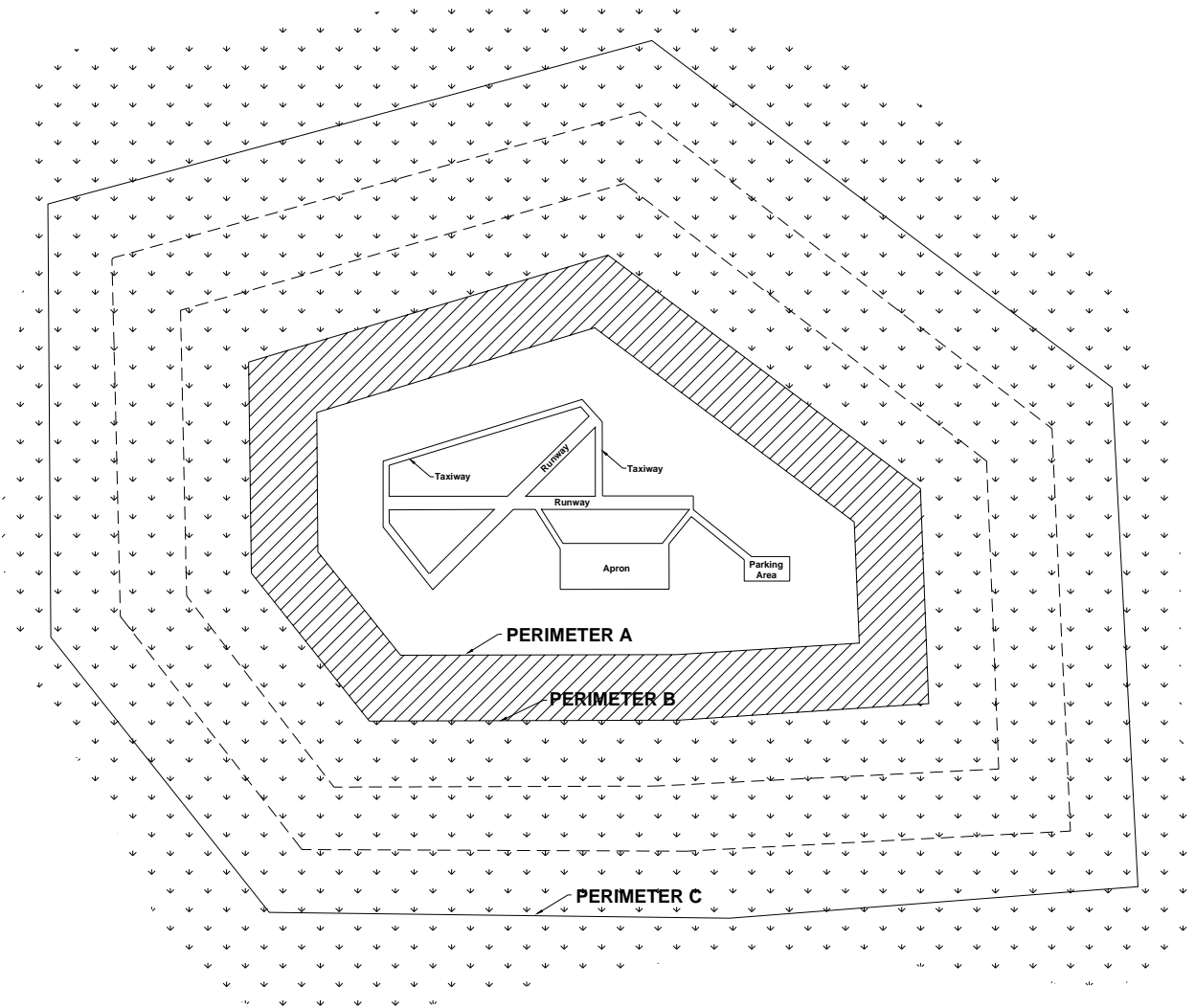
The basis for the separation criteria contained in this section can be found in existing FAA regulations. The separation distances are based on (1) flight patterns of piston-powered aircraft and turbine-powered aircraft, (2) the altitude at which most strikes happen (78 percent occur under 1,000 feet and 90 percent occur under 3,000 feet above ground level), and (3) National Transportation Safety Board (NTSB) recommendations.

1-2. AIRPORTS SERVING PISTON-POWERED AIRCRAFT. Airports that do not sell Jet-A fuel normally serve piston-powered aircraft. Notwithstanding more stringent requirements for specific land uses, the FAA recommends a separation distance of 5,000 feet at these airports for any of the hazardous wildlife attractants mentioned in Section 2 or for new airport development projects meant to accommodate aircraft movement. This distance is to be maintained between an airport's AOA and the hazardous wildlife attractant. Figure 1 depicts this separation distance measured from the nearest aircraft operations areas.

1-3. AIRPORTS SERVING TURBINE-POWERED AIRCRAFT. Airports selling Jet-A fuel normally serve turbine-powered aircraft. Notwithstanding more stringent requirements for specific land uses, the FAA recommends a separation distance of 10,000 feet at these airports for any of the hazardous wildlife attractants mentioned in Section 2 or for new airport development projects meant to accommodate aircraft movement. This distance is to be maintained between an airport's AOA and the hazardous wildlife attractant. Figure 1 depicts this separation distance from the nearest aircraft movement areas.

1-4. PROTECTION OF APPROACH, DEPARTURE, AND CIRCLING AIRSPACE. For all airports, the FAA recommends a distance of 5 statute miles between the farthest edge of the airport's AOA and the hazardous wildlife attractant if the attractant could cause hazardous wildlife movement into or across the approach or departure airspace.

Figure 1. Separation distances within which hazardous wildlife attractants should be avoided, eliminated, or mitigated.



PERIMETER A: For airports serving piston-powered aircraft, hazardous wildlife attractants must be 5,000 feet from the nearest air operations area.

PERIMETER B: For airports serving turbine-powered aircraft, hazardous wildlife attractants must be 10,000 feet from the nearest air operations area.

PERIMETER C: 5-mile range to protect approach, departure and circling airspace.

SECTION 2.

LAND-USE PRACTICES ON OR NEAR AIRPORTS THAT POTENTIALLY ATTRACT HAZARDOUS WILDLIFE.

2-1. GENERAL. The wildlife species and the size of the populations attracted to the airport environment vary considerably, depending on several factors, including land-use practices on or near the airport. This section discusses land-use practices having the potential to attract hazardous wildlife and threaten aviation safety. In addition to the specific considerations outlined below, airport operators should refer to *Wildlife Hazard Management at Airports*, prepared by FAA and U.S. Department of Agriculture (USDA) staff. (This manual is available in English, Spanish, and French. It can be viewed and downloaded free of charge from the FAA's wildlife hazard mitigation web site: <http://wildlife-mitigation.tc.FAA.gov>.) And, *Prevention and Control of Wildlife Damage*, compiled by the University of Nebraska Cooperative Extension Division. (This manual is available online in a periodically updated version at: ianrwww.unl.edu/wildlife/solutions/handbook/.)

2-2. WASTE DISPOSAL OPERATIONS. Municipal solid waste landfills (MSWLF) are known to attract large numbers of hazardous wildlife, particularly birds. Because of this, these operations, when located within the separations identified in the siting criteria in Sections 1-2 through 1-4, are considered incompatible with safe airport operations.

a. Siting for new municipal solid waste landfills subject to AIR 21. Section 503 of the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (Public Law 106-181) (AIR 21) prohibits the construction or establishment of a new MSWLF within 6 statute miles of certain public-use airports. Before these prohibitions apply, both the airport and the landfill must meet the very specific conditions described below. These restrictions do not apply to airports or landfills located within the state of Alaska.

The airport must (1) have received a Federal grant(s) under 49 U.S.C. § 47101, et. seq.; (2) be under control of a public agency; (3) serve some scheduled air carrier operations conducted in aircraft with less than 60 seats; and (4) have total annual enplanements consisting of at least 51 percent of scheduled air carrier enplanements conducted in aircraft with less than 60 passenger seats.

The proposed MSWLF must (1) be within 6 miles of the airport, as measured from airport property line to MSWLF property line, and (2) have started construction or establishment on or after April 5, 2001. Public Law 106-181 only limits the construction or establishment of some new MSWLF. It does not limit the expansion, either vertical or horizontal, of existing landfills.

NOTE: Consult the most recent version of AC 150/5200-34, *Construction or Establishment of Landfills Near Public Airports*, for a more detailed discussion of these restrictions.

- b. Siting for new MSWLF not subject to AIR 21.** If an airport and MSWLF do not meet the restrictions of Public Law 106-181, the FAA recommends against locating MSWLF within the separation distances identified in Sections 1-2 through 1-4. The separation distances should be measured from the closest point of the airport's AOA to the closest planned MSWLF cell.
- c. Considerations for existing waste disposal facilities within the limits of separation criteria.** The FAA recommends against airport development projects that would increase the number of aircraft operations or accommodate larger or faster aircraft near MSWLF operations located within the separations identified in Sections 1-2 through 1-4. In addition, in accordance with 40 CFR 258.10, owners or operators of existing MSWLF units that are located within the separations listed in Sections 1-2 through 1-4 must demonstrate that the unit is designed and operated so it does not pose a bird hazard to aircraft. (See Section 4-2(b) of this AC for a discussion of this demonstration requirement.)
- d. Enclosed trash transfer stations.** Enclosed waste-handling facilities that receive garbage behind closed doors; process it via compaction, incineration, or similar manner; and remove all residue by enclosed vehicles generally are compatible with safe airport operations, provided they are not located on airport property or within the Runway Protection Zone (RPZ). These facilities should not handle or store putrescible waste outside or in a partially enclosed structure accessible to hazardous wildlife. Trash transfer facilities that are open on one or more sides; that store uncovered quantities of municipal solid waste outside, even if only for a short time; that use semi-trailers that leak or have trash clinging to the outside; or that do not control odors by ventilation and filtration systems (odor masking is not acceptable) do not meet the FAA's definition of fully enclosed trash transfer stations. The FAA considers these facilities incompatible with safe airport operations if they are located closer than the separation distances specified in Sections 1-2 through 1-4.
- e. Composting operations on or near airport property.** Composting operations that accept only yard waste (e.g., leaves, lawn clippings, or branches) generally do not attract hazardous wildlife. Sewage sludge, woodchips, and similar material are not municipal solid wastes and may be used as compost bulking agents. The compost, however, must never include food or other municipal solid waste. Composting operations should not be located on airport property. Off-airport property composting operations should be located no closer than the greater of the following distances: 1,200 feet from any AOA or the distance called for by airport design requirements (see AC 150/5300-13, *Airport Design*). This spacing should prevent material, personnel, or equipment from penetrating any Object Free Area (OFA), Obstacle Free Zone (OFZ), Threshold Siting Surface (TSS), or Clearway. Airport operators should monitor composting operations located in proximity to the airport to ensure that steam or thermal rise does not adversely affect air traffic. On-airport disposal of compost by-products should not be conducted for the reasons stated in 2-3f.

- f. **Underwater waste discharges.** The FAA recommends against the underwater discharge of any food waste (e.g., fish processing offal) within the separations identified in Sections 1-2 through 1-4 because it could attract scavenging hazardous wildlife.
- g. **Recycling centers.** Recycling centers that accept previously sorted non-food items, such as glass, newspaper, cardboard, or aluminum, are, in most cases, not attractive to hazardous wildlife and are acceptable.
- h. **Construction and demolition (C&D) debris facilities.** C&D landfills do not generally attract hazardous wildlife and are acceptable if maintained in an orderly manner, admit no putrescible waste, and are not co-located with other waste disposal operations. However, C&D landfills have similar visual and operational characteristics to putrescible waste disposal sites. When co-located with putrescible waste disposal operations, C&D landfills are more likely to attract hazardous wildlife because of the similarities between these disposal facilities. Therefore, a C&D landfill co-located with another waste disposal operation should be located outside of the separations identified in Sections 1-2 through 1-4.
- i. **Fly ash disposal.** The incinerated residue from resource recovery power/heat-generating facilities that are fired by municipal solid waste, coal, or wood is generally not a wildlife attractant because it no longer contains putrescible matter. Landfills accepting only fly ash are generally not considered to be wildlife attractants and are acceptable as long as they are maintained in an orderly manner, admit no putrescible waste of any kind, and are not co-located with other disposal operations that attract hazardous wildlife.

Since varying degrees of waste consumption are associated with general incineration (not resource recovery power/heat-generating facilities), the FAA considers the ash from general incinerators a regular waste disposal by-product and, therefore, a hazardous wildlife attractant if disposed of within the separation criteria outlined in Sections 1-2 through 1-4.

2-3. WATER MANAGEMENT FACILITIES. Drinking water intake and treatment facilities, storm water and wastewater treatment facilities, associated retention and settling ponds, ponds built for recreational use, and ponds that result from mining activities often attract large numbers of potentially hazardous wildlife. To prevent wildlife hazards, land-use developers and airport operators may need to develop management plans, in compliance with local and state regulations, to support the operation of storm water management facilities on or near all public-use airports to ensure a safe airport environment.

- a. **Existing storm water management facilities.** On-airport storm water management facilities allow the quick removal of surface water, including discharges related to aircraft deicing, from impervious surfaces, such as pavement and terminal/hangar building roofs. Existing on-airport detention ponds collect storm water, protect water quality, and control runoff. Because they slowly release water

after storms, they create standing bodies of water that can attract hazardous wildlife. Where the airport has developed a Wildlife Hazard Management Plan (WHMP) in accordance with Part 139, the FAA requires immediate correction of any wildlife hazards arising from existing storm water facilities located on or near airports, using appropriate wildlife hazard mitigation techniques. Airport operators should develop measures to minimize hazardous wildlife attraction in consultation with a wildlife damage management biologist.

Where possible, airport operators should modify storm water detention ponds to allow a maximum 48-hour detention period for the design storm. The FAA recommends that airport operators avoid or remove retention ponds and detention ponds featuring dead storage to eliminate standing water. Detention basins should remain totally dry between rainfalls. Where constant flow of water is anticipated through the basin, or where any portion of the basin bottom may remain wet, the detention facility should include a concrete or paved pad and/or ditch/swale in the bottom to prevent vegetation that may provide nesting habitat.

When it is not possible to drain a large detention pond completely, airport operators may use physical barriers, such as bird balls, wires grids, pillows, or netting, to deter birds and other hazardous wildlife. When physical barriers are used, airport operators must evaluate their use and ensure they will not adversely affect water rescue. Before installing any physical barriers over detention ponds on Part 139 airports, airport operators must get approval from the appropriate FAA Regional Airports Division Office.

The FAA recommends that airport operators encourage off-airport storm water treatment facility operators to incorporate appropriate wildlife hazard mitigation techniques into storm water treatment facility operating practices when their facility is located within the separation criteria specified in Sections 1-2 through 1-4.

- b. New storm water management facilities.** The FAA strongly recommends that off-airport storm water management systems located within the separations identified in Sections 1-2 through 1-4 be designed and operated so as not to create above-ground standing water. Stormwater detention ponds should be designed, engineered, constructed, and maintained for a maximum 48-hour detention period after the design storm and remain completely dry between storms. To facilitate the control of hazardous wildlife, the FAA recommends the use of steep-sided, rip-rap lined, narrow, linearly shaped water detention basins. When it is not possible to place these ponds away from an airport's AOA, airport operators should use physical barriers, such as bird balls, wires grids, pillows, or netting, to prevent access of hazardous wildlife to open water and minimize aircraft-wildlife interactions. When physical barriers are used, airport operators must evaluate their use and ensure they will not adversely affect water rescue. Before installing any physical barriers over detention ponds on Part 139 airports, airport operators must get approval from the appropriate FAA Regional Airports Division Office. All vegetation in or around detention basins that provide food or cover for hazardous wildlife should be eliminated. If soil conditions and other requirements allow, the FAA encourages

the use of underground storm water infiltration systems, such as French drains or buried rock fields, because they are less attractive to wildlife.

- c. Existing wastewater treatment facilities.** The FAA strongly recommends that airport operators immediately correct any wildlife hazards arising from existing wastewater treatment facilities located on or near the airport. Where required, a WHMP developed in accordance with Part 139 will outline appropriate wildlife hazard mitigation techniques. Accordingly, airport operators should encourage wastewater treatment facility operators to incorporate measures, developed in consultation with a wildlife damage management biologist, to minimize hazardous wildlife attractants. Airport operators should also encourage those wastewater treatment facility operators to incorporate these mitigation techniques into their standard operating practices. In addition, airport operators should consider the existence of wastewater treatment facilities when evaluating proposed sites for new airport development projects and avoid such sites when practicable.
- d. New wastewater treatment facilities.** The FAA strongly recommends against the construction of new wastewater treatment facilities or associated settling ponds within the separations identified in Sections 1-2 through 1-4. Appendix 1 defines wastewater treatment facility as “any devices and/or systems used to store, treat, recycle, or reclaim municipal sewage or liquid industrial wastes.” The definition includes any pretreatment involving the reduction of the amount of pollutants or the elimination of pollutants prior to introducing such pollutants into a publicly owned treatment works (wastewater treatment facility). During the site-location analysis for wastewater treatment facilities, developers should consider the potential to attract hazardous wildlife if an airport is in the vicinity of the proposed site, and airport operators should voice their opposition to such facilities if they are in proximity to the airport.
- e. Artificial marshes.** In warmer climates, wastewater treatment facilities sometimes employ artificial marshes and use submergent and emergent aquatic vegetation as natural filters. These artificial marshes may be used by some species of flocking birds, such as blackbirds and waterfowl, for breeding or roosting activities. The FAA strongly recommends against establishing artificial marshes within the separations identified in Sections 1-2 through 1-4.
- f. Wastewater discharge and sludge disposal.** The FAA recommends against the discharge of wastewater or sludge on airport property because it may improve soil moisture and quality on unpaved areas and lead to improved turf growth that can be an attractive food source for many species of animals. Also, the turf requires more frequent mowing, which in turn may mutilate or flush insects or small animals and produce straw, both of which can attract hazardous wildlife. In addition, the improved turf may attract grazing wildlife, such as deer and geese. Problems may also occur when discharges saturate unpaved airport areas. The resultant soft, muddy conditions can severely restrict or prevent emergency vehicles from reaching accident sites in a timely manner.

2-4. WETLANDS. Wetlands provide a variety of functions and can be regulated by local, state, and Federal laws. Normally, wetlands are attractive to many types of wildlife, including many which rank high on the list of hazardous wildlife species (Table 1).

NOTE: If questions exist as to whether an area qualifies as a wetland, contact the local division of the U.S. Army Corps of Engineers, the Natural Resources Conservation Service, or a wetland consultant qualified to delineate wetlands.

- a. Existing wetlands on or near airport property.** If wetlands are located on or near airport property, airport operators should be alert to any wildlife use or habitat changes in these areas that could affect safe aircraft operations. At public-use airports, the FAA recommends immediately correcting, in cooperation with local, state, and Federal regulatory agencies, any wildlife hazards arising from existing wetlands located on or near airports. Where required, a WHMP will outline appropriate wildlife hazard mitigation techniques. Accordingly, airport operators should develop measures to minimize hazardous wildlife attraction in consultation with a wildlife damage management biologist.
- b. New airport development.** Whenever possible, the FAA recommends locating new airports using the separations from wetlands identified in Sections 1-2 through 1-4. Where alternative sites are not practicable, or when airport operators are expanding an existing airport into or near wetlands, a wildlife damage management biologist, in consultation with the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, and the state wildlife management agency should evaluate the wildlife hazards and prepare a WHMP that indicates methods of minimizing the hazards.
- c. Mitigation for wetland impacts from airport projects.** Wetland mitigation may be necessary when unavoidable wetland disturbances result from new airport development projects or projects required to correct wildlife hazards from wetlands. Wetland mitigation must be designed so it does not create a wildlife hazard. The FAA recommends that wetland mitigation projects that may attract hazardous wildlife be sited outside of the separations identified in Sections 1-2 through 1-4.
 - (1) Onsite mitigation of wetland functions.** The FAA may consider exceptions to locating mitigation activities outside the separations identified in Sections 1-2 through 1-4 if the affected wetlands provide unique ecological functions, such as critical habitat for threatened or endangered species or ground water recharge, which cannot be replicated when moved to a different location. Using existing airport property is sometimes the only feasible way to achieve the mitigation ratios mandated in regulatory orders and/or settlement agreements with the resource agencies. Conservation easements are an additional means of providing mitigation for project impacts. Typically the airport operator continues to own the property, and an easement is created stipulating that the property will be maintained as habitat for state or Federally listed species.

Mitigation must not inhibit the airport operator's ability to effectively control hazardous wildlife on or near the mitigation site or effectively maintain other aspects of safe airport operations. Enhancing such mitigation areas to attract hazardous wildlife must be avoided. The FAA will review any onsite mitigation proposals to determine compatibility with safe airport operations. A wildlife damage management biologist should evaluate any wetland mitigation projects that are needed to protect unique wetland functions and that must be located in the separation criteria in Sections 1-2 through 1-4 before the mitigation is implemented. A WHMP should be developed to reduce the wildlife hazards.

(2) Offsite mitigation of wetland functions. The FAA recommends that wetland mitigation projects that may attract hazardous wildlife be sited outside of the separations identified in Sections 1-2 through 1-4 unless they provide unique functions that must remain onsite (see 2-4c(1)). Agencies that regulate impacts to or around wetlands recognize that it may be necessary to split wetland functions in mitigation schemes. Therefore, regulatory agencies may, under certain circumstances, allow portions of mitigation to take place in different locations.

(3) Mitigation banking. Wetland mitigation banking is the creation or restoration of wetlands in order to provide mitigation credits that can be used to offset permitted wetland losses. Mitigation banking benefits wetland resources by providing advance replacement for permitted wetland losses; consolidating small projects into larger, better-designed and managed units; and encouraging integration of wetland mitigation projects with watershed planning. This last benefit is most helpful for airport projects, as wetland impacts mitigated outside of the separations identified in Sections 1-2 through 1-4 can still be located within the same watershed. Wetland mitigation banks meeting the separation criteria offer an ecologically sound approach to mitigation in these situations. Airport operators should work with local watershed management agencies or organizations to develop mitigation banking for wetland impacts on airport property.

2-5. DREDGE SPOIL CONTAINMENT AREAS. The FAA recommends against locating dredge spoil containment areas (also known as Confined Disposal Facilities) within the separations identified in Sections 1-2 through 1-4 if the containment area or the spoils contain material that would attract hazardous wildlife.

2-6. AGRICULTURAL ACTIVITIES. Because most, if not all, agricultural crops can attract hazardous wildlife during some phase of production, the FAA recommends against the used of airport property for agricultural production, including hay crops, within the separations identified in Sections 1-2 through 1-4. . If the airport has no financial alternative to agricultural crops to produce income necessary to maintain the viability of the airport, then the airport shall follow the crop distance guidelines listed in the table titled "Minimum Distances between Certain Airport Features and Any On-Airport Agricultural Crops" found in AC 150/5300-13, *Airport Design*, Appendix 17. The cost of wildlife control and potential accidents should be weighed against the income produced by the on-airport crops when deciding whether to allow crops on the airport.

- a. Livestock production.** Confined livestock operations (i.e., feedlots, dairy operations, hog or chicken production facilities, or egg laying operations) often attract flocking birds, such as starlings, that pose a hazard to aviation. Therefore, The FAA recommends against such facilities within the separations identified in Sections 1-2 through 1-4. Any livestock operation within these separations should have a program developed to reduce the attractiveness of the site to species that are hazardous to aviation safety. Free-ranging livestock must not be grazed on airport property because the animals may wander onto the AOA. Furthermore, livestock feed, water, and manure may attract birds.
- b. Aquaculture.** Aquaculture activities (i.e. catfish or trout production) conducted outside of fully enclosed buildings are inherently attractive to a wide variety of birds. Existing aquaculture facilities/activities within the separations listed in Sections 1-2 through 1-4 must have a program developed to reduce the attractiveness of the sites to species that are hazardous to aviation safety. Airport operators should also oppose the establishment of new aquaculture facilities/activities within the separations listed in Sections 1-2 through 1-4.
- c. Alternative uses of agricultural land.** Some airports are surrounded by vast areas of farmed land within the distances specified in Sections 1-2 through 1-4. Seasonal uses of agricultural land for activities such as hunting can create a hazardous wildlife situation. In some areas, farmers will rent their land for hunting purposes. Rice farmers, for example, flood their land during waterfowl hunting season and obtain additional revenue by renting out duck blinds. The duck hunters then use decoys and call in hundreds, if not thousands, of birds, creating a tremendous threat to aircraft safety. A wildlife damage management biologist should review, in coordination with local farmers and producers, these types of seasonal land uses and incorporate them into the WHMP.

2-7. GOLF COURSES, LANDSCAPING AND OTHER LAND-USE CONSIDERATIONS.

- a. Golf courses.** The large grassy areas and open water found on most golf courses are attractive to hazardous wildlife, particularly Canada geese and some species of gulls. These species can pose a threat to aviation safety. The FAA recommends against construction of new golf courses within the separations identified in Sections 1-2 through 1-4. Existing golf courses located within these separations must develop a program to reduce the attractiveness of the sites to species that are hazardous to aviation safety. Airport operators should ensure these golf courses are monitored on a continuing basis for the presence of hazardous wildlife. If hazardous wildlife is detected, corrective actions should be immediately implemented.
- b. Landscaping and landscape maintenance.** Depending on its geographic location, landscaping can attract hazardous wildlife. The FAA recommends that airport operators approach landscaping with caution and confine it to airport areas not associated with aircraft movements. A wildlife damage management biologist should review all landscaping plans. Airport operators should also monitor all landscaped areas on a continuing basis for the presence of hazardous wildlife. If

hazardous wildlife is detected, corrective actions should be immediately implemented.

Turf grass areas can be highly attractive to a variety of hazardous wildlife species. Research conducted by the USDA Wildlife Services' National Wildlife Research Center has shown that no one grass management regime will deter all species of hazardous wildlife in all situations. In cooperation with wildlife damage management biologist, airport operators should develop airport turf grass management plans on a prescription basis, depending on the airport's geographic locations and the type of hazardous wildlife likely to frequent the airport

Airport operators should ensure that plant varieties attractive to hazardous wildlife are not used on the airport. Disturbed areas or areas in need of re-vegetating should not be planted with seed mixtures containing millet or any other large-seed producing grass. For airport property already planted with seed mixtures containing millet, rye grass, or other large-seed producing grasses, the FAA recommends disking, plowing, or another suitable agricultural practice to prevent plant maturation and seed head production. Plantings should follow the specific recommendations for grass management and seed and plant selection made by the State University Cooperative Extension Service, the local office of Wildlife Services, or a qualified wildlife damage management biologist. Airport operators should also consider developing and implementing a preferred/prohibited plant species list, reviewed by a wildlife damage management biologist, which has been designed for the geographic location to reduce the attractiveness to hazardous wildlife for landscaping airport property.

- c. **Airports surrounded by wildlife habitat.** The FAA recommends that operators of airports surrounded by woodlands, water, or wetlands refer to Section 2.4 of this AC. Operators of such airports should provide for a Wildlife Hazard Assessment (WHA) conducted by a wildlife damage management biologist. This WHA is the first step in preparing a WHMP, where required.
- d. **Other hazardous wildlife attractants.** Other specific land uses or activities (e.g., sport or commercial fishing, shellfish harvesting, etc.), perhaps unique to certain regions of the country, have the potential to attract hazardous wildlife. Regardless of the source of the attraction, when hazardous wildlife is noted on a public-use airport, airport operators must take prompt remedial action(s) to protect aviation safety.

2-8. SYNERGISTIC EFFECTS OF SURROUNDING LAND USES. There may be circumstances where two (or more) different land uses that would not, by themselves, be considered hazardous wildlife attractants or that are located outside of the separations identified in Sections 1-2 through 1-4 that are in such an alignment with the airport as to create a wildlife corridor directly through the airport and/or surrounding airspace. An example of this situation may involve a lake located outside of the separation criteria on the east side of an airport and a large hayfield on the west side of an airport, land uses that together could create a flyway for Canada geese directly across the airspace of the airport. There are numerous examples of such situations;

therefore, airport operators and the wildlife damage management biologist must consider the entire surrounding landscape and community when developing the WHMP.

SECTION 3.

PROCEDURES FOR WILDLIFE HAZARD MANAGEMENT BY OPERATORS OF PUBLIC-USE AIRPORTS.

3.1. INTRODUCTION. In recognition of the increased risk of serious aircraft damage or the loss of human life that can result from a wildlife strike, the FAA may require the development of a Wildlife Hazard Management Plan (WHMP) when specific triggering events occur on or near the airport. Part 139.337 discusses the specific events that trigger a Wildlife Hazard Assessment (WHA) and the specific issues that a WHMP must address for FAA approval and inclusion in an Airport Certification Manual.

3.2. COORDINATION WITH USDA WILDLIFE SERVICES OR OTHER QUALIFIED WILDLIFE DAMAGE MANAGEMENT BIOLOGISTS. The FAA will use the Wildlife Hazard Assessment (WHA) conducted in accordance with Part 139 to determine if the airport needs a WHMP. Therefore, persons having the education, training, and expertise necessary to assess wildlife hazards must conduct the WHA. The airport operator may look to Wildlife Services or to qualified private consultants to conduct the WHA. When the services of a wildlife damage management biologist are required, the FAA recommends that land-use developers or airport operators contact a consultant specializing in wildlife damage management or the appropriate state director of Wildlife Services.

NOTE: Telephone numbers for the respective USDA Wildlife Services state offices can be obtained by contacting USDA Wildlife Services Operational Support Staff, 4700 River Road, Unit 87, Riverdale, MD, 20737-1234, Telephone (301) 734-7921, Fax (301) 734-5157 (<http://www.aphis.usda.gov/ws/>).

3-3. WILDLIFE HAZARD MANAGEMENT AT AIRPORTS: A MANUAL FOR AIRPORT PERSONNEL. This manual, prepared by FAA and USDA Wildlife Services staff, contains a compilation of information to assist airport personnel in the development, implementation, and evaluation of WHMPs at airports. The manual includes specific information on the nature of wildlife strikes, legal authority, regulations, wildlife management techniques, WHAs, WHMPs, and sources of help and information. The manual is available in three languages: English, Spanish, and French. It can be viewed and downloaded free of charge from the FAA's wildlife hazard mitigation web site: <http://wildlife-mitigation.tc.FAA.gov/>. This manual only provides a starting point for addressing wildlife hazard issues at airports. Hazardous wildlife management is a complex discipline and conditions vary widely across the United States. Therefore, qualified wildlife damage management biologists must direct the development of a WHMP and the implementation of management actions by airport personnel.

There are many other resources complementary to this manual for use in developing and implementing WHMPs. Several are listed in the manual's bibliography.

3-4. WILDLIFE HAZARD ASSESSMENTS, TITLE 14, CODE OF FEDERAL REGULATIONS, PART 139. Part 139.337(b) requires airport operators to conduct a Wildlife Hazard Assessment (WHA) when certain events occur on or near the airport.

Part 139.337 (c) provides specific guidance as to what facts must be addressed in a WHA.

3-5. WILDLIFE HAZARD MANAGEMENT PLAN (WHMP). The FAA will consider the results of the WHA, along with the aeronautical activity at the airport and the views of the airport operator and airport users, in determining whether a formal WHMP is needed, in accordance with Part 139.337. If the FAA determines that a WHMP is needed, the airport operator must formulate and implement a WHMP, using the WHA as the basis for the plan.

The goal of an airport's Wildlife Hazard Management Plan is to minimize the risk to aviation safety, airport structures or equipment, or human health posed by populations of hazardous wildlife on and around the airport.

The WHMP must identify hazardous wildlife attractants on or near the airport and the appropriate wildlife damage management techniques to minimize the wildlife hazard. It must also prioritize the management measures.

3-6. LOCAL COORDINATION. The establishment of a Wildlife Hazards Working Group (WHWG) will facilitate the communication, cooperation, and coordination of the airport and its surrounding community necessary to ensure the effectiveness of the WHMP. The cooperation of the airport community is also necessary when new projects are considered. Whether on or off the airport, the input from all involved parties must be considered when a potentially hazardous wildlife attractant is being proposed. Airport operators should also incorporate public education activities with the local coordination efforts because some activities in the vicinity of your airport, while harmless under normal leisure conditions, can attract wildlife and present a danger to aircraft. For example, if public trails are planned near wetlands or in parks adjoining airport property, the public should know that feeding birds and other wildlife in the area may pose a risk to aircraft.

Airport operators should work with local and regional planning and zoning boards so as to be aware of proposed land-use changes, or modification of existing land uses, that could create hazardous wildlife attractants within the separations identified in Sections 1-2 through 1-4. Pay particular attention to proposed land uses involving creation or expansion of waste water treatment facilities, development of wetland mitigation sites, or development or expansion of dredge spoil containment areas. At the very least, airport operators must ensure they are on the notification list of the local planning board or equivalent review entity for all communities located within 5 miles of the airport, so they will receive notification of any proposed project and have the opportunity to review it for attractiveness to hazardous wildlife.

3-7 COORDINATION/NOTIFICATION OF AIRMEN OF WILDLIFE HAZARDS. If an existing land-use practice creates a wildlife hazard and the land-use practice or wildlife hazard cannot be immediately eliminated, airport operators must issue a Notice to Airmen (NOTAM) and encourage the land-owner or manager to take steps to control the wildlife hazard and minimize further attraction.

SECTION 4.

FAA NOTIFICATION AND REVIEW OF PROPOSED LAND-USE PRACTICE CHANGES IN THE VICINITY OF PUBLIC-USE AIRPORTS

4-1. FAA REVIEW OF PROPOSED LAND-USE PRACTICE CHANGES IN THE VICINITY OF PUBLIC-USE AIRPORTS.

- a. The FAA discourages the development of waste disposal and other facilities, discussed in Section 2, located within the 5,000/10,000-foot criteria specified in Sections 1-2 through 1-4.
- b. For projects that are located outside the 5,000/10,000-foot criteria but within 5 statute miles of the airport's AOA, the FAA may review development plans, proposed land-use changes, operational changes, or wetland mitigation plans to determine if such changes present potential wildlife hazards to aircraft operations. The FAA considers sensitive airport areas as those that lie under or next to approach or departure airspace. This brief examination should indicate if further investigation is warranted.
- c. Where a wildlife damage management biologist has conducted a further study to evaluate a site's compatibility with airport operations, the FAA may use the study results to make a determination.

4-2. WASTE MANAGEMENT FACILITIES.

- a. **Notification of new/expanded project proposal.** Section 503 of the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (Public Law 106-181) limits the construction or establishment of new MSWLF within 6 statute miles of certain public-use airports, when both the airport and the landfill meet very specific conditions. See Section 2-2 of this AC and AC 150/5200-34 for a more detailed discussion of these restrictions.

The Environmental Protection Agency (EPA) requires any MSWLF operator proposing a new or expanded waste disposal operation within 5 statute miles of a runway end to notify the appropriate FAA Regional Airports Division Office and the airport operator of the proposal (40 CFR 258, *Criteria for Municipal Solid Waste Landfills*, Section 258.10, *Airport Safety*). The EPA also requires owners or operators of new MSWLF units, or lateral expansions of existing MSWLF units, that are located within 10,000 feet of any airport runway end used by turbojet aircraft, or within 5,000 feet of any airport runway end used only by piston-type aircraft, to demonstrate successfully that such units are not hazards to aircraft. (See 4-2.b below.)

When new or expanded MSWLF are being proposed near airports, MSWLF operators must notify the airport operator and the FAA of the proposal as early as possible pursuant to 40 CFR 258.

- b. Waste handling facilities within separations identified in Sections 1-2 through 1-4.** To claim successfully that a waste-handling facility sited within the separations identified in Sections 1-2 through 1-4 does not attract hazardous wildlife and does not threaten aviation, the developer must establish convincingly that the facility will not handle putrescible material other than that as outlined in 2-2.d. The FAA strongly recommends against any facility other than that as outlined in 2-2.d (enclosed transfer stations). The FAA will use this information to determine if the facility will be a hazard to aviation.
- c. Putrescible-Waste Facilities.** In their effort to satisfy the EPA requirement, some putrescible-waste facility proponents may offer to undertake experimental measures to demonstrate that their proposed facility will not be a hazard to aircraft. To date, no such facility has been able to demonstrate an ability to reduce and sustain hazardous wildlife to levels that existed before the putrescible-waste landfill began operating. For this reason, demonstrations of experimental wildlife control measures may not be conducted within the separation identified in Sections 1-2 through 1-4.

4-3. OTHER LAND-USE PRACTICE CHANGES. As a matter of policy, the FAA encourages operators of public-use airports who become aware of proposed land use practice changes that may attract hazardous wildlife within 5 statute miles of their airports to promptly notify the FAA. The FAA also encourages proponents of such land use changes to notify the FAA as early in the planning process as possible. Advanced notice affords the FAA an opportunity (1) to evaluate the effect of a particular land-use change on aviation safety and (2) to support efforts by the airport sponsor to restrict the use of land next to or near the airport to uses that are compatible with the airport.

The airport operator, project proponent, or land-use operator may use FAA Form 7460-1, *Notice of Proposed Construction or Alteration*, or other suitable documents similar to FAA Form 7460-1 to notify the appropriate FAA Regional Airports Division Office. Project proponents can contact the appropriate FAA Regional Airports Division Office for assistance with the notification process.

It is helpful if the notification includes a 15-minute quadrangle map of the area identifying the location of the proposed activity. The land-use operator or project proponent should also forward specific details of the proposed land-use change or operational change or expansion. In the case of solid waste landfills, the information should include the type of waste to be handled, how the waste will be processed, and final disposal methods.

- a. Airports that have received Federal grant-in-aid assistance.** Airports that have received Federal grant-in-aid assistance are required by their grant assurances to take appropriate actions to restrict the use of land next to or near the airport to uses that are compatible with normal airport operations. The FAA recommends that airport operators to the extent practicable oppose off-airport land-use changes or practices within the separations identified in Sections 1-2 through 1-4 that may attract hazardous wildlife. Failure to do so may lead to noncompliance with applicable grant assurances. The FAA will not approve the placement of airport

development projects pertaining to aircraft movement in the vicinity of hazardous wildlife attractants without appropriate mitigating measures. Increasing the intensity of wildlife control efforts is not a substitute for eliminating or reducing a proposed wildlife hazard. Airport operators should identify hazardous wildlife attractants and any associated wildlife hazards during any planning process for new airport development projects.

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APPENDIX 1. DEFINITIONS OF TERMS USED IN THIS ADVISORY CIRCULAR.

1. **GENERAL.** This appendix provides definitions of terms used throughout this AC.

1. **Air operations area.** Any area of an airport used or intended to be used for landing, takeoff, or surface maneuvering of aircraft. An air operations area includes such paved areas or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiways, or apron.
2. **Airport operator.** The operator (private or public) or sponsor of a public-use airport.
3. **Approach or departure airspace.** The airspace, within 5 statute miles of an airport, through which aircraft move during landing or takeoff.
4. **Bird balls.** High-density plastic floating balls that can be used to cover ponds and prevent birds from using the sites.
5. **Certificate holder.** The holder of an Airport Operating Certificate issued under Title 14, Code of Federal Regulations, Part 139.
6. **Construct a new MSWLF.** To begin to excavate, grade land, or raise structures to prepare a municipal solid waste landfill as permitted by the appropriate regulatory or permitting agency.
7. **Detention ponds.** Storm water management ponds that hold storm water for short periods of time, a few hours to a few days.
8. **Establish a new MSWLF.** When the first load of putrescible waste is received on-site for placement in a prepared municipal solid waste landfill.
9. **Fly ash.** The fine, sand-like residue resulting from the complete incineration of an organic fuel source. Fly ash typically results from the combustion of coal or waste used to operate a power generating plant.
10. **General aviation aircraft.** Any civil aviation aircraft not operating under 14 CFR Part 119, Certification: Air Carriers and Commercial Operators.
11. **Hazardous wildlife.** Species of wildlife (birds, mammals, reptiles), including feral animals and domesticated animals not under control, that are associated with aircraft strike problems, are capable of causing structural damage to airport facilities, or act as attractants to other wildlife that pose a strike hazard
12. **Municipal Solid Waste Landfill (MSWLF).** A publicly or privately owned discrete area of land or an excavation that receives household waste and that is not a land application unit, surface impoundment, injection well, or waste pile, as those terms are defined under 40 CFR § 257.2. An MSWLF may receive

other types wastes, such as commercial solid waste, non-hazardous sludge, small-quantity generator waste, and industrial solid waste, as defined under 40 CFR § 258.2. An MSWLF can consist of either a stand alone unit or several cells that receive household waste.

13. **New MSWLF.** A municipal solid waste landfill that was established or constructed after April 5, 2001.
14. **Piston-powered aircraft.** Fixed-wing aircraft powered by piston engines.
15. **Piston-use airport.** Any airport that does not sell Jet-A fuel for fixed-wing turbine-powered aircraft, and primarily serves fixed-wing, piston-powered aircraft. Incidental use of the airport by turbine-powered, fixed-wing aircraft would not affect this designation. However, such aircraft should not be based at the airport.
16. **Public agency.** A State or political subdivision of a State, a tax-supported organization, or an Indian tribe or pueblo (49 U.S.C. § 47102(19)).
17. **Public airport.** An airport used or intended to be used for public purposes that is under the control of a public agency; and of which the area used or intended to be used for landing, taking off, or surface maneuvering of aircraft is publicly owned (49 U.S.C. § 47102(20)).
18. **Public-use airport.** An airport used or intended to be used for public purposes, and of which the area used or intended to be used for landing, taking off, or surface maneuvering of aircraft may be under the control of a public agency or privately owned and used for public purposes (49 U.S.C. § 47102(21)).
19. **Putrescible waste.** Solid waste that contains organic matter capable of being decomposed by micro-organisms and of such a character and proportion as to be capable of attracting or providing food for birds (40 CFR §257.3-8).
20. **Putrescible-waste disposal operation.** Landfills, garbage dumps, underwater waste discharges, or similar facilities where activities include processing, burying, storing, or otherwise disposing of putrescible material, trash, and refuse.
21. **Retention ponds.** Storm water management ponds that hold water for several months.
22. **Runway protection zone (RPZ).** An area off the runway end to enhance the protection of people and property on the ground (see AC 150/5300-13). The dimensions of this zone vary with the airport design, aircraft, type of operation, and visibility minimum.
23. **Scheduled air carrier operation.** Any common carriage passenger-carrying operation for compensation or hire conducted by an air carrier or commercial

operator for which the air carrier, commercial operator, or their representative offers in advance the departure location, departure time, and arrival location. It does not include any operation that is conducted as a supplemental operation under 14 CFR Part 119 or as a public charter operation under 14 CFR Part 380 (14 CFR § 119.3).

- 24. Sewage sludge.** Any solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes, but is not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment process; and a material derived from sewage sludge. Sewage does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screenings generated during preliminary treatment of domestic sewage in a treatment works. (40 CFR 257.2)
- 25. Sludge.** Any solid, semi-solid, or liquid waste generated from a municipal, commercial or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility or any other such waste having similar characteristics and effect. (40 CFR 257.2)
- 26. Solid waste.** Any garbage, refuse, sludge, from a waste treatment plant, water supply treatment plant or air pollution control facility and other discarded material, including, solid liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved materials in domestic sewage, or solid or dissolved material in irrigation return flows or industrial discharges which are point sources subject to permits under section 402 of the Federal Water Pollution Control Act, as amended (86 Stat. 880), or source, special nuclear, or by product material as defined by the Atomic Energy Act of 1954, as amended, (68 Stat. 923). (40 CFR 257.2)
- 27. Turbine-powered aircraft.** Aircraft powered by turbine engines including turbojets and turboprops but excluding turbo-shaft rotary-wing aircraft.
- 28. Turbine-use airport.** Any airport that sells Jet-A fuel for fixed-wing turbine-powered aircraft.
- 29. Wastewater treatment facility.** Any devices and/or systems used to store, treat, recycle, or reclaim municipal sewage or liquid industrial wastes, including Publicly Owned Treatment Works (POTW), as defined by Section 212 of the Federal Water Pollution Control Act (P.L. 92-500) as amended by the Clean Water Act of 1977 (P.L. 95-576) and the Water Quality Act of 1987 (P.L. 100-4). This definition includes any pretreatment involving the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a POTW. (See 40 CFR Section 403.3 (q), (r), & (s)).

- 30. Wildlife.** Any wild animal, including without limitation any wild mammal, bird, reptile, fish, amphibian, mollusk, crustacean, arthropod, coelenterate, or other invertebrate, including any part, product, egg, or offspring thereof (50 CFR 10.12, *Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants*). As used in this AC, wildlife includes feral animals and domestic animals out of the control of their owners (14 CFR Part 139, Certification of Airports).
- 31. Wildlife attractants.** Any human-made structure, land-use practice, or human-made or natural geographic feature that can attract or sustain hazardous wildlife within the landing or departure airspace or the airport's AOA. These attractants can include architectural features, landscaping, waste disposal sites, wastewater treatment facilities, agricultural or aquaculture activities, surface mining, or wetlands.
- 32. Wildlife hazard.** A potential for a damaging aircraft collision with wildlife on or near an airport.
- 33. Wildlife strike.** A wildlife strike is deemed to have occurred when:
- a. A pilot reports striking 1 or more birds or other wildlife;
 - b. Aircraft maintenance personnel identify aircraft damage as having been caused by a wildlife strike;
 - c. Personnel on the ground report seeing an aircraft strike 1 or more birds or other wildlife;
 - d. Bird or other wildlife remains, whether in whole or in part, are found within 200 feet of a runway centerline, unless another reason for the animal's death is identified;
 - e. The animal's presence on the airport had a significant negative effect on a flight (i.e., aborted takeoff, aborted landing, high-speed emergency stop, aircraft left pavement area to avoid collision with animal) (Transport Canada, Airports Group, *Wildlife Control Procedures Manual*, Technical Publication 11500E, 1994).

2. RESERVED.

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Managing Conflicts in Illinois Created by Canada Geese

A guide to available management strategies



Figure 1. Goose strike to aircraft.

Introduction:

Canada geese are large magnificent birds that migrate between their traditional nesting grounds in Canada to their wintering grounds in the southern regions of the United States. However, populations of giant Canada geese are foregoing this traditional pattern and not migrating between different wintering and nesting grounds. While geese are an important component of our environment, significant conflicts can be encountered in many of our urban areas in Illinois. These conflicts include threats to aviation safety (Figure 1), consumption of field crops, feeding upon golf course greens and lawns, and threats to public safety from attacks while they defend their nests or the accumulation of their droppings on lawns, athletic fields, and in parks. Damage caused by geese in Illinois has become significant, requiring new management strategies by State and Federal agencies to provide assistance in resolving the problems. Although Canada geese are protected by state and federal laws, there are many effective management methods that can be used to minimize or eliminate conflicts with these birds. While some methods may require permits to implement, many only require knowledge and persistence of those experience the conflict.

General Biology:

The giant Canada Goose (*B. c. maxima*) is responsible for most of the conflicts with geese in urban areas of Illinois throughout the year. The Mississippi Valley Population of Canada geese consist of migrating birds which inhabit Illinois during the spring and fall migration periods, as well as throughout the winter months. These populations can add to damage caused by the giant Canada Goose.

Adult giant Canada geese weight approximately 11-12½ pounds. They have a wing span of approximately 6 feet, making them one of the largest flying birds in the world. Giant Canada geese generally winter close to their breeding grounds as opposed to other subspecies of Canada geese in Illinois which breed in Canada. In many locations giant Canada geese are remaining in the same area only to migrate south if local sources of water completely freeze over.

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Giant Canada geese may become sexually mature at 2-3 years of age, while other subspecies generally become mature at age 3-4. They mate for life with a single partner, but will remate if their partner dies. In February geese begin to establish nesting territories where they will remain through the nesting season in April. They will usually establish nests near water and on islands, but more frequently geese are selecting unusual nest sites such as roof tops, parking lot islands, and large plant pots near building entrances. Each pair of geese will produce a single clutch of eggs during this season. However, they may produce a second clutch if the first is destroyed (e.g. by predators). Generally, the female Canada goose will lay one egg every 1-1½ days until the clutch is complete with 5-8 eggs. She will then remain with the nest, incubating the eggs for 28 days, after which time they will hatch. Within 24 hours both adult geese will lead their young from the nest to a water source shortly after hatching.

Young geese grow quickly and can usually fly within 75 days of hatching. Young geese become 'imprinted' to the general area where they learn to fly and are likely to stay in the vicinity until they eventually produce young of their own. Under natural conditions, 60-70% of the young survive to adulthood. In urban areas, where they are provided added protection from predators and hunting, their survival rate is likely to be higher and Geese can approach an age of twenty. A recent study in the greater Chicago area has found that coyote predation on eggs/nests may be helping to limit giant Canada goose populations in our state's most urbanized region.

Canada geese are grazers, feeding primarily upon grass and crops (e.g., soybeans, corn, and wheat). During the summer months they are attracted to the succulent new shoots of grass growing on golf courses, lawns, athletic fields, and sprouting crops where they may cause significant damage. An adult Canada goose can produce as much as 3 pounds of feces daily. Fecal contamination of lawns and recreational areas is the most frequent type of conflict people experience with Canada geese in Illinois. In addition to nuisance concerns, the accumulation of feces in public swimming areas can drastically raise the level of fecal coliform bacteria in the water, causing swimming to be banned.

In general, Canada geese are attracted to areas because a water source (which serves to provide protection from predators) and/or food is available to them. Water sources which have gentle sloping shorelines with manicured lawns provide the greatest attractant because they have easy access to food and protection from other animals, including people. The area becomes even more attractive if other waterfowl are present because that indicates there is no immediate threat in the area.

One of the greatest attractants of an area is the presence of people that feed the geese. This provides an artificially created food supply and will concentrate the geese in unnatural numbers as the food supply is enhanced by well-meaning, but misguided individuals. Artificial feeding, typically with bread, does not provide the geese with the proper nutrients they require. It is also likely to cause the birds to inflict greater damage to the vegetation and ornamental plants when the food is not regularly supplied.

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Legal Status:

Canada geese, their nests, and eggs are protected by the Migratory Bird Treaty Act (16 USC 703-711) and by Illinois State Law (520 ILCS 5/2.1). The combination of Federal and State laws prohibit the taking (i.e., capturing and/or killing) of Canada geese in Illinois outside of the legal hunting seasons. It is currently Illinois Department of Natural Resources (IDNR) policy not to permit the capture and relocation of Canada geese to another site within Illinois. State permits can be obtained to destroy nests and eggs.

Damage Prevention:

Management programs used to minimize or eliminate conflicts with Canada geese should employ an integrated pest management (IPM) approach. IPM, simply stated, is utilizing many management methods together to solve the problem rather than relying on a single method. An example of an IPM approach to reduce goose damage at a golf course might include using border collies to harass the birds loafing and grazing on the greens and fairways, installing an overhead grid system on the water hazards to keep the geese off the water, using a repellent to prevent feeding on the grass, increasing the shore grade along the water hazards to make them unsuitable for the geese, and obtaining a permit to destroy the eggs and nests of Canada geese found on the course. This example demonstrates the employment of the five basic strategies of management:

1. harassment;
2. exclusion;
3. repellents;
4. habitat alteration; and
5. lethal management.

The *integration* of multiple management techniques from these strategies into your management program will produce much more effective results than any strategy can produce by itself. Brief descriptions of some of the more effective techniques, from these strategies, are described below.

Harassment

Canada geese seek areas where they can go about their daily activities in peace. If someone or something bothers them enough, they will usually find another area where they will not be disturbed. However, they are able to habituate to some harassment techniques when they figure out that there is no real threat to their well-being.

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Harassment techniques are most useful when you are trying to prevent damage from occurring rather than trying to stop damage that is already occurring. Once Canada geese have become accustomed to using an area, it will be more difficult to encourage them to move elsewhere.

It is also important to note that each year Canada geese have a flightless period during June through July when they molt and grow new flight feathers. This coincides with the period of time that goslings have not yet gained the ability to fly. During this time harassment may have little beneficial effect given the birds can not efficiently vacate the area.

Pyrotechnics

Pyrotechnics are specially designed fireworks that are used to frighten wildlife. There are several different types of pyrotechnics available (Figure 2), including: *screamers* and *bangers*, which are large bottle rocket-type devices fired from a 15-mm starter's pistol and whistle loudly or explode; and *shellcrackers*, which are specialized fireworks fired from a 12-gauge shotgun. Each pyrotechnic has a specific range of effectiveness. The distance a particular pyrotechnic device will travel varies greatly by manufacturer and type. They may range from fifty to several hundred yards.

[NOTE: Check with local authorities before using these devices for possible ordinances restricting their use.]



Figure 2. Pyrotechnics.

Propane Cannons

Propane cannons are popular dispersal tools in use at hundreds of airports around the country. Farmers have also used cannons with limited success. They operate completely by the pressure of a standard propane tank (Figure 3). On a timed basis, a small amount of propane is ignited, producing a very loud report that can be heard as much as a mile away. The simplest models explode every 15 seconds - 30 minutes, based on the setting. More sophisticated models use computer chips to control the detonation more randomly, on a particular schedule, or by remote control. Unfortunately, geese have demonstrated the ability to quickly adapt to the report of a propane cannon and do not respond afterwards. In addition, the repetitive noise produced by cannons can be disruptive to people in suburban and urban areas.

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Figure 3. Propane exploders.

Dogs

Using dogs to harass geese (Figure 4) from an area has become one of the most popular methods to reduce the presence of geese in a particular area. While many nuisance animal businesses use highly trained border collies to chase geese, just about any athletic, medium-large dog capable of obeying commands can be used. Control of the dog is vital to this technique because they must not be allowed to catch, injure, or kill a Canada goose. The geese are likely to seek refuge from the dog in a nearby body of water and simply wait for the dog to leave. To produce more effective results in these circumstances, the geese should be excluded from the water (described below) or also harassed with pyrotechnics.



Figure 4. Use of a dog to harass geese.

Swans

Another recent popular management technique to harass geese is the use of swans. The premise of this technique is that swans tend to be very aggressive in defense of their territory, especially during the breeding season, excluding other waterfowl from the area. As wild trumpeter swans are protected and cannot be employed for this purpose, nonnative mute swans are commonly used instead. (Note: Possession, sale, release, or use of mute swans in Illinois requires appropriate IDNR permits.) Unfortunately, mute swans only defend a territory from other birds during the short spring breeding season and they are much more tolerant of other waterfowl and may only defend the immediate area around their own nest. It is not uncommon to find situations where mute swans and Canada geese are

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sharing the habitat (Figure 5), adding to any manure problem that may already exist. Mute swans can even attract Canada geese to water sources. They may also have negative impacts on other native wildlife and their foraging upon vegetation may be more destructive than that actually caused by geese alone. Therefore, the use of mute swans to deter Canada geese is not recommended.



Figure 5. Mute Swans and Canada Geese.

Lasers

Lasers can be used to successfully harass Canada Geese without physically harming the birds. As with all other harassment techniques, other techniques should also be used to avoid the birds from becoming habituated to the laser. While lasers do not physically harm geese, they should be used with caution in accordance with the manufacturer's safety instructions. There are several different types of lasers available for use to disperse geese including the specially designed Avian Dissuader (red laser) (Figure 6) to general, less expensive, green and/or red laser pens. Since the strength of laser devices varies, the effective dispersal range varies dependent on the device used. All lasers perform best to disperse geese during low light conditions in the early morning and late evening hours.



Figure 6. Laser used to harass geese.

Plastic Scare Devices

Plastic swans, alligators, owls, snakes, coyotes and dead goose decoys have not consistently demonstrated an effectiveness in dispersing Canada geese. If you decide to employ these static devices, they must be moved to new locations frequently and must be used in conjunction with other forms goose abatement. use of these devices is not recommended.

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Other Harassment Techniques

There are numerous other harassment techniques which can be used to effectively resolve conflicts with Canada geese. Some of these include; high pressure water sprayers, air horns, beating pots and pans together, physically chasing the birds, and even shooting over the geese with live ammunition in areas where this is allowed. These can all be used to disperse Canada geese, especially if they are used in conjunction with other techniques. The key to success is to remain more persistent than the geese. As long as a Canada Goose is not "physically harmed," the harassment technique should be legal. If there is a question about the legality of a particular technique, contact USDA-APHIS-Wildlife Services office in Springfield at (217) 241-6700 prior to using the technique.

Exclusion

Exclusion can be a very effective method used to limit goose access to a specific area. Exclusion methods range from simple and inexpensive techniques to those that are very complex and expensive. Exclusion can be very effective when employed correctly and in conjunction with other management techniques.

Overhead Grid Systems

One of the most effective methods of exclusion is the installation of a grid system over the water surface which geese use. Grids work on a simple principle: Canada geese are large birds which require a long glide-slope to take off and land. By installing a grid system of cables above the surface of the water (Figure 6), the geese will view the grid as a barrier over the water. Grids are most economical on small bodies of water (<200 feet across), but can be used on larger bodies.

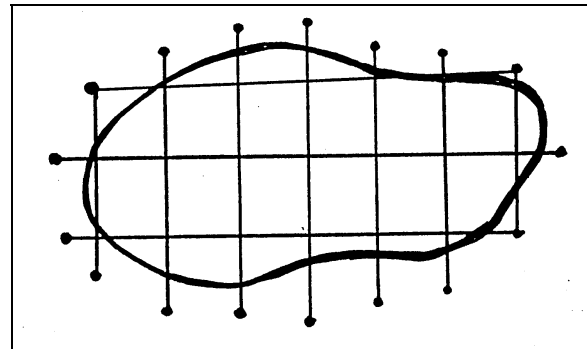


Figure 6. Diagram of overhead grid system.

Nearly any type of cord can be used to construct a grid line, from high tensile braided fishing line to plastic-coated Kevlar cord. Anchor points for the grid lines can be trees, wooden stakes, or "U" channel fence posts. While grid system specifications vary, spacing the lines 20 feet apart at least 3 feet above the surface of the water provides an effective goose barrier. Modifications can be made if water levels change or if geese penetrate the system. For example, geese may land on the shore and walk into the water under the grid. One solution could

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include constructing a 'drift fence' of poultry wire or decorative fencing around the perimeter of the water to impede terrestrial access. It must be noted that a grid constructed as recommended here will not exclude ducks, gulls, or other smaller birds.

Bird Balls™

The use of Bird Balls™ to prevent goose use of a body of water is one of the more unique methods available. The 4 inch diameter balls are placed in the water in sufficient numbers to completely cover the basin's surface. The balls are usually employed at airports or industrial sites to eliminate all bird use of a basin. Bird Balls™ not only exclude all wildlife from the surface of the water, but they prevent sunlight from penetrating to any aquatic plants, eliminating potential food sources for waterfowl as well.

Fencing

Fencing can be used to exclude geese from sensitive areas or to keep them separated from pedestrian traffic. Fencing material can include conventional woven wire or chicken wire; snow, chain link, or picket fences; single or dual strands of cord/wire; or even dense shrubbery. Another example of a fence that can be installed is a drift fence placed along a stream or pond edge. A single strand of electric fence is also another form of exclusion (Figure 7).

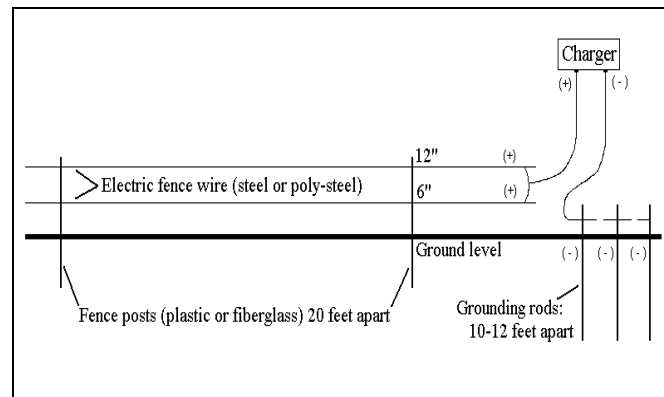


Figure 7. Diagram of fence exclusion.

The wire for the electric fence should be between 6" and 8" above the ground. The amperage required to exclude Canada Geese is minimal and will not harm them. **(Note: To avoid accidentally shocking pedestrians, electric fences should be well marked and not used in areas of public use.)**

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Fencing alone may not exclude geese from an area because they may still fly into the site. Therefore, other measures will need to be taken to exclude the birds from most locations. However, fencing may be very successful as a barrier between the birds and pedestrians during the goose nesting season; thus allowing geese to incubate eggs while allowing pedestrian traffic to pass nearby.

Habitat Modification

Habitat modification involves physically altering your property to make it less attractive to Canada geese. Before you can modify the habitat, you need to identify what features of your property are attracting the geese. As described earlier, geese are typically attracted to a location due to the presence of food or water. Therefore, modifications made to your property should focus on eliminating or reducing these attractants.

Eliminate all artificial feeding

Feeding geese should be prohibited/eliminated. Signs may need to be posted in public areas which read, "Do Not Feed the Animals." Individuals feeding waterfowl must be educated about their role in creating conflicts with geese. Hand feeding geese concentrates the birds making them more aggressive toward people because they are expecting to be fed and making them more susceptible to diseases, such as avian botulism and avian cholera. Moreover, artificial feeding rarely provides the proper nutrients that geese require. In communities experiencing conflicts with large numbers of geese, "No Feeding" policies or ordinances may need to be created and enforced as a first step toward reducing problems.

Remove domestic waterfowl

Domestic waterfowl function as 'decoys' for flying Canada geese. Waterfowl decoys are commonly used by hunters to attract geese into huntable locations. Live waterfowl cannot be used by hunters as decoys because they are so attractive they provide an unfair advantage to hunters. Conversely, you should not allow domestic waterfowl to inhabit your water to attract wild geese if you are already experiencing conflicts with the birds.

Steepen Pond/Creek Banks

As stated before, Canada geese prefer a gentle, grassy slope coming out of the water which enables them to easily walk into and out of the water to feed or loaf. Creating a steep bank along the shoreline will not allow them to do this. They will need to find alternative areas to raise their young. Steepening the shoreline can be done by building a vertical seawall three feet above the surface of the water or by creating a 200% earthen slope (i.e., 63° angles) from the water's edge (Figure 8). Allowing vegetation to grow tall along this slope will help to protect it from erosion and also serve to keep the geese from walking up the slope.

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Rip-rap may be ineffective on gentle slopes, but could be more effective on these steeper slopes. **(Note: Be aware that steep rip-rap lined banks and seawalls may prevent other animals from accessing the water as well.)**



Figure 8. Earthen slope.

Allow Water to Freeze in winter

One reason geese have become resident in this northern climate is the aeration of ponds to prevent complete surface freezing during the winter. Geese do not prefer to remain on a pond during the winter once it is frozen over, and thus they seek alternative areas to loaf and roost.

Plant Native Vegetation Barriers

Some entities recommend planting tall, native prairie grass stands along shorelines to discourage goose use. The premise of this technique is that predators may inhabit the tall grass which geese cannot see over/through as they walk and thus, geese do not feel secure under these conditions. In addition, most species of native grass are less palatable to the geese than turf grass. Giant Canada Geese can adapt to this technique, reducing its effectiveness significantly. Effectiveness may be improved by widening the stand to 30 or more feet.

Vegetation and Rock Barriers

Canada geese typically prefer to use a route from a body of water that affords a clear view of the surroundings. By planting large, dense shrubs or placing large rocks (two feet in diameter or more) along a shoreline, you may create a barrier that geese will be less likely to attempt to penetrate due to the lack of visibility of potential hazards (i.e., predators). However, as with native grass barriers, giant Canada geese have demonstrated the ability to adapt to rock and dense vegetative barriers.

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Chemical Repellents

One of the more common requests of people who are incurring Canada goose damage is for something to “spray” to repel the geese from the area. Although there are many “home remedies” for repelling wild animals, there are few legal over-the-counter products because of the strict registration requirements imposed to protect the environment. Repellants are registered for specific applications and are therefore not suitable for all situations. Repellants must be shown to have little or no adverse environmental impact while demonstrating they can perform as the manufacturer claims. Even so, the use of these products is not guaranteed to be successful and they should be used as part of an integrated management plan. Registration of a product with the Environmental Protection Agency is very costly and thus, few goose foraging repellants are available for use. Products currently registered are discussed below.

Methyl Anthranilate

There are several products which use the active ingredient methyl anthranilate (an extract of concord grapes) to protect turf from grazing by geese. ReJeX-it® Migrate and GooseChase™ are two such products that can be sprayed on the grass to make it less palatable to geese, encouraging them not to feed. These products are not designed to *repel* the geese from a specific area, just to prevent them from feeding upon the grass. Therefore, conflicts with the presence of geese in a locality will likely not be resolved with the use of these products alone. Methyl anthranilate ‘area’ applications through the use of fogging products such as ReJeX-it® Fog Force (Figure 9) can encourage geese to vacate a specific area. Methyl anthranilate turf applications biodegrade and must be reapplied after rainfall and/or mowing. [NOTE: Do not use other grape-flavored products as a cheap substitute. Substitute products are not registered for use in dispersing geese. Their use in this manner is not effective and would be a violation of federal and State laws.]



Figure 9. Methyl anthranilate fog application.

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Anthraquinone

Flight Control™ is a non-lethal repellent currently registered for use on geese. It has shown effectiveness as a foraging repellent against Canada goose grazing on turf. Anthraquinone is a naturally occurring chemical found in many plant species and in some invertebrates as a natural predator defense mechanism. It is a secondary repellent and affects birds by causing post-intestinal distress. Anthraquinone is not a taste repellent or contact irritant, as the birds do not hesitate to eat treated turf, and they exhibit no sign that treated turf is unpalatable to them. However, once the birds experience the adverse consequences they learn to avoid the protected turf. Flight Control™ will not biodegrade or wash off after a rain, but needs to be reapplied after mowing.

Live Capture

Capture & Relocation

Capture and relocation of the animals causing a particular conflict is commonly requested. This is not a viable solution to conflicts with Canada geese because goose populations in Illinois have reached sufficient levels to occupy virtually all suitable habitat. Research in Illinois evaluating attempts to relocate geese causing conflicts revealed that relocation to other areas did not resolve goose conflicts and may result in increased conflicts near the release site. In addition, goose relocation has the potential to move diseases from one population to another. Furthermore, geese have strong homing instincts, frequently returning to nest in the area where they learned to fly. Therefore, geese often return to their original capture site. For these reasons, Wildlife Services and the Illinois Department of Natural Resources (IDNR) do not subscribe to this practice in Illinois.

Capture & Euthanization

Some states have implemented programs involving the capture and euthanization of Canada geese. In the States where 'charity harvests' are implemented, localized goose populations are captured during the summer molting season and processed for meat donation to charitable organizations. While effective at managing local goose conflicts, this strategy is often criticized by some organizations who philosophically disagree with the management approach. As of the printing of this information, the charity harvest management technique is being reviewed as a possible management strategy, but implementing procedures have not been developed to employ it in Illinois.

Hunting

Hunting is an important tool used to manage many wildlife populations. Hunting can be a very effective technique to help minimize conflicts with Canada geese in locations in Illinois where it is legal. In Illinois, an early fall Canada goose hunting season is often established in specific counties. This season occurs prior to the southward migration of geese which breed in northern regions, thus focusing the harvest on giant Canada geese which cause conflicts with humans in the spring, summer, and fall.

Hunting is one of the most recommended management methods available where

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possible. Hunting helps to reduce the number of geese in an area, provides a strong repellent effect for the geese not taken, and re-enforces the use of other nonlethal techniques, such as pyrotechnics. Unfortunately, hunting is not a legal option in many urban and suburban areas (e.g. Cook and DuPage Counties) where Canada goose damage occurs. Other strategies will be necessary in these areas.

Toxicants

There are no toxicants registered with the Environmental Protection Agency for managing Canada geese in the United States.

Nest & Egg Destruction

Preventing goose eggs from hatching has become the most commonly used method to manage conflicts with giant Canada geese in urban areas in Illinois. It aids in decreasing the rapid growth of local goose populations. When left unchecked, a pair of Canada geese can generate a flock of more than 50 individuals in as little as five years. Nest destruction can also eliminate aggressive goose behavior, such as attacking people in an attempt to defend a viable nest. A free permit must be attained from the IDNR to manage goose nests.

Prior to implementing goose nest management activities, several nonlethal techniques should be attempted to prevent the geese from nesting in the area. This will help reduce the number of nests which need to be managed. If the geese are successful at nesting and you wish to destroy the nest and eggs, proper permits from the IDNR must be obtained (contact the IDNR or Wildlife Services office for assistance - phone numbers and addresses are provided on the last page). You should have all nests identified prior to requesting your permit as the number of nests to be destroyed will be needed. Locating nests may not be easy as geese frequently hide their nest on islands, in ornamental vegetation, along shorelines, and even on roof-tops.

After you obtain a permit, the incubation stage of the eggs must be determined. Feel the eggs. If they are cool, then incubation has not begun (probably because the female is not finished laying the entire clutch). If the eggs are warm, take one egg and place it in a pail of water (Figure 10).

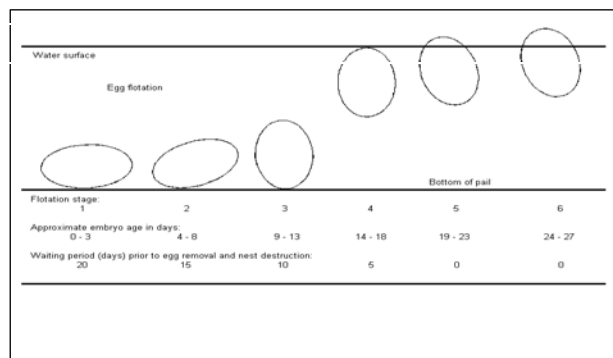


Figure 10. Egg flotation aging chart.

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If it sinks to the bottom of the pail (which signifies that the eggs have been incubating for 18 days or less), then remove it and spray the entire clutch with food-grade corn oil (approximately 3-6 ml per egg). Replace the eggs in the nest and wait two to three weeks before returning to remove the eggs. If the egg floats to the surface of the water (which signifies that the eggs have been incubating at least 14 - 18 days), the nest and eggs can be immediately removed and destroyed. If the eggs and nest are destroyed too soon (e.g. within 14 to 18 days of incubation), the adult geese will likely attempt to produce another clutch of eggs. Waiting until after the 18th day of incubation (i.e., when the eggs float) the adults will most likely have lost the nesting instinct and not attempt to make another nest. Before removing each egg, be sure that a chick is not pipping a hole through the eggshell. If one chick in a nest has begun pipping, then the nest and other eggs should be left alone and work should be concentrated on other nests that are not as advanced.

If you oiled the eggs and return in 2-3 weeks to remove them from the nest, make sure to be extremely careful during handling because they will be spoiled and emit a distinct odor if broken.

Be advised that Canada geese tenaciously defend their nests. A second person or dog (Figure 12) is recommended to help fend off goose attacks while the eggs are handled and managed.



Figure 12. Use of a dog to fend off nesting geese.

Reproductive Inhibitors

Wildlife Services' National Wildlife Research Center was instrumental in the development of a new product (nicarbazin/OvoControl-G™), which is an infertility agent for Canada geese in urban areas. In some situations the use of baits containing nicarbazin allow the numbers of small to moderate sized groups of Canada geese to be managed by reducing the hatchability of eggs laid by treated birds without requiring the location of each individual nest to be determined (as is the case for egg oiling/addling/destruction). However, Illinois law currently does not permit the use of nicarbazin in the state.

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Remember, a State permit must be obtained before any activity is conducted that involves the handling of Canada geese or their eggs. For assistance with obtaining these permits, you may contact the Illinois Department of Natural Resources or the USDA-APHIS-Wildlife Services office listed below.

IDNR
Urban Waterfowl Program Manager
2050 W. Stearns Rd.
Bartlett, IL 60103

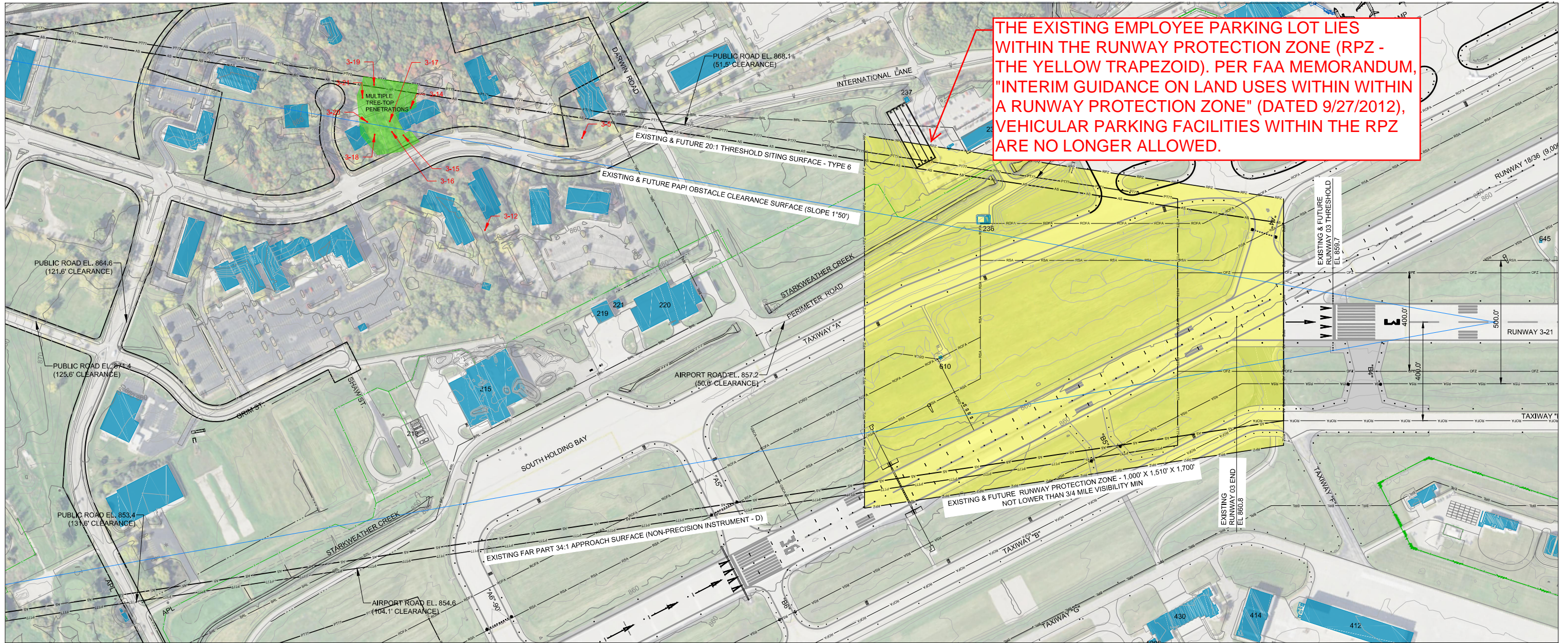
USDA-APHIS-WS
2869 Via Verde Dr.
Springfield, IL 62703
217 241-6700 (office)

Supply Sources can be located at:

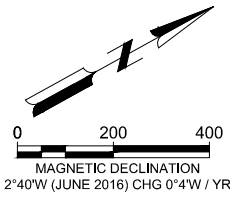
<http://web.extension.uiuc.edu/wildlife/>

Appendix B

HEIGHT LIMITATION
SUPPLEMENTARY
INFORMATION



THE EXISTING EMPLOYEE PARKING LOT LIES WITHIN THE RUNWAY PROTECTION ZONE (RPZ - THE YELLOW TRAPEZOID). PER FAA MEMORANDUM, "INTERIM GUIDANCE ON LAND USES WITHIN WITHIN A RUNWAY PROTECTION ZONE" (DATED 9/27/2012), VEHICULAR PARKING FACILITIES WITHIN THE RPZ ARE NO LONGER ALLOWED.



OBSTRUCTIONS RWY 03_EX

NO.	POINT ID	DESCRIPTION	ELEVATION	PENETRATION PART 77	ALLOWABLE PART 77 HT.	PENETRATION TSS SURFACE	ALLOWABLE TSS SURF HT.	DISPOSITION
3-5	10795	TREE	946.3	14	855.1	----	1002.0	TO BE LOWERED / REMOVED
3-12	10155	TREE	947.6	4	855.3	----	1021.7	TO BE LOWERED / REMOVED
3-14	28462	TREE	957.8	5	855.3	----	1036.8	TO BE LOWERED / REMOVED
3-15	10699	TREE	957.4	4	855.4	----	1038.2	TO BE LOWERED / REMOVED
3-16	28430	TREE	960.8	6	855.4	----	1040.5	TO BE LOWERED / REMOVED
3-17	28422	TREE	960.8	6	855.4	----	1041.0	TO BE LOWERED / REMOVED
3-18	28414	TREE	964.0	7	855.4	----	1044.0	TO BE LOWERED / REMOVED
3-19	28454	TREE	966.0	9	855.5	N/A	N/A	TO BE LOWERED / REMOVED
3-20	28446	TREE	960.3	3	855.5	----	1045.6	TO BE LOWERED / REMOVED
3-21	10691	TREE	962.2	4	855.5	----	1046.5	TO BE LOWERED / REMOVED

DRAWING LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE	APL	
AIRPORT BUILDINGS		
AIRPORT BUILDINGS (to be removed)	N/A	
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT/ROADWAY (to be removed)	N/A	
PAVED ROADS		
PART 77 APPROACH SURFACE	PT 77	(SAME)
THRESHOLD SITING: APPROACH SURFACE	AS	(SAME)
THRESHOLD SITING: DEPARTURE SURFACE	DS	(SAME)
RUNWAY PROTECTION ZONE	RPZ	(SAME)
BUILDING RESTRICTION LINE	BRL	N/A
RUNWAY SAFETY AREA	RSA	(SAME)
RUNWAY OBJECT FREE AREA	ROFA	(SAME)
RUNWAY VISIBILITY ZONE	RVZ	(SAME)
RUNWAY OBSTACLE FREE ZONE	OFZ	(SAME)
PRECISION OBSTACLE FREE ZONE (POFZ)		(SAME)
GLIDESLOPE CRITICAL AREA	GSCA	(SAME)
LOCALIZER CRITICAL AREA	LCA	(SAME)
TAXIWAY SAFETY AREA	TSA	(SAME)
TAXIWAY OBJECT FREE AREA	TOFA	(SAME)
OBSTRUCTION - GROUP OF TREES		(SAME)
OBSTRUCTION - TERRAIN		(SAME)
FENCE		
GROUND CONTOURS		N/A

NOTES

- SEE DATA SHEET FOR BUILDING LEGEND.

REVISIONS

NO.	ITEM	BY	DATE

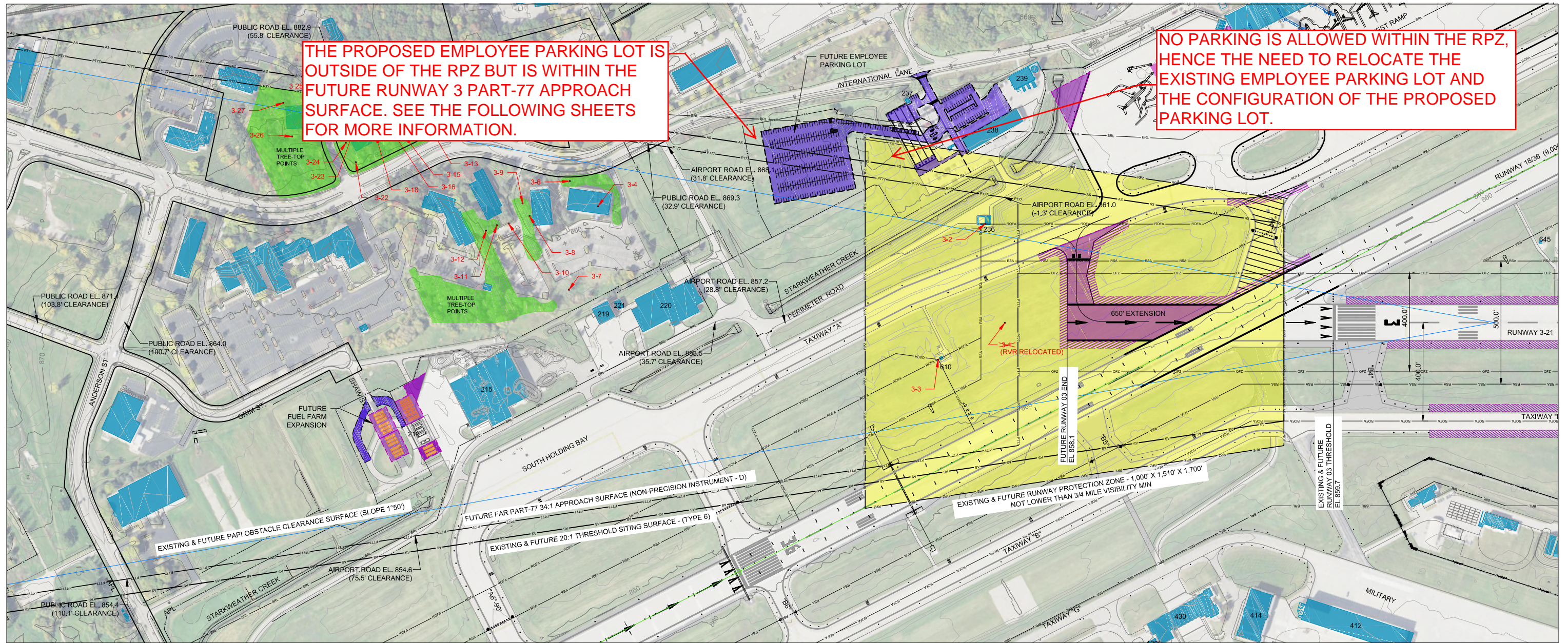
**Dane County Regional Airport
Madison, Wisconsin
INNER PORTION
OF THE APPROACH SURFACE DRAWING
Existing Runway 03 - Plan View**



2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

DATE
JAN 2017
SCALE
N/A
SHEET NO.
18 of 41
FINAL

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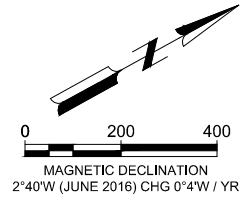


THE PROPOSED EMPLOYEE PARKING LOT IS OUTSIDE OF THE RPZ BUT IS WITHIN THE FUTURE RUNWAY 3 PART-77 APPROACH SURFACE. SEE THE FOLLOWING SHEETS FOR MORE INFORMATION.

NO PARKING IS ALLOWED WITHIN THE RPZ, HENCE THE NEED TO RELOCATE THE EXISTING EMPLOYEE PARKING LOT AND THE CONFIGURATION OF THE PROPOSED PARKING LOT.

OBSTRUCTIONS RWY 03 F

NO.	POINT ID	DESCRIPTION	ELEVATION	PENETRATION PART 77	ALLOWABLE PART 77 HT.	PENETRATION TSS SURFACE	ALLOWABLE TSS SURF HT.	DISPOSITION
3-1	28342	RVR	871.7	12	859.7	----	916.3	EX. NAVAID - (LIGHTED) → (RVR RELOCATED)
3-2	28018	BUILDING	874.9	13	862.0	----	920.3	TO BE LIGHTED
3-3	10123	G.S. ANTENNA	889.6	22	867.6	----	929.9	EX. NAVAID - (LIGHTED)
3-4	17355	BUILDING	913.6	5	908.2	----	998.9	TO BE LIGHTED
3-5	10795	TREE	946.3	36	910.0	----	1002.0	TO BE REMOVED / LOWERED
3-6	17979	TREE	914.8	3	911.6	----	1004.7	TO BE REMOVED / LOWERED
3-7	10195	TREE	924.2	12	911.7	----	1004.8	TO BE REMOVED / LOWERED
3-8	28350	TREE	935.7	19	916.4	----	1012.8	TO BE REMOVED / LOWERED
3-9	17123	TREE	934.4	17	917.3	----	1014.3	TO BE REMOVED / LOWERED
3-10	28366	TREE	931.9	13	918.9	----	1017.1	TO BE REMOVED / LOWERED
3-11	31401	TREE	928.8	9	920.3	----	1019.5	TO BE REMOVED / LOWERED
3-12	10155	TREE	947.6	26	921.6	----	1021.7	TO BE REMOVED / LOWERED
3-13	28398	TREE	949.8	21	928.5	----	1033.3	TO BE REMOVED / LOWERED
3-14	28462	TREE	957.8	27	930.5	----	1036.8	TO BE REMOVED / LOWERED
3-15	10699	TREE	957.4	26	931.3	----	1038.2	TO BE REMOVED / LOWERED
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3-18	28414	TREE	964.0	29	934.8	----	1044.0	TO BE REMOVED / LOWERED
3-20	28446	TREE	960.3	25	935.7	----	1045.6	TO BE REMOVED / LOWERED
3-22	28438	TREE	953.5	16	937.2	----	1048.1	TO BE REMOVED / LOWERED
3-23	31425	TREE	954.6	17	937.4	----	1048.4	TO BE REMOVED / LOWERED
3-24	17139	TREE	959.0	21	938.4	----	1050.1	TO BE REMOVED / LOWERED
3-25	28470	TREE	951.6	13	938.7	----	1050.8	TO BE REMOVED / LOWERED
3-26	31497	TREE	954.9	10	944.8	----	1061.0	TO BE REMOVED / LOWERED
3-27	10659	TREE	963.7	18	945.8	----	1062.8	TO BE REMOVED / LOWERED



DRAWING LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE	APL	
AIRPORT BUILDINGS		
AIRPORT BUILDINGS (to be removed)	N/A	
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT/ROADWAY (to be removed)	N/A	
PAVED ROADS		
PART 77 APPROACH SURFACE	PF77	(SAME)
THRESHOLD SITING: APPROACH SURFACE	AS	(SAME)
THRESHOLD SITING: DEPARTURE SURFACE	DS	(SAME)
RUNWAY PROTECTION ZONE	RPZ	(SAME)
BUILDING RESTRICTION LINE	BRL	N/A
RUNWAY SAFETY AREA	RSA	(SAME)
RUNWAY OBJECT FREE AREA	ROFA	(SAME)
RUNWAY VISIBILITY ZONE	RVZ	(SAME)
RUNWAY OBSTACLE FREE ZONE	OFZ	(SAME)
PRECISION OBSTACLE FREE ZONE (POFZ)		(SAME)
GLIDESLOPE CRITICAL AREA	GSCA	(SAME)
LOCALIZER CRITICAL AREA	LCA	(SAME)
TAXIWAY SAFETY AREA	TSA	(SAME)
TAXIWAY OBJECT FREE AREA	TOFA	(SAME)
OBSTRUCTION - GROUP OF TREES		(SAME)
OBSTRUCTION - TERRAIN		(SAME)
FENCE		
GROUND CONTOURS		N/A

NOTES

- SEE DATA SHEET FOR BUILDING LEGEND.

REVISIONS

NO.	ITEM	BY	DATE

**Dane County Regional Airport
Madison, Wisconsin
INNER PORTION
OF THE APPROACH SURFACE DRAWING
Future Runway 03 - Plan View**

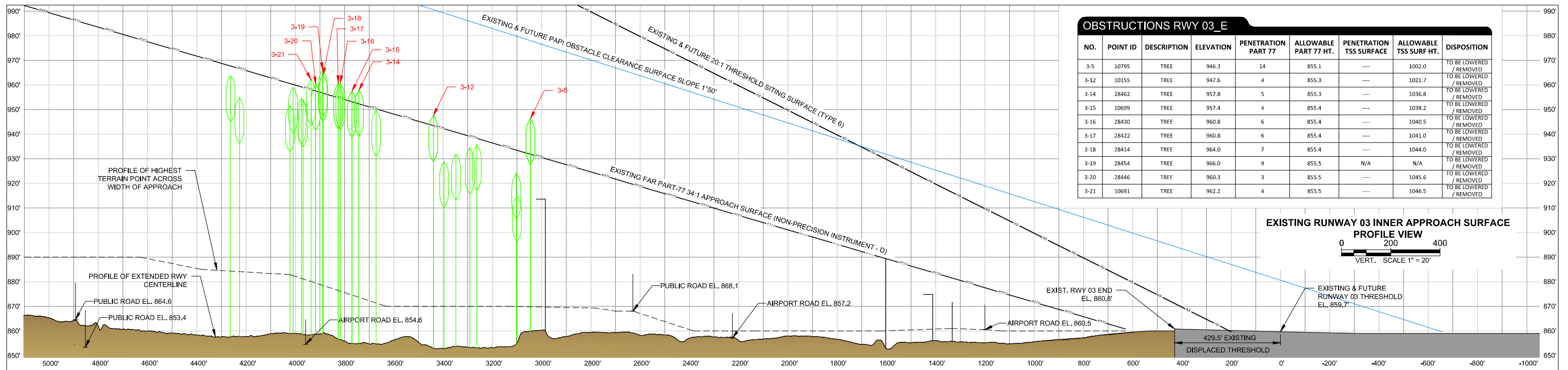


2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

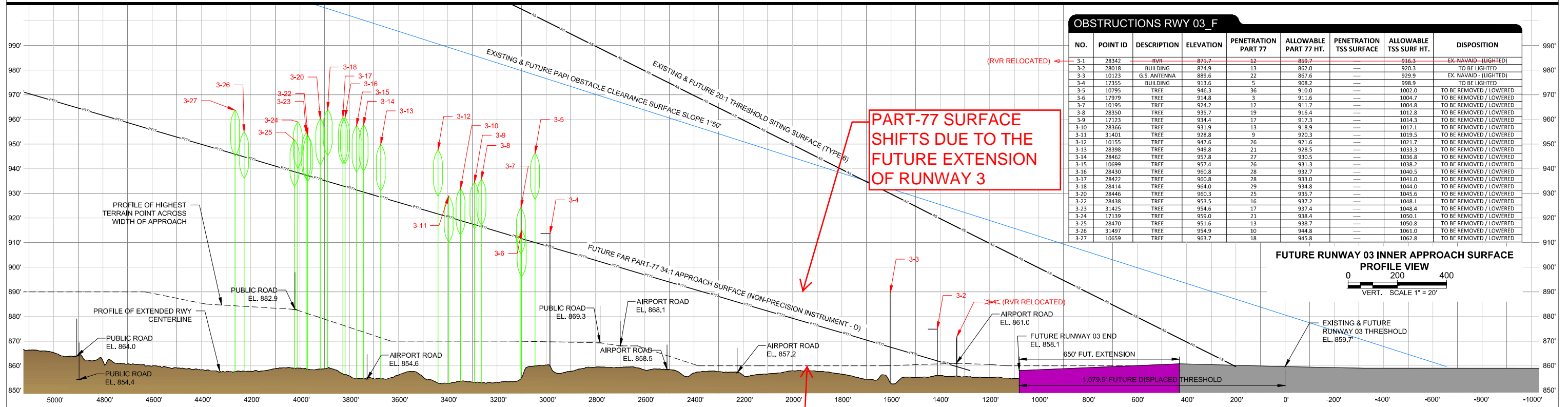
DATE
JAN 2017
SCALE
N/A
SHEET NO.
19 of 41

FINAL

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3-20	28446	TREE	960.3	3	855.5	----	1045.6	TO BE LOWERED / REMOVED
3-21	10691	TREE	962.2	4	855.5	----	1046.5	TO BE LOWERED / REMOVED



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Dane County Regional Airport

Madison, Wisconsin

INNER PORTION OF THE APPROACH SURFACE DRAWING

Existing & Future Runway 03 - Profile View

Mead and Hunt, Inc.

2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

DATE
JAN 2017

SCALE
N/A

SHEET NO.
20 of 41

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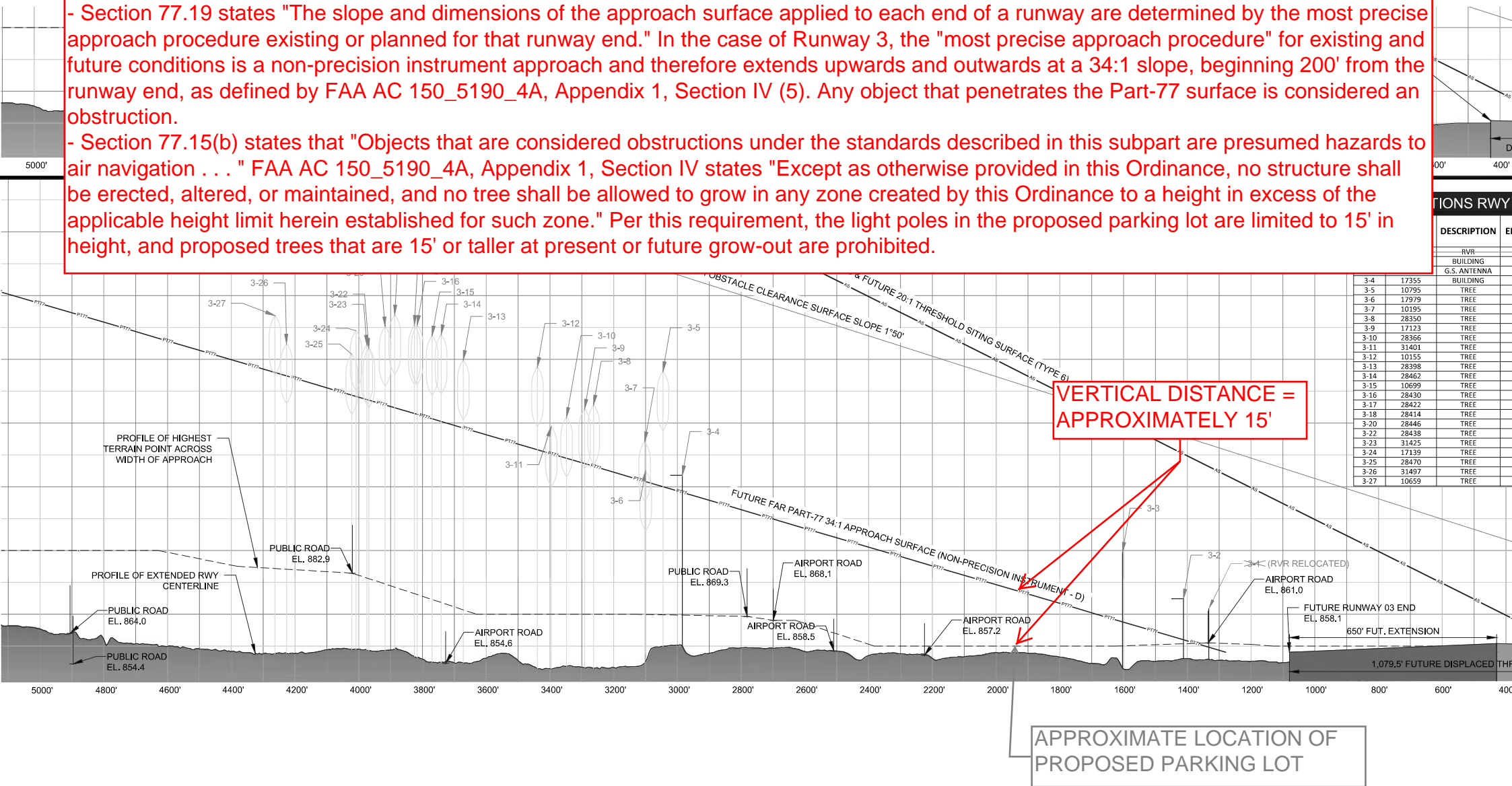
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- Code of Federal Regulations (CFR) Part 77 Section 77.17(a)(5) defines an obstruction as the following: "An existing object, including a mobile object, is, and a future object would be an obstruction to air navigation if it is of greater height than [t]he surface of a takeoff and landing area of an airport or any imaginary surface established under §77.19 . . . "

- Section 77.19 states "The slope and dimensions of the approach surface applied to each end of a runway are determined by the most precise approach procedure existing or planned for that runway end." In the case of Runway 3, the "most precise approach procedure" for existing and future conditions is a non-precision instrument approach and therefore extends upwards and outwards at a 34:1 slope, beginning 200' from the runway end, as defined by FAA AC 150_5190_4A, Appendix 1, Section IV (5). Any object that penetrates the Part-77 surface is considered an obstruction.

- Section 77.15(b) states that "Objects that are considered obstructions under the standards described in this subpart are presumed hazards to air navigation . . . " FAA AC 150_5190_4A, Appendix 1, Section IV states "Except as otherwise provided in this Ordinance, no structure shall be erected, altered, or maintained, and no tree shall be allowed to grow in any zone created by this Ordinance to a height in excess of the applicable height limit herein established for such zone." Per this requirement, the light poles in the proposed parking lot are limited to 15' in height, and proposed trees that are 15' or taller at present or future grow-out are prohibited.



VERTICAL DISTANCE = APPROXIMATELY 15'

APPROXIMATE LOCATION OF PROPOSED PARKING LOT



U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: A MODEL ZONING ORDINANCE TO LIMIT HEIGHT OF OBJECTS AROUND AIRPORTS	Date: 12/14/87 Initiated by: AAS-100	AC No: 150/5190-4A Change:
---	---	---

1. PURPOSE.

a. This advisory circular provides a model zoning ordinance to be used as a guide to control the height of objects around airports.

b. This advisory circular has been editorially updated for reprint/stock purposes only. There were no changes made to the content of the advisory circular except to update the format and renumber the document to AC 150/5190-4A.

2. CANCELLATION. AC 150/5190-4, A Model Zoning Ordinance to Limit Height of Objects Around Airports, dated August 23, 1977.

3. FOCUS.

a. Aviation safety requires a minimum clear space (or buffer) between operating aircraft and other objects. When these other objects are structures (such as buildings), the buffer may be achieved by limiting aircraft operations, by limiting the location and height of these objects, or, by a combination of these factors. This advisory circular concerns itself with developing zoning ordinances to control the height of objects, based on the obstruction surfaces described in Subpart C of Federal Aviation Regulations (FAR) Part 77, Objects Affecting Navigable Airspace, current edition. It should be recognized, however, that not all obstructions (objects whose height exceeds an obstruction surface) are a hazard to air navigation.

b. The Federal Aviation Administration (FAA) conducts aeronautical studies on obstructions which examine their effect on such factors as: aircraft operational capabilities; electronic and procedural requirements; and, airport hazard standards. If an aeronautical study shows that an obstruction, when evaluated against these factors, has no substantial adverse effect upon the safe and efficient use of navigable airspace, then the obstruction is considered not to be a hazard to air navigation. Advisory Circular 150/5300-4, Utility Airports--Air Access to National Transportation, current edition, presents additional discussion on hazards to air navigation.

c. Airport zoning ordinances developed for height limitations do not in themselves ensure compatible land use surrounding the airport. Land use zoning, incorporating height limiting criteria, is an appropriate means for achieving this objective. Advisory Circular 150/5050-6, Airport-Land Use Compatibility Planning, current edition, presents generalized guidance for compatible land use planning in the vicinity of airports.

4. BACKGROUND.

a. The purpose of zoning to limit the height of objects in the vicinity of airports is to prevent their interference with the safe and efficient operations of the airport.

b. Section 511 of the Airport and Airway Improvement Act of 1982, states, in part, the following: ". . . Sec. 511(a) SPONSORSHIP. As a condition precedent to approval of an airport development project contained in a project grant application submitted under this title, the Secretary shall receive assurances in writing, satisfactory to the Secretary that . . . (4) the aerial approaches to the airport will be adequately cleared and protected by removing, lowering, re-locating, marking, or lighting or mitigating existing airport hazards and by preventing the establishment or creation of future airport hazards; (5) appropriate action, including the adoption of zoning laws has been or will be taken, to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and takeoff aircraft;" Conformity with this advisory circular will assist the responsible local government in complying with the Section 511 assurances with respect to the height of objects. However, this advisory circular does not address other land use compatibility criteria, such as noise compatibility, which may be required under Section 511.

c. This advisory circular is based on the obstruction surfaces described in Subpart C of FAR Part 77. Examples of zoning ordinances for a utility airport and for a larger than utility airport have been included in appendices 2 and 3.

5. USE OF MODEL ZONING ORDINANCE.

a. Those responsible for drafting an airport zoning ordinance to limit height of objects are aware, of course, that it must conform to the prescribed authority of that particular airport zoning enabling act. Only terminology applicable to the airport named in the ordinance should be used.

b. The model ordinance included in this advisory circular defines and provides for the establishment of various zones and prescribes height limitations for each zone as required to prevent the creation or establishment of objects which would interfere with the operation of the airport. These zones will vary depending on the type, size, and layout of the runways. The model ordinance, therefore, leaves the specific zone measurements to be inserted by the political subdivision adopting the ordinance as appropriate for its particular airport.

c. The appendices also include examples of how the model ordinance may be used for various types of airports. Since much of the technical terminology and definitions are derived from Federal Aviation Regulations, technical procedural handbooks, and advisory circulars, care should be taken to ensure that language used in the ordinance drafted is consistent with terms used in the model ordinance.

d. Any height limitations imposed by a zoning ordinance must be "reasonable," meaning that the height limitations prescribed should not be so low at any point as to constitute a taking of property without compensations under local law. Therefore, the zoning ordinance should not purport to impose height limitations in any area so close to the ground that the application of criteria prescribed would result in unreasonable or unduly restrictive height limitations. This is provided for by provision 12, Excepted Height Limitations, of Section IV, Airport Zone Height Limitations, in the Model Zoning Ordinance.

e. The decision as to the excepted height limits should be made on the basis of local conditions and circumstances, including the uses being made of property in the vicinity of the airport. In making such a decision, the political subdivision should use the same procedures generally recognized as desirable in preparing comprehensive zoning ordinances, including necessary coordination with recognized state, regional, and local planning offices, where applicable.

f. Areas in the various zones where the height limitation is below the excepted height limit prescribed in the ordinance should be acquired to ensure the required protection. In the approach area, the minimum acquisition begins at the end of the primary surface defined in FAR Part 77, Section 77.25, and extends outward with the width of the approach surface defined in that section, to a point where the approach surface slope reaches a height of 50 feet above the ground elevation of the runway or terrain, whichever distance is the shorter. If easements are acquired, they should include the right of passage over the property by aircraft as well as the right to prevent creation of future obstructions.

g. Drafters of airport zoning ordinances should consult with Federal Aviation Administration (FAA) Airports personnel in regional or district offices when developing airport zoning regulations.

h. The standards contained in FAR Part 77, Subpart C, make it possible to determine, for any location on or adjacent to an airport, the height at which any structure or object of natural growth would constitute an obstruction. Section 77.13 of FAR Part 77, Subpart C sets forth the requirements for filing notice of proposed construction or alteration.

i. If the object exceeds a height or surface defined in Subpart C of FAR Part 77, it would be an obstruction and would be the subject of an aeronautical study by the FAA to determine its effect on navigable airspace. If the object is concluded to have a substantial adverse effect upon the safe and efficient utilization of such airspace, it would be determined to be a hazard to air navigation. The FAA cannot prevent its erection without local assistance. The enactment of this proposed model zoning ordinance will permit the local authorities to control the erection of hazards to air navigation and thus protect the community's investment in the airport.

j. The FAA aeronautical study will be made available to the local zoning authorities and will set forth the effects on aviation of any proposed object that would constitute an obstruction under Subpart C of FAR Part 77. This information can then be considered by the Board of Adjustment when processing applications for variances.

6. AIRPORT ZONING ORDINANCE MAP. AIRPORT LAYOUT PLAN (ALP)

a. Attached to the airport zoning ordinance and made a part thereof is the airport zoning map. The airport zoning map is similar for all types of airports and heliports, and must be compiled from the criteria in Subpart C of FAR Part 77 as reflected in the Ordinance. A typical example of this zoning map was reduced in size for printing in this publication (see appendix 4).

b. The airport zoning map is of the area affected by the airport zoning ordinance and shows the layout of the runways, the airport boundaries, the airport elevation, and the area topography. The map should also set forth the various zones with the applicable height limitations for each as described in the body of the ordinance. The zoning map should contain a method of land identification, as typical in different areas of the country, such as section, township and range, block and lot, or metes and bounds. This map should also depict other identifying geographic objects such as streams, rivers, railroads, roads, and streets. By using a map with this amount of detail, in conjunction with the text of an ordinance, a property owner should, without undue difficulty, be able to determine not only the location of his property, but also the height limitations imposed thereon by the ordinance.

c. Adequate topographic maps may be available from local government sources. Standard topographic maps (quadrangle maps) are available from the U. S. Geological Survey. Maps should be ordered from the Distribution Branch, U. S. Geological Survey, P. O. Box 25286, Federal Center, Denver, Colorado 80225.

d. Many state agencies also make topographic maps available. In the absence of contour topographic data, land evaluation source data may be available from bench marks, railroads, highways, or local project surveys. Contour data on zoning maps should be shown to the extent reasonably available or required locally to support the ordinance.

7. BOARD OF ADJUSTMENT. The model ordinance provides for the creation of a Board of Adjustment to hear appeals, to hear and decide special exemptions, and to hear and decide special variances. Provision is also made for judicial review of decisions of the Board of Adjustment. Such review and appeal procedures are intended to conform to applicable constitutional requirements.

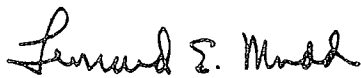
8. GENERAL INSTRUCTIONS FOR USING THE MODEL ZONING ORDINANCE.

a. The model zoning ordinance may be used as a guide for developing airport zoning ordinances to limit the height of objects that may interfere with the operation of a civil airport or heliport. The blank spaces should be filled in with appropriate data as noted.

b. It is not necessary that all material set forth in the model ordinance be used for all airport zoning ordinances. For example, if the airport to be zoned is a utility airport with no precision or nonprecision instrument runways existing or planned, those definitions and paragraphs referring to precision or nonprecision instrument runways or larger than utility runways may be omitted, (see appendix 2). However, if the airport changes to a larger than utility airport or receives instrument approach procedures, the ordinance should be amended to provide for the changes.

c. Section III should only include the airport zones applicable to the airport being zoned. An approach zone is applied to each end of each runway based upon the type of approach available or planned for that runway end. The most precise type of approach, existing or planned, for either end of the runway determines the primary surface width. Heliports do not have horizontal or conical zones. Other zones to accommodate the areas covered in FAR Par 77.23(a) (2) and (3) may be added.

d. Examples of several airport-type ordinances are included in the appendices for guidance.



LEONARD E. MUDD
Director, Office of Airport Standards

APPENDIX 1. MODEL ZONING ORDINANCE TO LIMIT HEIGHT
OF OBJECTS AROUND AN AIRPORT 1/

AN ORDINANCE REGULATING AND RESTRICTING THE HEIGHT OF STRUCTURES AND OBJECTS OF NATURAL GROWTH, AND OTHERWISE REGULATING THE USE OF PROPERTY, IN THE VICINITY OF THE _____ 2/ BY CREATING THE APPROPRIATE ZONES AND ESTABLISHING THE BOUNDARIES THEREOF; PROVIDING FOR CHANGES IN THE RESTRICTIONS AND BOUNDARIES OF SUCH ZONES; DEFINING CERTAIN TERMS USED HEREIN; REFERRING TO THE _____ 2/ ZONING MAP WHICH IS INCORPORATED IN AND MADE A PART OF THIS ORDINANCE; PROVIDING FOR ENFORCEMENT; ESTABLISHING A BOARD OF ADJUSTMENT; AND IMPOSING PENALTIES. 1/.

This Ordinance is adopted pursuant to the authority conferred by _____ 3/. It is hereby found that an obstruction has the potential for endangering the lives and property of users of _____ 2/, and property or occupants of land in its vicinity; that an obstruction may affect existing and future instrument approach minimums of _____ 2/; and that an obstruction may reduce the size of areas available for the landing, takeoff, and maneuvering of aircraft, thus tending to destroy or impair the utility of _____ 2/ and the public investment therein. Accordingly, it is declared:

- (1) that the creation or establishment of an obstruction has the potential of being a public nuisance and may injure the region served by _____ 2/;
- (2) that it is necessary in the interest of the public health, public safety, and general welfare _____ 4/ that the creation or establishment of obstructions that are a hazard to air navigation be prevented; and
- (3) that the prevention of these obstructions should be accomplished, to the extent legally possible, by the exercise of the police power without compensation.

1/ This title should be written to meet the usages and legal requirements of your state, and the political subdivision.

2/ Insert the name of the airport being zoned by the Ordinance.

3/ This citation should be made to conform to the usual method of citing your state laws.

4/ If other terms are commonly used by the courts of your state in defining the limits of police power, such as "convenience" or "prosperity," they should be added here.

It is further declared that the prevention of the creation or establishment of hazards to air navigation, the elimination, removal, alteration or mitigation of hazards to air navigation, or the marking and lighting of obstructions are public purposes for which a political subdivision may raise and expend public funds and acquire land or interests in land.

IT IS HEREBY ORDAINED BY _____ 5/ as follows:

SECTION I: SHORT TITLE

This Ordinance shall be known and may be cited as ___ 2/ Zoning Ordinance.

SECTION II: DEFINITIONS

As used in this Ordinance, unless the context otherwise requires:

1. AIRPORT - _____ 2/.
2. AIRPORT ELEVATION - The highest point of an airport's usable landing area measured in feet from sea level.
3. APPROACH SURFACE - A surface longitudinally centered on the extended runway centerline, extending outward and upward from the end of the primary surface and at the same slope as the approach zone height limitation slope set forth in Section IV of this Ordinance. In plan the perimeter of the approach surface coincides with the perimeter of the approach zone.
4. APPROACH, TRANSITIONAL, HORIZONTAL, AND CONICAL ZONES - These zones are set forth in Section III of this Ordinance.
5. BOARD OF ADJUSTMENT - A Board consisting of _____ 6/ members appointed by the _____ 6/ as provided in _____ 6/.
6. CONICAL SURFACE - A surface extending outward and upward from the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet.
7. HAZARD TO AIR NAVIGATION - An obstruction determined to have a substantial adverse effect on the safe and efficient utilization of the navigable airspace.

5/ A form of enacting clause commonly used by the political subdivision in adopting ordinances should be followed.

6/ Insert the number of members appointed to the Board of Adjustment, the appointing body, and the enabling legislation authorizing same.

8. HEIGHT - For the purpose of determining the height limits in all zones set forth in this Ordinance and shown on the zoning map, the datum shall be mean sea level elevation unless otherwise specified.
9. HELIPORT PRIMARY SURFACE - The area of the primary surface coincides in size and shape with the designated takeoff and landing area of a heliport. This surface is a horizontal plane at the elevation of the established heliport elevation.
10. HORIZONTAL SURFACE - A horizontal plane 150 feet above the established airport elevation, the perimeter of which in plan coincides with the perimeter of the horizontal zone.
11. LARGER THAN UTILITY RUNWAY - A runway that is constructed for and intended to be used by propeller driven aircraft of greater than 12,500 pounds maximum gross weight and jet powered aircraft.
12. NONCONFORMING USE - Any pre-existing structure, object of natural growth, or use of land which is inconsistent with the provisions of this Ordinance or an amendment thereto.
13. NONPRECISION INSTRUMENT RUNWAY - A runway having an existing instrument approach procedure utilizing air navigation facilities with only horizontal guidance, or area type navigation equipment, for which a straight-in nonprecision instrument approach procedure has been approved or planned.
14. OBSTRUCTION - Any structure, growth, or other object, including a mobile object, which exceeds a limiting height set forth in Section IV of this Ordinance.
15. PERSON - An individual, firm, partnership, corporation, company, association, joint stock association, or governmental entity; includes a trustee, a receiver, an assignee, or a similar representative of any of them.
16. PRECISION INSTRUMENT RUNWAY - A runway having an existing instrument approach procedure utilizing an Instrument Landing System (ILS) or a Precision Approach Radar (PAR). It also means a runway for which a precision approach system is planned and is so indicated on an approved airport layout plan or any other planning document.
17. PRIMARY SURFACE - A surface longitudinally centered on a runway. When the runway has a specially prepared hard surface, the primary surface extends 200 feet beyond each end of that runway; for military runways or when the runway has no specially prepared hard surface, or planned hard surface, the primary surface ends at each end of that runway. The width of the primary surface is set forth in Section III of this Ordinance. The elevation of any point on the primary surface

is the same as the elevation of the nearest point on the runway centerline.

18. RUNWAY - A defined area on an airport prepared for landing and take-off of aircraft along its length.
19. STRUCTURE - An object, including a mobile object, constructed or installed by man, including but without limitation, buildings, towers, cranes, smokestacks, earth formation, and overhead transmission lines.
20. TRANSITIONAL SURFACES - These surfaces extend outward at 90 degree angles to the runway centerline and the runway centerline extended at a slope of seven (7) feet horizontally for each foot vertically from the sides of the primary and approach surfaces to where they intersect the horizontal and conical surfaces. Transitional surfaces for those portions of the precision approach surfaces, which project through and beyond the limits of the conical surface, extend a distance of 5,000 feet measured horizontally from the edge of the approach surface and at 90 degree angles to the extended runway centerline.
21. TREE - Any object of natural growth.
22. UTILITY RUNWAY - A runway that is constructed for and intended to be used by propeller driven aircraft of 12,500 pounds maximum gross weight and less.
23. VISUAL RUNWAY - A runway intended solely for the operation of aircraft using visual approach procedures.

SECTION III: AIRPORT ZONES

In order to carry out the provisions of this Ordinance, there are hereby created and established certain zones which include all of the land lying beneath the approach surfaces, transitional surfaces, horizontal surfaces, and conical surfaces as they apply to 2/. Such zones are shown on 2/ Zoning map consisting of sheets, prepared by , and dated 19 , which is attached to this Ordinance and made a part hereof. An area located in more than one (1) of the following zones is considered to be only in the zone with the more restrictive height limitation. The various zones are hereby established and defined as follows:

1. Utility Runway Visual Approach Zone - The inner edge of this approach zone coincides with the width of the primary surface and is 7/ feet wide. The approach zone expands outward uniformly to a width of 1,250 feet at a horizontal distance of 5,000 feet from the primary surface. Its centerline is the continuation of the centerline of the runway.

7/ Insert dimension as set forth in FAR Part 77. Where more than one dimension is applicable, insert dimension identified to the appropriate runway involved.

2. Utility Runway Nonprecision Instrument Approach Zone - The inner edge of this approach zone coincides with the width of the primary surface and is 500 feet wide. The approach zone expands outward uniformly to a width of 2,000 feet at a horizontal distance 5,000 feet from the primary surface. Its centerline is the continuation of the centerline of the runway.
3. Runway Larger Than Utility Visual Approach Zone - The inner edge of this approach zone coincides with the width of the primary surface and is _____ 7/ feet wide. The approach zone expands outward uniformly to a width of 1,500 feet at a horizontal distance of 5,000 feet from the primary surface. Its centerline is the continuation of the centerline of the runway.
4. Runway Larger Than Utility With A Visibility Minimum Greater Than 3/4 Mile Nonprecision Instrument Approach Zone - The inner edge of this approach zone coincides with the width of the primary surface and is _____ 7/ feet wide. The approach zone expands outward uniformly to a width of 3,500 feet at a horizontal distance of 10,000 feet from the primary surface. Its centerline is the continuation of the centerline of the runway.
5. Runway Larger Than Utility With A Visibility Minimum As Low As 3/4 Mile Nonprecision Instrument Approach Zone - The inner edge of this approach zone coincides with the width of the primary surface and is 1,000 feet wide. The approach zone expands outward uniformly to a width of 4,000 feet at a horizontal distance of 10,000 feet from the primary surface. Its centerline is the continuation of the centerline of the runway.
6. Precision Instrument Runway Approach Zone - The inner edge of this approach zone coincides with the width of the primary surface and is 1,000 feet wide. The approach zone expands outward uniformly to a width of 16,000 feet at a horizontal distance of 50,000 feet from the primary surface. Its centerline is the continuation of the centerline of the runway.
7. Heliport Approach Zone - The inner edge of this approach zone coincides with the width of the primary surface and is _____ 8/ feet wide. The approach zone expands outward uniformly to a width of 500 feet at a horizontal distance of 4,000 feet from the primary surface.
8. Transitional Zones - The transitional zones are the areas beneath the transitional surfaces.

8/ The size of the heliport primary surface must be based on present and future heliport operations.

9. Heliport Transitional Zones - These zones extend outward from the sides of the primary surface and the heliport approach zones a horizontal distance of 250 feet from the primary surface centerline and the heliport approach zone centerline.
10. Horizontal Zone - The horizontal zone is established by swinging arcs of 9/ feet radii from the center of each end of the primary surface of each runway and connecting the adjacent arcs by drawing lines tangent to those arcs. The horizontal zone does not include the approach and transitional zones.
11. Conical Zone - The conical zone is established as the area that commences at the periphery of the horizontal zone and extends outward therefrom a horizontal distance of 4,000 feet.

SECTION IV: AIRPORT ZONE HEIGHT LIMITATIONS

Except as otherwise provided in this Ordinance, no structure shall be erected, altered, or maintained, and no tree shall be allowed to grow in any zone created by this Ordinance to a height in excess of the applicable height limit herein established for such zone. Such applicable height limitations are hereby established for each of the zones in question as follows:

1. Utility Runway Visual Approach Zone - Slopes twenty (20) feet outward for each foot upward beginning at the end of and at the same elevation as the primary surface and extending to a horizontal distance of 5,000 feet along the extended runway centerline.
2. Utility Runway Nonprecision Instrument Approach Zone - Slopes twenty (20) feet outward for each foot upward beginning at the end of and at the same elevation as the primary surface and extending to a horizontal distance of 5,000 feet along the extended runway centerline.
3. Runway Larger Than Utility Visual Approach Zone - Slopes twenty (20) feet outward for each foot upward beginning at the end of and at the same elevation as the primary surface and extending to a horizontal distance of 5,000 feet along the extended runway centerline.
4. Runway Larger Than Utility With A Visibility Minimum Greater Than 3/4 Mile Nonprecision Instrument Approach Zone - Slopes thirty-four (34) feet outward for each foot upward beginning at the end of and at the same elevation as the primary surface and extending to a horizontal distance of 10,000 feet along the extended runway centerline.

-
- 9/ The radius of arc is:
- a) 5,000 feet for all runways designated utility or visual,
 - b) 10,000 feet for all others.
- The radius of the arcs for each end of the runway shall be the same.
The radius used shall be the longest determined for either end.

5. Runway Larger Than Utility With A Visibility Minimum As Low As 3/4 Mile Nonprecision Instrument Approach Zone - Slopes thirty-four (34) feet outward for each foot upward beginning at the end of and at the same elevation as the primary surface and extending to a horizontal distance of 10,000 feet along the extended runway centerline.
6. Precision Instrument Runway Approach Zone - Slopes fifty (50) feet outward for each foot upward beginning at the end of and at the same elevation as the primary surface and extending to a horizontal distance of 10,000 feet along the extended runway centerline; thence slopes upward forty (40) feet horizontally for each foot vertically to an additional horizontal distance of 40,000 feet along the extended runway centerline.
7. Heliport Approach Zone - Slopes eight (8) feet outward for each foot upward beginning at the end of and at the same elevation as the primary surface and extending to a distance of 4,000 feet along the heliport approach zone centerline.
8. Transitional Zones - Slope seven (7) feet outward for each foot upward beginning at the sides of and at the same elevation as the primary surface and the approach surface, and extending to a height of 150 feet above the airport elevation which is ___ feet above mean sea level. In addition to the foregoing, there are established height limits sloping seven (7) feet outward for each foot upward beginning at the sides of and at the same elevation as the approach surface, and extending to where they intersect the conical surface. Where the precision instrument runway approach zone projects beyond the conical zone, there are established height limits sloping seven (7) feet outward for each foot upward beginning at the sides of and at the same elevation as the approach surface, and extending a horizontal distance of 5,000 feet measured at 90 degree angles to the extended runway centerline.
9. Heliport Transitional Zones - Slope two (2) feet outward for each foot upward beginning at the sides of and at the same elevation as the primary surface and the heliport approach zones and extending a distance of 250 feet measured horizontally from and at 90 degree angles to the primary surface centerline and heliport approach zones centerline.
10. Horizontal Zone - Established at 150 feet above the airport elevation or at a height of ___ feet above mean sea level.
11. Conical Zone - Slopes twenty (20) feet outward for each foot upward beginning at the periphery of the horizontal zone and at 150 feet above the airport elevation and extending to a height of 350 feet above the airport elevation.

12. Excepted Height Limitations - Nothing in this Ordinance shall be construed as prohibiting the construction or maintenance of any structure, or growth of any tree to a height up to _____ 10/ feet above the surface of the land.

SECTION V: USE RESTRICTIONS

Notwithstanding any other provisions of this Ordinance, no use may be made of land or water within any zone established by this Ordinance in such a manner as to create electrical interference with navigational signals or radio communication between the airport and aircraft, make it difficult for pilots to distinguish between airport lights and others, result in glare in the eyes of pilots using the airport, impair visibility in the vicinity of the airport, create bird strike hazards, or otherwise in any way endanger or interfere with the landing, takeoff, or maneuvering of aircraft intending to use the airport.

SECTION VI: NONCONFORMING USES

1. Regulations Not Retroactive - The regulations prescribed by this Ordinance shall not be construed to require the removal, lowering, or other change or alteration of any structure or tree not conforming to the regulations as of the effective date of this Ordinance, or otherwise interfere with the continuance of nonconforming use. Nothing contained herein shall require any change in the construction, alteration, or intended use of any structure, the construction or alteration of which was begun prior to the effective date of this Ordinance, and is diligently prosecuted.
2. Marking and Lighting - Notwithstanding the preceding provision of this Section, the owner of any existing nonconforming structure or tree is hereby required to permit the installation, operation, and maintenance thereon of such markers and lights as shall be deemed necessary by the ___ 11/ to indicate to the operators of aircraft in the vicinity of the airport the presence of such airport obstruction. Such markers and lights shall be installed, operated, and maintained at the expense of the ___ 12/.

10/ The adoption of height limits should be reasonable and based on land use considerations in the vicinity of the airport and the nature of the area to be zoned. The adoption of height limits should not be so low as to constitute a taking of private property without due process of law.

11/ Insert the title of the appropriate official who has been charged with the responsibility for determining the necessity for marking and lighting.

12/ Insert the name of the appropriate political body or subdivision.

SECTION VII: PERMITS

1. Future Uses - Except as specifically provided in a, b, and c hereunder, no material change shall be made in the use of land, no structure shall be erected or otherwise established, and no tree shall be planted in any zone hereby created unless a permit therefor shall have been applied for and granted. Each application for a permit shall indicate the purpose for which the permit is desired, with sufficient particularity to permit it to be determined whether the resulting use, structure, or tree would conform to the regulations herein prescribed. If such determination is in the affirmative, the permit shall be granted. No permit for a use inconsistent with the provisions of this Ordinance shall be granted unless a variance has been approved in accordance with Section VII, 4.
 - a. In the area lying within the limits of the horizontal zone and conical zone, no permit shall be required for any tree or structure less than seventy-five feet of vertical height above the ground, except when, because of terrain, land contour, or topographic features, such tree or structure would extend above the height limits prescribed for such zones.
 - b. In areas lying within the limits of the approach zones, but at a horizontal distance of not less than 4,200 feet from each end of the runway, no permit shall be required for any tree or structure less than seventy-five feet of vertical height above the ground, except when such tree or structure would extend above the height limit prescribed for such approach zones.
 - c. In the areas lying within the limits of the transition zones beyond the perimeter of the horizontal zone, no permit shall be required for any tree or structure less than seventy-five feet of vertical height above the ground, except when such tree or structure, because of terrain, land contour, or topographic features, would extend above the height limit prescribed for such transition zones.

Nothing contained in any of the foregoing exceptions shall be construed as permitting or intending to permit any construction, or alteration of any structure, or growth of any tree in excess of any of the height limits established by this Ordinance except as set forth in Section IV, 12.

2. Existing Uses - No permit shall be granted that would allow the establishment or creation of an obstruction or permit a nonconforming use, structure, or tree to become a greater hazard to air navigation than it was on the effective date of this Ordinance or any amendments thereto or than it is when the application for a permit is made. Except as indicated, all applications for such a permit shall be granted.

3. Nonconforming Uses Abandoned or Destroyed - Whenever the 13/ determines that a nonconforming tree or structure has been abandoned or more than 80 percent torn down, physically deteriorated, or decayed, no permit shall be granted that would allow such structure or tree to exceed the applicable height limit or otherwise deviate from the zoning regulations.

4. Variances - Any person desiring to erect or increase the height of any structure, or permit the growth of any tree, or use property, not in accordance with the regulations prescribed in this Ordinance, may apply to the Board of Adjustment for a variance from such regulations. The application for variance shall be accompanied by a determination from the Federal Aviation Administration as to the effect of the proposal on the operation of air navigation facilities and the safe, efficient use of navigable airspace. Such variances shall be allowed where it is duly found that a literal application or enforcement of the regulations will result in unnecessary hardship and relief granted, will not be contrary to the public interest, will not create a hazard to air navigation, will do substantial justice, and will be in accordance with the spirit of this Ordinance. Additionally, no application for variance to the requirements of this Ordinance may be considered by the Board of Adjustment unless a copy of the application has been furnished to the 14/ for advice as to the aeronautical effects of the variance. If the 14/ does not respond to the application within fifteen (15) days after receipt, the Board of Adjustment may act on its own to grant or deny said application.

5. Obstruction Marking and Lighting - Any permit or variance granted may, if such action is deemed advisable to effectuate the purpose of this Ordinance and be reasonable in the circumstances, be so conditioned as to require the owner of the structure or tree in question to install, operate, and maintain, at the owner's expense, such markings and lights as may be necessary. If deemed proper by the Board of Adjustment, this condition may be modified to require the owner to permit the 12/ at its own expense, to install, operate, and maintain the necessary markings and lights.

13/ Insert here the title of the appropriate official charged with making this determination.

14/ Insert here the official or body responsible for operation and maintenance of the airport to be zoned.

SECTION VIII: ENFORCEMENT

It shall be the duty of the ___ 15/ to administer and enforce the regulations prescribed herein. Applications for permits and variances shall be made to the ___ 15/ upon a form published for that purpose. Applications required by this Ordinance to be submitted to the ___ 15/ shall be promptly considered and granted or denied. Application for action by the Board of Adjustment shall be forthwith transmitted by the ___ 15/.

SECTION IX: BOARD OF ADJUSTMENT

1. There is hereby created a Board of Adjustment to have and exercise the following powers: (1) to hear and decide appeals from any order, requirement, decision, or determination made by the ___ 15/ in the enforcement of this Ordinance; (2) to hear and decide special exceptions to the terms of this Ordinance upon which such Board of Adjustment under such regulations may be required to pass; and (3) to hear and decide specific variances.
2. The Board of Adjustment shall consist of ___ members appointed by the ___ 12/ and each shall serve for a term of ___ years until a successor is duly appointed and qualified. Of the members first appointed, one shall be appointed for a term of ___ year, ___ for a term of ___ years, and ___ for a term of ___ years. Members shall be removable by the appointing authority for cause, upon written charges, after a public hearing.
3. The Board of Adjustment shall adopt rules for its governance and in harmony with the provisions of this Ordinance. Meetings of the Board of Adjustment shall be held at the call of the Chairperson and at such other times as the Board of Adjustment may determine. The Chairperson or, in the absence of the Chairperson, the Acting Chairperson may administer oaths and compel the attendance of witnesses. All hearings of the Board of Adjustment shall be public. The Board of Adjustment shall keep minutes of its proceedings showing the vote of each member upon each question; or if absent or failing to vote, indicating such fact, and shall keep records of its examinations and other official actions, all of which shall immediately be filed in the office of ___ 15/ and on due cause shown.
4. The Board of Adjustment shall make written findings of facts and conclusions of law giving the facts upon which it acted and its legal conclusions from such facts in reversing, affirming, or modifying any order, requirement, decision, or determination which comes before it under the provisions of this Ordinance.

15/ Insert here the title of the appropriate official, such as Director, Department of Public Works, etc.

5. The concurring vote of a majority of the members of the Board of Adjustment shall be sufficient to reverse any order, requirement, decision, or determination of the ___ 15/ or decide in favor of the applicant on any matter upon which it is required to pass under this Ordinance, or to effect variation to this Ordinance.

SECTION X: APPEALS

1. Any person aggrieved, or any taxpayer affected, by any decision of the ___ 15/ made in the administration of the Ordinance, may appeal to the Board of Adjustment.
2. All appeals hereunder must be taken within a reasonable time as provided by the rules of the Board of Adjustment, by filing with the ___ 15/ a notice of appeal specifying the grounds thereof. The ___ 15/ shall forthwith transmit to the Board of Adjustment all the papers constituting the record upon which the action appealed from was taken.
3. An appeal shall stay all proceedings in furtherance of the action appealed from unless the ___ 15/ certifies to the Board of Adjustment, after the notice of appeal has been filed with it, that by reason of the facts stated in the certificate a stay would in the opinion of ___ 15/ cause imminent peril to life or property. In such case, proceedings shall not be stayed except by the order of the Board of Adjustment on notice to the ___ 15/ and on due cause shown.
4. The Board of Adjustment shall fix a reasonable time for hearing appeals, give public notice and due notice to the parties in interest, and decide the same within a reasonable time. Upon the hearing, any party may appear in person or by agent or by attorney.
5. The Board of Adjustment may, in conformity with the provisions of this Ordinance, reverse or affirm, in whole or in part, or modify the order, requirement, decision, or determination appealed from and may make such order, requirement, decision, or determination as may be appropriate under the circumstances.

SECTION XI: JUDICIAL REVIEW

Any person aggrieved, or any taxpayer affected, by any decision of the Board of Adjustment, may appeal to the Court of ___ as provided in Section ___ of Chapter ___ of the Public Laws of ___ 16/.

16/ Insert the jurisdiction. Consideration should be given the desirability of setting forth this procedure here, or as an alternative attaching to all copies of this Ordinance, a copy of excerpts from the statute cited.

SECTION XII: PENALTIES

Each violation of this Ordinance or of any regulation, order, or ruling promulgated hereunder shall constitute a misdemeanor and shall be punishable by a fine of not more than _____ dollars or imprisonment for not more than _____ days or both; and each day a violation continues to exist shall constitute a separate offense.

SECTION XIII: CONFLICTING REGULATIONS

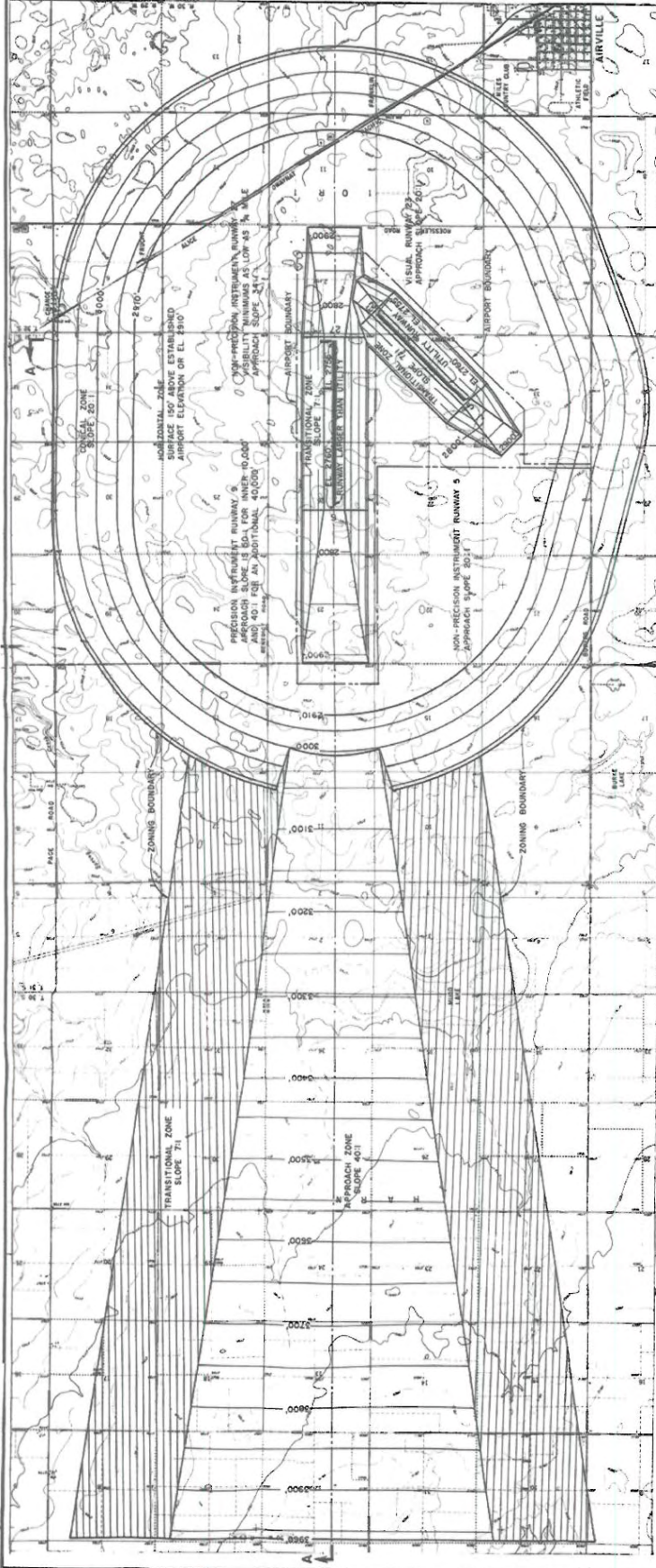
Where there exists a conflict between any of the regulations or limitations prescribed in this Ordinance and any other regulations applicable to the same area, whether the conflict be with respect to the height of structures or trees, and the use of land, or any other matter, the more stringent limitation or requirement shall govern and prevail.

SECTION XIV: SEVERABILITY

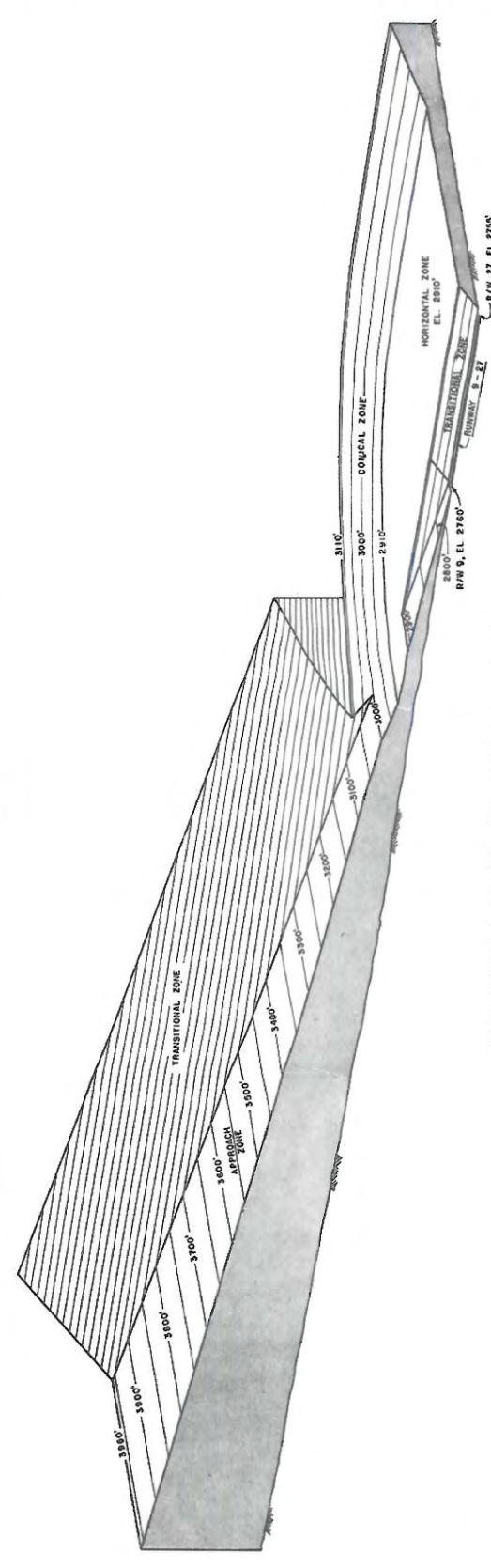
If any of the provisions of this Ordinance or the application thereof to any person or circumstances are held invalid, such invalidity shall not affect other provisions or applications of the Ordinance which can be given effect without the invalid provision or application, and to this end, the provisions of this Ordinance are declared to be severable.

SECTION XV: EFFECTIVE DATE

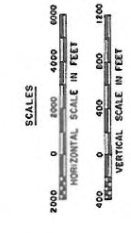
WHEREAS, the immediate operation of the provisions of this Ordinance is necessary for the preservation of the public health, public safety, and general welfare, an EMERGENCY is hereby declared to exist, and this Ordinance shall be in full force and effect from and after its passage by the ___ and publication and posting as required by law.
Adopted by the _____ this _____ day of _____, 19__.



ZONING PLAN



ISOMETRIC VIEW OF SECTION A-A



CITY & COUNTY OF AIRVILLE	
JOINT ZONING BOARD	
AIRVILLE MUNICIPAL	
AIRPORT ZONING MAP	
ZONING ORDINANCE ADOPTED (DATE)	
REVISION	APPROVED
REVIEWED	CHECKED
DATE	SHEET
DRAWN BY	DWR: R/S

Subpart C—Standards for Determining Obstructions to Air Navigation or Navigational Aids or Facilities

§77.13 Applicability.

This subpart describes the standards used for determining obstructions to air navigation, navigational aids, or navigational facilities. These standards apply to the following:

(a) Any object of natural growth, terrain, or permanent or temporary construction or alteration, including equipment or materials used and any permanent or temporary apparatus.

(b) The alteration of any permanent or temporary existing structure by a change in its height, including appurtenances, or lateral dimensions, including equipment or material used therein.

§77.15 Scope.

(a) This subpart describes standards used to determine obstructions to air navigation that may affect the safe and efficient use of navigable airspace and the operation of planned or existing air navigation and communication facilities. Such facilities include air navigation aids, communication equipment, airports, Federal airways, instrument approach or departure procedures, and approved off-airway routes.

(b) Objects that are considered obstructions under the standards described in this subpart are presumed hazards to air navigation unless further aeronautical study concludes that the object is not a hazard. Once further aeronautical study has been initiated, the FAA will use the standards in this subpart, along with FAA policy and guidance material, to determine if the object is a hazard to air navigation.

(c) The FAA will apply these standards with reference to an existing airport facility, and airport proposals received by the FAA, or the appropriate military service, before it issues a final determination.

(d) For airports having defined runways with specially prepared hard surfaces, the primary surface for each runway extends 200 feet beyond each end of the runway. For airports having defined strips or pathways used regularly for aircraft takeoffs and landings, and designated runways, without specially prepared hard surfaces, each end of the primary surface for each such runway shall coincide with the corresponding end of the runway. At airports, excluding seaplane bases, having a defined landing and takeoff area with no defined pathways for aircraft takeoffs and landings, a determination must be made as to which portions of the landing and takeoff area are regularly used as landing and takeoff pathways. Those determined pathways must be considered runways, and an appropriate primary surface as defined in §77.19 will be considered as longitudinally centered on each such runway. Each end of that primary surface must coincide with the corresponding end of that runway.

(e) The standards in this subpart apply to construction or alteration proposals on an airport (including heliports and seaplane bases with marked lanes) if that airport is one of the following before the issuance of the final determination:

(1) Available for public use and is listed in the Airport/Facility Directory, Supplement Alaska, or Supplement Pacific of the U.S. Government Flight Information Publications; or

(2) A planned or proposed airport or an airport under construction of which the FAA has received actual notice, except DOD airports, where there is a clear indication the airport will be available for public use; or,

(3) An airport operated by a Federal agency or the DOD; or,

(4) An airport that has at least one FAA-approved instrument approach.

§77.17 Obstruction standards.

(a) An existing object, including a mobile object, is, and a future object would be an obstruction to air navigation if it is of greater height than any of the following heights or surfaces:

(1) A height of 499 feet AGL at the site of the object.

(2) A height that is 200 feet AGL, or above the established airport elevation, whichever is higher, within 3 nautical miles of the established reference point of an airport, excluding heliports, with its longest runway more than 3,200 feet in actual length, and that height increases in the proportion of 100 feet for each additional nautical mile from the airport up to a maximum of 499 feet.

(3) A height within a terminal obstacle clearance area, including an initial approach segment, a departure area, and a circling approach area, which would result in the vertical distance between any point on the object and an established minimum instrument flight altitude within that area or segment to be less than the required obstacle clearance.

(4) A height within an en route obstacle clearance area, including turn and termination areas, of a Federal Airway or approved off-airway route, that would increase the minimum obstacle clearance altitude.

(5) The surface of a takeoff and landing area of an airport or any imaginary surface established under §77.19, 77.21, or 77.23. However, no part of the takeoff or landing area itself will be considered an obstruction.

(b) Except for traverse ways on or near an airport with an operative ground traffic control service furnished by an airport traffic control tower or by the airport management and coordinated with the air traffic control service, the standards of paragraph (a) of this section apply to traverse ways used or to be used for the passage of mobile objects only after the heights of these traverse ways are increased by:

(1) 17 feet for an Interstate Highway that is part of the National System of Military and Interstate Highways where overcrossings are designed for a minimum of 17 feet vertical distance.

(2) 15 feet for any other public roadway.

(3) 10 feet or the height of the highest mobile object that would normally traverse the road, whichever is greater, for a private road.

(4) 23 feet for a railroad.

(5) For a waterway or any other traverse way not previously mentioned, an amount equal to the height of the highest mobile object that would normally traverse it.

§77.19 Civil airport imaginary surfaces.

The following civil airport imaginary surfaces are established with relation to the airport and to each runway. The size of each such imaginary surface is based on the category of each runway according to the type of approach available or planned for that runway. The slope and dimensions of the approach surface applied to each end of a runway are determined by the most precise approach procedure existing or planned for that runway end.

(a) *Horizontal surface.* A horizontal plane 150 feet above the established airport elevation, the perimeter of which is constructed by SW.inging arcs of a specified radii from the center of each end of the primary surface of each runway of each airport and connecting the adjacent arcs by lines tangent to those arcs. The radius of each arc is:

(1) 5,000 feet for all runways designated as utility or visual;

(2) 10,000 feet for all other runways. The radius of the arc specified for each end of a runway will have the same arithmetical value. That value will be the highest determined for either end of the runway. When a 5,000-foot arc is encompassed by tangents connecting two adjacent 10,000-foot arcs, the 5,000-foot arc shall be disregarded on the construction of the perimeter of the horizontal surface.

(b) *Conical surface.* A surface extending outward and upward from the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

(c) *Primary surface.* A surface longitudinally centered on a runway. When the runway has a specially prepared hard surface, the primary surface extends 200 feet beyond each end of that runway; but when the runway has no specially prepared hard surface, the primary surface ends at each end of that runway. The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline. The width of the primary surface is:

(1) 250 feet for utility runways having only visual approaches.

(2) 500 feet for utility runways having non-precision instrument approaches.

(3) For other than utility runways, the width is:

(i) 500 feet for visual runways having only visual approaches.

(ii) 500 feet for non-precision instrument runways having visibility minimums greater than three-fourths statute mile.

(iii) 1,000 feet for a non-precision instrument runway having a non-precision instrument approach with visibility minimums as low as three-fourths of a statute mile, and for precision instrument runways.

(iv) The width of the primary surface of a runway will be that width prescribed in this section for the most precise approach existing or planned for either end of that runway.

(d) *Approach surface.* A surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface. An approach surface is applied to each end of each runway based upon the type of approach available or planned for that runway end.

(1) The inner edge of the approach surface is the same width as the primary surface and it expands uniformly to a width of:

(i) 1,250 feet for that end of a utility runway with only visual approaches;

(ii) 1,500 feet for that end of a runway other than a utility runway with only visual approaches;

(iii) 2,000 feet for that end of a utility runway with a non-precision instrument approach;

(iv) 3,500 feet for that end of a non-precision instrument runway other than utility, having visibility minimums greater than three-fourths of a statute mile;

(v) 4,000 feet for that end of a non-precision instrument runway, other than utility, having a non-precision instrument approach with visibility minimums as low as three-fourths statute mile; and

(vi) 16,000 feet for precision instrument runways.

(2) The approach surface extends for a horizontal distance of:

(i) 5,000 feet at a slope of 20 to 1 for all utility and visual runways;

(ii) 10,000 feet at a slope of 34 to 1 for all non-precision instrument runways other than utility; and

(iii) 10,000 feet at a slope of 50 to 1 with an additional 40,000 feet at a slope of 40 to 1 for all precision instrument runways.

(3) The outer width of an approach surface to an end of a runway will be that width prescribed in this subsection for the most precise approach existing or planned for that runway end.

(e) *Transitional surface.* These surfaces extend outward and upward at right angles to the runway centerline and the runway centerline extended at a slope of 7 to 1 from the sides of the primary surface and from the sides of the approach surfaces. Transitional surfaces for those portions of the precision approach surface which project through and beyond the limits of the conical surface, extend a distance of 5,000 feet measured horizontally from the edge of the approach surface and at right angles to the runway centerline.

§77.21 Department of Defense (DOD) airport imaginary surfaces.

(a) *Related to airport reference points.* These surfaces apply to all military airports. For the purposes of this section, a military airport is any airport operated by the DOD.

(1) *Inner horizontal surface.* A plane that is oval in shape at a height of 150 feet above the established airfield elevation. The plane is constructed by scribing an arc with a radius of 7,500 feet about the centerline at the end of each runway and interconnecting these arcs with tangents.

(2) *Conical surface.* A surface extending from the periphery of the inner horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 7,000 feet to a height of 500 feet above the established airfield elevation.

(3) *Outer horizontal surface.* A plane, located 500 feet above the established airfield elevation, extending outward from the outer periphery of the conical surface for a horizontal distance of 30,000 feet.

(b) *Related to runways.* These surfaces apply to all military airports.

(1) *Primary surface.* A surface located on the ground or water longitudinally centered on each runway with the same length as the runway. The width of the primary surface for runways is 2,000 feet. However, at established bases where substantial construction has taken place in accordance with a previous lateral clearance criteria, the 2,000-foot width may be reduced to the former criteria.

(2) *Clear zone surface.* A surface located on the ground or water at each end of the primary surface, with a length of 1,000 feet and the same width as the primary surface.

(3) *Approach clearance surface.* An inclined plane, symmetrical about the runway centerline extended, beginning 200 feet beyond each end of the primary surface at the centerline elevation of the runway end and extending for 50,000 feet. The slope of the approach clearance surface is 50 to 1 along the runway centerline extended until it reaches an elevation of 500 feet above the established airport elevation. It then continues horizontally at this elevation to a point 50,000 feet from the point of beginning. The width of this surface at the runway end is the same as the primary surface, it flares uniformly, and the width at 50,000 is 16,000 feet.

(4) *Transitional surfaces.* These surfaces connect the primary surfaces, the first 200 feet of the clear zone surfaces, and the approach clearance surfaces to the inner horizontal surface, conical surface, outer horizontal surface or other transitional surfaces. The slope of the transitional surface is 7 to 1 outward and upward at right angles to the runway centerline.

§77.23 Heliport imaginary surfaces.

(a) *Primary surface.* The area of the primary surface coincides in size and shape with the designated take-off and landing area. This surface is a horizontal plane at the elevation of the established heliport elevation.

(b) *Approach surface.* The approach surface begins at each end of the heliport primary surface with the same width as the primary surface, and extends outward and upward for a horizontal distance of 4,000 feet where its width is 500 feet. The slope of the approach surface is 8 to 1 for civil heliports and 10 to 1 for military heliports.

(c) *Transitional surfaces.* These surfaces extend outward and upward from the lateral boundaries of the primary surface and from the approach surfaces at a slope of 2 to 1 for a distance of 250 feet measured horizontally from the centerline of the primary and approach surfaces.



Federal Aviation Administration

Memorandum

Date: **SEP 27 2012**

To: Regional Airports Division Managers
610 Branch Managers
620 Branch Managers
ADO Managers

From: *Benito De Leon*
Benito De Leon, Director
Office of Airport Planning and Programming (APP-1)
Michael J. O'Donnell
Michael J. O'Donnell, Director
Office of Airport Safety and Standards (AAS-1)

Subject: Interim Guidance on Land Uses Within a Runway Protection Zone

Background

The FAA Office of Airports (ARP) has identified the need to clarify our policy on land uses within the Runway Protection Zone (RPZ). This memorandum presents interim policy guidance on compatible land uses within Runway Protection Zones (RPZ) to address recurrent questions about what constitutes a compatible land use and how to evaluate proposed land uses that would reside in an RPZ. While Advisory Circular 150/5300-Change 17(Airport Design) notes that "it is desirable to clear all objects from the RPZ," it also acknowledges that "some uses are permitted" with conditions and other "land uses are prohibited."

RPZ land use compatibility also is often complicated by ownership considerations. Airport owner control over the RPZ land is emphasized to achieve the desired protection of people and property on the ground. Although the FAA recognizes that in certain situations the airport sponsor may not fully control land within the RPZ, the FAA expects airport sponsors to take all possible measures to protect against and remove or mitigate incompatible land uses.

ARP is developing a new guidance document for the Regional Office (RO) and Airport District Office (ADO) staff that clarifies our policy regarding land uses in the RPZ. This new guidance document will outline a comprehensive review process for existing and proposed land uses within an RPZ and is slated for publication in 2013. We also intend to incorporate RPZ land use considerations into the ongoing update to the Land Use Compatibility Advisory Circular (AC) which is slated for publication in 2014.

This memorandum outlines interim guidance for ARP RO and ADO staff to follow until the comprehensive RPZ land use guidance is published.

Interim Guidance

New or Modified Land Uses in the RPZ

Regional and ADO staff must consult with the National Airport Planning and Environmental Division, APP-400 (who will coordinate with the Airport Engineering Division, AAS-100), when any of the land uses described in **Table 1** would enter the limits of the RPZ as the result of:

1. An airfield project (e.g., runway extension, runway shift)
2. A change in the critical design aircraft that increases the RPZ dimensions
3. A new or revised instrument approach procedure that increases the RPZ dimensions
4. A local development proposal in the RPZ (either new or reconfigured)

Table 1: Land Uses Requiring Coordination with APP-400

- Buildings and structures (Examples include, but are not limited to: residences, schools, churches, hospitals or other medical care facilities, commercial/industrial buildings, etc.)
- Recreational land use (Examples include, but are not limited to: golf courses, sports fields, amusement parks, other places of public assembly, etc.)
- Transportation facilities. Examples include, but are not limited to:
 - Rail facilities – light or heavy, passenger or freight
 - Public roads/highways
 - Vehicular parking facilities
- Fuel storage facilities (above and below ground)
- Hazardous material storage (above and below ground)
- Wastewater treatment facilities
- Above-ground utility infrastructure (i.e. electrical substations), including any type of solar panel installations.

Land uses that may create a safety hazard to air transportation resulting from wildlife hazard attractants such as retention ponds or municipal landfills are not subject to RPZ standards since these types of land uses do not create a hazard to people and property on the ground. Rather, these land uses are controlled by other FAA policies and standards. In accordance with the relevant Advisory Circulars, the Region/ADO must coordinate land use proposals that create wildlife hazards with AAS-300, regardless of whether the proposed land use occurs within the limits of an RPZ.

Alternatives Analysis

Prior to contacting APP-400, the RO and ADO staff must work with the airport sponsor to identify and document the full range of alternatives that could:

1. Avoid introducing the land use issue within the RPZ
2. Minimize the impact of the land use in the RPZ (i.e., routing a new roadway through the controlled activity area, move farther away from the runway end, etc.)

3. Mitigate risk to people and property on the ground (i.e., tunneling, depressing and/or protecting a roadway through the RPZ, implement operational measures to mitigate any risks, etc.)

Documentation of the alternatives should include:

- A description of each alternative including a narrative discussion and exhibits or figures depicting the alternative
- Full cost estimates associated with each alternative regardless of potential funding sources.
- A practicability assessment based on the feasibility of the alternative in terms of cost, constructability and other factors.
- Identification of the preferred alternative that would meet the project purpose and need while minimizing risk associated with the location within the RPZ.
- Identification of all Federal, State and local transportation agencies involved or interested in the issue.
- Analysis of the specific portion(s) and percentages of the RPZ affected, drawing a clear distinction between the Central Portion of the RPZ versus the Controlled Activity Area, and clearly delineating the distance from the runway end and runway landing threshold.
- Analysis of (and issues affecting) sponsor control of the land within the RPZ.
- Any other relevant factors for HQ consideration.

APP-400 will consult with AAS-100 when reviewing the project documents provided by the RO/ADO. APP-400 and AAS-100 will work with the Region/ADO to make a joint determination regarding Airport Layout Plan (ALP) approval after considering the proposed land use, location within the RPZ and documentation of the alternatives analysis.

In addition, APP-400 and AAS-100 will work with the Region/ADO to craft language for inclusion in the airspace determination letter regarding any violations to ensure that all stakeholders (including tenants, operators, and insurers) are fully apprised of the issues and potential risks and liabilities associated with permitting such facilities within the RPZ.

Existing Land Uses in the RPZ

This interim policy only addresses the introduction of new or modified land uses to an RPZ and proposed changes to the RPZ size or location. Therefore, at this time, the RO and ADO staff shall continue to work with sponsors to remove or mitigate the risk of any existing incompatible land uses in the RPZ as practical.

For additional information or questions regarding this interim guidance, please contact either Ralph Thompson, APP-400, at ralph.thompson@faa.gov or (202) 267-8772 or Danielle Rinsler, APP-401, at danielle.rinsler@faa.gov or (202) 267-8784.