
FINAL ENVIRONMENTAL ASSESSMENT VOLUME I

Replacement Passenger Terminal and Enabling Projects

Des Moines International Airport
Des Moines, Iowa

Prepared for

Des Moines Airport Authority
And
U.S. Department of Transportation
Federal Aviation Administration

As lead Federal Agency pursuant to the National Environmental Policy Act of 1969

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June 2019

**This Environmental Assessment becomes a Federal document when evaluated, signed
and dated by the Responsible Federal Official.**

Responsible Federal Official

Date

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VOLUME I

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Appendix B – Biological Resources

Appendix C – Hazardous Materials

Appendix D – Historic-Cultural Resources

VOLUME II

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Appendix F - Wetlands

Appendix G - Air Quality - Construction Emissions Inventory

Appendix H - Farmlands

Appendix I - Noise

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Acronyms and Abbreviations

A

AC	Advisory Circular
ACHP	Advisory Council on Historic Preservation
ACRP	Airport Cooperative Research Program
ADT	Average Daily Traffic
AEM	Area Equivalent Method
AIP	Airport Improvement Program
ALP	Airport Layout Plan
APE	Area of Potential Effect
AST	Above Ground Storage Tank

B

BMP	Best Management Practice
BRS	Biennial Reporting System

C

CAA	Clean Air Act
CEQ	Council on Environmental Quality
CESQG	Conditionally Exempt Small Quantity Generators
CFR	Code of Federal Regulation
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
CWA	Clean Water Act

D

DNL	Day-Night Average Sound Level
-----	-------------------------------

E

EA	Environmental Assessment
EF	Erosional Feature
EO	Executive Order
ESA	Endangered Species Act

F

FAA	Federal Aviation Administration
FBO	Fixed Base Operator

FE&C	Federal Enforcement and Compliance
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FPPA	Farmland Protection Policy Act
FRS	Facility Registry System

G

GA	General Aviation
GAO	Government Accountability Office
GHG	Greenhouse Gas

H

HSWA	Hazardous and Solid Waste Amendments
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I

IANG	Iowa Air National Guard
ICAO	International Civil Aviation Organization
ICIS	Integrated Compliance Information System
IDNR	Iowa Department of Natural Resources
IPaC	Information for Planning and Conservation

J

K

L

LED	Light-emitting Diode
LOS	Level of Service
LQG	Large Quantity Generator
LRP	Land Recycling Program

L Continued

LUST	Leaking Underground Storage Tank
LWCFA	Land and Water Conservation Fund Act

M

MBTA	Migratory Bird Treaty Act
MOA	Memorandum of Agreement

N

NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO ₂	Nitrogen Dioxide
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NPS	National Park Service
NRCS	National Resources Conservation Service
NRHP	National Register of Historic Places

O

O ₃	Ozone
OSA	Office of the State Archaeologist

P

Pb	Lead
PHMSA	Pipeline and Hazardous Materials Safety Administration
PM _{2.5}	Particulate Matter 2.5 Micrometers
PM ₁₀	Particulate Matter 10 Micrometers

*Q**R*

RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conservation and Recovery Information System
RON	Remain Overnight

S

SAGA	Sustainability Aviation Guidance Alliance
SEMS	Superfund Enterprise Management System
SFM	State Fire Marshal
SIP	State Implementation Plan
SO ₂	Sulfur Dioxide
SPCC	Spill Prevention Control and Countermeasure
SQG	Small Quantity Generator
SWPPP	Storm Water Pollution Prevention Plan

T

TAF	Terminal Area Forecast
TCP	Traditional Cultural Properties
TSA	Transportation Security Administration
TSCA	Toxic Substances Control Act

U

USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UST	Underground Storage Tank

V

VPD	Vehicles per Day
-----	------------------

W
WUS Waters of the U.S.

Y

X

Z

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CHAPTER 1

INTRODUCTION AND PROPOSED ACTION

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This Environmental Assessment (EA) identifies and evaluates potential environmental effects related to the proposed construction and operation of various airside and landside improvements at Des Moines International Airport (Airport).

The Federal Aviation Administration (FAA) is the lead federal agency to ensure compliance with the National Environmental Policy Act (NEPA) for airport development actions. This EA is prepared in accordance with FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, and FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*, as well as applicable Council on Environmental Quality (CEQ) regulations implementing NEPA, applicable Executive Orders (EOs), and other applicable federal, state, and local requirements.

1.1 AIRPORT OVERVIEW

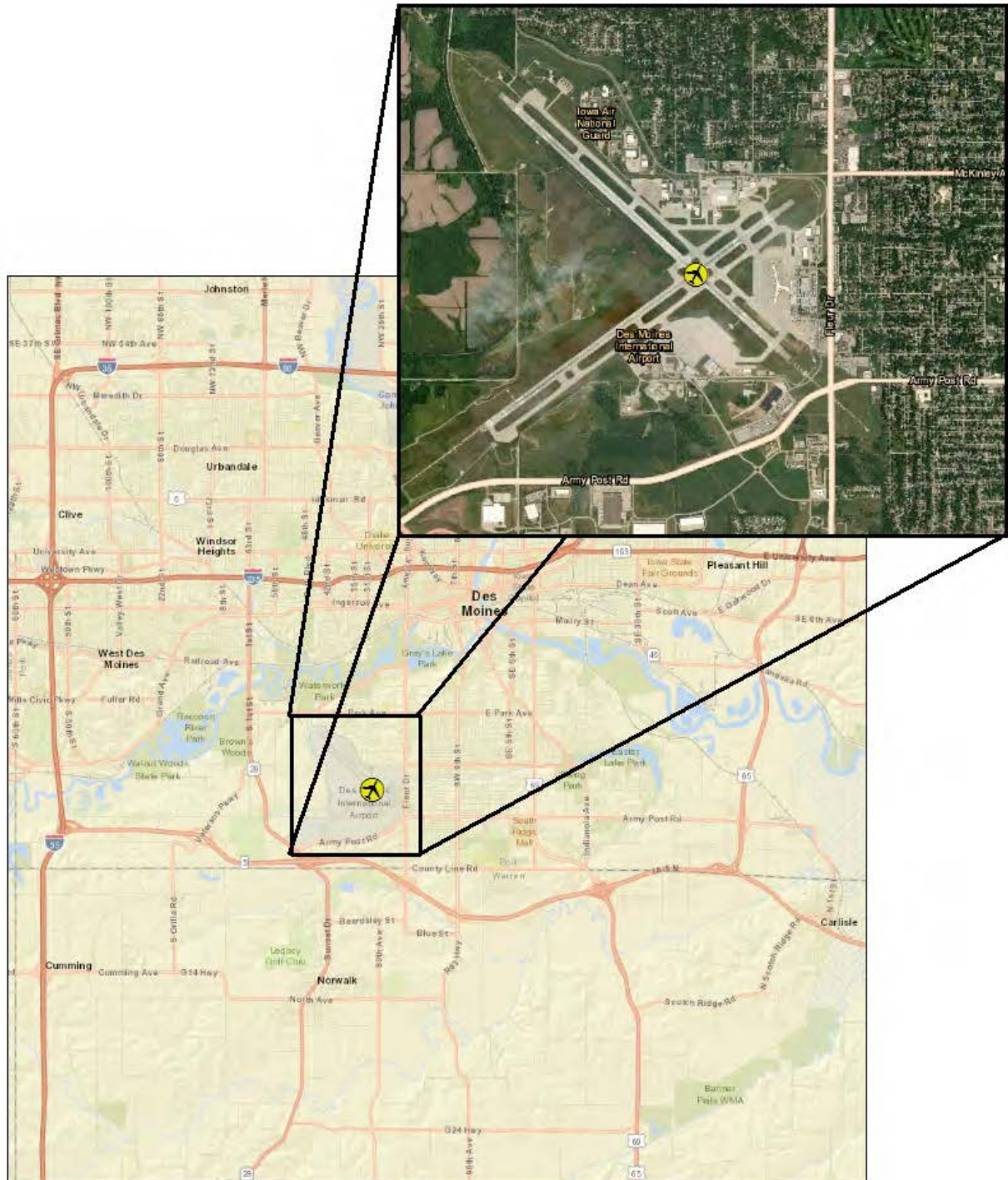
The Des Moines International Airport (DSM or Airport) is owned and operated by the Des Moines Airport Authority (Authority). The Authority Board is composed of five citizens appointed by the Mayor of Des Moines and approved by the Des Moines City Council.

The Airport is located within the City of Des Moines (City), which is in the southern portion of Polk County (County), Iowa. The Airport is about three miles southwest of downtown Des Moines and serves residents and visitors of the Des Moines Metropolitan Statistical Area including Polk, Dallas, Warren, Des Moines, and Guthrie counties in Iowa. **Figure 1-1** shows the location of the Airport. The Airport is divided into and commonly referred to as being in quadrants; north, south, east, and west (see **Figure 1-2**).

In the National Plan of Integrated Airport Systems, the FAA classifies the Airport as a small/non-hub primary commercial service airport.¹ The primary service classification indicates that the Airport is a public use facility with scheduled air carrier service and has 10,000 or more enplaned passengers per year. There are two runways, as well as taxiways, aprons, and other facilities at the Airport. Runway 5/23 is 9,003 feet long by 150 feet wide. Runway 13/31 is 9,002 feet long by 150 feet wide. The passenger terminal building and most of the support buildings are located in the east quadrant. The Iowa Air National Guard is located in the north quadrant and air cargo facilities are located in the south quadrant. There are fixed base operator facilities in the north, south, and east quadrants. There is no development in the west quadrant of the Airport.

¹ FAA. (2016, September 30). National Plan of Integrated Airport Systems (NPIAS) Report to Congress, 2017-2021. FAA: Washington, D.C. Retrieved June 2018, from FAA Airports: https://www.faa.gov/airports/planning_capacity/npas/reports/

FIGURE 1-1
AIRPORT LOCATION



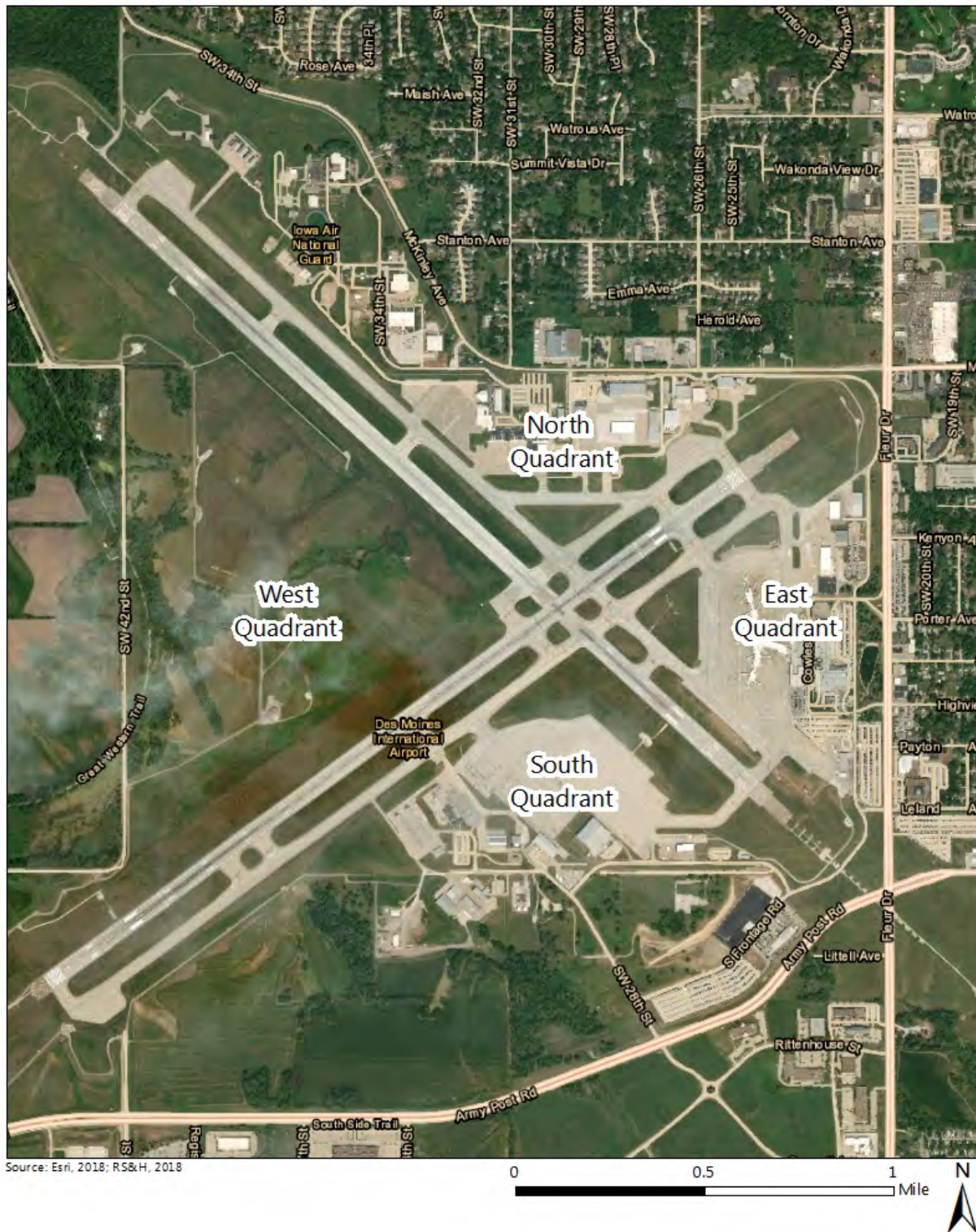
Source: Esri, 2018; RS&H, 2018

Note: This figure is for graphic purposes only and is not to scale.

Legend

 Airport Location

FIGURE 1-2
AIRPORT QUADRANTS



1.2 PASSENGER TERMINAL BUILDING BACKGROUND

The existing passenger terminal building was constructed in 1948 and has had various upgrades and improvements over the years. In 2013, the Authority conducted major improvements to the passenger terminal building after pieces of the ceiling fell to the floor. In addition, the Authority saw a rise in passenger traffic (enplanements) and new airline routes to and from the Airport. Given the age of the passenger terminal building, the building does not have capacity to accommodate the increase in passenger traffic. With the continued need for improvements and lack of capacity to efficiently serve its customers, the Authority undertook a long-range planning process in order to develop a long-term solution to the inefficiency of the passenger terminal building, assess how functional components of the Airport can grow to meet projected demands, and develop an overall terminal plan to meet the financial and functional needs of the Authority and its customers.

As part of the long-range planning process, the Authority completed a Terminal Area Concept Plan in 2014 (2014 Report).² The 2014 Report included an inventory of existing facilities at the Airport, aviation and passenger forecasts, facility requirements, analysis of alternatives for future development, analysis of the Authority's financial capacity, an overview of existing environmental conditions, and an update of the Airport's airport layout plan (ALP). An Advisory Committee was established to oversee the 2014 Report and select an alternative best suited for the Airport. Based on the existing facilities and needs of the Airport, the Advisory Committee selected an alternative for developing a new passenger terminal building in the south quadrant of the Airport.

In 2016, the Authority prepared *Addendum to the Terminal Area Concept Plan Technical Report* (2016 Addendum)³, which updated the 2014 Report due to changes in site use. The 2014 Report based the alternatives analysis in part on the ability to use the existing Iowa Air National Guard site in the north quadrant for the relocation of tenants in order to clear the south quadrant for the new terminal. However, after completion of the report, the Iowa Air National Guard site was determined to be "off-limits" and a new analysis of alternatives for the passenger terminal facilities was conducted. Given the new site use information, the 2016 Addendum determined that the east quadrant of the Airport was the best suited for a replacement passenger terminal while still meeting the needs of the Airport.

Both the 2014 Report and 2016 Addendum included public involvement and documents associated with the 2014 Report and 2016 Addendum were made available on the Airport's website. The 2014 Report and 2016 Addendum took into consideration concerns and comments made by the general public, as well as other interested parties.

Information from 2014 Report and 2016 Addendum are used in this EA to support the purpose and need statement for the Proposed Action (**Chapter 2**) and alternatives analysis (**Chapter 3**).

² Des Moines Airport Authority. (2014, April). *Des Moines International Airport Terminal Area Concept Plan Technical Report*. Retrieved July 2018, from Des Moines International Airport: <http://www.dsmairport.com/webres/File/about-the-airport/terminal-study/DSM%20Terminal-Area-Concept-Plan-Technical-Report%20-%20FINAL.pdf>

³ Des Moines Airport Authority. (2016, November). *Des Moines International Airport Addendum to: Terminal Area Concept Plan Technical Report*. Retrieved July 2018, from Des Moines International Airport: <http://www.dsmairport.com/webres/File/about-the-airport/terminal-study/Terminal%20Site%20Study%20Update.pdf>

1.3 PROPOSED ACTION

The Airport Authority proposes to develop a replacement passenger terminal building and other ancillary facilities at the Airport (Proposed Action). The Authority is seeking the FAA's approval of the revised airport layout plan (ALP) depicting the Proposed Action, as well as Airport Improvement Program (AIP) funding for eligible components of the Proposed Action.

The components of the Proposed Action, which is shown in **Figure 1-3**, include:

- » Project 1: Construction of a Replacement Passenger Terminal Building
- » Project 2: Demolition of the Existing Passenger Terminal Building
- » Project 3: Construction of a Terminal Apron with New Deicing Pad, Remain Overnight (RON) Pad, and Relocation of the Storm Control Building
- » Project 4: Construction of an Elevated Pedestrian Bridge
- » Project 5: Realignment of the Roadway Loop/Curbside
- » Project 6: Construction of a New Parking Structure
- » Project 7: Construction of a New Entry Plaza to Parking
- » Project 8: Construction of a New Exit Plaza from Existing Parking
- » Project 9: Relocation of the Employee Parking
- » Project 10: Relocation of the Cell Phone Lot
- » Project 11: Construction of a New Entry Intersection at Fleur Drive
- » Project 12: Relocation of Signature and DSM Flying Services
- » Project 13: Demolition of Buildings 34/35
- » Project 14: Construction of General Aviation (GA) Hangars
- » Project 15: Expansion of the South Apron
- » Project 16: Construction of a New Taxiway Entry
- » Project 17: Construction of a New Cargo Deicing Pad
- » Project 18: Improvements to South Roadways and Parking
- » Project 19: Construction of a New Rental Car Customer Service Building and Ready-Return Area
- » Project 20: Construction Borrow Area
- » Project 21: Construction of a New Dry Detention Basin
- » Project 22: Improvements to Fuel Road⁴

⁴ Project 22 has been shown to have independent utility from the Proposed Action. Therefore, this project component has been removed from the Proposed Action and analyzed as part of the future airport actions found in Section 4.5, *Cumulative Effects*. However, this project component is still being shown in Figure 1-3, *Proposed Action* for reference of this project component's location.

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FIGURE 1-3
PROPOSED ACTION



Legend

- | | | | |
|---------------------------------------------|-----------------------------|---------------------------------------------------|-----------------------------------------------------------------|
| Replacement Passenger Terminal Building (1) | Parking Structure (6) | Entry Intersection at Fleur Drive (11) | South Roadway and Parking Improvements (18) |
| Building Demolition (2, 13) | Entry Plaza to Parking (7) | Signature and DSM Flying Services Relocation (12) | Rental Car Customer Service Building and Ready-Return Area (19) |
| Apron Expansion (3, 15) | Exit Plaza from Parking (8) | General Aviation Hangars (14) | Construction Borrow Area (20) |
| Elevated Pedestrian Bridge (4) | Employee Parking (9) | Taxiway Entry (16) | Dry Detention Basin (21) |
| Roadway Loop/Curbside Realignment (5) | Cell Phone Lot (10) | Cargo Deicing Pad (17) | Fuel Road Improvements (22) |

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1. Construction of a Replacement Passenger Terminal Building: The Authority proposes to construct a replacement passenger terminal building northeast of the existing passenger terminal building. The replacement passenger terminal building would include ticketing, airline ticket office space, passenger screening space, Transportation Security Administration (TSA) space, outbound baggage screening and bag make-up space, baggage claim area and claim devices, inbound baggage delivery area, aircraft gates and passenger holdroom areas, concessions, rental car counters, circulation areas including mechanical/electrical and building support space, provide utilities (water, gas, electric, and sewer), airport administration offices, and airline support functions. All functions that are currently within the terminal area remain on Airport property.

2. Demolition of the Existing Passenger Terminal Building: The existing passenger terminal building would remain open during construction of the new replacement terminal. After the construction of the replacement passenger terminal building, the existing passenger terminal building would be decommissioned and demolished. At such time, the site will initially be used for airside use, but will be available for future airside development.

3. Construction of Terminal Apron with New Deicing Pad, Remain-Over-Night (RON) Pad, and Relocation of the Storm Control Building: The expanded terminal apron would include a designated deicing pad, ten RON hardstands, and the glycol storm control building. Fuel will continue to be delivered to the aircraft via the fuel consortium, located in the south quadrant, and their fleet of fuel trucks.

4. Construction of an Elevated Pedestrian Bridge: An elevated pedestrian bridge would be constructed to provide pedestrian access to the proposed replacement passenger terminal building from the proposed parking structure.

5. Realignment of the Roadway Loop/Curbside: A new roadway loop and curbside would be constructed to the east of the new ticketing plaza where it would split into several lanes for drop off, pick up, and bypass lanes.

6. Construction of New Parking Structure: A new parking garage adjacent to the existing parking garage south of the replacement terminal building would be constructed. This parking garage would be connected to the proposed replacement terminal by a new pedestrian bridge.

7. Construction of a New Entry Plaza to Parking: A new entry plaza to the current parking garages and proposed new parking structure would be constructed.

8. Construction of a New Exit Plaza from Existing Parking: A new exit plaza would be constructed on the south side of the existing parking garage. All traffic leaving from the lots and garages within the roadway loop would exit through the proposed exit plaza, where traffic will then merge with the existing roadway loop.

9. Relocation of the Employee Parking: The designated employee parking will be moved from a parking lot north of the existing passenger terminal building to an existing parking lot south of the existing passenger terminal building (and proposed replacement passenger terminal building).

10. Relocation of the Cell Phone Lot: The cell phone lot would be relocated from its existing location on South Airport Frontage Road in the south quadrant to the lot south of the existing Economy Lot #2.

11. Construction of a New Entry Intersection at Fleur Drive: A new entry intersection to the Airport would be constructed at Fleur Drive. This would provide prioritized access to the Airport (i.e., northbound traffic using the entrance to the Airport would not have to yield to southbound traffic on Fleur Drive, unlike the existing roadway configuration).

12. Relocation of Signature and DSM Flying Services: To provide for the development of the replacement passenger terminal building, Signature and DSM Flying Services would need to be relocated to the south quadrant.

13. Demolition of Buildings 34/35: To provide for the relocation of Signature and DSM Flying Services, Buildings 34 and 35 would be demolished and the current tenant of Building 34, (Air Methods), would be moved to the relocated Building 33 while the current tenants of Building 35, UPS (cargo air sort and office building), would be moved to the relocated Building 31.

14. Construction of GA Hangars: GA hangars would be constructed in the south quadrant. There is existing utility infrastructure in the south quadrant. GA hangar development will extend utilities to the existing infrastructure.

15. Expansion of the South Apron: The south apron would be extended to provide airfield access to the proposed location of the Signature and DSM Flying Services, as well as the relocated Building 33.

16. Construction of a New Taxiway Entry: A new taxiway entry from the south apron to the existing Taxiway P would be constructed to provide runway access to and from the relocated Signature and DSM Flying Services.

17. Construction of a New Cargo Deicing Pad: A portion of the existing south apron will be designated as a cargo deicing pad and will provide a designated area for cargo aircraft deicing activities.

18. Improvements to South Roadways and Parking: Improvements would be made to the roadways in the south quadrant, including the construction of additional parking spaces, to accommodate the relocation of cargo activities to the south quadrant.

19. Construction of a New Rental Car Customer Service Building and Rental Car Ready-Return Area: A new rental car customer service building and rental car ready-return area would be constructed south of the proposed replacement passenger terminal building

20. Construction Borrow Area: A construction borrow area has been identified for instances where fill is needed for the previously described project components. Fill material would be excavated from this site and transported to the appropriate project component site.

21. Construction of a New Dry Detention Basin: A dry detention basin would be constructed north of the proposed new parking structure to accommodate the increase in impervious surface and stormwater runoff that would occur from the other project components. The dry detention basin would be constructed in accordance with FAA design standards.

1.3.1 Phasing

Implementation of the Proposed Action would occur in several phases to minimize potential disruptions to Airport operations. Overall, the construction of the Proposed Action is proposed to occur over a twelve-year period, with construction proposed to start in 2020.

Enabling projects, such as the relocation of cargo activities to the south quadrant and airfield improvements, is proposed to begin in late 2019 to early 2020. Between 2020 and 2025, various landside and airside projects associated with the proposed replacement passenger terminal building would occur. Portions of the existing terminal would be closed, and select gates would be removed, starting in 2025. Construction of the proposed replacement passenger terminal building is anticipated to begin in 2026, after the majority of the proposed airfield improvements in the area have been completed. The proposed replacement passenger terminal building would open with 10 active gates in 2028, with the final gate opening in 2030. The proposed roadway improvements and demolition of the remaining existing passenger terminal building is anticipated to be complete in 2032.

1.4 REQUESTED FEDERAL ACTIONS

- » Unconditional approval of the Airport Layout Plan (ALP) to depict the proposed improvements pursuant to 49 USC §§ 40103(b) and 47107(a)(16).
- » Determination under 49 USC § 44502(b) that the airport development is reasonably necessary for use in air commerce or in the interests of national defense.
- » Approval of a Construction Safety and Phasing Plan to maintain aviation and airfield safety during construction pursuant to FAA Advisory Circular (AC) 150/5370-2F, Operational Safety on Airports During Construction (14 CFR Part 139 [49 USC § 44706]).
- » Approval of changes to the airport certification manual pursuant to 14 CFR Part 139 (49 USC § 44706).
- » Determinations, through the aeronautical study process, under 14 CFR Part 77, regarding obstructions to navigable airspace (49 USC Section 40103 (b) and 40113).
- » Approval of potential modification to FAA air traffic control facilities resulting from implementation of the proposed action.
- » Determinations under 49 USC 47106 and 47107 relating to the eligibility of the Proposed Action for federal funding under the Airport Improvement Program (AIP) and/or determinations under 49

USC 40117, as implemented by 14 CFR 158.25, to impose and use passenger facility charges (PFCs) collected at the airport to assist with construction of potentially eligible development items shown on the ALP including the proposed construction of the replacement terminal and associated actions that may directly or indirectly impact FAA facilities including but not limited to utility relocations.

1.5 DOCUMENT ORGANIZATION

This EA is organized into the following chapters:

Chapter 1: Introduction and Proposed Action – This chapter provides an overview of the Airport, describes the Proposed Action that this EA evaluates, and outlines the organization of the EA.

Chapter 2: Purpose and Need – This chapter identifies the problem that the Proposed Action addresses (i.e., need) and describes what the Authority is trying to achieve with the Proposed Action (i.e., purpose).

Chapter 3: Alternatives – This chapter identifies and describes the alternatives that this EA considers or eliminates from detailed analysis, including a description of the No Action Alternative.

Chapter 4: Affected Environment – This chapter provides an overview of the existing environmental conditions in the areas that the Proposed Action may affect. This chapter also identifies past, present, and reasonably foreseeable future actions that may contribute to cumulative impacts when considered in combination with the Proposed Action.

Chapter 5: Environmental Consequences – This chapter describes the potential environmental effects that the Proposed Action, No Action Alternative, and each reasonable alternative would have on the affected environment. Pursuant to regulations and CEQ Guidance documents, this chapter also discusses cumulative effects. That discussion focuses on the effects that the Proposed Action would have on environmental resources, in combination with the effects on those resources from past, present, and reasonably foreseeable future actions. Where appropriate, this EA contains figures and tables to clarify the analysis presented in this chapter.

Chapter 6: List of Preparers – This chapter identifies the individuals who prepared, contributed to, and reviewed this EA.

Chapter 7: Agency and Public Involvement – This chapter describes the coordination process associated with development of the EA.

Chapter 8: References – This chapter lists the references used in the development of this EA.

Appendices – The appendices contain relevant material, analyses, or technical reports used in preparing this EA.

CHAPTER 2

PURPOSE AND NEED

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According to Federal Aviation Administration (FAA) Order 1050.1F, Section 6-2.1(c), the purpose and need briefly describes the underlying purpose and need for the federal action and provides the foundation for identifying reasonable alternatives to a Proposed Action. The purpose and need identifies the problem facing the airport sponsor (i.e., the “need” for the action) and describes what would be achieved by the Authority’s Proposed Action (i.e., the “purpose” of the action).

2.1 BACKGROUND

As described in **Chapter 1**, the Authority completed a Terminal Area Concept Plan Technical Report in 2014 (2014 Report) to assess the current function of the Airport and determine if improvements to the existing passenger terminal building were needed in order to continue to effectively and efficiently serve the airlines and passengers.⁵ A 2016 Addendum to the 2014 Report was prepared to address changes that occurred with respect to master planning variables.⁶ The 2014 Report and the 2016 Addendum provide the basis for the purpose and need outlined below.

2.1.1 Aviation Activity

The FAA publishes its forecast annually for each U.S. airport, including DSM. The Terminal Area Forecast (TAF) is “*prepared to assist the FAA in meeting its planning, budgeting, and staffing requirements. In addition, state aviation authorities and other aviation planners use the TAF as a basis for planning airport improvements.*”⁷ The most recent release is the 2018 TAF, which was issued in February 2019.

The 2018 TAF includes historical information on aircraft operations from fiscal year 1990 through 2017 and forecasts for 2018 to 2045. At airports with FAA Airport Traffic Control Towers (ATCT) like DSM, FAA air traffic controllers provide historical aircraft operations data for the TAF, which count landings and takeoffs. These aircraft operations are recorded as either air carrier, commuter and air taxi, general aviation (GA), or military. Air carrier is defined as an aircraft with seating capacity of more than 60 seats or a maximum payload capacity of more than 18,000 pounds carrying passengers or cargo, for hire or compensation. Commuter and air taxi aircraft are designed to have a maximum seating capacity of 60 seats or a maximum payload capacity of 18,000 pounds carrying passengers or cargo for hire or compensation. GA aircraft include small aircraft ranging from one-seat single-engine planes to long-range corporate jets. GA includes all segments of the aviation industry besides commercial air carriers and military. According to the 2018 TAF, aircraft operations at DSM increased from 69,339 in 2016 to 70,184 in 2017. Passenger enplanements at DSM increased from 1,209,487 in 2016 to 1,246,447 in 2017. A copy of the 2018 TAF for DSM is provided in **Appendix A**.

2.2 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The following section discusses the purpose of and need for the project. This EA analyzes alternatives that would address those needs and accomplish that purpose. The purpose of the Proposed Action is to provide a better customer experience for passengers and to ensure continued safe, secure and efficient

⁵ Des Moines Airport Authority. (2014, April). *Des Moines International Airport Terminal Area Concept Plan Technical Report*. Retrieved July 2018, from Des Moines International Airport: <http://www.dsmairport.com/webres/File/about-the-airport/terminal-study/DSM%20Terminal-Area-Concept-Plan-Technical-Report%20-%20FINAL.pdf>

⁶ Des Moines Airport Authority. (2016, November). *Des Moines International Airport Addendum to: Terminal Area Concept Plan Technical Report*. Retrieved July 2018, from Des Moines International Airport: <http://www.dsmairport.com/webres/File/about-the-airport/terminal-study/Terminal%20Site%20Study%20Update.pdf>

⁷ Federal Aviation Administration, Terminal Area Forecast Summary, Fiscal Years 2018-2045.

airport operations by providing space for current and potential future demand. The Authority has identified a number of deficiencies within the existing passenger terminal that would need to be addressed in order to meet the project's purpose, as described in more detail below. The assessment of needs is based on meeting current demand, consistent with the 2018 FAA Terminal Area Forecast. The Proposed Action would not induce or cause growth in the number or type of aircraft operations at DSM beyond what was forecast for the existing airport. No additional airlines are expected to start services at the Airport as a result of implementation of the Proposed Action. In addition, the number and type of aircraft are anticipated to be the same between the existing passenger terminal facility and the proposed replacement terminal for the same future year.

2.2.1 Purpose For the Proposed Action

The purpose of the proposed replacement passenger terminal is to continue serving the needs of the community and provide a better customer experience for passengers and to ensure continued safe, secure and efficient airport operations. To do this, the goals and objectives of the Authority are to:

1. Modernize the passenger terminal and associated on-Airport facilities.
2. Better accommodate the existing and forecast increase in passengers (enplanements).
3. Enhance efficiency of aircraft movement on the apron.

The proposed passenger terminal replacement is to meet the current enplanement demand while also providing space for growth as it relates to enplanements. Many facilities in the terminal are out-of-date and the number of passengers currently traveling through the Airport exceed the terminal building's capabilities. This issue will only be exacerbated with the continued increase in passengers as forecast in the FAA's 2018 TAF. As described in **Section 2.1.1**, the TAF is updated annually by the FAA and used by the Airport to predict future demand and facility capacity requirements. Because the existing passenger terminal is already operating beyond its capacity, and increased operations and enplanements are projected in the TAF, improvements to the passenger terminal need to be made in order to support the current and projected demand.

The Proposed Action would not induce or change the number or type of aircraft operations at DSM. If at a future, unknown time the Authority has a need to increase the number of gates and/or change the aircraft fleet mix, the potential environmental effects would be analyzed under a separate NEPA document.

2.2.1.1 Modernize the Passenger Terminal and Associated on-Airport Facilities

Many of the existing passenger facilities at the Airport are out-of-date (see **Section 2.2.2.1**). The services provided at the Airport have out-grown the passenger terminal building's capabilities. Modernizing the passenger terminal and associated facilities would provide the space needed for passengers (e.g., parking, unloading, ticketing) and the security requirements associated with traveling (e.g., passenger security screening).

2.2.1.2 Accommodate the Increase in Passengers

According to the FAA's 2018 TAF, the number of passengers traveling through the Airport is expected to increase over the next 25 years (see **Section 2.2.2.2**). The existing passenger terminal building is 272,900 square feet. For the Authority to better serve the needs of the community and those traveling to and from

Des Moines, additional space and facilities are needed to accommodate the existing and forecast increase in passengers. The analysis in the 2014 Report determined that 315,500 square feet would be required to meet the needs of the Authority.⁸

2.2.1.3 Enhance Efficiency of Aircraft Movement on the Apron

Under the current layout of facilities at the Airport, there is a mixture of Fixed Base Operator (FBO)/General Aviation (GA) and commercial aircraft activity in the east quadrant. This can cause GA operations to delay commercial operations and vice versa. Separating these activities would enhance the efficiency of aircraft movement around the apron area, along with increasing the security of the commercial apron.

It is anticipated that the Proposed Action may increase the number of GA aircraft based at the Airport. The proposed relocation of FBO/GA operations from the east quadrant to the south quadrant and the proposed construction of GA hangars as described in the Proposed Action may increase the based GA aircraft by 15 new aircraft. The GA fleet mix (size and type of aircraft) would remain the same. Each of these aircraft could have up to five operations per week which could equate to an increase of about 11 daily GA operations or 3,911 annual GA operations. This increase in based aircraft is consistent with the future forecasted needs as described in **Section 2.1.1**. This potential increase in GA operations represents about a 4 percent increase in the Airport's total annual operations for 2032.

2.2.2 Need for the Proposed Action

As the following subsections describe, the facilities and infrastructure at the Airport have surpassed their useful life and the number of people traveling to and from Des Moines and the surrounding area continues to grow.

2.2.2.1 Out-of-Date Infrastructure

In 2014, the Authority completed the Terminal Area Concept Plan Technical Report to assess the function of the existing passenger terminal building and identify potential improvements. The existing passenger terminal building was constructed in 1948. While the Authority has conducted various improvements (over 60 renovations and additions to the 1948 terminal building have occurred) and maintenance to the passenger terminal building over the years, many components are out-of-date and inefficient. The 2014 Terminal Area Concept Plan Technical Report identifies the following deficiencies:

- » Key areas in the passenger terminal building (e.g., passenger check-in, baggage screening, security checkpoint queue, baggage claim) exceed their capacity during peak periods.
- » Areas in the passenger terminal building are not used due to less-than-ideal locations and out-of-date design.
- » Limited concessions post-passenger security screening.
- » Small passenger hold rooms, less than adequate restrooms and an inability to expand the existing hold rooms to meet airline requests.

⁸ Des Moines Airport Authority. (2014, April). *Des Moines International Airport Terminal Area Concept Plan Technical Report*, p. 4. Retrieved July 2018, from Des Moines International Airport: <http://www.dsmairport.com/webres/File/about-the-airport/terminal-study/DSM%20Terminal-Area-Concept-Plan-Technical-Report%20-%20FINAL.pdf>

- » Operational and safety concerns of existing on-Airport roadways, including but not limited to:
 - the presence of intersections in the final vehicular approach and exit to the Airport is a safety hazard because drivers are often unfamiliar with the intersection and become distracted;
 - short distances between driver decision points causing traffic congestion (e.g., in some areas drivers have 500 feet between decision points);
 - undefined channelization of the existing six-lane public parking exit plaza merging into a single lane of traffic; and
 - non-prioritized access to the Airport (i.e., the northbound entrance to the Airport does not have a signal, requiring entering traffic to continuously yield to southbound traffic on Fleur Drive).

2.2.2.2 Passenger Increase

The 2018 publication of the TAF using 2017 data for the Airport shows a continued increase in passengers at the Airport. The current passenger terminal building is not equipped to accommodate a continued increase in passenger traffic at the Airport. **Table 2-1** shows the most recent TAF for enplanements at the Airport from 2018 through 2037, which represents five years post-implementation of the Proposed Action. This increase in passengers traveling through the Airport would further magnify the Airport's deficiencies.

2.2.2.3 Separate Cargo and Commercial Aircraft Activities

A variety of GA and commercial aircraft use the apron area in the east quadrant. This use of apron causes a mixture of activities taking place and can interfere with one another. Moving all FBO/GA operations into one quadrant of the airfield would separate GA and commercial aircraft activities, allowing those respective operations to move more seamlessly.

TABLE 2-1
FORECAST ENPLANEMENTS AT THE AIRPORT

YEAR	TAF FORECAST ^{/a/}	ANNUAL CHANGE IN ENPLANEMENTS	ENPLANEMENT CHANGE FROM 2018
2018	1,248,222	-	-
2019	1,312,428	5%	5%
2020	1,379,984	5%	11%
2021	1,450,406	5%	16%
2022	1,523,434	5%	22%
2023	1,598,671	5%	28%
2024	1,675,832	5%	34%
2025	1,754,645	5%	41%
2026	1,835,006	5%	47%
2027	1,916,564	4%	54%
2028	1,999,093	4%	60%
2029	2,082,418	4%	67%
2030	2,166,213	4%	74%
2031	2,250,275	4%	80%
2032 ^{/b/}	2,334,388	4%	87%
2033	2,418,322	3%	94%
2034	2,502,266	3%	100%
2035	2,586,346	3%	107%
2036	2,670,514	3%	114%
2037 ^{/c/}	2,754,801	3%	121%

Notes: /a/ - 2018 publication of the TAF using 2017 data.

/b/ - Year of Proposed Action implementation.

/c/ - Five years after implementation of Proposed Action.

Source: FAA Terminal Area Forecast, 2018; RS&H, 2018

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CHAPTER 3

ALTERNATIVES

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Section 1502.14 of the President's Council on Environmental Quality (CEQ) Regulations⁹ Implementing the National Environmental Policy Act (NEPA) describes alternatives as the "heart" of the environmental impact evaluation process. The CEQ regulations require that the federal decision-maker perform the following tasks:

- » rigorously explore and objectively evaluate all reasonable alternatives and, for alternatives which were eliminated from detailed study, briefly discuss the reasons for the elimination;
- » devote substantial treatment to each alternative considered in detail so that reviewers may evaluate their comparative merits;
- » include reasonable alternatives not within the jurisdiction of the lead agency; and
- » include an analysis of the "no action" alternative.

Following the CEQ regulations, this chapter of the EA summarizes the screening analysis conducted to identify a range of alternatives for evaluation in this EA. The summary of the alternatives screening analysis presents the following:

- » an overview of the structure of the alternatives screening analysis;
- » a list of alternatives considered, including the Proposed Action and the No Action Alternative;
- » a concise explanation of why some of the initial alternatives considered have been eliminated from further analysis; and
- » a list of laws, regulations, and executive orders (EOs) and associated permits, licenses, and/or review applicable to the alternatives under the screening analysis.

3.1 ALTERNATIVES SCREENING PROCESS

The alternatives screening used a two-level screening process. Level 1 screening considered the ability of the alternative to meet the stated Purpose and Need for the Proposed Action. Level 2 screening evaluated alternatives in terms of constructability, cost, and operational functionality. Those alternatives that satisfied both Level 1 screening and Level 2 screening criteria were carried forward for detailed evaluation in this EA.

3.1.1 Level 1 Screening: Purpose and Need

The Level 1 screening evaluated each alternative's ability to satisfy the Purpose and Need of the Proposed Action. As part of the evaluation of the Purpose and Need was the ability of the Authority to accommodate the continued increase in passengers. Alternatives that would substantially reduce the ability of the Authority to accommodate existing and forecast enplanements were considered less viable than those alternatives that would not constrain Airport operations.

⁹ U.S. Code. 2007, *President's Council on Environmental Quality Regulations*, 40 CFR Part 1500-1508, July 1, 2007 (Revised).

3.1.2 Level 2 Screening: Constructability, Cost, Airfield Safety, and Operational Functionality

The Level 2 screening analysis was designed to determine which alternatives would be considered reasonable in terms of constructability, cost, airfield safety, and operational functionality, as described below.

3.1.2.1 Constructability

Construction at an airport has the potential to affect airfield infrastructure and operations, as well as the operation of passenger facilities. This is particularly true when construction occurs near an operational runway because the presence of construction equipment can affect the use of a runway. This also is true when construction occurs in the same location as existing passenger facilities because construction equipment and staging areas can compromise the use of the passenger facility. Consideration was given to each alternative for how construction could adversely affect Airport operations.

3.1.2.2 Cost

Each alternative was reviewed to determine whether the costs of implementation of the alternative would be disproportionately greater than the costs of other alternatives. In addition, cost was a factor in refining the Proposed Action. The planning process associated with the development of a replacement terminal went through several iterations to pare away nonessential elements and devise a design of the replacement terminal to reduce costs.

3.1.2.3 Airfield Safety

This criterion considers whether an alternative would potentially introduce issues with respect to the safe movement of aircraft on the airfield. The principal concern, pursuant to the FAA design guidelines, is whether an alternative would introduce conflicts for aircraft moving in and around the runway operations area or result in unacceptable impacts to airfield safety.

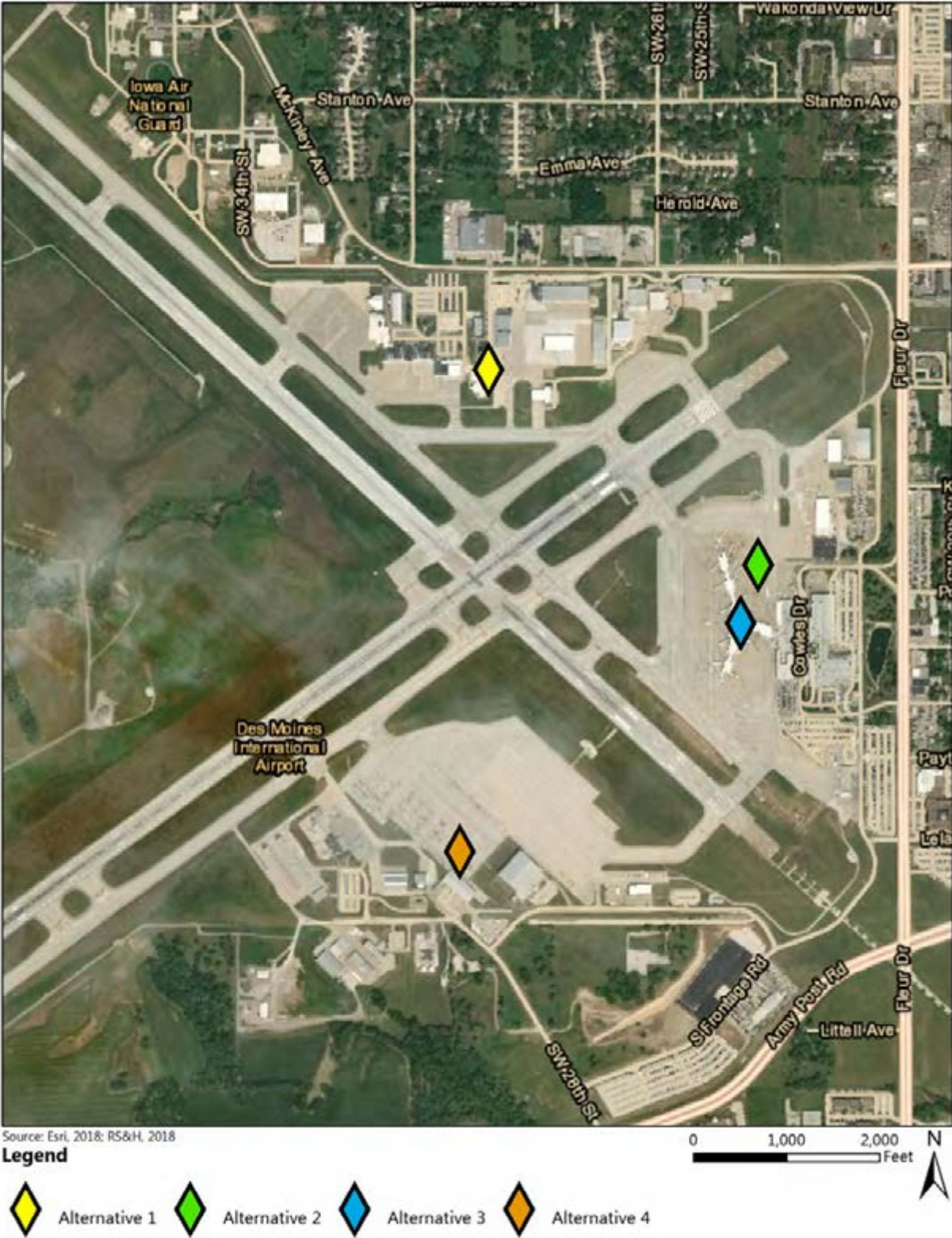
3.1.2.4 Operational Functionality

This criterion considers whether an alternative would result in the reduction of the functionality of the overall operations of the Airport. Of primary concern would be the ability of all of the various aspects of the Airport to continue to operate in an efficient manner and to maintain the necessary relationships between the various functions that exist at the Airport.

3.2 COMPARISON OF ALTERNATIVES

The passenger terminal is a critical part of an airport. It is important to select a location for the passenger terminal that provides adequate landside, airside, and circulation space with room to expand to meet future demand. In the case of building a replacement terminal, the location of the existing terminal is important, as existing air carrier operations could be affected with construction of the replacement terminal. Such factors are taken into account when considering the location of the replacement terminal. Four alternatives for the location of the passenger terminal building were identified and taken through the screening process (see **Figure 3-1**). **Table 3-1** at the end of this chapter provides an overview of the screening process for all alternatives.

FIGURE 3-1
ALTERNATIVE TERMINAL LOCATIONS



3.2.1 Alternative 1: North Concept Alternative

Level 1 - This alternative would construct a replacement terminal northwest of the existing terminal location, in the north quadrant of the Airport's property (see **Figure 3-1**). Although this alternative would meet the Level 1 screening criteria regarding Purpose and Need (to modernize the passenger terminal and associated on-Airport facilities), it would not accommodate the increase in passengers. As described in the 2016 Addendum to the 2014 Report, the area available to develop in the north quadrant is limited because of the location of the Iowa Air National Guard (IANG), which represents a sizable investment in infrastructure and requires flexibility in land use to accommodate future IANG occupancy changes.¹⁰ Since the IANG and a passenger terminal both require flexibility in land use to accommodate future growth, they would be in conflict with each other, as a result, Alternative 1 was rejected from further screening.

Level 2 – N/A

3.2.2 Alternative 2: East Concept Alternative

Level 1 - Under Alternative 2, a replacement passenger terminal would be constructed in the east quadrant, just north of the existing passenger terminal building (see **Figure 3-1**). This alternative would meet the Level 1 screening criteria regarding Purpose and Need (to modernize the passenger terminal and associated on-Airport facilities, as well as accommodate the increase in passengers). As a result, Alternative 2 was advanced to Level 2 screening.

Level 2 - This area of the Airport would allow for adequate space for the replacement terminal, circulation, and future expansion. As described in the 2016 Addendum to the 2014 Report, the new passenger terminal building would be able to use many of the existing terminal campus utilities and main roadway connections, as well as reduce the need to relocate current tenants.¹¹ The 2016 Addendum estimated that the east concept alternative would cost roughly 491 million dollars. In addition, the 2016 Addendum describes that a replacement terminal at this location would not substantially affect air carrier operations or passenger level of service at any point during construction. As a result, this alternative meets all Level 2 screening criteria and was retained for further consideration in this EA.

3.2.3 Alternative 3: Refurbish Existing Terminal Building Alternative

Level 1 - Although not included in the 2014 Report or the 2016 Addendum, the alternatives analysis in this EA considers refurbishment of the existing terminal building. This alternative would continue the use of the existing facility by rehabilitating the existing terminal and constructing building extensions to provide for more space (see **Figure 3-1**). Aside from the rehabilitation of the existing terminal, the primary landside improvement would be to the existing access roads to accommodate the forecast increase in enplanements. This alternative would meet the Level 1 screening criteria regarding Purpose and Need (to modernize the passenger terminal and associated on-Airport facilities, as well as accommodate the increase in passengers). As a result, Alternative 3 was advanced to Level 2 screening.

¹⁰ Des Moines Airport Authority. (2016, November). *Des Moines International Airport Addendum to: Terminal Area Concept Plan Technical Report*. Retrieved July 2018, from Des Moines International Airport: <http://www.dsmaairport.com/webres/File/about-the-airport/terminal-study/Terminal%20Site%20Study%20Update.pdf>

¹¹ Des Moines Airport Authority. (2016, November). *Des Moines International Airport Addendum to: Terminal Area Concept Plan Technical Report*, p. 8. Retrieved July 2018, from Des Moines International Airport: <http://www.dsmaairport.com/webres/File/about-the-airport/terminal-study/Terminal%20Site%20Study%20Update.pdf>

Level 2 - Rehabilitation of the existing terminal would be costly (roughly 519 million dollars) as the building is at the end of its useful life,¹² and would be difficult to phase without greatly affecting passenger level of service. Rehabilitation and upkeep of an aging facility can cost more in the long-run as maintenance costs increase over the life of a facility. Construction also would occur close to the gates and could require shutting down portions of the terminal for long periods of time. Overall, this can have a negative effect on the passenger's perception of the Airport and the overall level of service being provided. As a result of not meeting constructability, cost, and operational functionality included as part of Level 2 screening criteria, Alternative 3 was rejected from further consideration.

3.2.4 Alternative 4: South Concept Alternative

Level 1 - This alternative would construct a replacement passenger terminal southwest of the existing terminal location, in the south quadrant of the Airport's property (see **Figure 3-1**). This alternative would meet the Level 1 screening criteria regarding Purpose and Need (to modernize the passenger terminal and associated on-Airport facilities, as well as accommodate the increase in passengers). As a result, Alternative 4 was advanced to Level 2 screening.

Level 2 - This area of the Airport would allow for adequate space for the replacement terminal, circulation, and future expansion. However, as the 2016 Addendum describes, it would require the relocation of many current Airport tenants and additional modifications to the airfield, resulting in higher construction costs.¹³ In the 2016 Addendum, the south concept alternative was estimated to cost roughly 618 million dollars. In addition, the 2016 Addendum describes that a replacement terminal at this location would be located close to airline maintenance, general aviation and T-hangars, and air support sites, which would create congestion from vehicular and aircraft movement. As a result of not meeting cost and operational functionality included as part of Level 2 screening criteria, Alternative 4 was rejected from further consideration.

3.2.5 Alternative 5: No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal improvements. The Authority would continue to operate the Airport and serve forecast aviation demands with existing facilities. The No Action Alternative does not meet the project purpose and need (Level 1 screening criteria); however, in addition to being a Council on Environmental Quality/National Environmental Policy Act (CEQ/NEPA) requirement, it does serve as a baseline for a comparison of impacts to the preferred alternative and therefore, retained for analysis.

¹² Des Moines Airport Authority. (2014, April). *Des Moines International Airport Terminal Area Concept Plan Technical Report*, p. 16. Retrieved July 2018, from Des Moines International Airport: <http://www.dsmairport.com/webres/File/about-the-airport/terminal-study/DSM%20Terminal-Area-Concept-Plan-Technical-Report%20-%20FINAL.pdf>

¹³ Des Moines Airport Authority. (2016, November). *Des Moines International Airport Addendum to: Terminal Area Concept Plan Technical Report*, p. 9. Retrieved July 2018, from Des Moines International Airport: <http://www.dsmairport.com/webres/File/about-the-airport/terminal-study/Terminal%20Site%20Study%20Update.pdf>

3.3 ALTERNATIVES CARRIED FORWARD FOR ANALYSIS IN THIS EA

The following subsections summarized the alternatives carried forward for analysis in this EA.

3.3.1 Alternative 2: East Concept Alternative

Alternative 2 is the only terminal location alternative that meets the Level 1 and Level 2 screening criteria. **Chapter 1** provides a detailed description of the project elements for Alternative 2, which **Figure 1-2** also shows.

3.3.2 Alternative 5: No Action Alternative

The No Action Alternative is retained in accordance with CEQ regulations.

TABLE 3-1
ALTERNATIVES CONSIDERED AND THEIR DISPOSITION

Screening Level and Criteria	Alternative 1 (North)	Alternative 2 (East)	Alternative 3 (Refurbish)	Alternative 4 (South)	Alternative 5 (No Action Alternative)
Level 1: Does the alternative meet the Purpose and Need and accommodate increase in passengers?	No	Yes	Yes	Yes	No
Proceed to Level 2?	No	Yes	Yes	Yes	No
Level 2: Is there potential for adverse constructability issues?	N/A	No	Yes	No	N/A
Level 2: Is there a potential for costs to be disproportionately greater?	N/A	No	Yes	Yes	N/A
Level 2: Is there a potential for issues with respect to the safe movement of aircraft?	N/A	No	No	No	N/A
Level 2: Is there a potential for reduced operational functionality?	N/A	No	Yes	Yes	N/A
Retain for detailed analysis in EA?	No	Yes	No	No	Yes

Source: RS&H, 2018

CHAPTER 4

AFFECTED ENVIRONMENT

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This chapter provides a description of the current physical, natural, and human environment within the study areas established for this Environmental Assessment (EA). The chapter is divided into the following three sections:

- » **Study Areas.** Describes the areas for which data was collected to assess potential impacts to specific resources.
- » **Analysis Year.** Describes the analysis year that will be used in this EA.
- » **Resources Not Affected by the Proposed Action.** Describes the rational for why the Proposed Action would have no effect on the resource. These resources will not be further examined in **Chapter 5, Environmental Consequences.**
- » **Potentially Affected Environmental Resources.** Describes the environmental resources listed in FAA Order 1050.1F, Section 4-1 that the Proposed Action might affect.
- » **Past, Present, and Reasonably Foreseeable Actions.** Identifies and describes past, present, and reasonably foreseeable actions that, when considered in combination with the Proposed Action, could contribute to potentially significant cumulative impacts.

4.1 STUDY AREAS

4.1.1 Project Study Area

The Project Study Area, as **Figure 4-1** shows, encompasses about 850 acres of Airport property, is entirely within Polk County, and represents the area where the Proposed Action would be constructed. The Project Study Area encompasses the south and east quadrants of Airport property.

The Project Study Area used in this EA will address the resource categories that could be directly or indirectly effected by the Proposed Action. The Project Study Area boundary lines were based on the alternatives identified in **Chapter 3, Alternatives.**

4.1.2 Regional Study Area

The Regional Study Area, as **Figure 4-1** shows, encompasses about 5,800 acres and is entirely within Polk County.

The Regional Study Area used in this EA will address the resource categories that could be indirectly affected by the Proposed Action. This study area was established on a large geographic area to assess "indirect" impacts¹⁴ that may occur in the surrounding communities, such as impacts to air quality, noise-sensitive land uses, socioeconomic impacts, Department of Transportation Act, Section 4(f) resources, and historic and cultural resources. The Regional Study Area boundary lines were based off of the Airport's 2006 Day-Night Average Sound Level (DNL) 65 decibel (dBA) noise contour and the boundary lines were squared off to follow natural boundaries and roadways in the Airport vicinity.

¹⁴ 40 CFR Section 1508.8(b) states "Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable."

4.2 ANALYSIS YEAR

Unless otherwise noted, the existing conditions year described in this chapter is 2017, which is the last full calendar year for which data was available.

4.3 RESOURCES NOT AFFECTED BY THE PROPOSED ACTION

This section describes resources that would not be affected by the Proposed Action and are therefore not discussed further in this EA.

4.3.1 Coastal Resources

The Project Study Area is located in Iowa, which is not a coastal state and is therefore, not located near a designated coastal resource.¹⁵ The closest coastal resource is over 350 miles northeast from the Project Study Area. Thus, the Proposed Action would not affect any coastal resources.

4.3.2 Wild and Scenic Rivers (Water Resources)

There are no protected rivers or river segments in the Project Study Area. The closest wild and scenic river is a segment of the Missouri River, located about 170 miles west of the Project Study Area.¹⁶ The closest river listed on the National Rivers Inventory is the Middle Raccoon River, located about 27 miles west of the Project Study Area.¹⁷ Because these protected rivers and river segments are located so far from the Proposed Action, no adverse effect on protected rivers or river segments is anticipated.

¹⁵ USFWS. (2018). Coastal Barrier Resources System Mapper. Retrieved May 2018, from USFWS: <https://www.fws.gov/cbra/Maps/Mapper.html>.

¹⁶ USNPS. (2018). Wild and Scenic Rivers Program, Interactive Map of NPS Wild and Scenic Rivers. Retrieved May 2018, from USNPS: <https://www.nps.gov/orgs/1912/plan-your-visit.htm>.

¹⁷ USNPS. (2018). Nationwide Rivers Inventory. Retrieved May 2018, from USNPS: <https://www.nps.gov/maps/full.html?mapId=8adbe798-0d7e-40fb-bd48-225513d64977>.

**FIGURE 4-1
STUDY AREAS**



4.4 POTENTIALLY AFFECTED ENVIRONMENTAL RESOURCES

The following sections examine each of the environmental resource categories that have the potential to result in an impact as listed in Chapter 4 of FAA Order 1050.1F.

4.4.1 Air Quality

The Clean Air Act (CAA) is the primary statute related to air quality. The CAA regulates air pollutant emissions from stationary and mobile sources and authorizes the U.S. Environmental Protection Agency (USEPA) to establish National Ambient Air Quality Standards (NAAQS) for criteria pollutants. The CAA also gives the USEPA authority to regulate Hazardous Air Pollutants.

The USEPA sets NAAQS for certain air pollutants to protect public health and welfare. The USEPA has identified the following six criteria air pollutants and has set NAAQS for them: Carbon Monoxide (CO), Lead (Pb), Nitrogen Dioxide (NO₂), 8-Hour Ozone (O₃) Particulate Matter (PM₁₀ and PM_{2.5}), and Sulfur Dioxide (SO₂).

Areas found to be in violation of one or more NAAQS of these pollutants are classified as “nonattainment areas.” States with nonattainment areas must develop a State Implementation Plan (SIP) demonstrating how the areas will be brought back into attainment of the NAAQS within designated timeframes. Areas where concentrations of the criteria pollutants are below (i.e., within) these threshold levels are classified as “attainment areas.” Areas with prior nonattainment status that have since transitioned to attainment are known as “maintenance areas.” The Regional Study Area, which is located in Polk County, is in attainment for all criteria pollutants.¹⁸

4.4.2 Biological Resources

Relevant federal laws, regulations, Executive Orders (EOs) and other guidance relevant to the protection of biological resources include:

- » Endangered Species Act (ESA) (16 United States Code (U.S.C.) §§ 1531-1544)
- » Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668 et seq.)
- » Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et seq.)
- » Fish and Wildlife Coordination Act of 1980 (16 U.S.C. § 661-667)
- » EO 13112, Invasive Species (64 Federal Register (FR) 6183)
- » Marine Mammal Protection Act (16 U.S.C. § 1361 et seq.)
- » Migratory Bird Treaty Act (MBTA) (16 U.S.C. §§ 703 et seq.)
- » EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds* (66 FR 3853)
- » Incorporating Biodiversity Considerations into Environmental Impact Analysis under NEPA (CEQ, 1993)
- » Memorandum of Understanding to Foster the Ecosystem Approach (CEQ, 1995)

¹⁸ USEPA. (2018). Iowa Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants. Retrieved May 2018, from USEPA: https://www3.epa.gov/airquality/greenbook/anayo_ia.html.

The following regulations implement the federal acts that protect biotic communities:

- » 50 Code of Federal Regulation (CFR) Parts 17 and 402 implement the ESA
- » 50 CFR Part 22 implements the Bald and Golden Eagle Protection Act
- » 50 CFR Part 600 implements the Magnuson-Stevens Fishery Conservation and Management Act
- » 50 CFR Parts 18 and 216 implement the Marine Mammal Protection Act
- » 50 CFR Part 21 implements the MBTA

This section describes the coordination and investigation associated with fish, wildlife, and plant species within the Project Study Area. The evaluation includes coordination with the Iowa Department of Natural Resources (IDNR) and U.S. Fish and Wildlife Service (USFWS) regarding potential threatened and endangered (T&E) species issues that may result from the Proposed Action.

In an email dated July 6, 2018, the IDNR indicated that they had no site-specific records of rare species or significant natural communities in the Project Study Area that would be affected by the Proposed Action. USFWS Information for Planning and Conservation (IPaC) was referred to for federally-listed T&E species with the potential to occur in the Project Study Area, which identified five T&E species that may be present within Polk County (see Table 4-1).¹⁹

TABLE 4-1
FEDERALLY LISTED THREATENED AND ENDANGERED (T&E) SPECIES

GROUP	NAME	STATUS
Bird	Least tern (<i>Sterna antillarum</i>)	Endangered
Flowering Plant	Prairie bush clover (<i>Lespedeza leptostachya</i>)	Threatened
Flowering Plant	Western prairie fringed orchid (<i>Platanthera praeclara</i>)	Threatened
Mammal	Indiana bat (<i>Myotis sodalis</i>)	Endangered
Mammal	Northern long-eared bat (<i>Myotis septentrionalis</i>)	Threatened

Source: USFWS, 2018

A biological resources site survey was conducted on May 29, 2018 to evaluate whether the Project Study Area contains suitable habitat for federally-listed T&E species and to assess the potential for adverse effects from the Proposed Action.²⁰ **Appendix B** provides a detailed report outlining the site survey. The biological resources site survey concluded that a majority of the Project Study Area was affected by previous grading activities to create the airport, terminal, and supporting features. Two wooded drainageways are located in the southwest quadrant of the Project Study Area. There is not a continuous connection between the wooded areas in the Project Study Area and off-site forested areas. The land surrounding the Project Study Area is primarily residential, commercial, airport runways, or farmland.

¹⁹ USFWS. (2018) Information for Planning and Conservation (IPaC). Retrieved May 2018, from USFWS: <https://ecos.fws.gov/ipac/>.

²⁰ Foth. (2018). *Biological Resources Field Survey; Replacement Terminal Environmental Assessment Project, Des Moines International Airport*. July 13, 2018.

Suitable habitat for the least tern was not present within the Project Study Area due to the lack of barren river sandbars. The USFWS IPaC response indicated that there are no migratory birds of concern within the vicinity of the Project Study Area.

Suitable habitat for the prairie bush clover or Western prairie fringed orchid is not present within the Project Study Area due to historic farming practices, maintenance of the airport facilities, and the lack of native prairie and native wetland areas.

During the site visit, representative sample sites were evaluated for the two federally-listed bat species. The locations of the sample sites are depicted on Figure 2, of the *Biological Resources Field Survey Report* in **Appendix B** and **Figure 4-2**. Three sites were observed to have trees with loose and peeling bark or hollows/crevices that may be suitable habitat for the Indiana bat or Northern long-eared bat. Sample Sites 7, 9 and 10 are located within wooded drainageways in the central portion of the Project Study Area and the trees observed in those areas had a limited number of branches with loose or peeling bark. The remaining sample sites did not contain suitable habitat due to size of trees and the lack of suitable snags. The overall suitability of the Project Study Area for T&E bat species habitat is low.

4.4.3 Climate

Relevant federal laws, regulations, and EOs that relate to climate include:

- » CAA (42 U.S.C. §§ 7408, 7521, 7571, 7661 et seq.)
- » EO 13514, *Federal Leadership in Environment Energy and Economic Performance* (74 FR 52117)
- » EO 13653, *Preparing the United States for the Impacts of Climate Change* (78 FR 66817)
- » EO 13693, *Planning for Federal Sustainability* (80 FR 15869)

The following regulations implement the federal acts related to climate.

- » 40 CFR Parts 60, 85, 86, and 600 implement the CAA

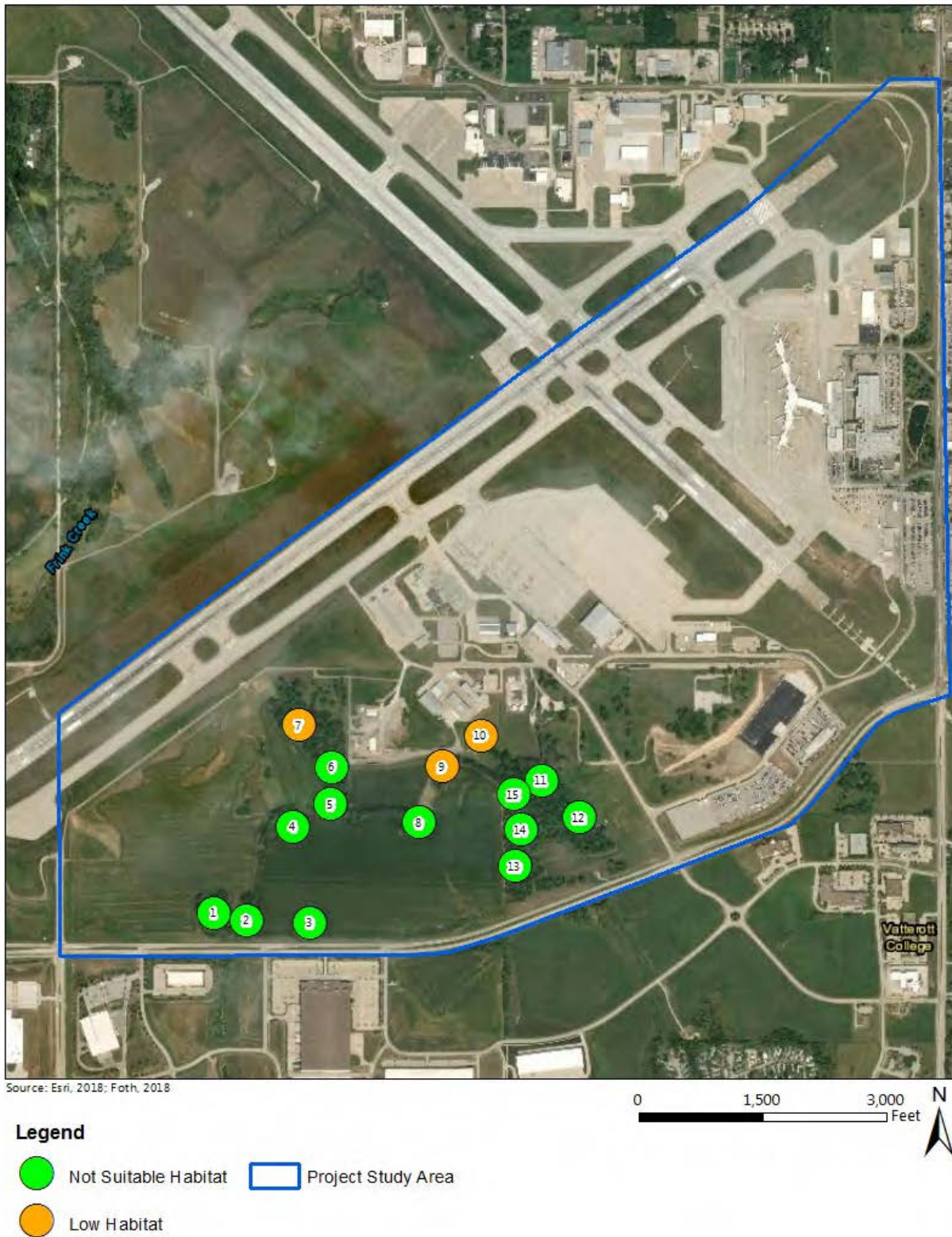
Greenhouse gases (GHG) are gases that trap heat in the earth's atmosphere. Both naturally occurring and man-made GHGs primarily include water vapor, carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Activities that require fuel or power are the primary stationary sources of GHGs at airports. Aircraft and ground access vehicles, which are not under the control of an airport, typically generate more GHG emissions than airport-controlled sources.

Research has shown there is a direct correlation between fuel combustion and GHG emissions. In terms of U.S. contribution, the Government Accountability Office (GAO) reports that "domestic aviation contributes about three percent of total carbon dioxide emissions, according to EPA data," compared with other industrial sources, including the remainder of the transportation sector (20%) and power generation (41%).²¹ The International Civil Aviation Organization (ICAO) estimates that GHG emissions from aircraft account for roughly three percent of all anthropogenic GHG emissions globally.²² Climate change due to GHG emissions is a global phenomenon; therefore, the affected environment is the global climate.

²¹ USGAO. (2009). Report to Congressional Committees, *Aviation and Climate Change*, June 2009.

²² Melrose, Alan. (2010). *European ATM and Climate Adaptation: A Scoping Study*, ICAO Environmental Report, 2010.

FIGURE 4-2
FEDERALLY-LISTED BAT SPECIES HABITAT ASSESSMENT MAP



4.4.4 Department of Transportation Act, Section 4(f)

Relevant federal laws, regulations, and EOs that relate to Department of Transportation Act, Section 4(f) (Section 4(f)) resources include:

- » U.S. Department of Transportation (USDOT) Act – Section 4(f) (49 U.S.C. § 303)
- » Land and Water Conservation Fund Act (LWCFA) of 1965 (16 U.S.C. §§ 4601-4604 et seq.)
- » Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) – Section 6009 (49 U.S.C. § 303)
- » U.S. Department of Defense Reauthorization (Public Law (P.L.) 105-185, Division A, Title X, Section 1079, November 18, 1997, 111 Stat. 1916)

The following regulations implement the federal acts related to Section 4(f) resources.

- » 23 CFR Part 774 et seq. implements USDOT Act – Section 4(f) and SAFETEA-LU – Section 6009
- » 36 CFR Part 59 et seq. implements the Land and Water Conservation Fund Act of 1965

Section 4(f) properties are publicly owned lands, including public parks, recreation areas, wildlife and waterfowl refuges, or publicly- or privately-owned historic sites of National, State, and/or local importance. The term historic sites includes prehistoric and historic districts, sites, buildings, structures, or objects listed in, or eligible for listing in, the National Register of Historic Places (NRHP). Refer to **Section 4.4.7** for more information on historic sites within the Regional Study Area. The FAA will not approve any program or project that requires the use of any Section 4(f) property determined by the officials having jurisdiction thereof, unless no feasible and prudent alternative exists to the use of such land and such program, and the project includes all possible planning to minimize harm resulting from the use.

No Section 4(f) properties exist within the Project Study Area. There are three Section 4(f) properties within the Regional Study Area (see **Figure 4-3**).²³ Oak Grove Cemetery is a municipal cemetery located in the northern portion of the Regional Study Area. Harmon Park is also in the northern portion of the Regional Study Area and offers tennis courts. About three miles of the 16.5-mile asphalt surface Great Western Trail Bike Path passes through the western and northern portions of the Regional Study Area.²⁴

4.4.5 Farmlands

Relevant federal laws, regulations, and EOs that relate to farmlands include:

- » Farmland Protection Policy Act (FPPA) (7 U.S.C. §§ 3034201-4209)
- » Memorandum on the Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act
- » State and local regulations

²³ City of Des Moines. (2018). Des Moines Parks and Recreation Finder. Retrieved September 2018, from City of Des Moines: <http://maps.dmgov.org/apps/parksfinder/default.htm>.

²⁴ Polk County. (2018). Polk County Conservation, 12. Great Western Trail. Retrieved September 2018, from Polk County: <https://www.polkcountyiowa.gov/conservation/parks-trails/12-great-western-trail/>.

FIGURE 4-3
SECTION 4(F) PROPERTIES IN REGIONAL STUDY AREA



The following regulations implement the federal acts related to Section 4(f) resources.

- » 7 CFR Parts 7657-658 implements FPPA

According to the National Resources Conservation Service (NRCS) Web Soil Survey, the south quadrant of Project Study Area contains prime farmland and farmland of statewide importance.²⁵ Additionally, about 160 acres of Airport property in the southwest corner of the Project Study Area is currently leased for agricultural purposes on a year-to-year basis (see **Figure 4-4**).

4.4.6 Hazardous Materials, Solid Waste, and Pollution Prevention

Relevant federal laws, regulations, and EOs that relate hazardous materials, solid waste, and pollution prevention include:

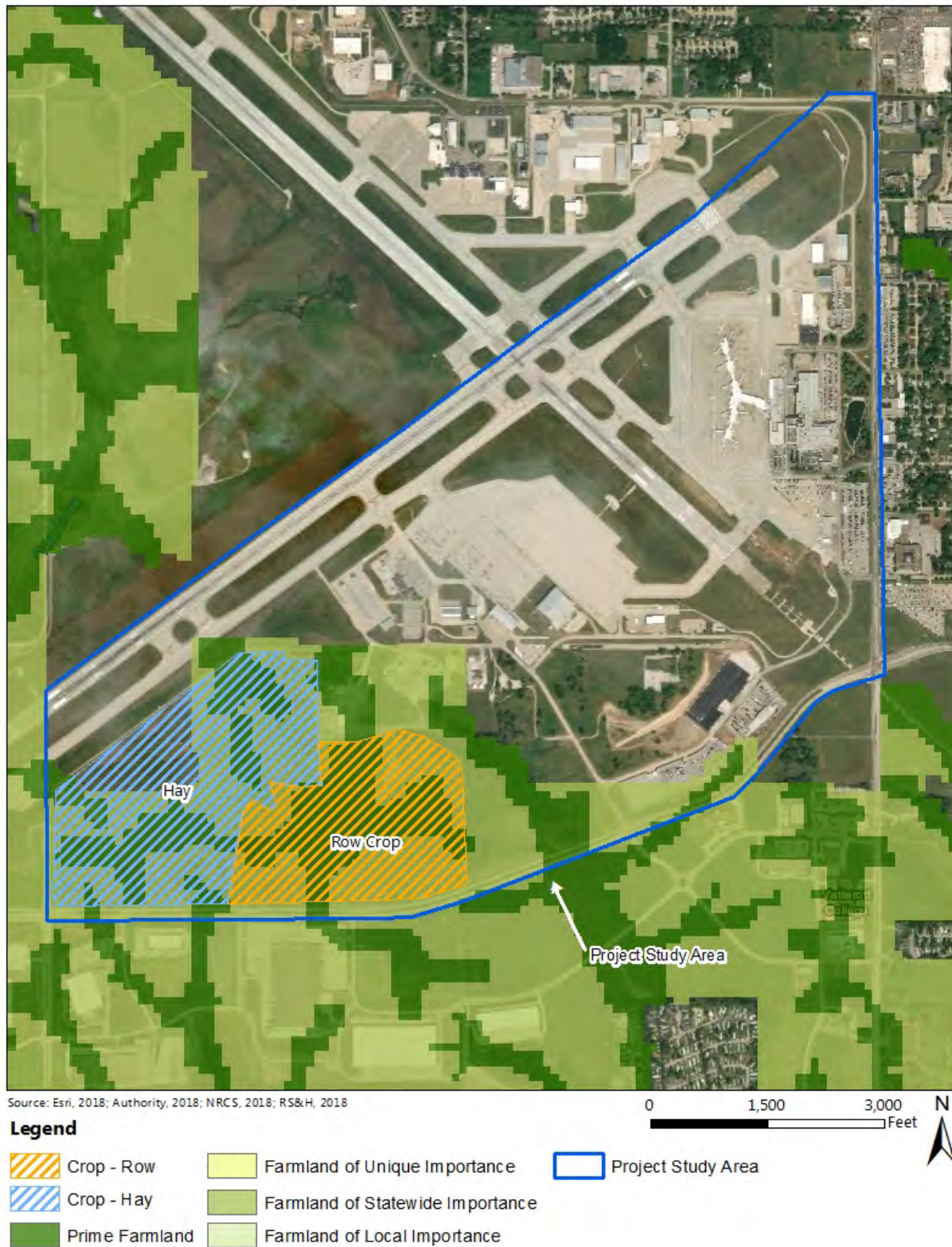
- » Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S.C. §§ 9601-9765)
- » Emergency Planning and Community Right to Know Act (42 U.S.C. §§ 11001-11050)
- » Federal Facilities Compliance Act (42 U.S.C. § 6961)
- » Hazardous Materials Transportation Act (49 U.S.C. §§ 5101-5128)
- » Oil Pollution Prevention Act of 1990 (33 U.S.C. §§ 2701-2762)
- » Pollution Prevention Act (42 U.S.C. §§ 13101-13109)
- » Toxic Substances Control Act (TSCA) (15 U.S.C. §§ 2601-2697)
- » Resource Conservation and Recovery Act (RCRA) (42 U.S.C. §§ 6901-6992k)
- » EO 12088, *Federal Compliance with Pollution Control Standards* (43 FR 47707)
- » EO 12580, *Superfund Implementation* (52 FR 2923), (63 CFR 45871), and (68 CFR 37691)
- » EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management* (72 FR 3919)
- » EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance* (74 FR 52117)

The following regulations implement the federal acts related to hazardous materials, solid waste, and pollution prevention:

- » 40 CFR Parts 300, 311, 355, 370, and 373 implement CERCLA
- » 40 CFR Parts 350-372 implement the Emergency Planning and Community Right to Know Act
- » 40 CFR Part 22 implements the Federal Facilities Compliance Act
- » 49 CFR Parts 100-185 implement the Hazardous Materials Transportation Act
- » 40 CFR Parts 109-116 implement the Oil Pollution Act
- » 40 CFR Parts 240-299 implements RCRA
- » 40 CFR Parts 745, 761, and 763 implements TSCA

²⁵ USDA. (2018). National Resources Conservation Service, Web Soil Survey. Retrieved August 2018, from USDA: <https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>.

FIGURE 4-4
PRIME FARMLANDS, FARMLANDS OF IMPORTANCE, AND LEASED FARMLANDS IN PROJECT STUDY AREA



In a regulatory context, the terms "hazardous wastes," "hazardous substances," and "hazardous materials" have very specific meanings as described below.

- » **Hazardous Wastes:** Subpart C of RCRA defines hazardous wastes (sometimes called characteristic wastes) as solid wastes that are ignitable, corrosive, reactive, or toxic. Examples include waste oil, mercury, lead or battery acid. In addition, Subpart D of RCRA contains a list of specific types of solid wastes that the USEPA has deemed hazardous (sometimes called listed wastes). Examples include degreasing solvents, petroleum refining waste, or pharmaceutical waste.
- » **Hazardous Substances:** Section 101(14) of CERCLA defines this term broadly. It includes hazardous wastes, hazardous air pollutants, or hazardous substances designated as such under the Clean Water Act (CWA) and TSCA and elements, compounds, mixtures, or solutions, or substances listed in 40 CFR Part 302 that pose substantial harm to human health or environmental resources. Pursuant to CERCLA, hazardous substances do not include any petroleum or natural gas substances and materials. Examples include ammonia, bromine, chlorine, or sodium cyanide.
- » **Hazardous Materials:** According to 49 CFR Part 172, hazardous materials are any substances commercially transported that pose unreasonable risk to public health, safety, and property. These substances include hazardous wastes and hazardous substances as well as petroleum and natural gas substances and materials. As a result, hazardous materials represent hazardous wastes and substances. Examples include household batteries, gasoline, or fertilizers.

A search of available environmental database records was conducted on August 1, 2018²⁶ to identify sites within and surrounding the Project Study Area with activities involving storage and use of hazardous materials. The databases searched included federal and state records by property location and provide information regarding use of hazardous materials to assist in evaluating the potential for contamination with the Project Study Area.

The USEPA records revealed no sites listed or under consideration for listing on the National Priorities List (NPL). Three leaking underground storage tank (LUST) sites were identified within the Project Study Area. The LUST sites within the Project Study Area were issued no further action required classifications by the IDNR. LUST sites also were identified adjacent to the east boundary of the Project Study Area. Special consideration of these locations may be required if ground disturbing or shallow groundwater dewatering activities occur near these sites during development of the Proposed Action.

A summary of the environmental database record findings for sites within the Project Study Area is provided on **Table 4-2**. The site locations are shown on **Figure 4-5** (see also **Appendix C**).

²⁶ ERIS. (2018). Database Report, DSM Airport Terminal Study. Retrieved August 2018, from ERIS: <https://www.erisinfo.com/products-services/>.

TABLE 4-2
HAZARDOUS MATERIALS DATABASE SUMMARY

Record Source	Within Project Study Area	Total Mapped within 1-Mile Radius	Description
SEMS Archive	0	1	The Superfund Enterprise Management System (SEMS) Archived Site Inventory displays site and location information at sites archived from SEMS. An archived site is one at which USEPA has determined that assessment has been completed and no further remedial action is planned under the Superfund program at this time.
CERCLIS	0	1	Superfund is a program administered by the USEPA to locate, investigate, and clean up the worst hazardous waste sites throughout the United States. CERCLIS is a database of potential and confirmed hazardous waste sites at which the USEPA Superfund program has some involvement. It contains sites that are either proposed to be or are on the NPL, as well as sites that are in the screening and assessment phase for possible inclusion on the NPL. The USEPA administers the Superfund program in cooperation with individual states and tribal governments; this database is made available by the USEPA.
CERCLIS NFRAP	0	1	An archived site is one at which USEPA has determined that assessment has been completed and no further remedial action is planned under the Superfund program at this time. The Archive designation means that, to the best of USEPA's knowledge, assessment at a site has been completed and that USEPA has determined no further steps will be taken to list this site on the NPL. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.
RCRA LQG	0	1	RCRA Info is USEPA's comprehensive information system, providing access to data supporting the RCRA of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRA Info replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS). A hazardous waste generator is any person or site whose processes and actions create hazardous waste (see 40 CFR 260.10). Large Quantity Generators (LQGs) generate 1,000 kilograms per month or more of hazardous waste or more than one kilogram per month of acutely hazardous waste.

TABLE 4-2 (CONT'D)
HAZARDOUS MATERIALS DATABASE SUMMARY

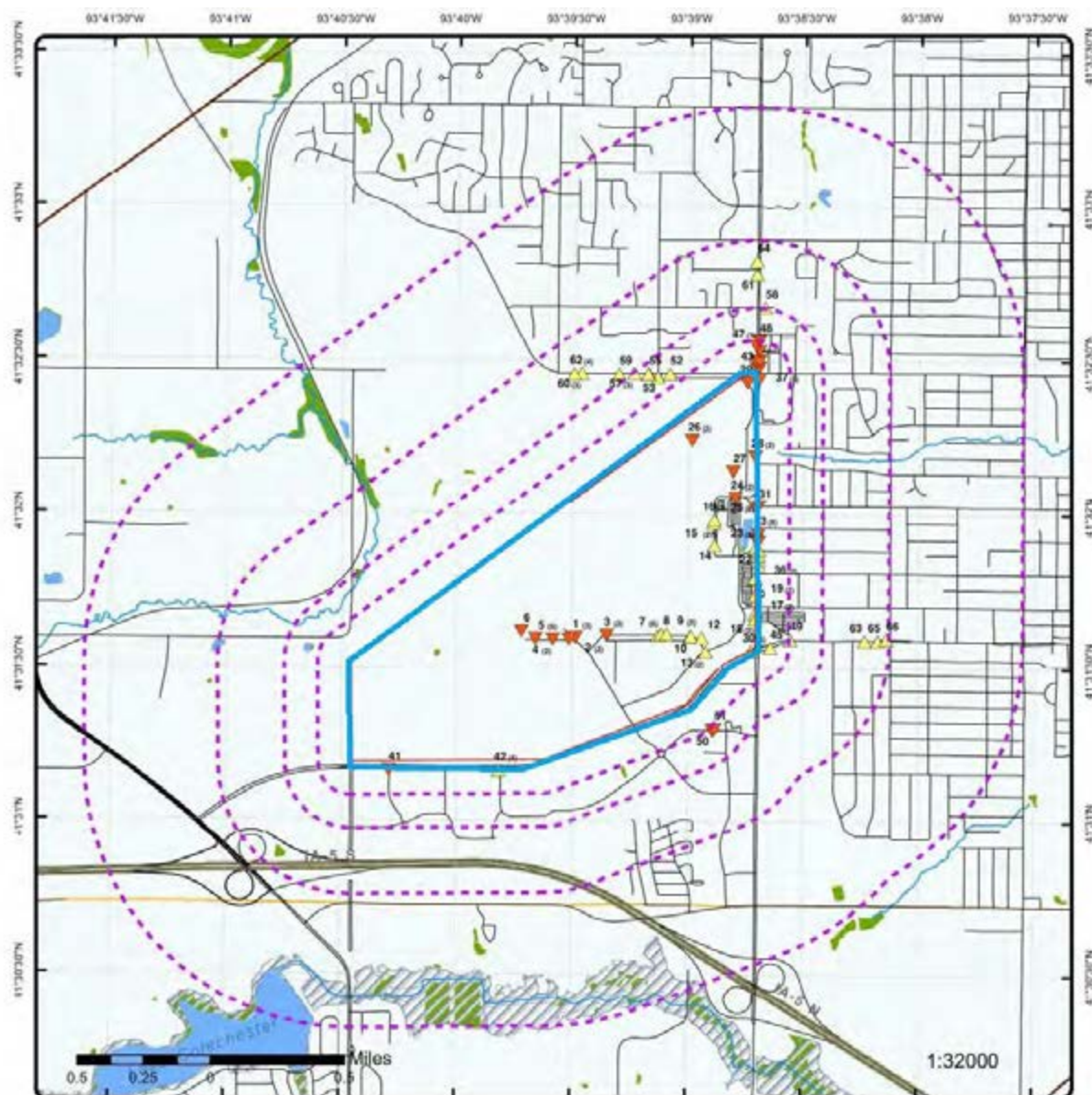
Record Source	Within Project Study Area	Total Mapped within 1-Mile Radius	Description
RCRA SQG	2	3	A hazardous waste generator is any person or site whose processes and actions create hazardous waste (see 40 CFR 260.10). RCRA Small Quantity Generators (SQGs) generate more than 100 kilograms, but less than 1,000 kilograms, of hazardous waste per month.
RCRA CESQG	3	9	A hazardous waste generator is any person or site whose processes and actions create hazardous waste (see 40 CFR 260.10). RCRA Conditionally Exempt Small Quantity Generators (CESQG) generate 100 kilograms or less per month of hazardous waste or one kilogram or less per month of acutely hazardous waste.
RCRA NON GEN	6	10	Generators not presently generating hazardous waste.
ERNS	4	4	Database of oil and hazardous substances spill reports controlled by the National Response Center. The primary function of the National Response Center is to serve as the sole national point of contact for reporting oil, chemical, radiological, biological, and etiological discharges into the environment anywhere in the United States and its territories. This database is made available by the USEPA.
CONT	0	2	The Contaminated Sites Section of the IDNR deals with a range of situations that involve contamination caused by a release of hazardous materials or hazardous waste products.
LUST	3	20	A list of LUST sites where petroleum contamination has been found. This list was made available by a joint venture of the IDNR and the Public Safety State Fire Marshal Office (SFM).
UST	12	32	The Underground Storage Tanks (UST) Section of the IDNR is responsible for the regulation of underground storage tank systems used for the storage of regulated substances, primarily petroleum products.
AST	0	1	A list of aboveground storage tanks (AST) that contain primarily the aboveground storage of combustible or flammable products. This list is maintained by a joint venture between the IDNR and the Public Safety SFM.
DELISTED TANK	0	1	This database contains a list of storage tank sites that were removed by the IDNR from Storage Tanks Section.

TABLE 4-2 (CONT'D)
HAZARDOUS MATERIALS DATABASE SUMMARY

Record Source	Within Project Study Area	Total Mapped within 1-Mile Radius	Description
INST	0	1	A list of sites in the Land Recycling Program (LRP) that have Institutional Controls in place. This list was made available by the IDNR.
VCP	0	1	The LRP of the IDNR allows owners or other stakeholders of a property to voluntarily assess and implement remedial actions at a site that is contaminated or perceived to be contaminated. The assessment of the property must address the severity of the contamination problems and the risks associated with the contamination.
FINDS/FRS	32	44	The USEPA's Facility Registry System (FRS) is a centrally managed database that identifies facilities, sites or places subject to environmental regulations or of environmental interest. FRS creates high quality, accurate, and authoritative facility identification records through rigorous verification and management procedures that incorporate information from program national systems, state master facility records, data collected from USEPA's Central Data Exchange registrations and data management personnel.
HMIRS	5	5	U.S. Department of Transportation (USDOT) Pipeline and Hazardous Materials Safety Administration (PHMSA) Incidents Reports Database taken from Hazmat Intelligence Portal, USDOT.
ICIS	16	17	The Integrated Compliance Information System (ICIS) is a system that provides information for the Federal Enforcement and Compliance (FE&C) and the National Pollutant Discharge Elimination System (NPDES) programs. The FE&C component supports the USEPA's Civil Enforcement and Compliance program activities. These activities include Compliance Assistance, Compliance Monitoring and Enforcement. The NPDES program supports tracking of NPDES permits, limits, discharge monitoring data and other program reports.
SPILLS	8	12	Spill incidents reported to the IDNR and tracked in the Hazardous Substance Incident database.
TOTAL	91	166	

Source: ERIS, 2018.

FIGURE 4-5
HAZARDOUS MATERIALS DATABASE SUMMARY



Map : 1 Mile Radius

Order No: 20180730224

Address: 5800 Fleur Drive, Des Moines, IA



Source: © 2016 ESRI

© ERIS Information Inc.

Activities conducted by the Airport and its tenants involve storage and use of a variety of hazardous materials. These materials include gasoline, diesel, aircraft fuels, motor oils, lubricants, cleaning solvents, paint, herbicides, pesticides, fertilizer, as well as airfield and aircraft deicing materials.

The ERIS Environmental Database Report did not identify the aboveground oil storage containers present on the airport property. By volume, petroleum fuels such as Jet-A, diesel, and gasoline are the primary hazardous materials stored and used at the Airport. The Airport and its tenants operate aboveground and underground fuel and oil storage systems within the Project Study Area. These systems are used for fueling of ground support vehicles and equipment, fueling of general aviation and commercial aircraft, emergency power generators, and oils/lubricants for maintaining equipment. The systems are designed and operated in accordance with applicable state and federal regulatory requirements. The Airport maintains a Spill Prevention Control and Countermeasure (SPCC) Plan for oil storage systems under direct operational control of the Airport, which was updated and approved in May 2017. Airport policy requires that tenants maintain SPCC Plans for their oil storage and dispensing systems. The SPCC's require performance of routine equipment inspections and training of oil handling personnel.

The Airport and its tenants implement pollution prevention measures specific to their operations and material storage areas in accordance with the requirements of their respective Storm Water Pollution Prevention Plans (SWPPPs). The Airport's SWPPP was certified in January 2018. The SWPPP requires routine inspections and monitoring/reporting of storm water discharges from the airport in accordance with the NPDES permit issued by the IDNR (NPDES Permit No. 77-27-0-08 and USEPA No. IA0075931, expires April 30, 2022).

Tenants at the Airport perform aircraft deicing activities on the terminal apron and south cargo apron within the Project Study Area. The deicing operations are conducted in accordance with the Airport Deicing Operations Plan. The aprons are equipped with storm water drainage systems designed to capture storm water from the deicing areas. The fluids are routed to the Des Moines Water Reclamation Authority sanitary sewer system for treatment at the wastewater treatment plant.

Solid wastes generated at the Airport are transported to the Metro Waste Authority - Metro Park East Landfill for disposal. The landfill is located approximately 20 miles east of the Airport. The landfill operates under a permit issued by the IDNR and has an estimated remaining capacity of 43 years. The Metro Waste Authority offers hazardous waste recycling and disposal services at the Hazardous Waste Drop-Off facility located approximately 20 miles northeast of the Airport.

4.4.7 Historical, Architectural, Archaeological, and Cultural Resources

The National Historic Preservation Act (NHPA) (54 U.S.C. §§300101 et seq.) establishes the Advisory Council on Historic Preservation (ACHP). The ACHP oversees federal agency compliance with the NHPA. The NHPA also established the National Register of Historic Places (NRHP), which the National Park Service (NPS) oversees. Other applicable statutes and EOs include:

- » American Indian Religious Freedom Act (42 U.S.C. § 1996)
- » Antiquities Act of 1906 (54 U.S.C. §§320301-320303)
- » Archeological and Historic Preservation Act (54 U.S.C. §§ 312501-312508)

- » Archeological Resources Act (16 U.S.C. §§ 470aa-470mm)
- » USDOT Act, Section 4(f) (49 U.S.C. § 303)
- » Historic Sites Act of 1935 (16 U.S.C. §§ 461-467)
- » Native American Graves Protection and Repatriation Act (25 U.S.C. §§ 3001-3013)
- » Public Building Cooperative Use Act (40 U.S.C. §§ 601a, 601a1, 606, 611c, and 612a4)
- » EO 11593, *Protection and Enhancement of the Cultural Environment* (36 FR 8921)
- » EO 13006, *Locating Federal Facilities on Historic Properties in Our Nation's Central Cities* (61 FR 26071)
- » EO 13007, *Indian Sacred Sites* (61 FR 26771)
- » EO 13175, *Consultation and Coordination with Indian Tribal Governments* (65 FR 67249)
- » Executive Memorandum, Government-to-Government Relations with Native American Tribal Governments (April 29, 1994)
- » Executive Memorandum on Tribal Consultation (Nov. 5, 2009) (65 FR 67249)
- » USDOT Order 5650.1, *Protection and Enhancement of the Cultural Environment*

The following regulations implement the federal acts related to historical, architectural, archaeological, and cultural resources:

- » 36 CFR Parts 60, 62.1, 65, 68, 73, 78, 79, and 800 implement the NHPA
- » 43 CFR §§ 7.7 and 7.32, and 25 CFR Part 262.7 implement the American Indian Religious Freedom Act
- » 43 CFR Part 3 implements the Antiquities Act of 1906
- » 36 CFR Parts 68 and 79 implements the Archeological and Historic Preservation Act
- » 43 CFR Part 7, 36 CFR Part 79, and 25 CFR Part 262 implement the Archaeological Resources Protection Act
- » 23 CFR Part 774 implements the USDOT Act – Section 4(f)
- » 36 CFR Part 65 implements the Historic Sites Act of 1935
- » 43 CFR Part 10 and 25 CFR § 262.8 implement the Native American Graves Protection and Repatriation Act
- » 41 CFR Parts 101-117 implement the Public Building Cooperative Use Act

The direct Area of Potential Effect (APE) is the same as the Project Study Area and the indirect APE is the same as the Regional Study Area (see **Figure 4-6**). The direct APE is about 850 acres, is entirely on Airport property, and includes all areas of potential disturbance. The indirect APE is about 5,800 acres and includes all property within the current Airport 65 DNL noise contour.

FIGURE 4-6
AREAS OF POTENTIAL EFFECT



4.4.7.1 Historical and Architectural Resources

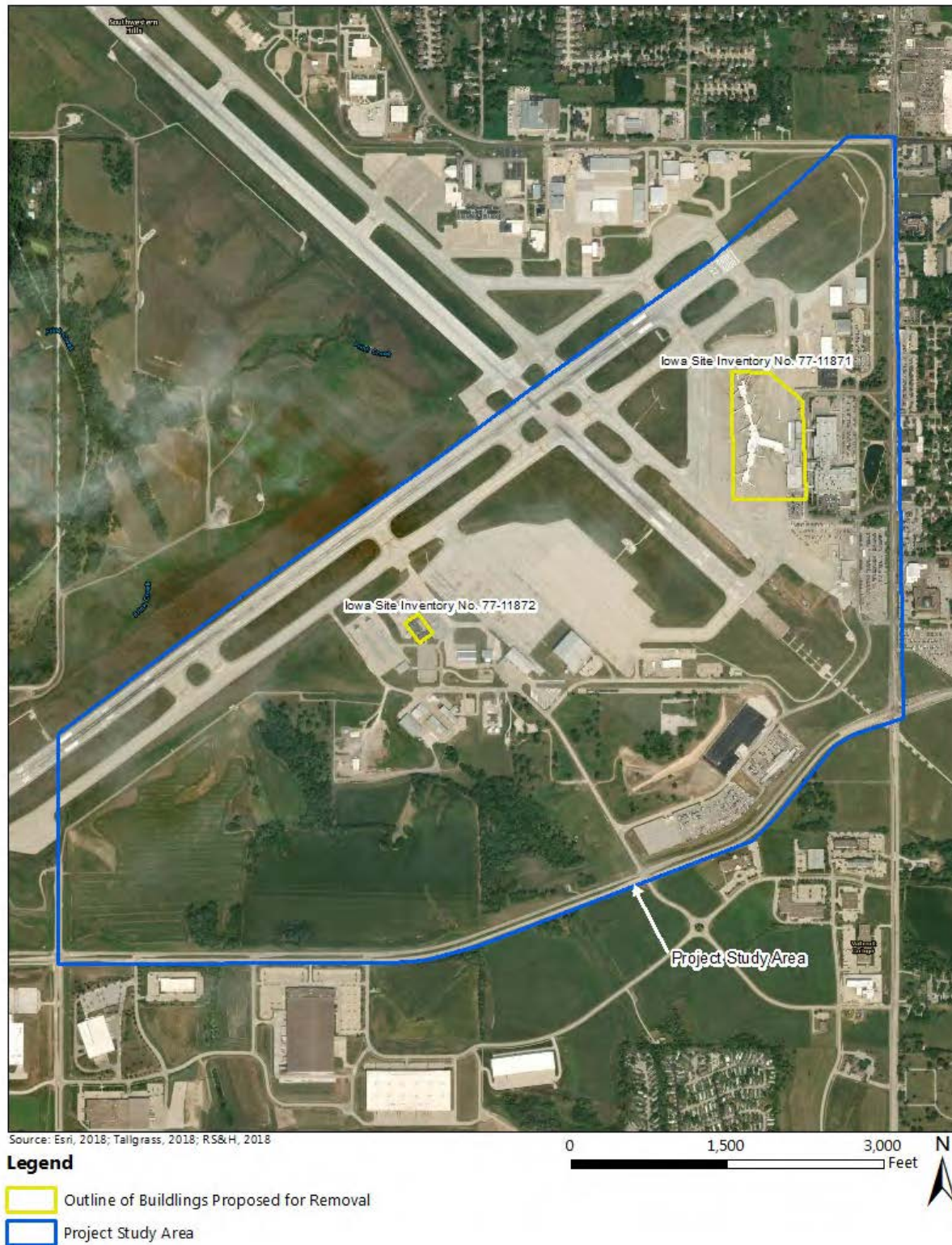
There are only two buildings proposed for replacement or removal as part of the Proposed Action within the direct APE. These consist of the current Airport terminal/administration building/concourse, which encompasses the historic 1949-1950 Des Moines Municipal Airport terminal/administration building (Iowa Site Inventory No. 77-11871); and Building 35, which is a former fixed base operator (FBO) building that was built circa 1971 for Iowa Aviation, Inc. (Iowa Site Inventory No. 77-11872) (see **Figure 4-7**). While Building 35 appears to be less than 50 years of age, its date of construction is uncertain and close enough to the 50-year limit that it was inventoried and evaluated for eligibility for inclusion in the NRHP. In addition, the Airport as a whole (excluding the Iowa Air National Guard complex), was also assessed as a potential historic district. A historic and architectural site survey of the direct APE was conducted in June 2018 (see **Appendix D**).

The 1949-1950 Airport terminal and administration building was designed by William Niels Nielsen, who was a veteran of the First World War and a 1925 graduate of Iowa State College with a degree in architectural engineering. The 1949-1950 Airport terminal and administration building has been so heavily modified by later expansion/modification of the original building and additions to that building, including the concourse and a multi-level parking garage, and other exterior/interior alterations that it no longer possesses sufficient historic integrity to qualify for inclusion in the NRHP. Therefore, the 1949-1950 Airport terminal and administration building is recommended as not eligible for inclusion in the NRHP for lack of sufficient historic integrity. This building is recommended for no further architectural/historical investigation (see **Appendix D**).

The circa 1971 Iowa Aviation, Inc. FBO building (Building 35) was found to be just under 50 years of age; however, the uncertainty of its actual construction date and the fact that it is so close to being 50 years old, resulted in the decision to complete an inventory form and NRHP evaluation of this building. This building, as originally planned in 1970, was a one-story office building that included a pilots' lounge and a classroom. It was built to house Iowa Aviation, Inc., which was a private commercial service that catered to business and private general-aviation aircraft rather than commercial airlines. As such, it was categorized as a FBO. This building was also found to have been added to in 1999 for another FBO, with the building remodeled and expanded again around 2000 for United Parcel Service. The evaluation resulted in a recommendation of Building 35 as not eligible for the NRHP because it lacks sufficient integrity and significance. Furthermore, as a building that is likely less than 50 years of age, Building 35 does not possess sufficient significance to meet the level of exceptional importance required under NRHP Criteria Consideration G for properties less than 50 years of age to qualify for inclusion in the NRHP. This building is recommended for no further architectural/historical investigation (see **Appendix D**).

The Airport as a whole encompasses approximately 49 buildings and structures, only two of which are of historic age (pre-1968) and eight of which date from the 1970s. The rest of the buildings were built after the 1980s. Of the two historic-age buildings, the 1949-1950 terminal does not retain historic integrity. The 1957 Federal Inspection building appears to retain some degree of historic integrity but is a modest-sized building that does not possess sufficient architectural significance to be potentially individually eligible. At present, it may be the only standing building that could be considered contributing to a historic district, if one still existed. The Assessor's records for the Airport property also list 288 building permits from 1995

FIGURE 4-7
IOWA SITE INVENTORY NUMBERS FOR BUILDING PROPOSED FOR REMOVAL



to 2017 for additions, alterations, remodeling, paving, new construction, and building removal supporting the already-known extent of the modifications to the historic Airport in the modern era. The runways and landscape of the Airport have also been reworked, repaved, replaced, and built over through the years. Even the area of the pond to the east of the terminal complex has been reworked more than once in the 20th century, with the current pond area extensively sculpted and landscaped and the pond itself reduced in size from what it was originally. The construction of the parking garage on the west side of the pond in the 1990s effectively destroyed most of the original “park” area in that location. As a result, it is concluded that the existing Airport does not retain sufficient integrity to be considered eligible for inclusion in the NRHP as a historic district. It is recommended for no further architectural/historical investigation for the Proposed Action (see **Appendix D**).

There are no historic properties within the Regional Study Area (see **Figure 4-8**). The closest NRHP property is the Fort Des Moines Army Officer Training School, which is a historic district and is located over 3,500 feet east of the Regional Study Area.

4.4.7.2 Archaeological and Cultural Resources

The direct APE was assessed as part of the Phase I pre-field analysis for archaeological potential, with most of the direct APE eliminated from further investigation because of the extensive, intensive, and recurring impacts from airport construction, demolition, and expansion through the years. There was an area in the southwest quadrant of the direct APE that was targeted for Phase I archaeological field survey that encompassed 255 acres (**Figure 4-9**). The targeted area has been affected around its perimeter, including impacts to the tributary valley; however, the interior of this area was found through research to have been only affected by cultivation and therefore, was considered to retain a potential for intact archaeological sites. This area is proposed for a borrow area and other potential ground-disturbing activities by the Proposed Action. There are no standing buildings of historic age within the targeted field survey area.

A special note was also made of a previously recorded site, 13PK961, which is located within the direct APE. This site was identified as the “Truman Jones Farm Cemetery,” based on the depiction of a cemetery on a parcel owned by Truman Jones on the 1907 plat map of Bloomfield Township (see **Appendix D**). It is not known if the burials once in this cemetery were ever moved. A survey of this area using a backhoe and approved investigation techniques was conducted in February 2019 and no evidence of the cemetery was found. The location is not being disclosed for confidentiality purposes.

The Phase I field survey examined the targeted area of the direct APE according to the current guidelines for Phase I survey in Iowa as approved by the Association of Iowa Archaeologists and standard archaeological practices. The field methodology included a combination of intensive pedestrian surface survey and systematically-placed shovel tests and soil cores.

FIGURE 4-8
HISTORIC PROPERTIES IN REGIONAL STUDY AREA

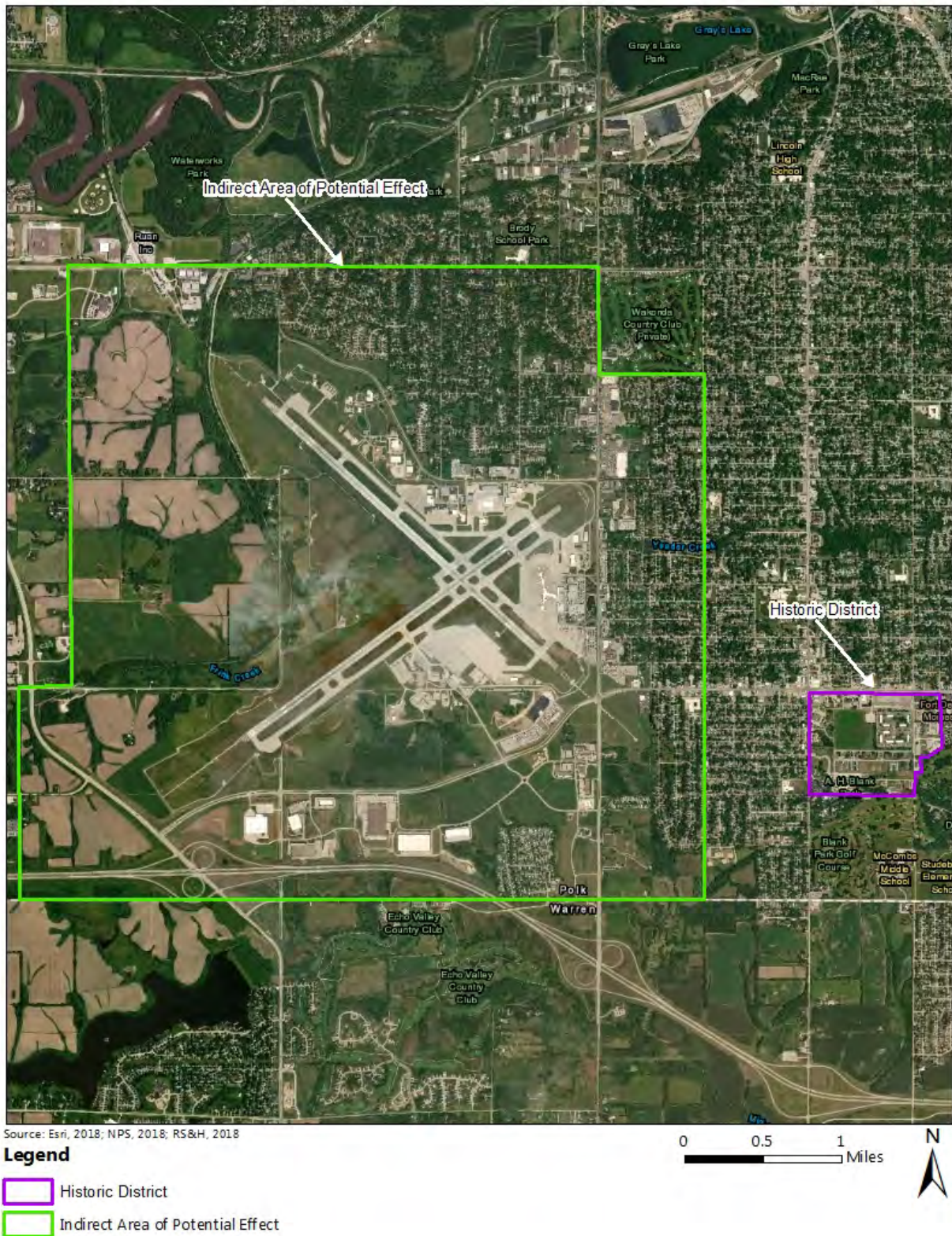


FIGURE 4-9
PHASE I ARCHAEOLOGICAL SURVEY AREA



Six archaeological sites were identified and assigned site numbers of 13PK1058 through 13PK1063 (see **Table 4-3** and **Appendix D**).

Each site was evaluated for potential eligibility for inclusion in the NRHP using the integrity considerations and significance criteria of the NRHP. This evaluation resulted in a recommendation that none of these sites are eligible because of a lack of sufficient integrity and/or significance. The sparse nature of the site deposits and context of these finds indicate a low potential for these sites to yield information of significance concerning the prehistory of this region under Criterion D or any other NRHP Criteria. Therefore, these sites are recommended as not eligible for inclusion in the NRHP and for no further archaeological investigation (see **Appendix D**).

No other potential historic properties were identified within the direct or indirect APE. Therefore, no further archaeological investigation of the direct or indirect APE is recommended (see **Table 4-3**).

TABLE 4-3
SUMMARY OF CULTURAL RESOURCES SITE SURVEY

Inventory/Site No.	Resource Type	NRHP evaluation	Recommendation
77-11871	Airport terminal	Not eligible	No further study
77-11872	FBO Building 35	Not eligible	No further study
13PK1058	Late Woodland isolated find (projectile point)	Not eligible	No further study
13PK1059	Prehistoric lithic scatter	Not eligible	No further study
13PK1060	Prehistoric lithic scatter	Not eligible	No further study
13PK1061	Prehistoric lithic scatter	Not eligible	No further study
13PK1062	Prehistoric lithic scatter	Not eligible	No further study
13PK1063	Prehistoric isolated find (pitted cobble tool)	Not eligible	No further study

Source: Tallgrass, 2018

4.4.8 Land Use

Various statutes, regulations, and EOs relevant to the Proposed Action include:

- » the Airport and Airway Improvement Act of 1982, and subsequent amendments (49 U.S.C. 47107(a)(10))
- » the Airport Improvement Program (49 U.S.C. 47106(a)(1))
- » the Airport Safety, Protection of Environment, Criteria for Municipal Solid Waste Landfills (40 CFR § 258.10)
- » state and local regulations

The Airport is located in the City of Des Moines and is entirely within Polk County. The Project Study Area is zoned as “limited industrial” by the City of Des Moines.²⁷ According to the Des Moines, Iowa Code of Ordinances Chapter 134, *Zoning*, “airport and associated uses of land and structures” are permitted within this zone.²⁸ The Regional Study Area is generally zoned as single family residential and planned business development to the east; industrial and single family residential to the north; single family residential and commercial to the east; and planned business development and mobile home residential to the south.

The closest residential area is 300 feet east of the Project Study Area. This residential area is buffered from the Airport by a general retail area located along Fleur Drive.²⁹ Line of sight from this residential area to the Airport is predominantly blocked by commercial buildings or vegetation. Additionally, the Airport is slightly higher (about 40 feet higher in elevation) than this particular residential area;³⁰ therefore, the majority of the residential area does not have direct line of sight to the Airport. The Regional Study Area contains all Airport property and some residential areas to the north, east, and south. The remaining Regional Study Area is vacant land.

4.4.9 Natural Resources and Energy Supply

The federal government encourages airport development that minimizes the use of consumable natural resources and minimizes demands on energy supplies. FAA policy also encourages developing facilities to use the highest design standards and to incorporate sustainable measures into designs.

Statutes and EOs that are relevant to natural resources and energy supply impacts include:

- » Energy Independence and Security Act (42 U.S.C. § 17001 et seq.)
- » Energy Policy Act (42 U.S.C. § 15801 et seq.)
- » EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management* (72 FR 3919)
- » EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance* (74 FR 52117)

Airport personnel and tenants regularly use consumable materials to maintain various airside and landside facilities and services. Those materials may include asphalt, concrete, aggregate for sub-base materials, various metals associated with such maintenance, as well as fuels associated with operation of aircraft and vehicles.

Electrical power is necessary to keep the Airport operational and safe. Airport lighting within the Project Study Area consists of airfield navigational aids, runway taxiway edge lighting, signage, landside lighting for buildings, access roadways, apron areas, and automobile parking areas. MidAmerican Energy supplies

²⁷ City of Des Moines. (2018). Community Development, Zoning, Zoning Map of the City of Des Moines. Retrieved June 2018, from City of Des Moines: <https://www.dmgov.org/Departments/CommunityDevelopment/Pages/Zoning.aspx>.

²⁸ City of Des Moines. (2018). Code of Ordinances, Chapter 134 – Zoning. Retrieved June 2018, from City of Des Moines: https://library.municode.com/ia/des_moines/codes/code_of_ordinances?nodeId=MUCO_CH134ZO_ARTIIIDI_DIV26LIIN.

²⁹ City of Des Moines. (2018). Information Technology, Land Use and Zoning, Land Use. Retrieved June 2018, from City of Des Moines: <https://maps.dmgov.org/docs/maps/CDLandUseMap.pdf>.

³⁰ Google Earth.

the Airport with electricity and gas.³¹ The Airport's electrical vault its emergency generator are located in the north quadrant of the Airport, near the east cargo facility. The Airport passenger terminal's emergency generator is located in the passenger terminal in between the two Concourses. The Airport's fuel farm is also located in the southern portion of the Airport, about 1,800 feet north of Army Post Road.

4.4.10 Noise and Noise-Compatible Land Use

Statutes and EOs that are relevant to noise and noise-compatible land use impacts include:

- » The Control and Abatement of Aircraft Noise and Sonic Boom Act of 1968 (49 U.S.C. § 44715)
- » The Noise Control Act of 1972 (42 U.S.C. §§ 4901-4918)
- » Aviation Safety and Noise Abatement Act of 1979 (49 U.S.C. § 47501 et seq.)
- » Airport and Airway Improvement Act of 1982 (49 U.S.C. § 47101 et seq.)
- » Airport Noise and Capacity Act of 1990 (49 U.S.C. §§ 47521-47534, §§ 106(g))
- » Section 506 of the FAA Modernization and Reform Act of 2012, *Prohibition on Operating Certain Aircraft Weighting 75,000 Pounds or Less Not Complying with Stage 3 Noise Levels* (49 U.S.C. §§ 47534)
- » state and local noise laws and ordinances

The following regulations implement the federal acts related to noise and noise-compatible land use:

- » 49 CFR Part 821 and 14 CFR Parts 21, 36, 91, 119, 135, and 150 implement The Control and Abatement of Aircraft Noise and Sonic Boom Act of 1968
- » 40 CFR Part 209 implements The Noise Control Act of 1972
- » 14 CFR Part 150 implements the Aviation Safety and Noise Abatement Act of 1979
- » 14 CFR Part 161 implements the Airport Noise and Capacity Act of 1990
- » 14 CFR Part 91 implements Section 506 of the FAA Modernization and Reform Act of 2012

Day-Night Sound Level (DNL) is based on sound levels measured in relative intensity of sound decibels (dB) on the A-weighted scale (dBA) over a time-weighted average normalized to a 24-hour period. DNL has been widely accepted as the best available method to describe aircraft noise exposure. The USEPA identifies DNL as the principal metric for airport noise analysis. The FAA requires DNL as the noise descriptor for use in aircraft noise exposure analysis and noise compatibility planning. DNL levels are commonly shown as lines of equal noise exposure, similar to terrain contour maps, referred to as noise contours. **Table 4-4** shows the DNL noise contours and the land use capability guidelines for uses within those contours.³² All residential areas are considered compatible with cumulative noise levels below DNL 65 dBA.

³¹ Iowa Utilities Board. (2018). Town Provider List. Retrieved June 2018, from Iowa Utilities Board: <https://iub.iowa.gov/sites/default/files/files/misc/town-provider-list.pdf>.

³² FAA. (1985). Federal Aviation Regulations Part 150, *Airport Noise Compatibility Planning*, CFR 14, Chapter I, Subchapter I, Part 150, Table 1, January 18, 1985, as amended.

TABLE 4-4
FAR PART 150 NOISE/LAND USE COMPATIBILITY GUIDELINES

Land Use	DNL 65 to 70	DNL 70 to 75	DNL 75+
Residential			
Residential other than mobile homes and transient lodgings	NLR required (a)	NLR required (a)	Incompatible
Mobile homes	Incompatible	Incompatible	Incompatible
Transient lodgings	NLR required (a)	NLR required (a)	NLR required (b)
Public Use			
Schools	NLR required (a)	NLR required (a)	Incompatible
Hospitals and nursing homes	NLR required	NLR required	Incompatible
Churches, auditoriums, and concert halls	NLR required	NLR required	Incompatible
Governmental services	Compatible	NLR required	NLR required (b)
Transportation	Compatible	Compatible (c)	Compatible (c)
Parking	Compatible	Compatible (c)	Compatible (c) (d)
Commercial Use			
Offices, business, and professional	Compatible	NLR required	NLR required (b)
Wholesale and retail—building materials, hardware, and farm equipment	Compatible	Compatible (c)	Compatible (c) (d)
Retail trade—general	Compatible	NLR required	NLR required (b)
Utilities	Compatible	Compatible (c)	Compatible (c) (d)
Communication	Compatible	NLR required	NLR required (b)
Manufacturing and Production			
Manufacturing—general	Compatible	Compatible (c)	Compatible (c) (d)
Photographic and optical	Compatible	NLR required	NLR required (b)
Agriculture (except livestock) and forestry	Compatible (c)	Compatible (c)	Compatible (e)
Livestock farming and breeding	Compatible (c)	Compatible (c)	Incompatible
Mining and fishing resources production and extraction	Compatible	Compatible	Compatible
Recreational			
Outdoor sports arenas and spectator sports	Compatible (f)	Compatible (f)	Incompatible
Outdoor music shells, amphitheaters	Incompatible	Incompatible	Incompatible
Nature exhibits and zoos	Compatible	Incompatible	Incompatible
Amusements, parks, resorts, and camps	Compatible	Compatible	Incompatible
Golf courses, riding stables, and water recreation	Compatible	NLR required	NLR required (b)

TABLE 4-4 (CONT'D)
FAR PART 150 NOISE/LAND USE COMPATIBILITY GUIDELINES

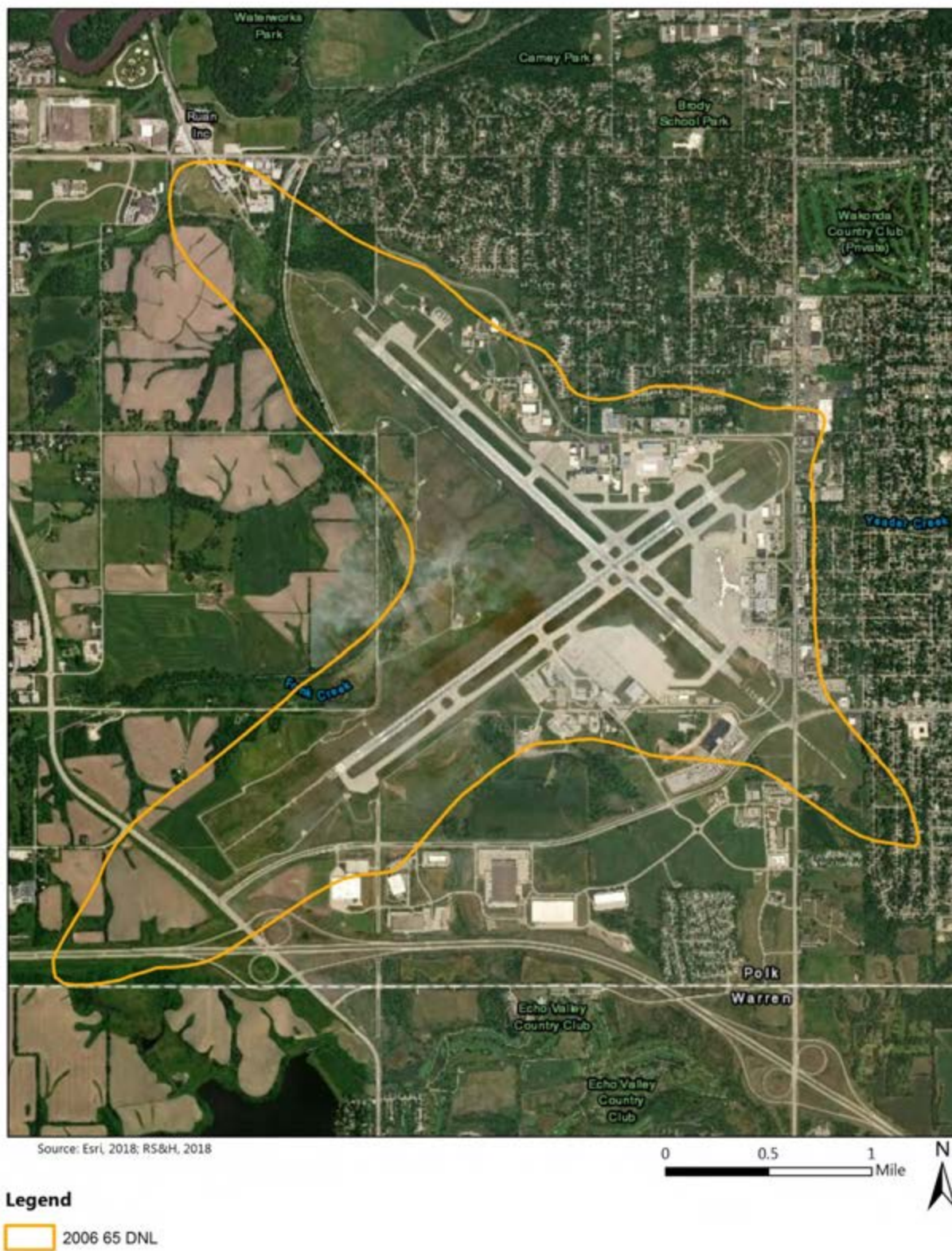
Notes: The designations in this table do not constitute a federal determination that any use of land is acceptable or unacceptable under federal, State, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities.

- DNL = Annual day-night average sound level, in A-weighted decibels.
- Compatible = Generally, no special noise attenuating materials are required to achieve an interior noise level of DNL 45 in habitable spaces, or the activity (whether indoors or outdoors) would not be subject to a significant adverse effect by the outdoor noise level.
- Incompatible = Generally, the land use, whether in a structure or an outdoor activity, is considered to be incompatible with the outdoor noise level even if special attenuating materials were to be used in the construction of the building.
- NLR = Noise Level Reduction. NLR is used to denote the total amount of noise transmission loss in decibels required to reduce an exterior noise level in habitable interior spaces to DNL 45. In most places, typical building construction automatically provides an NLR of 20 decibels. Therefore, if a structure is located in an area exposed to aircraft noise of DNL 65, the interior noise level would be about DNL 45. If the structure is located in an area exposed to aircraft noise of DNL 70, the interior noise level would be about DNL 50, so an additional NLR of 5 decibels would be required if not afforded by the normal construction. This NLR can be achieved through the use of noise attenuating materials in the construction of the structure.
- (a) The land use is generally incompatible with aircraft noise and should only be permitted in areas of infill in existing neighborhoods.
 - (b) NLR required between DNL 75 and 80; incompatible with aircraft noise of DNL 80 and higher.
 - (c) NLR required in offices or other areas with noise-sensitive activities.
 - (d) Incompatible with aircraft noise of DNL 85 and higher.
 - (e) Residential buildings incompatible with aircraft noise of DNL 75 and higher.
 - (f) This land use is considered compatible provided that special sound attenuation systems are installed.

Source: FAA, 1985

The Authority conducted a 14 CFR Part 150 Noise Compatibility Study in 2006. **Figure 4-10** shows the aviation noise contours for the Airport prepared as part of that study. Incompatible land uses were identified within the DNL 65 dBA contour. As mitigation, the Authority purchased aviation easements, which are a property right acquired from a landowner that protects the use of airspace by aircraft, including the right of the aircraft to cause noise. Although completed in 2006, these contours represent the best available noise information for the Airport.

FIGURE 4-10
2006 AIRPORT DNL 65 dBA CONTOUR



4.4.11 Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks

The following section describes the existing demographics of the Regional Study Area as it relates to socioeconomics, surface traffic, environmental justice, and children's environmental health and safety risks. The Regional Study Area lies contains the following Census Tracts; 40.04, Block Groups 1 and 2; 45.02, Block Groups 1, 2, and 3; 46.03, Block Groups 3 and 4; 47.01, Block Groups 1, 2, and 3; 110.28, Block Group 1; and 116, Block Group 1 (see **Figure 4-11**).

4.4.11.1 Socioeconomics

The Uniform Relocation Assistance and Real Property Acquisitions Policy Act of 1970 (42 U.S.C. § 61 et seq.), implemented by 49 CFR Part 24, is the primary statute related to socioeconomic impacts.

Population and Housing

Table 4-5 shows the population and housing data for the Census Tracts that are within the Regional Study Area. Data from the Regional Study Area, the City of Des Moines, and Polk County were included for comparison purposes. The Regional Study Area does not contain a high-density residential area; about five percent of the total population of the City of Des Moines lives within in the Regional Study Area and about two percent of the total population of the County lives within the Regional Study Area. A total of about 10,600 people live in the Regional Study area. There are about 4,700 households, 93.19 percent of which are occupied, for an average of 2.26 persons per household.

TABLE 4-5
POPULATION AND HOUSING CHARACTERISTICS

Socioeconomic Characteristic	Regional Study Area	City of Des Moines	Polk County
Total Population	10,608	212,859	459,159
Total Households	4,698	90,437	190,705
Average Persons per Household	2.26	2.35	2.41
Percent Housing Occupied	93.19%	91.93%	93.61%

Source: U.S. Census Bureau, 2012-2016; RS&H, 2018

Employment

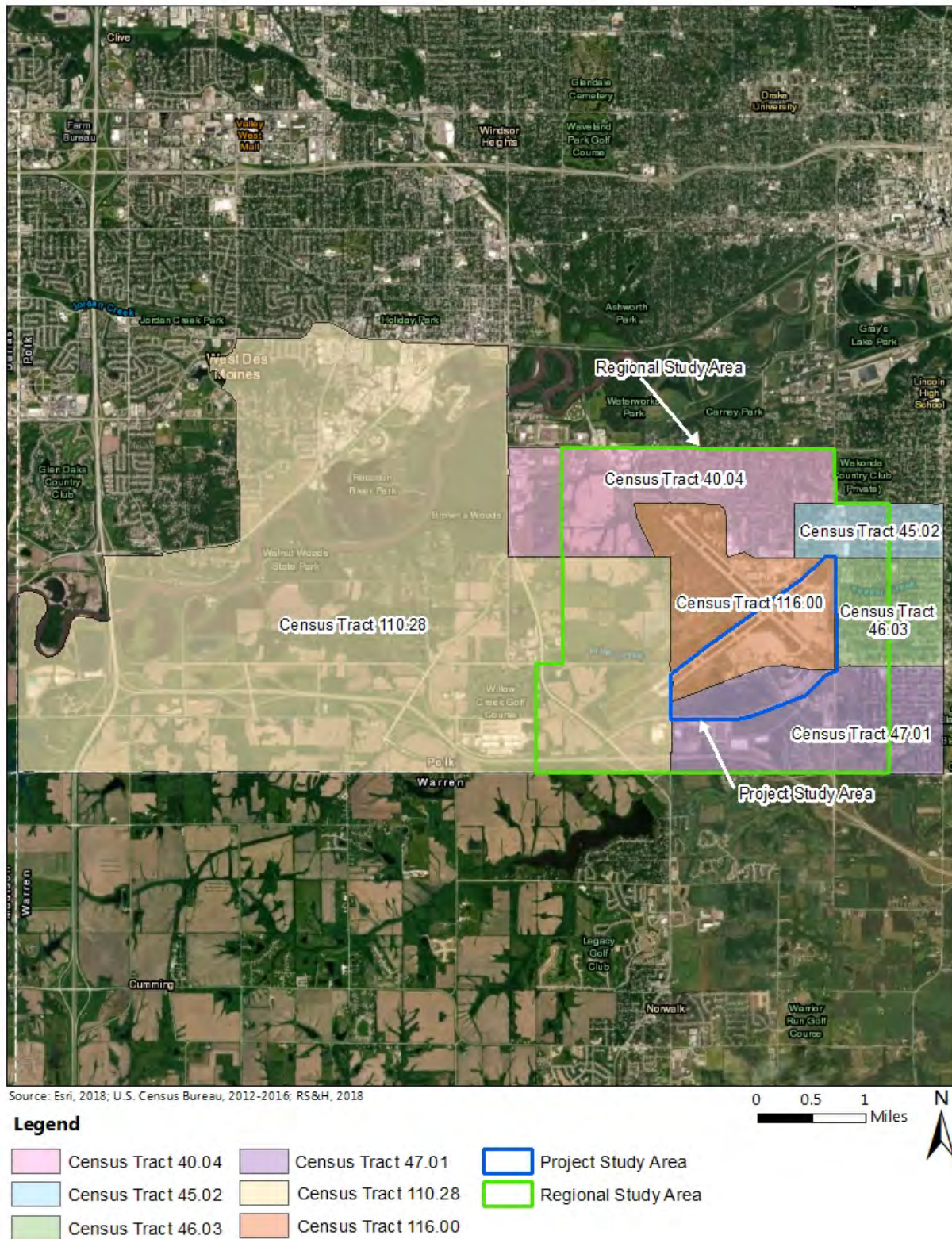
Table 4-6 shows that the Regional Study Area has the lowest unemployment rate (2.81%) when compared to the City of Des Moines (7.01%) and Polk County (5.2%).

TABLE 4-6
EMPLOYMENT CHARACTERISTICS

Socioeconomic Characteristic	Regional Study Area	City of Des Moines	Polk County
Percent Unemployed	2.81%	7.01%	5.2%

Source: U.S. Census Bureau, 2012-2016; RS&H, 2018

FIGURE 4-11
CENSUS TRACTS IN REGIONAL STUDY AREA



Surface Traffic

There is no federal statutory or regulatory requirement for adverse effects resulting from surface traffic impacts.

A surface traffic study for the City of Des Moines was reviewed and the data from the report is included in this section (see **Appendix E**).³³ Existing traffic volume data in the report at the following critical intersections documents existing traffic volume levels in the area, known as the study intersections:

- » Fleur Drive and Cowles Drive/Porter Avenue
- » Fleur Drive and Southlawn Drive
- » Fleur Drive and Highview Drive
- » Fleur Drive and Payton Avenue
- » Fleur Drive and Leland Avenue
- » Fleur Drive and Army Post Road
- » Army Post Road and SW 28th Street

Weekday peak period traffic turning movement counts were conducted at the study intersections on typical weekdays during March 2017. The data collected identified the following peak periods:

- » AM Peak Hour (7:15 am-8:15 am)
- » Midday Peak Hour (2:00 pm-3:00 pm)
- » PM Peak Hour (4:30 pm-5:30 pm)

Directional 24-hour counts were obtained from the Iowa Department of Transportation (DOT) for the year 2016 on Fleur Drive, Army Post Road, Porter Avenue, and Cowles Drive/Highview Drive. This data provided the Average Daily Traffic (ADT) for the Regional Study Area roads. The Iowa DOT ADT data is included in **Appendix E**.

McKinley Avenue runs east-west on the north side of the Airport. It is a signalized intersection with Fleur Drive. Although McKinley Avenue abuts the Airport, there is no public access to the Airport from this street, nor is there an unimpeded path to McKinley Avenue from downtown Des Moines. According to the data from the Iowa DOT, McKinley Avenue has an ADT ranging from 5,600 vehicles per day (vpd) to 8,300 vpd. The volume of traffic using McKinley Avenue is less than half of the amount of traffic using Fleur Drive. Therefore, McKinley Avenue was not included in the HNTB study nor is it included in this Project Study Area.

According to the 2017 surface traffic study, the majority of traffic to/from the Airport travels north/south on the Fleur Drive corridor. The traffic volume data indicates the Airport traffic will continue to use the existing traffic patterns in the Regional Study Area with the exception of the relocated Airport entrance intersection. With the new entrance intersection, turning movement traffic at Cowles Drive/Porter Drive

³³ HNTB. (2017). *Des Moines International Airport Terminal Programming Study – Traffic and Safety Report*, October 2017.

shifts to Fleur Drive and Cowles Drive/Highview Drive; however, there is no indication that traffic uses the side streets to the east of Fleur Drive to directly access the Airport.

Based on the results of the surface traffic analysis in the 2017 surface traffic study, all study area intersections either remain at an acceptable level of service (LOS) or are the same as the no build condition. There are several uncontrolled intersections that operate with LOS F in the existing, future no build, and future build conditions. LOS F is typical at uncontrolled minor urban intersections and driveways on major roadways in peak hours. For signalized intersections, LOS D is generally considered acceptable in urban areas during peak traffic flow periods. With the exception of the intersection of Fleur Drive at Army Post Road (AM peak only), all signalized study intersections are operating at LOS C or better with the majority operating above LOS C.

4.4.11.2 Environmental Justice

Relevant statutes, EOs, memorandums, and guidance include:

- » Title VI of the Civil Rights Act, as amended (42 U.S.C. §§ 2000d-2000d-7)³⁴
- » EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (59 FR 7629)
- » Memorandum of Understanding on Environmental Justice and EO 12898
- » USDOT Order 5610.2(a), Environmental Justice in Minority and Low-Income Populations (77 FR 27534)
- » CEQ Guidance: Environmental Justice: Guidance Under the NEPA
- » Revised USDOT Environmental Justice Strategy (77 FR 18879)

The following regulation implements the federal acts related to environmental justice:

- » 28 CFR §42.401 implements Title VI of the Civil Rights Act, as amended.

Table 4-7 shows the total minority presence and the population living in poverty in the Regional Study Area, the City of Des Moines, and Polk County, based on the U.S. Census Bureau 2012-2016 American Community Survey 5-Year Estimates. The Regional Study Area, City of Des Moines, and Polk County are predominantly white with the highest minority population located in the City of Des Moines (22.87%). The lowest minority population is found within the Regional Study Area (11.98%), which is not considered a significant proportion of minorities. **Table 4-7** also shows that the City of Des Moines has the highest percent of the population living below the poverty line (18.97%) when compared to the Regional Study Area (8.93%) and Polk County (12.40%).

³⁴ Title VI and its implementing regulations are not specific to environmental justice; it is a broader statutory prohibition on discrimination.

TABLE 4-7
ENVIRONMENTAL JUSTICE CHARACTERISTICS

Environmental Justice Characteristic	Regional Study Area	City of Des Moines	Polk County
Percent Minority	11.98%	22.87%	14.97%
Percent Living Below Poverty Line	8.93%	18.97%	12.40%

Note: The percent unemployed is based on the civilian population 16 years and over, not the total population.

Source: U.S. Census Bureau, 2012-2016; RS&H, 2018

4.4.11.3 Children's Environmental Health and Safety Risks

In addition to the residential area discussed in **Section 4.4.8**, areas of particular concern for children's environmental health risks and safety include schools, day cares, children's health clinics, and child friendly recreational facilities. There are three schools within the Regional Study Area; Morris Elementary, Jefferson Elementary, and Des Moines Adventist School.³⁵ Morris Elementary and Jefferson Elementary serve kindergarten through fifth grade, and the Des Moines Adventist School serves kindergarten through eighth grade. Two schools are found just outside of the Regional Study Area; Wright Elementary School and Brody Middle School. Wright Elementary School, serving kindergarten through fifth grade, is located about 150 feet east of the Regional Study Area and Brody Middle School, serving sixth through eighth grade, is located about 200 feet north of the Regional Study Area. There is one day care facility located within the Regional Study Area, Little Sprouts Children's Center.³⁶ Approximately 2,500 feet east of the Regional Study Area is another day care facility, La Petite Academy.³⁷ The closest children's health clinic, Orchard Place, is located approximately 2,300 feet east of the Regional Study Area. There is one child friendly recreational facility located within the Regional Study area, Harmon Park, a city park with two tennis courts.³⁸ Approximately 1,600 feet east of the Regional Study Area is the George Nahas Aquatic Center and George Nahas Park. **Table 4-8** shows children age distribution of the Regional Study Area compared to the City of Des Moines and Polk County.

TABLE 4-8
CHILDREN AGE DISTRIBUTIONS

Child Age Group	Regional Study Area	City of Des Moines	Polk County
Population Under 6	688	16,505	40,169
Population ages 6-11	498	15,834	39,590
Population ages 12-17	397	13,942	36,001
Total	1,583	46,281	115,760

Source: U.S. Census Bureau, 2012-2016; RS&H, 2018

³⁵ USEPA. (2018). NEPAassist, Places, Schools. Retrieved September 2018, from USEPA:

<https://nepassisttool.epa.gov/nepassist/nepamap.aspx?wherestr=des+moines+international+airport>.

³⁶ Little Sprouts Children's Center. (2018). Retrieved September 2018, from Little Sprouts Children's Center:

<http://littlesproutschildrenscenter.com/>.

³⁷ La Petite Academy of Des Moines IA. (2018). Retrieved September 2018, from La Petite Academy of Des Moines IA:

<https://www.lapetite.com/your-local-school/des-moines-ia-7264/>.

³⁸ City of Des Moines. (2018). Parks and Recreation, Parks and Recreation Finder. Retrieved September 2018, from City of Des Moines: <http://maps.dmgov.org/apps/parksfinder/default.htm>.

4.4.12 Visual Effects

There is no federal statutory or regulatory requirement for adverse effects resulting from light emissions or visual impacts. FAA Order 1050.1F describe factors to consider for light emissions and visual resources/visual character.

4.4.12.1 Light Emissions

Current Airport facilities are illuminated for safety and security reasons by various types of lighting for buildings, access roadways, apron areas, and automobile parking areas, as well as lighting for runways, taxiways, and apron areas. The closest residential area is about 300 feet to the east of the Project Study Area. This residential area is buffered from the Airport by a general retail area. Line of sight from this residential area to the Airport is predominantly blocked by commercial buildings or vegetation.

4.4.12.2 Visual Resources and Visual Character

Visual Character

The visual character of the Project Study Area consists of various airside and landside facilities and structures, including runways, taxiways, the passenger terminal building, air traffic control tower, surface parking lots and parking structures, apron areas, hangars, maintenance areas, aircraft parking positions, rental car facilities, maintained grassland, and a pond.

Visual Resources

Scenic resources within the City of Des Moines include public parks and green space. As previously discussed in **Section 4.4.4**, Harmon Park is in the northern portion of the Regional Study Area.

4.4.13 Water Resources

The following subsections describe the water resources in and around the Project Study Area. Water resources include wetlands, floodplains, surface waters, and groundwater. As **Section 4.2.2** describes, there are no protected river segments in or around the Project Study Area; therefore, those resources are not discussed in this section.

4.4.13.1 Wetlands

Statutes and EOs that are relevant to wetlands include:

- » EO 11990, *Protection of Wetlands* (42 FR 26961)
- » CWA (33 U.S.C. §§ 1251-1387)
- » Fish and Wildlife Coordination Act (16 U.S.C. § 661-667d)
- » USDOT Order 660.1A, Preservation of the Nation's Wetlands
- » state statutes protecting wetlands

The following regulation implements the federal act related to wetlands:

- » 33 CFR Parts 320-332 and 40 CFR Parts 230-233 implement the Clean Water Act as it pertains to wetlands.

Wetlands generally have three essential characteristics: hydrophytic vegetation, hydric soils, and wetland hydrology. Wetlands and Waters of the U.S. (WUS) are regulated by the U.S. Army Corps of Engineers (USACE). A Wetland and WUS delineation was conducted to evaluate potential wetland areas and WUS in the Project Study Area (see **Appendix F**).

Based on the results of the delineation, 3.51 acres of wetlands, 1.4 acres of pond, 2,280 linear feet of WUS and 520 linear feet of drainage features were identified in the Project Study Area (see **Figure 4-12**).

Tables 4-9 through 4-12 summarize the sizes of the delineated wetland, WUS, erosional features (EF) and pond within the Project Study Area.

TABLE 4-9
WETLAND AREA SUMMARY

WETLAND IDENTIFICATION	WETLAND AREA (ACRES)
WL-1	0.29
WL-2	0.08
WL-3	0.24
WL-4	0.46
WL-5	0.20
WL-6	1.00
WL-7	0.44
WL-8	0.17
WL-9	0.33
WL-10	0.30
Total	3.51

Source: Foth, 2018

TABLE 4-10
WATERS OF THE U.S. (WUS) LENGTH SUMMARY

WUS IDENTIFICATION	WUS LENGTH (FEET)
WUS-1	2,140 (within Project Study Area)
WUS-2	140
Total	2,280

Source: Foth, 2018

TABLE 4-11
DRAINAGE FEATURE LENGTH SUMMARY

DRAINAGE FEATURE IDENTIFICATION	LENGTH (FEET)
EF-1	450
EF-2	70
Total	520

Source: Foth, 2018

FIGURE 4-12
WETLAND AND WATERS OF THE U.S. (WUS) DELINEATION MAP



TABLE 4-12
POND SUMMARY

POND IDENTIFICATION	POND AREA (ACRES)
Pond 1 (Stormwater Detention Basin)	1.4
Total	1.4

Source: Foth, 2018

4.4.13.2 Floodplains

Relevant statutes and EOs pertaining to floodplains include:

- » EO 11988, *Floodplain Management* (42 FR 26951)
- » National Flood Insurance Act (42 U.S.C. § 4001 *et seq.*)
- » USDOT Order 5650.2, Floodplain Management and Protection
- » State and local statutes protecting floodplains

The following regulation implements the federal act related to floodplains.

- » 44 CFR Part 60 implements the National Flood Insurance Act.

Floodplains are flood prone areas adjacent to rivers, creeks, ditches, lakes, or other surface water features. The Federal Emergency Management Agency (FEMA) defines floodplains according to the frequency or likelihood that a specific area will become flooded. For example, a 100-year floodplain is an area that statistically has a one percent chance of becoming flooded in any year.

FEMA effective Flood Insurance Rate Map (FIRM) panels 1902270009E, 1902270011D, 1909010200C, and 1902270008D identify the Project Study Area as Zone X, areas determined to be outside the 100- and 500-year floodplain. In addition, Preliminary FIRM map number 19153C0345F, dated June 17, 2015, also identifies the Project Study Area as Zone X, areas determined to be outside the 100- and 500-year floodplain.³⁹

4.4.13.3 Surface Waters

Relevant regulations and statutes pertaining to surface waters include:

- » CWA (33 U.S.C. §§ 1251-1387)
- » Fish and Wildlife Coordination Act (16 U.S.C. § 661-667d)
- » Rivers and Harbors Act (33 U.S.C. § 401 and 403)
- » Safe Drinking Water Act (42 U.S.C. §§ 300(f)-300j-26)
- » State statutes protecting surface waters

³⁹ City of Des Moines (2018). Engineering Department, FEMA Preliminary Flood Insurance Maps. Retrieved July 2018, from City of Des Moines: <https://www.dmgov.org/Departments/Engineering/PDF/Preliminary%20Flood%20Insurance%20Rate%20Map%20-%2006-17-15%20-%200345F.pdf>.

The following regulations implement the federal acts related to surface water.

- » 40 CFR Parts 110-112, 116, 117, 122, 125, 129-131, 136 and 403 implement the Clean Water Act.
- » 33 CFR Parts 114-118 and 320-332 implement the Rivers and Harbors Act.
- » 40 CFR Parts 141-149 implement the Safe Drinking Water Act.

Surface waters include areas where water collects on the surface of the ground, such as streams, rivers, lakes, ponds, estuaries, and oceans. The Project Study Area intersects three watersheds: the Yeader Creek-Des Moines River watershed (HUC 12 ID: 071000081503), Middle Creek watershed (HUC 12 ID: 071000080404), and the Jordan Creek-Raccoon River watershed (HUC 12 ID: 071000061703).⁴⁰ As described in **Section 4.4.13.1**, there are wetlands, WUS, a pond/stormwater detention basin, and drainage/erosional features in the Project Study Area. The two delineated WUS are unnamed tributaries of Middle Creek located in the southern quadrant of the Airport. The stormwater detention basin is located between the existing terminal and Fleur Drive in the Yeader Creek-Des Moines River watershed. Wetlands and drainage/erosional features are located in the Middle Creek and Jordan Creek-Raccoon River watersheds in the south quadrant of the Airport.

As described in **Section 4.4.6**, the Airport operates under an Iowa NPDES for stormwater discharge associated with industrial activity from vehicle maintenance, equipment cleaning, and deicing/anti-icing areas at the airport, which expires on April 30, 2022. The permit requires the implementation of a SWPPP and best management practices (BMPs) designed to limit the discharge of pollutants to surrounding surface waters and to meet all numeric effluent limits.

Airlines and FBOs conduct aircraft deicing and anti-icing operations during the winter months. The Airport conducts pavement deicing and anti-icing operations using potassium and/or sodium acetate for airfield pavement and sodium chloride on landside surfaces. Pavement deicers are more environmentally benign than aircraft deicers. The airlines and FBOs use propylene and/or ethylene glycol for aircraft deicing and anti-icing operations at designated locations on the terminal and cargo aprons. During the winter season, deicer-impacted stormwater runoff from these locations is collected in the storm system and stored in underground detention tanks adjacent to the aprons. Deicer-impacted stormwater in the storage tanks is discharged to the sanitary system in accordance with an industrial discharge permit issued by the Des Moines Metropolitan Wastewater Reclamation Authority.

4.4.13.4 Groundwater

Relevant regulations and statutes pertaining to groundwater include:

- » Safe Drinking Water Act (42 U.S.C. §§ 300(f)-300j-26)
- » state statutes protecting surface waters

The following regulation implements the federal act related to groundwater.

- » 40 CFR Parts 141-149 implement the Clean Water Act as it pertains to groundwater.

⁴⁰ USEPA. (2018). NEPAAssist, Water Features, Watersheds. Retrieved June 2018, from USEPA: <https://nepassisttool.epa.gov/nepassist/nepamap.aspx?wherestr=des+moines+international+airport>.

Des Moines Water Works provides potable water services to the Airport. Des Moines Water Works supplies drinking water to approximately 500,000 people in the Greater Des Moines area. It uses a combination of water sources for water supply including the Raccoon and Des Moines Rivers, reservoirs, wells, and aquifers. Located approximately three miles north of the Airport, a three-mile long infiltration gallery system running parallel to the Raccoon River provides up to one-third of the water needed. The gallery system is a series of concrete rings below the river bottom that allows water to naturally filter through sand and gravel into the rings.

According to the Iowa DNR GeoData dataset for “All Registered Wells in the State of Iowa”, there are several active, plugged, and abandoned groundwater wells in the Project Study Area.

4.5 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

The Council on Environmental Quality (CEQ), at 40 CFR Part 1508.7, defines a cumulative impact as the “impact on the environment which results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time.”

This section identifies past, present, and reasonably foreseeable actions that, when considered in combination with the Proposed Action, could contribute to potentially significant cumulative impacts. Projects described below only include those that had or have the potential to affect the environmental resources that construction and/or operation of the Proposed Action could affect. The following summary of past, present, and reasonably foreseeable projects include those undertaken or regulated by the Airport, the City of Des Moines and Polk County.

4.5.1.1 Past Actions

The following describes the past action(s) that have occurred on- and off-Airport property between 2013 and 2017.

The Airport reported the following on-Airport past actions:

- » Economy II Parking Lot Improvements
- » Building 7 Parking Lot Improvements
- » Building 48 Demolition
- » Taxiway D Phase II Construction Phase Services
- » Cargo Deicing Stormwater Line Bypass
- » North General Aviation Road Rehabilitation
- » General Aviation Apron Reconstruction Phase I;
- » Leland Avenue Widening
- » Rental Lot No. 1 Reconstruction
- » Runway 13/31 Storm Pipe Repairs
- » Runway 13/31 Reconstruction Phase I

- » Rental Lot 1 Expansion
- » Building 2 Demolition
- » Building 36 Demolition
- » Building 65 Demolition
- » North General Aviation Apron Construction Phase II
- » Perimeter Roadway Drainage Improvements
- » Cowles Drive and Duckpond Road Rehabilitation
- » Runway 13/31 Phase 3 Reconstruction Phase III
- » Access Roadway Construction from Gate 26 to Building 65
- » T Hangar Construction

The following off-Airport projects have been completed within two miles of the Project Study Area:⁴¹

- » Bridge Construction above Great Western Trail Bike Path at Old Army Post Road (one mile west of Project Study Area)
- » Sanitary Sewer Construction on Wakonda Parkway (2,800 feet northeast of Project Study Area)
- » South Union Street Bridge Rehabilitation over Yeader Creek (1.5 miles east of Project Study Area)
- » Yeader Creek Grade Control Improvements (3,700 feet east of Project Study Area)
- » George Flagg Parkway Resurfacing from Park Avenue to SW 30th Street (1.85 miles northwest of Project Study Area)

4.5.1.2 Present Actions

The following describes the actions that are currently under construction on- and off-Airport.

The Airport reported the following on-Airport present actions:

- » Runway 13 Rehabilitation Phase VI
- » Cargo Hangar Relocation

There are currently no off-Airport projects being completed within two miles of the Airport.⁴²

4.5.1.3 Reasonably Foreseeable Actions

The following describes the actions that are reasonably foreseeable on- and off-Airport between the years of 2019 and 2021.

The Airport reported the following on-Airport future actions:

- » Runway 5 Reconstruction

⁴¹ City of Des Moines. (2018). Engineering Department. Retrieved July 2018, from City of Des Moines: <https://www.dmgov.org/Departments/Engineering/Pages/ProjectBidInformation.aspx?Year=2013>.

⁴² City of Des Moines. (2018). Construction Projects, Current Construction Projects. Retrieved July 2018, from City of Des Moines: <https://projects.dmgov.org/>.

- » Taxiway B Reconstruction, East of Runway 23
- » Taxiway P Reconstruction
- » Apron A Reconstruction
- » Runway 5/23 Drainage Improvements
- » Fuel Road Improvements

The following future off-Airport projects are reasonably foreseeable within two miles of the Project Study Area:⁴³

- » SW 9th Street Rehabilitation from Wall Avenue to Army Post Road (one-mile east of Project Study Area)

⁴³ City of Des Moines. (2018), Bids and Contracts, Future Contract Letting Schedule. Retrieved July 2018, from City of Des Moines: https://www.dmgov.org/Departments/Engineering/PDF/future_schedule.pdf.

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CHAPTER 5

ENVIRONMENTAL CONSEQUENCES

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This chapter presents an analysis of the potential environmental impacts from implementation of the Proposed Action compared to the No Action Alternative. The analyses in this chapter are consistent with Federal Aviation Administration (FAA) Orders 1050.1F and 5050.4B. To evaluate potential impacts, the analyses in this chapter overlay the components of the Proposed Action and No Action Alternative onto the existing conditions within the study areas for each environmental impact category presented in **Chapter 4. Table 5-1** at the end of this section summarizes the environmental resources and potential effects for each alternative.

As described in **Section 4.2**, the Proposed Action would not affect coastal resources or wild and scenic rivers (under Water Resources), and consistent with FAA Order 5050.4B (paragraph 807.f) and FAA Order 1050.1F (paragraph 4-2(c)), are not included in the evaluation of environmental categories. The remainder of this chapter describes the potential effects to the following environmental resource categories:

- » Air Quality (**Section 5.1**)
- » Biological Resources (**Section 5.2**)
- » Climate (**Section 5.3**)
- » Department of Transportation Act, Section 4(f) (**Section 5.4**)
- » Farmlands (**Section 5.5**)
- » Hazardous Materials, Solid Waste, and Pollution Prevention (**Section 5.6**)
- » Historical, Architectural, Archeological, and Cultural Resources (**Section 5.7**)
- » Land Use (**Section 5.8**)
- » Natural Resources and Energy Supply (**Section 5.9**)
- » Noise and Noise-Compatible Land Use (**Section 5.10**)
- » Socioeconomics, Environmental Justice, and Children’s Environmental Health and Safety Risks (**Section 5.11**)
- » Visual Effects (**Section 5.12**)
- » Water Resources (**Section 5.13**)
- » Cumulative Effects (**Section 5.14**)

The analysis years described in this chapter are 2032, which represents the year of Proposed Action implementation, and 2037, which represents five years post-Proposed Action implementation.

5.1 AIR QUALITY

This section describes the significance threshold(s) pertaining to air quality, describes methodologies used to determine the potential air quality effects from the No Action Alternative and Proposed Action, and identifies potential air quality impacts.

5.1.1 Significance Threshold

FAA Order 1050.1F, Exhibit 4-1, provides the FAA’s significance threshold for air quality, which states that a significant impact would occur if “the action would cause pollutant concentrations to exceed one or more of the National Ambient Air Quality Standards (NAAQS), as established by the U.S. Environmental

Protection Agency (USEPA) under the Clean Air Act (CAA), for any of the time periods analyzed, or to increase the frequency or severity of any such existing violations.”

5.1.2 Methodology

As stated in Section 4.4.1, the Regional Study Area, located in Polk County, is in attainment for all criteria pollutants. Therefore, the consideration of potential air quality effects is limited to the possibility that construction emissions or increased taxiing distances from the replacement passenger terminal could exceed the NAAQS for a criteria pollutant. The methodology for determining air quality impacts is limited to construction-related emissions, and a qualitative analysis of the increased aircraft taxiing distances.

Mobile sources of air emissions include motor vehicles and other engines and equipment that can be moved from one location to another. These are typically classified as “road sources” and “non-road sources.” Road sources include automobiles, light-duty and heavy-duty trucks. No significant changes are anticipated to passenger vehicles accessing the parking area located directly in front of the terminals. Therefore, neither the Proposed Action nor the No Action Alternative would significantly affect road sources of emissions and therefore, were not included in the inventory. Shuttles currently operate on the Airport, and specifically to the future rental car service building and ready-return area, and the employee parking lot, as those two lots are currently being used for public parking. Since there would be no change in shuttle service to these lots and neither the Proposed Action nor the No Action Alternative would affect shuttle emissions, they were not included in the inventory.

The larger jet aircraft use auxiliary power units (APUs) while at the gate to operate the heating, air conditioning, and electric systems. The APU is also used to ‘start up’ or restart the aircraft engines before departing from the gate area. Neither the Proposed Action nor the No Action Alternative would affect APU emissions and therefore, were not included in the inventory.

Non-road sources include airport ground support equipment (GSE) and construction equipment. Typical GSE include airport equipment that provides air conditioning, air start, baggage tractors, belt loaders, catering vehicles, and emergency vehicles. Neither the Proposed Action nor the No Action alternative would affect GSE emissions and therefore, were not included in the inventory.

Construction emissions are quantified using the U.S. Environmental Protection Agency (USEPA) MOVES model. Factors that influence construction emissions include, but are not limited to, construction duration; construction type; materials used; estimated cost of construction; number, type, duration, and intensity of construction equipment usage; vehicle miles traveled; ambient meteorological conditions; fuel type used; and anticipated quantity of materials consumed. This analysis assumes that construction would occur within a 12-month period. However, it is likely that construction will occur over the course of multiple years. Assuming all construction would occur in a 12-month period provides a conservative analysis (i.e., overestimates potential construction-related emissions).

5.1.3 Environmental Consequences

The following sections describe the potential air quality effects from the No Action Alternative and Proposed Action.

5.1.3.1 No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal and enabling projects. The Authority would continue to operate the Airport and serve forecast aviation demands. Airport development would be subject to review and approval under the National Environmental Policy Act (NEPA) and is not assumed under this alternative. Therefore, there would be no affect to air quality.

5.1.3.2 Proposed Action

Table 5-1 shows the temporary construction-related emissions from the Proposed Action (see **Appendix G** for the detailed output). The *de minimus* threshold for attainment areas is 100 tons per year for each criteria pollutant. The potential construction-related emissions from the Proposed Action would remain below the *de minimus* thresholds for all criteria pollutants.

TABLE 5-1
CONSTRUCTION EMISSIONS INVENTORY (TONS)

	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	VOC
<i>de minimis</i> threshold	100	100	100	100	100	100
Total Construction Emissions	29.86	49.45	0.34	8.15	6.96	11.45
Exceed <i>de minimis</i> ?	No	No	No	No	No	No

Source: RS&H, 2018

Construction of the Proposed Action would result in a temporary increase in criteria pollutant emissions. Although the temporary increase in emissions would not affect Polk County's attainment status, the selected contractor could use Best Management Practices (BMPs), to the extent practicable, to reduce criteria pollutant emissions. Additionally, air pollutant emissions associated with commercial aircraft, ground service equipment, and off-Airport surface traffic would not change significantly. Therefore, the Proposed Action would not have permanent, long-term effects on air quality.

The Proposed Action may increase general aviation (GA) operations at the Airport by 3,911 annual operations, which represents about a four percent increase in the Airport's annual operations for 2032. The Proposed Action may also increase based aircraft at the Airport by 15. This increase in operations is not considered significant. The Proposed Action would also result in a minor increase in taxiing distance from the replacement passenger terminal to the ends of Runways 5, 13, and 31 and a minor decrease in taxiing distance from the replacement passenger terminal to the end of Runway 23. The increase in taxiing distance would be less than 1,000-feet for each of these runway ends. The increase of GA aircraft operations and taxi distances would result in emissions below *de minimus* thresholds.

Since the Airport, located in Polk County, is in an attainment status area for all criteria pollutants and construction and taxi air quality assessment demonstrate that the Proposed Action would not cause an increase in air emissions above the *de minimus* thresholds for any of the NAAQS, no adverse impact on local or regional air quality is expected. No further analysis or reporting is required under CAA or NEPA.

5.1.4 Mitigation and Best Management Practices

As described above, the Proposed Action would not exceed the *de minimis* threshold and no significant effect is anticipated. In the absence of potentially significant effects, mitigation measures are not proposed. Although construction of the Proposed Action would not cause a significant effect to air quality, the construction contractor could conduct construction activities in accordance with FAA Advisory Circular 150/5370-10G, *Standards for Specifying Construction of Airports*.

The following BMPs could be implemented to help reduce emissions associated with construction vehicles and equipment during the construction periods:

- » require construction-related contractors to use ultra-low sulfur diesel fuel in on- and off-road engines/vehicles;
- » limit idling gasoline- and diesel- powered construction vehicles and equipment engines to no more than five minutes, when feasible;
- » encourage contractors to substitute low- and zero-emitting construction equipment whenever possible;
- » implement a construction-employee shuttle service, rideshare program and/or on-site food service to reduce vehicle trips;
- » use electrical drops in place of temporary electrical generator wherever possible; and
- » adopt construction-period air quality mitigation monitoring programs requiring contractors to train and monitor their employees and sub-contractors on the implementation and adherence to these emission-reduction measures.

Other construction-related air quality mitigation measures aimed at reducing the occurrence and potential impacts from “fugitive” dust also could be implemented. These measures may include, but are not limited to, the following:

- » apply non-toxic soil stabilizers to all inactive construction areas including areas with disturbed soils and stockpiles of raw materials;
- » stabilize on-site truck haul routes and staging areas with dust-prevention materials;
- » reduce truck speeds on haul routes to minimize dust re-entrainment;
- » remove mud and dirt from haul truck wheels and cover truck bodies before leaving the construction site(s);
- » permanently cover all ground surfaces with vegetation or impervious materials as soon as practicable; and
- » post a publicly visible sign with the contact information for reporting dust complaints.

5.2 BIOLOGICAL RESOURCES

This section describes the significance threshold(s) pertaining to biological resources, describes methodologies used to determine the potential effects the No Action Alternative and Proposed Action would have on biological resources, and identifies potential biological resource impacts.

5.2.1 Significance Threshold

FAA Order 1050.1F, Exhibit 4-1, provides the FAA's significance threshold for biological resources, which states that a significant impact would occur if "the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service determines that the action would be likely to jeopardize the continued existence of a federally listed threatened or endangered species, or would result in the destruction or adverse modification of federally designated critical habitat." No significance threshold has been developed for non-listed species.

5.2.2 Methodology

As **Chapter 4** describes, the USFWS Information for Planning and Consultation (IPaC) tool and the Iowa Department of Natural Resources (IDNR) were used to determine the type of species that may be found in the Project Study Area.

FAA Order 1050.1F, Exhibit 4-1, provides the factors that should be considered in evaluating the context and intensity of potential environmental impacts to biological resources, which include:

- » "a long-term or permanent loss of unlisted plant or wildlife species, i.e., extirpation of the species from a large project area (e.g., a new commercial service airport);
- » adverse impacts to special status species (e.g., state species of concern, species proposed for listing, migratory birds, bald and golden eagles) or their habitats;
- » substantial loss, reduction, degradation, disturbance, or fragmentation of native species' habitats or their populations; or
- » adverse impacts on a species' reproductive success rates, natural mortality rates, non-natural mortality (e.g., road kills and hunting), or ability to sustain the minimum population levels required for population maintenance."

Section 7 of the Endangered Species Act provides the mechanism for federal agencies to coordinate to ensure that federal actions do not jeopardize any listed species. As **Section 4.4.2** describes, the Project Study Area has low overall suitability for two federally-listed species, the Indiana bat and the Northern long-eared bat (see **Appendix B** for the *Biological Resources Field Survey*). A Section 7 consultation was required due to the presence of potential bat habitat. During preliminary consultation, the USFWS indicated that they would provide a formal response during the Section 404 Permitting process. The USFWS responded on April 25, 2019 stating that they have no comments on the Proposed Action (see **Appendix B**). As indicated in **Section 4.4.2**, there are no state-listed species.

5.2.3 Environmental Consequences

The following sections describe the potential effects to biological resources from the No Action Alternative and the Proposed Action.

5.2.3.1 No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal and enabling projects. The Authority would continue to operate the Airport and serve forecast aviation

demands. Airport development would be subject to review and approval under NEPA and is not assumed under this alternative. Therefore, there would be no affect to biological resources.

5.2.3.2 Proposed Action

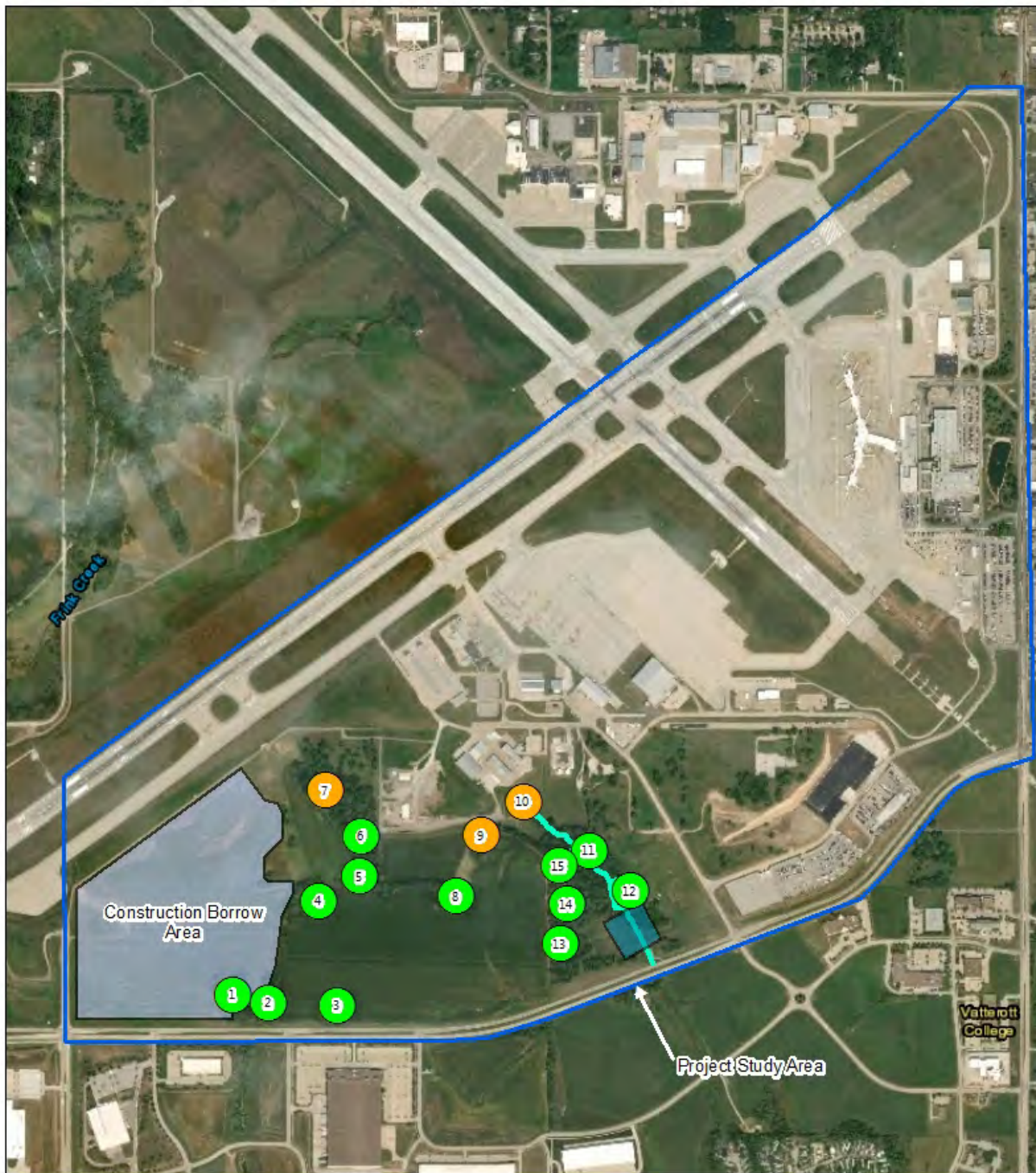
Construction activities associated with the Proposed Action would include clearing and grubbing. The habitats within the Project Study Area are not unique, rare, or protected. During construction, direct mortality to individual animals could occur due to excavation and grading. As **Section 4.4.2** describes, the Project Study Area has low overall suitability for two federally-listed bat species. The suitable habitat is located within wooded drainageways in the central portion of the Project Study Area. The Proposed Action may include the removal of trees as part of the creation or maintenance of stormwater detention areas and/or construction borrow area; however, none of the trees that would be removed as part of the Proposed Action were identified as suitable bat habitat in the *Biological Resources Field Survey* (see **Appendix B**) as depicted on **Figure 5-1**. The Proposed Action would not likely result in a direct adverse effect but may result in indirect adverse effects to the Indiana bat and/or Northern long-eared bat through the loss of foraging habitat. The Proposed Action may affect, but not likely adversely affect listed bat species and therefore would not have a significant impact to biological resources.

5.2.4 Mitigation and Best Management Practices

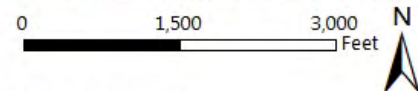
Potential effects to the Indiana bat and Northern long-eared bat can be reduced by minimization of the number of trees removed by the Proposed Action and by removal of foraging habitat between October 31 and April 1, outside of the maternal season of the bats. The USFWS did not identify any other mitigation measures in their correspondence dated April 25, 2019 (see **Appendix B**).

Additionally, FAA Advisory Circular (AC) 150/5370-10G, Item P-156, *Temporary Air and Water Pollution, Soil Erosion, and Siltation Control* identified BMPs to minimize potential impacts during construction. Adherence to these BMPs would minimize potential impacts to biological resources.

FIGURE 5-1
PRELIMINARY BIOLOGICAL RESOURCES IMPACTS



Source: Esri, 2018; Foth, 2018



Legend

- | | | |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| ● Not Suitable Bat Habitat | Construction Borrow Area | — Waters of the U.S. |
| ● Low Bat Habitat | Stormwater Improvements | Project Study Area |

5.3 CLIMATE

This section describes the significance threshold(s) pertaining to climate, describes methodologies used to determine the potential effects the No Action Alternative and Proposed Action, and identifies potential climate impacts.

5.3.1 Significance Threshold

While FAA 1050.1F does not provide a significance threshold for aviation-related greenhouse gases (GHG) emissions, the projected increase in GHG emissions from the Proposed Action is discussed in the context of national and global GHG emissions from all sources.

5.3.2 Methodology

The analysis in the EA uses the USEPA MOVES model to calculate GHGs associated with construction of the Proposed Action. Increased aircraft taxiing distances from the replacement passenger terminal to runway ends were also qualitatively analyzed for air quality impacts (see **Section 5.1.3**). Because the FAA has not established significance thresholds for climate, this section focuses on the disclosure of GHG emissions, rather than provision of an effect determination.

5.3.3 Environmental Consequences

This section describes the potential climate effects associated with implementation of the No Action Alternative and the Proposed Action.

5.3.3.1 No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal and enabling projects. The Authority would continue to operate the Airport and serve forecast aviation demands. Airport development would be subject to review and approval under NEPA and is not assumed under this alternative. Therefore, there would be no effects on aviation-related GHG emissions.

5.3.3.2 Proposed Action

Although there are no federal standards for aviation-related GHG emissions, it is well established that GHG emissions can affect climate. The Council on Environmental Quality (CEQ) has indicated that climate should be considered in NEPA analyses.⁴⁴ As noted by CEQ, "it is not useful, for NEPA purposes, to link GHG emissions from a proposal to specific climatological changes to a particular site...When considering the GHG emissions, agencies do not need to calculate a proposal's GHG emissions as a percentage of nationwide or worldwide GHG emissions unless the agency determines that such information would be helpful to decision makers and the public to distinguish among alternatives and mitigations, or that the emissions and sequestration associated with a proposed action may rise to a significant level."⁴⁵ ⁴⁶

⁴⁴ FAA. (2012, January 12). Order 1050.1E, Change 1, Guidance Memo #3, *Considering Greenhouse Gasses and Climate under the National Environmental Policy Act (NEPA): Interim Guidance*.

⁴⁵ CEQ. (2016, August 1). Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews. Retrieved November 2018, from: https://obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/nepa_final_ghg_guidance.pdf.

⁴⁶ On April 5, 2017, CEQ withdrew the above referenced final guidance. However, the climate analysis included in this EA is pursuant to FAA Order 1050.1F.

Operation of the Proposed Action would result in slightly longer taxiing distance from the proposed replacement passenger terminal to runway ends 13, 5, and 31. The increase in taxiing distance would be less than 1,000-feet for each of the Runway ends, and would therefore, be expected to result in emissions below *de minimus* thresholds. The replacement passenger terminal represents a decrease in taxiing distance to Runway end 23. Operation of the Proposed Action would not cause construction-related GHG emissions. Construction would cause 34,667.49 tons of CO₂. Following completion of the Proposed Action, there would be no additional GHG emissions associated with the construction of the Proposed Action. The temporary increase in GHG emission would represent less than one percent of the U.S. based GHG emissions and less than one percent of global GHG emissions.^{47, 48} The Proposed Action would not have an adverse impact to climate change as compared to the No Action alternative.

5.3.4 Mitigation and Best Management Practices

Since the FAA has not established significance thresholds related to GHG emissions, no significant impact has been identified. In the absence of potentially significant impacts, no mitigation measures are proposed. Although the Proposed Action would not significantly affect global GHG emissions, the Proposed Action could include BMPs to reduce construction-related GHG emissions. FAA AC 150/5370-10G identifies BMPs to minimize GHG impacts during construction.⁴⁹ The selected construction contractor would be notified of possible BMPs and the Authority would encourage the use of BMPs.

5.4 DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(f)

This section describes the significance threshold(s) pertaining to U.S. Department of Transportation (USDOT) Section 4(f) resources, describes methodologies used to determine the potential effects the No Action Alternative and Proposed Action, and identifies the potential Section 4(f) resource impacts.

5.4.1 Significance Threshold

FAA Order 1050.1F, Exhibit 4-1, provides the FAA's significance threshold for Section 4(f), which states that a significant impact would occur if "the action involves more than a minimal physical use of a Section 4(f) resource or constitutes a 'constructive use' based on an FAA determination that the aviation project would substantially impair the Section 4(f) resource."

For Section 4(f) purposes, an action would "use" a resource in one of two ways.

- » Physical Use: The action physically occupies and directly uses the Section 4(f) resource. An action's occupancy or direct control (via purchase) causes a change in the use of the Section 4(f) resource.
- » Constructive Use: The action indirectly uses a Section 4(f) resource by substantially impairing the resource's intended use, features, or attributes.

⁴⁷ USEPA. (2017, February 14). Sources of Greenhouse Gas Emissions. Retrieved December 2018, from USEPA: <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>.

⁴⁸ USEPA. (2017, February 14). Global Greenhouse Gas Emissions Data. Retrieved December 2018, from USEPA: <https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data>.

⁴⁹ Federal Aviation Administration, AC 150/5370-10G, *Standards for Specifying Construction of Airports*, Item P-156, *Temporary Air And Water Pollution, Soil Erosion, and Siltation Control*,. Accessed: https://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.current/documentnumber/150_5370-10, September 2018.

5.4.2 Methodology

FAA Order 1050.1F Desk Reference, Chapter 5, Section 3 provides guidance specific to airport projects to determine project use of a Section 4(f) resource. Methods used to determine land use compatibility under 14 CFR Part 150 (Noise Compatibility Planning) are helpful in determining if aircraft noise would cause a constructive use of Section 4(f) resources.

The Regional Study Area was reviewed for any publicly owned park, recreational area, wildlife or waterfowl refuge, or historic site. As identified in **Section 4.4.4**, the following three Section 4(f) resources were identified within the Regional Study Area: a bike trail, a cemetery, and a park. An analysis of whether any components of any of the reasonable alternatives would have a physical or constructive use of the Section 4(f) was conducted.

5.4.3 Environmental Consequences

This section describes the potential effects to Section 4(f) resources associated with implementation of the No Action Alternative and the Proposed Action.

5.4.3.1 No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal and enabling projects. The Authority would continue to operate the Airport and serve forecast aviation demands. Airport development would be subject to review and approval under NEPA and is not assumed under this alternative. Therefore, there would be no affect to Section 4(f) resources.

5.4.3.1 Proposed Action

Construction of the Proposed Action would occur entirely on Airport Property and would not require the physical use (direct use) of any section 4(f) resource.

Operation of the Proposed Action (e.g., operation of the replacement terminal and associated infrastructure) would not significantly affect the area's air quality, climate, natural resources, noise, or water resources (see **Sections 5.1, 5.3, 5.9, 5.10, and 5.13**, respectively). For those reasons, the Proposed Action would not constructively use (indirectly affect) Section 4(f) resources.

5.4.4 Mitigation and Best Management Practices

The Proposed Action would not directly or indirectly affect Section 4(f) resources. Therefore, mitigation or BMPs for Section 4(f) resources are not proposed.

5.5 FARMLANDS

This section describes the significance threshold(s) pertaining to farmlands within the Project Study Area, the methodologies used to determine the potential effects of the No Action Alternative and Proposed Action, and the potential farmland-related impacts.

5.5.1 Significance Threshold

According to FAA Order 1050.1F, a significant impact would occur if "the action would have the potential to convert important farmlands to non-agricultural uses. Important farmlands include pastureland,

cropland, and forest considered to be prime, unique, or statewide or locally important land.” An action would be considered to create a significant impact if “the total combined score on Form AD-1006, *Farmland Conversion Impact Rating*, ranges between 200 and 260 points.”

5.5.2 Methodology

Farmland impacts were quantified with the United States Department of Agriculture (USDA) Web Soil Survey. Soil delineation data was performed in order to indicate the presence of prime or unique farmland of statewide importance.

Parts I, III, and VI of Form AD-1006, *Farmland Conversion Impact Rating*, were completed and sent to the Natural Resources Conservation Service (NRCS) on November 19, 2018. Upon completion of Parts II, IV, and V by the NRCS, Form AD-1006 was finalized to assess the potential impacts of converting prime farmland in the Project Study Area (see **Appendix H**).

5.5.3 Environmental Consequences

This section describes the potential effects to farmland resources associated with implementation of the No Action Alternative and the Proposed Action.

5.5.3.1 No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal and enabling projects. The Authority would continue to operate the Airport and serve forecast aviation demands. Airport development would be subject to review and approval under NEPA and is not assumed under this alternative. Therefore, there would be no affect to farmlands.

5.5.3.2 Proposed Action

The construction borrow area for the Proposed Action is proposed for areas that include prime farmland, farmland of statewide importance, and current farm leases. Initially, the construction borrow area was proposed to temporarily convert 162 acres of farmland to non-agricultural use. Of this total, 46.1 acres are prime farmland and 86.3 acres are farmland of statewide importance. The completion of Form AD-1006 produced a score of 55, out of a possible 260 (see **Appendix H**). However, to minimize impacts both to farmlands and wetlands (see **Section 5.13.1**), the construction borrow area for the Proposed Action was reduced. Therefore, 62.3 acres of farmland would be temporarily converted to non-agricultural use as a result of the Proposed Action. Of this total, 18 acres are prime farmland and 29.3 acres are farmland of statewide importance (see **Figure 5-2**). The remaining 15 acres does not contain prime farmland or farmland of statewide importance but is being leased by the Airport for agricultural purposes. After implementation of the Proposed Action, the borrow area would return to farmland. Coordination with the NRCS on November 29, 2018 confirmed that there would be no impact to farmlands since the conversion of farmlands would be temporary (see **Appendix H**).

5.5.4 Mitigation and Best Management Practices

As stated by the NRCS, the Proposed Action would not contribute to the conversion of important farmland to nonagricultural uses. Since there would be no impact to farmlands, no mitigation or best management practices are warranted.

FIGURE 5-2
CONSTRUCTION BORROW AREA IN FARMLAND



5.6 HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION PREVENTION

This section describes the significance threshold(s) pertaining to hazardous materials, solid waste, and pollution prevention. This section also describes methodologies used to determine the potential effects of the No Action Alternative and Proposed Action and the potential hazardous material, solid waste, and pollution prevention impacts.

5.6.1 Significance Threshold

FAA Order 1050.1F does not provide a significance threshold for hazardous materials, solid waste, and pollution prevention; however, it does provide a number of factors to consider in evaluating the context and intensity of potential environmental impacts. These include when the action would have the potential to:

- » violate applicable federal, state, tribal, or local laws or regulations regarding hazardous materials and/or solid waste management;
- » involve a contaminated site (including but not limited to a site listed on the National Priorities List);
- » produce an appreciably different quantity or type of hazardous waste;
- » generate an appreciably different quantity or type of solid waste or use a different method of collection or disposal and/or would exceed local capacity; or
- » adversely affect human health and the environment.

5.6.2 Methodology

This EA analyzes the potential increase in hazardous materials and waste at the Airport under the Proposed Action, including construction and operation activities. This EA also analyzes how those materials and wastes would be handled and stored at the Airport, and how the Proposed Action may affect those resources identified in **Section 4.4.6**.

5.6.3 Environmental Consequences

This section describes the potential effects to hazardous materials, solid waste, and pollution prevention associated with implementation of the No Action Alternative and the Proposed Action.

5.6.3.1 No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal and enabling projects. The Authority would continue to operate the Airport and serve forecast aviation demands. Airport development would be subject to review and approval under NEPA and is not assumed under this alternative. Therefore, there would be no affect to hazardous materials, solid waste, or pollution prevention.

5.6.3.2 Proposed Action

Construction of the Proposed Action would require demolition of buildings and would generate other construction debris that would cause a short-term, temporary increase in the quantity of solid waste generated at the Airport. The selected construction contractor would be responsible for disposing of any solid waste in accordance with all federal, state, and local rules and regulations. Building materials

generated during demolition may contain hazardous materials such as asbestos-containing materials or lead based paint. Pre-demolition surveys would be conducted to identify the potential presence of hazardous materials and assist in developing plans for removal and disposal in accordance with federal, state, and local regulatory requirements. The Metro Park East landfill has the capacity to accommodate the solid wastes generated by construction of the Proposed Action and is expected to stay open until 2048.⁵⁰

Construction of the Proposed Action could disturb areas of contaminated soil and/or groundwater. The levels of any contaminants remaining in soil and groundwater at the three known LUST sites within the Project Study Area, described in **Section 4.1.2**, is anticipated to be low based on the IDNR site classification of “No Action Required”. Should contaminated soil or groundwater be encountered during construction, coordination with the IDNR would occur prior to resuming construction activities to ensure proper management and disposal of affected material. The Proposed Action may result in a beneficial impact by reducing the level of hazardous materials in the environment.

Implementation of the Proposed Action would result in temporary increases in the storage of hazardous materials. This would primarily be in the form of diesel fuel and lubricants for operation and maintenance of construction equipment. The storage and use of these hazardous materials would be at a centralized construction equipment staging area. The materials would be stored in compliance with federal, state, and local regulatory requirements and permit conditions requiring implementation of pollution prevention measures.

The Proposed Action would require removal or relocation of underground and aboveground emergency generator storage tanks containing diesel fuel and transformers containing dielectric fluid during building demolition activities. Decommissioning, removal, or relocation of these tanks would be performed in compliance with federal, state, and local regulatory requirements.

Operations resulting from the Proposed Action would not significantly change the type or quantity of hazardous materials stored and used at the Airport. Under the Proposed Action, the materials currently used at the Airport will be stored and used as it currently is today. The Authority would be responsible for continuing to store and use hazardous materials in accordance with the federal, state, and local rules and regulations. The Authority would update its Stormwater Pollution Prevention Permit (SWPPP) and Spill Prevention, Control, and Countermeasure (SPCC) plan to reflect facility changes and maintain compliance with applicable regulatory requirements (see **Section 5.13** for more details).

Since the Proposed Action would comply with all federal, state, and local regulations and permitting conditions, construction and operation of the Proposed Action would not significantly affect hazardous materials, solid waste, or pollution prevention at the Airport.

⁵⁰ USEPA. (September 2018). Landfill Methane Outreach Program (LMOP), Landfill Technical Data. Retrieved December 2018, from USEPA: <https://www.epa.gov/lmop/landfill-technical-data>.

5.6.4 Mitigation and Best Management Practices

Storm water discharges associated with construction of the Proposed Action would require permitting and compliance under the Iowa National Pollutant Discharge Elimination System (NPDES) program. A SWPPP would be prepared and permit authorization would be obtained prior to commencing ground-disturbing activities. Construction and operation of the Proposed Action would be in accordance with the permit conditions, including implementation of BMPs to avoid or minimize any potential releases of fuel, oils, sediments, and other contaminants to storm water. In the event of an accidental release of hazardous materials during construction, development activities would cease and remediation would follow all federal, state, and local requirements. Additionally, the Authority recycles all concrete when possible and would do so for the Proposed Action. This would reduce construction-related solid waste being transported to the Metro Park East landfill.

Should any contaminated soil or groundwater be encountered during construction, coordination with the IDNR would occur prior to resuming construction activities to ensure proper management and disposal of affected material. Additionally, remediation of any hazardous building materials (e.g., asbestos, lead based paint) or other hazardous materials would occur in accordance with federal, state, and local requirements prior to demolition activities.

5.7 HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

This section describes the significance threshold(s) pertaining to historical, architectural, archeological, and cultural resources. This section also describes methodologies used to determine the potential effects of the No Action Alternative and Proposed Action and the potential historical, architectural, archaeological, and cultural resource impacts.

5.7.1 Significance Threshold

FAA Order 1050.1F does not provide a significance threshold for historical, architectural, archeological and cultural resources; however, it does provide a factor to consider in evaluating the context and intensity of potential environmental impacts. This would occur when the action would result in a finding of adverse effect through the process outlined in Section 106 of the National Historic Preservation Act (NHPA).

5.7.2 Methodology

For purposes of this EA, historic, archeological, and cultural resources are districts, sites, buildings, structures, objects, landscapes, and Native American Traditional Cultural Properties (TCPs) that are on or eligible for listing on the National Register of Historic Places (NRHP). Such "NRHP properties" are nationally important due to their significant and respective roles in American history, prehistory, architecture, archeology, engineering and culture. Regulations at 36 Code of Federal Regulations (CFR) Part 800 et seq. provide detailed instructions to federal agencies on how to assess and address effects on those historically significant properties.

The FAA evaluates direct and indirect impacts from federal actions on historic, architectural, archaeological, and other cultural resources under Section 106 of the NHPA, the principal statute concerning such resources. Section 106 requires federal agencies to take into account the effects of their

undertakings on properties that are listed in or determined eligible for inclusion in the NRHP and to consult with the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officers (THPO), and other parties to develop and evaluate alternatives or modifications to the undertaking where necessary to avoid, minimize, or mitigate adverse effects on historic properties.

The scale of the undertaking and the extent of FAA involvement define the scope of the Section 106 review, including FAA's obligation to identify historic properties, assess effects, and develop and evaluate alternatives or modifications to the undertaking that could avoid, minimize, or mitigate adverse effects on historic properties. In this case, FAA's role is limited to approval or disapproval of an Airport Layout Plan depicting the project sponsor's proposal, as it may be modified through consultation, and potential approval or disapproval of Federal funding.

This analysis uses information from the 2018 Phase I archaeological survey and 2018 Architectural / Historical Intensive Survey and Evaluation of the Terminal Building and Building 35 along with the airport as a potential historic district (see **Appendix D**). As described in **Section 4.4.7**, the Direct Area of Potential Effect (APE) is the same as the Project Study Area and the Indirect APE is the same as the Regional Study Area.

5.7.3 Environmental Consequences

This section describes the potential effects to historical, architectural, archeological, and cultural resources associated with implementation of the No Action Alternative and the Proposed Action.

5.7.3.1 No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal and enabling projects. The Authority would continue to operate the Airport and serve forecast aviation demands. Airport development would be subject to review and approval under NEPA and is not assumed under this alternative. Therefore, there would be no affect to historic, architectural, archeological, or cultural resources.

5.7.3.2 Proposed Action

As **Section 4.4.7** describes, six archaeological resources, designated as 13PK1058 through 13PK1063, were identified during the Phase I archaeological investigation conducted for the Proposed Action. These sites are located within the Direct Area of Potential Effect and all were recommended as not eligible for inclusion in the NRHP. The intensive architectural/historic investigation for the Proposed Action recommended the existing passenger terminal building and Building 35 as not eligible for inclusion in the NRHP as individual buildings. In addition, an assessment of the Airport as a potential historic district, recommended the Airport not eligible for inclusion in the NRHP. The FAA determined, and the Iowa SHPO concurred on March 25, 2019 that no historic properties will be effect.

The FAA coordinated with the Iowa Tribe of Oklahoma, Miami Tribe of Oklahoma, Omaha Tribe, Ponca Tribe of Nebraska, Sac and Fox Tribe of the Mississippi in Iowa/Meskaki Nation, and the Yankton Sioux Tribe of South Dakota. The Miami Tribe of Oklahoma responded that they have no objection to the

project. The Omaha Tribe responded that they are interested in consulting further; however, no response on the Draft EA was received. The other tribes did not respond.

The closest NRHP site, a historic district, is over 6,900 feet and 5,400 feet east, from the Direct APE and Indirect APE, respectively. The Proposed Action would not change the viewshed of the Direct APE or affect air quality, noise, or water quality in a manner that would affect that or any other NRHP-listed or eligible resource.

5.7.4 Mitigation and Best Management Practices

The six identified archaeological sites and two architectural properties evaluated during the Phase I and intensive surveys for this project were recommended not eligible for inclusion in the NRHP. The Proposed Action would not cause direct or indirect effects to these identified sites and properties. Therefore, mitigation measures and BMPs are not proposed for those resources. However, in the unlikely event that there is an unanticipated discovery of archeological material during construction, construction activities would stop immediately and the selected construction contractor would contact the Authority. The Authority would coordinate with the FAA and Iowa SHPO and construction activities would not resume without verbal and/or written authorization.

5.8 LAND USE

This section describes the significance threshold(s) pertaining to land use, describes methodologies used to determine potential effects of the No Action Alternative and Proposed Action, and identifies the potential effects on compatible land use.

5.8.1 Significance Threshold

FAA Order 1050.1F does not provide a significance threshold or specific independent factors to consider for land use impacts; however, it does state that the determination that a significant impact exists in the land use impact category is normally dependent on the significance of other impacts that can be related to land use (i.e., noise).

5.8.2 Methodology

The compatibility of existing and planned land uses with an aviation or aerospace proposal is usually associated with noise impacts, as described in FAA 1050.1F Desk Reference, Chapter 11 *Noise and Noise-Compatible Land Use*. In addition to the impacts of noise on land use compatibility, other potential impacts of FAA actions may also effect use land use compatibility such as the disruption of communities, relocation, induced socioeconomic impacts, and land uses protected under Section 4(f) of the USDOT Act.

The most current land uses and zoning designations within Polk County were obtained for the Regional Study Area. The land use analysis considered existing and future land use plans within the Regional Study Area and evaluated the Proposed Action to determine whether it would be compatible with land use guidelines as well as local noise ordinances within Polk County. An adverse impact or incompatible land use would occur if the Proposed Action does not comply with current land use and zoning designations.

5.8.3 Environmental Consequences

This section describes the potential effects to land use associated with implementation of the No Action Alternative and the Proposed Action.

5.8.3.1 No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal and enabling projects. The Authority would continue to operate the Airport and serve forecast aviation demands. As shown in the 2018 TAF presented in Chapter 2, aviation activity at the Airport would increase and would occur under the No Action Alternative. Airport development would be subject to review and approval under NEPA and is not assumed under this alternative. Therefore, there would be no affect to land use.

5.8.3.2 Proposed Action

The construction and operation of the Proposed Action would occur entirely on Airport property and would be compatible with the existing Airport environment. As described in **Section 4.4.8**, the Airport is zoned as “limited industrial” and Airport development, both existing and future, is consistent with that zoning. As with the No Action Alternative, aviation activities under the Proposed Action are expected to increase as shown in the TAF. As **Section 5.10** describes, this increase would be minor and would not cause a significant change in the Airport’s aviation noise contours. Therefore, noise-sensitive residential areas in the Airport vicinity would not be affected. Additionally, as described throughout **Chapter 5**, the Proposed Action would not significantly affect other resources that could indirectly affect land use (e.g., the Proposed Action would not disrupt communities, affect Section 4(f) resources, etc.). Therefore, the Proposed Action would not change the land use in or around the Project Study Area.

5.8.4 Mitigation and Best Management Practices

Construction and operation of the Proposed Action would not affect land use. Therefore, no mitigation or BMPs are proposed.

5.9 NATURAL RESOURCES AND ENERGY SUPPLY

This section describes the significance threshold(s) pertaining to natural resources and energy supply. This section also describes the methodologies used to determine the potential effects of the No Action Alternative and Proposed Action and the potential natural resource and energy supply impacts.

5.9.1 Significance Threshold

FAA Order 1050.1F does not define a significance threshold for natural resources and energy supply; however, it does provide a number of factors to consider in evaluating the context and intensity of potential environmental impacts. Potentially significant effects could occur if the action would have the potential to cause demand to exceed available or future supplies of these resources, which include aviation and surface vehicle fuel, construction material, and electrical power.

5.9.2 Methodology

This EA evaluates project-related potential effects on natural resources and energy supplies in the Project Study Area.

5.9.3 Environmental Consequences

The following sections describe the potential effects to natural resources and energy supply from the No Action Alternative and Proposed Action.

5.9.3.1 No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal and enabling projects. The Authority would continue to operate the Airport and serve forecast aviation demands. Airport development would be subject to review and approval under NEPA and is not assumed under this alternative. Therefore, there would be no affect to natural resources or energy supplies.

5.9.3.2 Proposed Action

Construction of the Proposed Action would temporarily increase the amount of natural resources used at the Airport. These could include prefabricated building components, aggregate, sub-base materials, and oils associated with the construction of the Proposed Action. These resources are not rare or in short supply, and the quantity required for development of this size would not place an undue strain on supplies. Additionally, the Authority recycles all concrete when possible and would do so for the Proposed Action. Construction also would increase the energy demand at the Airport; however, this increase would be temporary and minor, and within the supply capabilities of the City.

Operation of the Proposed Action would require the use of natural resources in the forms of electricity, natural gas, and water. The proposed replacement terminal building would update and replace older and less energy efficient utilities in the current terminal building. Sustainable design elements may be considered during the design of the Proposed Action to increase energy efficiency. For example, each of the project components could use light-emitting diode (LED) lighting through the facility, low flow plumbing fixtures, and energy efficient appliances, among other measures. For those reasons, the Proposed Action would not have a significant effect on energy supplies. Additionally, the use of natural resources would not be significant and would not place a strain on the availability of resources for the surrounding area. The natural resources required by the Proposed Action are not rare or in short supply. In comparison with the No Action Alternative, the Proposed Action could increase GA operations by an assumed four percent and increase the number of based aircraft at the Airport by 15, which would result in a relative increase in fuel use at the Airport. However, the Proposed Action does not propose additional fuel capacity at the existing fuel farm because the existing fuel farm has capacity to accommodate the assumed four percent increase in GA operations. For those reasons, the Proposed Action would not have a significant effect on natural resources.

5.9.4 Mitigation and Best Management Practices

The design of the Proposed Action could include sustainable design elements to reduce energy consumption and possible emissions. These elements may include, but are not limited to, energy efficient lighting and equipment. Airport Cooperative Research Program (ACRP) Synthesis 10, *Airport Sustainability Practices* and the Sustainability Aviation Guidance Alliance Database (SAGA) database provide a wide range of sustainable elements that the selected design contractor could implement. Sustainable design elements could be considered during the design phase of the project, as well as opportunities to reduce waste, recycle, and reuse materials during the construction and operation of the Proposed Action.

5.10 NOISE AND NOISE-COMPATIBLE LAND USE

This section describes the significance threshold(s) pertaining to noise and noise-compatible land use, describes the methodologies used to determine the potential noise effects associated with the No Action Alternative and Proposed Action, and identifies potential noise impacts.

5.10.1 Significance Threshold

FAA Order 1050.1F, Exhibit 4-1, provides the FAA's significance threshold for noise and noise-compatible land use, which states that a significant impact would occur if "The action would increase noise by DNL 1.5 dB or more for a noise sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level due to a DNL 1.5 dB or greater increase, when compared to the no action alternative for the same timeframe. For example, an increase from DNL 65.5 dB to 67 dB is considered a significant impact, as is an increase from DNL 63.5 dB to 65 dB."

In addition, FAA Order 1050.1F states, "Special consideration needs to be given to the evaluation of the significance of noise impacts on noise sensitive areas within Section 4(f) properties (including, but not limited to, noise sensitive areas within national parks; national wildlife and waterfowl refuges; and historic sites, including traditional cultural properties) where the land use compatibility guidelines in 14 CFR Part 150 are not relevant to the value, significance, and enjoyment of the area in question." For example, the DNL 65 dB threshold does not adequately address the impacts of noise on visitors to areas within a national park or national wildlife and waterfowl refuge where other noise is very low and a quiet setting is a generally recognized purpose and attribute.

5.10.2 Methodology

The potential noise effects associated with the Proposed Action were evaluated using the FAA's Area Equivalent Method (AEM) (version 2C SP2). The analysis compares two future scenarios, the Proposed Action and the No Action Alternative. AEM uses the anticipated increase of the 65 DNL noise contour to determine if a significant impact, which is defined as a 17 percent or more increase in the size of the 65 DNL noise contour, would occur. Flight tracks, runway use, and run-ups are not included in AEM noise analyses; therefore, they are not discussed in this noise analysis. The AEM spreadsheet for this analysis is available for reference in **Appendix I**.

Based on the proposed number of GA hangars proposed to be constructed as described in the Proposed Action, this analysis assumes there could be an additional 15 GA aircraft based at the Airport. Because the type of aircraft, number of aircraft, and their operational frequency is not known at this time, this analysis also assumes each aircraft could have up to five operations per week and that the GA fleet mix would remain the same. This equates to an increase of about 3,911 annual operations, or about 11 daily operations (about 5.5 daily Landing and Take-Off cycles). The potential increase in GA operations represents about a 4 percent increase in the Airport's annual operations for 2032.

5.10.3 Environmental Consequences

This section describes the potential noise effects associated with the implementation of the No Action Alternative or the Proposed Action.

5.10.3.1 No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal and enabling projects. The Authority would continue to operate the Airport and serve forecast aviation demands. Airport development would be subject to review and approval under NEPA and is not assumed under this alternative. Therefore, the No Action Alternative would not have noise effects.

5.10.3.2 Proposed Action

Construction of the Proposed Action would cause noise from construction vehicles and machinery and would generally be limited to the immediate vicinity of the construction work occurring. Noise levels would vary depending on the nature of the construction activity and the type and model of equipment in use. Grading and scraping operations are typically the noisiest activities, with noise levels as high as 70 to 90 dBA within 50 feet of their operations; however, distance rapidly attenuates noise levels. Noise from point sources attenuates at a rate of about 6 dB per doubling of distance; in other words, noise levels would be 6 dB less at 100 feet from the equipment, 12 dB less at 200 feet, and 24 dB less at 400 feet. While construction could occur during night-time hours, the majority of construction is expected to occur during day-light hours. The closest residential areas are about 300 feet east of the Project Study Area and is buffered from the Airport by a general retail area along Fleur Drive. While construction noise associated with the Proposed Action may be heard in this residential area, it is not anticipated to significantly affect the area given the distance from the Project Study Area and the existing buffers between the residential areas the Project Study Area.

The Proposed Action includes the construction of new GA hangars. The construction of these hangars could attract new GA tenants that do not currently operate at the Airport. As previously described, the operation of the Proposed Action is estimated to increase GA operations at the Airport by 3,911 annual operations. The results of the AEM analysis indicate that the Proposed Action would cause a 0.2 percent increase in the size of the DNL 65 dBA noise contour in 2032. Because the potential noise increase associated with the Proposed Action would be substantially lower than the 17 percent significance threshold established by the FAA, no significant impact would occur.

The replacement passenger terminal would be oriented so that the majority of its gates are facing McKinley Avenue and the residential area to the north of the Project Study Area. However, runway use would not change at the airport as a result of the Proposed Action. Because taxiing noise rarely contributes to airport noise contours, and because the potential noise increase associated with increased GA operations is below the 17 percent significance threshold, no significant impact would occur.

5.10.4 Mitigation and Best Management Practices

Construction or the Proposed Action and operation of the Airport in the future would not cause significant noise impacts; therefore, no mitigation is proposed.

5.11 SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, AND CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS

This section describes the significance threshold(s) pertaining to socioeconomic, environmental justice, and children's environmental health and safety risks. This section also describes methodologies used to

determine the potential effects the No Action Alternative and Proposed Action and identifies the potential socioeconomic effects.

5.11.1 Socioeconomics

This section describes the significance threshold, methodology of analysis, and potential effects of the No Action Alternative and Proposed Action regarding socioeconomic issues such population and housing (see **Section 5.11.2** for a discussion on transportation).

5.11.1.1 Significance Threshold

FAA Order 1050.1F does not provide a significance threshold for socioeconomic; however, it does provide a number of factors to consider in evaluating the context and intensity of potential environmental impacts. These include when the action would have the potential to:

- » "Induce substantial economic growth in an area, either directly or indirectly (e.g., through establishing project in an undeveloped area);
- » Disrupt or divide the physical arrangement of an established community;
- » Cause extensive relocation when sufficient replacement housing is unavailable;
- » Cause extensive relocation of community businesses that would cause severe economic hardship for affected communities;
- » Disrupt local traffic patterns and substantially reduce the levels of service of roads serving an airport and its surrounding communities; or
- » Produce a substantial change in the community tax base."

5.11.1.2 Methodology

The analysis in this section, consistent with FAA requirements, considers the potential for the Proposed Action to:

- » move people from their homes;
- » move businesses;
- » divide or disrupt established communities;
- » disrupt orderly, planned development; or
- » create a notable change in employment

5.11.1.3 Environmental Consequences

This section describes the potential socioeconomic affects associated with implementation of the No Action Alternative and the Proposed Action.

5.11.1.3.1 No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal and enabling projects. The Authority would continue to operate the Airport and serve forecast aviation demands. Airport development would be subject to review and approval under the National Environmental Policy Act (NEPA) and is not assumed under this alternative. Therefore, the No Action Alternative would not have socioeconomic effects.

5.11.1.3.2 Proposed Action

The construction of the Proposed Action would result in the short-term employment of construction workers. Because the construction of the Proposed Action is temporary, this would not cause a shift in population growth or change population growth patterns. Additionally, it is likely that construction workers would be from the Des Moines metropolitan area and would not require temporary housing or affect the housing environment in the area. Workers employed for the construction of the Proposed Action would most likely be of those already in the construction occupation within the Des Moines metropolitan area. As such, construction of the Proposed Action would not affect the labor force in the area. Construction vehicles and workers would access the Project Study Area via Fleur Drive, Army Post Road, and on-Airport roadways (see **Section 5.11.2** for more details). Construction-related traffic would be temporary (e.g., lasting only as long as construction). Therefore, construction of the Proposed Action would not have a significant socioeconomic effect.

The operation of the Proposed Action could add additional Airport tenant employees; however, it is assumed to not be a significant change in the number of people employed at the Airport, as one of the primary purposes of the replacement passenger terminal is to provide adequate tenant space to existing tenants. The tenants of buildings scheduled for demolition as part of the Proposed Action (Air Methods and UPS) would be relocated to different buildings in phases in order to avoid disrupting normal operations. Therefore, the operation of the Proposed Action is not likely to affect population growth or growth patterns, housing, or the labor force in the area. Therefore, the Proposed Action would not have a significant socioeconomic effect.

DSM is supported wholly by airport user charges and other airport revenue. As a result, there would be no substantial change in the community tax base as a result of the proposed action.

5.11.1.4 Mitigation and Best Management Practices

Because the Proposed Action would not have a socioeconomic impact, no mitigation or BMP's are proposed.

5.11.2 Surface Traffic

This section describes the environmental consequences associated with surface traffic impacts, resulting from the No Action Alternative and the Proposed Action.

5.11.2.1 Significance Threshold

FAA Order 1050.1F does not provide a significance threshold for surface traffic; however, it does provide a number of factors to consider. These include when the action would have the potential to disrupt local traffic patterns and substantially reduce the levels of service on roads serving an airport and its surrounding communities.

5.11.2.2 Methodology

The analysis in this EA, consistent with FAA requirements, considers the potential of the No Action Alternative and the Proposed Action Alternative to change surface transportation patterns or traffic levels; or disrupt orderly, planned development.

5.11.2.3 Environmental Consequences

This section describes the potential surface traffic affects associated with implementation of the No Action Alternative and the Proposed Action.

5.11.2.3.1 No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal and enabling projects. The Authority would continue to operate the Airport and serve forecast aviation demands. As forecasted, passengers at the Airport would increase, resulting in increasing vehicle trips on the surface roadway system. The existing roadway system would be able to accommodate the increase in vehicle trips without decreasing LOS. Airport development would be subject to review and approval under NEPA and is not assumed under this alternative. Therefore, there would be no affect to surface traffic.

5.11.2.3.2 Proposed Action

Construction vehicles would travel on local roads to access the Airport. Construction-related traffic would likely occur before or after peak traffic times and would not significantly affect the level of service (LOS) of roadways around the airport. Potential traffic-related effects from construction would be temporary, lasting only as long as the 12-year construction period of the Proposed Action.

The Proposed Action Alternative would not result in any physical changes to the surface roadway system providing access to the Airport, with the exception of moving the entrance of the Airport 1,000 feet south along Fleur Drive to the current exit location (from Cowles Drive/Porter Avenue to Cowles Drive/Highview Drive). The entrance location change does not affect the regional pattern of the surface traffic arriving and departing the Airport.

As with the No Action Alternative, an increase in vehicle trips on the surface roadway system would occur with or without the Proposed Action. The increased trip levels would occur as the Airport continues to meet the forecasted aviation demands.

While the 2017 surface traffic study does indicate needed improvements along Fleur Drive, specifically at the intersection of Army Post Road and Fleur Drive, the new Airport terminal traffic does not generate the need for the improvements. The need for these improvements are unrelated to the Proposed Action, and would be necessary with or without the new passenger terminal. Under the Proposed Action, GA operations would move to the south quadrant. The surface traffic study indicates that under the Proposed Action, the intersection of Army Post Road and SW 28th Street would remain at the highest level of service, thereby not requiring improvements.

The Proposed Action would not significantly change the number of employees at the Airport, or induce an increase in the number of enplanements at the Airport compared to the No Action Alternative over what is forecasted in the TAF. As stated in **Section 4.4.11**, Airport traffic is anticipated to continue to use the existing traffic patterns with the exception of the relocated Airport entrance intersection, and the majority of the traffic study intersections are operating above LOS C. Employee parking is proposed to be relocated to an existing public parking that has enough capacity to accommodate any potential increase

in Airport employees. The Proposed Action does not include any permanent road closures. As previously described, the Airport entrance would be realigned and improved. This roadway realignment would improve the movement of traffic in and around the terminal area. This would not affect traffic patterns of off-Airport roadways.

5.11.2.4 Mitigation and Best Management Practices

The Proposed Action would not significantly affect surface traffic. Therefore, no mitigation is proposed.

5.11.3 Environmental Justice

This section describes the significance threshold, methodology of analysis, and potential effects of the No Action Alternative and Proposed Action regarding environmental justice issues such as minority and low income populations.

5.11.3.1 Significance Threshold

FAA Order 1050.1F does not provide a significance threshold for environmental justice; however, it does provide a number of factors to consider in evaluating the context and intensity of potential environmental impacts. These include when “the action would have the potential to lead to a disproportionately high and adverse impact to an environmental justice population (i.e., a low-income or minority population) due to:

- » Significant impacts in other environmental impact categories; or
- » Impacts on the physical or natural environment that affect an environmental justice population in a way that the FAA determines are unique to the environmental justice population and significant to that population.”

5.11.3.2 Methodology

The analysis in this section, consistent with FAA requirements, considers the potential for the Proposed Action to disproportionately affect environmental justice populations.

5.11.3.3 Environmental Consequences

This section describes the potential impact on environmental justice populations associated with implementation of the No Action Alternative and the Proposed Action.

5.11.3.3.1 No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal and enabling projects. The Authority would continue to operate the Airport and serve forecast aviation demands. Airport development would be subject to review and approval under NEPA and is not assumed under this alternative. Therefore, the No Action Alternative would not have an impact on environmental justice populations.

5.11.3.3.2 Proposed Action

As shown in **Section 4.4.11**, there are no environmental justice populations within the Regional Study Area. The construction and operation of the Proposed Action would occur entirely on Airport property and would not require the relocation of residents or businesses, aside from the relocation of tenants in buildings scheduled for demolition. These tenants include Air Method and UPS. Because the Proposed

Action would occur in phases, the regular operation of these tenants would not be significantly disrupted. As described throughout this chapter, the Proposed Action would not cause significant environmental effects (e.g., air quality, noise, water quality) and therefore, the potential effects from the Proposed Action would not disproportionately affect any population surrounding the Airport.

5.11.3.4 Mitigation and Best Management Practices

The Proposed Action would not affect environmental justice populations. Therefore, no mitigation or BMPs are proposed.

5.11.4 Children's Environmental Health and Safety Risks

This section describes the significance threshold, methodology of analysis, and potential effects of the No Action Alternative and Proposed Action regarding children's environmental health and safety risks.

5.11.4.1 Significance Threshold

FAA Order 1050.1F does not provide a significance threshold for children's environmental health and safety risks; however, it does provide a factor to consider in evaluating the context and intensity of potential environmental impacts. This would occur when the action would have the potential to lead to a disproportionate health or safety risk to children.

5.11.4.2 Methodology

The analysis in this section, consistent with FAA requirements, considers the potential for the Proposed Action to disproportionately increase the health or safety risk to children.

5.11.4.3 Environmental Consequences

This section describes the potential socioeconomic affects associated with implementation of the No Action Alternative and the Proposed Action.

5.11.4.3.1 No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal and enabling projects. The Authority would continue to operate the Airport and serve forecast aviation demands. Airport development would be subject to review and approval under NEPA and is not assumed under this alternative. Therefore, the No Action Alternative would affect children's health and safety.

5.11.4.3.2 Proposed Action

The construction and operation of the Proposed Action would occur entirely on Airport property and would not require the acquisition or relocation of any residences, schools, childcare centers, or similar facilities. The Proposed Action would not increase environmental health and safety risks or exposure of environmental contaminants to children in the surrounding community. Construction emissions resulting from the Proposed Action would be temporary and would occur over the duration of construction activities. Therefore, there are no health and safety risks to children associated with the implementation of the Proposed Action.

5.11.4.4 Mitigation and Best Management Practices

Because the Proposed Action would not have an impact on children's health and safety, no mitigation or BMPs are proposed.

5.12 VISUAL EFFECTS

This section describes the regulations and significance threshold(s) pertaining to visual effects, describes methodologies used to determine the potential visual effects of the No Action Alternative and Proposed Action, and identifies potential visual impacts.

5.12.1 Light Emissions

The following sections describe the potential effects from light emissions as a result of implementation of the Proposed Action.

5.12.1.1 Significance Threshold

FAA Order 1050.1F does not provide a significance threshold for visual effects; however, it does provide a number of factors to consider in evaluating the context and intensity of potential environmental impacts. For light emissions, these factors include the degree to which the action would have the potential to:

- » Create annoyance or interfere with normal activities from light emissions; and
- » Affect the visual character of the area due to the light emissions, including the importance, uniqueness, and aesthetic value of the affected visual resources.

5.12.1.2 Methodology

Airport-related light emissions are of particular concern if light is directed towards a residential area or other sensitive site. Impacts from lighting associated with the Proposed Action are determined by evaluating the individual lighting systems to be developed at the Airport and assessing distance and light intensity as they relate to the surrounding light-sensitive land uses. These factors identify the potential for lighting to result in annoyance to local residents.

5.12.1.3 Environmental Consequences

This section describes the potential visual effects from light emissions associated with implementation of the Proposed Action compared to the No Action Alternative.

5.12.1.3.1 No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal and enabling projects. The Authority would continue to operate the Airport and serve forecast aviation demands. Airport development would be subject to review and approval under NEPA and is not assumed under this alternative. Therefore, there would be no affect from light emissions.

5.12.1.3.2 Proposed Action

Construction activity is unlikely to occur during the nighttime hours; but if nighttime construction were to occur, it would likely be restricted to airfield-related construction. Light emissions from any nighttime-related construction would be temporary. Additionally, the closest residential area is about 300 feet east of the Airport and is shielded by existing vegetation and commercial development along Fleur Drive.

The Proposed Action would require lighting for safety and security reasons. Lighting would illuminate the interior and exterior of hangars and buildings, as well as along roadways. Exterior illumination would be directional and focus lighting on vehicle and pedestrian movement areas. The closest residential area is about 300 feet to the east of the Project Study Area and is buffered from the Airport by existing commercial buildings and vegetation. Because line-of-sight from the residential area to the Project Study Area is predominantly blocked, and because new lighting would be directional, significant visual effects from light emissions would not occur. The replacement passenger terminal is not anticipated to result in an obstructed line-of-sight for the air traffic control tower (ATCT) for aircraft movements; however, construction materials should be considered at the time of final design to avoid unwanted glare. Previous discussions between the Authority and FAA indicated that should final design of the replacement passenger terminal warrant a glare and/or line-of-sight study and subsequent impacts occur, supplemental NEPA documentation would be needed.

5.12.1.4 Mitigation and Best Management Practices

The Proposed Action would not cause visual effects; however, BMPs to reduce possible glare could be implemented, as appropriate. For example, shield hooding on lighting fixtures to direct light to specific areas could be used. Final design of the replacement passenger terminal will account for potential obstructed line-of-sight for the air traffic control tower and potentially unwanted glare from building components.

5.12.2 Visual Resources and Visual Character

The following sections describe the potential effects on visual resources/visual character as a result of implementation of the Proposed Action.

5.12.2.1 Significance Threshold

FAA Order 1050.1F does not provide a significance threshold for visual effects; however, it does provide a number of factors to consider in evaluating the context and intensity of potential environmental impacts. For visual resources/visual character, these include the extent the action would have the potential to:

- » Affect the nature of the visual character of the area, including the importance, uniqueness, and aesthetic value of the affected visual resources;
- » Contrast with the visual resources and/or visual character in the study area; and
- » Block or obstruct the views of visual resources, including whether these resources would still be viewable from other locations.

5.12.2.2 Methodology

Potential aesthetic effects of an action are generally assessed to the extent that the development contrasts with the environmental setting and whether a jurisdiction agency considers this contrast objectionable. Effects may also include those resulting from actions that may have both beneficial and detrimental effects.

5.12.2.3 Environmental Consequences

This section describes the potential visual effects from changes to visual resources/visual character associated with implementation of the Proposed Action compared to the No Action Alternative.

5.12.2.3.1 No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal and enabling projects. The Authority would continue to operate the Airport and serve forecast aviation demands. Airport development would be subject to review and approval under NEPA and is not assumed under this alternative. Therefore, there would be no affect to visual resources.

5.12.2.3.2 Proposed Action

Construction of the Proposed Action would require the use of large construction equipment. However, the equipment would only be at the Airport during the construction period and is considered temporary. Additionally, the line-of-sight to the closest residential area is shielded by existing vegetation and commercial development along Fleur Drive.

The Proposed Action would be similar to the infrastructure and buildings that are currently located in the Project Study Area, (e.g., runways, apron areas, surface parking, and a passenger terminal), and would not alter the visual character of the area. Because line-of-sight from the closest residential area to the Project Study Area is predominantly shielded by existing vegetation and commercial development along Fleur Drive and the visual character of the Airport would not be changed, significant visual effects are not anticipated.

5.12.2.4 Mitigation and Best Management Practices

The Proposed Action would not cause effects to the visual resources/visual character of the Airport therefore, no mitigation or BMPs are being proposed.

5.13 WATER RESOURCES

This section describes the significance threshold(s) pertaining to water resources, including wetlands, floodplains, surface water, and groundwater. This section also describes methodologies used to determine the potential effects the No Action Alternative and Proposed Action would have on those resources and identifies the potential water resource impacts. As **Chapter 4** describes, there are no protected river segments in the Project Study Area; therefore, this section does not discuss that resource category (Wild and Scenic Rivers).

5.13.1 Wetlands

The regulations concerning wetlands require consultation with agencies responsible for issuing Section 404 permits or for protecting wetlands. State and local regulations also address wetland protection. In addition, required public input provides valuable information about wetland-related issues and concerns.

A wetland may be “jurisdictional” under federal regulations in some instances due to the wetland’s connection to interstate commerce. In other cases, a wetland may be “non-jurisdictional” because it has no such connection. The designation of a wetland does not rely on its jurisdiction or non-jurisdictional

status. Instead, the technical definition of a wetland depends on whether the area's soil, vegetation, and hydrology meet certain criteria. Such "delineations" are determined according to the U.S. Army Corp of Engineer's (USACE's) *Wetland Delineation Manual 1987*.

This analysis includes data obtained from the Wetland and Waters of the U. S. (WUS) Delineation Report (see **Appendix F**). As **Section 4.1.4** describes, 3.51 acres of wetlands, 1.4 acres of pond, 2,280 linear feet of WUS, and 520 linear feet of drainage features were identified in the Project Study Area. In a Preliminary Jurisdictional Determination letter dated October 17, 2018, the USACE determined 0.84 acres of forested wetland, 2.67 acres of emergent wetlands, and approximately 2,280 feet of stream were determined to be jurisdictional. The pond was determined to be a non-jurisdictional manmade structure and the 520 feet of erosional features were determined to be non-jurisdictional due to lack of a defined bed and bank.

5.13.1.1 Significance Threshold

FAA Order 1050.1F, Exhibit 4-1, defines the FAA's significance threshold for wetlands, which states that a significant impact would occur if "The action would:

- » Adversely affect a wetland's function to protect the quality or quantity of municipal water supplies, including surface waters and sole source and other aquifers;
- » Substantially alter the hydrology needed to sustain the affected wetland system's values and functions or those of a wetland to which it is connected;
- » Substantially reduce the affected wetland's ability to retain floodwaters or storm runoff, thereby threatening public health, safety or welfare (the term welfare includes cultural, recreational, and scientific resources or property important to the public);
- » Adversely affect the maintenance of natural systems supporting wildlife and fish habitat or economically important timber, food, or fiber resources of the affected or surrounding wetlands;
- » Promote development of secondary activities or services that would cause the circumstances listed above to occur; or
- » Be inconsistent with applicable state wetland strategies."

5.13.1.2 Methodology

The potential effects were assessed based on the location, preliminary planning, and intended function of the Proposed Action. The proposed disturbed areas for the Proposed Action were analyzed to evaluate the potential short-term construction and long-term operational impacts.

5.13.1.3 Environmental Consequences

This section describes the potential wetland effects associated with implementation of the No Action Alternative and the Proposed Action.

5.13.1.3.1 No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal and enabling projects. The Authority would continue to operate the Airport and serve forecast aviation demands. Airport development would be subject to review and approval under NEPA and is not assumed under this alternative. Therefore, there would be no affect to wetlands.

5.13.1.3.2 Proposed Action

The Proposed Action would include the creation or maintenance of stormwater detention areas and/or construction borrow areas near the delineated wetlands and WUS. The preliminary design for the stormwater detention area includes establishment of a stormwater basin adjacent to WUS-1 north of Army Post Road, at the approximate location shown on **Figure 5-3**. Within the basin, the WUS-1 channel would be widened to improve capacity and riffle structures would be added to the channel to control the flow of water. Modifications would be made to the existing culvert structure to facilitate stormwater detention, which would result in impacts to approximately 290 feet of WUS-1. The Proposed Action would minimize the amount of permanent fill placed within WUS-1.

The construction borrow area would be in the southwest corner of the Project Study Area. The approximate limits of the borrow area is shown on **Figure 5-3**. The construction borrow area was designed to minimize impacts to wetlands. The proposed construction borrow area would affect 0.33 acres of Wetland 9.

The thresholds of significance as described in **Section 5.13.1.1** would not be triggered due to the following reasons:

- » any proposed wetland impacts within the Project Study Area would not adversely affect the wetland's ability to protect the quality or quantity of municipal water supplies as the wetland areas do not play a significant role in the area's water supplies;
- » the functions and values of wetlands within the Project Study Area would not be altered as a majority of the delineated wetlands within would remain unaffected (0.33 acres of wetland impact out of 3.51 acres delineated);
- » the Proposed Action would not substantially reduce the affected wetland's ability to retain floodwater or storm associated runoff as an appropriate drainage mitigation/design would be completed to accommodate runoff from any new impervious surfaces;
- » the Proposed Action will include storm water improvements that minimize impacts to a WUS while providing additional storm water detention capacity;
- » adverse effects to the maintenance of natural systems supporting wildlife and fish habitat or economically-important resources would not occur as a majority of the wetland areas would remain (3.18 acres) and no economically-important resources exist;
- » would not promote development of secondary activities or services that would affect the resources or functions of the wetland as the proposed fill of 0.33 acres would not cause changes to the remaining wetland resources or functions; and
- » Coordination with IDNR would occur prior to implementation of this alternative to ensure consistence with State wetland strategies.

5.13.1.4 Mitigation and Best Management Practices

In accordance with stipulations that would be provided in the USACE Section 404 Permit, the Authority is coordinating with the USACE and IDNR for the Proposed Action to ensure that wetlands and WUS are avoided to the maximum extent practicable and, if necessary, would provide appropriate compensatory mitigation for any impacts to jurisdictional wetlands and WUS. The Section 404 permit application was

submitted to the USACE and IDRN on March 12, 2019 (see **Appendix F**). The USACE, in consultation with other interested agencies, concurred with the mitigation plan and validation of the Section 404 permit application on April 3, 2019 (see **Appendix F**). Mitigation specified in the Section 404 permit includes purchasing 0.33 emergent wetland acre-credits prior to construction. The Authority will provide proof of purchase to the USACE.

A wetland mitigation bank is a wetland area that has been restored, established, enhanced, or preserved, which is then set aside to compensate for future conversions of wetlands for development activities. Permittees, upon approval of regulatory agencies, can purchase credits from a mitigation bank to meet their requirements for compensatory mitigation. The value of these “credits” is determined by quantifying the wetland functions or acres restored or created. The bank sponsor is ultimately responsible for the success of the project. Mitigation banking is performed “off-site”, meaning it is at the location not on or immediately adjacent to the site of impacts, but within the same watershed. Federal regulations establish a flexible preference for using credits from a mitigation bank over other compensation mechanisms. The Project Study Area is in the primary or secondary service areas of two USACE-approved wetland mitigation banks.

FIGURE 5-3
PRELIMINARY WETLAND AND WATERS OF THE U.S. (WUS) IMPACTS



5.13.2 Floodplains

This section describes significance thresholds pertaining to floodplains and describes methodologies used to determine the potential consequences of the Proposed Action on floodplains compared to the No Action Alternative.

5.13.2.1 Significance Threshold

FAA Order 1050.1F, Exhibit 4-1 defines the FAA's significance threshold for floodplains, which states that a significant impact would occur if "The action would cause notable adverse impacts on natural and beneficial floodplain values."

5.13.2.2 Methodology

The analysis to determine if any potential floodplain impacts included the examination of Federal Emergency Management Agency (FEMA) effective and preliminary flood insurance rate map (FIRM) panels to determine if the improvements were located within a floodplain.

5.13.2.3 Environmental Consequences

This section describes the potential floodplains effects associated with the implementation of the Proposed Action compared to the No Action Alternative.

5.13.2.3.1 No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal and enabling projects. The Authority would continue to operate the Airport and serve forecast aviation demands. Airport development would be subject to review and approval under NEPA and is not assumed under this alternative. Therefore, there would be no affect to water resources, including floodplains.

5.13.2.3.2 Proposed Action

The Proposed Action is in Zone X, which is identified on FEMA effective FIRM panels 1902270009E, 1902270011D, 1909010200C, and 1902270008D dated July 15, 1988 and preliminary FIRM panel 19153C0345F, dated June 17, 2015. Zone X areas are determined to be outside the 100-year and 500-year floodplains. Therefore, the Proposed Action would not affect 100-year floodplains.

5.13.2.4 Mitigation and Best Management Practices

Since the Proposed Action would not occur within the regulated floodplain, no mitigation or permitting is warranted. However, the construction contractor should comply with the construction National Pollutant Discharge Elimination System (NPDES) Permit and the developed construction Stormwater Pollution Prevention Plan (SWPPP) developed for the Proposed Action.

5.13.3 Surface Waters

This section describes significance thresholds and methodologies used to determine the potential effects the Proposed Action would have on surface waters compared to the No Action Alternative.

5.13.3.1 Significance Threshold

FAA Order 1050.1F, Exhibit 4-1, defines the FAA's significance threshold for surface waters, which states, "The action would:

- » Exceed water quality standards established by Federal, state, local, and tribal regulatory agencies; or
- » Contaminate public drinking water supply such that public health may be adversely affected.”

The IDNR regulates surface water quality and quantity through the NPDES. The Proposed Action would be expected to comply with the Iowa Administrative Code paragraph 567-61.2(2) and the Iowa Antidegradation Implementation Procedure.

5.13.3.2 Methodology

Potential surface water impacts were assessed based on potential adverse short-term construction and long-term operational impacts that could result from the Proposed Action. Factors considered included existing regulatory requirements, location, results of preliminary planning, and the intended function of the Proposed Action.

Surface waters associated with the Proposed Action need to comply with the IDNR and City of Des Moines Stormwater Code requirement of treating the 1.25” 24-hour storm event and providing a detention time of at least 24 hours (Section 106.136 of City of Des Moines Municipal Code).

Effluent limits of chemical discharges of specific outfalls are identified in the existing Individual NPDES permit. The maximum allowable discharge for all of the outfalls identified for oil and grease and ethaline glycol is 15 milligrams per liter (mg/l) and 185 mg/l, respectively. The allowable discharge for propylene glycol is 150 mg/l from Outfall 001 (Yeader Creek) and is 355 mg/l from Outfalls 002 (Frink Creek) and 003 (Middle Creek). The permit also stipulates that dry weather discharge of deicing chemicals is not allowed. The permit allows the airport to discharge 15,000 pounds per day (lb/day) of chemical oxygen demand (COD) to the local sewer system prior to discharging to any waters of the state. Direct discharge of any deicing activities are only allowed through the specified outfalls mentioned in the permit.

5.13.3.3 Environmental Consequences

This section describes the potential effects of the Proposed Action on surface waters when compared to the No Action Alternative.

5.13.3.3.1 No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal and enabling projects. The Authority would continue to operate the Airport and serve forecast aviation demands. Airport development would be subject to review and approval under NEPA and is not assumed under this alternative. Therefore, there would be no affect to water resources, including surface waters.

5.13.3.3.2 Proposed Action

As described in **Section 4.4.13.3**, surface waters within the Proposed Action include wetlands, WUS, pond/stormwater detention basin, and drainage/erosional features. The Proposed Action may directly affect delineated surface waters or wetlands as discussed in **Section 5.13.1.3.2**.

Implementation of the Proposed Action would permanently increase the amount of impervious surface by approximately 20 acres. The increase in impervious surface would increase stormwater runoff in the area and in turn, increase stormwater treatment required.

To meet IDNR and the City of Des Moines stormwater requirements for stormwater management as identified in Iowa Administrative Code, the Proposed Action would include on-site stormwater management facilities for detention. Water quality compliance requires that the Proposed Action include BMPs such as dry swales, bioretention, infiltration, and sheet flow to open space. In addition, the Airport would need to amend the NPDES Industrial Stormwater General Permit (77-27-0-08) for stormwater discharges associated with industrial activities to include the new facilities. This process includes updating the Airport's SWPPP.

The Proposed Action would include construction of a new dry detention basin (Project 21) located north of the proposed new parking structure to accommodate the increase in impervious surface from other project components. In addition, improvements to the existing detention facility located north of Army Post Road are intended to provide additional capacity to handle the runoff from the various components of the Proposed Action.

The Proposed Action and associated stormwater management improvements would need to be reviewed by the City of Des Moines staff to ensure compliance with the stormwater regulations.

The Proposed Action includes the construction of two new designated deicing pads. One would convert a portion of the south apron to serve cargo aircraft (Project 17), and the other would be a new pad and glycol storm control building associated with the construction of the terminal apron (Project 3). These deicing pads are intended to improve the current deicing fluid collection and containment system. According to the Airport's Deicing Containment System Operations and Maintenance Manual, deicing currently occurs on the terminal and cargo aprons. Snow containing deicing fluid is pushed to designated grassed areas adjacent to the apron pavement edge where it melts and is collected and contained in storage tanks. The new designated deicing pads would provide a designated location for deicing activities in a smaller footprint and provide the opportunity for more efficient collection thereby decreasing the potential for deicing fluids to enter downstream surface waters. These new deicing pads would be subject to the chemical discharge effluent limits that are specified in the Individual NPDES permit.

Construction and operation of the Proposed Action would not have a significant effect on surface water. The Airport would be responsible for ensuring that an NPDES permit for construction activities is obtained prior to the start of ground disturbing activities. Additionally, the selected construction contractor would be responsible for adhering to the NPDES permit requirements and implementation of BMPs during construction. The Proposed Action's compliance with the NPDES Permit, the SWPPP, and the City of Des Moines Stormwater Management Plan would help to ensure that the additional anticipated runoff is properly treated and that the stormwater facilities contain enough capacity to comply with the detention requirements.

5.13.3.4 Mitigation and Best Management Practices

Compliance with the existing Industrial NPDES permit (77-27-0-08) would minimize the potential water quality effects from construction and operation of the Proposed Action. This permit would include the establishment of BMPs to limit pollutant discharges to the surface waters. The flagging of any non-affected surface water that are within 50 feet of any clearing, grading, or filling activities is encouraged for the duration of the construction. A Notice of Intent (NOI) to NPDES for discharge from construction activities is required. A site-specific SWPPP would be required for the construction, and the owner's representative would be responsible for ensuring the contractor follows the SWPPP during construction.

The City also requires the responsible party to maintain the facilities. This includes:

- » Periodically inspecting stormwater runoff control facilities, including pipes, inlets and outlets.
- » Removing litter, sediment and debris from such facilities.
- » Not removing or changing vegetation without the prior written consent of the city engineer or public works director except for stormwater runoff control facilities that must be moved in accordance with the stormwater runoff control plan.
- » Not placing yard debris, soil or rocks or concrete, or similar materials, within a swale, or retention or detention pond without the prior written consent of the city engineer or public works director.
- » Not re-grading the area of the stormwater runoff control facilities without the prior written consent of the city engineer or public works director.
- » Maintaining and keeping records of inspection, maintenance and repair for at least five years and made available upon request to the city engineer.
- » Prohibiting any action that will render a stormwater management facility inoperable or will significantly decrease its functioning.

Construction and operation of the Proposed Action would not affect water quality in any manner that would affect the quality of the public drinking water supply. In addition, the Proposed Action would not increase the use of public water supplies in a manner that would affect the overall supply of public water. The extension of utilities, including water and sewer lines, associated with the Proposed Action would be coordinated with and verified by the local entities.

5.13.4 Groundwater

This section describes significance threshold(s) and describes methodologies used to determine the potential effects the Proposed Action would have on groundwater compared to the No Action Alternative.

5.13.4.1 Significance Threshold

FAA Order 1050.1F, Exhibit 4-1, defines the FAA's significance threshold for groundwater, which states that a significant impact would occur if "The action would:

- » Exceed groundwater quality standards established by federal, state, local, and tribal regulatory agencies; or
- » Contaminate an aquifer used for public water supply such that public health may be adversely affected."

5.13.4.2 Methodology

Potential groundwater effects were assessed based on location, preliminary planning results, and intended function of the Proposed Action. The proposed disturbed areas for the Proposed Action were evaluated with respect to groundwater recharge as well as any changes in operational activities for potable water consumption and domestic water treatment to determine if any consequences exist.

5.13.4.3 Environmental Consequences

This section describes the potential effects to groundwater associated with implementation of the Proposed Action compared to the No Action Alternative.

5.13.4.3.1 No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal and enabling projects. The Authority would continue to operate the Airport and serve forecast aviation demands. Airport development would be subject to review and approval under NEPA and is not assumed under this alternative.

5.13.4.3.2 Proposed Action

The proposed dry detention basin construction would not significantly affect the groundwater recharge due to the anticipated shallow depth of the bottom of the facilities and the excessive depth of the aquifer in the area of the construction.

The Proposed Action calls for the construction of two new deicing pads with dedicated collection systems that collect the pollutants associated with the deicing process prior to affecting the groundwater. To aid the collection and provide an additional measure to protect groundwater, an impervious liner is typically installed below deicing pads to prevent deicer fluid from infiltrating the pavement section to reach groundwater.

The construction of the Proposed Action could minimally affect groundwater due to the increase in stormwater runoff from the proposed increase in the impervious surface area. Any effects on the groundwater would be considered minimal and not affect the overall operations of the system and not exceed any water quality standards that are set forth by any local, state, or federal jurisdictions or contaminate the aquifer that is used for the public water supply.

5.13.4.4 Mitigation and Best Management Practices

Due to the minimal potential impacts to the groundwater as a result of implementation of the Proposed Action, mitigation for groundwater disturbance would not be required. The contractor should implement the following BMPs to protect the groundwater and minimize any impacts during construction:

- » Neat and orderly storage of any chemicals that are being stored on site
- » Regular garbage and waste disposal
- » Prompt cleanup of any spills of hydraulic fluids, liquid, or dry materials
- » Performance of regular preventative maintenance on all equipment to prevent leaks

5.14 CUMULATIVE EFFECTS

This section describes the significance threshold(s) pertaining to cumulative effects. This section also describes the methodologies used to determine the potential cumulative effects of the No Action Alternative and Proposed Action, and the potential cumulative impacts.

5.14.1 Significance Threshold

The analysis of potential cumulative effects uses the thresholds of significance in FAA Order 1050.1F, Exhibit 4-1 for each individual resource category.

5.14.2 Methodology

The CEQ regulations require the analysis and disclosure of the Proposed Action's potential cumulative effects (40 CFR §§ 1508.25(a)(2) and (3)). This informs the public if the Proposed Action, when considered with other projects occurring within the Project Study Area during specific periods (i.e., "past, present, and reasonably foreseeable actions"), would cause a significant environmental effect.

This EA uses information presented in **Chapter 4** to determine potential cumulative impacts. Cumulative impacts are only considered for those resources the Proposed Action would affect. The Proposed Action would not result in cumulative impacts to resources that the Proposed Action would not affect. Each past, present, and reasonably foreseeable future action was cumulatively analyzed for its potential to impact the same environmental resources impacted by the Proposed Action.

5.14.3 Environmental Consequences

This section describes the potential cumulative effects of the No Action Alternative and Proposed Action when considered with past, present, and reasonably foreseeable future actions listed in **Section 4.5**.

5.14.3.1 No Action Alternative

Under the No Action Alternative, the Authority would not implement the replacement terminal and enabling projects. The Authority would continue to operate the Airport and serve forecast aviation demands. Airport development would be subject to review and approval under NEPA and is not assumed under this alternative. Therefore, the No Action Alternative would not cause cumulative effects when considered with past, present, and reasonably foreseeable future projects.

5.14.3.2 Proposed Action

Implementation of the Proposed Action would cause less than significant environmental effects related to construction-related air quality emissions; biological resources; climate; hazardous materials, solid waste, and pollution prevention; historical, architectural, archaeological, and cultural resources; land use; natural resources and energy supply; noise and noise-compatible land use; socioeconomics, environmental justice, and children's health and safety; visual effects; and water resources.

Air Quality

The past, present, and reasonably foreseeable future actions described in **Section 4.5** and the Proposed Action would cause increases to emissions during the construction-related activities for each project component. Construction of past and present projects does not coincide with the construction period of

the Proposed Action. As such, the temporary emissions would not cause a significant cumulative effect. Construction of reasonably foreseeable future actions may coincide with the Proposed Action. However, given the preliminary extent of those projects, it is unlikely that construction of the Proposed Action, when considered with the reasonably foreseeable future actions, would cause a significant cumulative air quality effect.

Biological Resources

Past, Present, and reasonably foreseeable future actions and the Proposed Action could affect biological resources. The cumulative projects described in **Section 4.5** have not caused, or are not expected to cause, significant effects to biological resources. Given the potential effects of the Proposed Action that **Section 5.2** describes, the Proposed Action in addition to past, present, and reasonably foreseeable future actions is not anticipated to cause significant effects to biological resources.

Climate

The cumulative impact of the Proposed Action on the global climate when added to other past, present, and reasonably foreseeable future actions is not currently scientifically predictable. Aviation has been calculated to contribute about three percent of global CO₂ emissions; this contribution may grow to five percent by 2050. Actions are underway within the U.S. and by other nations to reduce aviation's contribution through such measures as new aircraft technologies to reduce emissions and improve fuel efficiency, renewable alternative fuels with lower carbon footprints, more efficient air traffic management, market-based measures and environmental regulations including an aircraft CO₂ standard. The U.S. has ambitious goals to achieve carbon-neutral growth for aviation by 2020 compared to a 2005 baseline, and to gain absolute reductions in GHG emissions by 2050. At present, there are no calculations of the extent to which measures individually or cumulatively may affect aviation's CO₂ emissions. Moreover, there are large uncertainties regarding aviation's impact on climate. The FAA, with support from the U.S. Global Change Research Program and its participating federal agencies (e.g., NASA, NOAA, USEPA, and U.S. Department of Energy), has developed the Aviation Climate Change Research Initiative in an effort to advance scientific understanding of regional and global climate impacts of aircraft emissions, with quantified uncertainties for current and projected aviation scenarios under changing atmospheric conditions.⁵¹

Farmlands

Past, present and reasonably foreseeable future actions and the Proposed Action could affect soils rated as prime farmlands or farmlands of statewide importance. As described in **Section 5.5**, 62.3 acres of farmland would be temporarily converted to non-agricultural use during the construction of the Proposed Action. However, because this conversion would be temporary, the NRCS confirmed that there would be no impact to farmlands. Therefore, the Proposed Action in addition to past, present, and reasonably foreseeable future actions, are not anticipated to cause a significant cumulative effect to prime farmland or farmland of statewide importance.

⁵¹ Brown, N., M. Gupta, R. Jefferies, L. Maurice. (2010), The U.S. Strategy for Tackling Aviation Climate Impacts, 27th International Congress of the Aeronautical Sciences (ICAS). Retrieved from ICAS, October 2018: http://www.icas.org/ICAS_ARCHIVE/ICAS2010/PAPERS/690.PDF.

Hazardous Materials, Solid Waste and Pollution Prevention

Review of available information for past and present projects did not reveal any significant effects to hazardous materials and solid waste. Reasonably foreseeable future projects could potentially include facilities that store or handle waste. However, those projects would be required to follow federal, state, and local rules and regulations regarding the handling, storage, and use of hazardous materials. The Authority would amend, if needed, the procedures for managing solid waste at the Airport should the amount of solid waste generated exceed what can currently be managed. For those reasons, the Proposed Action in addition to past, present, and reasonably foreseeable future actions, is not anticipated to cause a significant cumulative effect to hazardous materials, solid waste, or pollution prevention.

Historical, Architectural, Archaeological, and Cultural Resources

The past, present, and reasonably foreseeable future actions and the Proposed Action could result in impacts to historic, architectural, archaeological, and cultural resources. As also described in **Section 5.7**, six archaeological resources were identified within the Direct APE, and were not recommended as eligible for inclusion in the NRHP. Additionally, the existing passenger terminal building and Building 35 were not recommended as eligible for inclusion of the NRHP. The Airport was also not recommended for inclusion in the NRHP as a potential historic district. For these reasons, the Proposed Action in addition to past, present, and reasonably foreseeable future actions, is not anticipated to cause a significant cumulative effect to historical, architectural, archaeological, or cultural resources.

Natural Resources and Energy Supply

The past, present, and reasonably foreseeable future actions and the Proposed Action could cause an increase in the use of natural resources and energy demand, both during construction and after implementation of the Proposed Action. However, the Proposed Action does not require the use of unusual materials or materials that are in short supply. Additionally, the utility provider for the area is expected to have sufficient capacity to handle the increase in energy supply. Further, the Authority can implement sustainable elements that may include, but are not limited to, energy efficient lighting and equipment. Airport Cooperative Research Program (ACRP) Synthesis 10, *Airport Sustainability Practices* and the Sustainability Aviation Guidance Alliance Database (SAGA) database provide a wide range of sustainable elements that the selected design contractor could implement. Sustainable design elements could be considered during the design phase of the project, as well as opportunities to reduce waste, recycle, and reuse materials during the construction and operation of the Proposed Action. As such, the Proposed Action, in addition to past, present, and reasonably foreseeable future actions, is not anticipated to cause a significant cumulative effect to natural resources and energy supply.

Noise and Noise-Compatible Land Use

The past, present, and reasonably foreseeable future actions and the Proposed Action could result in increased noise to the surrounding area during construction activities. Noise levels would vary based on the nature of construction activities and the type and model of equipment used. Grading and scraping operations are typically the noisiest activities, with equipment noise levels as high as 70 to 90 dBA within 50 feet of their operations. However, distance would rapidly attenuate noise levels so that noise sensitive areas would experience a temporary increase in ambient background noise levels. The increase in noise would occur only as long as construction. In addition, construction of these cumulative projects would not

all occur at the same time. As described in **Section 5.10**, the increase in aviation noise due to the Proposed Action is not significant. The cumulative projects at the Airport that are related to aviation noise have not resulted in and are not anticipated to result in significant noise impacts to the surrounding area. Each reasonably foreseeable project at the Airport would assess potential noise impacts and implement BMPs to minimize noise effects to the surrounding area. Therefore, the Proposed Action, in combination with the cumulative projects, is not anticipated to significantly increase noise in the surrounding areas.

Water Resources

The past, present, and reasonably foreseeable future actions and the Proposed Action could affect wetlands, surface water, and groundwater. However, each project disturbing wetlands would require a Section 404 permit. Additionally, each project disturbing over one acre of land would require a Stormwater Construction Permit. Additionally, various water quality standards and regulations implemented at the state and federal level require development to address the increase in impervious surface and potential pollutants found in subsequent stormwater runoff. Therefore, when considered cumulatively, there would not be a significant cumulative effect to wetlands, surface water, or groundwater.

5.15 SUMMARY OF ENVIRONMENTAL IMPACTS

Table 5-2 presents a summary of the environmental impacts associated with the Proposed Action and the No Action Alternative.

TABLE 5-2
ENVIRONMENTAL IMPACT SUMMARY MATRIX

Environmental Consequences Impact Category	Proposed Action		No Action Alternative	
	Impacts	Mitigation	Impacts	Mitigation
Air Quality	No significant impact	No mitigation required Implement Best Management Practices (BMPs) during construction activities to reduce fugitive dust emissions and reduce emissions associated with construction vehicles and equipment.	No significant impact	None
Biological Resources	No significant impact	Remove trees between October 31 and April 1.	None	None

TABLE 5-2 (CONT'D)
ENVIRONMENTAL IMPACT SUMMARY MATRIX

Environmental Consequences Impact Category	Proposed Action		No Action Alternative	
	Impacts	Mitigation	Impacts	Mitigation
Climate	No adverse impact	None required	None	None
Coastal Resources	None	None	None	None
Department of Transportation Act, Section 4(f)	None	None	None	None
Farmlands	None	None	None	None
Hazardous Materials, Solid Waste, and Pollution Prevention	No significant impact	Dispose of all hazardous materials, including asbestos, associated with the demolition of the existing passenger terminal in accordance with Federal, state, and other applicable regulations. Follow requirements of the NPDES permit issued by IDNR. Update SWPPP and SPCC plans.	None	None
Historical, Architectural, Archeological, and Cultural Resources	No significant impact	Stop construction immediately and notify FAA and SHPO in the event a potentially-historic artifact is discovered during ground disturbing activity.	None	None
Land Use	None	None	None	None
Natural Resources and Energy Supply	No significant impact	No mitigation required. Recycle and reuse existing materials and implement sustainable construction, building, and operational measures where reasonable and practicable.	None	None

TABLE 5-2 (CONT'D)
ENVIRONMENTAL IMPACT SUMMARY MATRIX

Environmental Consequences Impact Category	Proposed Action		No Action Alternative	
	Impacts	Mitigation	Impacts	Mitigation
Noise and Noise-Compatible Land Use	No significant impact	None	None	None
Socioeconomic, Environmental Justice, & Children's Health	No significant impact	None	None	None
Visual Effects	No significant impact	None required	None	None
Wetlands	No significant impact	Obtained Section 404 permit. Purchase 0.33-acre wetland credits. Implement BMPs during construction activities to avoid wetland resources.	None	None
Floodplains	None	No mitigation required. Implement BMPs during construction activities to limit runoff and erosion.	None	None
Surface Water	No significant impact	Ensure the Airport operates in accordance with the requirements of the National Pollutant Discharge Elimination System (NPDES) permit issued by the IDNR. Implement BMPs during construction activities to limit runoff and erosion.	None	None
Groundwater	No significant impact	None required	None	None
Wild and Scenic Rivers	None	None	None	None

TABLE 5-2 (CONT'D)
ENVIRONMENTAL IMPACT SUMMARY MATRIX

Environmental Consequences Impact Category	Proposed Action		No Action Alternative	
	Impacts	Mitigation	Impacts	Mitigation
Cumulative Impacts	Not significant	None required	None	None

Source: RS&H, 2019.

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CHAPTER 6

LIST OF PREPARERS

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6.1 LEAD AGENCY

The FAA is the lead agency for the preparation of this EA. Responsibility for review and approval of this EA rests with the FAA. The following FAA Staff Members were involved in the preparation of this EA.

6.1.1 Federal Aviation Administration

Scott Tener. Environmental Specialist.

Jeff Deitering. Iowa Airport Planner.

6.2 PRINCIPAL PREPARERS

Responsibility for preparation of this EA rests with the Des Moines Airport Authority. Listed below are the persons responsible for the preparation of this EA.

6.2.1 Des Moines Airport Authority

Kevin Foley. Executive Director and General Manager.

Bryan Belt. Director of Engineering and Planning.

Alan H. Graff. Director of Operations.

Brian Mulcahy. Director of Finance.

6.2.2 RS&H Iowa, P.C.

David Full, AICP. M.S., Urban Planning. Project Manager. Responsible for contractual oversight of the EA preparation, quality assurance/quality control of the EA, and client coordination.

Rodney Bishop, P.E. B.S., Civil Engineering. Project Officer. Responsible for contractual oversight.

Julie Barrow. M.S., Environmental Science. Deputy Project Manager. Responsible for oversight of the EA preparation, and client/subconsultant coordination.

Natalie Heath, AICP. M.S., Urban and Regional Planning. Environmental Specialist. Responsible for research and technical writing.

Lindsey Maron, PE, CFM. M.E. Civil Engineering. Water Resources Engineer. Responsible for research and technical writing for water resources.

Will Davidson. B.S. Environmental Restoration Science, B.S. Water Science. Environmental Specialist. Responsible for research and technical writing.

6.2.3 Foth Infrastructure & Environment, LLC

Adam Wilhelm. B.S., Civil Engineering. Senior Client Manager. Responsible for knowledge of facilities, planned improvements, and coordination of Foth members.

Eva Moritz. B.S., Agricultural Engineering. Lead Environmental Engineer. Responsible for biological resources, and wetlands.

Ronn Beebe. B.S., Geology. Lead Environmental Scientist. Responsible for hazardous materials, solid waste, and pollution prevention.

Katie Goff. M.S., Geoscience. Environmental Scientist. Responsible for collection of field data and wetlands.

Molly Long. M.S., Civil Engineering. Lead Civil Engineer. Responsible for surface traffic impacts.

6.2.4 Hanser & Associates, L.C.

Ryan Hanser. B.A., Communication. Accreditation in Public Relations, Public Relations Society of America. President. Responsible for public input.

Ronald Hanser. B.S., Journalism. Chairman. Responsible for public input.

6.2.5 Tallgrass Archaeology LLC

Leah Rogers. M.S., Anthropology. Principal Investigator in Archaeology, Architectural History, and History. Responsible for cultural resources survey and evaluations and technical writing.

Cindy Nagel. B.A., Anthropology. Responsible for archaeological field investigation and assistance with technical writing.

Jan Olive Full. Ph.D., History, M.A., American Studies. B.G.S., English and Business. As a subconsultant to Tallgrass Archaeology LLC, responsible for the architectural/historical inventory and evaluation of the Airport Terminal and Building 35 and completion of Iowa Site Inventory Forms for both properties.

CHAPTER 7

AGENCY AND PUBLIC INVOLVEMENT

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The Environmental Assessment coordination process described in this chapter provided interested agencies and the public the opportunity to comment on potential effects of the construction and operation of the Proposed Action.

As the National Environmental Policy Act (NEPA) and Federal Aviation Administration (FAA) Order 1050.1F require, a public involvement process was conducted. This process provided the opportunity for public and agency input regarding the Proposed Action analyzed in this EA. The public and agency involvement process was initiated to:

- » Provide information about the Proposed Action's purpose and need and the alternatives the EA discusses.
- » Obtain feedback about the above information from the public and agencies interested in and affected by the Proposed Action (i.e., interested parties).
- » Inform those interested parties that the EA will provide a full and fair discussion of project-related environmental effects.
- » Provide timely public notices to interested parties so that they may submit comments and participate in public open meetings concerning the Proposed Action.
- » Record comments received from interested parties.

7.1 PUBLIC INVOLVEMENT AND AGENCY COORDINATION APPROACH AND PROCESS

Pertinent federal statutes, regulations, executive orders, and guidance were considered when conducting the public involvement process. On August 15, 2018, the Authority held agency and public scoping meetings at the Airport (see **Appendix J**). There were two agency representatives at the agency meeting and no attendees at the public scoping meeting. The Authority did not receive any written comments. **Appendix J** includes the advertisements for the meetings and the meeting materials.

7.2 DISTRIBUTION OF DRAFT EA

The Draft EA was made available for a 35-day review period (35 days after the notice of availability advertisement) at the Authority's office during normal business hours, on the Authority's website, and at a local library (see **Table 7-1**).

Electronic copies of the Draft EA were mailed to agencies who requested a copy of the Draft EA for review. The Authority held a public open house on May 7, 2019 from 5:30 pm to 7:00 pm Central Daylight Time in the Authority Cloudroom on the second floor of the Airport. No members of the public attended the public open house, and no written comments on the Draft EA were received.

TABLE 7-1
DRAFT EA AVAILABLE LOCATIONS

Location Name	Address	Draft EA Copy Type
Des Moines International Airport Authority Office	5800 Fleur Drive, Suite 207 Des Moines, IA 50321	Hard Copy
Des Moines International Airport Website	https://www.dsmairport.com/about-the-airport/new-terminal-documentation/New%20Terminal%20Documentation.aspx	Electronic
South Side Library	1111 Porter Avenue Des Moines, IA 50315	Hard Copy

Source: RS&H, 2018

7.3 FINAL EA

The Final EA will be made available at the Authority's office and on the Authority website.

CHAPTER 8

REFERENCES

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APPENDIX A

Terminal Area Forecast (TAF)

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APO TERMINAL AREA FORECAST DETAIL REPORT
Forecast Issued February 2019

DSM													
AIRCRAFT OPERATIONS													
Enplanements				Itinerant Operations				Local Operations					
Fiscal Year	Air Carrier	Commuter	Total	Air Carrier	Air Taxi & Commuter	GA	Military	Total	Civil	Military	Total	Total Ops	Total Tracon Ops
REGION:ACE STATE:IA LOCID:DSM													
CITY:DES MOINES AIRPORT:DES MOINES INTL													
1990	669,715	22,343	692,058	21,029	15,155	53,305	4,587	94,076	15,130	2,236	17,366	111,442	155,258
1991	681,322	22,322	703,644	27,616	23,073	64,968	5,775	121,432	20,118	3,402	23,520	144,952	150,476
1992	699,090	28,383	727,473	27,179	21,763	62,436	6,054	117,432	18,349	3,354	21,703	139,135	147,310
1993	623,323	41,643	664,966	25,845	23,631	57,524	3,947	110,947	14,283	3,567	17,850	128,797	139,771
1994	603,235	88,072	691,307	29,270	26,120	58,924	5,006	119,320	12,727	1,907	14,634	133,954	151,481
1995	616,862	123,596	740,458	31,541	27,556	58,443	4,748	122,288	12,397	2,358	14,755	137,043	156,493
1996	733,947	181,678	915,625	34,238	28,048	58,013	3,501	123,820	12,570	1,308	13,878	137,698	158,642
1997	628,534	190,050	818,584	30,067	31,540	53,597	3,135	118,339	8,680	970	9,650	127,989	152,232
1998	565,524	255,537	821,061	28,483	36,474	50,300	2,770	118,027	12,182	1,790	13,972	131,999	155,048
1999	575,182	271,971	847,153	35,210	34,506	49,737	2,853	122,306	11,829	1,919	13,748	136,054	159,729
2000	509,866	311,403	821,269	34,962	33,065	47,482	2,823	118,332	9,575	1,989	11,564	129,896	155,452
2001	483,291	336,157	819,448	33,508	33,374	40,616	2,741	110,239	9,438	1,792	11,230	121,469	145,603
2002	444,145	358,889	803,034	31,106	35,159	40,448	3,069	109,782	6,224	2,450	8,674	118,456	147,763
2003	405,187	477,176	882,363	29,535	37,351	39,537	2,676	109,099	6,360	2,359	8,719	117,818	145,230
2004	332,966	622,718	955,684	27,024	38,617	38,240	2,611	106,492	5,051	2,417	7,468	113,960	143,573
2005	232,311	711,082	943,393	25,452	36,125	37,845	2,279	101,701	4,862	2,189	7,051	108,752	139,012
2006	186,608	743,223	929,831	20,643	42,144	36,653	2,398	101,838	4,310	1,674	5,984	107,822	138,027
2007	250,557	713,078	963,635	16,832	45,770	35,057	2,308	99,967	4,629	1,615	6,244	106,211	137,925
2008	233,454	708,295	941,749	17,637	39,341	31,359	2,141	90,478	5,760	944	6,704	97,182	127,539
2009	196,550	662,795	859,345	16,535	35,941	25,829	2,590	80,895	7,642	1,477	9,119	90,014	116,199
2010	209,653	672,110	881,763	15,699	31,768	25,268	2,128	74,863	7,126	1,368	8,494	83,357	107,671
2011	199,464	718,969	918,433	15,676	31,146	25,509	2,558	74,889	6,379	1,549	7,928	82,817	107,126
2012	303,340	685,657	988,997	18,509	26,345	26,360	2,679	73,893	6,706	1,460	8,166	82,059	110,094
2013	428,533	640,362	1,068,895	20,328	22,607	24,966	1,914	69,815	6,317	1,632	7,949	77,764	101,520
2014	514,776	613,037	1,127,813	22,642	19,426	23,079	630	65,777	4,652	114	4,766	70,543	96,154
2015	518,706	624,044	1,142,750	27,506	12,855	23,678	1,114	65,153	4,109	465	4,574	69,727	99,467
2016	663,943	545,544	1,209,487	28,271	12,174	23,589	1,098	65,132	3,676	531	4,207	69,339	98,589
2017	710,086	536,361	1,246,447	32,061	8,536	23,432	1,464	65,493	4,026	665	4,691	70,184	99,869
2018*	741,429	571,893	1,313,322	30,182	9,315	24,446	1,125	65,068	4,679	514	5,193	70,261	98,201
2019*	802,132	668,514	1,470,646	34,687	8,616	24,837	1,125	69,265	5,628	514	6,142	75,407	102,606

APO TERMINAL AREA FORECAST DETAIL REPORT
Forecast Issued February 2019

DSM	AIRCRAFT OPERATIONS													
	Enplanements			Itinerant Operations				Local Operations				Total Ops	Total Tracon Ops	Based Aircraft
	Fiscal Year	Air Carrier	Commuter	Total	Air Carrier	Air Taxi & Commuter	GA	Military	Total	Civil	Military			
2020*	832,558	690,720	1,523,278	36,592	7,311	24,861	1,125	69,889	5,638	514	6,152	76,041	102,751	110
2021*	864,158	713,856	1,578,014	38,155	6,811	24,885	1,125	70,976	5,648	514	6,162	77,138	103,729	110
2022*	896,353	737,438	1,633,791	39,916	5,958	24,909	1,125	71,908	5,658	514	6,172	78,080	104,376	110
2023*	928,984	761,383	1,690,367	41,883	4,719	24,933	1,125	72,660	5,668	514	6,182	78,842	104,667	110
2024*	961,758	785,464	1,747,222	43,435	4,345	24,957	1,125	73,862	5,678	514	6,192	80,054	105,812	110
2025*	994,585	809,643	1,804,228	44,789	4,390	24,981	1,125	75,285	5,688	514	6,202	81,487	107,364	110
2026*	1,027,433	833,891	1,861,324	46,146	4,435	25,005	1,125	76,711	5,698	514	6,212	82,923	108,920	110
2027*	1,060,286	858,194	1,918,480	47,505	4,480	25,029	1,125	78,139	5,708	514	6,222	84,361	110,481	110
2028*	1,093,196	882,605	1,975,801	48,869	4,526	25,053	1,125	79,573	5,718	514	6,232	85,805	112,050	110
2029*	1,126,235	907,193	2,033,428	50,241	4,572	25,077	1,125	81,015	5,728	514	6,242	87,257	113,629	110
2030*	1,159,476	932,026	2,091,502	51,624	4,619	25,101	1,125	82,469	5,738	514	6,252	88,721	115,223	110
2031*	1,193,027	957,180	2,150,207	53,023	4,666	25,126	1,125	83,940	5,749	514	6,263	90,203	116,836	110
2032*	1,226,961	982,673	2,209,634	54,439	4,714	25,151	1,125	85,429	5,760	514	6,274	91,703	118,468	110
2033*	1,261,322	1,008,540	2,269,862	55,875	4,762	25,176	1,125	86,938	5,771	514	6,285	93,223	120,121	110
2034*	1,296,178	1,034,828	2,331,006	57,333	4,811	25,201	1,125	88,470	5,782	514	6,296	94,766	121,800	110
2035*	1,331,562	1,061,565	2,393,127	58,814	4,860	25,226	1,125	90,025	5,793	514	6,307	96,332	123,502	110
2036*	1,367,419	1,088,688	2,456,107	60,316	4,910	25,251	1,125	91,602	5,804	514	6,318	97,920	125,227	110
2037*	1,403,777	1,116,215	2,519,992	61,839	4,960	25,276	1,125	93,200	5,815	514	6,329	99,529	126,974	110
2038*	1,440,645	1,144,156	2,584,801	63,384	5,011	25,301	1,125	94,821	5,826	514	6,340	101,161	128,746	110
2039*	1,478,018	1,172,509	2,650,527	64,951	5,062	25,326	1,125	96,464	5,837	514	6,351	102,815	130,541	110
2040*	1,515,904	1,201,286	2,717,190	66,541	5,114	25,351	1,125	98,131	5,848	514	6,362	104,493	132,360	110
2041*	1,554,165	1,230,357	2,784,522	68,147	5,166	25,376	1,125	99,814	5,859	514	6,373	106,187	134,194	110
2042*	1,592,768	1,259,689	2,852,457	69,768	5,219	25,401	1,125	101,513	5,870	514	6,384	107,897	136,046	110
2043*	1,631,753	1,289,295	2,921,048	71,404	5,272	25,427	1,125	103,228	5,881	514	6,395	109,623	137,917	110
2044*	1,671,107	1,319,145	2,990,252	73,055	5,326	25,453	1,125	104,959	5,892	514	6,406	111,365	139,806	110
2045*	1,710,962	1,349,348	3,060,310	74,726	5,380	25,479	1,125	106,710	5,903	514	6,417	113,127	141,718	110

APPENDIX B

BIOLOGICAL RESOURCES

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Report

Biological Resources Field Survey

**Replacement Terminal Environmental Assessment Project
Des Moines International Airport
Project I.D.: 18R009.00**

**RS&H Iowa, P.C.
San Francisco, CA 94104**

July 17, 2018





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July 17, 2018

Mr. Kraig McPeck
U.S. Fish and Wildlife Service
1511 47th Avenue
Moline, IL 61265

Dear Mr. McPeck:

RE: Biological Resources Field Survey; Replacement Terminal Environmental Assessment Project, Des Moines International Airport, 5800 Fleur Drive, Des Moines, Iowa, IDNR Project No. 15705

Foth Infrastructure & Environment, LLC (Foth) is pleased to submit the Biological Resources Field Survey for RS&H Iowa, P.C. on behalf of the Des Moines International Airport. **At this time, we are requesting concurrence from the U.S. Fish and Wildlife Service (USFWS) regarding the proposed project.** This report is part of an Environmental Assessment for the Replacement Terminal project and documentation of the potential effect to biological resources is critical for the advancement of the project through that process. In order to avoid delays in the process, Foth is requesting that the USFWS respond by August 30, 2018.

If you have any questions concerning this report, please contact Eva at 515-251-2524 or by e-mail at eva.moritz@foth.com.

Sincerely,
Foth Infrastructure & Environment, LLC

A handwritten signature in blue ink, appearing to read "E Moritz", with a stylized flourish at the end.

Eva Moritz, P.E.
Environmental Engineer

cc: Mr. David Full, RS&H Iowa, P.C.
Mr. Seth Moore, IDNR

Biological Resources Field Survey

Distribution

<u>No. of Copies</u>	<u>Sent To</u>
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Electronic	Mr. David Full RS&H Iowa, P.C. 369 Pine Street, Suite 610 San Francisco, CA 94104
1	Mr. Seth Moore Sovereign Lands & Environmental Review Coordinator Iowa Department of Natural Resources 502 East 9th Street Des Moines, IA 50319

Biological Resources Field Survey

Replacement Terminal Environmental Assessment Project
Des Moines International Airport
Project ID: 18R009.00

Prepared for
RS&H Iowa, P.C.
369 Pine Street, Suite 610
San Francisco, CA 94104

Prepared by
Foth Infrastructure & Environment, LLC

July 17, 2018

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Biological Resources Field Survey

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Biological Resources Field Survey

Executive Summary

The purpose of the assessment was to evaluate whether the project study area contains suitable habitat for federally-listed Threatened and Endangered (T&E) species and to assess the potential for adverse effects from the Proposed Action. The survey was performed for RS&H Iowa, P.C. on behalf of the Des Moines International Airport. The project study area covers approximately 850 acres and is located in Sections 29, 30, 31 and 32, Township 78 North, Range 24 West, Des Moines, Polk County, Iowa.

Five T&E species were identified for Polk County. Suitable habitat for the prairie bush clover or Western prairie fringed orchid is not present within the project study area due to historic farming practices, maintenance of the airport facilities, and the lack of native prairie and native wetland areas. Suitable habitat for the least tern was also not present within the project study area due to the lack of barren river sandbars. There are no migratory birds of concern within the vicinity of the project study area.

Three areas within the project study area were identified to have low suitability habitat for the Indiana bat or Northern long-eared bat. The remaining wooded areas within the project study area did not have suitable habitat for the two bat species. The Proposed Action may include removal of trees within the project study area for the creation or maintenance of stormwater detention areas. Prior to tree removal, RS&H Iowa, P.C. will evaluate alternatives for avoidance or minimization of impact to the identified T&E bat habitat.

It is Foth's opinion that the Proposed Action will not likely result in a direct adverse effect, but may result in indirect adverse effects to the Indiana bat and/or Northern long-eared bat. However, the impacts can be adequately assessed and conservation measures can be designed to minimize those effects. RS&H Iowa, P.C. is proposing to reduce the potential for effects to the Indiana bat and Northern long-eared bat by removal of any trees that were identified as suitable habitat between October 31 and April 1, outside of the maternal season of the bats. It is Foth's opinion that there will be no effect to the least tern, prairie bush clover, Western prairie fringed orchid, or migratory birds as a result of the Proposed Action.



List of Abbreviations, Acronyms, and Symbols

dbh	diameter breast height
Foth	Foth Infrastructure & Environment, LLC
IDNR	Iowa Department of Natural Resources
T&E	Threatened and Endangered
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WUS	Waters of the United States

1 Introduction

Foth Infrastructure & Environment, LLC (Foth) has prepared this Biological Resources Field Survey for the project study area for RS&H Iowa, P.C. on behalf of the Des Moines International Airport. The purpose of the assessment was to evaluate whether the project study area contains suitable habitat for federally-listed T&E species and to assess the potential for adverse effects from the Proposed Action. The project study area covers approximately 850 acres and is located in Sections 29, 30, 31 and 32, Township 78 North, Range 24 West, Des Moines, Polk County, Iowa as depicted on Figure 1. An aerial photograph of the project study area can be seen on Figure 2.

2 Agency Consultation

Foth requested input from the Iowa Department of Natural Resources (IDNR) and U.S. Fish and Wildlife Service (USFWS) regarding potential threatened & endangered (T&E) species issues that may result from the Proposed Action. In an email dated July 6, 2018, the IDNR indicated that they had no site-specific records of rare species or significant natural communities in the project study area that would be affected by the Proposed Action. A copy of the IDNR email can be found in Appendix A.

Foth requested an official list of T&E Species from the USFWS for the project study area. In a response dated June 19, 2018, the USFWS identified five T&E species that may be present within Polk County, as documented in Appendix A. The habitat of the five T&E species are summarized on the following table.

Table 2-1 – Federally Listed T&E Species

Group	Name	Status	Habitat
Bird	Least tern (<i>Sterna antillarum</i>)	Endangered	Barren river sandbars (USFWS, 2013)
Flowering Plant	Prairie bush clover (<i>Lespedeza leptostachya</i>)	Threatened	Native prairie areas and pastures (Iowa Department of Agriculture and Land Stewardship)
Flowering Plant	Western prairie fringed orchid (<i>Platanthera praeclara</i>)	Threatened	Wet prairie and sedge meadows (USFWS, 2014)
Mammal	Indiana bat (<i>Myotis sodalis</i>)	Endangered	Peeling bark of dead and dying trees. (USFWS, 2018)
Mammal	Northern long-eared bat (<i>Myotis septentrionalis</i>)	Threatened	Underneath bark, in cavities, or in crevices of both live and dead trees (USFWS, 2014)

(USFWS, 2018)

3 Map Observation

Foth reviewed map and aerial photograph resources to evaluate potential habitat features in the project study area. The 2017, 1990s and 1930s aerial photographs of the project study area can be seen as Figures 2, 3, and 4. Additional historic aerials were reviewed but have not been included in this report (Iowa State University, 2018) (Google Earth, 2018); copies of historic aerials can be provided upon request.

The current airport runways, terminal building and supporting areas are present on the 2017 through 2004 aerial photographs. Changes to the runway lengths, the location of Army Post Road, and paved areas within the airport appear to have changed in the 1990s, 2002, and 2004 aerials. The terminal and runway appear to have changed again in the 1960s aerial and in the 1930s aerial. In each of the historic aerials, the areas surrounding the runways, aprons and terminal buildings appear to have been significantly disturbed by grading to create a level airfield. A pond appears to have been constructed east of the terminal building prior to the 1950s aerial. The southwest quadrant of the project study area appears to have been farmed in the 2017 through 1930s aerials. Drainage features were apparent throughout the farmed areas on each of the historic aerial photos.

The 1930s aerial photograph, Figure 4, was reviewed to identify if current forested areas in the project study area were present approximately 75 years ago. If wooded areas evident in the 1930s aerial are still present within the project study area, those areas would be more likely to contain dead or dying trees with potential roosting cavities or exfoliating bark. A majority of the farmed area appeared to lack tree growth in the 1930s aerial. Some trees were apparent near the southeast corner of the project study area associated with residential properties or farmsteads; those trees were removed during the re-configuration of Army Post Road prior to 2002. The drainage features appeared to be predominantly farmed until the 1970s. Tree growth within the drainage features became more prevalent after the 1990s aerial, as shown on Figure 3. Based on aerial photograph observations, the wooded areas within the project study area would not be considered mature forest.

The historic disturbances from farming and airport maintenance practices make it unlikely for native prairie and/or native wetland areas to be present within the project study area.

4 T&E Bat Habitat Evaluation

According to the USFWS 2018 Range-Wide Indiana Bat Summer Survey Guidelines (USFWS, 2018) suitable summer habitat for Indiana bats consists of a wide variety of forested and wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags greater than or equal to five inches diameter breast height (dbh) that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet of other forested and wooded habitat.

Suitable summer habitat for Northern long-eared bat consists of a wide variety of forested and wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures (USFWS, 2018). This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags greater than or equal to three inches dbh that have exfoliating bark, cracks, crevices, and/or cavities), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit characteristics of suitable roost trees and are within 1,000-feet of other forested and wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat. Northern long-eared bats typically occupy their summer habitat from mid-May through mid-August each year and the species may arrive or leave some time before or after this period.

4.1 Survey Methods

Foth evaluated whether the trees within the project study area may be suitable habitat for the Indiana bat and/or Northern long-eared bat based on the USFWS 2018 Range-Wide Indiana Bat Summer Survey Guidelines (USFWS, 2018). Foth performed an Initial Project Screening, as described in the guidance. Foth reviewed topographic and aerial photograph resources to evaluate landscape features within a five-mile radius of the project study area. A summary of our map observations can be found on the Indiana Bat Habitat Assessment Datasheet in Appendix B.

Following the guidelines, forests and woodlots would be evaluated for potential roosts, including live trees and/or snags greater than five inches dbh that had exfoliating bark, cracks, crevices, and/or hollows. Trees without these characteristics would not be considered potential suitable Indiana bat roost trees. Observed live trees would be placed into one of the following size categories: small (three to eight inches dbh), medium (nine to fifteen inches dbh), large (greater than fifteen inches dbh); however, only trees exhibiting exfoliating bark, cracks, crevices or hollows would be noted as potential suitable roost trees.

According to the USFWS guidance, if suitable summer habitat is absent, no further summer surveys are necessary; however, the client should coordinate with the USFWS regarding the findings. If suitable summer habitat is identified, the potential for adverse effects to Indiana bats and/or Northern long-eared bats should be assessed.

4.2 Field Observations

As summarized on the Indiana Bat Habitat Assessment Datasheet in Appendix B, a majority of the project study area has been affected by grading to create the airport, terminal and supporting features. Two wooded drainageways are located in the southwest quadrant of the project study area. There is not a continuous connection between the wooded areas in the project study area and off-site forested areas. The land surrounding the project study area is primarily residential, commercial, airport runways or farm ground.

During the site visit, Foth selected sample sites that were representative of the surrounding area or areas where potential habitat trees were observed. The locations of the sample sites can be seen on Figure 2 and a summary of our findings can be found on the Indiana Bat Habitat Assessment Datasheets in Appendix B. Photographs showing the site conditions and representative trees can be seen in Appendix C and the photograph locations are shown on Figures 2A through 2C.

The following tables summarize the finding of the habitat evaluation.

Table 4-1 – Habitat Sample Site Summary

Sample Site No.	% Trees with Exfoliating Bark	No. of Suitable Snags	Snag Size (inches)	Suitability for T&E bats?
1	3%	0	--	No
2	3%	0	--	No
3	1%	0	--	No
4	0	0	--	No
5	1%	0	--	No
6	2%	0	--	No
7	5%	2	9-15	Low
8	0	0	--	No
9	3%	2	9-15	Low
10	2%	1	>15	Low
11	2%	0	--	No
12	3%	0	--	No
13	0	0	--	No
14	1%	0	--	No
15	2%	0	--	No

Prepared by: ESM
Checked by: RPB

Table 4-2 – Summary of Sample Sites with Suitable Habitat

Suitable Habitat Sample Sites and Snags by Snag Size				
Suitable Habitat Sample Site No.	3-8 inches	9-15 inches	>15 inches	Total
7	0	2	0	2
9	0	2	0	2
10	0	0	1	1
Total	0	4	1	5

Prepared by: ESM
Checked by: RPB

As summarized above, three suitable habitat sites were identified within the project study area. The sites were determined to be suitable based on tree density, number of suitable snags within medium to large sized trees, and association with a nearby waterbody. The suitable habitat sites are identified on Figures 2A through 2C. The suitability of each site was low based on the limited number of snags observed within each site and the condition of the bark. Additional comments about the condition of the bark on the identified trees can be found on the datasheets in Appendix B.

5 T&E Plant Habitat Evaluation

During a site visit in May 2018, Foth observed that the majority of the project study area was disturbed by the airport and its associated operations. The ditches and low-lying areas adjacent to the runways and aprons were historically graded and artificially manipulated during construction of the runways and supporting apron areas. The ditches are regularly mowed and maintained to avoid the creation of hazardous wildlife attractants. The southwest quadrant of the project study area has historically been farmland and contains two wooded drainageways. The project study area did not contain apparent native prairie or native wetland areas that would be suitable habitat for the prairie bush clover or Western prairie fringed orchid.

6 T&E Bird Habitat Evaluation

Waters of the United States (WUS) WUS-1 is a perennial water source, but did not appear to be suitable habitat for the least tern because of its size and lack of barren river sandbars.

7 Migratory Birds

In a response dated June 19, 2018, the USFWS indicated that there are no migratory birds of concern within the vicinity of the project study area (see Appendix A).

8 Summary of Field Observations

During the site visit, Foth observed three sites of trees with loose and peeling bark or hollows/crevices that may be suitable habitat for the Indiana bat or Northern long-eared bat.

Sample Sites 7, 9 and 10 are located within wooded drainageways in the central portion of the project study area. Sites 7 and 9 appeared to have some tree growth on the 1990s aerial, but no trees were apparent on the 1930s aerial. Site 10 did not have tree growth in the 1930s aerial and mature trees were not apparent on the 1990s aerial. The suitable habitat trees within the project study area had a limited number of branches with loose or peeling bark. The remaining sample sites did not contain suitable habitat due to size of trees and the lack of suitable snags. The overall suitability of the project study area for T&E bat habitat is low.

Suitable habitat for the prairie bush clover or Western prairie fringed orchid is not present within the project study area due to historic farming practices, maintenance of the airport facilities, and the lack of native prairie and native wetland areas. Suitable habitat for the least tern was also not present within the project study area due to the lack of barren river sandbars. The USFWS indicated that there are no migratory birds of concern within the vicinity of the project study area.

The Proposed Action may include removal of trees within the project study area for the creation or maintenance of stormwater detention areas. Prior to tree removal, RS&H Iowa, P.C. will evaluate alternatives for avoidance or minimization of impact to the identified T&E bat habitat.

9 Recommendations

It is Foth's opinion that the Proposed Action will not likely result in a direct adverse effect, but may result in indirect adverse effects, to the Indiana bat and/or Northern long-eared bat. However, the effects can be adequately assessed and conservation measures can be designed to minimize those effects. RS&H Iowa, P.C. is proposing to reduce the potential for effects to the Indiana bat and Northern long-eared bat by removal of any trees that were identified as suitable habitat between October 31 and April 1, outside of the maternal season of the bats. It is Foth's opinion that there will be no effect to the least tern, prairie bush clover, Western prairie fringed orchid, or migratory birds as a result of the Proposed Action.

At this time, we are requesting concurrence from the USFWS regarding the proposed project. This report is part of an Environmental Assessment for the Replacement Terminal project and documentation of the potential effect to biological resources is critical for the advancement of the project through that process. In order to avoid delays in the process, Foth is requesting that the USFWS respond by August 30, 2018.

10 General Comments

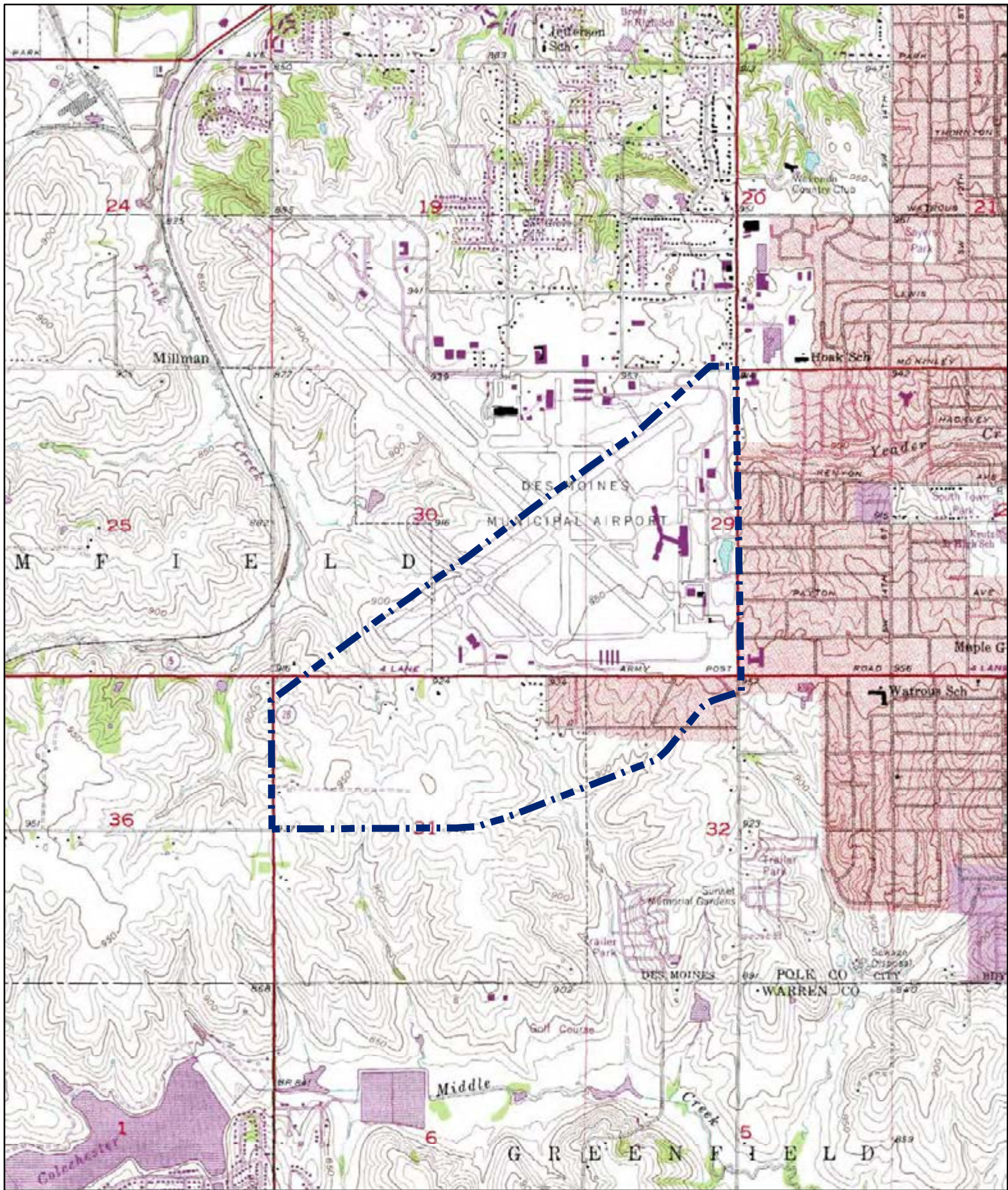
The Biological Resources Field Survey was conducted based on USFWS criteria and habitat data described in this report. Foth's scope of services only included assessment and potential identification of federally-listed T&E species; our assessment did not include the identification of state-listed T&E species. The USFWS guidance provided assistance for identifying potential Indiana bat and/or Northern long-eared bat; however, this guidance alone may not satisfy requirements by all agencies for a threatened and endangered species habitat assessment. Foth did not attempt to identify every possible tree or plant species within the project study area. The limitations of this field survey should be recognized. This report has been prepared in accordance with generally accepted scientific and engineering evaluation practices. This report is

for the exclusive use of the client for the project being discussed. No warranties, either expressed or implied, are intended or made.

11 References

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- USFWS. (2018, May 30). *Find Endangered Species*. Retrieved June 4, 2018, from <http://www.fws.gov/endangered/>

Figures



Source: MAPPING IMAGERY COURTESY OF THE NATURAL RESOURCES GEOGRAPHIC INFORMATION SYSTEMS LIBRARY - <http://www.igsb.uiowa.edu/nrgislib/>

Legend

 Project Study Area

0 3,000 6,000 Feet



Figure 1 USGS Topographic Map



Source: MAPPING IMAGERY COURTESY OF THE NATURAL RESOURCES GEOGRAPHIC INFORMATION SYSTEMS LIBRARY - <http://www.igsb.uiowa.edu/nrgislibx/>

Legend

Bat Habitat Suitability

- Not Suitable
- Low

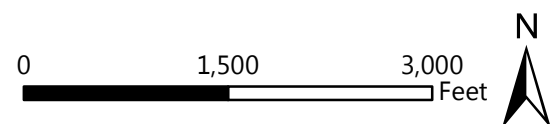
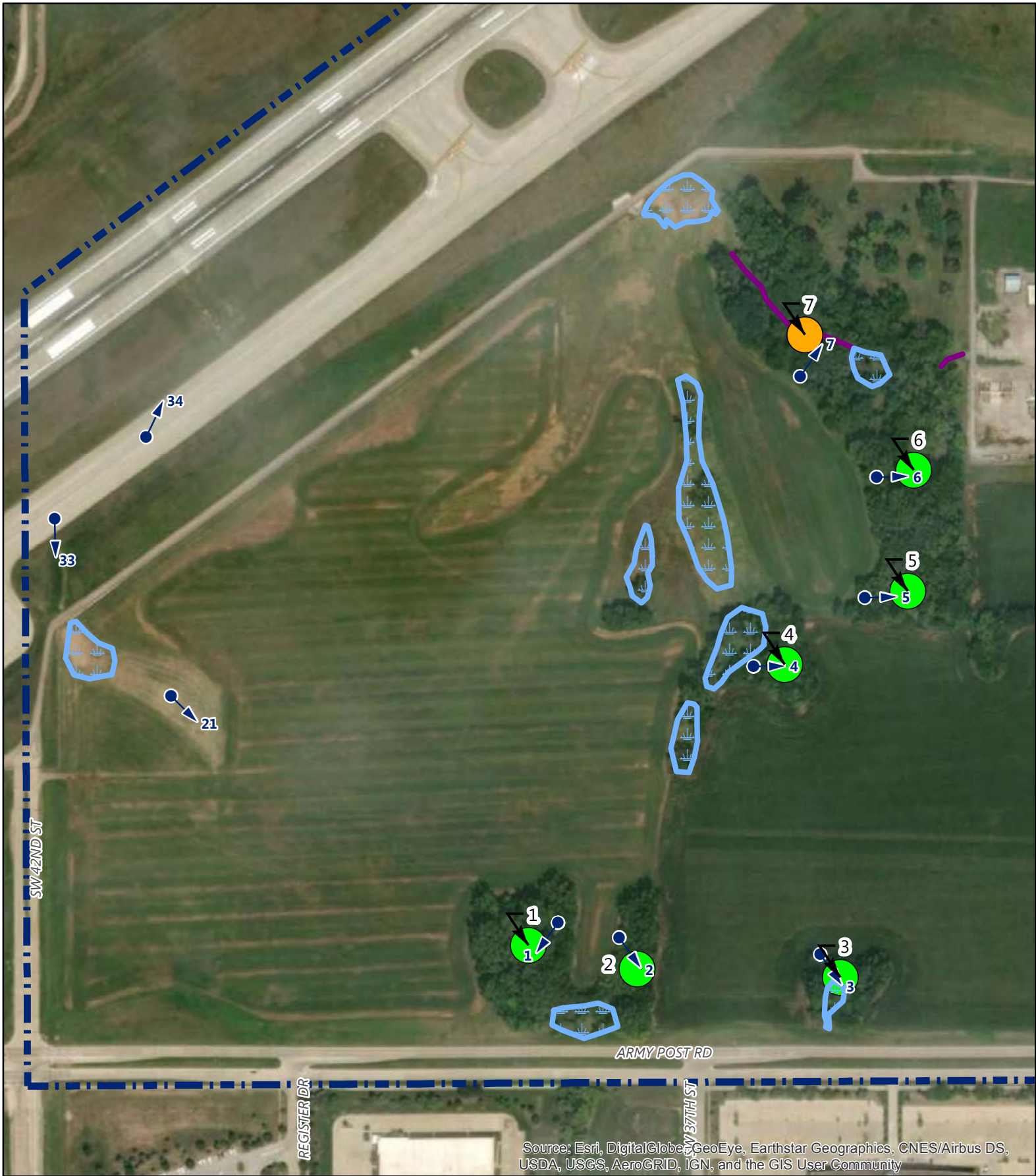
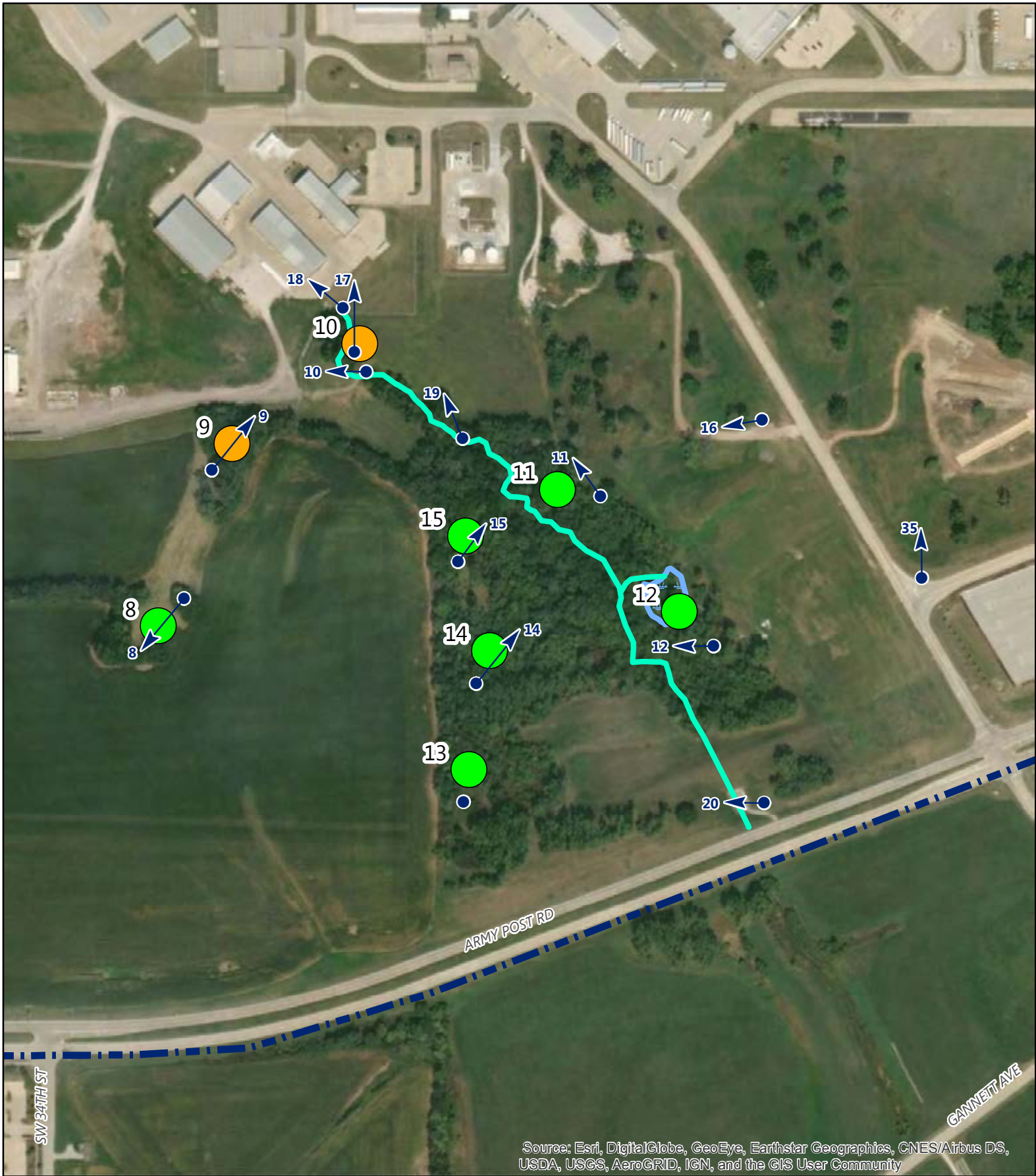


Figure 2 Habitat Assessment Map








Source: MAPPING IMAGERY COURTESY OF THE NATURAL RESOURCES GEOGRAPHIC INFORMATION SYSTEMS LIBRARY - <http://www.igsb.uiowa.edu/nrgislibx/>





Source: MAPPING IMAGERY COURTESY OF THE NATURAL RESOURCES GEOGRAPHIC INFORMATION SYSTEMS LIBRARY - <http://www.igsb.uiowa.edu/nrgislibx/>

Legend

-  Wetland
-  WUS
-  Photo Location/Direction
- Bat Habitat Suitability**
-  Not Suitable
-  Low

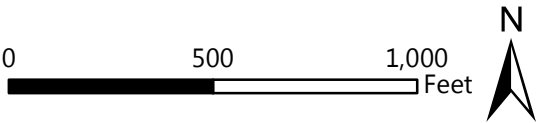


Figure 2B Habitat Assessment Map



Source: MAPPING IMAGERY COURTESY OF THE NATURAL RESOURCES GEOGRAPHIC INFORMATION SYSTEMS LIBRARY - <http://www.igsb.uiowa.edu/nrgislibx/>

Legend

WUS

Bat Habitat Suitability

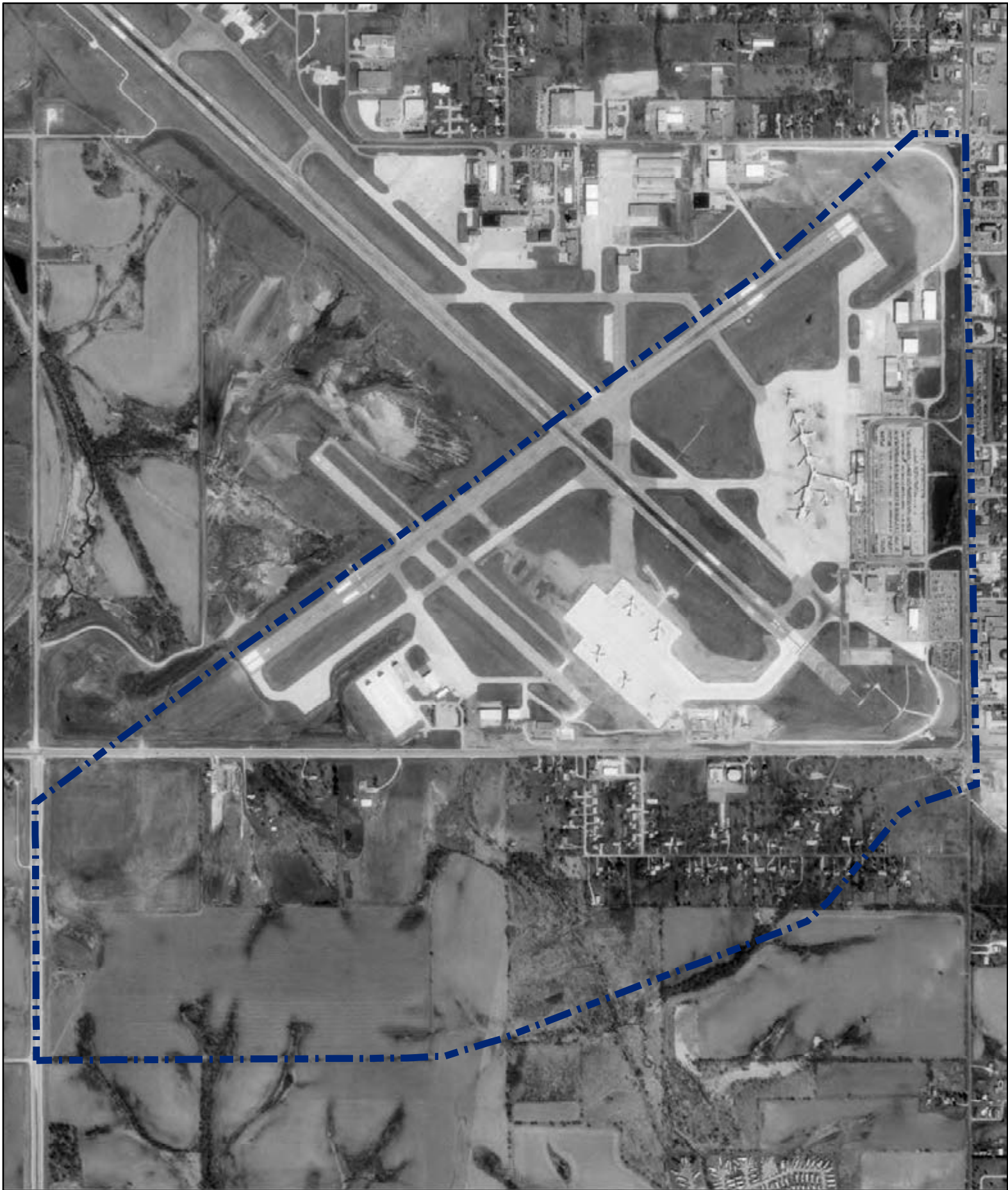
Low

Not Suitable

Photo Location/Direction

0 1,000 2,000 Feet

Figure 2C Habitat Assessment Map



Source: MAPPING IMAGERY COURTESY OF THE NATURAL RESOURCES GEOGRAPHIC INFORMATION SYSTEMS LIBRARY - <http://www.igsb.uiowa.edu/nrgislib/>

Legend

 Project Study Area

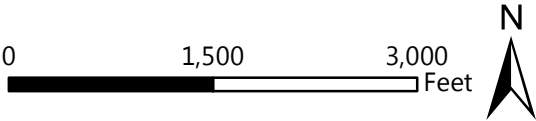


Figure 3 1990s Aerial Mapping



Source: MAPPING IMAGERY COURTESY OF THE NATURAL RESOURCES GEOGRAPHIC INFORMATION SYSTEMS LIBRARY - <http://www.igsb.uiowa.edu/nrgislibx/>

Legend

 Project Study Area

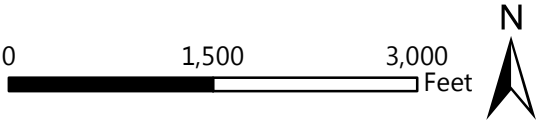


Figure 4 1930s Aerial Mapping

Appendix A

Agency Consultation

Moritz, Eva S

From: colleen.conroy@dnr.iowa.gov on behalf of DNR Sov Land and Env Review
<sler@dnr.iowa.gov>
Sent: Friday, July 06, 2018 2:47 PM
To: Moritz, Eva S
Cc: Stacey Sipe; Unknown Unknown
Subject: (SL 15705) Re: Des Moines International Airport Consultation Request
Attachments: image001.png; image001.png

Airport Terminal
Polk County
Section 29-32, Township 78 N, Range 24W

Thank you for inviting Department comment on the impact of this project. The Department has searched for records of rare species and significant natural communities in the project area and found no site-specific records that would be impacted by this project. However, these records and data are not the result of thorough field surveys. If listed species or rare communities are found during the planning or construction phases, additional studies and/or mitigation may be required.

This letter is a record of review for protected species, rare natural communities, state lands and waters in the project area, including review by personnel representing state parks, preserves, recreation areas, fisheries and wildlife but does not include comment from the Environmental Services Division of this Department. This letter does not constitute a permit. Other permits may be required from the Department or other state or federal agencies before work begins on this project.

Please reference the following DNR Environmental Review/Sovereign Land Program tracking number assigned to this project in all future correspondence related to this project: 15705.

If you have questions about this letter or require further information, please contact me at (515) 725-8464.

Environmental Review requests can be submitted electronically to: SLER@dnr.iowa.gov.



Seth Moore | Environmental Specialist
Iowa Department of Natural Resources
P 515-725-8464 | F 515-725-8201
502 E 9th St, Des Moines, IA 50319
www.iowadnr.gov

On Thu, Jun 7, 2018 at 1:01 PM Moritz, Eva S <Eva.Moritz@foth.com> wrote:

Eva Moritz, Environmental Engineer

Foth Infrastructure & Environment, LLC

8191 Birchwood Court, Suite L

Johnston, IA 50131

Ph: (515) 254-1393 / Fax: (515) 254-1642

Direct: (515) 251-2524 / Cell: (515) 210-6302

www.foth.com



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United States Department of the Interior



FISH AND WILDLIFE SERVICE
Illinois-Iowa Ecological Services Field Office
Illinois & Iowa Ecological Services Field Office
1511 47th Ave
Moline, IL 61265-7022
Phone: (309) 757-5800 Fax: (309) 757-5807

In Reply Refer To:

June 19, 2018

Consultation Code: 03E18000-2018-SLI-1296

Event Code: 03E18000-2018-E-02837

Project Name: Replacement Terminal Project - Des Moines International Airport

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The attached species list identifies any federally threatened, endangered, proposed and candidate species that may occur within the boundary of your proposed project or may be affected by your proposed project. The list also includes designated critical habitat if present within your proposed project area or affected by your project. This list is provided to you as the initial step of the consultation process required under section 7(c) of the Endangered Species Act, also referred to as Section 7 Consultation.

Section 7 of the Endangered Species Act of 1973 requires that actions authorized, funded, or carried out by Federal agencies not jeopardize federally threatened or endangered species or adversely modify designated critical habitat. To fulfill this mandate, Federal agencies (or their designated non-federal representative) must consult with the Service if they determine their project "may affect" listed species or critical habitat.

Under 50 CFR 402.12(e) (the regulations that implement Section 7 of the Endangered Species Act) the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally. You may verify the list by visiting the ECOS-IPaC website <http://ecos.fws.gov/ipac/> at regular intervals during project planning and implementation and completing the same process you used to receive the attached list. As an alternative, you may contact this Ecological Services Field Office for updates.

Please use the species list provided and visit the U.S. Fish and Wildlife Service's Region 3 Section 7 Technical Assistance website at - <http://www.fws.gov/midwest/endangered/section7/s7process/index.html>. This website contains step-by-step instructions which will help you

determine if your project will have an adverse effect on listed species and will help lead you through the Section 7 process.

For all wind energy projects and projects that include installing towers that use guy wires or are over 200 feet in height, please contact this field office directly for assistance, even if no federally listed plants, animals or critical habitat are present within your proposed project or may be affected by your proposed project.

Although no longer protected under the Endangered Species Act, be aware that bald eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.) and Migratory Bird Treaty Act (16 U.S.C. 703 et seq), as are golden eagles. Projects affecting these species may require measures to avoid harming eagles or may require a permit. If your project is near an eagle nest or winter roost area, see our Eagle Permits website at <http://www.fws.gov/midwest/midwestbird/EaglePermits/index.html> to help you determine if you can avoid impacting eagles or if a permit may be necessary.

We appreciate your concern for threatened and endangered species. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
 - USFWS National Wildlife Refuges and Fish Hatcheries
 - Migratory Birds
 - Wetlands
-

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Illinois-Iowa Ecological Services Field Office
Illinois & Iowa Ecological Services Field Office
1511 47th Ave
Moline, IL 61265-7022
(309) 757-5800

Project Summary

Consultation Code: 03E18000-2018-SLI-1296

Event Code: 03E18000-2018-E-02837

Project Name: Replacement Terminal Project - Des Moines International Airport

Project Type: TRANSPORTATION

Project Description: The study is part of an Environmental Assessment for a replacement terminal and supporting projects at the airport.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/41.53021954470205N93.65514296420562W>



Counties: Polk, IA

Endangered Species Act Species

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Indiana Bat <i>Myotis sodalis</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Birds

NAME	STATUS
Least Tern <i>Sterna antillarum</i> Population: interior pop. No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8505	Endangered

Flowering Plants

NAME	STATUS
Prairie Bush-clover <i>Lespedeza leptostachya</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4458	Threatened
Western Prairie Fringed Orchid <i>Platanthera praeclara</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1669	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

-
1. The [Migratory Birds Treaty Act](#) of 1918.
 2. The [Bald and Golden Eagle Protection Act](#) of 1940.
 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

THERE ARE NO FWS MIGRATORY BIRDS OF CONCERN WITHIN THE VICINITY OF YOUR PROJECT AREA.

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) and/or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [E-bird Explore Data Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ “Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds” at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER EMERGENT WETLAND

- [PEM1Cx](#)

FRESHWATER POND

- [PUBGx](#)

RIVERINE

- [R4SBC](#)
-

Appendix B
Indiana Bat Habitat Assessment Datasheets

Indiana Bat Habitat Assessment Datasheet

Project Name: Replacement Terminal Date: 05/29/18
Section, Township, Range: Sections 29, 30, 31 and 32, Township 78 North, Range 24 West
Lat, Long: 41.52040433 -93.66910738 Surveyor: KRG
UTM/Zone: 15

Brief Project Description

This report was prepared as part of an Environmental Assessment for the Replacement Terminal project.

Project Area

Project	Total Acres	Forest Acres	Open Acres
	850	Approximately 35	815
Proposed Tree Removal (ac)	Completely cleared	Partially cleared (will leave trees)	Preserve acres (no clearing)
	Unknown	Unknown	Unknown

Vegetation Cover Types

Pre-Project	Post-Project
A majority of the project study area has been impacted by grading to create the airport, terminal and supporting features. Two treed drainageways are located in the southwest quadrant of the project study area.	Unknown

Landscape within 5 mile radius (Iowa State University, 2017) (Google Earth, 2017)

Flight Corridors to other forested areas?

There is not a continuous connection between the wooded areas in the project study area and off-site forested areas.

Describe Adjacent Properties (e.g. forested, grassland, commercial, or residential development, water sources)

The area east of the project study area is residential. Areas to the north are commercial/airport support and residential. The land west and northwest of the project study area is associated with the airport or is farm ground. A wooded riparian corridor is present adjacent to Frink Creek west of the project study area. A commercial area, Army Post Road and a golf course are located south of the project study area.

Proximity to Public Land

What distance (mi.) from the project area to forested public lands (e.g. national or state forests, national or state parks, conservation lands, wildlife management areas)?

- There are no state forests within Polk County (IDNR, 2011). Big Creek State Park and Walnut Woods State Park are located within Polk County (IDNR, No Date a). Walnut Woods State Park is located approximately 3 miles west of the project study area and Big Creek State Park is located over 18 miles north/northwest of the project study area.
- There are no State Preserves in Polk County (IDNR, No Date b)
- There are five Wildlife Management areas in Polk County. Each of the areas appears to be greater than five miles from the project study area (IDNR, No Date c).
- There is one Bird Conservation Areas in Polk County; however, it appears to be greater than five miles from the project study area (IDNR, No Date d)
- There are no national parks within Polk County (National Park Service, No Date). There are no national forests in Iowa (U.S. Forest Service, No Date).

Prepared by: ESM

Checked by: RPB

Works Cited

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- Iowa State University. (2017). *Iowa State University Geographic Information Systems Support & Research Facility*. Retrieved from GISU: <http://ortho.gis.iastate.edu/>
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<http://www.nps.gov/state/ia/index.htm>
- U.S. Forest Service. (No Date). *Find a Forest or Grassland*. Retrieved June 26, 2018, from
<http://www.fs.fed.us/>

Site 1

Sample Site Description	
Sample Site No.(s):	1
Latitude, Longitude:	41.52040433 -93.66910738

Water Resources at Site			
Stream Type (# and length)	Ephemeral	Intermittent	Perennial
	--	--	--
Pools/Ponds (# and size)	--	Open and accessible to bats?	
		--	
Wetlands (approx. ac.)	Permanent	Seasonal	
	Wetland 1 0.29 acres	--	

Describe existing condition of water sources:
Site 1 is located in a wooded upland drainageway near Wetland 1

Forest Resources at Sample Site			
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	41-60%	61-80%	21-40%
Dominant Species of Mature Trees	Cottonwood, Box Elder, Silver Maple		
% Trees with Exfoliating Bark	1%	2%	0%
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)
	30%	40%	30%
No. of Suitable Snags	0	0	0

Standing dead trees with exfoliating bark, cracks, crevices or hollows.
Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS?

No

Additional Comments:

Prepared by: ESM

Checked by: RPB

Site 2

Sample Site Description	
Sample Site No.(s):	2
Latitude, Longitude:	41.52022403 -93.66800256

Water Resources at Site			
Stream Type (# and length)	Ephemeral	Intermittent	Perennial
	--	--	--
Pools/Ponds (# and size)	--	Open and accessible to bats?	
		--	
Wetlands (approx. ac.)	Permanent	Seasonal	
	Wetland 1 0.29 acres	--	

Describe existing condition of water sources:
Site 2 is located in a wooded upland drainageway near Wetland 1

Forest Resources at Sample Site			
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	1-10%	81-100%	21-40%
Dominant Species of Mature Trees	Box Elder, Cottonwood, Silver Maple		
% Trees with Exfoliating Bark	1%	1%	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)
	60%	30%	10%
No. of Suitable Snags	0	0	0

Standing dead trees with exfoliating bark, cracks, crevices or hollows.
Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS?

No

Additional Comments:

Young tree stand.

Prepared by: ESM

Checked by: RPB

Site 3

Sample Site Description			
Sample Site No.(s):	3		
Latitude, Longitude:	41.5201588	-93.66592983	

Water Resources at Site			
Stream Type (# and length)	Ephemeral	Intermittent	Perennial
	--	--	--
Pools/Ponds (# and size)	--	Open and accessible to bats?	
		--	
Wetlands (approx. ac.)	Permanent	Seasonal	
	Wetland 2 0.08 acres	--	

Describe existing condition of water sources:
Site 3 is located in a wooded upland drainageway near Wetland 2

Forest Resources at Sample Site			
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	11-20%	61-80%	11-20%
Dominant Species of Mature Trees	Willow, Cottonwood, Mulberry, Basswood		
% Trees with Exfoliating Bark	0	1%	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)
	20%	60%	20%
No. of Suitable Snags	0	0	0

Standing dead trees with exfoliating bark, cracks, crevices or hollows.
Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS?

No

Additional Comments:

Prepared by: ESM

Checked by: RPB

Site 4

Sample Site Description	
Sample Site No.(s):	4
Latitude, Longitude:	41.52254561 -93.66649565

Water Resources at Site				Describe existing condition of water sources: Site 4 is located in a wooded upland drainageway near Wetland 4
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	
	--	--	--	
Pools/Ponds (# and size)	--	Open and accessible to bats?		
		--		
Wetlands (approx. ac.)	Permanent	Seasonal		
	Wetland 4 0.46 acres	--		

Forest Resources at Sample Site			
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	0	61-80%	11-20%
Dominant Species of Mature Trees	Box Elder, Cottonwood, Mulberry		
% Trees with Exfoliating Bark	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)
	20%	80%	0
No. of Suitable Snags	0	0	0

Standing dead trees with exfoliating bark, cracks, crevices or hollows.
Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS?

No

Additional Comments:

Young tree stand

Prepared by: ESM

Checked by: RPB

Site 5

Sample Site Description			
Sample Site No.(s):	5		
Latitude, Longitude:	41.52310452	-93.66524137	

Water Resources at Site					Describe existing condition of water sources: Site 5 is located in a wooded upland drainageway. The site was not located near wetlands or streams.
Stream Type (# and length)	Ephemeral	Intermittent	Perennial		
	--	--	--		
Pools/Ponds (# and size)	--	Open and accessible to bats?			
		--			
Wetlands (approx. ac.)	Permanent	Seasonal			
	--	--			

Forest Resources at Sample Site			
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	11-20%	40-60%	11-20%
Dominant Species of Mature Trees	Basswood, Box Elder, Mulberry		
% Trees with Exfoliating Bark	0	0	1%
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)
	10%	80%	10%
No. of Suitable Snags	0	0	0

Standing dead trees with exfoliating bark, cracks, crevices or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments:	
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Prepared by:	ESM
Checked by:	RPB

Site 6

Sample Site Description	
Sample Site No.(s):	6
Latitude, Longitude:	41.52402554 -93.66518319

Water Resources at Site				Describe existing condition of water sources: Site 6 is located in a wooded upland drainageway. The site was not located near wetlands or streams.
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	
	--	--	--	
Pools/Ponds (# and size)	--	Open and accessible to bats?		
		--		
Wetlands (approx. ac.)	Permanent	Seasonal		
	--	--		

Forest Resources at Sample Site			
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	11-20%	21-40%	11-20%
Dominant Species of Mature Trees	Cottonwood, Silver Maple, American Elm		
% Trees with Exfoliating Bark	2%	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)
	10%	30%	60%
No. of Suitable Snags	0	0	0

Standing dead trees with exfoliating bark, cracks, crevices or hollows.
Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments:

One snag visible was present on a dying >15 inch dbh Eastern cottonwood tree. The snag was approximately 20 feet above ground level and consisted of a mostly bare dead branch with some peeling bark. The dead branch was approximately 10 inches diameter. Because a majority of the branch was bare, it would not be considered a suitable snag.

Prepared by: ESM
Checked by: RPB

Site 7

Sample Site Description	
Sample Site No.(s):	7
Latitude, Longitude:	41.52505859 -93.66629024

Water Resources at Site			
Stream Type (# and length)	Ephemeral	Intermittent	Perennial
	EF-1 450 feet	--	--
Pools/Ponds (# and size)	--	Open and accessible to bats?	
		--	
Wetlands (approx. ac.)	Permanent	Seasonal	
	Wetland 8 0.17 acres	--	

Describe existing condition of water sources:
Site 7 is located in a wooded drainageway near Erosional Feature EF-1 and Wetland 8

Forest Resources at Sample Site			
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	21-40%	41-60%	11-20%
Dominant Species of Mature Trees	Cottonwood, Black Walnut, Mulberry, Box Elder		
% Trees with Exfoliating Bark	0	5%	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)
	20%	50%	20%
No. of Suitable Snags	0	2	0

Standing dead trees with exfoliating bark, cracks, crevices or hollows.
Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS?

Low

Additional Comments:

Two dead trees appeared to have hollow trunks with dead branches with peeling bark (diameters of 8 inches and 10 inches). The dead branches were approximately 15 feet above ground level.

Prepared by: ESM

Checked by: RPB

Site 8

Sample Site Description			
Sample Site No.(s):	8		
Latitude, Longitude:	41.52265391 -93.66229012		

Water Resources at Site			
Stream Type (# and length)	Ephemeral	Intermittent	Perennial
	--	--	--
Pools/Ponds (# and size)	--	Open and accessible to bats?	
		--	
Wetlands (approx. ac.)	Permanent	Seasonal	
	--	--	

Describe existing condition of water sources:
Site 8 is located in an upland drainageway with a riparian fringe. The site was not located near wetlands or streams.

Forest Resources at Sample Site			
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	1-10%	11-20%	1-10%
Dominant Species of Mature Trees	Mulberry, Crabapple, Cottonwood		
% Trees with Exfoliating Bark	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)
	10%	80%	10%
No. of Suitable Snags	0	0	0

Standing dead trees with exfoliating bark, cracks, crevices or hollows.
Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS?

No

Additional Comments:

Sparse tree coverage in this sample site.

Prepared by: ESM

Checked by: RPB

Site 9

Sample Site Description	
Sample Site No.(s):	9
Latitude, Longitude:	41.52404206 -93.66153711

Water Resources at Site				Describe existing condition of water sources: Site 9 is located in a wooded upland drainageway. The site was not located near wetlands or streams.
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	
	--	--	--	
Pools/Ponds (# and size)	--	Open and accessible to bats?		
		--		
Wetlands (approx. ac.)	Permanent	Seasonal		
	--	--		

Forest Resources at Sample Site			
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	21-40%	41-60%	21-40%
Dominant Species of Mature Trees	Cottonwood, Mulberry, Willow		
% Trees with Exfoliating Bark	1%	2%	0%
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)
	20%	60%	20%
No. of Suitable Snags	0	2	0

Standing dead trees with exfoliating bark, cracks, crevices or hollows.
Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS?

Low

Additional Comments:

There was a medium to large stand of Eastern cottonwood and willow trees. Several dying branches were present on two mid-sized cottonwood trees. The snags were approximately 20 to 25 feet above ground level and were 8 to 10 inches diameter with some peeling bark.

Prepared by: ESM

Checked by: RPB

Site 10

Sample Site Description			
Sample Site No.(s):	10		
Latitude, Longitude:	41.52480563 -93.66023788		

Water Resources at Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: Site 10 is located in a wooded drainageway near WUS-1
	--	--	WUS-1 2,140 feet	
Pools/Ponds (# and size)	--	Open and accessible to bats?		
		--		
Wetlands (approx. ac.)	Permanent	Seasonal		
	--	--		

Forest Resources at Sample Site			
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	1-10%	21-40%	1-10%
Dominant Species of Mature Trees	Willow, Mulberry, Hackberry		
% Trees with Exfoliating Bark	1%	1%	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)
	10%	70%	20%
No. of Suitable Snags	0	0	1

Standing dead trees with exfoliating bark, cracks, crevices or hollows.
Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Low

Additional Comments:

A dying willow branch was observed 10 feet above ground level. The 12 inch diameter branch had some peeling bark.

Prepared by: ESM
Checked by: RPB

Site 11

Sample Site Description			
Sample Site No.(s):	11		
Latitude, Longitude:	41.52369418	-93.658223	

Water Resources at Site				Describe existing condition of water sources: Site 11 is located in a wooded drainageway near WUS-1
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	
	--	--	WUS-1 2,140 feet	
Pools/Ponds (# and size)	--	Open and accessible to bats?		
		--		
Wetlands (approx. ac.)	Permanent	Seasonal		
	--	--		

Forest Resources at Sample Site			
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	61-80%	61-80%	41-60%
Dominant Species of Mature Trees	Black Walnut, Basswood, Green Ash		
% Trees with Exfoliating Bark	1%	0	1%
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)
	30%	40%	30%
No. of Suitable Snags	0	0	0

Standing dead trees with exfoliating bark, cracks, crevices or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments:	
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Prepared by:	ESM
Checked by:	RPB

Site 12

Sample Site Description			
Sample Site No.(s):	12		
Latitude, Longitude:	41.52276356	-93.65698018	

Water Resources at Site					Describe existing condition of water sources: Site 2 is located in a wooded drainageway near Wetland 10, WUS-1 and WUS-2
Stream Type (# and length)	Ephemeral	Intermittent	Perennial		
	WUS-2 140 feet	--	WUS-1 2,140 feet		
Pools/Ponds (# and size)	--	Open and accessible to bats?			
		--			
Wetlands (approx. ac.)	Permanent	Seasonal			
	Wetland 10 0.30	--			

Forest Resources at Sample Site			
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	1-10%	21-40%	61-80%
Dominant Species of Mature Trees	Cottonwood, Box Elder, Dogwood		
% Trees with Exfoliating Bark	0	1%	2%
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)
	40%	50%	10%
No. of Suitable Snags	0	0	0

Standing dead trees with exfoliating bark, cracks, crevices or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments:

Prepared by:	ESM
Checked by:	RPB

Site 13

Sample Site Description			
Sample Site No.(s):	13		
Latitude, Longitude:	41.52136269	-93.65874685	

Water Resources at Site				Describe existing condition of water sources: Site 13 is located in a wooded upland drainageway. The site was not located near wetlands or streams.
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	
	--	--	--	
Pools/Ponds (# and size)	--	Open and accessible to bats?		
		--		
Wetlands (approx. ac.)	Permanent	Seasonal		
	--	--		

Forest Resources at Sample Site			
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	1-10%	61-80%	41-60%
Dominant Species of Mature Trees	Cottonwood, Basswood, Dogwood		
% Trees with Exfoliating Bark	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)
	40%	50%	10%
No. of Suitable Snags	0	0	0

Standing dead trees with exfoliating bark, cracks, crevices or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments:	

Prepared by:	ESM
Checked by:	RPB

Site 14

Sample Site Description			
Sample Site No.(s):	14		
Latitude, Longitude:	41.52246531	-93.65891594	

Water Resources at Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: Site 14 is located in a wooded upland drainageway. The site was not located near wetlands or streams.
	--	--	--	
Pools/Ponds (# and size)	--	Open and accessible to bats?		
		--		
Wetlands (approx. ac.)	Permanent	Seasonal		
	--	--		

Forest Resources at Sample Site			
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	11-20%	21-40%	21-40%
Dominant Species of Mature Trees	Cottonwood, Basswood, American Elm		
% Trees with Exfoliating Bark	0	1%	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)
	65%	20%	15%
No. of Suitable Snags	0	0	0

Standing dead trees with exfoliating bark, cracks, crevices or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments:	

Prepared by:	ESM
Checked by:	RPB

Site 15

Sample Site Description	
Sample Site No.(s):	15
Latitude, Longitude:	41.52334043 -93.65916013

Water Resources at Site				Describe existing condition of water sources: Site 15 is located in a wooded upland drainageway. The site was not located near wetlands or streams.
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	
	--	--	--	
Pools/Ponds (# and size)	--	Open and accessible to bats?		
		--		
Wetlands (approx. ac.)	Permanent	Seasonal		
	--	--		

Forest Resources at Sample Site			
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	11-20%	21-40%	21-40%
Dominant Species of Mature Trees	Cottonwood, American Elm, Box Elder		
% Trees with Exfoliating Bark	1%	1%	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)
	25%	60%	15%
No. of Suitable Snags	0	0	0

Standing dead trees with exfoliating bark, cracks, crevices or hollows.
Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments:

Two cottonwood trees had dying branches approximately 20 feet above ground level. The 6 to 8 inch diameter branches were mostly bare and would not be considered suitable habitat.

Prepared by: ESM
Checked by: RPB

Appendix C

Photographic Log

Client's Name: RS&H	Site Location: Des Moines Airport Replacement Terminal	Project No. 18R009.00
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Photo No. 1	Date: 5/29/18	
Direction Photo Taken: Southwest		
Photo Taken By: Katie Goff		
Description: Sample Site 1		

Photo No. 2	Date: 5/29/18	
Direction Photo Taken: Southeast		
Photo Taken By: Katie Goff		
Description: Sample Site 2		

Client's Name: RS&H	Site Location: Des Moines Airport Replacement Terminal	Project No. 18R009.00
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Photo No. 3	Date: 5/29/18
Direction Photo Taken: Southeast	
Photo Taken By: Katie Goff	
Description: Sample Site 3	

A photograph of a dense forest. The image shows several tree trunks in the foreground and middle ground, surrounded by thick green foliage and branches. The lighting is bright, suggesting a sunny day, with sunlight filtering through the leaves. The forest appears to be a mix of deciduous and possibly some evergreen trees. The ground is covered with fallen leaves and low-lying plants.

Photo No. 4	Date: 5/29/18	
Direction Photo Taken: East		
Photo Taken By: Katie Goff		
Description: Sample Site 4		



Photographic Log

Client's Name: RS&H	Site Location: Des Moines Airport Replacement Terminal	Project No. 18R009.00
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Photo No. 5	Date: 5/29/18	
Direction Photo Taken: East		
Photo Taken By: Katie Goff		
Description: Sample Site 5		

Photo No. 6	Date: 5/29/18	
Direction Photo Taken: East		
Photo Taken By: Katie Goff		
Description: Sample Site 6		



Photographic Log

Client's Name: RS&H	Site Location: Des Moines Airport Replacement Terminal	Project No. 18R009.00
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Photo No. 7	Date: 5/29/18	
Direction Photo Taken: Northeast		
Photo Taken By: Katie Goff		
Description: Sample Site 7		

Photo No. 8	Date: 5/29/18	
Direction Photo Taken: Southwest		
Photo Taken By: Katie Goff		
Description: Sample Site 8		



Photographic Log

Client's Name: RS&H	Site Location: Des Moines Airport Replacement Terminal	Project No. 18R009.00
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Photo No. 9	Date: 5/29/18	
Direction Photo Taken: Northeast		
Photo Taken By: Katie Goff		
Description: Sample Site 9		

Photo No. 10	Date: 5/29/18
Direction Photo Taken: West	
Photo Taken By: Katie Goff	
Description: Sample Site 10	

A photograph showing a dense thicket of green trees and foliage in the foreground. In the background, a grassy field is visible, bordered by a dark fence or line of trees. The scene is brightly lit, suggesting a sunny day.

Client's Name: RS&H	Site Location: Des Moines Airport Replacement Terminal	Project No. 18R009.00
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Photo No. 11	Date: 5/29/18	
Direction Photo Taken: Northwest		
Photo Taken By: Katie Goff		
Description: Sample Site 11		


Photo No. 12	Date: 5/29/18	
Direction Photo Taken: West		
Photo Taken By: Katie Goff		
Description: Sample Site 12		



Photographic Log

Client's Name: RS&H	Site Location: Des Moines Airport Replacement Terminal	Project No. 18R009.00
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Photo No. 13	Date: 5/29/18	
Direction Photo Taken: North		
Photo Taken By: Katie Goff		
Description: Sample Site 13		

Photo No. 14	Date: 5/29/18	
Direction Photo Taken: Northeast		
Photo Taken By: Katie Goff		
Description: Sample Site 14		



Photographic Log

Client's Name: RS&H	Site Location: Des Moines Airport Replacement Terminal	Project No. 18R009.00
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Photo No. 15	Date: 5/29/18	
Direction Photo Taken: Northeast		
Photo Taken By: Katie Goff		
Description: Sample Site 15		

Photo No. 16	Date: 5/29/18
Direction Photo Taken: West	
Photo Taken By: Katie Goff	
Description: Dead tree near construction entrance	

A photograph showing a dirt road or driveway leading towards a construction site. In the center background, a large, dead tree with a hollowed-out trunk stands prominently. To the left of the road, a yellow construction vehicle, possibly a backhoe or loader, is parked. The area is grassy, and there are other trees in the background under an overcast sky. The rear of a dark-colored car is visible on the right side of the frame.

Client's Name: RS&H	Site Location: Des Moines Airport Replacement Terminal	Project No. 18R009.00
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Photo No. 17	Date: 5/9/18
Direction Photo Taken: North	
Photo Taken By: Katie Goff	
Description: WUS-1	

A photograph of a small, shallow stream flowing through a wooded area. The water is murky brown and reflects the surrounding greenery. The stream is bordered by dense green grass and trees. A fallen log lies across the stream in the foreground. The background shows more trees and a grassy field.

Photo No. 18	Date: 5/9/18
Direction Photo Taken: North	
Photo Taken By: Katie Goff	
Description: WUS-1, photo taken near airport fence at the north end of WUS-1	

A photograph showing a concrete culvert with a metal grate. The culvert is partially obscured by a large pile of rocks and debris. A chain-link fence is visible in the background, and a tree trunk is on the right side of the frame. The ground is covered with grass and some small yellow flowers.

Client's Name: RS&H	Site Location: Des Moines Airport Replacement Terminal	Project No. 18R009.00
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Photo No. 19	Date: 5/9/18	
Direction Photo Taken: North		
Photo Taken By: Katie Goff		
Description: WUS-1		

Photo No. 20	Date: 5/9/18	
Direction Photo Taken: West		
Photo Taken By: Katie Goff		
Description: WUS-1 near southern boundary of project study area		

Client's Name: RS&H	Site Location: Des Moines Airport Replacement Terminal	Project No. 18R009.00
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Photo No. 21	Date: 5/8/18	
Direction Photo Taken: East		
Photo Taken By: Katie Goff		
Description: Western portion of the project area		

Photo No. 22	Date: 5/29/18
Direction Photo Taken: South	
Photo Taken By: Katie Goff	
Description: Pond 1	

A photograph of a pond with a fountain, surrounded by trees and grass. The pond is in the center, with a small fountain spraying water into the air. The water is calm, reflecting the sky and the surrounding greenery. The pond is bordered by a strip of light-colored gravel or stones. In the foreground, there is a well-maintained green lawn. The background is filled with various types of trees, some with dense foliage and others with more sparse leaves. The sky is clear and blue, suggesting a bright, sunny day. The overall scene is peaceful and well-kept, typical of a park or a golf course.



Photographic Log

Client's Name: RS&H	Site Location: Des Moines Airport Replacement Terminal	Project No. 18R009.00
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Photo No. 23	Date: 6/20/18	
Direction Photo Taken: Northwest		
Photo Taken By: Drew Eich		
Description: Greenspace at the end of the runway		

Photo No. 24	Date: 6/20/18	
Direction Photo Taken: Northwest		
Photo Taken By: Drew Eich		
Description: Ditch between taxiway and runway		



Photographic Log

Client's Name: RS&H	Site Location: Des Moines Airport Replacement Terminal	Project No. 18R009.00
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Photo No. 25	Date: 6/20/18	
Direction Photo Taken: Southeast		
Photo Taken By: Drew Eich		
Description: Greenspace at the end of the runway		

Photo No. 26	Date: 6/20/18	
Direction Photo Taken: West		
Photo Taken By: Drew Eich		
Description: Ditch between taxiway and apron		



Photographic Log

Client's Name: RS&H	Site Location: Des Moines Airport Replacement Terminal	Project No. 18R009.00
-------------------------------	------------------------------------------------------------------	---------------------------------

Photo No. 27	Date: 6/20/18	
Direction Photo Taken: Southwest		
Photo Taken By: Drew Eich		
Description: Ditch between taxiway and runway		

Photo No. 28	Date: 6/20/18	
Direction Photo Taken: Northeast		
Photo Taken By: Drew Eich		
Description: Greenspace at the end of the runway		



Photographic Log

Client's Name: RS&H	Site Location: Des Moines Airport Replacement Terminal	Project No. 18R009.00
-------------------------------	------------------------------------------------------------------	---------------------------------

Photo No. 29	Date: 6/20/18	
Direction Photo Taken: Southwest		
Photo Taken By: Drew Eich		
Description: Greenspace at the end of the runway		

Photo No. 30	Date: 6/20/18	
Direction Photo Taken: Northeast		
Photo Taken By: Drew Eich		
Description: Ditch between apron and runway		



Photographic Log

Client's Name: RS&H	Site Location: Des Moines Airport Replacement Terminal	Project No. 18R009.00
-------------------------------	------------------------------------------------------------------	---------------------------------

Photo No. 31	Date: 6/20/18	
Direction Photo Taken: Northwest		
Photo Taken By: Drew Eich		
Description: Ditch between taxiway and apron		

Photo No. 32	Date: 6/20/18	
Direction Photo Taken: Southeast		
Photo Taken By: Drew Eich		
Description: Ditch between taxiway and runway		



Photographic Log

Client's Name: RS&H	Site Location: Des Moines Airport Replacement Terminal	Project No. 18R009.00
-------------------------------	------------------------------------------------------------------	---------------------------------

Photo No. 33	Date: 6/20/18	
Direction Photo Taken: South		
Photo Taken By: Drew Eich		
Description: Low-lying area between Wetland 9 and the taxiway		

Photo No. 34	Date: 6/20/18	
Direction Photo Taken: Northeast		
Photo Taken By: Drew Eich		
Description: Ditch between taxiway and runway		

Client's Name: RS&H	Site Location: Des Moines Airport Replacement Terminal	Project No. 18R009.00
-------------------------------	------------------------------------------------------------------	---------------------------------

Photo No. 35	Date: 6/20/18	
Direction Photo Taken: North		
Photo Taken By: Drew Eich		
Description: Upland area east of SW 28 th Street		

Photo No. 36	Date: 6/20/18	
Direction Photo Taken: North		
Photo Taken By: Drew Eich		
Description: Upland area east of SW 28 th Street		



7800 E. Union Avenue, Suite 700
Denver, Colorado 80237

☎ 303-409-7900
F 303-568-7583
rsandh.com

PHONE MEETING/CONVERSATION LOG:

RS&H Project Number:	224.1786.001
Phone Conversation Date:	August 8, 2018
Participants:	Mr. Kraig McPeck, USFWS Mrs. Eva Moritz, Foth
Subject:	DSM EA – Biological Resources Field Survey Report

Following are the minutes of this phone conversation (please review and advise of any changes):

Mr. Kraig McPeck, USFWS, called to say that they received the Biological Resources Field Survey Report. They will not be responding to our request for concurrence at this time. They will respond to our request if/when we submit a Section 404 Permit Application.

In his opinion, the bat habitat looks isolated and he isn't too concerned about it. The conservation measures we proposed for the bat species are appropriate but he would like us to consider conservation measures for the loss of bird habitat. He indicated that he didn't foresee any reasons that USFWS wouldn't concur with our findings.

Compiled By:	Eva Moritz, 515-251-2524
Distribution:	Dave Full (RS&H), Julie Barrow (RS&H), Will Davidson (RS&H), Adam Wilhelm (Foth)
File Location:	RS & H Iowa\Replacement Terminal EA\Correspondence\Phone Conversation Log\180808_Task 14.2_Coordination Call USFWS_Final.docx

From: [Moritz, Eva S](#)
To: [Barrow, Julie](#); [Davidson, William](#); [Full, David](#)
Subject: FW: [EXTERNAL] Replacement Terminal USFWS coordination
Date: Thursday, April 25, 2019 1:50:10 PM
Attachments: [image001.png](#)

Eva Moritz, PE, Lead Environmental Engineer
Licensed in Iowa
Foth Infrastructure & Environment, LLC
8191 Birchwood Court, Suite L
Johnston, IA 50131
Ph: (515) 254-1393 / Fax: (515) 254-1642
Direct: (515) 251-2524 / Cell: (515) 210-6302
www.foth.com



From: McPeck, Kraig <kraig_mcpeek@fws.gov>
Sent: Thursday, April 25, 2019 2:34 PM
To: Moritz, Eva S <Eva.Moritz@foth.com>
Subject: Re: [EXTERNAL] Replacement Terminal USFWS coordination

Hi Eva,

Thanks for the email. No comment from us. Thanks

Kraig McPeck
Field Supervisor

US Fish and Wildlife Service
Illinois and Iowa ES Field Office
1511 47th Avenue
Moline, IL 61265
309-757-5800 x202
309-429-0362 (cell)
309-757-5807 (fax)

One thorn of experience is worth a whole wilderness of warning- James Russell Lowell

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On Thu, Apr 25, 2019 at 3:29 PM Moritz, Eva S <Eva.Moritz@foth.com> wrote:

| Kraig, I spoke to you in August about the proposed replacement terminal project at the Des

Moines International Airport. We received a Section 404 Permit for the project at the beginning of April. Will the FWS be commenting on the project? Please let me know if you have any questions or need additional information. Thanks

Eva Moritz, PE, Lead Environmental Engineer
Licensed in Iowa
Foth Infrastructure & Environment, LLC
8191 Birchwood Court, Suite L
Johnston, IA 50131
Ph: (515) 254-1393 / Fax: (515) 254-1642
Direct: (515) 251-2524 / Cell: (515) 210-6302
www.foth.com



APPENDIX C

HAZARDOUS MATERIALS

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DATABASE REPORT

Project Property: *DSM Airport Terminal Study
5800 Fleur Drive
Des Moines IA
18R009.00*

Project No: *18R009.00*

Report Type: *Database Report*

Order No: *20180730224*

Requested by: *Foth Infrastructure & Environment LLC*

Date Completed: *August 1, 2018*

**Environmental Risk
Information Services**
A division of Glacier Media Inc.
P: 1.866.517.5204
E: info@erisinfo.com

www.erisinfo.com

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Reliance on information in Report: This report DOES NOT replace a full Phase I Environmental Site Assessment but is solely intended to be used as database review of environmental records.

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Executive Summary

Property Information:

Project Property: *DSM Airport Terminal Study
5800 Fleur Drive Des Moines IA*

Project No: *18R009.00*

Coordinates:

Latitude: *41.528076*
Longitude: *-93.657597*
UTM Northing: *4,597,589.93*
UTM Easting: *445,138.67*
UTM Zone: *UTM Zone 15T*

Elevation: *942 FT*

Order Information:

Order No: *20180730224*
Date Requested: *July 30, 2018*
Requested by: *Foth Infrastructure & Environment LLC*
Report Type: *Database Report*

Historicals/Products:

ERIS Xplorer [*ERIS Xplorer - Interactive Viewer*](#)
Excel Add-On *Excel Add-On*

Executive Summary: Report Summary

Database	Searched	Search Radius	Project Property	Within 0.12mi	.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
<u>Standard Environmental Records</u>								
Federal								
NPL	Y	1	0	0	0	0	0	0
PROPOSED NPL	Y	1	0	0	0	0	0	0
DELETED NPL	Y	.5	0	0	0	0	-	0
SEMS	Y	.5	0	0	0	0	-	0
SEMS ARCHIVE	Y	.5	0	0	0	1	-	1
ODI	Y	.5	0	0	0	0	-	0
IODI	Y	.5	0	0	0	0	-	0
CERCLIS	Y	.5	0	0	0	1	-	1
CERCLIS NFRAP	Y	.5	0	0	0	1	-	1
CERCLIS LIENS	Y	PO	0	-	-	-	-	0
RCRA CORRACTS	Y	1	0	0	0	0	0	0
RCRA TSD	Y	.5	0	0	0	0	-	0
RCRA LQG	Y	.25	0	0	1	-	-	1
RCRA SQG	Y	.25	2	1	0	-	-	3
RCRA CESQG	Y	.25	3	3	3	-	-	9
RCRA NON GEN	Y	.25	6	2	2	-	-	10
FED ENG	Y	.5	0	0	0	0	-	0
FED INST	Y	.5	0	0	0	0	-	0
ERNS 1982 TO 1986	Y	PO	0	-	-	-	-	0
ERNS 1987 TO 1989	Y	PO	0	-	-	-	-	0
ERNS	Y	PO	4	-	-	-	-	4
FED BROWNFIELDS	Y	.5	0	0	0	0	-	0
FEMA UST	Y	.25	0	0	0	-	-	0
SEMS LIEN	Y	PO	0	-	-	-	-	0
SUPERFUND ROD	Y	1	0	0	0	0	0	0
State								
SHWS	Y	1	0	0	0	0	0	0

Database	Searched	Search Radius	Project Property	Within 0.12mi	.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
DEL SHWS	Y	1	0	0	0	0	0	0
CONT	Y	.5	0	0	0	2	-	2
SWF/LF	Y	.5	0	0	0	0	-	0
LUST	Y	.5	3	8	2	7	-	20
LAST	Y	.5	0	0	0	0	-	0
DELISTED LST	Y	.5	0	0	0	0	-	0
UST	Y	.25	12	12	8	-	-	32
AST	Y	.25	0	1	0	-	-	1
SFM AST	Y	.25	0	0	0	-	-	0
DELISTED TANK	Y	.25	0	1	0	-	-	1
INST	Y	.5	0	0	0	1	-	1
VCP	Y	.5	0	0	0	1	-	1
BROWNFIELDS	Y	.5	0	0	0	0	-	0

Tribal

INDIAN LUST	Y	.5	0	0	0	0	-	0
INDIAN UST	Y	.25	0	0	0	-	-	0
DELISTED ILST	Y	.5	0	0	0	0	-	0
DELISTED IUST	Y	.25	0	0	0	-	-	0

County

No County standard environmental record sources available for this State.

Additional Environmental Records

Federal

FINDS/FRS	Y	PO	32	12	-	-	-	44
TRIS	Y	PO	0	-	-	-	-	0
HMIRS	Y	.125	5	0	-	-	-	5
NCDL	Y	PO	0	-	-	-	-	0
TSCA	Y	.125	0	0	-	-	-	0
HIST TSCA	Y	.125	0	0	-	-	-	0
FTTS ADMIN	Y	PO	0	-	-	-	-	0
FTTS INSP	Y	PO	0	-	-	-	-	0
PRP	Y	PO	0	-	-	-	-	0
SCRD DRYCLEANER	Y	.5	0	0	0	0	-	0
ICIS	Y	PO	16	1	-	-	-	17
FED DRYCLEANERS	Y	.25	0	0	0	-	-	0
DELISTED FED DRY	Y	.25	0	0	0	-	-	0
FUDS	Y	1	0	0	0	0	0	0
MLTS	Y	PO	0	-	-	-	-	0
HIST MLTS	Y	PO	0	-	-	-	-	0
MINES	Y	.25	0	0	0	-	-	0
ALT FUELS	Y	.25	0	0	0	-	-	0

Database	Searched	Search Radius	Project Property	Within 0.12mi	.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
SSTS	Y	.25	0	0	0	-	-	0
PCB	Y	.5	0	0	0	0	-	0
State								
SPILLS	Y	.125	8	4	-	-	-	12
LIENS	Y	PO	0	-	-	-	-	0
DRYCLEANERS	Y	.25	0	0	0	-	-	0
Tribal	No Tribal additional environmental record sources available for this State.							
County	No County additional environmental record sources available for this State.							

Total:	91	45	16	14	0	166
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* PO – Property Only

* 'Property and adjoining properties' database search radii are set at 0.25 miles.

Executive Summary: Site Report Summary - Project Property

Map Key	DB	Company/Site Name	Address	Direction	Distance (mi/ft)	Elev Diff (ft)	Page Number
1	FINDS/FRS	FEDEX EXPRESS-DSMR	3023 ARMY POST RD DES MOINES IA 50321	-	0.00 / 0.00	-4	41
1	HMIRS		3023 ARMY POST RD DES MOINES IA	-	0.00 / 0.00	-4	41
1	RCRA CESQG	FEDEX EXPRESS - DSMR	3023 ARMY POST RD DES MOINES IA 50321	-	0.00 / 0.00	-4	48
2	FINDS/FRS	AIRFIELD MAINTENANCE FACILITY	3200 ARMY POST RD DES MOINES IA 50321	-	0.00 / 0.00	-4	49
2	UST	AIRFIELD MAINTENANCE FACILITY	3200 ARMY POST RD Des Moines IA 50321	-	0.00 / 0.00	-4	50
		UST ID Status: 17703 Regulated tanks - active					
3	FINDS/FRS	MESABA AIRLINES - HANGAR	2901 ARMY POST RD DES MOINES IA 50321	-	0.00 / 0.00	-4	66
3	ICIS	MESABA AIRLINES - HANGAR	2901 ARMY POST RD DES MOINES IA 50321	-	0.00 / 0.00	-4	66
3	RCRA SQG	ENDEAVOR AIR	2901 ARMY POST RD DES MOINES IA 50321	-	0.00 / 0.00	-4	66
4	FINDS/FRS	EVERGREEN AVIATION	3101 ARMY POST RD DES MOINES IA 50321-4043	-	0.00 / 0.00	-19	74
4	RCRA NON GEN	EVERGREEN AVIATION	3101 ARMY POST RD DES MOINES IA 50321-4043	-	0.00 / 0.00	-19	74
5	FINDS/FRS	MEREDITH HANGAR	3333 ARMY POST RD DES MOINES IA 50321	-	0.00 / 0.00	-23	76
5	FINDS/FRS	UNITED PARCEL SERVICE	3333 ARMY POST RD DES MOINES IA 50321	-	0.00 / 0.00	-23	77
5	HMIRS		3333 ARMY POST RD DES MOINES IA	-	0.00 / 0.00	-23	77

Map Key	DB	Company/Site Name	Address	Direction	Distance (mi/ft)	Elev Diff (ft)	Page Number
5	RCRA NON GEN	UNITED PARCEL SERVICE	3333 ARMY POST RD WEST HANGER DES MOINES IA 50321	-	0.00 / 0.00	-23	79
5	UST	MEREDITH HANGAR	3333 ARMY POST RD Des Moines IA 503210000 <i>UST ID Status: 3039 Regulated tanks - r/f</i>	-	0.00 / 0.00	-23	81
6	LUST	SIGNATURE FLIGHT SUPPORT	DES MOINES INTL AIRPORT Des Moines IA 503210000 <i>LUST ID Leak Status: 1748 Unknown</i>	-	0.00 / 0.00	-13	83
7	ERNS		2601 ARMY POST RD DESMOINES IA	-	0.00 / 0.00	8	87
7	FINDS/FRS	DSM AIRPORT - SOUTH CARGO FUELING	2601 ARMY POST ROAD DES MOINES IA 50321	-	0.00 / 0.00	8	90
7	FINDS/FRS	UNITED PARCEL SERVICE	2601 ARMY POST RD DES MOINES IA 50320	-	0.00 / 0.00	8	90
7	HMIRS		2601 ARMY POST RD DES MOINES IA	-	0.00 / 0.00	8	91
7	RCRA CESQG	UNITED PARCEL SERVICE	2601 ARMY POST RD DES MOINES IA 50320	-	0.00 / 0.00	8	96
7	UST	DSM AIRPORT - SOUTH CARGO FUELING	2601 ARMY POST RD Des Moines IA 50321 <i>UST ID Status: 17076 Regulated tanks - active</i>	-	0.00 / 0.00	8	97
8	HMIRS		2601 ARMY POST DES MOINES IA	-	0.00 / 0.00	9	107
9	FINDS/FRS	FEDERAL EXPRESS CORP - DSMR	2571 ARMY POST RD DES MOINES IA 50321	-	0.00 / 0.00	9	109
9	RCRA NON GEN	FEDERAL EXPRESS CORP - DSMR	2571 ARMY POST RD DES MOINES IA 50321	-	0.00 / 0.00	9	109
10	UST	DSM ALSF	DES MOINES AIRPORT 2400 ARMY POST RD Des Moines IA 50321 <i>UST ID Status: 17634 Emergency power generator tanks - active</i>	-	0.00 / 0.00	7	110
11	FINDS/FRS	DSM ALSF - DES MOINES AIRPORT	BLDG 30 2400 ARMY POST ROAD DES MOINES IA 50321	-	0.00 / 0.00	8	118

Map Key	DB	Company/Site Name	Address	Direction	Distance (mi/ft)	Elev Diff (ft)	Page Number
11	ICIS	DSM ALSF - DES MOINES AIRPORT	BLDG 30 2400 ARMY POST ROAD DES MOINES IA 50321	-	0.00 / 0.00	8	118
11	ICIS	DES MOINES AIRPORT-DSM ALSF	BLDG. 30, 2400 ARMY POST ROAD DES MOINES IA 50321	-	0.00 / 0.00	8	118
12	UST	DSM ATCT	DES MOINES AIRPORT Des Moines IA 50321 <i>UST ID Status: 2543 Regulated tanks - active</i>	-	0.00 / 0.00	10	119
13	SPILLS	Transportation Spill	Fleur Dr & Army Post Rd Des Moines IA <i>Location ID: 20000267217 State Facility ID OP Status: 311576479 Closed</i>	-	0.00 / 0.00	6	125
13	SPILLS	Transformer Spill	Army Post Rd & Fleur Des Moines IA 50321 <i>Location ID: 20000269983 State Facility ID OP Status: 311587698 Closed</i>	-	0.00 / 0.00	6	126
14	HMIRS		5800 FLEUA DRIVE DES MOINES IA	-	0.00 / 0.00	6	126
15	ERNS		5800 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	5	128
15	ERNS		5800 FLEUR DRIVE DEPT. OF AVIATION DES MOINES IA 50321	-	0.00 / 0.00	5	131
15	ERNS		5800 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	5	134
15	FINDS/FRS	DES MOINES INTERNATIONAL AIRPORT	5800 FLEUR DR DES MOINES IA 50321	-	0.00 / 0.00	5	137
15	FINDS/FRS	DAL GLOBAL SERVICES, LLC-DSM	5800 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	5	137
15	FINDS/FRS	FAA DSM RTRD	5800 FLEUR DR DES MOINES IA 503210000	-	0.00 / 0.00	5	138
15	FINDS/FRS	MESABA AIRLINES	5800 FLEUR DR GATE C-1 DES MOINES IA 50321	-	0.00 / 0.00	5	139
15	FINDS/FRS	ENVOY AIR INC.	5800 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	5	139

Map Key	DB	Company/Site Name	Address	Direction	Distance (mi/ft)	Elev Diff (ft)	Page Number
15	FINDS/FRS	TSA AT DES MOINES INTERNATIONAL AIRPORT	5800 FLEUR DR DES MOINES IA 50321	-	0.00 / 0.00	5	140
15	FINDS/FRS	AMERICAN AIRLINES - DSM AE DSM	5800 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	5	140
15	ICIS	ENVOY AIR INC.	5800 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	5	141
15	ICIS	DES MOINES INTERNATIONAL AIRPORT	5800 FLEUR DR DES MOINES IA 50321	-	0.00 / 0.00	5	141
15	ICIS	DSM GS - DES MOINES AIRPORT	5800 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	5	141
15	ICIS	UNITED AIRLINES INC	5800 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	5	142
15	ICIS	DES MOINES INTERNATIONAL AIRPORT	5800 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	5	142
15	ICIS	DSM GS	5800 FLEUR DR DES MOINES IA 50321	-	0.00 / 0.00	5	142
15	ICIS	DES MOINES AIRPORT - FAA/DSM/LOC	5800 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	5	143
15	LUST	see 200500033	5800 FLEUR DRIVE Des Moines IA 503150000 LUST ID Leak Status: 1738 Unknown	-	0.00 / 0.00	5	143
15	RCRA NON GEN	MESABA AIRLINES	5800 FLEUR DR GATE C-1 DES MOINES IA 50321	-	0.00 / 0.00	5	146
15	RCRA SQG	TRANSPORTATION SECURITY ADMINISTRATION AT DES MOINES INTL AIRPORT (TSA-DSM)	5800 FLEUR DR DES MOINES IA 50321	-	0.00 / 0.00	5	150
15	SPILLS	Des Moines International Airport - Construction	5800 Fleur Dr Des Moines IA 50321 Location ID: 20000248576 State Facility ID OP Status: 311309349 Closed, 311309349 Closed, 311309349 Closed, 311309349 Closed, 311309349 Closed, 311309349 Closed	-	0.00 / 0.00	5	153
15	SPILLS	Dal Global Services, Llc-dsm	5800 Fleur Drive Des Moines IA 50321 Location ID: 20000248516 State Facility ID OP Status: 311308677 Closed, 311308677 Closed	-	0.00 / 0.00	5	156

[illegible]

Map Key	DB	Company/Site Name	Address	Direction	Distance (mi/ft)	Elev Diff (ft)	Page Number
UST ID Status: 17075 Regulated tanks - active							
20	FINDS/FRS	DES MOINES DEPARTMENT OF AVIATION	6014 FLEUR DR DES MOINES IA 50321	-	0.00 / 0.00	8	203
21	FINDS/FRS	U S POSTAL SERVICE - DES MOINES	6010 FLEUR DR DES MOINES IA 50321-2854	-	0.00 / 0.00	8	203
21	RCRA NON GEN	U S POSTAL SERVICE - DES MOINES	6010 FLEUR DR DES MOINES IA 50321-2854	-	0.00 / 0.00	8	204
22	SPILLS	Parking Garage	5880 Fleur Dr Des Moines IA 50321	-	0.00 / 0.00	1	205
Location ID: 20000269963 State Facility ID OP Status: 311586726 Closed							
23	FINDS/FRS	CEDAR VALLEY CORP LLC	PORTABLE DES MOINES IA 99999	-	0.00 / 0.00	-2	206
23	ICIS	CEDAR VALLEY CORP LLC	PORTABLE DES MOINES IA 99999	-	0.00 / 0.00	-2	207
24	FINDS/FRS	MUNICIPAL AIRPORT L AIRPORT	MUNICIPAL AIRPORT DES MOINES IA 503210000	-	0.00 / 0.00	-10	207
24	UST	MUNICIPAL AIRPORT L AIRPORT	MUNICIPAL AIRPORT Des Moines IA 503210000	-	0.00 / 0.00	-10	207
UST ID Status: 4614 Regulated tanks - r/f							
25	FINDS/FRS	SIGNATURE FLIGHT SUPPORT	5600 FLEUR DR DES MOINES IA 50321	-	0.00 / 0.00	-16	211
25	FINDS/FRS	DES MOINES FLYING SERVICE	5600 FLEUR DRIVE DES MOINES IA 50321-2842	-	0.00 / 0.00	-16	211
25	FINDS/FRS	STAR	5600 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	-16	212
25	ICIS	DES MOINES FLYING SERVICE INC	5600 FLEUR DRIVE DES MOINES IA 50321-2842	-	0.00 / 0.00	-16	212
25	ICIS	SIGNATURE FLIGHT SUPPORT	5600 FLEUR DR DES MOINES IA 50321	-	0.00 / 0.00	-16	213
25	ICIS	DES MOINES FLYING SERVICE	5600 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	-16	213

Map Key	DB	Company/Site Name	Address	Direction	Distance (mi/ft)	Elev Diff (ft)	Page Number
25	RCRA CESQG	SIGNATURE FLIGHT SUPPORT CORPORATION	5600 FLEUR DR DES MOINES IA 50321	-	0.00 / 0.00	-16	213
25	RCRA NON GEN	DES MOINES FLYING SERVICE INC - FORMER SITE OF	5600 FLEUR DR (SOUTH END OF BLDG) DES MOINES IA 50315-0302	-	0.00 / 0.00	-16	216
26	FINDS/FRS	NATL WEATHER SVC	INTERNATIONAL AIRPORT DES MOINES IA 503210000	-	0.00 / 0.00	-11	221
26	UST	NATIONAL WEATHER SERVICE	INTERNATIONAL AIRPORT Des Moines IA 503210000 <i>UST ID / Status: 2936 Regulated tanks - r/f</i>	-	0.00 / 0.00	-11	221
27	LUST	SIGNATURE FLIGHT SUPPORT	DES MOINES INTL AIRPORT Des Moines IA 503210000 <i>LUST ID / Leak Status: 1749 Unknown</i>	-	0.00 / 0.00	-9	223
28	FINDS/FRS	DES MOINES INTERNATIONAL AIRPORT - APRON CONSTRUCTION	5400 FLEUR DR DES MOINES IA 50321	-	0.00 / 0.00	-40	227
28	SPILLS	Des Moines International Airport - Apron Construction	5400 Fleur Dr Des Moines IA 50321 <i>Location ID: 20000248129 State Facility ID / OP Status: 311304362 Closed</i>	-	0.00 / 0.00	-40	227
29	SPILLS	Handling And Storage Spill	Fleur Dr & McKinley Ave Des Moines IA 50321 <i>Location ID: 20000271034 State Facility ID / OP Status: 311673168 Closed</i>	-	0.00 / 0.00	-22	228

Executive Summary: Site Report Summary - Surrounding Properties

Map Key	DB	Company/Site Name	Address	Direction	Distance (mi/ft)	Elev Diff (ft)	Page Number
30	FINDS/FRS	DES MOINES AIRPORT	2104 ARMY POST RD DES MOINES IA 503210000	ESE	0.00 / 10.57	11	228
30	FINDS/FRS	BUDGET RENT-A-CAR	2110 ARMY POST RD DES MOINES IA 503200000	ESE	0.00 / 10.57	11	229
30	LUST	DES MOINES AIRPORT	2104 ARMY POST RD Des Moines IA 503210000 <i>LUST ID / Leak Status: 2922 Stopped</i>	ESE	0.00 / 10.57	11	230
30	LUST	BUDGET RENT-A-CAR	2110 ARMY POST RD Des Moines IA 503200000 <i>LUST ID / Leak Status: 47 Stopped</i>	ESE	0.00 / 10.57	11	232
30	UST	BUDGET RENT-A-CAR	2110 ARMY POST RD Des Moines IA 503200000 <i>UST ID / Status: 48 Non-regulated leaking site</i>	ESE	0.00 / 10.57	11	235
30	UST	DES MOINES AIRPORT	2104 ARMY POST RD Des Moines IA 503210000 <i>UST ID / Status: 6699 Regulated tanks - r/f</i>	ESE	0.00 / 10.57	11	236
31	UST	UNITED AIRLINES	DES MOINES INTL AIRPORT Des Moines IA 503210000 <i>UST ID / Status: 3585 Regulated tanks - r/f</i>	ENE	0.01 / 49.44	-18	241
32	FINDS/FRS	PRECISION COLLISION CENTER	5807 FLEUR DR DES MOINES IA 50321	ENE	0.01 / 50.18	0	247
32	RCRA CESQG	PRECISION COLLISION CENTER	5807 FLEUR DR DES MOINES IA 50321	ENE	0.01 / 50.18	0	247
33	FINDS/FRS	QUIKTRIP #559	5701 FLEUR DR DES MOINES IA 50321	ENE	0.01 / 50.52	-2	249
33	FINDS/FRS	QUIKTRIP CORP STORE 559 - FORMER SITE OF	5701 FLEUR DR DES MOINES IA 50321	ENE	0.01 / 50.52	-2	250
33	LUST	QUIKTRIP	5701 FLEUR DR Des Moines IA 503210000 <i>LUST ID / Leak Status: 3946 Unknown</i>	ENE	0.01 / 50.52	-2	250
33	RCRA NON GEN	QUIKTRIP CORP STORE 559 - FORMER SITE OF	5701 FLEUR DR DES MOINES IA 50321	ENE	0.01 / 50.52	-2	254

Map Key	DB	Company/Site Name	Address	Direction	Distance (mi/ft)	Elev Diff (ft)	Page Number
33	UST	QUIKTRIP	5701 FLEUR DR Des Moines IA 503210000 <i>UST ID / Status:</i> 8673 Regulated tanks - r/f	ENE	0.01 / 50.52	-2	255
34	FINDS/FRS	SINGH DEVELOPMENT, LLC	5941 FLEUR DRIVE DES MOINES IA 50321	ENE	0.01 / 50.56	4	261
35	FINDS/FRS	H & A MINI MART	5901 FLEUR DR DES MOINES IA 50321-2847	ENE	0.01 / 50.68	3	262
35	LUST	H & A MINI MART	5901 FLEUR DR Des Moines IA 50321 <i>LUST ID / Leak Status:</i> 1499 Stopped	ENE	0.01 / 50.68	3	262
35	LUST	H & A MINI MART	5901 FLEUR DR Des Moines IA 50321 <i>LUST ID / Leak Status:</i> 6549	ENE	0.01 / 50.68	3	266
35	UST	H & A MINI MART	5901 FLEUR DR Des Moines IA 50321 <i>UST ID / Status:</i> 3369 Regulated tanks - active	ENE	0.01 / 50.68	3	271
36	FINDS/FRS	SCHLARBAUM AUTO BODY MICHAEL SCHLARBAUM	5919 FLEUR DR DES MOINES IA 503210000	ENE	0.01 / 51.28	5	290
36	UST	SCHLARBAUM AUTO BODY MICHAEL SCHLARBAUM	5919 FLEUR DR Des Moines IA 503210000 <i>UST ID / Status:</i> 9758 Regulated tanks - r/f	ENE	0.01 / 51.28	5	290
37	FINDS/FRS	LAWS 66	4801 FLEUR DR. DES MOINES IA 50321	NE	0.01 / 59.26	-30	293
37	FINDS/FRS	PHILLIPS 66	4801 FLEUR DRIVE DES MOINES IA 503150000	NE	0.01 / 59.26	-30	293
37	ICIS	LAWS 66	4801 FLEUR DR. DES MOINES IA 50321	NE	0.01 / 59.26	-30	294
37	LUST	PHILLIPS 66	4801 FLEUR DRIVE Des Moines IA 503150000 <i>LUST ID / Leak Status:</i> 1962 Unknown	NE	0.01 / 59.26	-30	294
37	UST	PHILLIPS 66	4801 FLEUR DRIVE Des Moines IA 503150000 <i>UST ID / Status:</i> 4497 Regulated tanks - r/f	NE	0.01 / 59.26	-30	297

Map Key	DB	Company/Site Name	Address	Direction	Distance (mi/ft)	Elev Diff (ft)	Page Number
38	FINDS/FRS	PRECISION COLLISON CENTER	5897 A FLEUR DIVE DES MOINES IA 50321	ENE	0.01 / 60.91	2	303
39	FINDS/FRS	CLEAR ZONE RUNWAY 5/23 EXTENSION	4720 FLEUR DRIVE DES MOINES IA 50315-	NE	0.02 / 104.17	-26	303
39	LUST	CLEAR ZONE RUNWAY 5/23 EXTENSION	4720 FLEUR DRIVE Des Moines IA 50315- LUST ID / Leak Status: 5944 Stopped	NE	0.02 / 104.17	-26	304
39	UST	CLEAR ZONE RUNWAY 5/23 EXTENSION	4720 FLEUR DRIVE Des Moines IA 50315- UST ID / Status: 524 Non-regulated leaking site	NE	0.02 / 104.17	-26	307
40	RCRA NON GEN	SUNOCO SERVICE STATION-FORMER SITE OF	4723 FLEUR DR DES MOINES IA 50321	NE	0.03 / 132.44	-25	308
40	UST	FORMER PRECISION TUNE	4723 FLEUR DR OR 2127 MCKINLEY Des Moines IA 503150000 UST ID / Status: 16711 Regulated tanks - r/f	NE	0.03 / 132.44	-25	310
41	RCRA CESQG	DES MOINES REGISTER	7400 REGISTER DR DES MOINES IA 50321	SW	0.03 / 176.56	-8	312
42	AST	HP Enterprise Services(Des Moines)	3600 Army Post Rd. Des Moines IA 50321 AST ID / Status / Status Start Dt: 14430 Regulated tanks - active 2011-11-29 15:43:17	SSW	0.04 / 192.01	1	316
42	DELISTED TANK	HP Enterprise Services - Tanks	3600 Army Post Rd-Des Moines IA	SSW	0.04 / 192.01	1	319
42	RCRA SQG	HEWLETT PACKARD COMPANY	3600 ARMY POST RD DES MOINES IA 50321	SSW	0.04 / 192.01	1	320
42	SPILLS	Hewlett-packard Company - Des Moines	3600 Army Post Road Road Des Moines IA 50321 Location ID: 20000264601 State Facility ID / OP Status: 311551447 Closed, 311551447 Open	SSW	0.04 / 192.01	1	322
43	SPILLS	Transformer Spill	4704 Fleur Dr Des Moines IA 50315 Location ID: 20000269443 State Facility ID / OP Status: 311623464 Closed	NE	0.05 / 239.53	-23	323
44	SPILLS	Hy Vee	4701 Fleur Dr Des Moines IA 50321-2335 Location ID: 20000265585 State Facility ID / OP Status: 311573114 Closed	NE	0.05 / 251.98	-23	323
44	UST	HY-VEE	4701 Fleur Dr Des Moines IA 50315	NE	0.05 / 251.98	-23	324

Map Key	DB	Company/Site Name	Address	Direction	Distance (mi/ft)	Elev Diff (ft)	Page Number
UST ID / Status: 18017 Regulated tanks - active							
45	UST	Not Known	2016 ARMY POST Des Moines IA 503150000	E	0.06 / 296.16	12	354
UST ID / Status: 4998 Regulated tanks - r/f							
46	RCRA CESQG	HY-VEE PHARMACY FULFILLMENT CENTER	4707 FLEUR DR DES MOINES IA 50321	NE	0.08 / 442.17	-15	359
46	SPILLS	Transportation Spill	4707 Fleur Dr Des Moines IA 50321	NE	0.08 / 442.17	-15	361
Location ID: 20000274996 State Facility ID / OP Status: 311692374 Closed							
47	LUST	STAR	4600 FLEUR DR Des Moines IA 50321	NNE	0.10 / 546.64	-10	361
LUST ID / Leak Status: 1088 Unknown							
47	UST	STAR	4600 FLEUR DR Des Moines IA 50321	NNE	0.10 / 546.64	-10	367
UST ID / Status: 2440 Regulated tanks - r/f							
48	RCRA NON GEN	SMARTS TARGET OUTLET 596	4605 FLEUR DR DES MOINES IA 50321	NNE	0.13 / 663.33	-5	387
49	UST	CASEYS GENERAL STORE 3518	1907 ARMY POST ROAD Des Moines IA 50315	E	0.13 / 689.27	17	388
UST ID / Status: 18430 Regulated tanks - active							
50	RCRA LQG	EUROFINS SCIENTIFIC - NUTRITION ANALYSIS CENTER	2200 RITTENHOUSE ST STE 150 DES MOINES IA 50321	SE	0.14 / 728.36	-5	395
51	RCRA CESQG	ACCENT TAG & LABEL INC	2201 RITTENHOUSE ST DES MOINES IA 50321	SE	0.14 / 744.14	-4	409
52	UST	PRINCIPAL HANGER	2502 MCKINLEY AVE Des Moines IA 50321	NNE	0.17 / 871.35	9	410
UST ID / Status: 17856 Regulated tanks - active							
53	UST	DSM ASR	DES MOINES AIRPORT Des Moines IA 503210000	NNE	0.18 / 965.18	11	417
UST ID / Status: 2542 Emergency power generator tanks - active							
54	RCRA CESQG	DES MOINES, CITY OF- AVIATION GARAGE	2600 SW MCKINLEY DES MOINES IA 50321	NNE	0.21 / 1,115.73	13	424
54	UST	AIRPORT FIELD MAINTENANCE	2600 MCKINLEY AVENUE Des Moines IA 503210000	NNE	0.21 / 1,115.73	13	426
UST ID / Status: 17003 Regulated tanks - r/f							

Map Key	DB	Company/Site Name	Address	Direction	Distance (mi/ft)	Elev Diff (ft)	Page Number
54	UST	DSM GS	2600 MCKINLEY AVE Des Moines IA 503210000 <i>UST ID / Status:</i> 2541 Regulated tanks - active	NNE	0.21 / 1,115.73	13	431
55	UST	MEREDITH HANGER	2602 MCKINLEY AVE Des Moines IA 50321 <i>UST ID / Status:</i> 17702 Regulated tanks - active	NNE	0.21 / 1,119.21	13	440
56	LUST	MID-AMERICA JET CENTER	2606 MCKINLEY Des Moines IA 50321 <i>LUST ID / Leak Status:</i> 6347	NNE	0.21 / 1,126.16	13	448
56	RCRA CESQG	MID AMERICA JET CENTER	2606 MCKINLEY DES MOINES IA 50321	NNE	0.21 / 1,126.16	13	450
56	UST	MID-AMERICA JET CENTER	2606 MCKINLEY Des Moines IA 50321 <i>UST ID / Status:</i> 10582 Regulated tanks - r/f	NNE	0.21 / 1,126.16	13	452
57	LUST	EMERY WORLDWIDE-A CF COMPANY	2701 SW MCKINLEY Des Moines IA 503210000 <i>LUST ID / Leak Status:</i> 1840 Unknown	NNE	0.25 / 1,305.38	11	455
57	RCRA NON GEN	EMORY WORLD WIDE	2701 SW MCKINLEY DES MOINES IA 50321	NNE	0.25 / 1,305.38	11	458
57	UST	EMERY WORLDWIDE-A CF COMPANY	2701 SW MCKINLEY Des Moines IA 50321 <i>UST ID / Status:</i> 4192 Regulated tanks - r/f	NNE	0.25 / 1,305.38	11	459
58	LUST	PHILLIPS 66	4503 FLEUR DR Des Moines IA 503210000 <i>LUST ID / Leak Status:</i> 3610 Unknown	NNE	0.25 / 1,327.77	9	464
59	LUST	ELLIOTT AVIATION	2800 MCKINLEY AVE Des Moines IA 50321 <i>LUST ID / Leak Status:</i> 3148 Unknown	N	0.28 / 1,463.26	13	467
60	CONT	Parr Manufacturing	3001 McKinley Avenue Des Moines IA 50321	N	0.36 / 1,913.00	13	470
60	INST	Parr Manufacturing	3001 McKinley Avenue Des Moines IA 50321	N	0.36 / 1,913.00	13	470
60	VCP	Parr Manufacturing	3001 McKinley Avenue Des Moines IA 50321	N	0.36 / 1,913.00	13	471
61	LUST	AMOCO #9522	4108 FLEUR DR Des Moines IA 503150000	NNE	0.37 / 1,969.99	15	471

Map Key	DB	Company/Site Name	Address	Direction	Distance (mi/ft)	Elev Diff (ft)	Page Number
LUST ID / Leak Status: 3005 Unknown							
62	CERCLIS	DES MOINES AIR NATIONAL GUARD	3100 SW MCKINLEY AVE DES MOINES IA 50321	N	0.38 / 1,988.72	13	474
62	CERCLIS NFRAP	DES MOINES AIR NATIONAL GUARD	3100 SW MCKINLEY AVE DES MOINES IA 50321	N	0.38 / 1,988.72	13	476
62	CONT	Iowa Air National Guard (Des Moines)	3100 McKinley Avenue Des Moines IA 50321	N	0.38 / 1,988.72	13	478
62	SEMS ARCHIVE	DES MOINES AIR NATIONAL GUARD	3100 SW MCKINLEY AVE DES MOINES IA 50321	N	0.38 / 1,988.72	13	478
63	LUST	TIRE CITY	1538 SW ARMY POST RD Des Moines IA 503150000	E	0.41 / 2,158.32	16	479
LUST ID / Leak Status: 5582 Stopped							
64	LUST	QUIKTRIP #559	4024 FLEUR DR Des Moines IA 50321	NNE	0.42 / 2,232.18	17	482
LUST ID / Leak Status: 5843 Stopped							
65	LUST	GIT-N-GO	1414 ARMY POST RD Des Moines IA 503150000	E	0.46 / 2,415.60	17	484
LUST ID / Leak Status: 2285 Unknown							
66	LUST	SMITH'S TENDERLOINS (FORMER SERVICE STATION)	1401 ARMY POST ROAD Des Moines IA 503150000	E	0.49 / 2,584.55	15	488
LUST ID / Leak Status: 318							

Executive Summary: Summary by Data Source

Standard

Federal

SEMS ARCHIVE - SEMS List 8R Archive Sites

A search of the SEMS ARCHIVE database, dated Apr 11, 2018 has found that there are 1 SEMS ARCHIVE site(s) within approximately 0.50 miles of the project property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
DES MOINES AIR NATIONAL GUARD	3100 SW MCKINLEY AVE DES MOINES IA 50321	N	0.38 / 1,988.72	62

CERCLIS - Comprehensive Environmental Response, Compensation and Liability Information System - CERCLIS

A search of the CERCLIS database, dated Oct 25, 2013 has found that there are 1 CERCLIS site(s) within approximately 0.50 miles of the project property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
DES MOINES AIR NATIONAL GUARD	3100 SW MCKINLEY AVE DES MOINES IA 50321	N	0.38 / 1,988.72	62

CERCLIS NFRAP - CERCLIS - No Further Remedial Action Planned

A search of the CERCLIS NFRAP database, dated Oct 25, 2013 has found that there are 1 CERCLIS NFRAP site(s) within approximately 0.50 miles of the project property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
DES MOINES AIR NATIONAL GUARD	3100 SW MCKINLEY AVE DES MOINES IA 50321	N	0.38 / 1,988.72	62

RCRA LQG - RCRA Generator List

A search of the RCRA LQG database, dated Apr 12, 2018 has found that there are 1 RCRA LQG site(s) within approximately 0.25 miles of the project property.

<u>Lower Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
EUROFINS SCIENTIFIC - NUTRITION ANALYSIS CENTER	2200 RITTENHOUSE ST STE 150 DES MOINES IA 50321	SE	0.14 / 728.36	50

RCRA SQG - RCRA Small Quantity Generators List

A search of the RCRA SQG database, dated Apr 12, 2018 has found that there are 3 RCRA SQG site(s) within approximately 0.25 miles of the project property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
TRANSPORTATION SECURITY ADMINISTRATION AT DES MOINES INTL AIRPORT (TSA- DSM)	5800 FLEUR DR DES MOINES IA 50321	-	0.00 / 0.00	15

HEWLETT PACKARD COMPANY	3600 ARMY POST RD DES MOINES IA 50321	SSW	0.04 / 192.01	42
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<u>Lower Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
ENDEAVOR AIR	2901 ARMY POST RD DES MOINES IA 50321	-	0.00 / 0.00	3

RCRA CESQG - RCRA Conditionally Exempt Small Quantity Generators List

A search of the RCRA CESQG database, dated Apr 12, 2018 has found that there are 9 RCRA CESQG site(s) within approximately 0.25 miles of the project property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
UNITED PARCEL SERVICE	2601 ARMY POST RD DES MOINES IA 50320	-	0.00 / 0.00	7

DES MOINES, CITY OF- AVIATION GARAGE	2600 SW MCKINLEY DES MOINES IA 50321	NNE	0.21 / 1,115.73	54
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MID AMERICA JET CENTER	2606 MCKINLEY DES MOINES IA 50321	NNE	0.21 / 1,126.16	56
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<u>Lower Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
FEDEX EXPRESS - DSMR	3023 ARMY POST RD DES MOINES IA 50321	-	0.00 / 0.00	1

SIGNATURE FLIGHT SUPPORT CORPORATION	5600 FLEUR DR DES MOINES IA 50321	-	0.00 / 0.00	25
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PRECISION COLLISION CENTER	5807 FLEUR DR DES MOINES IA 50321	ENE	0.01 / 50.18	32
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DES MOINES REGISTER	7400 REGISTER DR DES MOINES IA 50321	SW	0.03 / 176.56	41
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<u>Lower Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
HY-VEE PHARMACY FULFILLMENT CENTER	4707 FLEUR DR DES MOINES IA 50321	NE	0.08 / 442.17	46
ACCENT TAG & LABEL INC	2201 RITTENHOUSE ST DES MOINES IA 50321	SE	0.14 / 744.14	51

RCRA NON GEN - RCRA Non-Generators

A search of the RCRA NON GEN database, dated Apr 12, 2018 has found that there are 10 RCRA NON GEN site(s) within approximately 0.25 miles of the project property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
FEDERAL EXPRESS CORP - DSMR	2571 ARMY POST RD DES MOINES IA 50321	-	0.00 / 0.00	9
MESABA AIRLINES	5800 FLEUR DR GATE C-1 DES MOINES IA 50321	-	0.00 / 0.00	15
U S POSTAL SERVICE - DES MOINES	6010 FLEUR DR DES MOINES IA 50321-2854	-	0.00 / 0.00	21
EMORY WORLD WIDE	2701 SW MCKINLEY DES MOINES IA 50321	NNE	0.25 / 1,305.38	57

<u>Lower Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
EVERGREEN AVIATION	3101 ARMY POST RD DES MOINES IA 50321-4043	-	0.00 / 0.00	4
UNITED PARCEL SERVICE	3333 ARMY POST RD WEST HANGER DES MOINES IA 50321	-	0.00 / 0.00	5
DES MOINES FLYING SERVICE INC - FORMER SITE OF	5600 FLEUR DR (SOUTH END OF BLDG) DES MOINES IA 50315-0302	-	0.00 / 0.00	25
QUIKTRIP CORP STORE 559 - FORMER SITE OF	5701 FLEUR DR DES MOINES IA 50321	ENE	0.01 / 50.52	33
SUNOCO SERVICE STATION- FORMER SITE OF	4723 FLEUR DR DES MOINES IA 50321	NE	0.03 / 132.44	40

<u>Lower Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
SMARTS TARGET OUTLET 596	4605 FLEUR DR DES MOINES IA 50321	NNE	0.13 / 663.33	48

ERNS - Emergency Response Notification System

A search of the ERNS database, dated Feb 8, 2017 has found that there are 4 ERNS site(s) within approximately 0.02 miles of the project property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
	2601 ARMY POST RD DESMOINES IA	-	0.00 / 0.00	7
	5800 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	15
	5800 FLEUR DRIVE DEPT. OF AVIATION DES MOINES IA 50321	-	0.00 / 0.00	15
	5800 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	15

State

CONT - Contaminated Sites in Iowa

A search of the CONT database, dated Jun 4, 2018 has found that there are 2 CONT site(s) within approximately 0.50 miles of the project property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
Parr Manufacturing	3001 McKinley Avenue Des Moines IA 50321	N	0.36 / 1,913.00	60
Iowa Air National Guard (Des Moines)	3100 McKinley Avenue Des Moines IA 50321	N	0.38 / 1,988.72	62

LUST - Leaking Underground Storage Tank Sites in Iowa

A search of the LUST database, dated Apr 2, 2018 has found that there are 20 LUST site(s) within approximately 0.50 miles of the project property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
see 200500033	5800 FLEUR DRIVE Des Moines IA 503150000	-	0.00 / 0.00	15

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
LUST ID Leak Status: 1738 Unknown				
BUDGET RENT-A-CAR	2110 ARMY POST RD Des Moines IA 503200000	ESE	0.00 / 10.57	30
LUST ID Leak Status: 47 Stopped				
DES MOINES AIRPORT	2104 ARMY POST RD Des Moines IA 503210000	ESE	0.00 / 10.57	30
LUST ID Leak Status: 2922 Stopped				
H & A MINI MART	5901 FLEUR DR Des Moines IA 50321	ENE	0.01 / 50.68	35
LUST ID Leak Status: 6549				
H & A MINI MART	5901 FLEUR DR Des Moines IA 50321	ENE	0.01 / 50.68	35
LUST ID Leak Status: 1499 Stopped				
MID-AMERICA JET CENTER	2606 MCKINLEY Des Moines IA 50321	NNE	0.21 / 1,126.16	56
LUST ID Leak Status: 6347				
EMERY WORLDWIDE-A CF COMPANY	2701 SW MCKINLEY Des Moines IA 503210000	NNE	0.25 / 1,305.38	57
LUST ID Leak Status: 1840 Unknown				
PHILLIPS 66	4503 FLEUR DR Des Moines IA 503210000	NNE	0.25 / 1,327.77	58
LUST ID Leak Status: 3610 Unknown				
ELLIOTT AVIATION	2800 MCKINLEY AVE Des Moines IA 50321	N	0.28 / 1,463.26	59
LUST ID Leak Status: 3148 Unknown				
AMOCO #9522	4108 FLEUR DR Des Moines IA 503150000	NNE	0.37 / 1,969.99	61
LUST ID Leak Status: 3005 Unknown				
TIRE CITY	1538 SW ARMY POST RD Des Moines IA 503150000	E	0.41 / 2,158.32	63
LUST ID Leak Status: 5582 Stopped				
QUICKTRIP #559	4024 FLEUR DR Des Moines IA 50321	NNE	0.42 / 2,232.18	64
LUST ID Leak Status: 5843 Stopped				
GIT-N-GO	1414 ARMY POST RD Des Moines IA 503150000	E	0.46 / 2,415.60	65
LUST ID Leak Status: 2285 Unknown				
SMITH'S TENDERLOINS (FORMER SERVICE STATION)	1401 ARMY POST ROAD Des Moines IA 503150000	E	0.49 / 2,584.55	66

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
LUST ID Leak Status: 318				
<u>Lower Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
SIGNATURE FLIGHT SUPPORT	DES MOINES INTL AIRPORT Des Moines IA 503210000	-	0.00 / 0.00	<u>6</u>
LUST ID Leak Status: 1748 Unknown				
SIGNATURE FLIGHT SUPPORT	DES MOINES INTL AIRPORT Des Moines IA 503210000	-	0.00 / 0.00	<u>27</u>
LUST ID Leak Status: 1749 Unknown				
QUIKTRIP	5701 FLEUR DR Des Moines IA 503210000	ENE	0.01 / 50.52	<u>33</u>
LUST ID Leak Status: 3946 Unknown				
PHILLIPS 66	4801 FLEUR DRIVE Des Moines IA 503150000	NE	0.01 / 59.26	<u>37</u>
LUST ID Leak Status: 1962 Unknown				
CLEAR ZONE RUNWAY 5/23 EXTENSION	4720 FLEUR DRIVE Des Moines IA 50315-	NE	0.02 / 104.17	<u>39</u>
LUST ID Leak Status: 5944 Stopped				
STAR	4600 FLEUR DR Des Moines IA 50321	NNE	0.10 / 546.64	<u>47</u>
LUST ID Leak Status: 1088 Unknown				

UST - Underground Storage Tanks in Iowa

A search of the UST database, dated Apr 2, 2018 has found that there are 32 UST site(s) within approximately 0.25 miles of the project property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
DSM AIRPORT - SOUTH CARGO FUELING	2601 ARMY POST RD Des Moines IA 50321	-	0.00 / 0.00	<u>7</u>
UST ID Status: 17076 Regulated tanks - active				
DSM ALSF	DES MOINES AIRPORT 2400 ARMY POST RD Des Moines IA 50321	-	0.00 / 0.00	<u>10</u>
UST ID Status: 17634 Emergency power generator tanks - active				
DSM ATCT	DES MOINES AIRPORT Des Moines IA 50321	-	0.00 / 0.00	<u>12</u>
UST ID Status: 2543 Regulated tanks - active				
see 200500033	5800 FLEUR DRIVE Des Moines IA 503150000	-	0.00 / 0.00	<u>15</u>
UST ID Status: 3932 Regulated tanks - r/f				
FAA DSM LOC	5800 FLEUR Drive Des Moines IA 50321	-	0.00 / 0.00	<u>15</u>

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
UST ID Status: 2540 Regulated tanks - active				
FAA VORTAC	5800 FLEUR Drive Des Moines IA 50321	-	0.00 / 0.00	<u>15</u>
UST ID Status: 2545 Regulated tanks - r/f				
DES MOINES INTERNATIONAL AIRPORT	5800 FLEUR DR Des Moines IA 50309	-	0.00 / 0.00	<u>15</u>
UST ID Status: 17921 Regulated tanks - active				
DES MOINES AIRPORT-EAST CARGO FUELING	6100 FLEUR DR Des Moines IA 50321	-	0.00 / 0.00	<u>19</u>
UST ID Status: 17075 Regulated tanks - active				
DES MOINES AIRPORT	2104 ARMY POST RD Des Moines IA 503210000	ESE	0.00 / 10.57	<u>30</u>
UST ID Status: 6699 Regulated tanks - r/f				
BUDGET RENT-A-CAR	2110 ARMY POST RD Des Moines IA 503200000	ESE	0.00 / 10.57	<u>30</u>
UST ID Status: 48 Non-regulated leaking site				
H & A MINI MART	5901 FLEUR DR Des Moines IA 50321	ENE	0.01 / 50.68	<u>35</u>
UST ID Status: 3369 Regulated tanks - active				
SCHLARBAUM AUTO BODY MICHAEL SCHLARBAUM	5919 FLEUR DR Des Moines IA 503210000	ENE	0.01 / 51.28	<u>36</u>
UST ID Status: 9758 Regulated tanks - r/f				
Not Known	2016 ARMY POST Des Moines IA 503150000	E	0.06 / 296.16	<u>45</u>
UST ID Status: 4998 Regulated tanks - r/f				
CASEYS GENERAL STORE 3518	1907 ARMY POST ROAD Des Moines IA 50315	E	0.13 / 689.27	<u>49</u>
UST ID Status: 18430 Regulated tanks - active				
PRINCIPAL HANGER	2502 MCKINLEY AVE Des Moines IA 50321	NNE	0.17 / 871.35	<u>52</u>
UST ID Status: 17856 Regulated tanks - active				
DSM ASR	DES MOINES AIRPORT Des Moines IA 503210000	NNE	0.18 / 965.18	<u>53</u>
UST ID Status: 2542 Emergency power generator tanks - active				
DSM GS	2600 MCKINLEY AVE Des Moines IA 503210000	NNE	0.21 / 1,115.73	<u>54</u>
UST ID Status: 2541 Regulated tanks - active				
AIRPORT FIELD MAINTENANCE	2600 MCKINLEY AVENUE Des Moines IA 503210000	NNE	0.21 / 1,115.73	<u>54</u>

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
UST ID Status: 17003 Regulated tanks - r/f				
MEREDITH HANGER	2602 MCKINLEY AVE Des Moines IA 50321	NNE	0.21 / 1,119.21	55
UST ID Status: 17702 Regulated tanks - active				
MID-AMERICA JET CENTER	2606 MCKINLEY Des Moines IA 50321	NNE	0.21 / 1,126.16	56
UST ID Status: 10582 Regulated tanks - r/f				
EMERY WORLDWIDE-A CF COMPANY	2701 SW MCKINLEY Des Moines IA 50321	NNE	0.25 / 1,305.38	57
UST ID Status: 4192 Regulated tanks - r/f				
<u>Lower Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
AIRFIELD MAINTENANCE FACILITY	3200 ARMY POST RD Des Moines IA 50321	-	0.00 / 0.00	2
UST ID Status: 17703 Regulated tanks - active				
MEREDITH HANGAR	3333 ARMY POST RD Des Moines IA 503210000	-	0.00 / 0.00	5
UST ID Status: 3039 Regulated tanks - r/f				
MUNICIPAL AIRPORT L AIRPORT	MUNICIPAL AIRPORT Des Moines IA 503210000	-	0.00 / 0.00	24
UST ID Status: 4614 Regulated tanks - r/f				
NATIONAL WEATHER SERVICE	INTERNATIONAL AIRPORT Des Moines IA 503210000	-	0.00 / 0.00	26
UST ID Status: 2936 Regulated tanks - r/f				
UNITED AIRLINES	DES MOINES INTL AIRPORT Des Moines IA 503210000	ENE	0.01 / 49.44	31
UST ID Status: 3585 Regulated tanks - r/f				
QUIKTRIP	5701 FLEUR DR Des Moines IA 503210000	ENE	0.01 / 50.52	33
UST ID Status: 8673 Regulated tanks - r/f				
PHILLIPS 66	4801 FLEUR DRIVE Des Moines IA 503150000	NE	0.01 / 59.26	37
UST ID Status: 4497 Regulated tanks - r/f				
CLEAR ZONE RUNWAY 5/23 EXTENSION	4720 FLEUR DRIVE Des Moines IA 50315-	NE	0.02 / 104.17	39
UST ID Status: 524 Non-regulated leaking site				
FORMER PRECISION TUNE	4723 FLEUR DR OR 2127 MCKINLEY Des Moines IA 503150000	NE	0.03 / 132.44	40
UST ID Status: 16711 Regulated tanks - r/f				

<u>Lower Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
HY-VEE	4701 Fleur Dr Des Moines IA 50315	NE	0.05 / 251.98	44
<i>UST ID Status: 18017 Regulated tanks - active</i>				
STAR	4600 FLEUR DR Des Moines IA 50321	NNE	0.10 / 546.64	47
<i>UST ID Status: 2440 Regulated tanks - r/f</i>				

AST - Aboveground Storage Tanks

A search of the AST database, dated Oct 26, 2017 has found that there are 1 AST site(s) within approximately 0.25 miles of the project property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
HP Enterprise Services(Des Moines)	3600 Army Post Rd. Des Moines IA 50321	SSW	0.04 / 192.01	42
<i>AST ID Status Status Start Dt: 14430 Regulated tanks - active 2011-11-29 15:43:17</i>				

DELISTED TANK - Delisted Storage Tanks

A search of the DELISTED TANK database, dated Apr 2, 2018 has found that there are 1 DELISTED TANK site(s) within approximately 0.25 miles of the project property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
HP Enterprise Services - Tanks	3600 Army Post Rd-Des Moines IA	SSW	0.04 / 192.01	42

INST - Sites with Institutional Controls

A search of the INST database, dated Jun 4, 2018 has found that there are 1 INST site(s) within approximately 0.50 miles of the project property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
Parr Manufacturing	3001 McKinley Avenue Des Moines IA 50321	N	0.36 / 1,913.00	60

VCP - Land Recycling Program Sites

A search of the VCP database, dated Jun 4, 2018 has found that there are 1 VCP site(s) within approximately 0.50 miles of the project property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
Parr Manufacturing	3001 McKinley Avenue Des Moines IA 50321	N	0.36 / 1,913.00	60

Non Standard

Federal

FINDS/FRS - Facility Registry Service/Facility Index

A search of the FINDS/FRS database, dated Apr 17, 2018 has found that there are 44 FINDS/FRS site(s) within approximately 0.02 miles of the project property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
DSM AIRPORT - SOUTH CARGO FUELING	2601 ARMY POST ROAD DES MOINES IA 50321	-	0.00 / 0.00	<u>7</u>
UNITED PARCEL SERVICE	2601 ARMY POST RD DES MOINES IA 50320	-	0.00 / 0.00	<u>7</u>
FEDERAL EXPRESS CORP - DSMR	2571 ARMY POST RD DES MOINES IA 50321	-	0.00 / 0.00	<u>9</u>
DSM ALSF - DES MOINES AIRPORT	BLDG 30 2400 ARMY POST ROAD DES MOINES IA 50321	-	0.00 / 0.00	<u>11</u>
DES MOINES INTERNATIONAL AIRPORT	5800 FLEUR DR DES MOINES IA 50321	-	0.00 / 0.00	<u>15</u>
DAL GLOBAL SERVICES, LLC- DSM	5800 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	<u>15</u>
FAA DSM RTRD	5800 FLEUR DR DES MOINES IA 503210000	-	0.00 / 0.00	<u>15</u>
MESABA AIRLINES	5800 FLEUR DR GATE C-1 DES MOINES IA 50321	-	0.00 / 0.00	<u>15</u>
ENVOY AIR INC.	5800 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	<u>15</u>
TSA AT DES MOINES INTERNATIONAL AIRPORT	5800 FLEUR DR DES MOINES IA 50321	-	0.00 / 0.00	<u>15</u>
AMERICAN AIRLINES - DSM AE DSM	5800 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	<u>15</u>
UNITED AIRLINES INC	DES MOINES INTL AIRPORT DES MOINES IA 503210000	-	0.00 / 0.00	<u>16</u>

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
DSM ALSF	DES MOINES AIRPORT DES MOINES IA 50321	-	0.00 / 0.00	16
AMERICAN EAGLE	DES MOINES INTL AIRPORT DES MOINES IA 50321	-	0.00 / 0.00	16
DES MOINES INTERNATIONAL AIRPORT	6200 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	17
HEAD INC	6214 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	18
DES MOINES AIRPORT-EAST CARGO FUELING	6100 FLEUR DR DES MOINES IA 50321	-	0.00 / 0.00	19
DES MOINES DEPARTMENT OF AVIATION	6014 FLEUR DR DES MOINES IA 50321	-	0.00 / 0.00	20
U S POSTAL SERVICE - DES MOINES	6010 FLEUR DR DES MOINES IA 50321-2854	-	0.00 / 0.00	21
DES MOINES AIRPORT	2104 ARMY POST RD DES MOINES IA 503210000	ESE	0.00 / 10.57	30
BUDGET RENT-A-CAR	2110 ARMY POST RD DES MOINES IA 503200000	ESE	0.00 / 10.57	30
SINGH DEVELOPMENT, LLC	5941 FLEUR DRIVE DES MOINES IA 50321	ENE	0.01 / 50.56	34
H & A MINI MART	5901 FLEUR DR DES MOINES IA 50321-2847	ENE	0.01 / 50.68	35
SCHLARBAUM AUTO BODY MICHAEL SCHLARBAUM	5919 FLEUR DR DES MOINES IA 503210000	ENE	0.01 / 51.28	36
PRECISION COLLISON CENTER	5897 A FLEUR DIVE DES MOINES IA 50321	ENE	0.01 / 60.91	38

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
<u>Lower Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
FEDEX EXPRESS-DSMR	3023 ARMY POST RD DES MOINES IA 50321	-	0.00 / 0.00	<u>1</u>
AIRFIELD MAINTENANCE FACILITY	3200 ARMY POST RD DES MOINES IA 50321	-	0.00 / 0.00	<u>2</u>
MESABA AIRLINES - HANGAR	2901 ARMY POST RD DES MOINES IA 50321	-	0.00 / 0.00	<u>3</u>
EVERGREEN AVIATION	3101 ARMY POST RD DES MOINES IA 50321-4043	-	0.00 / 0.00	<u>4</u>
MEREDITH HANGAR	3333 ARMY POST RD DES MOINES IA 50321	-	0.00 / 0.00	<u>5</u>
UNITED PARCEL SERVICE	3333 ARMY POST RD DES MOINES IA 50321	-	0.00 / 0.00	<u>5</u>
CEDAR VALLEY CORP LLC	PORTABLE DES MOINES IA 99999	-	0.00 / 0.00	<u>23</u>
MUNICIPAL AIRPORT L AIRPORT	MUNICIPAL AIRPORT DES MOINES IA 503210000	-	0.00 / 0.00	<u>24</u>
SIGNATURE FLIGHT SUPPORT	5600 FLEUR DR DES MOINES IA 50321	-	0.00 / 0.00	<u>25</u>
DES MOINES FLYING SERVICE	5600 FLEUR DRIVE DES MOINES IA 50321-2842	-	0.00 / 0.00	<u>25</u>
STAR	5600 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	<u>25</u>
NATL WEATHER SVC	INTERNATIONAL AIRPORT DES MOINES IA 503210000	-	0.00 / 0.00	<u>26</u>

<u>Lower Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
DES MOINES INTERNATIONAL AIRPORT - APRON CONSTRUCTION	5400 FLEUR DR DES MOINES IA 50321	-	0.00 / 0.00	<u>28</u>
PRECISION COLLISION CENTER	5807 FLEUR DR DES MOINES IA 50321	ENE	0.01 / 50.18	<u>32</u>
QUIKTRIP #559	5701 FLEUR DR DES MOINES IA 50321	ENE	0.01 / 50.52	<u>33</u>
QUIKTRIP CORP STORE 559 - FORMER SITE OF	5701 FLEUR DR DES MOINES IA 50321	ENE	0.01 / 50.52	<u>33</u>
LAWS 66	4801 FLEUR DR. DES MOINES IA 50321	NE	0.01 / 59.26	<u>37</u>
PHILLIPS 66	4801 FLEUR DRIVE DES MOINES IA 503150000	NE	0.01 / 59.26	<u>37</u>
CLEAR ZONE RUNWAY 5/23 EXTENSION	4720 FLEUR DRIVE DES MOINES IA 50315-	NE	0.02 / 104.17	<u>39</u>

HMIRS - Hazardous Materials Information Reporting System

A search of the HMIRS database, dated Sep 11, 2017 has found that there are 5 HMIRS site(s) within approximately 0.12 miles of the project property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
	2601 ARMY POST RD DES MOINES IA	-	0.00 / 0.00	<u>7</u>
	2601 ARMY POST DES MOINES IA	-	0.00 / 0.00	<u>8</u>
	5800 FLEUA DRIVE DES MOINES IA	-	0.00 / 0.00	<u>14</u>

<u>Lower Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
	3023 ARMY POST RD DES MOINES IA	-	0.00 / 0.00	<u>1</u>

<u>Lower Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
	3333 ARMY POST RD DES MOINES IA	-	0.00 / 0.00	5

ICIS - Integrated Compliance Information System (ICIS)

A search of the ICIS database, dated Nov 18, 2016 has found that there are 17 ICIS site(s) within approximately 0.02 miles of the project property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
DES MOINES AIRPORT-DSM ALSF	BLDG. 30, 2400 ARMY POST ROAD DES MOINES IA 50321	-	0.00 / 0.00	11
DSM ALSF - DES MOINES AIRPORT	BLDG 30 2400 ARMY POST ROAD DES MOINES IA 50321	-	0.00 / 0.00	11
DES MOINES AIRPORT - FAA/DSM/LOC	5800 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	15
DSM GS	5800 FLEUR DR DES MOINES IA 50321	-	0.00 / 0.00	15
DES MOINES INTERNATIONAL AIRPORT	5800 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	15
UNITED AIRLINES INC	5800 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	15
ENVOY AIR INC.	5800 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	15
DES MOINES INTERNATIONAL AIRPORT	5800 FLEUR DR DES MOINES IA 50321	-	0.00 / 0.00	15
DSM GS - DES MOINES AIRPORT	5800 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	15
DES MOINES INTERNATIONAL AIRPORT	6200 FLEUR DRIVE DES MOINES IA 503212854	-	0.00 / 0.00	17
HEAD INC	6214 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	18

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
Lower Elevation	Address	Direction	Distance (mi/ft)	Map Key
MESABA AIRLINES - HANGAR	2901 ARMY POST RD DES MOINES IA 50321	-	0.00 / 0.00	<u>3</u>
CEDAR VALLEY CORP LLC	PORTABLE DES MOINES IA 99999	-	0.00 / 0.00	<u>23</u>
DES MOINES FLYING SERVICE	5600 FLEUR DRIVE DES MOINES IA 50321	-	0.00 / 0.00	<u>25</u>
SIGNATURE FLIGHT SUPPORT	5600 FLEUR DR DES MOINES IA 50321	-	0.00 / 0.00	<u>25</u>
DES MOINES FLYING SERVICE INC	5600 FLEUR DRIVE DES MOINES IA 50321-2842	-	0.00 / 0.00	<u>25</u>
LAWS 66	4801 FLEUR DR. DES MOINES IA 50321	NE	0.01 / 59.26	<u>37</u>

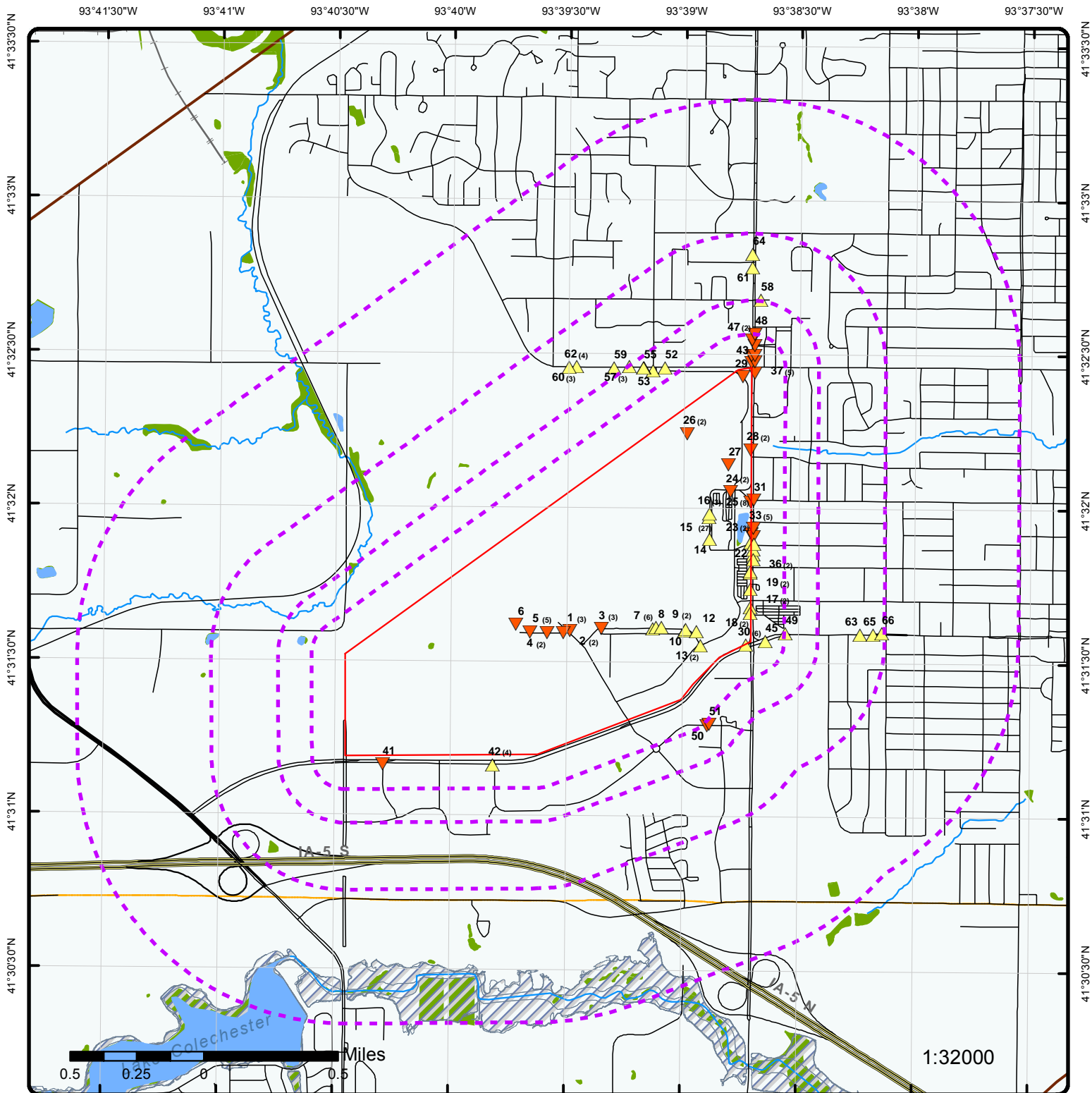
State

SPILLS - Spill incidents reported to Iowa DNR and tracked in the Hazardous Substance Incident database

A search of the SPILLS database, dated Apr 17, 2018 has found that there are 12 SPILLS site(s) within approximately 0.12 miles of the project property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
Transportation Spill	Fleur Dr & Army Post Rd Des Moines IA <i>Location ID: 20000267217</i> <i>State Facility ID OP Status: 311576479 Closed</i>	-	0.00 / 0.00	<u>13</u>
Transformer Spill	Army Post Rd & Fleur Des Moines IA 50321 <i>Location ID: 20000269983</i> <i>State Facility ID OP Status: 311587698 Closed</i>	-	0.00 / 0.00	<u>13</u>
Dal Global Services, Llc-dsm	5800 Fleur Drive Des Moines IA 50321 <i>Location ID: 20000248516</i> <i>State Facility ID OP Status: 311308677 Closed, 311308677 Closed</i>	-	0.00 / 0.00	<u>15</u>
Des Moines International Airport - Construction	5800 Fleur Dr Des Moines IA 50321	-	0.00 / 0.00	<u>15</u>

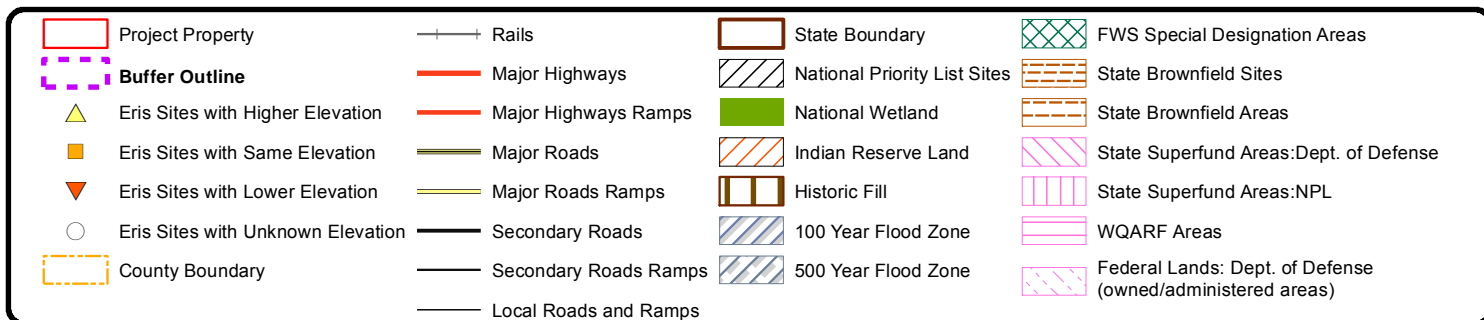
<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
Location ID: 20000248576 State Facility ID OP Status: 311309349 Closed, 311309349 Closed, 311309349 Closed, 311309349 Closed, 311309349 Closed, 311309349 Closed				
See 200500033	5800 Fleur Drive Des Moines IA 50321	-	0.00 / 0.00	15
Location ID: 20000155305 State Facility ID OP Status: 310491431 Open, 310491431 Closed, 310491431 Closed, 310491431 Closed, 310491431 Closed, 310491431 Closed, 310491431 Closed, 310491431 Closed, 310491431 Closed, 310491431 Closed, 310491431 Closed, 310491431 Closed, 310491431 Closed				
Parking Garage	5880 Fleur Dr Des Moines IA 50321	-	0.00 / 0.00	22
Location ID: 20000269963 State Facility ID OP Status: 311586726 Closed				
Hewlett-packard Company - Des Moines	3600 Army Post Road Road Des Moines IA 50321	SSW	0.04 / 192.01	42
Location ID: 20000264601 State Facility ID OP Status: 311551447 Closed, 311551447 Open				
<u>Lower Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
Des Moines International Airport - Apron Construction	5400 Fleur Dr Des Moines IA 50321	-	0.00 / 0.00	28
Location ID: 20000248129 State Facility ID OP Status: 311304362 Closed				
Handling And Storage Spill	Fleur Dr & McKinley Ave Des Moines IA 50321	-	0.00 / 0.00	29
Location ID: 20000271034 State Facility ID OP Status: 311673168 Closed				
Transformer Spill	4704 Fleur Dr Des Moines IA 50315	NE	0.05 / 239.53	43
Location ID: 20000269443 State Facility ID OP Status: 311623464 Closed				
Hy Vee	4701 Fleur Dr Des Moines IA 50321-2335	NE	0.05 / 251.98	44
Location ID: 20000265585 State Facility ID OP Status: 311573114 Closed				
Transportation Spill	4707 Fleur Dr Des Moines IA 50321	NE	0.08 / 442.17	46
Location ID: 20000274996 State Facility ID OP Status: 311692374 Closed				

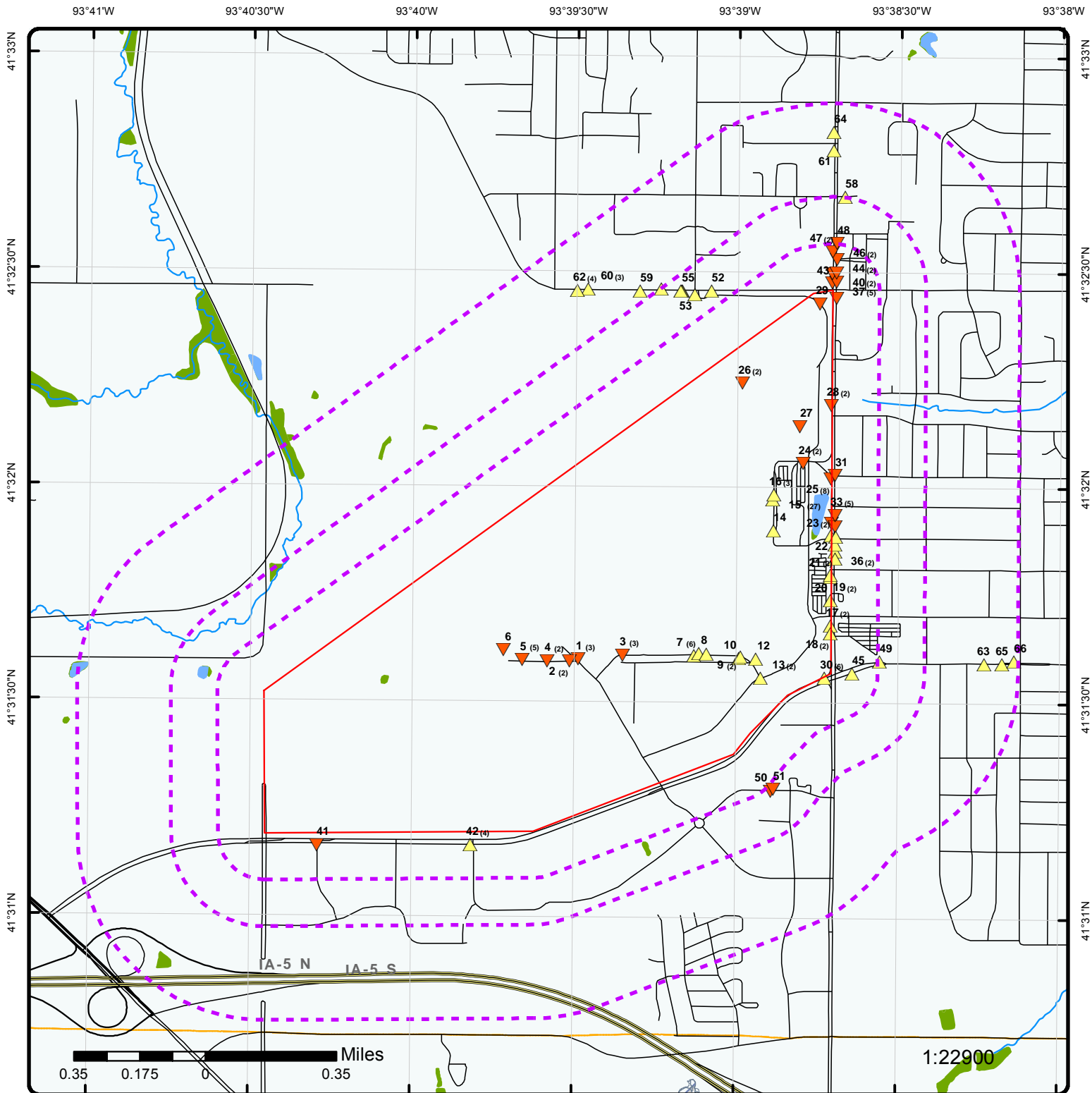


Map : 1 Mile Radius

Order No: 20180730224

Address: 5800 Fleur Drive, Des Moines, IA





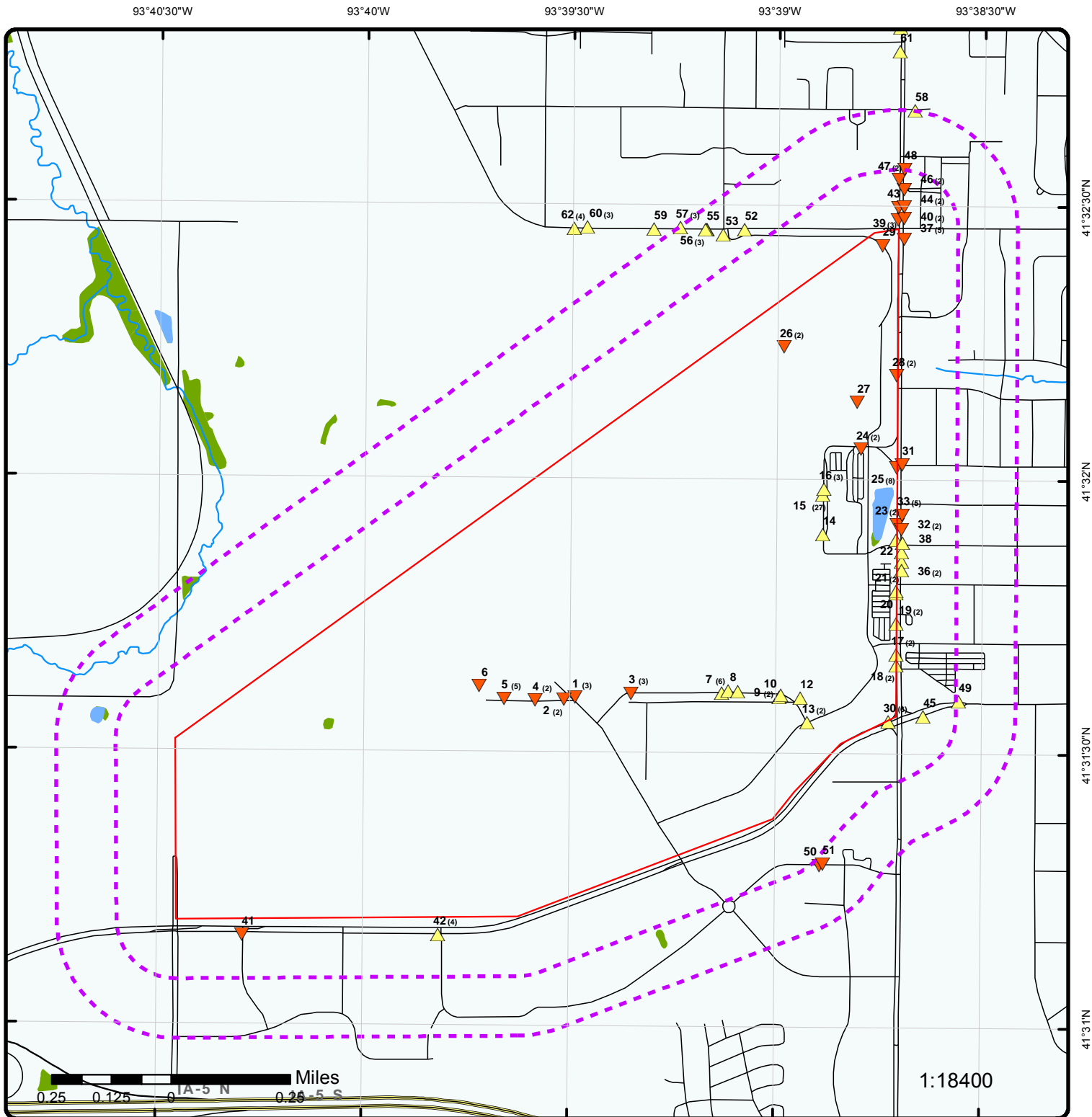
Map : 0.5 Mile Radius

Order No: 20180730224

Address: 5800 Fleur Drive, Des Moines, IA



Project Property	Rails	State Boundary	FWS Special Designation Areas
Buffer Outline	Major Highways	National Priority List Sites	State Brownfield Sites
Eris Sites with Higher Elevation	Major Highways Ramps	National Wetland	State Brownfield Areas
Eris Sites with Same Elevation	Major Roads	Indian Reserve Land	State Superfund Areas:Dept. of Defense
Eris Sites with Lower Elevation	Major Roads Ramps	Historic Fill	State Superfund Areas:NPL
Eris Sites with Unknown Elevation	Secondary Roads	100 Year Flood Zone	WQARF Areas
County Boundary	Secondary Roads Ramps	500 Year Flood Zone	Federal Lands: Dept. of Defense (owned/administered areas)
	Local Roads and Ramps		



Map : 0.25 Mile Radius

Order No: 20180730224

Address: 5800 Fleur Drive, Des Moines, IA



Project Property	Rails	State Boundary	FWS Special Designation Areas
Buffer Outline	Major Highways	National Priority List Sites	State Brownfield Sites
Eris Sites with Higher Elevation	Major Highways Ramps	National Wetland	State Brownfield Areas
Eris Sites with Same Elevation	Major Roads	Indian Reserve Land	State Superfund Areas:Dept. of Defense
Eris Sites with Lower Elevation	Major Roads Ramps	Historic Fill	State Superfund Areas:NPL
Eris Sites with Unknown Elevation	Secondary Roads	100 Year Flood Zone	WQARF Areas
County Boundary	Secondary Roads Ramps	500 Year Flood Zone	Federal Lands: Dept. of Defense (owned/administered areas)
	Local Roads and Ramps		

93°40'30"W

93°40'W

93°39'30"W

93°39'W

41°32'30"N

41°32'N

41°31'30"N

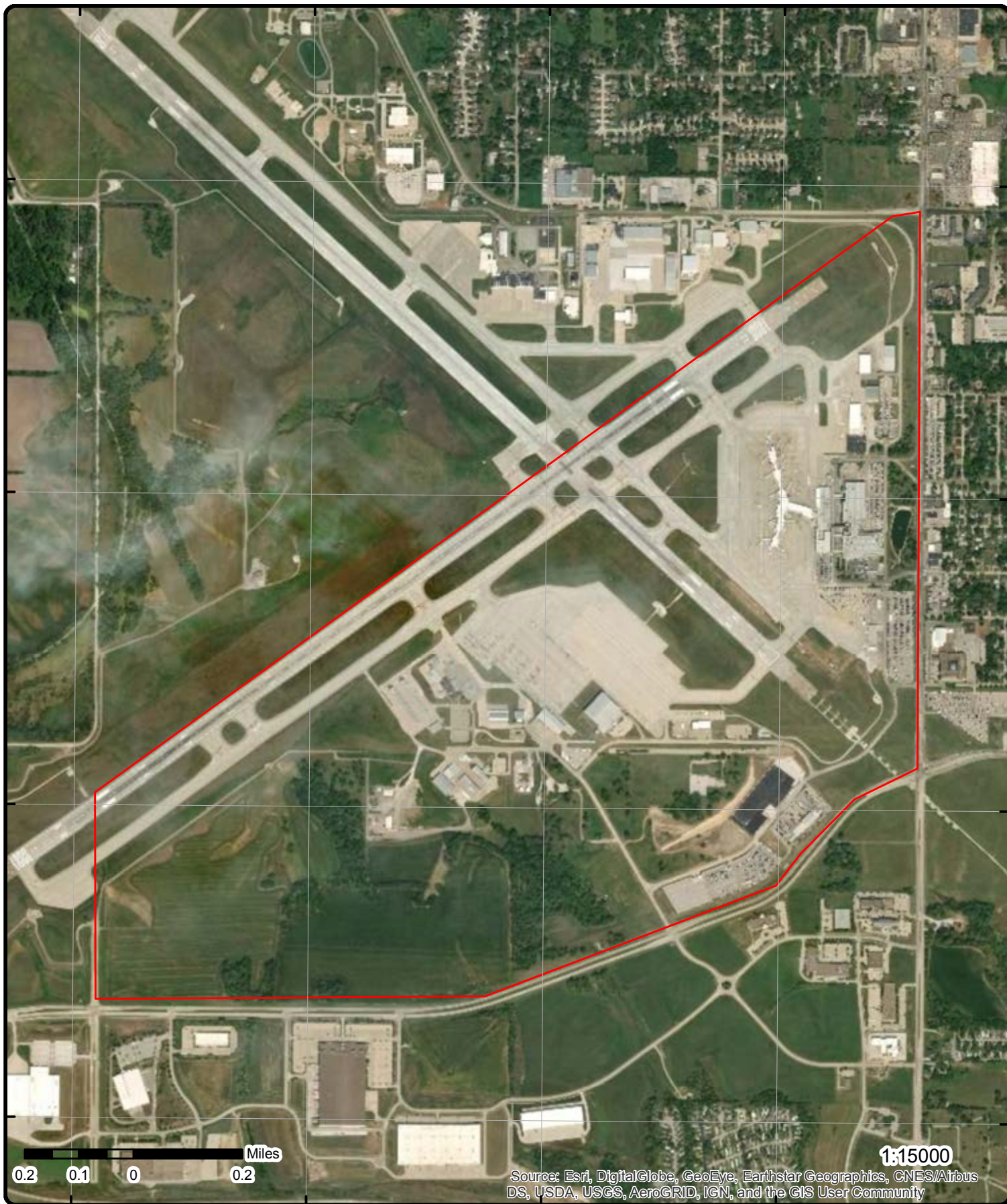
41°31'N

41°32'30"N

41°32'N

41°31'30"N

41°31'N



Aerial (2017)

Address: 5800 Fleur Drive, Des Moines, IA

Source: ESRI World Imagery

Order No: 20180730224



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APPENDIX D

HISTORIC AND CULTURAL RESOURCES

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From: scott.tener@faa.gov
To: [Barrow, Julie; BMBelt@dsmairport.com](mailto:Barrow_Julie@BMBelt@dsmairport.com)
Subject: FW: R&C#181077033_FAA_DesMoines International Airport
Date: Tuesday, December 18, 2018 3:20:34 PM

FYI...

From: Andre, Sara <sara.andre@iowa.gov>
Sent: Tuesday, December 18, 2018 4:03 PM
To: Tener, Scott (FAA) <scott.tener@faa.gov>
Cc: Higginbottom, Daniel <daniel.higginbottom@iowa.gov>; Unknown Unknown <shpo106@iowa.gov>
Subject: R&C#181077033_FAA_DesMoines International Airport

R&C# 181077033

Agency: FAA

County/Muni: Polk County, Des Moines

Project: Des Moines International Airport - passenger terminal replacement, etc.

Mr. Tener:

The following response is in regards to your October submittal of the above-named project. Please note that the following comments are in regards to the Architectural/Historical Intensive Survey and Evaluation only.

Tallgrass Archaeology, LLC prepared the submitted survey information: *Des Moines International Airport Replacement Terminal Environmental Assessment, City of Des Moines, Polk County, Iowa: Architectural/Historical Intensive Survey and Evaluation*. Based on their report and survey, they recommend that the following resources are not eligible for the National Register of Historic Places: 1949-50 Des Moines Municipal Airport Terminal & Administration Building, the Iowa Aviation Inc., Fixed Base Operator Building (Building 35), and the Des Moines International Airport (as potential historic district). Iowa SHPO concurs with the consultant's recommendation of not eligible for the above-noted resources.

We look forward to continuing consultation on the Des Moines International Airport project. If you have any comments or questions, please contact either Dan Higginbottom or me. Please note that Dan will be unavailable until January 13, 2019. Please be sure to reference the R&C# in future correspondence.

Kind regards,

Sara

Sara André

Architectural Historian

State Historic Preservation Office

sara.andre@iowa.gov | 515-242-6157 | iowaculture.gov

Iowa Arts Council | Produce Iowa | State Historical Society of Iowa

Iowa Department of Cultural Affairs

Share your stories using #iowahistory



U.S. Department
Of Transportation

**Federal Aviation
Administration**

Central Region
Iowa, Kansas
Missouri, Nebraska

901 Locust
Kansas City, Missouri 64106-2325

March 11, 2019

CERTIFIED MAIL

Review & Compliance Program Manager
State Historical Society of Iowa
State Historic Preservation Office
600 E. Locust Street
Des Moines, Iowa 50319-0290

Iowa SHPO 181077033
Pre-Construction Monitoring of Potential Cemetery
Environmental Assessment for Replacement of Passenger Terminal
Des Moines International Airport
Des Moines, Polk County, Iowa

In response to your October 16, 2018 email, a pre-construction survey was completed on the portion of the proposed fuel access road crossing through the potential Truman Jones Cemetery shown on the 1907 Bloomfield Township plat. The supplemental report for the survey is attached.

Based on the enclosed survey along with the previous information provided regarding the proposed undertaking, we do not believe that there will be any historic properties that will be affected. We request your concurrence with a "No historic properties will be affected" finding. The airport will be required to contact your office if archaeological resources are uncovered during the project.

If you have any questions, please contact me at scott.tener@faa.gov or (816) 329-2639.

Sincerely,

Scott Tener, P.E.
Environmental Specialist

Enclosure: Pre-Construction Monitoring Supplemental Report (Tallgrass, March 2019)

Tener, Scott (FAA)

From: Higginbottom, Daniel <daniel.higginbottom@iowa.gov>
Sent: Monday, March 25, 2019 12:34 PM
To: Tener, Scott (FAA); Sara Andre; Unknown Unknown
Subject: 181077033
Attachments: 20190325123410605.pdf

March 25, 2019

Scott-

See the attached file for our response to your recent submission.

Daniel K. Higginbottom, Archaeologist
Iowa State Historic Preservation Office

----- Forwarded message -----

From: <DCA-333PRN01@iowa.gov>
Date: Mon, Mar 25, 2019 at 12:29 PM
Subject: Message from "DCA-333PRN01"
To: Daniel Higginbottom <daniel.higginbottom@iowa.gov>

This E-mail was sent from "DCA-333PRN01" (MP C4504).

Scan Date: 03.25.2019 12:34:10 (-0400)
Queries to: DCA-333PRN01@iowa.gov

--

Daniel K. Higginbottom, Archaeologist
Iowa State Historic Preservation Office
State Historical Society of Iowa
600 E Locust
Des Moines, Iowa 50319-0290

REQUEST FOR SHPO COMMENT ON A PROJECT

181025095

Submit one copy with each property for which our comment is requested. Please print or type.

Return to: State Historical Society of Iowa, State Historic Preservation Office, 600 E. Locust St, Des Moines, IA 50319-0290

I. GENERAL INFORMATION

☒ This is a new submittal

☐ This is more information relating to SHPO R&C #:

a. Property Name: Des Moines International Airport (Environmental Assessment for Airport Improvements)

b. Property Street & Number: 5800 Fleur Dr

c. County: Polk City: Des Moines Zip: 50321

d. Federal Agency: FAA Federal Funding Program/Permit: AIP

e. Agency Project No.: N/A If HUD, circle one: 24 CFR Part 50 or Part 58

f. Contact Person on Project: Scott Tener Phone: 816-329-2639

g. Contact Address: FAA ACE-611F, 901 Locust, Kansas City, MO Zip: 64116 email: scott.tener@faa.gov

II. IDENTIFICATION OF HISTORIC PLACES

Scope of Effort Applied

☐ As agreed in programmatic or other agency agreements with SHPO (if applicable)

☒ Includes the attached elements required under 36 CFR 800.4(a)

- 1) Area of potential effects, as defined in 800.16(d), is shown on map
- 2) Existing information has been reviewed on historic properties in the property area at SHPO office and/or other locations of inventory data
- 3) Information has been sought from parties likely to have knowledge about historic properties in the project area
- 4) Information gathered from Indian tribes, as appropriate

Identification Results

History and Architecture

☒ An attached Iowa Site Inventory form is completed for each building 50 years of age or older

Archaeology

☒ Yes ☐ No The project will involve excavation

If yes, submit all of the following information

- 1) Precise project location map (preferably U.S.G.S. 7.5 min Quad with name, date, & location)
- 2) Site plan showing limits of proposed excavation
- 3) Number of acres in project _____
- 4) Legal location: Section(s) _____ Township(s) _____ Range(s) _____
- 5) Description of width and depth of proposed excavation and current conditions of project area

III. APPLICANT CERTIFICATION (Check Either Adverse Effect or No Adverse Effect for Historic Property Affected category)

Findings (Check One)

☒ **No historic properties will be affected** (i.e., none are present or there are historic properties present but the project will have no effect upon them) and adequate documentation under 800.11 is provided, including:

- 1) A description of the undertaking, specifying the Federal involvement, and its area of potential effects, including photographs, maps, drawings, as necessary **and**
- 2) A description of the steps taken to identify historic properties, including, as appropriate, efforts to seek information pursuant to 800.4(b) **and**
- 3) The basis for determining that no historic properties are present or affected.

I understand that the SHPO has 30 days from receipt to object to the finding, after which the applicant's responsibilities under Section 106 of the Historic Preservation Act are fulfilled.

☐ **An historic property will be affected** for which documentation is provided as required in 36 CFR Part 800.11(e) and, in applying the criteria of adverse effect under 800.5, propose that the project be considered to have **(Check One)**:

- ☐ A **No Adverse Effect** under which, in consultation with the SHPO, the project will be modified or conditions imposed to avoid adverse effects. I understand that failure of the SHPO to provide a dated response within 30 days from receipt to the finding shall be considered agreement of the SHPO with the finding
- ☐ An **Adverse Effect** is found and the applicant, or other federally authorized representative, will consult with the SHPO and other consulting parties to resolve the adverse effect under 800.6

Federally Authorized Signature: _____

Type name below →

Scott Tener

Date: _____

9/28/18

IV. STATE HISTORIC PRESERVATION OFFICE COMMENT

- * ☒ Agree with the finding in section III above (move to reader's file)
- ☐ Object to the finding for reasons indicated in attached letter
- ☐ Cannot review until information is sent as follows: _____

☐ See attached follow-up letter

Authorized Signature: _____

Date: _____

3/25/2019

Please mail a copy of this signed statement to your contact person at the Federal Agency

Version: 12/18/02

* Observe consulting archaeologists' cautions.

From: scott.tener@faa.gov
To: BMBelt@dsmairport.com
Cc: Barrow, Julie; jeff.deitering@faa.gov
Subject: Archaeology SHPO Comments: 181077033-FAA-Polk-Des Moines-Des Moines International Airport-Proposed Passenger Terminal Replacement Project- Phase I Archaeological Investigation [TA18-698-2]
Date: Tuesday, October 16, 2018 1:09:21 PM

Bryan/Julie,

Comments for Archaeology only below. The SHPO has concerns with the Truman Jones Cemetery. The location of the cemetery raises some concern about project impacts and the potential discovery of human remains for proposed activities in the immediate area - namely projects 21 (Rental Car Service Building and Ready-Return Area) and 22 (Fuel Road Improvements). The SHPO strongly advises that Dr. John Doershuk (State Archaeologist) and Dr. Lara Noldner (Director of the Bioarchaeology Program at OSA) be contacted for further guidance. Until such consultation occurs, the SHPO cannot issue a concurrence to the FAA's determination of 'no historic properties' as it relates to archaeological resources.

Please contact Dr. Doershuk and Dr. Noldner to see if they have any concerns. We need to try to confirm the location/relocation of the cemetery and determine project impacts in this area. We may need to complete another survey of this area to get better information. If we cannot determine the cemetery's disposition, then we may need to develop a Memorandum of Agreement with the SHPO prior to Section 106 consultation being concluded and a NEPA determination being made.

The SHPO should be sending Architectural comments soon.

Please let me know if you have any questions,

Scott Tener
Environmental Specialist

FAA Central Region Airports Division
901 Locust St., Room 364
Kansas City, Missouri 64106-2325
T 816.329.2639 | F 816.329.2611
<http://www.faa.gov/airports/central/>

From: Higginbottom, Daniel <daniel.higginbottom@iowa.gov>
Sent: Tuesday, October 16, 2018 11:31 AM
To: Tener, Scott (FAA) <scott.tener@faa.gov>; Unknown Unknown <shpo106@iowa.gov>; John Doershuk (E-mail) <john-doershuk@uiowa.edu>; Lara K <lara-noldner@uiowa.edu>; Sara Andre <sara.andre@iowa.gov>; Leah Rogers (lrogerstallgrass@gmail.com) <lrogerstallgrass@gmail.com>
Subject: 181077033-FAA-Polk-Des Moines-Des Moines International Airport-Proposed Passenger Terminal Replacement Project- Phase I Archaeological Investigation [TA18-698-2]

October 16, 2018

181077033-FAA-Polk-Des Moines-Des Moines International Airport-Proposed
Passenger Terminal Replacement Project- Phase I Archaeological Investigation
[TA18-698-2]

Scott,

We have received your October 5, 2018 submittal regarding the above-referenced federal undertaking including copies of the report entitled *Des Moines International Airport Replacement Terminal Environmental Assessment, City of Des Moines, Polk County, Iowa: Phase I Archaeological Investigation [TA18-698--2]* and *Des Moines International Airport Replacement Terminal Environmental Assessment, City of Des Moines, Polk County, Iowa: Architectural/Historical Intensive Survey and Evaluation [TA18-698--1]* prepared by Leah Rogers, Cindy Nagel, and Jan Olive Full of Tallgrass Archaeology, LLC., Iowa City. The following response is based upon our review of the archaeological investigation only. A response addressing the architectural aspect of the SHPO review is forthcoming and will be provided thru a separate communication.

Preliminary background review identified on previously reported archaeological site within the project area of potential effects (APE). This site, the Truman Jones Cemetery (13PK961) is discussed in greater detail below. The full extent of the project APE consists of 803 acres. However, the Principal Investigator has employed landuse history, geospatial and geotechnical data to identified areas of past disturbance and results of previous surveys thereby eliminating a considerable area lacking archaeological potential. Survey effort targeted an area of 255 acres that demonstrated some degree of archaeological potential.

Pedestrian reconnaissance and systematic subsurface sampling identified five (5) newly recorded sites designated 13PK1059-13PK1063. All are described as low-density prehistoric artifact scatters, but only one (13PK1059) yielded a time diagnostic pattern tool that allows a more refined Late Woodland Period assignment. The survey found that the archaeological material at all sites were confined to the disturbed plowzone and consequently that all sites lacked spatial integrity and research potential. The consulting archaeologist has recommended that all five sites be considered ineligible for listing in the National Register of Historic Places. We agree with this assessment.

The Truman Jones Cemetery is located outside of the area surveyed by Tallgrass, but is within the defined APE. Its location is based upon information obtained from the 1907 Polk County property atlas and research conducted by local cemetery historian Nick Hornyak. The cemetery is no longer evident through ground level observation and no records have been produced that confirm burials associated with this cemetery were relocated prior to development of the Des Moines Airport property. The consulting archaeologist speculates that the cemetery location appears to be under what is now the east end of the SE Service Road adding "...this location should be considered to have some potential for human remains if this location is ever proposed for impacts" (page 16).

The poorly understood location and boundaries of 13PK961 raises some concern about project impacts and the potential discovery of human remains for proposed activities in the immediate area - namely projects 21 (Rental Car Service Building and Ready-Return Area) and 22 (Fuel Road Improvements). There is also a question of the cemetery's age and statutory jurisdiction in the event human remains are uncovered. We strongly advise the FAA and project proponent to contact the Dr. John Doershuk (State Archaeologist) and Dr. Lara Noldner (Director of the Bioarchaeology Program at OSA) for further guidance. Until such consultation occurs, our office would be premature in issuing a concurrence to the FAA's determination of 'no historic properties' as it relates to archaeological resources.

Daniel K. Higginbottom, Archaeologist
Iowa State Historic Preservation Office

From: [Doershuk, John F](#)
To: BMBelt@dsmairport.com; [Barrow, Julie](#); [Full, David](#); [Higginbottom, Daniel \[DCA\]](#)
(Daniel.Higginbottom@iowa.gov); [Leah Rogers](#)
Cc: [Mack, Jennifer E](#); [Noldner, Lara K](#)
Subject: RE: DSM Airport Project 22
Date: Friday, October 19, 2018 9:26:16 AM

Reissued to include that OSA has no ancient human remains-related concerns about Project 21 (the Rental Car Service Building and Ready-Return Area).

JFD

Leah et al.,

Thank you for providing the maps and associated descriptive information about “Project 22: Fuel Road Improvements” at the Des Moines Airport. Attached is our georeferencing of the 1907 plat cemetery boundaries (in pink) on the roadway engineering plan. Obviously, there is the potential for considerable introduced error in getting these map views integrated, but as there is evidently overlap, it is my recommendation that Sta. 108+00—111+00 earthmoving activities, including for the planned drains and any other subsurface activity, should be monitored by Tallgrass Archaeology.

Sincerely,
John F. Doershuk, Ph.D.
State Archaeologist and Director
Office of the State Archaeologist
Adjunct Associate Professor, Anthropology
University of Iowa
700 Clinton Street
Iowa City, Iowa 52242-1030
319-384-0751 (office)
archaeology.uiowa.edu
OSA: a UI research center since 1959

From: Leah Rogers [<mailto:lrogerstallgrass@gmail.com>]
Sent: Thursday, October 18, 2018 4:31 PM
To: Mack, Jennifer E <jennifer-mack@uiowa.edu>
Cc: Barrow, Julie <Julie.Barrow@rsandh.com>; Full, David <David.Full@rsandh.com>
Subject: DSM Airport projects

Jennifer: Here is the response from Bryan Belt at the DSM Airport including a map of the underground utility lines that run through the area on the north side of old Army Post Road. Again, the rental car lot project area is well south of old Army Post Road and most of the northern part of that lot was previously surveyed for the 1990s road realignment, although I suspect the depiction in I-Sites probably needs to be adjusted because the road as built does not really match the survey area depiction. You can also see on the 1990s aerial that there used

to be a mid-20th century subdivision south of old Army Post Road that covered this area and was demolished when the road was realigned. OSA did the archaeology for that project and I did the architectural history.

Leah Rogers, Tallgrass

From: Belt, Bryan M. [mailto:BMBelt@dsmairport.com]

Sent: Thursday, October 18, 2018 3:03 PM

To: Barrow, Julie <Julie.Barrow@rsandh.com>

Subject: RE: DSM EA - OSA Questions

Julie

Roadway – yes the sub drain is planned on being installed with the roadway, so will be new. We have a high water table on the Airport, and getting rid of it extends the life of the pavement. Item to note: There are multiple utilities that already run through this area, quite a few of them deep. See attached. I have turned on all:

- FAA NavAides
- Gas
- Water
- Storm
- Sanitary
- Electrical
- Communications

Rental car facility – new building to be erected. Item you are seeing is the canopy at the entry/exit lanes. Footings for this canopy are deep, approximately 6-7' deep.

BRYAN BELT

director of engineering

515.256.5160

Leah D. Rogers

Tallgrass Archaeology LLC

2460 S. Riverside Drive

Iowa City, IA 52246

319-354-6722

Graphic Redacted for Confidentiality Purposes

From: [Leah Rogers](#)
To: [Barrow, Julie](#); [Full, David](#)
Cc: [Doershuk, John E](#); [Noldner, Lara K](#); [Mack, Jennifer E](#)
Subject: Fwd: DSM Airport
Date: Monday, October 22, 2018 1:24:29 PM

Here is the very positive response from OSA regarding the proposal to scrape the area of potential effect for the cemetery site prior to construction under the direction of a qualified archaeologist. Also provided is the wording used for the Booneville Road project. We can adapt the language to the current project. John and Lara of the OSA were both supportive of this methodology because as John points out it is much preferable to finding things during construction. Using a trackhoe with a flat-edged bucket to scrape of the layers of gravel and soil to expose the subsoil where any grave features will be visible is also a common way to conduct data recovery on historic sites and works very well.

Tallgrass has also had success with using a skid loader to remove the topsoil in a similar technique as well as a backhoe with a toothless bucket removing just a few inches at a time. We were able to use a small belly loader with great success on a data recovery at Lake Red Rock years ago but that small of a belly loader is not easy to find and probably too much of a machine for the area in question at the Des Moines Airport (belly loaders require a large turning radius to make this technique work and is probably best for large open site areas.

The idea is to, as smoothly and cleanly as possible, remove the topsoil/overburden to expose a fresh-cut face of the subsoil so that any darker-colored feature stains, such as graves, really stand out. The fewer track marks from the machine the better. When we use skid loaders we have them make one pass, check the cleanly-cut soils in-between the tracks, and then move over to make a pass through their old tracks and so forth. All techniques will work and usually depends on what the surface overburden is and what machines are available. Skid loaders also have a problem with traction when things are wet, so that would not work if it started raining a lot again this fall.

Leah D. Rogers

Tallgrass Archaeology LLC
2460 S. Riverside Drive
Iowa City, IA 52246
319-354-6722

----- Forwarded message -----

From: **Noldner, Lara K** <lara-noldner@uiowa.edu>
Date: Mon, Oct 22, 2018 at 1:59 PM
Subject: RE: DSM Airport
To: Leah Rogers <lrogerstallgrass@gmail.com>, Doershuk, John F <john-doershuk@uiowa.edu>
Cc: Mack, Jennifer E <jennifer-mack@uiowa.edu>

I do! Here is the relevant snippet from the email I sent them.. Monitored mechanical stripping of the remaining berm well in advance of construction activity is the best way forward in order to determine whether additional grave shafts are present without unwanted damage to any

potentially present human remains. This means using a trackhoe with a flat edged bucket to gradually scrape off thin layers of soil. The monitor of this work must be a qualified archaeologist who meets the Secretary of the Interior's Standards. Should any grave shafts be encountered, the area must be secured and no further excavation conducted until I am notified and can conduct an investigation.

You can of course adjust as needed. Thanks!

Lara

From: Leah Rogers <lrogerstallgrass@gmail.com>
Sent: Monday, October 22, 2018 1:52 PM
To: Doershuk, John F <john-doershuk@uiowa.edu>
Cc: Noldner, Lara K <lara-noldner@uiowa.edu>; Mack, Jennifer E <jennifer-mack@uiowa.edu>
Subject: Re: DSM Airport

Do you have the language that would have been used in the recommendations for the Booneville study? Thanks!

Leah D. Rogers

Tallgrass Archaeology LLC

2460 S. Riverside Drive

Iowa City, IA 52246

319-354-6722

On Mon, Oct 22, 2018 at 1:37 PM Doershuk, John F <john-doershuk@uiowa.edu> wrote:

I prefer archaeologist-controlled pre-construction investigation assuming the APE is thoroughly explored.

Thanks,

John

From: Noldner, Lara K
Sent: Monday, October 22, 2018 1:35 PM
To: lrogerstallgrass@gmail.com; Doershuk, John F <john-doershuk@uiowa.edu>
Cc: Mack, Jennifer E <jennifer-mack@uiowa.edu>
Subject: RE: DSM Airport

Hi Leah,

Thanks for working with John and Jennifer on this last week. My apologies that I've not joined the conversation until now, but I think that the same method of monitored scraping that we recommended for the site on Booneville Rd. would be acceptable for this airport road work as well. Jennifer filled me in on most of your conversations, so I'm mostly up to speed on this, but do you have any concerns with this approach, John or Jennifer?

Thanks,

Lara

From: Doershuk, John F
Sent: Monday, October 22, 2018 1:24 PM
To: Noldner, Lara K <lara-noldner@uiowa.edu>
Subject: FW: DSM Airport

From: Leah Rogers <lrogerstallgrass@gmail.com>
Sent: Monday, October 22, 2018 9:25 AM
To: Doershuk, John F <john-doershuk@uiowa.edu>
Cc: Barrow, Julie <Julie.Barrow@rsandh.com>; Full, David <David.Full@rsandh.com>
Subject: DSM Airport

John: Eva Moritz of Foth had a recommendation this morning at our Airport conference call based on the protocol for a project they are working on for a cemetery site along Booneville

Road in West Des Moines. She indicated that OSA had approved scraping the area in question before actual construction started to determine if any grave sites were present in the hopes of avoiding major construction delays.

Is that a possible recommendation for the fuel road area in question regarding the possible cemetery site on the DSM airport? I don't know what Dan Higginbottom's reaction might be, and he still may want an archaeologist on site during construction in the targeted area just to be sure that human remains are not encountered, but this would likely help avoid major construction delays if any grave sites are identified in advance of construction, which would always be a preferred scenario.

Let me know your thoughts. We will still need to do an MOA regarding this site but this would be the time to propose this alternative methodology before an agreement is written and signed.

Leah D. Rogers

Tallgrass Archaeology LLC

2460 S. Riverside Drive

Iowa City, IA 52246

319-354-6722



U.S. Department
Of Transportation

**Federal Aviation
Administration**

Central Region
Iowa, Kansas
Missouri, Nebraska

901 Locust
Kansas City, Missouri 64106-2325

September 28, 2018

CERTIFIED MAIL

Review & Compliance Program Manager
State Historical Society of Iowa
State Historic Preservation Office
600 E. Locust Street
Des Moines, Iowa 50319-0290

Section 106 Consultation
Environmental Assessment for Replacement of Passenger Terminal
Des Moines International Airport
Des Moines, Polk County, Iowa

An Environmental Assessment (EA) is being prepared for proposed development at the Des Moines International Airport (Airport) subject to the National Environmental Policy Act (NEPA). The NEPA review process requires compliance with Section 106 of the National Historic Preservation Act (NHPA), as implemented through 36 CFR 800.

The purpose of this letter is to initiate Section 106 consultation with the State Historic Preservation Office (SHPO) for the proposed undertaking at the airport. The Federal Aviation Administration (FAA) is the lead federal agency for the NEPA document.

The Airport proposes to develop a replacement passenger terminal building and other ancillary facilities. The proposed undertaking at the airport includes the following major projects which are all shown on the attached map:

Construction of a Replacement Passenger Terminal Building (Project 1): The Authority proposes to construct a replacement passenger terminal building northeast of the existing passenger terminal building. The replacement passenger terminal building would include ticketing, airline ticket office space, passenger screening space, Transportation Security Administration (TSA) space, outbound baggage screening and bag make-up space, baggage claim area and claim devices, inbound baggage delivery area, aircraft gates and passenger holdroom areas, concessions, rental car counters, circulation areas including mechanical/electrical and building support space, airport administration offices, and airline support functions.

Demolition of the Existing Passenger Terminal Building (Project 2): After the construction of the replacement passenger terminal building, the existing passenger terminal building would be demolished.

Construction of Terminal Apron with New Deicing Pad, RON Pad, and Relocation of the Storm Control Building (Project 3): The expanded terminal apron would include a designated deicing pad, ten RON hardstands, and the glycol storm control building.

Construction an Elevated Pedestrian Bridge (Project 4): An elevated pedestrian bridge would be constructed to provide pedestrian access to the proposed replacement passenger terminal building from the existing parking structure.

Realignment of the Roadway Loop/Curbside (Project 5): A new roadway loop and curbside would be constructed to the east of the new ticketing plaza where it would split into several lanes for drop off, pick up, and bypass lanes.

Construction of a new Parking Structure (Project 6): A new parking structure would be constructed to the southeast of the new Terminal Building.

Construction of a New Entry Plaza to Parking (Project 7): A new entry plaza to the current parking garages and proposed new parking structure would be constructed.

Construction of a New Exit Plaza from Existing Parking (Project 8): A new exit plaza would be constructed on the south side of the existing parking garage. All traffic leaving from the lots and garages within the roadway loop would exit through the proposed exit plaza, where traffic will then merge with the existing roadway loop.

Relocation of the Employee Parking (Project 9): The designated employee parking will be moved from a parking lot north of the existing passenger terminal building to a parking lot south of the existing passenger terminal building (and proposed replacement passenger terminal building).

Relocation of the Cell Phone Lot (Project 10): The cell phone lot would be relocated from its existing location on South Airport Frontage Road in the south quadrant to the lot south of the existing Economy Lot #2.

Construction of a New Entry Intersection at Fleur Drive (Project 11): A new entry intersection to the Airport would be constructed at Fleur Drive. This would provide prioritized access to the Airport (i.e., northbound traffic using the entrance to the Airport would not have to yield to southbound traffic on Fleur Drive, unlike the existing roadway configuration).

Relocation of Signature and DSM Flying Services (Project 12): To provide for the development of the replacement passenger terminal building, Signature and DSM Flying Services would need to be relocated to the south quadrant.

Demolition of Buildings 34/35 (Project 13): To provide for the relocation of Signature and DSM Flying Services, Buildings 34 and 35 would be demolished and the current tenant of Building 34, (Air Methods), would be moved to the relocated Building 33 while the current tenants of Building 35, UPS (cargo air sort and office building), would be moved to the relocated Building 31.

Construction of GA Hangars (Project 14): GA hangars would be constructed in the south quadrant.

Expansion of the South Apron (Project 15): The south apron would be extended to provide airfield access to the proposed location of the Signature and DSM Flying Services, as well as the relocated Building 33.

Construction of a New Taxiway Entry (Project 16): A new taxiway entry from the south apron to the existing Taxiway P would be constructed to provide runway access to and from the relocated Signature and DSM Flying Services.

Construction of a New Cargo Deicing Pad (Project 17): A portion of the existing south apron will be designated as a cargo deicing pad and will provide a designated area for cargo aircraft deicing activities.

Improvements to South Roadways and Parking (Project 18): Improvements would be made to the roadways in the south quadrant, including the construction of additional parking spaces, to accommodate the relocation of cargo activities to the south quadrant.

Construction of a New Rental Car Customer Service Building and Rental Car Ready-Return Area (Project 19): A new rental car customer service building and rental car ready-return area would be constructed south of the proposed replacement passenger terminal building

Improvements to Fuel Road (Project 20): The existing Fuel Road would be enhanced to allow for the transport of fuel from the fuel farm to the south quadrant.

Construction of a New Dry Detention Basin (Project 21): A dry detention basin would be constructed north of the proposed new parking structure to accommodate the increase in impervious surface and stormwater runoff that would occur from the other project components. The dry detention basin would be constructed in accordance with FAA design standards.

Construction Borrow Area (Project 22): A construction borrow area has been identified for instances where fill is needed for the previously described project components. Fill material would be excavated from this site and transported to the appropriate project component site. Implementation of the Proposed Action would occur in several phases to minimize potential disruptions to Airport operations. Overall, the construction of the Proposed Action would occur over a twelve-year period, with construction starting in 2020.

Enabling projects, such as the relocation of cargo activities to the south quadrant and airfield improvements, would begin in late 2019 to early 2020. Between 2020 and 2025, various landside and airside projects associated with the replacement passenger terminal building would occur. Portions of the existing terminal would be closed, and select gates would be removed, starting in 2025. Construction of the replacement passenger terminal building would begin in 2026, after the majority of the airfield improvements in the area have been completed. The replacement passenger terminal building would open with 10 active gates in 2028, with the final gate opening in 2030. The final roadway improvements and demolition of the remaining existing passenger terminal building would be complete in 2032.

In accordance with the Section 106 process, we are enclosing a vicinity map, project map, Phase I Archeological Investigation, Architectural/Historical Intensive Survey and Evaluation, and

Iowa Site Inventory Forms for the Des Moines Municipal Airport/Aviation Park, Airport Terminal & Administration Building, and Fixed Based Operator Building #35.

Based on the enclosed surveys of the proposed undertaking, we do not believe that there will be any historic properties that will be affected. I have enclosed the "Request for SHPO Comment on a Project" form for the proposed undertaking and request your concurrence with a "No historic properties will be affected" finding. The airport will be required to contact your office if archaeological resources are uncovered during the project.

If you have any questions, please contact me at scott.tener@faa.gov or (816) 329-2639.

Sincerely,

Scott Tener, P.E.
Environmental Specialist

Enclosure: Project Exhibits
Archaeological Report
Architectural Report
Site Inventory Forms (3)
Request for SHPO Comment on a Project

REQUEST FOR SHPO COMMENT ON A PROJECT

Submit one copy with each property for which our comment is requested. Please print or type.

Return to: State Historical Society of Iowa, State Historic Preservation Office, 600 E. Locust St, Des Moines, IA 50319-0290

I. GENERAL INFORMATION

☒ This is a new submittal

☐ This is more information relating to SHPO R&C #:

- a. Property Name: Des Moines International Airport (Environmental Assessment for Airport Improvements)
- b. Property Street & Number: 5800 Fleur Dr
- c. County: Polk City: Des Moines Zip: 50321
- d. Federal Agency: FAA Federal Funding Program/Permit: AIP
- e. Agency Project No.: N/A If HUD, circle one: 24 CFR Part 50 or Part 58
- f. Contact Person on Project: Scott Tener Phone: 816-329-2639
- g. Contact Address: FAA ACE-611F, 901 Locust, Kansas City, MO Zip: 64116 email: scott.tener@faa.gov

II. IDENTIFICATION OF HISTORIC PLACES

Scope of Effort Applied

- ☐ As agreed in programmatic or other agency agreements with SHPO (if applicable)
- ☒ Includes the attached elements required under 36 CFR 800.4(a)
- 1) Area of potential effects, as defined in 800.16(d), is shown on map
 - 2) Existing information has been reviewed on historic properties in the property area at SHPO office and/or other locations of inventory data
 - 3) Information has been sought from parties likely to have knowledge about historic properties in the project area
 - 4) Information gathered from Indian tribes, as appropriate

Identification Results

History and Architecture

☒ An attached Iowa Site Inventory form is completed for each building 50 years of age or older

Archaeology

- ☒ Yes ☐ No The project will involve excavation
- If yes, submit all of the following information
- 1) Precise project location map (preferably U.S.G.S. 7.5 min Quad with name, date, & location)
 - 2) Site plan showing limits of proposed excavation
 - 3) Number of acres in project
 - 4) Legal location: Section(s) _____ Township(s) _____ Range(s) _____
 - 5) Description of width and depth of proposed excavation and current conditions of project area

III. APPLICANT CERTIFICATION (Check Either Adverse Effect or No Adverse Effect for Historic Property Affected category)

Findings (Check One)

- ☒ **No historic properties will be affected** (i.e., none are present or there are historic properties present but the project will have no effect upon them) and adequate documentation under 800.11 is provided, including:
- 1) A description of the undertaking, specifying the Federal involvement, and its area of potential effects, including photographs, maps, drawings, as necessary **and**
 - 2) A description of the steps taken to identify historic properties, including, as appropriate, efforts to seek information pursuant to 800.4(b) **and**
 - 3) The basis for determining that no historic properties are present or affected.
- I understand that the SHPO has 30 days from receipt to object to the finding, after which the applicant's responsibilities under Section 106 of the Historic Preservation Act are fulfilled.

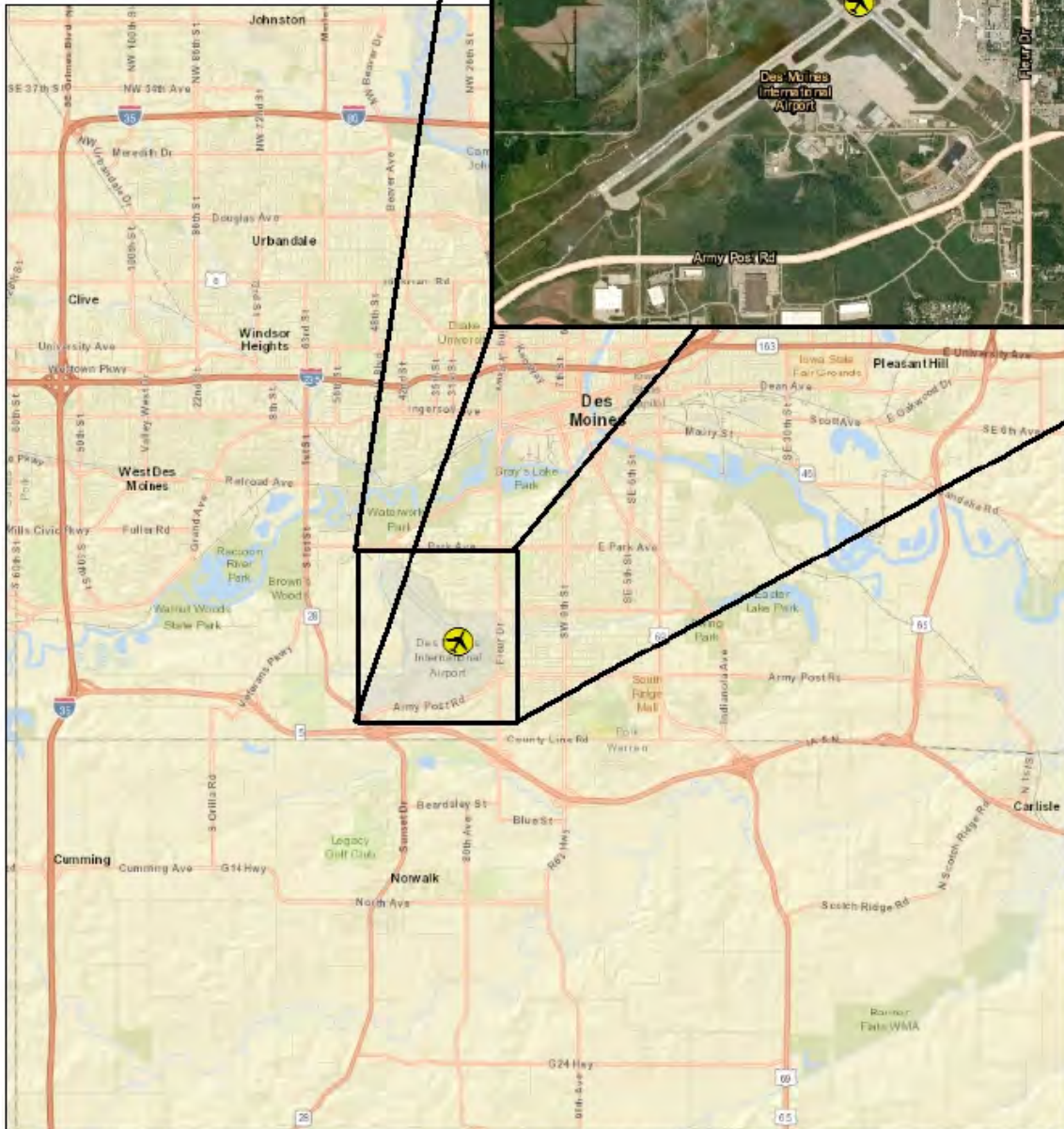
- ☐ **An historic property will be affected** for which documentation is provided as required in 36 CFR Part 800.11(e) and, in applying the criteria of adverse effect under 800.5, propose that the project be considered to have **(Check One)**:
- ☐ A **No Adverse Effect** under which, in consultation with the SHPO, the project will be modified or conditions imposed to avoid adverse effects. I understand that failure of the SHPO to provide a dated response within 30 days from receipt to the finding shall be considered agreement of the SHPO with the finding
- ☐ An **Adverse Effect** is found and the applicant, or other federally authorized representative, will consult with the SHPO and other consulting parties to resolve the adverse effect under 800.6

Federally Authorized Signature: _____ Date: _____
Type name below → Scott Tener

IV. STATE HISTORIC PRESERVATION OFFICE COMMENT

- ☐ Agree with the finding in section III above (move to reader's file) ☐ See attached follow-up letter
- ☐ Object to the finding for reasons indicated in attached letter
- ☐ Cannot review until information is sent as follows: _____

Authorized Signature: _____ Date: _____



Source: Esri, 2018; RS&H, 2018

Note: This figure is for graphic purposes only and is not to scale.

Legend



Airport Location



Location and Vicinity Map

Des Moines International Airport
Polk County, Iowa

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Source: Esri, 2018; RS&H, 2018

0 1,500 3,000 Feet

N

Legend			
Replacement Passenger Terminal Building (1)	Parking Structure (6)	Entry Intersection at Fleur Drive (11)	South Roadway and Parking Improvements (18)
Building Demolition (2, 13)	Entry Plaza to Parking (7)	Signature and DSM Flying Services Relocation (12)	Rental Car Customer Service Building and Ready-Return Area (19)
Apron Expansion (3, 15)	Exit Plaza from Parking (8)	General Aviation Hangars (14)	Construction Borrow Area (20)
Elevated Pedestrian Bridge (4)	Employee Parking (9)	Taxiway Entry (16)	Dry Detention Basin (21)
Roadway Loop/Curbside Realignment (5)	Cell Phone Lot (10)	Cargo Deicing Pad (17)	Fuel Road Improvements (22)

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APPENDIX D-1

Tribal Coordination

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U.S. Department
of Transportation

**Federal Aviation
Administration**

Central Region
Iowa, Kansas,
Missouri, Nebraska

901 Locust
Kansas City, Missouri 64106
(816) 329-2600

<DATE>

CERTIFIED MAIL

<NAME> [See Attached List]

<ADDRESS>

Section 106 Consultation
Environmental Assessment for Passenger Terminal Replacement Project
Des Moines International Airport
Des Moines, Polk County, Iowa

Dear <NAME>:

An Environmental Assessment (EA) is being prepared for the proposed undertaking to replace the passenger terminal building at the Des Moines International Airport subject to the National Environmental Policy Act (NEPA). The NEPA review process requires compliance with Section 106 of the National Historic Preservation Act (NHPA), as implemented through 36 CFR 800. The FAA is the lead federal agency for the NEPA document. Jim Johnson, FAA Central Region Airports Division Manager, will be making the final FAA decision on the EA.

We request your input on properties of cultural or religious significance that may be affected by the proposed undertaking and invite you to participate in the Section 106 consultation process. For your review, please find enclosed a Phase I Archaeological Investigation dated August 2018.

To help in our preparation of the EA, we would appreciate your input (via mail or e-mail) within thirty (30) days. If you have questions or require additional information, please contact me at 816-329-2639 or scott.tener@faa.gov.

Sincerely,

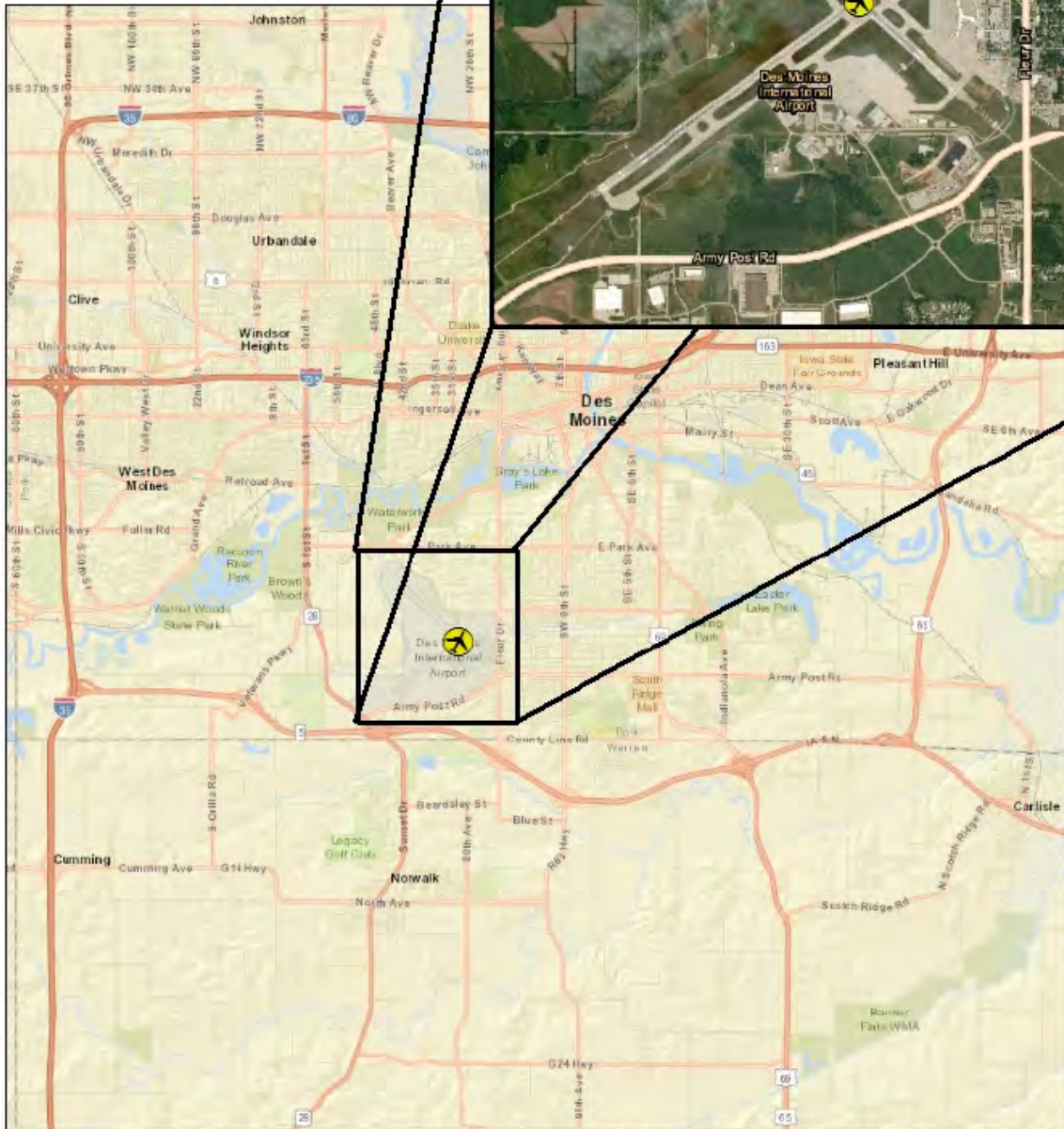
Scott Tener, P.E.
Environmental Specialist

Enclosures

Tribal Coordination – Environmental Assessment
Des Moines International Airport; Polk County; Des Moines, IA

10/3/18

Contact	Delivered (Cert Mail)	Response Returned	Action Requested
Ms. Bobi Roush Cultural Preservation Department Iowa Tribe of Oklahoma 335588 E 750 Road Perkins, OK 74059	10/9/18	No Response 4/12/19	
Ms. Diane Hunter Tribal Historic Preservation Officer Miami Tribe of Oklahoma P.O. Box 1326 Miami, OK 74355	10/9/18	No Objection 11/7/18	
Mr. Tony Provost Tribal Historic Preservation Officer Omaha Tribe P.O. Box 368 Macy, NE 68039	10/10/18	Have Interest 10/19/18	3/27/19-FAA request for info. 4/8/19-FAA request for info and provided Draft EA for review. 5/13/19-FAA request for comments or concerns.
Mr. Shannon Wright Tribal Historic Preservation Officer Ponca Tribe of Nebraska PO BOX 288 Niobrara NE 68760	10/9/18	No Response 4/12/19	
Mr. Johnathan L. Buffalo Historic Preservation Director Sac and Fox Tribe of the Mississippi in Iowa/Meskwaki Nation 349 Meskwaki Road Tama, IA 52339	10/9/18	No Response 4/12/19	
Mr. Kip Spotted Eagle Tribal Historic Preservation Officer Yankton Sioux Tribe of South Dakota P.O. Box 1153 Wagner, SD 57380-1153	10/10/18	No Response 4/12/19	



Source: Esri, 2018; RS&H, 2018

Note: This figure is for graphic purposes only and is not to scale.

Legend

 Airport Location



Location and Vicinity Map

Des Moines International Airport
Polk County, Iowa

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Source: Esri, 2018; RS&H, 2018

0 1,500 3,000 Feet

N

Legend			
 Replacement Passenger Terminal Building (1)	 Parking Structure (6)	 Entry Intersection at Fleur Drive (11)	 South Roadway and Parking Improvements (18)
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 Roadway Loop/Curbside Realignment (5)	 Cell Phone Lot (10)	 Cargo Deicing Pad (17)	 Fuel Road Improvements (22)

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Miami Tribe of Oklahoma

3410 P St. NW, Miami, OK 74354 • P.O. Box 1326, Miami, OK 74355

Ph: (918) 541-1300 • Fax: (918) 542-7260

www.miamination.com



November 7, 2018

Scott Tener
Environmental Specialist
U.S. Department of Transportation
Federal Aviation Administration
901 Locust
Kansas City, MO 64106

Re: Des Moines International Airport Passenger Terminal Replacement – Comments of the Miami Tribe of Oklahoma

Dear Mr. Tener:

Aya, kikwehsitoole – I show you respect. My name is Diane Hunter, and I am the Tribal Historic Preservation Officer for the Federally Recognized Miami Tribe of Oklahoma. In this capacity, I am the Miami Tribe's point of contact for all Section 106 issues.

The Miami Tribe offers no objection to the above-mentioned project at this time, as we are not currently aware of existing documentation directly linking a specific Miami cultural or historic site to the project site. However, as this site is within the aboriginal homelands of the Miami Tribe, if any human remains or Native American cultural items falling under the Native American Graves Protection and Repatriation Act (NAGPRA) or archaeological evidence is discovered during any phase of this project, the Miami Tribe requests immediate consultation with the entity of jurisdiction for the location of discovery. In such a case, please contact me at 918-541-8966 or by email at dhunter@miamination.com to initiate consultation.

The Miami Tribe accepts the invitation to serve as a consulting party to the proposed project. In my capacity as Tribal Historic Preservation Officer I am the point of contact for consultation.

Respectfully,

Diane Hunter
Tribal Historic Preservation Officer

Tener, Scott (FAA)

From: Nilah Griffin <Nilah.Griffin@omahatribe.com>
Sent: Friday, October 19, 2018 10:57 AM
To: Tener, Scott (FAA)
Subject: EA Des Moines Airport

Good Morning,

yes we do have interest in this site.

Nilah Griffin
Tribal Historic Preservation Deputy
101 Main St
Macy, NE 68039
402-837-8391 Ext. 174 Office
402-385-8273 Cell

Tener, Scott (FAA)

From: Tener, Scott (FAA)
Sent: Wednesday, March 27, 2019 4:09 PM
To: Nilah Griffin
Subject: RE: EA Des Moines Airport, Polk County, IA

Good afternoon,

I am sorry that it has taken so long for us to get back with you regarding the project to replace the passenger terminal at the Des Moines International Airport, Polk County, Iowa.

During our consultation with the SHPO, concerns were raised regarding a cemetery shown on a 1907 Map. We recently completed another Phase 1 Archaeological Investigation and found no evidence of the cemetery. The SHPO provided their concurrence that no historic properties will be effected.

I am reaching out to you to determine what your interest is. Our letter, dated October 3, 2018, provided a Phase 1 Archeological Investigation (August 2018) for your review. We are nearing completion of the Draft Environmental Assessment and anticipate publishing the Draft EA for public comment in April. Is there any other information you would like for us to provide regarding this project?

Please let me know if you have any questions,

Scott Tener
Environmental Specialist

FAA Central Region Airports Division
901 Locust St., Room 364
Kansas City, Missouri 64106-2325
T 816.329.2639 | F 816.329.2611
<http://www.faa.gov/airports/central/>

From: Nilah Griffin <Nilah.Griffin@omahatribe.com>
Sent: Friday, October 19, 2018 10:57 AM
To: Tener, Scott (FAA) <scott.tener@faa.gov>
Subject: EA Des Moines Airport

Good Morning,

yes we do have interest in this site.

Nilah Griffin
Tribal Historic Preservation Deputy
101 Main St
Macy, NE 68039
402-837-8391 Ext. 174 Office



U.S. Department
of Transportation

**Federal Aviation
Administration**

Central Region
Iowa, Kansas,
Missouri, Nebraska

901 Locust
Kansas City, Missouri 64106
(816) 329-2600

April 8, 2019

CERTIFIED MAIL

Mr. Tony Provost
Tribal Historic Preservation Officer
Omaha Tribe
P.O. Box 368
Macy, NE 68039

Section 106 Consultation - Draft Environmental Assessment
Passenger Terminal Replacement Project
Des Moines International Airport
Des Moines, Polk County, Iowa

Dear Mr. Provost:

An Environmental Assessment (EA) is being prepared for the proposed undertaking to replace the passenger terminal building at the Des Moines International Airport subject to the National Environmental Policy Act (NEPA). The NEPA review process requires compliance with Section 106 of the National Historic Preservation Act (NHPA), as implemented through 36 CFR 800. The FAA is the lead federal agency for the NEPA document. Jim Johnson, FAA Central Region Airports Division Manager, will be making the final FAA decision on the EA.

On October 19, 2018, we received an email from Nilah Griffin stating that you have interest in this site. I am reaching out to you to determine what your interests are. Enclosed is the Draft EA (2-Volumes) for your review.

You may also download a PDF copy of the Draft EA at: <https://www.dsmaairport.com/about-the-airport/new-terminal-documentation/New%20Terminal%20Documentation.aspx>

We request your input on properties of cultural or religious significance that may be affected by the proposed undertaking. We would appreciate your input (via mail or e-mail) within thirty (30) days. If you have questions or require additional information, please contact me at 816-329-2639 or scott.tener@faa.gov.

Sincerely,

Scott Tener, P.E.
Environmental Specialist

Enclosures

Tener, Scott (FAA)

From: Tener, Scott (FAA)
Sent: Monday, May 13, 2019 3:56 PM
To: tparker@omahatribe.com
Cc: 'Nilah Griffin'
Subject: RE: Section 106 Consultation - Environmental Assessment, Des Moines Airport, Polk County, IA
Attachments: DSM-Omaha Tribal Coordination Letter_4-8-19.pdf

Mr. Parker,

We sent a draft Environmental Assessment to your office in April regarding the proposed construction of a replacement passenger terminal building at the Des Moines International Airport. We completed our consultation with the Iowa SHPO and they concurred that no historic properties will be effected. We also just completed a 30-day public involvement process and received no comments. I am reaching out to you to see if you have any comments or concerns.

With the public involvement process concluded, we anticipate issuing the Final EA and Finding of No Significant Impact within the next month or two. Please let me know if you have any concerns or wish to consult further on this undertaking.

Please let me know if you have any questions,

Scott Tener
Environmental Specialist

FAA Central Region Airports Division
901 Locust St., Room 364
Kansas City, Missouri 64106-2325
T 816.329.2639 | F 816.329.2611
<http://www.faa.gov/airports/central/>

From: Tener, Scott (FAA)
Sent: Wednesday, March 27, 2019 4:09 PM
To: Nilah Griffin <Nilah.Griffin@omahatribe.com>
Subject: RE: EA Des Moines Airport, Polk County, IA

Good afternoon,

I am sorry that it has taken so long for us to get back with you regarding the project to replace the passenger terminal at the Des Moines International Airport, Polk County, Iowa.

During our consultation with the SHPO, concerns were raised regarding a cemetery shown on a 1907 Map. We recently completed another Phase 1 Archaeological Investigation and found no evidence of the cemetery. The SHPO provided their concurrence that no historic properties will be effected.

I am reaching out to you to determine what your interest is. Our letter, dated October 3, 2018, provided a Phase 1 Archeological Investigation (August 2018) for your review. We are nearing completion of the Draft Environmental Assessment and anticipate publishing the Draft EA for public comment in April. Is there any other information you would like for us to provide regarding this project?

Please let me know if you have any questions,

Scott Tener
Environmental Specialist

FAA Central Region Airports Division
901 Locust St., Room 364
Kansas City, Missouri 64106-2325
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From: Nilah Griffin <Nilah.Griffin@omahatribe.com>
Sent: Friday, October 19, 2018 10:57 AM
To: Tener, Scott (FAA) <scott.tener@faa.gov>
Subject: EA Des Moines Airport

Good Morning,

yes we do have interest in this site.

Nilah Griffin
Tribal Historic Preservation Deputy
101 Main St
Macy, NE 68039
402-837-8391 Ext. 174 Office
402-385-8273 Cell

APPENDIX D-2

Architectural and Historical Resources

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**DES MOINES INTERNATIONAL AIRPORT REPLACEMENT
TERMINAL ENVIRONMENTAL ASSESSMENT,
CITY OF DES MOINES, POLK COUNTY, IOWA:**
Architectural/Historical Intensive Survey and Evaluation

**RS&H Project 224-1786-001
Tallgrass Archaeology LLC Report TA18-698--1
HADB No. 77-331**

Submitted to

**RS&H
7800 E. Union Ave., Suite 700
Denver, CO 80237**

Submitted by

**Tallgrass Archaeology LLC
Leah D. Rogers, Principal Investigator
2460 South Riverside Dr.
Iowa City, IA 52246**

and

**Tallgrass-Full LLC
Jan Olive Full, Ph.D.
Iowa City, IA**

August 2018

ABSTRACT

The architectural/historical intensive survey and evaluation for the Des Moines International Airport Replacement Terminal Environmental Assessment in the City of Des Moines, Polk County, Iowa, inventoried and evaluated two buildings proposed for replacement or removal and the airport as a whole as a potential historic district. The two buildings include the current airport terminal and administration building and the so-called Building 35, which is a former fixed base operator building now used by United Parcel Service.

1949-50 Des Moines Municipal Airport Terminal & Administration Building

The original 1949-50 terminal building would have been locally significant under both Criterion C and Criterion A had it retained historic integrity. Significance under Criterion A rests with its role in the development of Des Moines' commercial air travel accommodations, including passenger and airline services, as well as the growing public thirst for air travel and all things aviation. Under Criterion C, the terminal reflects the post-World War Two federal funding of aviation infrastructure, especially commercial passenger facilities, with larger buildings accommodating specialized interior functions divided into passenger comforts, airline operations, and safety represented by the weather bureau and pilots' facilities. *However*, the original terminal and its surroundings have been heavily modified, leaving it without historic integrity. The terminal building itself is obscured by modern structures that have negatively impacted the integrity of setting, in that the public's main approach to the terminal is obscured and altered by the nearly 2,000-stall concrete parking structure. Because it lacks historic integrity, the terminal building is recommended not eligible for inclusion in the NRHP. It is also recommended for no further architectural/historical investigation.

Circa 1971 Iowa Aviation Inc., Fixed Base Operator Building (aka, Building 35)

This building with its alterations is less than 50 years old and does not meet the basic requirement for consideration of NRHP eligibility. Furthermore, it does not possess sufficient integrity or significance to meet the level of exceptional importance required under Criteria Consideration G for properties less than 50 years of age to qualify for inclusion in the NRHP. Therefore, this property is recommended as not eligible and is also recommended for no further architectural/historical investigation.

Des Moines International Airport as a Potential Historic District

The airport as a whole encompasses approximately 49 buildings and structures, only two of which are of historic age (pre-1968) and eight of which date from the 1970s. The rest of the buildings were built after the 1980s. Of the two historic-age buildings, the 1949-50 terminal does not retain historic integrity. The 1957 Federal Inspection building appears to retain some degree of historic integrity but is a modest-sized building that does not possess sufficient architectural significance to be potentially individually eligible. At present, it may be the only standing building that could be considered contributing to a historic district, if one still existed. The Assessor's records for the airport property also list 288 building permits from 1995 to 2017 for additions, alterations, remodeling, paving, new construction, and building removal supporting the already-known extent of the modifications to the historic airport in the modern era. The

runways and landscape of the airport have also been reworked, repaved, replaced, and built over through the years. Even the area of the lake to the east of the terminal complex has been reworked more than once in the 20th century, with the current lake area extensively sculpted and landscaped and the lake itself reduced in size from what it was originally. The construction of the parking garage on the west side of the lake in the 1990s effectively destroyed most of the original “park” area in that location. As a result, it is concluded that the existing airport does not retain sufficient integrity to be considered eligible for inclusion in the NRHP as a historic district. It is recommended for no further architectural/historical investigation for the currently proposed project.

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DES MOINES INTERNATIONAL AIRPORT REPLACEMENT TERMINAL EA, CITY OF DES MOINES, POLK COUNTY, IOWA:

1. Introduction and Project Area

This study reports the findings of an architectural/historical intensive survey and evaluation for the Des Moines International Airport Replacement Terminal Environmental Assessment, City of Des Moines, Polk County, Iowa (Figure 1). The Area of Potential Effect encompasses that portion of the airport where improvements are proposed (Figure 2). Proposed projects include replacement or removal of two buildings of historic age (50 years of age or older) or near historic age (Figure 3). The project is a federally-assisted undertaking, thus falling under the requirements of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA). Section 106 requires Federal agencies to take into account the effects of their undertakings on historic properties, and to afford the Advisory Council on Historic Preservation (ACHP), the State Historic Preservation Officer (SHPO), and others as appropriate, a reasonable opportunity to comment on such undertakings.¹ The federal agency in this case is the Federal Aviation Administration (FAA). The study was conducted by Tallgrass Archaeology LLC of Iowa City, Iowa, and Tallgrass-Full LLC of Iowa City. The study was conducted for RS&H of Denver, Colorado, and the Des Moines Airport Authority.

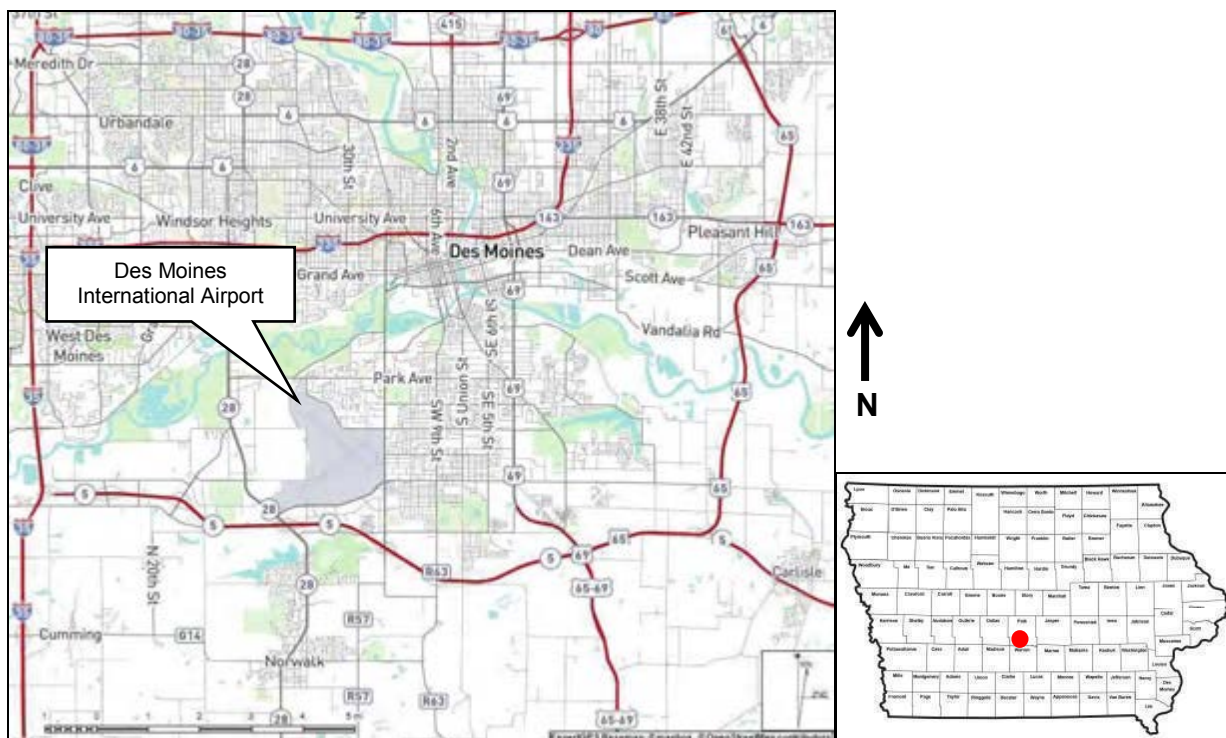


Figure 1. Map location of the Des Moines International Airport (gray-shaded in map to left) and general location in Polk County and the State of Iowa (red dot in map to right).

(Street map obtained from ExpertGPS Pro mapping software, 2018).

¹ ACHP Section 106 Regulations Summary, accessed at <http://www.achp.gov/106summary.html>, February 2015 and 36 CFR Part 800 - Protection of Historic Properties incorporating amendments effective August 5, 2004, accessed at <http://www.achp.gov/regs-rev04.pdf>.



Figure 2. Aerial map showing current project's Area of Potential Effect (blue outline).
(Source: 2013 aerial obtained from ExpertGPS Pro mapping software, 2018).



Figure 3. Aerial map showing location of buildings (yellow circled) proposed for replacement or removal and evaluated by the current study.

(Aerial obtained from ExpertGPS Pro mapping software, 2018).

2. Methods and Sources

The objective of the Intensive survey was to evaluate the National Register of Historic Places (NRHP) eligibility of two buildings proposed for replacement at the Des Moines International Airport in Des Moines, Iowa. The field photography was completed on June 27, 2018 by Tallgrass Archaeology LLC staff member, Cindy L. Nagel, after obtaining security clearance and badging by the Airport Security Office. Historical research was conducted by Jan Olive Full of Tallgrass-Full LLC using information, maps, photographs, and other historical data provided by the Des Moines International Airport from their archives. Bryan Belt, Director of Engineering, Des Moines International Airport, was instrumental in the compilation and sharing of the historical documentation from the airport's collections. Additional historical materials were obtained from the State Historical Society of Iowa in Iowa City.

Jan Olive Full of Tallgrass-Full worked in cooperation with Tallgrass Archaeology LLC in the completion of this study. Leah D. Rogers of Tallgrass Archaeology LLC served as the Principal Investigator and co-authored the project report with Full.

The two airport buildings were evaluated using the significance criteria and integrity considerations of the NRHP, with the airport as a whole considered for potential eligibility as a historic district. Iowa Site Inventory forms were completed for the two buildings by Jan Olive Full and for the airport by Leah D. Rogers. In addition, a Historical Architectural Data Base (HADB) form was completed for this report. Copies of the inventory forms and the HADB form are presented in the Appendix.

3. Previous Studies

Neither of the two buildings that are the focus of the current study had been previously inventoried or evaluated for NRHP eligibility. The only previous study of buildings on or near airport property included the buildings associated with the Iowa Air National Guard facility, which is on the north edge of the Des Moines International Airport and reported in: *Des Moines Air National Guard Integrated Cultural Resources Management Plan* (e.g., Iowa Site Inventory Form 77-10590) and a cultural and historical survey of the Iowa Air National Guard Base by R.W. Anderson (1996). In addition, was a cultural resources study conducted for an airport expansion and Army Post Relocation project in 1993 (reported in Peterson 1993 and Rogers 1993). The suburban houses recorded and evaluated by the 1993 study are no longer standing having been determined to be not eligible for the NRHP and subsequently removed for the road relocation project.

Figure 4 is a representation from the I-Sites database of the previously-inventoried properties in the project area and vicinity. The cluster of number in the south half of the APE are the residential properties once standing in the Wakonda Heights subdivision. As noted above, those houses were evaluated as not eligible for the NRHP and were subsequently removed. It should be noted that their mapped location in I-Sites is actually too far south and east of their actual location, which was along the south side of old Army Post Road and not the relocated road on the south boundary of the current APE (see Figure 4). In addition, some of those properties are represented by yellow squares, which denotes potential eligibility, as opposed to green squares, which are ineligible properties. However, all of the Wakonda Heights houses were found to be ineligible and should be represented by green squares on Figure 4 (see also Rogers 1993).² Other properties shown on the I-Sites map include: 77-05613, which is a house that was located at 2210 Army Post Road but was non-extant as of 1986 and 77-06226, which is a house built in 1961 at 6821 Fleur Drive that was recommended as not eligible when originally evaluated. Here again, the square for 77-06226 should be green and not yellow in the I-Sites representation (see Figure 4).

² The reason for their representation as yellow squares is that when the data was entered into I-Sites, these properties were incorrectly identified as potentially eligible because there was evaluation of Criteria Consideration G (for modern properties to be eligible for the NRHP); however, none of these properties actually qualified for listing in the NRHP under Consideration G. Therefore, all of these properties should be represented by green squares in I-Sites.

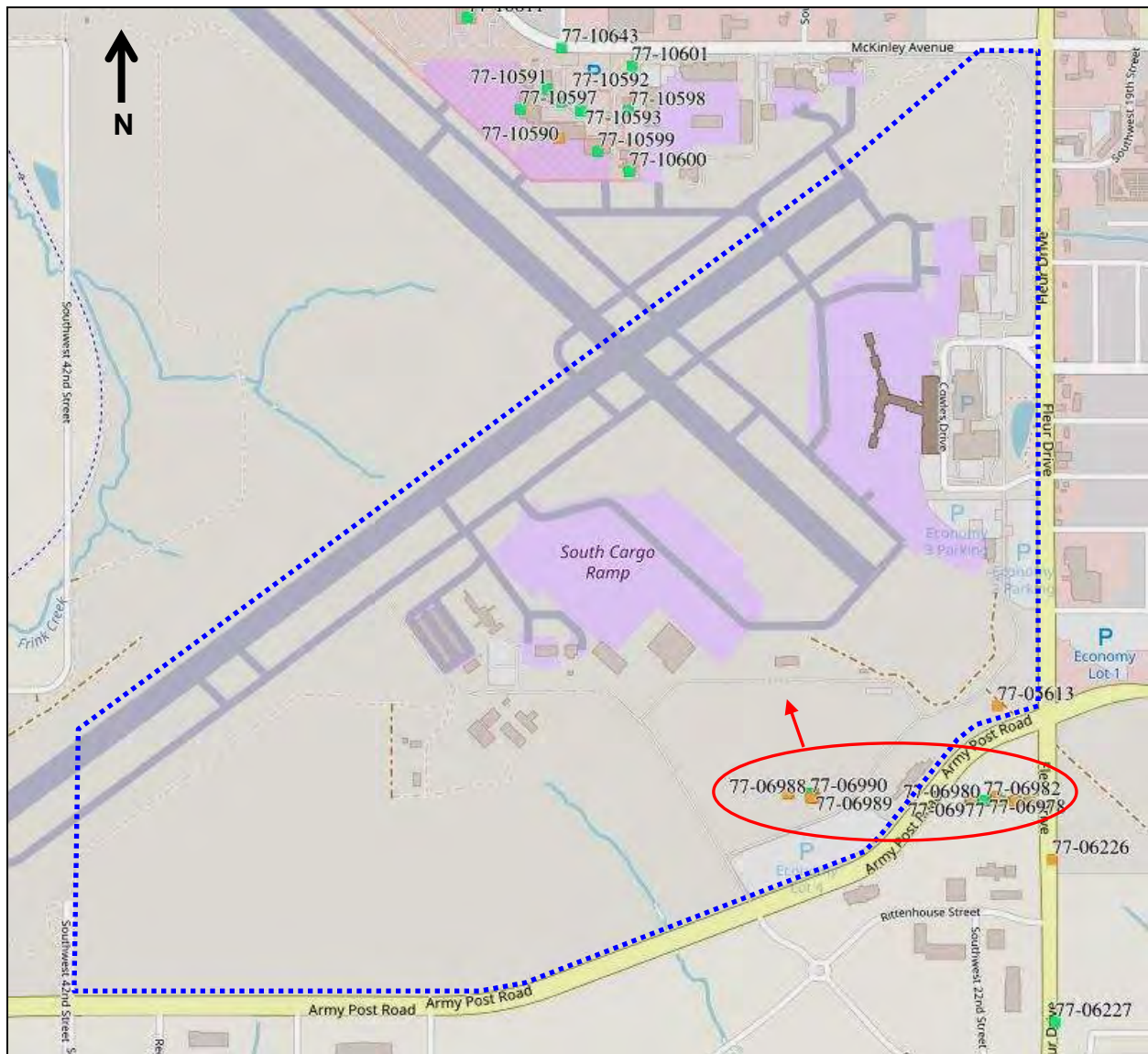


Figure 4. Street map showing location of previously-inventoried architectural properties in relation to the current project's APE (blue dotted outline). NRHP-eligible properties are represented by red squares; potentially eligible by yellow squares; and ineligible or unevaluated properties by green squares. As noted above, the yellow squares for the Wakonda Heights (now non-extant houses; red circled) should have been green squares because they were found to be ineligible. The Wakonda Heights properties are also mapped too far to the south and east and were on the south side of old Army Post Road (red arrow points to correct location). 77-06226 should also be represented by a green not a yellow square as it was previously evaluated as not eligible. (Source: I-Sites Pro, 2018).

The nearest NRHP-listed historic property is the Fort Des Moines Provisional Army Officer Training School, which is also listed as a National Historic Landmark. This property is located at the southeast corner of Army Post Road and SW 9th Street a half-mile east of the airport property (Figure 5). The integrity of this historic property will not be impacted by any of the proposed projects at the Des Moines International Airport. Also note, that the Iowa Air National Guard Facility is not included within the current APE (see Figure 4).

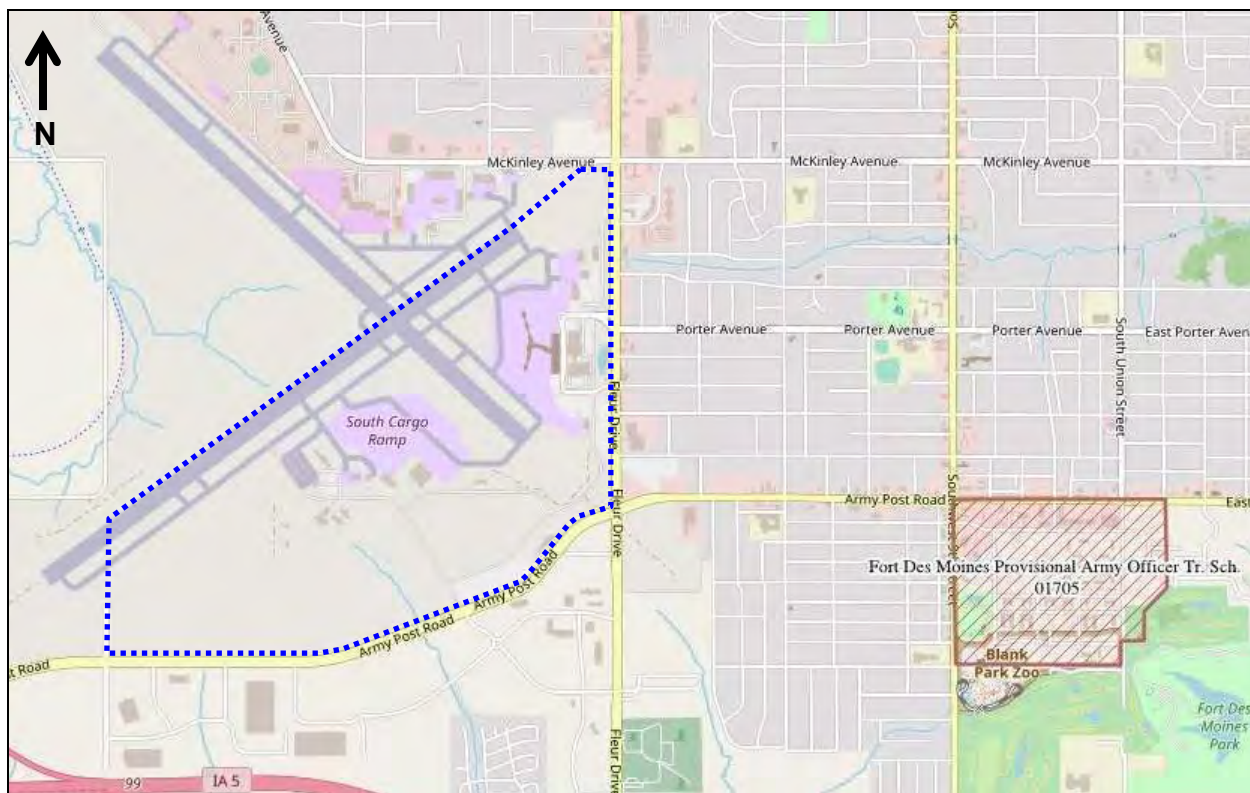


Figure 5. Street map showing the location of the current project's APE (blue dotted outline) in relation to the nearest NRHP-listed property - the Fort Des Moines Provisional Army Officer Training School (brown hash-marked outline). This property is also listed as a National Historic Landmark. (Source: I-Sites Pro, 2018).

4. Historical Overview

In the early 20th century, prior to the construction of what is now the Des Moines International Airport, aviation in the Des Moines' vicinity was limited to small private airfields. "With the first transcontinental air mail flight scheduled for February, 1921, Des Moines needed an air field" ("50th Anniversary, Des Moines Municipal Airport," 1981, airport collection). This need "stirred city fathers to appropriate a field at Southeast 30th Street and Vandalia Road, south east of the city. This field was the embryo of our Des Moines Municipal Airport" (Ibid., 5). Because there was no state legislation at the time that provided for cities to expend money for airports, the City of Des Moines used the existing legislative authority to fund "parks" outside of the city limits. Therefore, the first airfield, "like the locations that followed it, was called [the] "Des Moines Aviation Park" (Ibid., 5). The Vandalia Road airfield was deemed unsafe because of fog and flooding that occurred at its low-lying location near the Des Moines River, so a new 16-acre tract was purchased near Altoona, northeast of Des Moines. It was on this airfield that the first hangar was built of metal in 1928 (Ibid., 5).

In 1929, the 43rd Iowa General Assembly passed an act that allowed for cities to sell municipal bonds and make tax levy assessments for municipal airports. What would become the "Des Moines Municipal Airport" was located on "the Jones farm," which was 160-acre parcel of farm land at Southwest 21st and Army Post Road ("50th Anniversary, Des Moines Municipal Airport,"

1981, airport collection). Specifically, this land was owned by Truman Jones, who had owned this property since circa 1902 and prior to that it had been owned by L.T. Filson from circa 1872 (Polk County historic plat maps dating from 1872-1930). The advantage of Jones' farm land was that it "was situated on a natural hilltop which provided good drainage. There was room for expansion and it was just four and one half miles from the center of Des Moines" (Ibid., 5).

The land was purchased in 1931, and initial construction began in 1932. In the process, "250,000 cubic yards of dirt were moved and two 1800 feet long and 100 feet wide runways were built, surfaced with asphalt and edged with concrete" ("50th Anniversary, Des Moines Municipal Airport," 1981, pg. 6). The "old hanger at the Altoona site was dismantled and moved onto the new location where it was reconstructed" (Ibid.) (Figure 6).



Figure 6. Late 1930s aerial view of the project APE (brown outline) showing the original Des Moines Municipal Airport (yellow-shaded). Note the two runways and the location along the west side of Fleur where the hangar and other buildings had been placed. (Aerial obtained from ArcGIS - Iowa Geographic Map Server, 2018).

The Des Moines airport saw a number of improvements from the late 1930s into the early 1940s, heavily supported by Depression-era federal programs like the WPA. In 1934, a second story was added to the original multi-purpose municipal hangar (passenger, baggage, and airplane hangar) to house a restaurant and the weather bureau. About the same time a beacon tower was constructed and the two existing runways were lengthened (“50th Anniversary, Des Moines Municipal Airport,” 1981). A second hangar on the airfield was owned and used by United Air Lines (formerly Boeing Air Transport), and in 1940 discussions began on the possibility of constructing a third hangar for the Air National Guard (*Des Moines Tribune*, 10/3/1940). William N. Nielsen, a local Des Moines architect, was hired to design the third hangar, which was under construction in early 1941 and largely funded by the WPA (*Ibid.*; *Des Moines Tribune*, 11/10/1943) (Figure 7).



Figure 7. Original terminal/hangar building (foreground center) and United Air Lines Hangar (top left) on the Des Moines Municipal Airport in 1940. Note the lake in the background. (Photograph from the Des Moines Municipal Airport collection; copy obtained from Thompson, 226).

The location of the buildings in Figure 7 was south of the current airport terminal complex. These buildings were still standing into the 1960s but had been removed by the 1970s, with the exception of the United Air Lines Hangar, which was still there in a remodeled state in the 1980s but had been removed by the 1990s (Aerial photographs, ArcGIS- Iowa Geographic Map Server, 2018). The lake that shows in the background of the 1940 photograph is the only original part of the Des Moines Municipal Airport that is extant in the present-day; however, the lake size has been reduced and the area around it also partially built over for the parking garage and the landscape sculpted and modified with plantings through the years. Other photographs of the lake

show that there was a picnic shelter on the west side of the lake. It appears that this public area was part of park aspect of the airport, which was still governed by the City's Parks Department until the 1960s.

Soon after the third hangar's construction, negotiations commenced between the city and architect Nielsen for the design of an "administration" building, to be constructed in two stages or "units" at an anticipated total cost of \$350,000 (*Des Moines Tribune*, 11/16/1944). Nielsen's first sketches of this administration-terminal building did not look much like later plans or what was ultimately constructed. "The sketches show the entire building would be of semi-circular shape with the inside of the curve facing S.W. Twenty-first Street and the outside of the airport. The central part, or first unit, would contain general offices, a café and weather bureau rooms and would be topped by a control tower" (*Des Moines Register*, 6/11/1944). When Nielsen's contract with the city for the job was finally executed in November 1944, it specified that either Nielsen himself or "his assistant" spend at least three hours a day at the site supervising construction (*Des Moines Tribune*, 11/16/1944). This provision may account for the references to another local architectural firm, Keefer and Jones, in the historical records, though the firm is virtually absent in the publicity and news articles describing the new terminal and its construction.

William N. Nielsen (1895-1970) was a World War One veteran and a 1925 graduate of Iowa State College with a degree in architectural engineering. He first worked for the Des Moines firm of Tinsley, McBroom & Higgins between 1925 and 1931, and then was briefly in partnership with another architect named Baty (Barbara Beving Long, "Camp Dodge Pool District," National Register of Historic Places nomination, written 1989, listed 1995; Obituary of William Nielsen, *Des Moines Register*, 1/26/1970). The son of Danish immigrants, Nielsen was born in South Omaha, Nebraska and worked as a carpenter prior to the war. Based solely on newspaper accounts in the 1940s, in addition to his work for the City of Des Moines, it appears Nielsen also designed residences and commercial buildings in other communities around central Iowa. He liked to work in concrete and his designs were influenced by the clean lines of the International Style, modified to fit a central Iowa vernacular (see for example, the Guthrie Center Town Hall, drawing available in the *Des Moines Tribune*, 4/11/1936).

Keffer & Jones, was comprised of Karl K. Keffer (1883-1954) and Earl E. Jones (1885-1950). Both raised in Iowa, Keffer and Jones met at Columbia University and formed a partnership in 1916 that lasted until Jones' death at age 65 in 1950, the year the airport terminal was finished and began operating. Keffer was two years older than Jones, so it is probably a fair assumption to think younger associates in the firm of Keffer & Jones may have had the supervisory duties mandated in Nielsen's airport contract with the city. Wesley Shank's historical biography of these two architects does not list the Des Moines municipal airport among their commissions (Wesley J. Shank, *Iowa's Historic Architects: A Biographical Dictionary* [1998], 88, 93-94).

Nielsen's preliminary plans for the "first unit" of the new terminal building were described as having a "tower and the rest would be two stories high with a promenade deck off the second floor." It would be financed by a "special emergency tax levy of one-mill," which did raise \$143,000 (*Des Moines Tribune*, 1/24/1945; *Des Moines Register*, 1/29/1945). A drawing of this first unit was published a few months later in one of the local newspapers. The semi-circular design mentioned earlier had been changed to a sort of squared pyramid of "cast stone," with a

large first-story base of 182' x 82', a smaller second story of 62' x 62', and a control tower rising from the center of the second story (*Des Moines Register*, 9/9/1945, *Des Moines Tribune*, 10/1/1945). Unfortunately, when bids were taken on these plans in March of 1946, the cost for just this “first unit” had soared to over \$300,000 and all bids were rejected (*Des Moines Register*, 4/12/1946).

After a two-year lull in the project’s development, the city council again hired Nielsen to prepare revised plans for a terminal building. But those plans did not contemplate a phased construction schedule, as the earlier “first unit” plan was already deemed “inadequate” by 1948. The expected cost for this larger building was \$600,000, a significant increase from the modest expected outlay \$143,000 in 1945 (*Des Moines Register*, 1/30/1948). While the revised plans represented a 260'x 80' footprint, the interior functions apparently were further revised from these plans. The pilot’s lounge, for example, was located in the basement initially, but was moved up as constructed. Also, “most of the second floor would be an “open spectator’s roof terrace” but actual plans suggest this description does not match the final arrangement of functions on that level (*Des Moines Register*, 1/30/1948).

By the middle of the summer 1948, with cost estimates continuing to rise to \$625,000 to \$680,000, the city was planning to request half the cost from the federal government. Together with the \$143,000 raised several years earlier, the city would finance the rest of it through bonds to be retired from the building’s revenues (*Des Moines Register*, 7/20/1948). A comparison of architect Nielsen’s revised plans with a 1950s black-and-white image of the actual building indicates these 1948 plans were, indeed, the final plans (Figures 8 and 9).

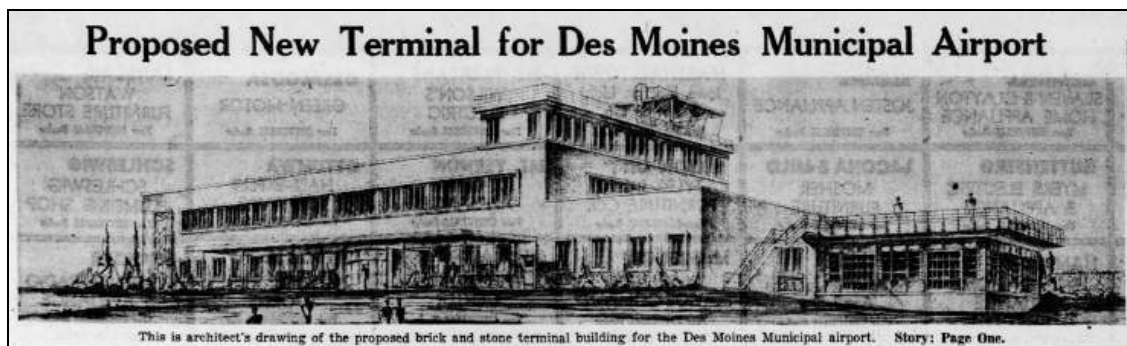


Figure 8. The architect’s final design for the “new terminal at the Des Moines Municipal Airport.”
(Source: *Des Moines Register*, 12/12/1948).



Figure 9. 1950s postcard image shows the terminal not long after its completion.
(Image from the Airport’s collections).

With the plans nearing completion, and the financing strategy in place, construction of what was now anticipated to cost \$700,000 was expected to start in early 1949. “Of steel, brick and stone construction, the building [will have] a basement and two floors. Above the second floor will be weather bureau, communications and CAA offices and above these will be the glass-enclosed control tower...[the] freight handling depot at the north end of the building will be topped with an observation deck for visitors” (suggesting a scaled down observation area but a beefed-up interior second floor plan) (*Des Moines Register*, 12/12/1948).

Bids were accepted for the work in February 1949, and the general contractor Garmer & Stiles Co., was awarded the project. By this time, the cost had climbed again to \$775,400 (*Des Moines Tribune*, 2/10, 2/28/1949). Grading the site began in early April and by mid-August the steel framework was up (*Des Moines Register*, 4/7, 8/13/1949). Three or four months later, on December 27, 1949, the *Des Moines Register* published a picture of the “half finished” terminal’s airfield west side--perhaps the public’s first peek at the semi-circular projecting bay that promised excellent views of the planes on the field (Figure 10).



Figure 10. Image from the *Des Moines Register* of the steel frame work of the new terminal building under construction. (Source: *Des Moines Register*, 8/13/1949).

Close to a year later, when the new terminal was nearly finished, the *Register* again featured a picture of the terminal airfield’s west side with the remark that costs had risen to \$900,000 (*Des Moines Register*, 11/12/1950) (Figure 11). The relief at having a finished terminal seems evident with the reporter’s remark: “A terminal building for Des Moines has been talked about since the present airport was opened in 1940” (Ibid.). Following the terminal’s opening, the second-floor restaurant began to advertise as the “Cloud Room,” where boys could register for the Round the World Pilots Club, and girls could register for the Round the World Flight Nurses Club. The private dining room next to the Cloud Room was called the Skyview and was available as an event venue.



Figure 11. 1950 image of the nearly-completed airport terminal from the same view as in Figure 10.
 (Source: *Des Moines Register*, 11/12/1950)

The first big aviation event at the airport was an airshow held in conjunction with the formal dedication of the “million-dollar terminal building” (*Des Moines Register*, 9/24/1951). The official estimate of attendance at the day-long event was 15,000 (*Ibid.*) and included hundreds of small, general aviation planes flown in for the day. A United Air Lines DC-4 sat parked on the apron outside the restaurant/waiting room semi-circular bay, open and available for tours by the public. Reflecting the Cold War era in which the terminal was opened, a test of an “emergency airlift” was held in conjunction with the terminal dedication, wherein the “cargo included penicillin, burn ointment, chlorine for treating water” and a variety other items deemed necessary in the event of “an enemy bombing.” These emergency supplies were flown in by 411 small planes from around the state, which then parked in the “grassy areas along the runways” (*Ibid.*) (Figures 12-13).



Figure 12. 1951 image from the dedication of the new airport terminal.
 (Source: *Des Moines Register*, 9/24/1951)



Figure 13. 1951 image from the dedication of the new airport terminal.

(Source: Des Moines Register, 9/24/1951)

As the airport expanded and evolved, the terminal building underwent a number of modifications, additions, and improvements through the years. The runways also were extended, and new runways were added. In the process, the airport property has also expanded from the original 160 acres to over 2,600 acres today. The Des Moines International Airport is currently undertaking another new chapter in its history by replacing the existing terminal and other improvements. The airport is no longer “south of the city” having been incorporated into the city’s corporate boundary.

In the late 1960s, the last vestige of the old “Aviation Park” was removed, which was a deteriorating shelter house (“50th Anniversary, Des Moines Municipal Airport,” 1981, airport collection). In the 1960s, the governing by the City’s Parks Department was switched to a separate Aviation Department, and in 1982, the Aviation Policy Advisory Board was established. In 1986, the Des Moines Municipal Airport was renamed the Des Moines International Airport. In 2011, the City transferred control of the airport to the Des Moines Airport Authority but retained ownership of the land. In turn, the Airport Authority agreed a 99-year lease on the land and holds title to all property and equipment on the land (“Airport authority approved by Des Moines City Council,” October 11, 2011, DesMoinesRegister.com).

Figures 14-17 show the progression of construction on the airport property. It can be seen that none of the original Des Moines Aviation Park buildings or structures are extant and the original Des Moines Municipal Airport buildings are also non-extant, including the terminal/hangar building and United Air Lines Hangar shown in Figure 7. The aerial views also show that the

current South Cargo area was not developed until the 1970s, including Building 35. In addition, three buildings north of the terminal complex were present by the 1970s but were not there in the 1960s (see Figures 14-17).

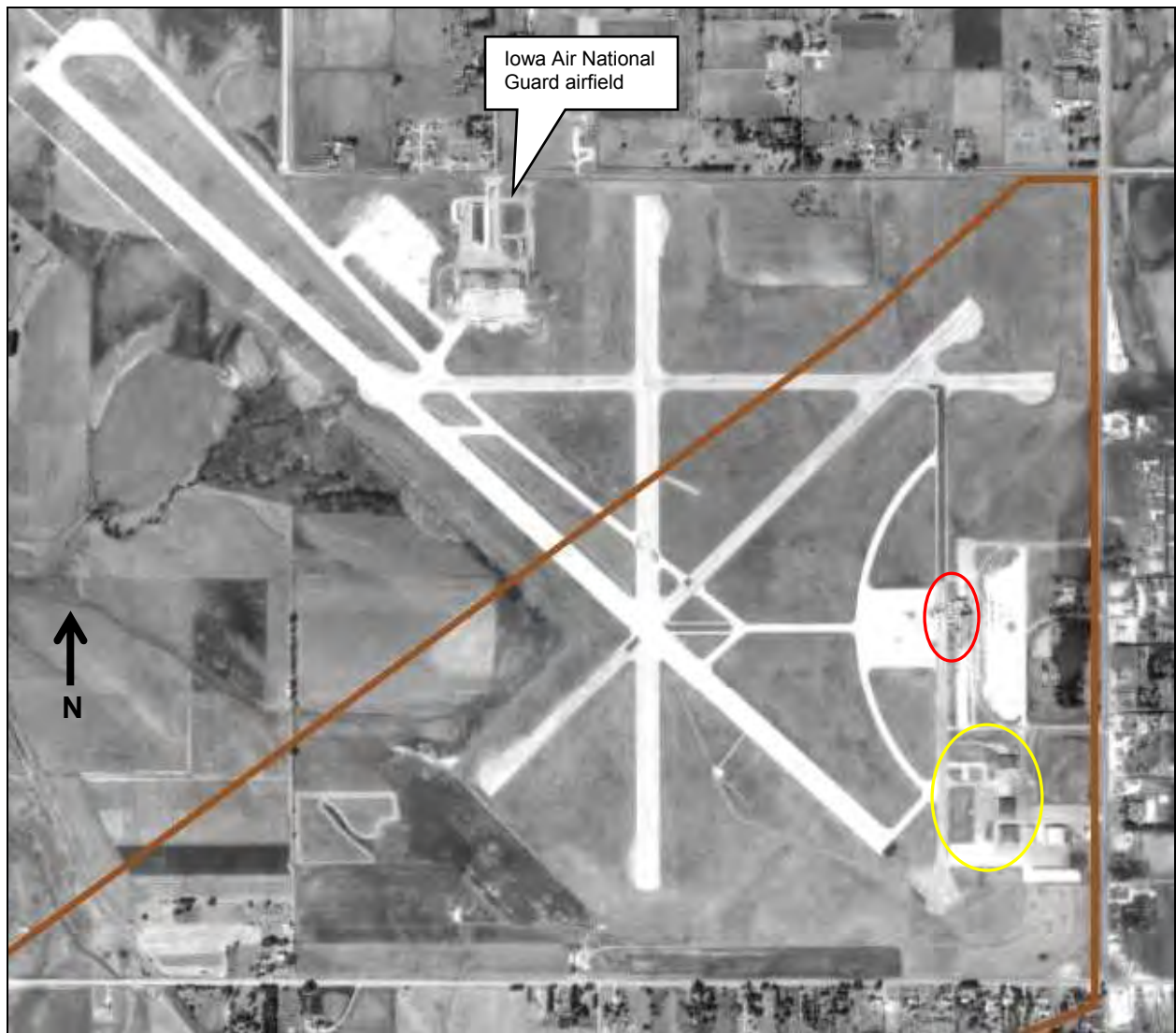


Figure 14. 1950s aerial showing airport development. Current APE is brown outline in Figures 14-16). 1949-50 terminal/administration building is circled in red; earlier terminal/hangar and United Air Lines Hangar area circled in yellow. (Source: ArcGIS - Iowa Geographic Map Server, 2018).

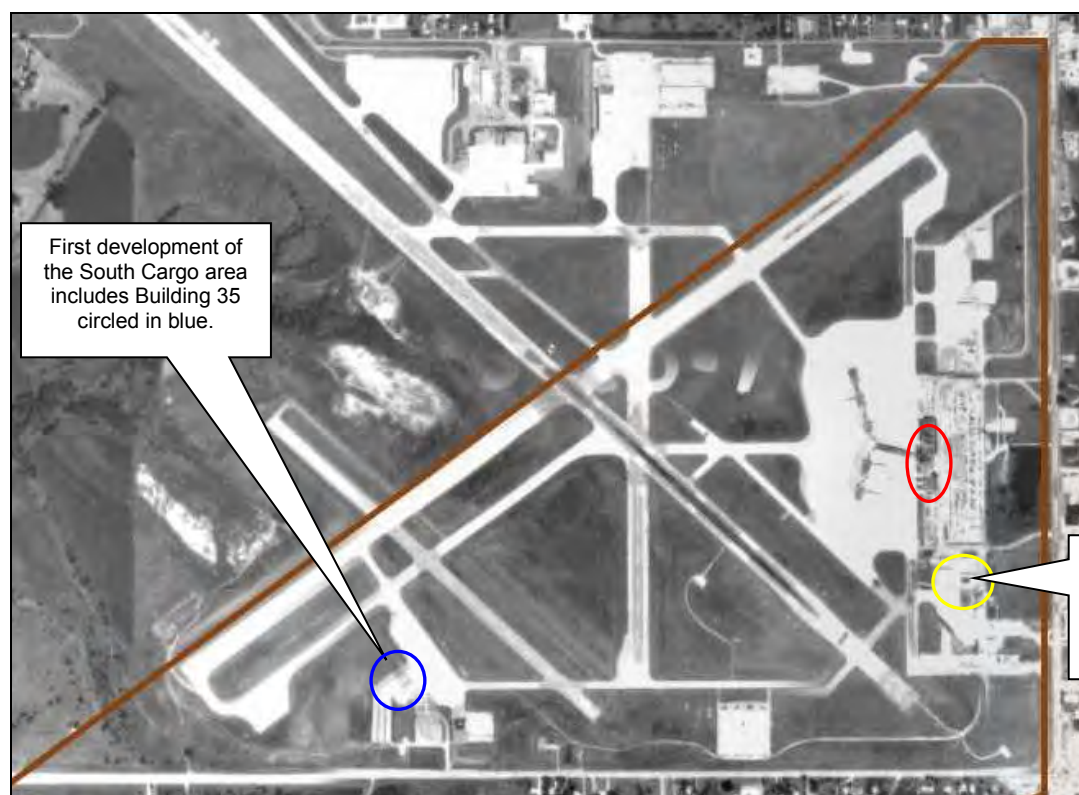
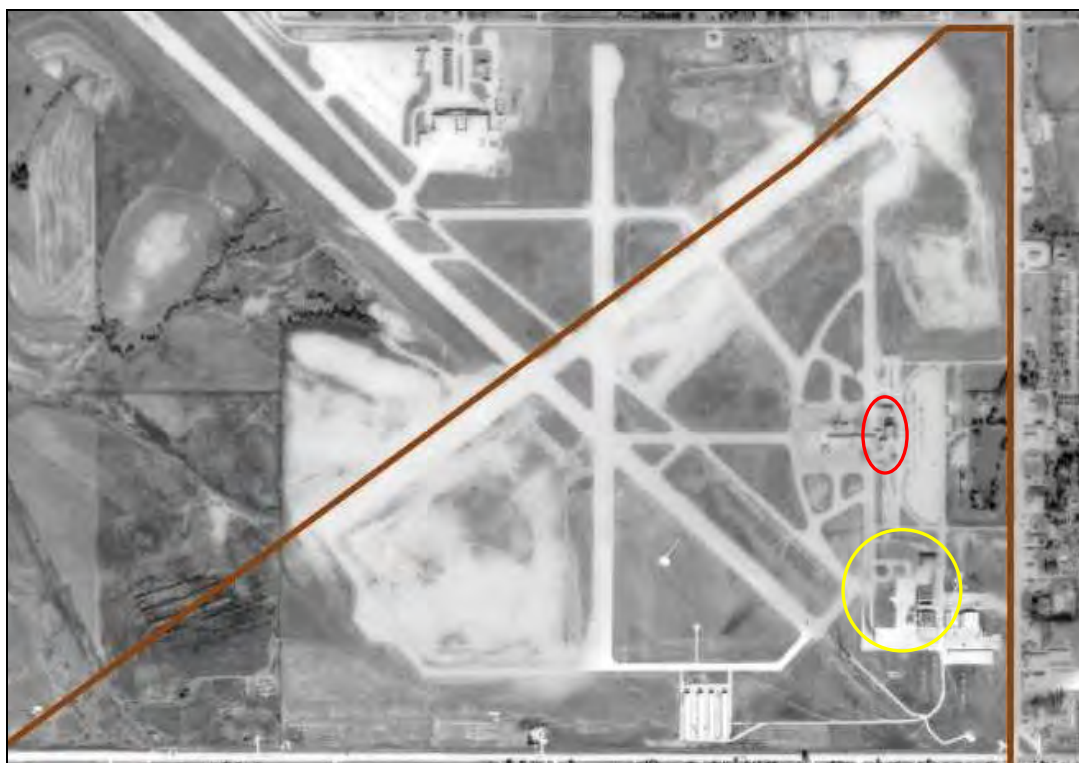


Figure 15. 1960s (top) and 1970s (bottom) aeriels showing airport development and expansion. Note new runways are under construction in the 1960s having removed one of the original runways. 1949-50 terminal/administration building is circled in red; earlier terminal/hangar and United Air Lines Hangar area circled in yellow. (Source: ArcGIS - Iowa Geographic Map Server, 2018).

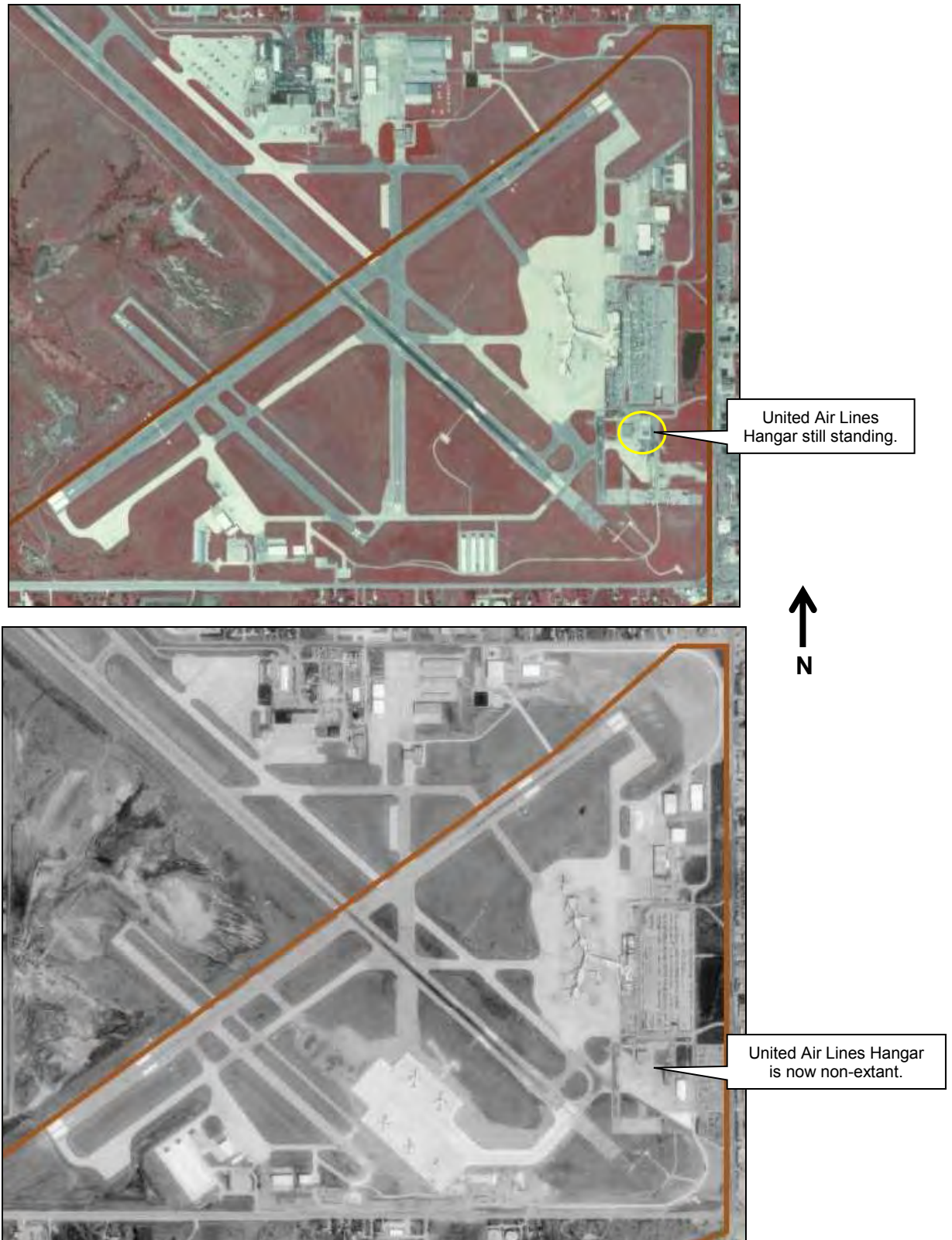


Figure 16. 1980s (top) and 1990s (bottom) aeriels showing continued airport development and expansion. (Source: ArcGIS - Iowa Geographic Map Server, 2018).

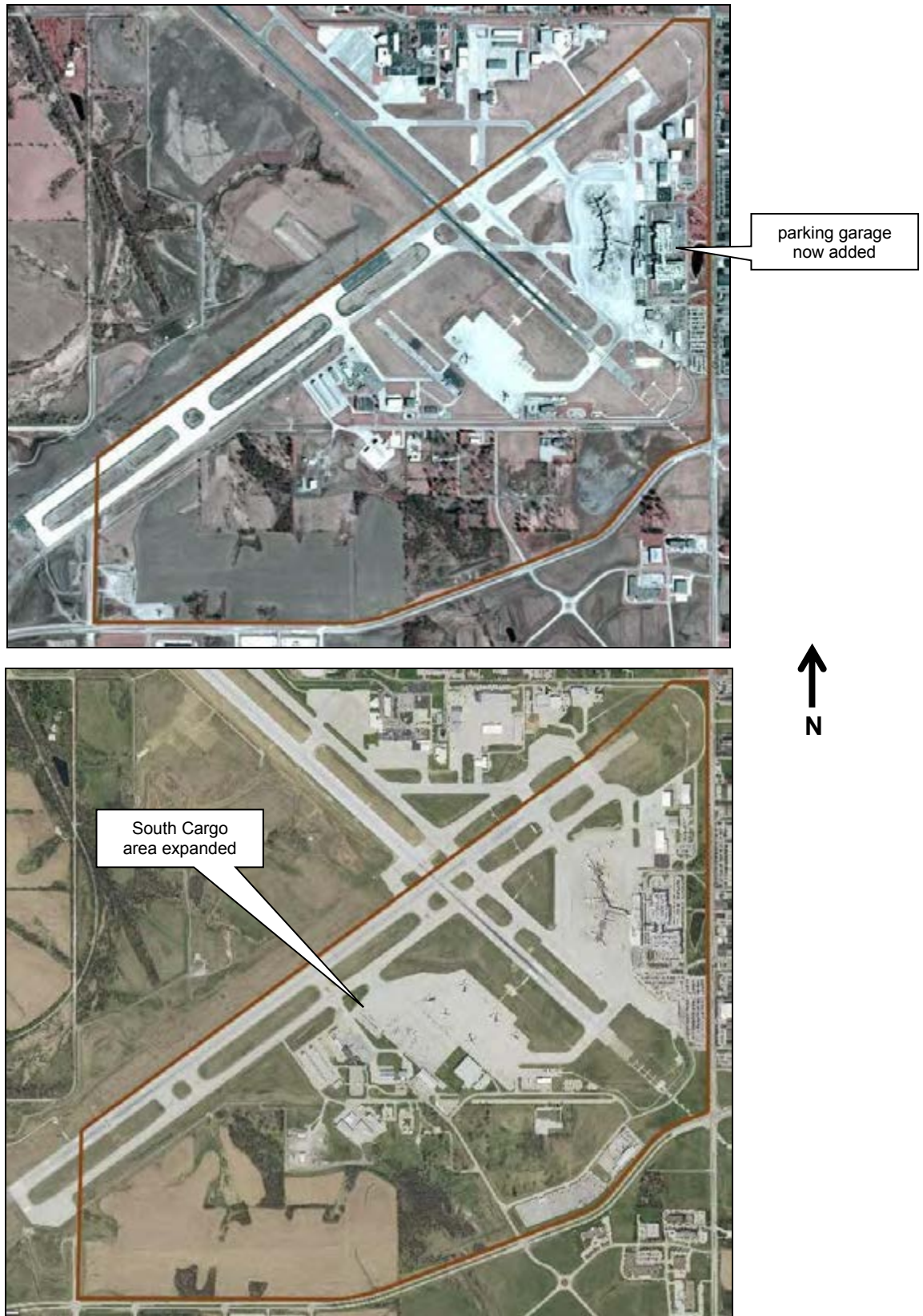


Figure 17. 2002 (top) and 2017 (bottom) aerals showing airport development and expansion.
(Source: ArcGIS - Iowa Geographic Map Server, 2018).

5. Findings and Recommendations

Narrative Description of Terminal & Administration Building (77-11871)

Built between April 1949 and November 1950, with additions through at least 1998, the Des Moines Municipal Airport terminal and administration building sits at the east edge of the airport, which is located in the southwest part of the city in southern Polk County (*Des Moines Register*, 4/7/1949, 11/12/1950; “Airport Terminal Building Historical Project Listing” [hereafter “List”]). The site is level; the elevation is 958’ above sea level. Across the airport street (Cowles Drive) in front of the terminal to the east is a large concrete, 3-story, open, parking garage/ramp built within the last two decades (*Des Moines Register*, 10/8/2000). Originating at the same time, of construction is an elevated glass and steel pedestrian walkway and sheltering sidewalk canopies that connect the terminal and parking garage. Also, at sidewalk level, is a large, modern steel canopy structure stretching along the entire east side of the terminal. Streets that ring the overall airport property include Fleur Drive (formerly SW 21st Street) to the east, Army Post Road to the south, SW 42nd St. to the west, and McKinley Ave. on the north. The terminal building’s public/passenger side is along the Cowles and Fleur drives to the east, with the airfield/runway/restricted access side on the west.

More or less rectangular in shape, the original portion of the two-story terminal building is 80’ wide and 260’ long on the south and west sides, and 40’ wide and 220’ long on the north and east sides (Figure 18). A 40’ x 40’ notch at the northeast corner of the building keeps it from having a full rectangular footprint. Except for the north end where it is a single story, most of the original building is two stories.



Figure 18. Current aerial with the approximate area of original 1949-50 terminal highlighted in yellow. (Source: Google.com on 6/22/2018)

A partial third story and the control tower are found at the north end. The plans appear to show a wooden platform at the north end also but aerials indicate that is nonextant. Currently, various modern one- and two-story additions and expansions to the north, west, and south virtually obscure the entire original terminal building (Table 1) (Figure 19). The exterior additions, which

more than doubled the size of the original building, are clad in brick and stone or stone-like panels. The long street-level modern canopy along the east elevation further obscures the ground floor of the expanded terminal, and the main entrance has been relocated from the original location, widened, and reworked in glass that extends up to the second story (Figures 20-23).

Table 1. “Airport Terminal Building Historical Project Listing, 1945-1998”

(Source: partial list of plans, alterations & additions, airport collection)

1950	terminal entrance elevator
1956	terminal restaurant alteration/addition
1958	terminal building/concourse alteration/addition
1959	terminal elevator
1959	terminal baggage claim room addition
1960	terminal bldg. north end addition
1968	terminal remodeling & addition
1968	terminal escalator
1969	concourse/stem construction
1972	terminal concourse apron
1977	terminal weather service renovation
1979	terminal 2 nd floor lounge remodeling
1982	terminal restaurant/lounge/gifts and news plan (addition)
1983	terminal doors and windows replacement
1984	terminal and concourse elevator addition
1985	terminal baggage claim addition
1985	terminal and concourse bldg. renovations
1986	terminal renovation
1986	airport passenger loading bridges
1987	terminal building improvements
1987	airport passenger loading bridges
1987	terminal office, misc. interior remodeling
1988	concourse gifts and news shop
1988	terminal exterior remodeling
1989	terminal concourse escalators
1990	terminal business center build
1991	terminal operations center build
1997	terminal baggage claim addition
1998	airline gates added to concourse A



Figure 19. Current aerial view of terminal, looking south. Note from left to right: large parking ramp, expanded modern terminal with the historic terminal in the middle, stem connector and branching concourses with multiple gates. (Source: Polk County Assessor, 2018).



Figure 20. Current view of south end and east side of terminal building, looking northwest.
(Photograph taken June 27, 2018 by Cindy L. Nagel)



Figure 21. Current view of north end and east side of terminal building, looking southwest.
(Photograph taken June 27, 2018 by Cindy L. Nagel)



Figure 22. Current view of entrance area, with sheltering canopies overhead and along the terminal building looking northwest. *(Photograph taken June 27, 2018 by Cindy L. Nagel)*



Figure 23. Two views of the airfield side of the terminal building, looking easterly. The distinctive semi-circular bay is seen in far left buried behind additions.
(Photographs taken June 27, 2018 by Cindy L. Nagel)

The original section of the terminal building was constructed in 1949-50 and built with a steel framework using a 20' grid plan. It was clad on the exterior with a red brick veneer, stone trim, burnished aluminum panels, and numerous windows that allowed the public to view the aviation comings and goings on the field (see Figure 9). In the 1960s, the terminal was expanded and the façade was completely remodeled (Figure 24).



Figure 24. 1960s postcard view of the remodeled east front (looking northwest) of the expanded terminal before the larger, full-length, sidewalk canopy was added. Ground floor windows have been bricked in and a metal screening added to the second level (nonextant).
(Image obtained from the Airport collection).

The west airfield side had and has a rounded 2-story bay that projects out from the terminal toward the runways (Figures 25-27). This projection originally held a waiting area on the ground floor and a restaurant on the second level. Dining and snacks are now available in a fully modernized area of the former waiting area on the ground floor. Additional original functions housed on the first floor included: a coffee shop, barber shop, pilots' operations room, spaces for several airlines' ticketing and baggage operations, several men's and women's restrooms, an airport manager's office, a large lobby and concessions area, and an air freight and post office (plan sheet #236-618, collection of the airport). In addition to the dining restaurant, the upper

floor also had space for accommodating other passenger needs including: a private dining room with a lounge, a lounge off the main dining room, and a large kitchen. Spaces dedicated to airport operations included: an equipment room, a “CAA” [Civil Aeronautics Authority] district office and operations office, pilots’ spaces, storage rooms, and a weather bureau (plan sheet #236-619).



Figure 25. Early 1950s airfield side looking toward the west elevation of the terminal; two Braniff DC-3 “tail draggers” waiting to load. Note the ribbon windows, the projecting round bay, and the short original canopy on the terminal. (Image obtained from the Airport collection).



Figure 26. 1950s view of the airfield side of the terminal, looking northeast. (Image obtained from the Airport collection).



Figure 27. 1950s view of terminal, airfield side, looking southeast.

(Source: State Historical Society of Iowa, Iowa City).

Today those functions still relevant, would be housed in the expanded terminal, which has been repeatedly updated and modernized (see Table 1). Modern interior finishes include dropped ceilings, various types of modern lighting, carpet, and terrazzo or terrazzo-like flooring (Figures 28-35).

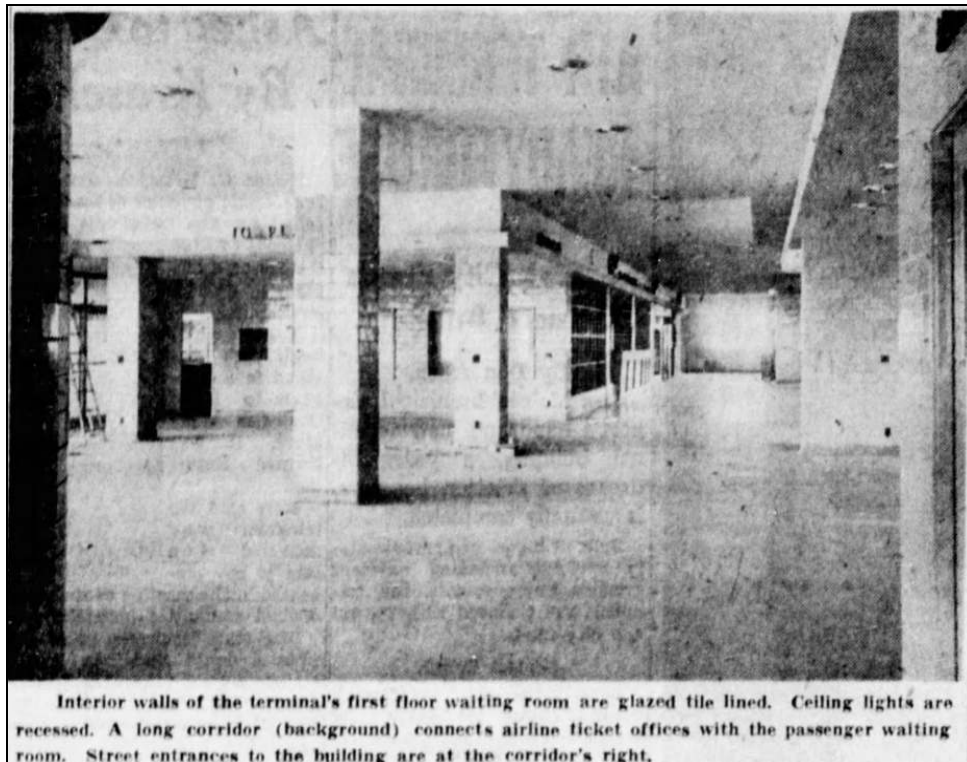


Figure 28. Photograph showing the original interior hallway of the terminal building.

(Source: Des Moines Register, 11/12/1950).



Figure 29. Current view in the area of the 1950 image in Figure 20. *(Photograph taken June 27, 2018).*



Figure 30. Current view of the Airline counters. *(Photograph taken June 27, 2018).*



Figure 31. 1959 *Des Moines Register* photograph of “the 340 foot long concourse, enclosed for air passenger comfort.” However, it was noted that it was neither heated nor air conditioned. (Image obtained from “50th Anniversary, Des Moines Municipal Airport,” 1981, airport collection).

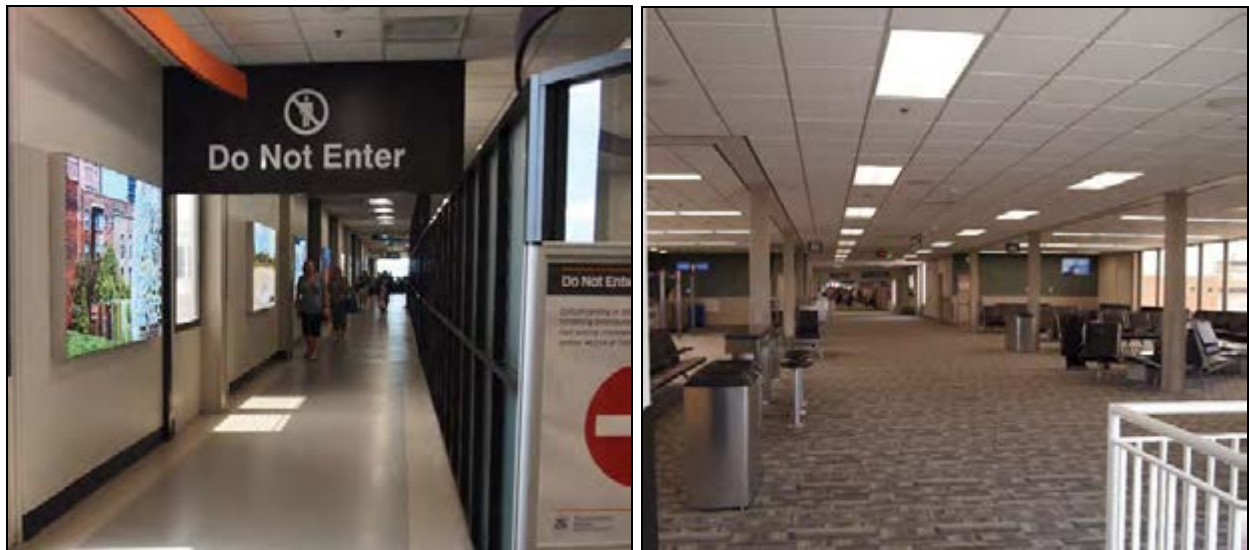


Figure 32. Current views of Concourse stem looking toward concourses and gates (left) and Concourse A (right). (Photograph taken June 27, 2018).



Figure 33. Current view of baggage carousels. *(Photograph taken June 27, 2018).*



Figure 34. Inside front entrance, current view. *(Photograph taken June 27, 2018).*



Figure 35. Car rental counters, current view. *(Photograph taken June 27, 2018).*

The airfield side of the building originally had a short, open canopy extending out from the terminal to shelter passengers as they walked to their waiting planes (plan sheet #236-619). This was replaced in 1958 by an enclosed, ground-level concourse. Today a modern, elevated and climate-controlled boarding structure, consisting of a “connection stem” walkway with two branching concourses (A and C) at the end (1969, 2001, 2003, and later), has replaced these former structures. Concourse A extends to the north and contains gates A-1 to A-5. Concourse C extends to the south and now contains gates C-1 to C-7 (Figure 36). There is no Concourse B (Bryan Belt, Director of Engineering, Des Moines International Airport, email dated 7/9/2018; Table 1; Des Moines International Airport, “Master Plan Update” 2007, from the airport’s collection; Des Moines Register, 10/8/2000).

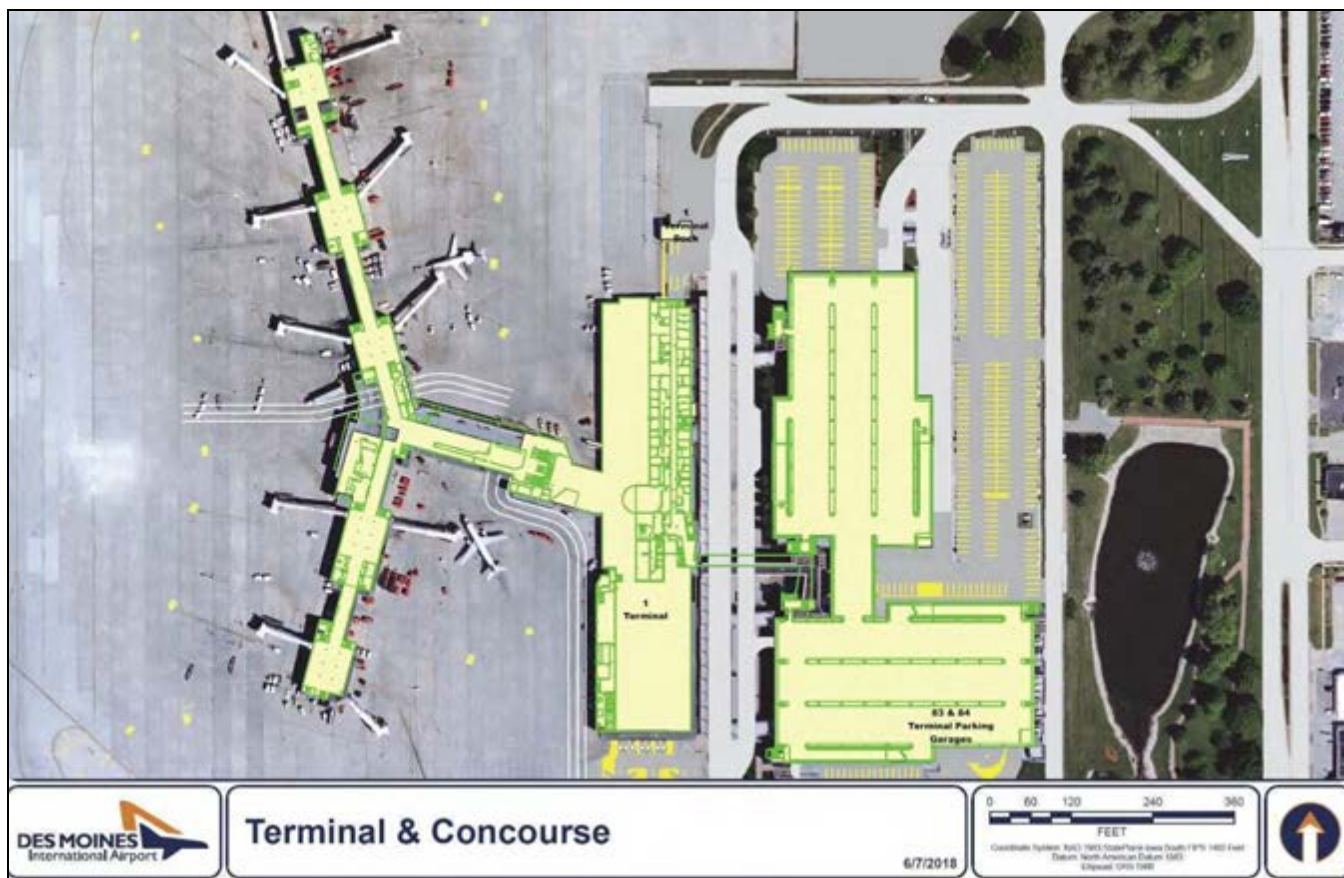


Figure 36. Current floor plans of terminal and concourses. (Map obtained from Airport collection, 2018).

Narrative Description of Iowa Aviation, Inc. Fixed Base Operator Building (77-11872)

The Fixed Base Operator Building also known as “Building 35” is located in the southwest portion of the Des Moines International Airport just north of the former alignment of Army Post Road (Figure 37). In the 1990s, Army Post Road, which originally had a straight east-west alignment along the south side of the airport, was shifted to the south and is now a two-lane roadway angling from northeast to southwest along the expanded airport property (Figure 38).

The subject building is situated on level ground and oriented with the front of the office block facing southeast. This is an irregularly shaped building comprised of an office area separated from a service/shop area by a narrow segue, and a large (former) airplane hangar attached to the northwest end of the service/shop. Telescoping from the northwest is a large newer addition from c.1999 and there are smaller, c.1999 loading-dock additions on either side. Built c.1971, it was significantly expanded using plans drawn in 1999 by Schemmer Associates. This alteration added the large rear storage addition to the northwest side of the former hangar and the much smaller loading-dock side additions. It also converted the hangar to storage. The project was part of the building’s conversion from a fixed base operator (FBO) to use by United Parcel Service (UPS).

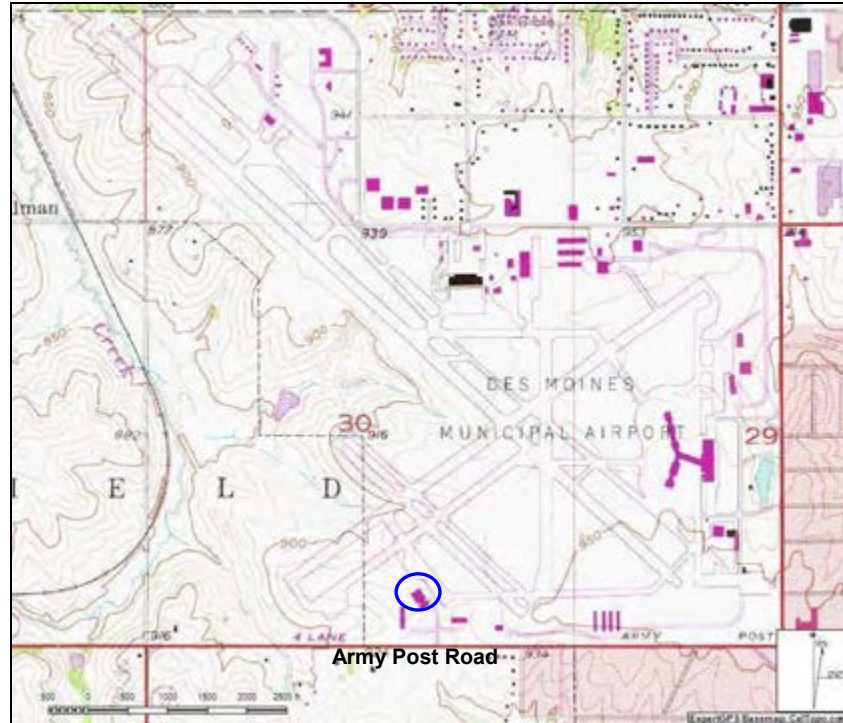


Figure 37. Topographic map showing the location of Building 35 (blue circled) in relation to the original alignment of Army Post Road (red line near bottom of map). (Source: USGS Des Moines SW Quadrangle Map 1956 - photorevised 1967, 1971, and 1976 - obtained from ExpertGPS mapping software, 2018).

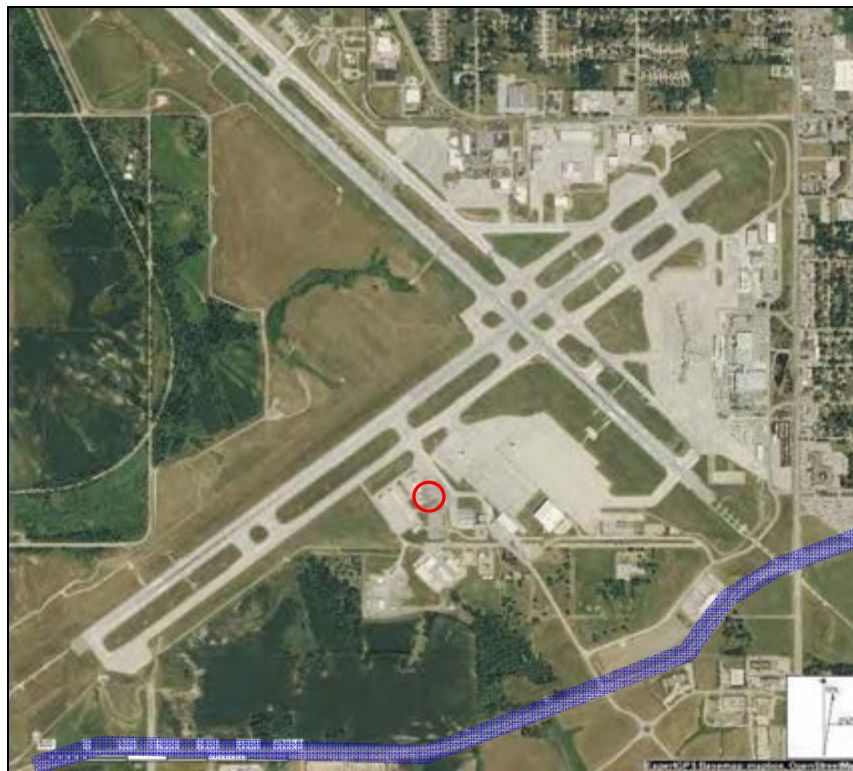


Figure 38. Modern aerial map showing the location of Building 35 (red circled) in relation to the current alignment of Army Post Road (highlighted in blue). (Source: 2013 Aerial obtained from ExpertGPS mapping software, 2018).

As originally planned in 1970, the one-story office portion held various offices, a pilots' lounge, and a classroom. This general floorplan appears to still exist (Figure 39). A narrower hall segue with restrooms connected the office block to the service/shop portion of the original 1970s building. The segue is clad with wood siding. The far northwest hangar part of the original building was for servicing aircraft. It was larger and aircraft could be rolled in through large doorways. The facility is surrounded by concrete aprons on all sides with the eastern apron being the largest.

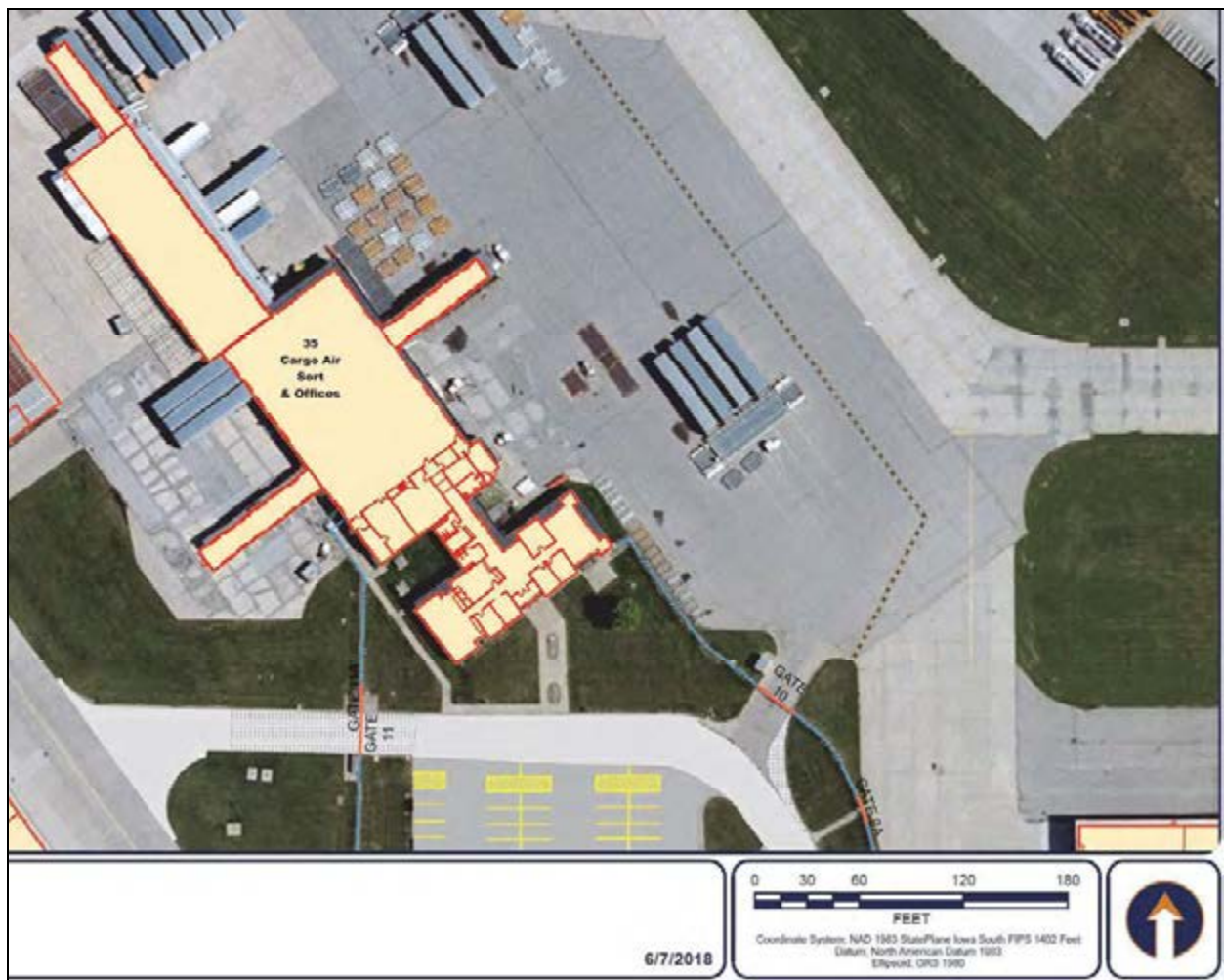


Figure 39. Plan and layout of Building 35 indicating the original interior walls are extant when compared to the 1970 plan sheet (see Iowa Site Inventory Form 77-11872 in Appendix).
(Source: Des Moines International Airport, 2018).

The one-story, non-hangar portion of the building was built of concrete wall panels separated by large, dark-glass windows terminating at the roof with a wide metal or wooden header panels. The roof is flat. This treatment follows through to the front section of the higher, flat-roofed hangar. Loading-dock doors have been installed in the former hangar doorways. More loading docks are located in the 1999 additions (Figure 40). The additions are steel sided.

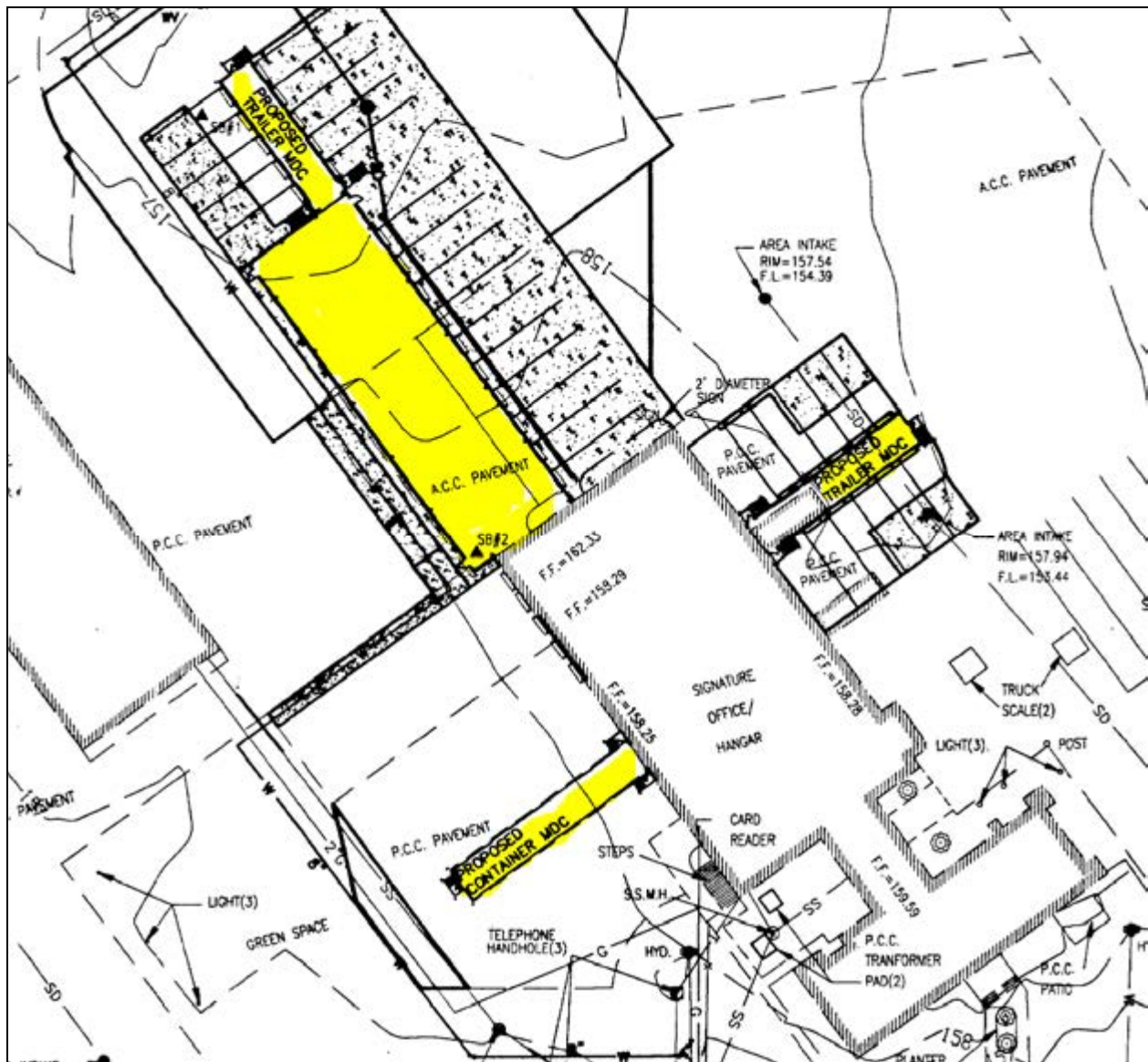


Figure 40. 1999 site plan of Building 35. Additions are highlighted in yellow.
 (Source: Des Moines International Airport collection).

This facility was constructed to house a fixed-base operator called Iowa Aviation Inc. An FBO is a private commercial service that caters to business and private general-aviation aircraft rather than the commercial airlines. Possible services offered by FBOs include aviation fueling, hangaring, tie-downs and chalking on the apron, aircraft maintenance, flight instruction, charter flights, and aircraft rental. There were at least two other FBOs on the airport grounds during the 1960s: Des Moines Flying Service and Elliot Flying Service (*Des Moines Tribune*, 4/1/1960). The 1999 addition plans identify “Signature” as the FBO in the former Iowa Aviation, Inc. office and hangar at that time. According to Signature Flight Support’s website (www.signatureflight.com on 6/25/2018), Signature was the result of the 1992 merger of Page AvJet and Butler Aviation. United Parcel Service, an air cargo and package delivery business, moved into the former Signature building after its remodeling and expansion, around 1999 or 2000 (Figures 41-44).



Figure 41. Current view of Building 35 office block, looking northwest.
(Photograph taken June 27, 2018).



Figure 42. 1990s storage addition and loading dock on Building 35, looking north.
(Photograph taken May 2, 2018).



Figure 43. From left to right: Building 35 office block, segue, former hangar, looking southwest.
(Photograph taken May 2, 2018).



Figure 44. Southwest loading dock, looking northwest. (Photograph taken June 27, 2018).

Narrative Description of Des Moines International Airport (77-12008)

The modern airport of today contains only a few buildings that are potentially of historic age (i.e., pre-1968). These include that portion of the current terminal complex that contains the 1949-50 Des Moines Municipal Terminal/Administration Building as described above. Another that was uncertain if historic age or not was Building 35, which was found to have been built around 1971 as also described above. Table 2 presents a listing of the extant buildings and structures on the airport and their dates of construction, although some may not be exact; some addresses also vary from other sources.

Table 2. List of Buildings and Structures on the Des Moines International Airport.

(List provided by Des Moines International Airport, 2018).

1	Terminal Building (Iowa Inventory)	5800 Fleur Drive	1949-50
	Parking Garages	5801 Fleur Drive	1998
2	Federal Inspection	6000 Fleur Drive	1957
4	Deicer Storage Building	6014 Fleur Drive	2002
5	East Air Cargo Building	6100 Fleur Drive	1987
6	Parking Office	5880 Fleur Drive	1999
7	Executive Hangar & Offices	5304 Fleur Drive	1975
8	Community Hangar	5300 Fleur Drive	1975
9	Community Hangar	5310 Fleur Drive	1975
10	Aircraft Maintenance and FBO Facility	5600 Fleur Drive	1970
11	Storm Water Control Building	5100 Fleur Drive	2007
28	Consolidated Rental Facility	2300 Airport S Frontage Rd	2010
29	Aircraft Maintenance Facility	2901 Army Post Road	2008
30	ALSF Substation Building		
31	South Air Cargo Building	2601 Army Post Road	1991

32	South Air Cargo Building	3023 & 3025 Army Post Rd	2003
34	Executive Hangars	3121 Army Post Road	1985
35	Business Center and Sort Facility	3251 Army Post Road	c.1971
36	Executive Hangars & Offices	3261 Army Post Road	1970
37	South T-Hangars	3301 Army Post Road	1985
38	South GA Flight Planning Building	3241 Army Post Road	1992
39	South T-Hangars	3311 Army Post Road	1970
40	Executive Hangar	3305 Army Post Road	1975
41	South T Hangars	3391 Army Post Road	2018
42	Executive Hangars & Offices	3393 Army Post Road	2018/1990
43	Airport Sand/Salt Storage Facility	3216 Army Post Road	2012
44	FM Vehicle Storage Building	3220 Army Post Road	2006
45	Fuel Farm Maintenance		
46	Aircraft Maintenance Building	3200 Army Post Road	2000
46B	Pole Barn Sand Storage (Temporary)		
46C	Pole Barn (Temporary)		
46D	Garage (Temporary)		
47	FM Vehicle Storage Building	3210 Army Post Road	2001
49	South IDF Building	3090 Army Post Road	2000
50	FM Chemical Storage Building	3150 Army Post Road	2003
52	Storm Water Control Building	None	2003
53	Deicer and Water Metering Building	None	2003
54	UPS Deicer Building		
60	Principal Hangar	2502 McKinley Ave	2001
61	North IDF Building	2504 McKinley Avenue	2005
62	Meredith Flight Center		
64	Jet Center	2610 McKinley Avenue	1985
65	Hangar / classroom	2612 McKinley Avenue	1991
66	Executive Hangars	2612 McKinley Avenue	1980
67	Executive Hangars and FBO Facility	2688-2700 McKinley Ave	1980
69	Community Hangar	2800 McKinley Avenue	1982
70	Fire Rescue Station	2810 McKinley Avenue	1980
71	Offices and Aircraft Maintenance Facility	2800 McKinley Avenue	1980
None	Parking Booths, Shelters, and Canopies	5800 Fleur Drive	1998

NOTES ON TABLE 2: Brown-shaded buildings are considered to be “structures” as opposed to “buildings” in type. Also, buildings No. 33, 26A, 48, 51, and 91 were lined-out on the original list and are considered to be non-extant. These buildings were removed from the above list.

As can be seen in Table 2, the only historic-age buildings identified are the 1949-50 terminal building (given an incorrect year built of 1948 in the master table) and the Federal Inspection building reportedly dating from 1957. Figure 45 is a photograph taken in 2011 of the Federal Inspection building, with the building a somewhat typical late 1950s one-story construction of

red and buff-colored brick veneer, flat roof, rows of glass windows, and a flat metal overhang of the front entry. While it may retain good historic integrity, this modest-sized, utilitarian building does not appear to possess sufficient architectural significance to be individually eligible.



Figure 45. Federal Inspection Building built in 1957 on the airport property.

(Source: Photograph taken in 2011 by the Polk County Assessor; accessed at <http://web.assess.co.polk.ia.us/>, 2018).

Some of the “1970” buildings are close to that 50 year mark of 1968 for basic NRHP consideration; however, there are only eight buildings out of a total of 49 buildings and structures that are identified as having been built in the 1970s. Among these is Building 35, with both that building and the 1949-50 terminal building recommended herein as not eligible for inclusion in the NRHP for lack of sufficient integrity. The fact that the main historic building of potential significance - the 1949-50 terminal/ administration building - is not eligible for the NRHP, indicates a low potential for the airport as a whole in its current state to be eligible as a historic district. This conclusion is further supported by the low number of potentially historic-age buildings (the 1957 building and the 1970s buildings), which number only 9 out of 49 extant buildings and structures, or only 18% of the total extant buildings. The WPA-built portions of the Des Moines Municipal Airport in the 1930s-early 1940s are also largely gone, including the improvements to the original terminal/hangar building, the beacon tower, the extension of the original runways and the construction of a new North-South runway and a fourth runway after October 1938 (“50th Anniversary, Des Moines Municipal Airport,” 1981, airport collection). Using the 1950s aerial and comparing it to the succession of aerials from the 1960s to 2017, it can be seen that one of the four runways was completely removed and a second was almost completely removed during subsequent airport expansions and runway reconfigurations (Figure 46). The remaining sections were widened and resurfaced/repaved and repaved through the years. Currently, Runway 13-31 is being resurfaced.

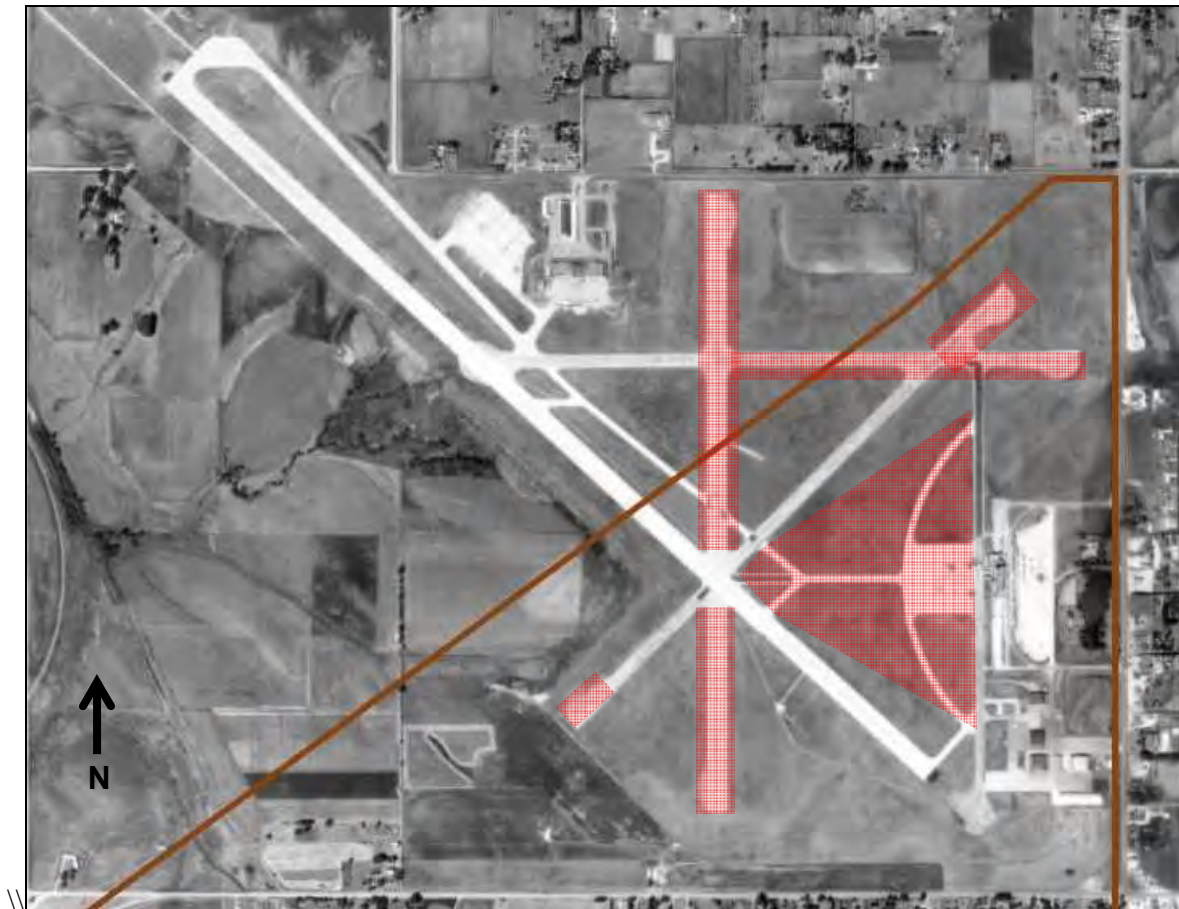


Figure 46. 1950s aerial showing those portions of the WPA-built runways that were later completely removed and in several areas were subsequently built over (red-shaded).

The remaining sections were widened and extended in later years.

(Source: ArcGIS-Iowa Geographic Map Server, 2018).

Conclusions and Recommendations

1949-50 Des Moines Municipal Airport Terminal & Administration Building

The original 1949-50 terminal building would have been locally significant under both Criterion C and Criterion A had it retained historic integrity. Significance under Criterion A rests with its role in the development of Des Moines' commercial air travel accommodations, including passenger and airline services, as well as the growing public thirst for air travel and all things aviation. Under Criterion C, the terminal reflects the post-World War Two federal funding of aviation infrastructure, especially commercial passenger facilities, with larger buildings accommodating specialized interior functions divided into passenger comforts, airline operations, and safety represented by the weather bureau and pilots' facilities. *However*, the original terminal and its surroundings have been heavily modified, leaving it without historic integrity. The terminal building itself is obscured by modern structures that have negatively impacted the integrity of setting, in that the public's main approach to the terminal is obscured and altered by the nearly 2,000-stall concrete parking structure. Because it lacks historic

integrity, the terminal building is recommended not eligible for inclusion in the NRHP. It is also recommended for no further architectural/historical investigation.

Circa 1971 Iowa Aviation Inc., Fixed Base Operator Building (aka, Building 35)

This building with its alterations is less than 50 years old and does not meet the basic requirement for consideration of NRHP eligibility. Furthermore, it does not possess sufficient integrity or significance to meet the level of exceptional importance required under Criteria Consideration G for properties less than 50 years of age to qualify for inclusion in the NRHP. Therefore, this property is recommended as not eligible and is also recommended for no further architectural/historical investigation.

Des Moines International Airport as a Potential Historic District

The airport as a whole encompasses approximately 49 buildings and structures, only two of which are of historic age (pre-1968) and eight of which date from the 1970s. The rest of the buildings were built after the 1980s. Of the two historic-age buildings, the 1949-50 terminal does not retain historic integrity. The 1957 Federal Inspection building appears to retain some degree of historic integrity but is a modest-sized building that does not possess sufficient architectural significance to be potentially individually eligible. At present, it may be the only standing building that could be considered contributing to a historic district, if one still existed. The Assessor's records for the airport property also list 288 building permits from 1995 to 2017 for additions, alterations, remodeling, paving, new construction, and building removal supporting the already-known extent of the modifications to the historic airport in the modern era. The runways and landscape of the airport have also been reworked, repaved, replaced, and built over through the years. Even the area of the lake to the east of the terminal complex has been reworked more than once in the 20th century, with the current lake area extensively sculpted and landscaped and the lake itself reduced in size from what it was originally. The construction of the parking garage on the west side of the lake in the 1990s effectively destroyed most of the original "park" area in that location. As a result, it is concluded that the existing airport does not retain sufficient integrity to be considered eligible for inclusion in the NRHP as a historic district. It is recommended for no further architectural/historical investigation for the currently proposed project.

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**DES MOINES INTERNATIONAL AIRPORT REPLACEMENT
TERMINAL ENVIRONMENTAL ASSESSMENT,
CITY OF DES MOINES, POLK COUNTY, IOWA:**
Phase I Archaeological Investigation

RS&H Project 224-1789-001

Tallgrass Archaeology Report No. TA18-698--2

Submitted to

RS&H
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August 2018

CONFIDENTIALITY STATEMENT

Information contained in this report relating to the nature and location of archaeological sites is considered private and confidential and not for public disclosure in accordance with Section 304 of the National Historic Preservation Act (54 U.S.C. § 307103); 36 CFR Part 800.6 (a)(5) of the Advisory Council on Historic Preservation's rules implementing Sections 106 and 110 of the Act; Section 9(a) of the Archaeological Resource Protection Act (54 U.S.C. § 100707) and, Chapter 22.7, subsection 20 of the Iowa Code.

ABSTRACT

The Phase I archaeological investigation of the proposed Des Moines International Airport Replacement Terminal Environmental Assessment in the City of Des Moines, Polk County, Iowa, assessed the archaeological potential of an APE, which encompasses 803 ac (325 ha). The majority of the APE was found to have little or no potential for intact evidence of historic or prehistoric occupation as a result of the extensive, intensive, and recurring construction, demolition, and expansion activities associated with the airport in the historic and modern eras. However, the assessment did identify an area totaling 255 ac (103.2 ha) that retained some potential for intact archaeological sites. This area was then examined by pedestrian surface survey and the excavation of 217 subsurface tests including: 206 shovel tests and 11 soil cores. The Phase I field investigation identified six prehistoric archaeological sites designated as 13PK1058 through 13PK1063. The sites were all represented by lithic surface finds, with shovel testing at each site location producing no additional artifacts or any evidence of intact features or sub-plow zone cultural deposits. One of the sites (13PK1058) consisted of a Late Woodland projectile point, with site 13PK1063 consisting of a pitted cobble tool that could date from the Archaic or Woodland periods. The rest of the sites were represented by chert flakes and flake tools that were non-diagnostic beyond a general Prehistoric Period affiliation. All of the sites reflect limited activities conducted by prehistoric peoples at these locations likely while hunting and gathering in the nearby creek valleys. Sites 13PK1058 through 13PK1063 were concluded to lack sufficient integrity or significance to be eligible for inclusion in the NRHP under Criterion D or any other NRHP significance criteria. All of these sites were recommended as not eligible and for no further archaeological investigation. There was one site, 13PK961, that had been previously recorded on the basis of a map representation of a historic cemetery on the former Truman Jones farm. This farm became the nucleus of the original Des Moines Aviation Park in the 1920s and from which the subsequent Des Moines Municipal Airport expanded. The former cemetery is no longer identifiable on the surface and appears to be under what is now the SE Service Road. It is not known if the burials were removed, but this location should be considered to have some potential for human remains if this location is ever proposed for impacts. The currently-proposed project does not include any planned improvements in this location. Therefore, for the current project, no further archaeological investigation is recommended.

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INTRODUCTION

This report presents the results of a Phase I archaeological investigation of the proposed Des Moines International Airport Replacement Terminal Environmental Assessment in the City of Des Moines, Polk County, Iowa (Figures 1-2). The Area of Potential Effect (APE) for the Phase I archaeological investigation encompasses that portion of the airport where various activities are proposed (Figures 1-2). These include: replacement of the existing terminal/administration building, removal of Building 35, and a parcel that may be used for borrow during the construction activities. This APE was assessed for archaeological potential with the area slated for borrowing and other earthmoving activities identified as the only area within the overall APE that still retained potential for intact archaeological sites (Figure 3).

The proposed project is a federally-assisted undertaking, thus falling under the requirements of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA). Section 106 requires Federal agencies to take into account the effects of their undertakings on historic properties, and to afford the Advisory Council on Historic Preservation (ACHP), the State Historic Preservation Officer (SHPO), and others as appropriate, a reasonable opportunity to comment on such undertakings.¹ The federal agency in this case is the Federal Aviation Administration (FAA). The study was conducted by Tallgrass Archaeology LLC of Iowa City, Iowa, for RS&H of Denver, Colorado, and the Des Moines Airport Authority. The purpose of a Phase I Archaeological Investigation is to identify and delineate all archaeological resources within a defined APE to identify potential historic properties. Historic properties are defined as any site, district, building, structure, or object that is included, or eligible for inclusion, in the National Register of Historic Places (NRHP).

There are no historic-age standing buildings within the Phase I APE; however, two airport buildings, including the current terminal/administration/concourse building and Building 35, a former fixed base operator building, are proposed for replacement and removal on the airport property. The terminal building encompasses the 1949-50 terminal/administration building, thus being of historic age (i.e., 50 years of age or older). Building 35 was of an uncertain age and was found to be just over 50 years of age but close enough to warrant inventory and evaluation for NRHP eligibility. These two buildings were intensively surveyed and evaluated by Tallgrass Archaeology LLC and Tallgrass-Full LLC, with the results of that study reported in Rogers and Full (2018). Both buildings were recommended as not eligible for inclusion in the NRHP primarily for lack of sufficient historic integrity.

The archaeological field investigation was conducted between May 7 and June 14, 2018. Leah D. Rogers served as Principal Investigator and Project Archaeologist, Cindy L. Nagel, supervised the fieldwork and co-authored the project report with the Principal Investigator. Project Assistants: Ashlynn Brown, Lisa Goffstein, Addison Marsengill, and Dan McCullough assisted with the fieldwork, post-field lab, and report compilation activities. The Principal Investigator is solely responsible for the content and accuracy of this report with respect to site location, description, and evaluation.

The project parcel is in the N1/2 of Section 31, T78N-R24W; the SE1/4, SW1/4 and the SW1/4, SE1/4 of Section 30; with a small extension into the NW1/4, SW1/4, NW1/4 of Section 32 all in T78N-R24W, Bloomfield Township, Polk County, Iowa (see Figure 1). The project parcel is bounded by SW 42nd Street on the west, the current alignment of Army Post Road on the south, SW 28th Street on the east, and the runway and airport cargo buildings complex to the north (see Figure 2). **The APE totals 803 ac (325 ha), with the targeted Phase I field survey area encompassing 255 ac (103.2 ha) of that total.**

¹ ACHP Section 106 Regulations Summary, accessed at <http://www.achp.gov/106summary.html>, February 2015 and 36 CFR Part 800 - Protection of Historic Properties incorporating amendments effective August 5, 2004, accessed at <http://www.achp.gov/regs-rev04.pdf>.

ENVIRONMENTAL CONTEXT

The current project area is in Iowa's largest landform region known as the Southern Iowa Drift Plain, very near the southern margin of the Bemis advance of the Des Moines Lobe (Prior 1991) (Figure 4). The topography of the Southern Iowa Drift Plain is one of steeply rolling hills, level upland divides, stepped erosion surfaces, and dendritic drainage networks. The uplands are mantled by a moderate to thick cover of Wisconsinan-age loess, which has been deflated in many areas from years of intensive cultivation and surface erosion. Pre-Illinoian glacial drift and the underlying sedimentary bedrock are exposed within deeper stream valleys. The project area is approximately 2.4 kilometers (1.5 miles) south of the Raccoon River and approximately 7 kilometers (4.4 miles) from the confluence of the Raccoon and Des Moines rivers. This river system was formed by glacial outwash from the melting of the Des Moines Lobe ice sheet and deeply incised the till plain, exposing the underlying bedrock in many places.

The survey area encompasses the upper reaches of an unnamed intermittent tributary of Middle Creek located in the eastern portion of the project parcel and an unnamed intermittent tributary of Frink Creek, located in the north-central portion of the project parcel. Middle Creek is just under a mile to the south of the current APE and flows to the east-southeast into the North River. Frink Creek, which is labeled "Four Mile Creek" on the historical plat maps, is just under a half-mile to the northwest of the survey area and flows to the north into the Raccoon River.

The survey area encompasses upland divide and interfluvial landforms including broad summits and moderately- to gently-sloping shoulder, side, and nose slopes (see Figure 1). The interior of the targeted area for the Phase I field survey had been primarily impacted by intensive cultivation in the historic and modern eras, while the edges of this area on all sides have all been heavily impacted by runway and airport construction, road relocation and construction, and a suburban residential housing development that was all removed as the airport expanded (see Figure 3). The extent of the previously-disturbed areas is detailed further in this report.

The mapped soils within the survey area include: Colo-Judson silty clay loams, occasionally flooded, (11B) in the small tributaries and Ladoga silty clay loam, dissected till plains, eroded (76C2); Ladoga silty clay loam, eroded (76D2); Sharpsburg silty clay loam (370B) and Sharpsburg silty clay loam, eroded (370C2); Sharpsburg-Urban land complex (4370C); and Orthents, loamy (5040) on the upland landforms (Figure 5) (Web Soil Survey 2018). The areas mapped as "urban" soils and as Orthents are locations that have been heavily impacted and modified by previous construction and other earthmoving projects in the survey area.

Colo series consist of very deep, well drained soils that formed in alluvium. These soils are found on floodplains, low terrace streams, alluvial fans, and upland drainageways and typically have a slope range of 0 to 5 percent. The native vegetation was tall prairie grasses. A typical representative soil profile is Ap-A1-A2-A3-BA-Bg-BCg-Cg (Soil Survey Staff 2018).

Judson series consist of very deep, well drained soils that formed in silty colluvium derived from non-calcareous loess. These soils typically have a slope range of 0 to 12 percent and are commonly found on foot slopes, upland drainageways, and alluvial fans. Native vegetation consisted of deciduous trees, mainly oak and hickory. A typical representative soil profile is A1-E1-E2-BE-Bt1-Bt2-BC-C (Soil Survey Staff 2018).

Ladoga series consist of very deep, moderately well drained soils formed in loess that are found on convex summits of interfluvial, side slopes, and nose slopes on dissected till plains and tread and risers on stream terraces. Slope range is 0 to 30 percent. The native vegetation was tall prairie grasses and deciduous trees. A typical representative soil profile is A-E-BE-Bt1-Bt2-Bt3-Bt4-Bt5 (Soil Survey Staff 2018).

Sharpsburg series consist of very deep, moderately well drained soils formed in loess with a slope from 0 to 18 percent. These soils are found on interfluvial and hill slopes on uplands and on treads and risers on stream terraces in river valleys. Native vegetation was tall prairie grasses. A typical representative soil profile is Ap-A1-A2-Bt1-Bt2-Bt3-BC-C (Soil Survey Staff 2018).

HISTORIC CONTEXTS

Historic contexts for the prehistoric period of the Des Moines vicinity have been set forth in previous studies including those for the Des Moines River valley below the Saylorville Lake Dam (e.g. Benn and Harris 1983) and the numerous studies conducted for the CBD Loop/Martin Luther King Jr. Parkway through the years (e.g. Henning et al. 1982; Overstreet et al 1998, 2000; Schoen and Holt 1998, 2000; Schoen et al. 2003) as well as other studies in project area vicinity (e.g., Page et al. 1993) and general prehistoric contexts compiled for Iowa (Alex 2000; 2002).

Generally, the full range of known human prehistory in Iowa from Paleoindian through the Proto-Historic periods could be evidenced in the archaeological record of the Des Moines River Valley and the current project area. Site types that could be expected include: lithic scatters, open habitation sites, resource procurement and processing sites, and burial mounds on the upland margins of creek and river valleys. Previous surveys near the current project area have reported sites of a general prehistoric period affiliation and categorized as “scatter” sites. These have included scatters of fire-cracked rocks, chert flakes and shatter, some ground-stone tools, and introduced chert rocks not natural to those locations (I-Sites Pro 2018). These scatters are evidence of prehistoric occupation likely during resource procurement and processing activities in this area. It is expected that the current project parcel could contain evidence of similar prehistoric activities given its location along the upper reaches of an intermittent drainageway (see Figure 1).

Paleoindian Period

In the project area, the Late Wisconsin glacial ice sheet terminated just to the north with the area likely uninhabitable because of the close proximity to this ice sheet until after the ice sheet began retreating between 14,000-13,000 RCYPB (radiocarbon years before present) Therefore, the first era in which we could expect some tangible evidence of human occupation would be in the Paleoindian period, which is generally dated between 12,500-9,500 RCYPB.

The Paleoindian subsistence base showed a reliance on the hunting of big game animals, including now-extinct megafauna such as mammoths and mastodons, but almost certainly including some exploitation of smaller game animals and wild plants (Alex 2002). The Paleoindian tradition was relatively stable through time and covered a wide expanse of territory. While there are no fully documented Paleoindian sites found to date in the Des Moines vicinity, private local collections do contain materials from this period such as early fluted Clovis points and later Agate Basin and Angostura lanceolate points. Other artifacts identified with the Paleoindian tradition include stone knives, scrapers, abraders, choppers, and rubbing stones along with some bone and antler artifacts (Alex 2002). In 1988, a Phase I survey for the F-500 highway corridor in the Des Moines vicinity recovered a Dalton projectile point, diagnostic of the late Paleoindian to Early Archaic periods. This point was recovered from an upland divide between the Des Moines and North River valleys on the south side of Des Moines (Collins 1988). Henning et al. (1982:4.3-4.4) have further noted that upland sites overlooking the confluence of the Raccoon and Des Moines rivers would have the greatest potential for early prehistoric occupation sites; however, the “climatic conditions for human occupation [of this area] and the animals they hunted were probably very poor until well after 10,000 B.P.” lessening the potential for encountering sites from the Paleoindian period in the confluence area (Henning et al. 1982:4.4).

Archaic Period

By 10,000 RCYBP, the Des Moines Lobe had retreated from Iowa and the Holocene epoch began. The transition from a glacial climate to a post-glacial climate coincides with the mass extinction of the Pleistocene megafauna, a phenomenon possibly caused by “environmental change, disease, or predation by hunters leading to overkill—or a combination of all three” and resulted in human adaptations to this changing environment that mark the beginning of the Archaic period (Alex 2000:41). The Archaic

Tradition (10,500-2,350 RCYBP) began at a time when loessal deposition was waning and eroding, and soil formation became the dominant force upon the landscape. The Altithermal, a time of warm-dry conditions, encouraged the expansion of prairie-grasses across the Midwest during this period. The Archaic peoples appear to have had a more diverse diet than their Paleoindian ancestors, with their diet consisting of modern bison (*Bison bison*), deer, fish, waterfowl, other large and small mammals, and a variety of wild plants, seeds, and nuts. Their lifestyle became more regionally focused than that of Paleoindian peoples and appears to have involved small family groups “moving about as the seasons changed and as different food resources became available” (Alex 2002). Because of the increasing regional focus, it is suspected that “the overall population level in Iowa towards the end of the Archaic had increased over Paleo-Indian times” (Alex 2002).

Technological advances during the Archaic period included the use of ground-stone tools for a variety of purposes such as bannerstones, full-grooved axes, gorgets, manos and metates, and plummets. The appearance of bannerstones marks the introduction of a new hunting technique, with the bannerstones suspected to have been used as weights for atlatls, or spear throwers. “By using an atlatl, Archaic hunters would have been able to throw their spears further and with greater force than before” (Alex 2002). Other lithic artifacts from the Archaic period include: lanceolate, side-notched, and stemmed projectile points, “several different forms of scrapers, ovoid blades, drills, and notched flakes” (Alex 2002). Bone and copper artifacts are also known from Archaic sites, with the raw copper acquired from the Great Lakes region and then traded widely throughout eastern North America (Alex 2002). Archaic period sites have been recorded in central Iowa, with sites specifically recorded in Boone, Dallas, Polk, and Story counties. It is expected that Archaic sites could be found along the Des Moines River valley margins in both upland surface and alluvial plain buried contexts. Excavations at site 13PK61 at the confluence of the Des Moines and Raccoon rivers in downtown Des Moines identified a dense lithic debris deposit associated with a Late Archaic component on this multi-component prehistoric and historic site (I-Sites Pro 2018).

Another Archaic site of note in the Des Moines vicinity is the so-called “Palace Site,” or 13PK966. This site is located on the north side of the Des Moines River in the southeast portion of the city and represents a Middle Archaic habitation and burial site dating to 7,000 years ago. It was found within an early terrace deposit of a paleochannel of the Des Moines River (Pope et al. 2014). Five Middle Archaic components were identified at the Palace Site, with numerous features encountered, most of which were clusters of burned and unburned rock likely used for cooking hearths. The material culture recovered from the Palace Site included: numerous mammal bones (deer, domesticated dog), plant remains, side-notched projectile points, lithic debitage, ochre, and grinding stones. Archaeological evidence of architectural structures indicates that the occupants used this site as an anchor location for subsequent or repeated use. Investigations of the main occupations of the site indicate repeated visits to the site locale over about a 300-year time span (Pope et al. 2014:6). The site deposits were buried in Gunder Member sediments beneath a High Terrace surface (Pope et al. 2014:59).

Woodland Period

The Woodland period is generally dated between 2,350 RCYBP to approximately 850 RCYBP and marks a time of population and settlement expansion and increasing sedentism based on hunting and gathering and incipient agriculture. The period is generally marked by the appearance of pottery and the construction of earthen burial mounds, although both innovations may date to as early as 3,000 RCYBP. Furthermore, these innovations did not occur at one time and were not adopted by all groups at the same time (Alex 2000). The Early Woodland period (2,350-2,050 RCYBP) can be characterized as a transition from the Archaic lifeways and is defined by the use of ceramic containers and an increasing reliance on cultivated plants for subsistence. Early Woodland ceramics tend to be thick, straight-walled, and flat-bottomed, with the earliest pottery type in Iowa referred to as Marion Thick, which exhibit cord marking on both the interior and exterior surfaces (Alex 2002). Some Early Woodland large-to-medium stemmed point types include Adena, Kramer, and the distinctive Turkey Tail point (Morrow 1984).

The Middle Woodland period (2,050-1,550 B.P.) was a time of dramatic change marked by widespread trade associated with the Hopewell Interaction Sphere that peaked ca. 2,000 B.P. During this time, long distance trade flourished as well as a mortuary tradition that was characterized by large, conical-shaped earthen mounds containing high status burials and exotic trade goods, which included Appalachian mica, pipestone from Ohio and Illinois, Gulf Coast conch shell, Great Lakes copper, and obsidian from the Yellowstone region (Alex 2000, 2002). The Middle Woodland period began in southeastern Iowa “with the appearance of large village sites containing Havana pottery such as the Yellow River Village, Kingston, Gast Farm, and Wolfe sites” (Alex 2002). The Boone Mound on the Des Moines River in Boone County, Iowa, “was perhaps the largest Middle Woodland mound west of the Mississippi” (Alex 2002).

The Late Woodland period (1,550-850 B.P.) saw the introduction of the bow and arrow, an increase in the reliance on maize horticulture, the appearance of fortified villages in some regions, and the use of more rounded or globular grit-tempered pottery replacing the “bag-shaped pottery of Early and Middle Woodland sites” (Alex 2002). Burial mound traditions continued, with low conical and linear mounds common throughout central and eastern Iowa; however, these mounds were much smaller and lacked the exotic trade items of Hopewellian mounds. In northeastern Iowa, animal-shaped earthenworks or “effigy” mounds characterized the Late Woodland period in that region. Woodland period lithic artifacts include straight-stemmed, side- and corner-notched projectile points in a variety of styles; however, by the Late Woodland period, smaller, side-notched and unnotched triangular-shaped arrow points became common with the introduction of bow hunting technology (Alex 2000, 2002).

Woodland period sites are better reported in central Iowa and the Des Moines vicinity largely because there are more sites dating from this period as a result of population and settlement expansion but also because sites dating from the older periods may be deeply buried under colluvial and alluvial sediments and have yet to be discovered. There is evidence in the region of occupations representing all of the Woodland subperiods (i.e., Early, Middle, and Late); however, the majority of recorded sites have not been investigated in sufficient detail to assign these sites to a specific subperiod other than a general Woodland affiliation. Burial mounds are known in the region, with most recorded along the valley margins of the major river valleys. However, burial sites have been documented along the margins of the smaller tributary valleys as well. It is known that there once were more plentiful mound sites in this region that have since been destroyed by agriculture and urban construction activities.

Late Prehistoric Period

Late Prehistoric traditions in Iowa (950-300 RCYBP) are represented in the region by two cultures: Great Oasis and Oneota. Semi-permanent villages that were dependent upon maize horticulture, hunting, gathering, and foraging for subsistence strategies characterize both cultures. However, Great Oasis sites are concentrated in northwestern Iowa and along the Des Moines and Raccoon rivers in the central part of the state, while Oneota sites are located statewide including a large cluster beginning south of the City of Des Moines (Alex 2000). The Oneota culture spread across parts of Illinois, Iowa, Minnesota, Wisconsin, Missouri, Kansas, Nebraska, and South Dakota along major waterways, after A.D. 1300.

Some archaeologists believe that it was in the migration of people outward from [the great political and religious center of Cahokia in the vicinity of present-day East St. Louis, Illinois] that we can find the origin of Oneota. Others suggest that Oneota and Cahokia were distinct entities, but that they derived from a common Woodland cultural ancestor. Still others believe that Oneota Culture essentially evolved from indigenous Woodland cultures in the Upper Mississippi Valley with some influences from Mississippian groups (Alex 2002). It is further believed that “most late Oneota sites represent the protohistoric locations of Siouan speakers, particularly the Chiwere-Winnebago whose descendants were the Ioway, Oto, Missouri, and Winnebago (including the Ho-Chunk of Wisconsin and the Winnebago of Nebraska)” (Alex 2000:185). “It is also likely that some Dhegihan Sioux, such as the Kansa, Omaha-Ponca, and Dakota, and possibly Algonquian speakers such as the Miami, left material remains archaeologists would identify as Oneota” (Alex 2000:185).

Oneota sites reflect subsistence based on intensive maize, squash, and bean horticulture as well as the hunting and gathering of bison, deer, elk, fish, and shellfish. Oneota sites in Iowa include large village sites, with cemeteries and sometimes burial mounds in the vicinity of the villages (Alex 2002). Bell-shaped storage pits are common features on Oneota village sites. The most distinctive Oneota artifacts are catlinite (red pipestone) pipes and tablets and shell-tempered elliptical, globular-shaped pottery vessels with rounded bases, looped handles, and trailed geometric designs. Lithic items, such as triangular-shaped arrow points (often of Burlington chert), end scrapers, knives, drills, abraders, and groundstone manos and metates, are associated with the Oneota culture along with shell ornaments and bone awls and scapula hoes. Excavations in downtown Des Moines have uncovered evidence of a Moingona Phase Oneota site as well as remnants of the early historic Fort Des Moines II occupation within the boundaries of site 13PK61 (Schoen 2003; Schoen and Holt 1998, 2000; Schoen et al. 2003).

Great Oasis is “thought to have developed from a Woodland culture base by A.D. 900” and is further thought to have been ancestral to cultures like Mill Creek in northwestern Iowa (Alex 2002). Great Oasis people built their villages on low ground, “usually on terraces above the floodplain of a nearby river or stream” (Alex 2002). Their house structures were long rectangular structures built into a shallow pit. Typical Great Oasis artifacts include small, triangular side-notched arrow points, with many of their chipped stone tools manufactured of materials traded in from distant sources including Bijou Hills quartzite and Knife River flint from the Dakotas and Hixton silicified sandstone from Wisconsin (Alex 2002). The most distinctive Great Oasis artifact type is their pottery, which are grit-tempered, globular-shaped jars with rounded bases and smoothed surfaces over which rim decoration was applied using incised rectilinear motifs. Great Oasis cemeteries are located on hills or bluffs away from their living area, with this culture practicing “a number of different burial customs including both interment (sometimes in a mound) and cremation” (Alex 2002). Two extensive Great Oasis cemeteries have been documented, one in West Des Moines and a second south of Redfield in Dallas County (Alex 2002).

Historic Period

The proto-historic and historic periods (ca. A.D. 1700 to present) began as European and Euro-American traders, trappers, missionaries, and explorers entered this region followed by Euroamerican settlers beginning their westward advance. The arrival of Euroamericans brought dramatic shifts within the lifeways of the native populations. As many as eighteen different Native American groups may have lived in Iowa during the historic period (Alex 2000:211). These groups included: “the Ioway, Oto, Winnebago, Omaha, Ottawa, Huron, Miami, Kitchigami, Mascouten, Chippewa, Sauk, Meskwaki, Potawatomi, Pawnee, Santee, Yankton, Moingwena, and Peoria” (Alex 2000:211). Prominent among these native groups during the proto-historic and early historic periods were the Ioway and Oto. These two groups are closely related and inhabited much of present-day Iowa from ca. A.D. 1600 through the mid-1700s. By 1765, most of the Ioway had settled within the middle Des Moines River valley, where they lived a semi-sedentary lifestyle based on corn, beans, and squash cultivation. In response to increasing pressures from encroaching Sioux, Sauk, and Meskwaki and from the U.S. government during the 1820s, the Ioway began to sell their land in Iowa to the United States and eventually, through an 1838 treaty, ceded the last of their land claims in Iowa to the government and moved to southeastern Kansas (Harvey and Kolb 2004; Schoen 2003).

The early historic period of Des Moines’ development was characterized primarily by sites and activities associated with the removal of the Sauk and Meskwaki from Iowa according to the terms of the Treaty of 1842. This treaty stipulated that the Sauk and Meskwaki could stay in the Iowa Territory for three years beyond the treaty date, after which time they were to remove to Kansas. To comply with other treaty stipulations, the Sauk and Meskwaki had to first move west of a line, known as the “Red Rock Line,” within the present-day boundaries of Lake Red Rock, before removing from the territory entirely by 1845. This placed the Sauk and Meskwaki in the vicinity of the Raccoon and Des Moines river confluence prompting the establishment of the Raccoon River Agency and Fort Des Moines II by the United States government at this location (Dunbar/Jones Partnership 1994:4-13).

The establishment of Fort Des Moines II in 1843 was to facilitate the removal of the Sauk and Meskwaki from the central Des Moines River valley. Upon removal in 1845, the fort was abandoned by the military. Within a year, Euro-American settlers had platted a town called “Fort Des Moines” around the abandoned fort buildings. Fort Des Moines was designated as the Polk County seat of government in 1847 and in 1856 became simply known as “Des Moines.” The following year, Des Moines was designated as the state capital. The location of Fort Des Moines II and the subsequent original town plat of Fort Des Moines formed “the core of city development from which all else emanated” (Long 1983:2).

The current project area was in the rural environs of, but outside, the City of Des Moines in the 19th century. The earliest historical map of the current project area was the 1848 General Land Office (GLO) plat map that shows this area in open prairie (Figure 6). Timber/prairie margins were often the site of early historic settlements because of the availability of timber for fuel and building material and open prairie for establishing small farm fields. The 1848 map of the project area shows no farm fields or other cultural features except for a trail or early road that extends roughly north to south and extending through the far southeastern corner of the APE (see Figure 6). Another trail branched off this trail and headed east to west about one-quarter to one-half miles north of the current APE (see Figure 6). Early trails mapped by the GLO were often Native American trails that were later used by early Euro-American settlers.

The next available historical map dates from 1872 and shows only the eastern and western edges of the APE entered with land claims, with the interior unlabeled with any landowner names suggesting these parcels had not yet been claimed (Figure 7). A school or church was depicted to the northwest of the project area but outside of the current APE in 1872 (see Figure 7). Two houses were depicted within the APE in 1872; however, both locations were later built over by the airport (see Figure 7).

By 1885, the APE had been fully entered, with five houses depicted on the map. One of these was on a 40-acre parcel owned by “Thomas Lowe” in the southwest portion of the APE, with three of the others located on the north and south sides of old Army Post Road and the fourth located along the west side of Fleur Drive (see Figure 7). The school (labeled now as the Pine Grove School) was also still extant just outside of the current project area.

The one other feature of note on the 1885 map was a rail line that curved through the southwest portion of the APE (see Figure 7). This line was the Des Moines, Osceola & Southern Railroad (Warner and Foote 1885). The railroad curved along the east side of what is now called Frink Creek where it turned with the creek east towards Des Moines but stayed on the south side of the Raccoon River. When the Chicago Great Western Railroad line was established by 1895 to the northwest of the current project area, that line made a fairly sharp turn to the north as it crossed Frink Creek (labeled on late 19th and early 20th century maps as “Four Mile Creek”) and then closely paralleled the west side of the earlier rail line, which by the early 1900s was part of the Chicago, Burlington & Quincy Railroad (see Figure 7). The two lines paralleled one another eastward to the south side of the City of Des Moines where they connected with other rail lines. The rail line through the current project area was still in place in 1930 (see Figures 7-8); however, by late 1930s, the aerial image from that time period appears to show the rail line now defunct and the tracks removed, but the curving berm of the railroad line was still evident from the air (Figure 9). By the 1950s, the former railroad line was becoming faint, with sections now put into cultivation and the line becoming more and more indistinct over time (see Figure 9). As the late 20th century progressed, the rail line gradually disappeared, although one curving section in the current APE is still identifiable from the air (Figures 9-17). The LiDAR image of the project area shows more distinctly where the vestige of this former rail line curved through the project area (Figure 18). In Iowa, railroad lines are no longer recorded as archaeological sites unless there is some potential significance to a particular section or the location was once part of a railroad yard or station. There is no potential significance to the former rail line in the current APE and the physical structure of the former railroad grade and berm has been greatly impacted by cultivation and construction activities. Therefore, this former railroad line vestige in the current project area was not recorded as an archaeological site and warrants no further investigation.

As for the historical settlement of the project area, by 1902, the same number of houses was depicted but some were now in different locations (see Figure 7). Property owners of the depicted houses included

Thomas Lowe, Joseph Geil, and Truman Jones. Two additional houses were depicted in the northeast corner of the project area on small parcels owned by James Newby and John Severn by 1907 (see Figure 8). In 1907, there was a cemetery shown on the north side of old Army Post Road on the 160-acre parcel owned by Truman Jones (see Figure 8). This cemetery is further discussed in this report. The 1907 map was the only map on which this cemetery was depicted (see Figures 7-8). Generally, the configuration of property ownership and house locations did not change much through 1930 (see Figure 8).

The aerial images of the project area show that the APE was primarily agricultural land in the late 1930s, with six farmsteads shown in the southwestern, central, and northeastern corners of the project area (see Figure 9). One notable change by the late 1930s was the establishment of the Des Moines Aviation Park, the forerunner of today's Des Moines International Airport, on the 160-acre parcel previously owned by Truman Jones (see Figure 9). By that time, two perpendicular and crossing runways had been built and several buildings, including the first hangar/terminal building, had been built parallel to, and just west of, Fleur Drive (see Figure 9; see also Rogers and Full 2018). Also of note, was a suburban residential development platted along the south side of old Army Post Road in the southeast part of the current APE and known as Wakonda Heights. This plat was made in 1923 (see Figure 9).

By the early 1950s, what was then the new Des Moines Municipal Airport terminal/administration building had been built on the site of the original aviation park buildings, and longer and additional runways had been built (see Figure 9). Wakonda Heights had also expanded along old Army Post Road by the early 1950s. When Army Post Road was proposed for relocation in the early 1990s, the standing houses in Wakonda Heights were also proposed for removal to make way for the new alignment and the expansion of the airport. The archaeological and architectural/historical resources of the expansion road relocation area were evaluated, with the Wakonda Heights subdivision recommended as not eligible for the NRHP as either individual houses or as a historic district (Rogers 1993). The houses within the road relocation/airport expansion area were removed after 1993 (see Figures 12-16). The original alignment of Army Post Road, where it remained in place through the airport property, was renamed the SE Service Road. What is now Army Post Road is a four-lane divided roadway that curves to the southwest and forms the south boundary of the current APE (see Figures 12-16).

The 1960s and 1970s aerials show the infill of the Wakonda Heights plat along the south side of old Army Post Road, with the area to the south of that plat being actively and heavily disturbed around the tributary valley in the 1970s aerial (see Figure 10). This disturbance included the construction of an earthen berm through which the tributary continued to flow but provided some flood control in this watershed. One can see in the 1970s aerial that most of what is now the wooded area along this tributary had been stripped of vegetation and the surface was being mechanically scraped and moved around (see Figure 10). Also visible in both the 1960s and 1970s aerials was the ongoing expansion of the Des Moines Municipal Airport that now covered most of the APE (see Figure 10). In fact, that portion of the current APE north of old Army Post Road had been impacted by extensive earthmoving, fill placement, and runway and building construction (see Figure 10).

The 1980s aerial shows further disturbance to what is now the wooded area around the tributary in the southwest quadrant of the project area, with what appear to be borrow areas and a curving system of access roads crisscrossing this area (see Figure 11). Construction was also now extending along the south side of Army Post Road related to the airport expansion, which continued with improvements and additional expansion into the 1990s. In addition, by the 1990s, the buildings of the former farmstead in the southwest quadrant of the project area, once owned by Thomas Lowe, had been removed (see Figure 11). By 2002, this former farmstead site was again being actively and heavily impacted for what appeared to be a construction staging area for the Army Post Road relocation and runway expansion project (see Figure 12). The disturbed area included land along the southwest side of the current project area (see Figure 12). By 2002, Army Post Road had been relocated to the south forming the south boundary of the current APE (see Figure 12). Old Army Post Road was only partially intact and had been renamed in part, SE Service Road as it was now fully within the airport property. The houses of Wakonda Heights had been largely removed by 2002, with complete removal accomplished by 2005 (see Figure 13). In the process of the continuing expansion of the airport property, areas in the APE were often repeatedly

disturbed by more than one construction project or earthmoving event at different times (see Figures 12-16). The disturbances had nearly covered the entire APE by 2004, with only the remaining agricultural fields in the southwest quadrant still undisturbed except by cultivation (see Figures 13-17). In the process, all of the farmstead sites shown on the historic plat maps were destroyed by airport construction, road relocation and construction, and other earthmoving activities. The extent and intensity of the previous disturbances is evidenced also on the LiDAR image of the APE, which shows the natural terrain leveled, built over, disturbed, and cut in all but the agricultural field portion of southwest quadrant of the APE (see Figure 18). The extent of disturbance to the tributary valley is also evidenced on the LiDAR image. In fact, there was ongoing disturbance yet again to the east side of the tributary area at the time of the current field investigation.

RESEARCH DESIGN AND METHODOLOGY

The current investigation was divided into three stages: pre-field archival research; field investigations; and post-field artifact processing, analysis, and evaluation, and summary of the field results. The pre-field archaeological records search for the project area consisted of a check of the I-Sites Pro: an online GIS and Database of Iowa Archaeology maintained online by the Office of the State Archaeologist (OSA). The site records search was performed to locate any previously recorded archaeological sites and architectural properties within a 1.6 km (1 mi) radius of the project area and examine all available professional reports and literature applicable to the project area. Historical plats and atlases, obtained from the State Historical Society of Iowa in Iowa City and online databases, were consulted to assess historic site potential. Historical and modern aerial photographs and LiDAR images were also obtained from the ArcGIS-Iowa Geographic Map Server maintained by Iowa State University.

The pre-field assessment of the archaeological potential enabled the Phase I survey area of the current APE to be reduced by eliminating from further investigation the previously-surveyed portions of the project area and those locations that had been heavily impacted by previous construction and other earthmoving activities. The impacted areas were documented by aerial and LiDAR images dating from the late 1930s to 2017.

The field investigation was conducted by Tallgrass Archaeology LLC personnel between May 7 and June 14, 2018 under the oversight of the Principal Investigator, Leah Rogers, and the field direction of Project Archaeologist, Cindy L. Nagel. Assistance with the fieldwork was provided by Ashlynn Brown, Lisa Goffstein, Addison Marsengill, and Dan McCullough.

Based on the assessment results, the Phase I archaeological field investigation then targeted that portion of the current APE that had not been previously surveyed and/or previously disturbed, thus retaining some potential for intact archaeological sites. The fieldwork began with an intensive, systematic pedestrian surface survey of the agricultural field portions of the survey area. The survey was conducted in parallel transects no greater than 15 meters apart, reducing to less than 10 meters at identified site locations. The wooded area of the survey area had inadequate surface visibility (less than 30%) and had been assessed to have no archaeological potential because of the extent of the previous disturbances to this area as documented by the late 1930s-2017 aeriels and the LiDAR image of this area as well as ongoing construction impacts at the time of the field investigation. [It should be noted that the ongoing construction impacts in the eastern portion of the project area were from projects unrelated to the current undertaking.]

The western portion of the survey area was newly-planted in grasses and alfalfa having only 10-20% surface visibility and was examined by systematic subsurface testing using shovels. The shovel tests were 30 cm (approximately 12 in) in diameter and excavated in 10 cm (approximately 4 in) increments, with the soil screened through 0.635 cm (0.25 in) hardware cloth. Soil profiles were described, and all tests were backfilled upon completion. The location of all surface artifact scatters and subsurface tests were mapped using handheld GPS units set at the NAD83 datum. These data were then downloaded into

ExpertGPS mapping software to produce the maps for this report. Representative photographs were taken of the survey area, with field conditions and surface visibility noted.

The recovered artifacts were washed, labeled, and analyzed by Tallgrass personnel. Dan McCullough processed the artifacts. Lisa Goffstein completed the artifact analysis. Report production was assisted by Addison Marsengill and Ashlynn Brown, with the report co-authored by Cindy L. Nagel and Leah D. Rogers.

Appendix A presents the soil profile descriptions for the subsurface tests conducted during the Phase I archaeological investigation. Appendix B presents the artifact descriptions and photographs for the sites recorded during this study. Appendix C presents a National Archaeological Data Base (NADB) form completed for this report and copies of the Iowa Archaeological Site forms completed for this project. The site information was entered online in the I-Sites database.

RESULTS OF THE INVESTIGATION

Previous Investigations

Research conducted in I-Sites Pro: An Online GIS and Database for Iowa Archaeology showed that portions of the current APE had been previously surveyed, with only one previously recorded archaeological site within the APE (Figure 19). This site is 13PK961, which was recorded on the basis of archival information. This site is mapped the right of way of current SE Service Road, which is part of old Army Post Road but is wider than the original road (see Figure 18). This site is identified as the “Truman Jones Farm cemetery” and was recorded by the OSA based on Nick Hornyak’s research of burials in Polk County (<http://frelik.homestead.com/polck8.html>), which placed the location

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Graphic Redacted for Confidentiality Purposes

2018). It is not known who was buried in this cemetery but it was postulated that it was probably members of the Jones family. The cemetery is highlighted in yellow on the 1907 plat in Figure 8 on what was then Truman Jones property. The Jones farm was the nucleus of the original Des Moines Aviation Park, and for a time, there remained a narrow strip of grass along the north side of old Army Post Road just south of the original runways (see Figure 9). However, by the 1960s, this grassy strip was being reduced and built over by airport expansion (see Figure 10). The location of this cemetery site is not currently proposed for any impacts from the current project. However, it should be noted that this possible cemetery is located on the airport property and should be taken into consideration if any earthmoving is proposed in the future in this area of the current SE Service Road (see Figure 19).

The Historic Indian Locations Database (HILD) and Notable Locations Iowa database features in I-Sites were also examined for information about the current APE. There were no HILD sites identified in the APE, with no notable features identified within the APE but several were noted in the vicinity (I-Sites Pro 2018). The notable features included two cemeteries, both east of Fleur Drive and not located on airport property. One is an established cemetery, while the other was labeled on the 1885 plat map as a “Catholic Cemetery” but was not shown as such on any subsequent maps and is not evident as a cemetery in the present-day neighborhood along Porter Avenue (see “Catholic Cemetery” highlighted in yellow in Figure 7). The other “notable locations” in the vicinity were archaeological “find spots” consisting of isolated prehistoric artifacts noted during previous Phase I investigations at a time when isolated finds were not assigned regular site numbers as they are today (I-Sites Pro 2018).

The following are the National Archaeological Data Base (NADB) citations for the previous Phase I archaeological investigations within the current APE (R&C numbers keyed to Figure 19):

R&C Number: 881277088

PETERSON, CYNTHIA L.

1993 PHASE I ARCHAEOLOGICAL SURVEY OF PROPOSED AIRPORT EXPANSION AND ARMY POST ROAD RELOCATION ALTERNATIVES, T78N-R24W AND T78N-R25W, POLK COUNTY, IOWA. CCR 373.

OFFICE OF THE STATE ARCHAEOLOGIST, UNIVERSITY OF IOWA, IOWA CITY, IA.

Area Surveyed: 139.4 ACRES

Township(s): Text Redacted for Confidentiality Purposes

Site(s): 13PK599

R&C Number: 770391342

HOTOPP, JOHN A., EMILIE LAWRENCE, AND MICHAEL LIPSMAN

1977 RF-28-1 AND RF-28-2 WARREN AND POLK COUNTIES PRIMARY ROADS. IDOT PCR 1(12). OFFICE OF THE STATE ARCHAEOLOGIST, UNIVERSITY OF IOWA, IOWA CITY, IA.

Township(s): Text Redacted for Confidentiality Purposes

Site(s): no sites found

R&C Number: 870377110

MERRY, CARL A.

1987 A PHASE I ARCHAEOLOGICAL SURVEY OF PRIMARY ROADS PROJECT FR-5-5(23)--2G-77, A.K.A. PIN 85-77320-1, POLK COUNTY, IOWA. IDOT CCR 10(69). OFFICE OF THE STATE ARCHAEOLOGIST, UNIVERSITY OF IOWA, IOWA CITY, IA.

Township(s): Graphic Redacted for Confidentiality Purposes

Site(s): no sites found

R&C Number: 990877062

SELLARS, JONATHAN R., AND LESLIE AMBROSINO

1999 PHASE I CULTURAL RESOURCE INVESTIGATIONS FOR THE PROPOSED AIRPORT BUSINESS PARK, BLOOMFIELD TOWNSHIP, POLK COUNTY, IOWA. REPORCE CAS-175. CONSULTING ARCHAEOLOGICAL SERVICES, CRESTON, IA.

Area Surveyed: 100 ACRES

Township(s): Graphic Redacted for Confidentiality Purposes

Site(s): 13PK761, 13PK600, 13PK601

Several of these previous Phase I surveys included portions of the current APE (see Figure 19). These were primarily areas in the south half of the APE (see Figure 19). As noted above, no archaeological sites were found by those previous surveys within the current APE. This includes the area of the former farmstead on Thomas Lowe's property in the southwest quadrant of the APE and former house sites shown on the 1885 to early 20th century plat maps in the northern portion of the targeted survey area along old Army Post Road (see Figures 7-18). It should also be noted that these former house sites were all in locations that were heavily impacted in the mid-to-late 20th century and into the early 21st century by repeated construction and other earthmoving activities. As a result, these former site locations are considered to be destroyed and warrant no further investigation.

Current Investigation

The current field investigation began on May 7 and was completed on June 14, 2018. The agricultural fields were examined by intensive pedestrian surface survey conducted in parallel transects at intervals no greater than 15 meters (49.2 feet) reducing to less than 10 meters (32.8 feet) on identified site locations. Ridgetop surfaces were also closely inspected for any foundations or other structural evidence, with none observed. No evidence of any historic sites was observed on the surface; however, six surface finds were identified as evidence of prehistoric occupation of this area. The eastern agricultural field had been harvested in the fall of 2017 and weathered over the winter prior to the field investigation. The field had not yet been prepared for planting when the investigation began in early May 2018. The cornfield afforded good surface visibility of at least 45%, with the field surface closely inspected for cultural material. Any surface finds that were identified were mapped, and their locations surface surveyed a second time to define the horizontal site boundaries. These finds were then shovel tested, with tests placed around the surface finds and excavated at 10-meter intervals. None of the shovel tests excavated at the identified site locations recovered any additional cultural material.

The west field had been planted to grass cover over the winter and had started growing by the time of the May 7th initiation of fieldwork. Surface visibility was limited in this field, which was still inspected

by intensive pedestrian surface survey to identify any surface features, such as foundations, or concentrations of structural material. The middle section of this field, and two areas to the northeast, were designated as survey Areas D, E, and F and were subjected to systematic shovel testing in grid patterns and transects, with tests placed at no greater than 15-meter (49.2-foot) intervals. The areas targeted for subsurface testing resulted from the elimination of the previously surveyed areas and the heavily impacted areas around the north, west, and south edges of this field as documented by the aerial and LiDAR images from the late 1930s-2017 and I-Sites Pro (2018). These tests produced no cultural material in a primary context.

Area H was identified as the only location in the targeted survey area that appeared to have been little impacted by earthmoving activities. This area was grass-covered and afforded limited surface visibility but was still examined by surface survey to locate any foundations or other structural evidence. It was then examined by systematic shovel testing conducted in a grid pattern with tests placed at no greater than 15-meter (49.2-foot) intervals. Two tests produced wire nails and a piece of wire fencing material, but these items were found in a disturbed, secondary context. As a result, this material did not warrant archaeological site designation.

In total, the Phase I investigation included the excavation of 206 shovel tests and the extraction of 11 soil cores to further assess and document areas of disturbance and examine archaeological potential. Figures 20-35 are maps showing the survey conditions and the location of all subsurface tests. The soil profiles for all subsurface tests are presented in Appendix A. Photographs of the field conditions, site locations, and subsurface test profiles are presented in Plates 1-30.

The Phase I investigation resulted in the identification of six previously unrecorded archaeological sites. These sites are designated herein as 13PK1058 through 13PK1063. These sites were initially identified by surface survey, with each identified site then examined by systematic shovel test excavation at 10-meter (32.8-foot) intervals (see Figures 20-29). The six sites are all prehistoric sites consisting of lithic material and stone tools found on the surface of summits and slopes of upland interfluvies within the south-central portion of the project area (see Figures 20-21). The artifact descriptions and photographs of each artifact are presented in Appendix B. The six sites are described in detail below.

Archaeological Site 13PK1058

Legal Location:

Text Redacted for Confidentiality Purposes

GPS Coordinates (NAD83):

Text Redacted for Confidentiality Purposes

Site Type: Late Woodland isolated find

Site Size: 10 m x 10 m, or 100 m² (32.8 x 32.8 ft, or 1,075 sq ft)

Landform: Upland summit

Nearest Water Source: 630 meters (2,066 feet) to unnamed intermittent tributary of Middle Creek

Description: This site consists of an isolated surface find, specifically a small projectile point found on the surface of the cornfield (see Plate 14). The site was further examined by systematic shovel test excavation, with five shovel tests excavated at intervals of 10 meters (32.8 feet) or less around the surface find (see Figure 25). Appendix A presents the soil profile descriptions for these tests. None of the tests produced any additional cultural material. There was no indication in any of the shovel tests of intact cultural deposits, with the shovel tests encountering the Bt horizon just below the plow zone. The presence of an isolated projectile point is not an uncommon find in Iowa, with the point likely lost while hunting in this area.

Artifacts: One prehistoric artifact was recovered from site 13PK1058 and consists of a single, small projectile point, 2.1 cm (0.83 in) long and 1.4 cm (0.55 in) wide at the base. This projectile point is a likely arrow point being small in size and side-notched. It has a concave base that is not ground or thinned, pointed basal ears, and a triangular blade outline. This point appears to be a possible Haskell point and is similar in age to a Reed Point, which is generally Late Woodland in age (Alex 2000:93; Morrow 1984:84). Appendix B presents a detailed description and photographs of this artifact.

Significance: Site 13PK1058 is an isolated prehistoric find consisting of a single projectile point recovered from an eroded field surface. Shovel tests excavated around this find produced no additional cultural material and showed a location deflated into the subsoil from surface erosion. While of interest as a Late Woodland arrow point, this single artifact has a low potential to yield information of significance to the prehistory of this region beyond its identification of this location in Polk County as having been used during the Late Woodland period for hunting activities. Therefore, site 13PK1058 does not possess sufficient integrity or significance to be considered eligible for inclusion in the NRHP under Criterion D or any other NRHP significance criteria.

Recommendation: Site 13PK1058 is recommended not eligible for the NRHP and for no further archaeological investigation.

Archaeological Site 13PK1059

Legal Location: [REDACTED] Text Redacted for Confidentiality Purposes

GPS Coordinates (NAD83): [REDACTED] Text Redacted for Confidentiality Purposes

Site Type: Prehistoric scatter

Site Size: 10 m x 12 m, or 120 m² (32.8 x 39.4 ft, or 1,292 sq ft)

Landform: Upland interfluvial shoulder slope

Nearest Water Source: 290 meters (951 feet) to unnamed intermittent tributary of Middle Creek

Description: This site consists of a sparse scatter of prehistoric lithic artifacts found on the surface of a cultivated field not yet prepped for spring planting. The surface collection of this site produced two chert flakes. The site deposit was then examined by means of shovel test excavation around the surface finds. A total of nine shovel tests were excavated at 10-meter (32.8-foot) intervals across the site location to further examine site integrity and potential significance (see Figure 26). No additional cultural material was recovered in any of these tests. The profiles showed a location deflated from surface erosion, with the Bt horizon encountered just below the plow zone (see Appendix A). The scatter of lithic material indicates a limited activity area where the early stages of lithic tool reduction were taking place likely during resource procurement forays in this region. One of the flakes also exhibited use-wear indicating some resource processing.

Artifacts: Two prehistoric artifacts were recovered from the surface of this site consisting of primary and secondary decortication flakes. One of the flakes shows possible use-wear on one edge suggesting that it was used as a tool for resource processing. Appendix B presents a detailed description of this artifact assemblage along with photographs of each artifact. The flakes are non-diagnostic beyond a general Prehistoric Period affiliation.

Significance: Site 13PK1059 represents a sparse lithic scatter consisting of two chert flakes that reflect some lithic tool manufacture at this location and limited resource processing. The items are non-diagnostic beyond a general Prehistoric Period affiliation but indicate the presence of prehistoric peoples in this area likely during hunting and gathering activities in the nearby creek valleys. The lack of sub-plow zone artifacts or any indication of intact cultural deposits indicates a low potential for this site to yield information of significance to the prehistory of this region. Therefore, site 13PK1059 is recommended as not eligible for inclusion in the NRHP for lack of sufficient integrity and significance under Criterion D or any other NRHP criteria.

Recommendation: Site 13PK1059 is recommended as not eligible for the NRHP and for no further archaeological investigation.

Archaeological Site 13PK1060

Legal Location: [REDACTED] Text Redacted for Confidentiality Purposes

GPS Coordinates (NAD83): [REDACTED] Text Redacted for Confidentiality Purposes

Site Type: Prehistoric scatter

Site Size: 10 m x 10 m, or 100 m² (32.8 x 32.8 ft, or 1,075 sq ft)

Landform: Upland interfluvial shoulder slope

Nearest Water Source: 486 meters (1,594 feet) to unnamed intermittent tributary of Middle Creek

Description: This site consists of a single chert flake found on the surface of a cultivated field not yet prepped for spring planting. The site deposit was then examined by means of shovel test excavation around the surface find. Five shovel tests were excavated at 10-meter (32.8-foot) intervals across the site location to further examine site integrity and potential significance (see Figure 27). No additional cultural material was recovered in these tests, which showed a location deflated from surface erosion, with the Bt horizon encountered just below the plow zone (see Appendix A).

Artifacts: One prehistoric artifact was recovered from the surface of this site consisting of a secondary thinning flake fragment. Appendix B presents a detailed description and photographs of this artifact. The flake is non-diagnostic beyond a general Prehistoric Period affiliation.

Significance: Site 13PK1060 represents a sparse surface scatter consisting of a single chert flake that reflects some tool manufacture/repair at this location. The item is non-diagnostic beyond a general Prehistoric Period affiliation but indicates the presence of prehistoric peoples in this area likely while hunting and gathering in the nearby creek valleys. The lack of sub-plow zone artifacts or any indication of intact cultural deposits indicates a low potential for this site to yield information of significance to the prehistory of this region. Therefore, site 13PK1060 is recommended as not eligible for inclusion in the NRHP for lack of sufficient integrity and significance under Criterion D or any other NRHP criteria.

Recommendation: Site 13PK1060 is recommended as not eligible for the NRHP and for no further archaeological investigation.

Archaeological Site 13PK1061

Legal Location: [REDACTED] Text Redacted for Confidentiality Purposes

GPS Coordinates (NAD83): [REDACTED] Text Redacted for Confidentiality Purposes

Site Type: Prehistoric scatter

Site Size: 7 m x 26 m, or 183 m² (23 ft x 85 ft, or 1,955 sq ft)

Landform: Upland interfluvial shoulder slope

Nearest Water Source: 156 meters (512 feet) to unnamed intermittent tributary of Middle Creek

Description: This site consists of a sparse scatter of prehistoric lithic artifacts found on the surface of a cultivated field not yet prepped for spring planting. The surface collection of this site produced three chert flakes. The site deposit was then examined by means of shovel test excavation around the surface finds. A total of 12 shovel tests was excavated at 10-meter (32.8-foot) intervals across the site location to further examine site integrity and potential significance (see Figure 28). No additional cultural material was recovered in these tests, which showed a surface deflated by erosion and the Bt horizon just below the plow zone (see Appendix A).

Artifacts: Three prehistoric artifacts were recovered from the surface of this site consisting of two heated chert thinning flakes (one secondary and one tertiary) and a chert biface tool fragment, possibly used as a graver. Appendix B presents a detailed description of this artifact assemblage and photographs of each artifact. These items are non-diagnostic beyond a general Prehistoric Period affiliation.

Significance: Site 13PK1061 represents a sparse surface scatter consisting of two chert flakes and a biface tool that reflect some tool manufacture/repair at this location and some limited resource processing. The items are non-diagnostic beyond a general Prehistoric Period affiliation but indicate the presence of prehistoric peoples in this area likely while hunting and gathering in the nearby creek valleys. The lack of sub-plow zone artifacts or any indication of intact cultural deposits indicates a low potential for this site to yield information of significance to the prehistory of this region. Therefore, site 13PK1060 is recommended as not eligible for inclusion in the NRHP for lack of sufficient integrity and significance under Criterion D or any other NRHP criteria.

Recommendation: Site 13PK1060 is recommended as not eligible for the NRHP and for no further archaeological investigation.

Archaeological Site 13PK1062

Legal Location: [REDACTED] Text Redacted for Confidentiality Purposes

GPS Coordinates (NAD83): [REDACTED] Text Redacted for Confidentiality Purposes

Site Type: Prehistoric scatter

Site Size: 10 m x 10 m, or 100 m² (32.8 x 32.8 ft, or 1,075 sq ft)

Landform: Upland summit

Nearest Water Source: 910 meters (2,985 feet) to unnamed intermittent tributary of Middle Creek

Description: This site consists of a single chert flake found on the surface of a cultivated field not yet prepped for spring planting. The site deposit was then examined by means of shovel test excavation around the surface find. Five shovel tests were excavated at 10-meter (32.8-foot) intervals across the site location to further examine site integrity and potential significance (see Figure 25). No additional cultural material was recovered in these tests, with the tests showing a surface deflated by erosion and the Bt horizon encountered just below the plow zone.

Artifacts: One prehistoric artifact was recovered from the surface of this site consisting of secondary thinning flake. Appendix B presents a detailed description and photographs of this artifact. The flake is non-diagnostic beyond a general Prehistoric Period affiliation.

Significance: Site 13PK1062 represents a sparse surface scatter consisting of a single chert flake that reflects some tool manufacture/repair at this location. The item is non-diagnostic beyond a general Prehistoric Period affiliation but indicates the presence of prehistoric peoples in this area likely while hunting and gathering in the nearby creek valleys. The lack of sub-plow zone artifacts or any indication of intact cultural deposits indicates a low potential for this site to yield information of significance to the prehistory of this region. Therefore, site 13PK1062 is recommended as not eligible for inclusion in the NRHP for lack of sufficient integrity and significance under Criterion D or any other NRHP criteria.

Recommendation: Site 13PK1062 is recommended as not eligible for the NRHP and for no further archaeological investigation.

Archaeological Site 13PK1063

Legal Location: [REDACTED] Text Redacted for Confidentiality Purposes

GPS Coordinates (NAD83): [REDACTED] Text Redacted for Confidentiality Purposes

Site Type: Prehistoric isolated find

Site Size: 10 m x 10 m, or 100 m² (32.8 x 32.8 ft, or 1,075 sq ft)

Landform: Upland interfluve shoulder slope

Nearest Water Source: 313 meters (1,027 feet) to unnamed intermittent tributary of Middle Creek

Description: This site consists of single prehistoric artifact found on the surface of a cultivated field not yet prepped for spring planting. The artifact is natural glacial cobble that was used as a nutting stone. The site was then examined by means of shovel test excavation around the surface find. Five shovel tests were excavated at 10-meter (32.8-foot) intervals across the site location to further examine site integrity and potential significance (see Figure 28). No additional cultural material was recovered in these tests, which showed a surface that was deflated from erosion and encountered the Bt horizon just below the plow zone (see Appendix A).

Artifacts: One prehistoric artifact was recovered from the surface of this site consisting of a pitted cobble tool used for food processing, possibly for cracking open nuts or processing other hard foodstuffs. The artifact is pitted on both sides of this cobble. Appendix B presents a detailed description and photographs of this artifact. Cobble tools of this type can be found on Archaic to Woodland age sites, but the lack of additional artifacts from this location precludes a more specific temporal/cultural identification.

Significance: Site 13PK1063 is represented by a single pitted cobble tool indicating some limited resource processing at this location. The item is not specifically diagnostic, but this artifact type is known from Archaic and Woodland period sites. Its presence at this location indicates that prehistoric peoples were using this spot for resource processing likely while hunting and gathering in the nearby creek valleys. The lack of sub-plow zone artifacts or any indication of intact cultural deposits indicates a low potential for this site to yield information of significance to the prehistory of this region. Therefore, site 13PK1063 is recommended as not eligible for inclusion in the NRHP for lack of sufficient integrity and significance under Criterion D or any other NRHP criteria.

Recommendation: Site 13PK1063 is recommended as not eligible for the NRHP and for no further archaeological investigation.

MANAGEMENT SUMMARY AND RECOMMENDATIONS

The Phase I archaeological investigation of the proposed Des Moines International Airport Replacement Terminal Environmental Assessment in the City of Des Moines, Polk County, Iowa, assessed the archaeological potential of an APE, which encompasses 803 ac (325 ha). The majority of the APE was found to have little or no potential for intact evidence of historic or prehistoric occupation as a result of the extensive, intensive, and recurring construction, demolition, and expansion activities associated with the airport in the historic and modern eras. However, the assessment did identify an area totaling 255 ac (103.2 ha) that retained some potential for intact archaeological sites. This area was then examined by pedestrian surface survey and the excavation of 217 subsurface tests including: 206 shovel tests and 11 soil cores. The Phase I field investigation identified six prehistoric archaeological sites designated as 13PK1058 through 13PK1063. The sites were all represented by lithic surface finds, with shovel testing at each site location producing no additional artifacts or any evidence of intact features or sub-plow zone cultural deposits. One of the sites (13PK1058) consisted of a Late Woodland projectile point, with site 13PK1063 consisting of a pitted cobble tool that could date from the Archaic or Woodland periods. The rest of the sites were represented by chert flakes and flake tools that were non-diagnostic beyond a general Prehistoric Period affiliation. All of the sites reflect limited activities conducted by prehistoric peoples at these locations likely while hunting and gathering in the nearby creek valleys. Sites 13PK1058 through 13PK1063 were concluded to lack sufficient integrity or significance to be eligible for inclusion in the NRHP under Criterion D or any other NRHP significance criteria. All of these sites were recommended as not eligible and for no further archaeological investigation. There was one site, 13PK961, that had been previously recorded on the basis of a map representation of a historic cemetery on the former Truman Jones farm. This farm became the nucleus of the original Des Moines Aviation Park in the 1920s and from which the subsequent Des Moines Municipal Airport expanded. The former cemetery is no longer identifiable on the surface and appears to be under what is now the SE Service Road. It is not known if the burials were removed, but this location should be considered to have some potential for human remains if this location is ever proposed for impacts. The currently-proposed project does not include any planned improvements in this location. Therefore, for the current project, no further archaeological investigation is recommended.

As always, it should be noted that no field technique is completely adequate to define all potential cultural resources within a given area. Therefore, should any cultural resources (including human remains) be detected during construction, the SHPO in Des Moines should be notified immediately. It is the responsibility of the contractor to protect cultural resources from disturbance until a professional examination can be made or until clearance to proceed is authorized by the State Historic Preservation Officer or a designated representative.

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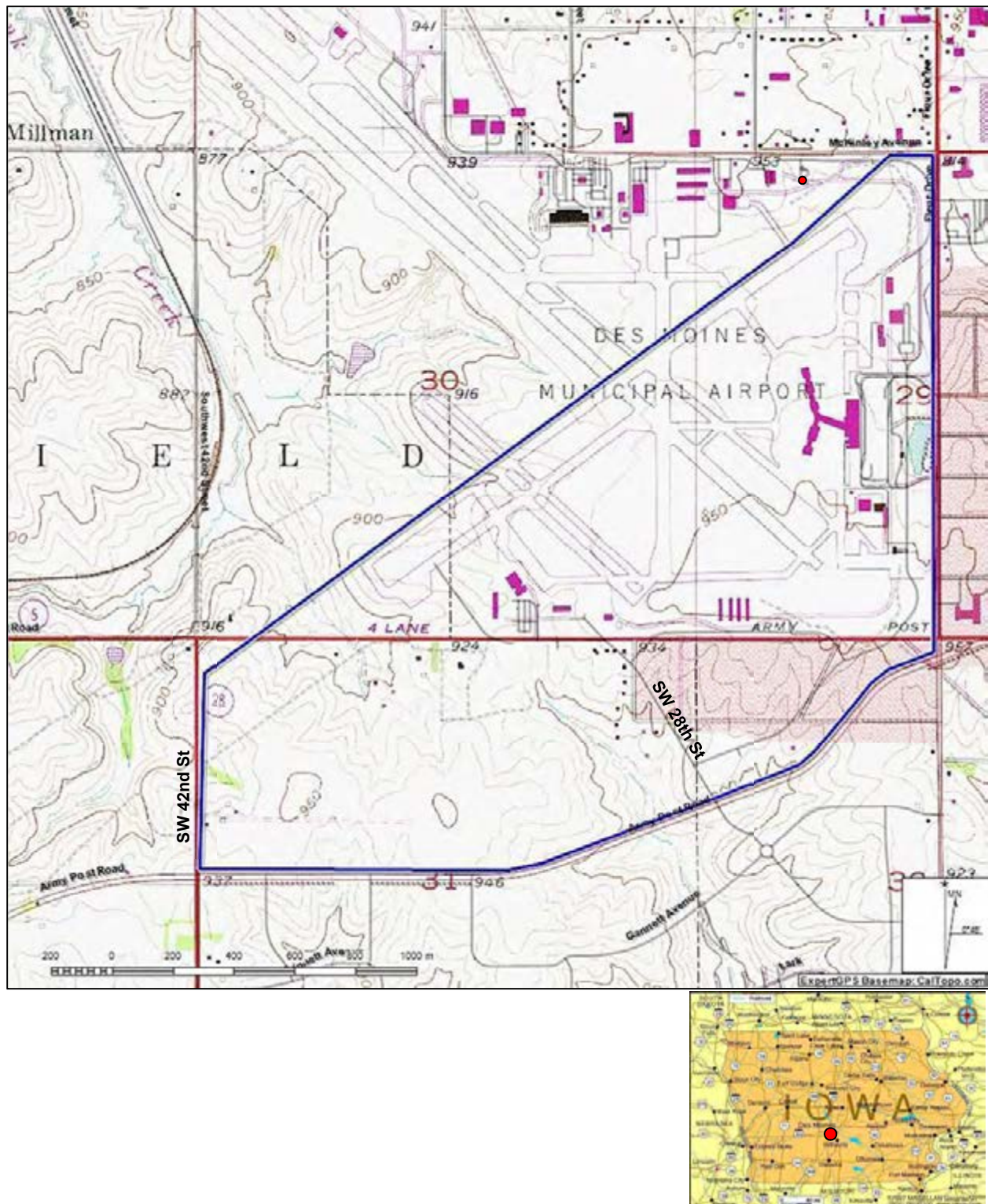


Figure 1. Topographic location of the APE for the current investigation (blue outline). Source for base map: USGS Des Moines SW 1956 (photorevised 1967, 1971, 1976) quadrangle, obtained from ExpertGPS Pro mapping software, 2018.



Figure 2. Aerial view of the APE for the current investigation (blue outline).
Source for base map: 2013 aerial obtained from ExpertGPS Pro mapping software, 2018.

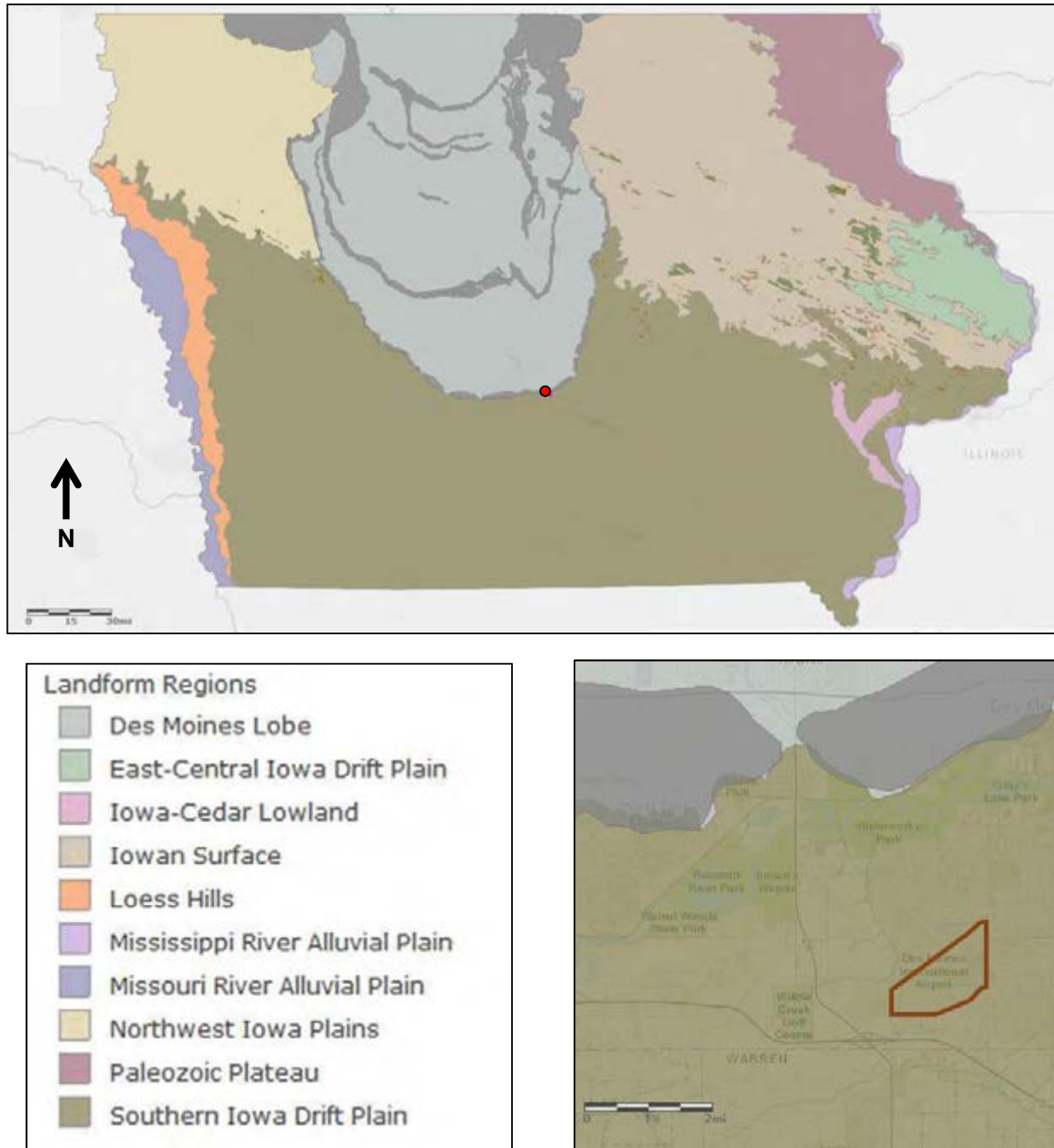


Figure 3. Landform regions of Iowa showing project area location (top; red dot) and specific location (bottom; brown outline). Maps obtained from ArcGIS - Iowa Geographic Map Server 2018.

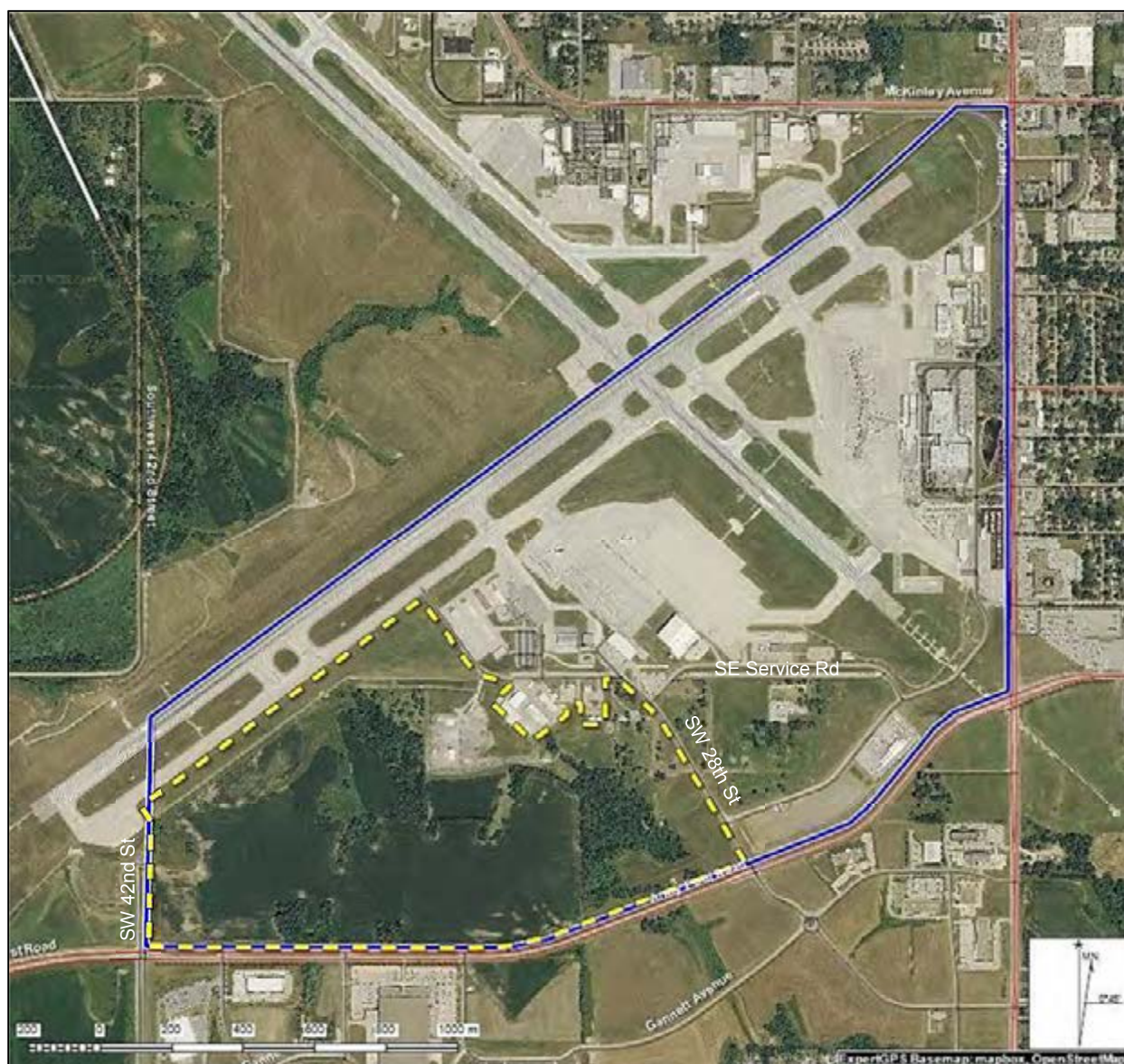
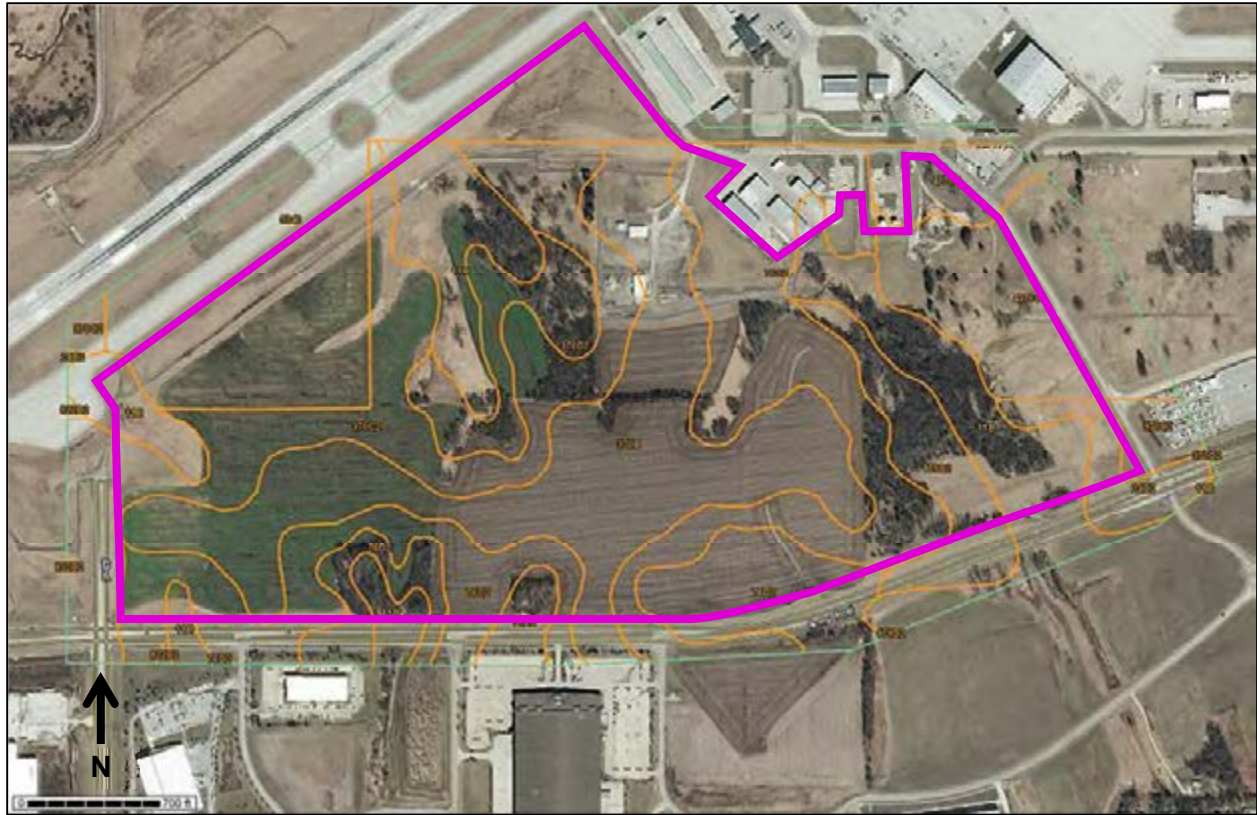


Figure 4. Aerial view of the APE for the current investigation (blue outline) showing the area targeted for Phase I field survey (yellow dashed outline) following assessment of APE.
Source for base map: 2013 aerial obtained from ExpertGPS Pro mapping software, 2018.



Map Unit Symbol	Map Unit Name
11B	Colo-Judson silty clay loams, 0 to 5 percent slopes, occasionally flooded; Roberts Creek-Gunder or Corrington members
24D2	Shelby clay loam, 9 to 14 percent slopes, moderately eroded; shallow to glacial till
76C2	Ladoga silty clay loam, dissected till plain, 5 to 9 percent slopes, eroded; thick loess
76D2	Ladoga silty clay loam, 9 to 14 percent slopes, eroded; thick loess
179D2	Gara clay loam, 9 to 14 percent slopes, moderately eroded; shallow to glacial till
370B	Sharpsburg silty clay loam, 2 to 5 percent slopes; thick loess
370C2	Sharpsburg silty clay loam, 5 to 9 percent slopes, eroded; thick loess
370D2	Sharpsburg silty clay loam, 9 to 14 percent slopes, eroded; thick loess
822D2	Lamoni silty clay loam, 9 to 14 percent slopes, moderately eroded; shallow to pre-Wisconsinan paleosol
4370B	Sharpsburg-Urban land complex, 2 to 5 percent slopes; thick loess/modified by urban development
4370C	Sharpsburg-Urban land complex, 5 to 9 percent slopes; thick loess/modified by urban development
5040	Orthents, loamy; shallow soils that lack horizon development

Figure 5. Soil types mapped within the area targeted for Phase I field survey (pink outline).
Sources: Artz 2005; Web Soil Survey 2018

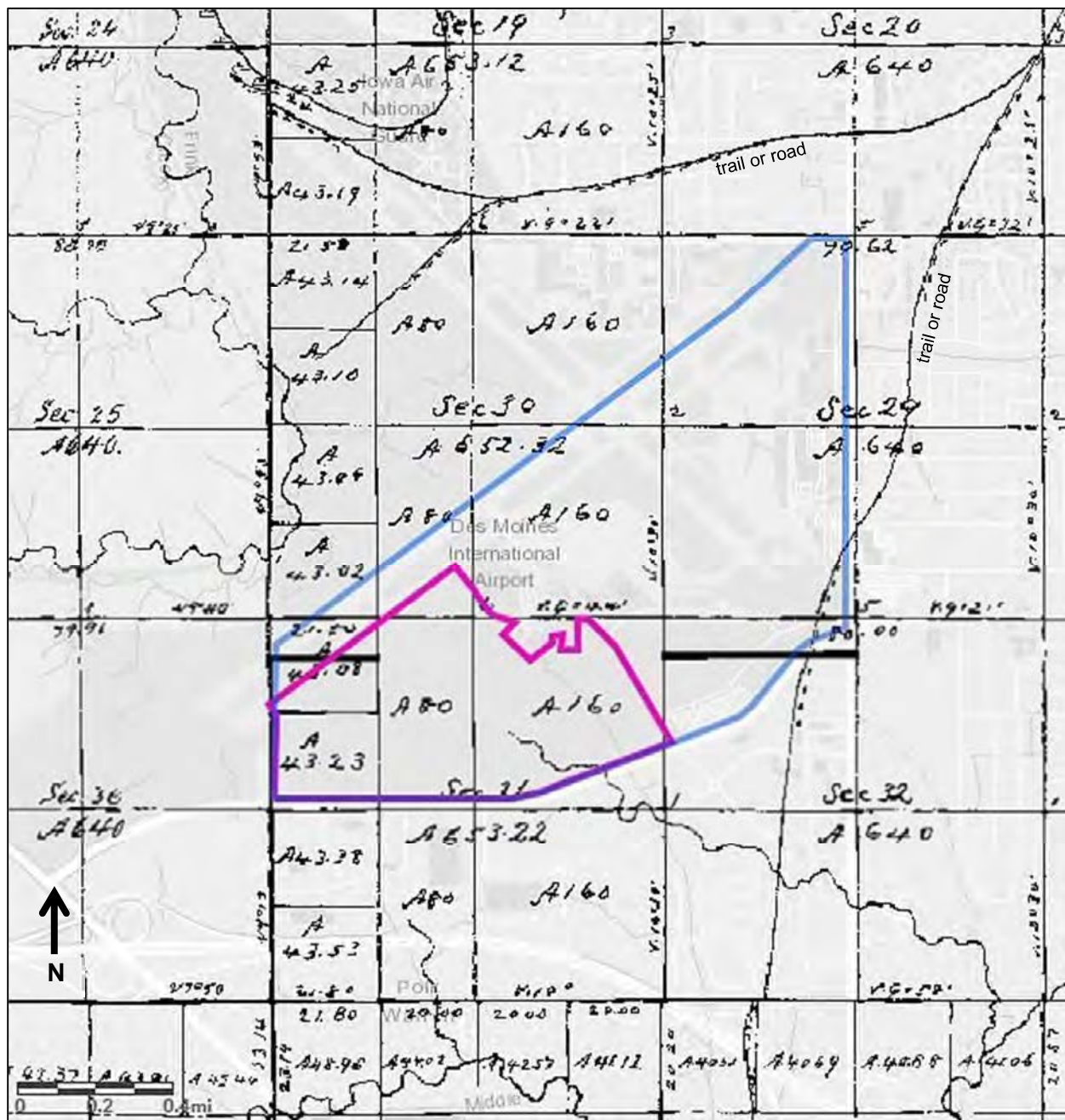
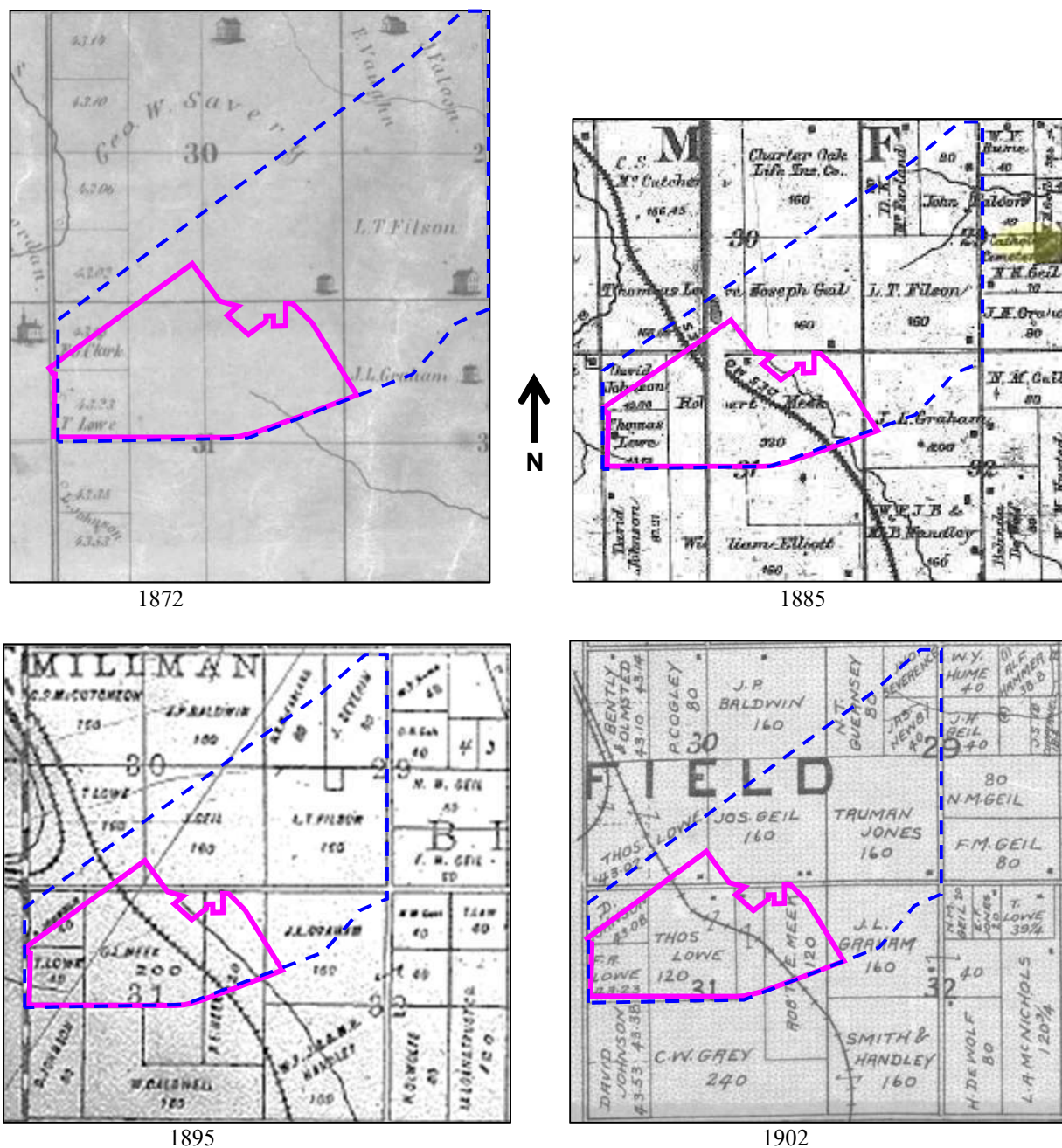


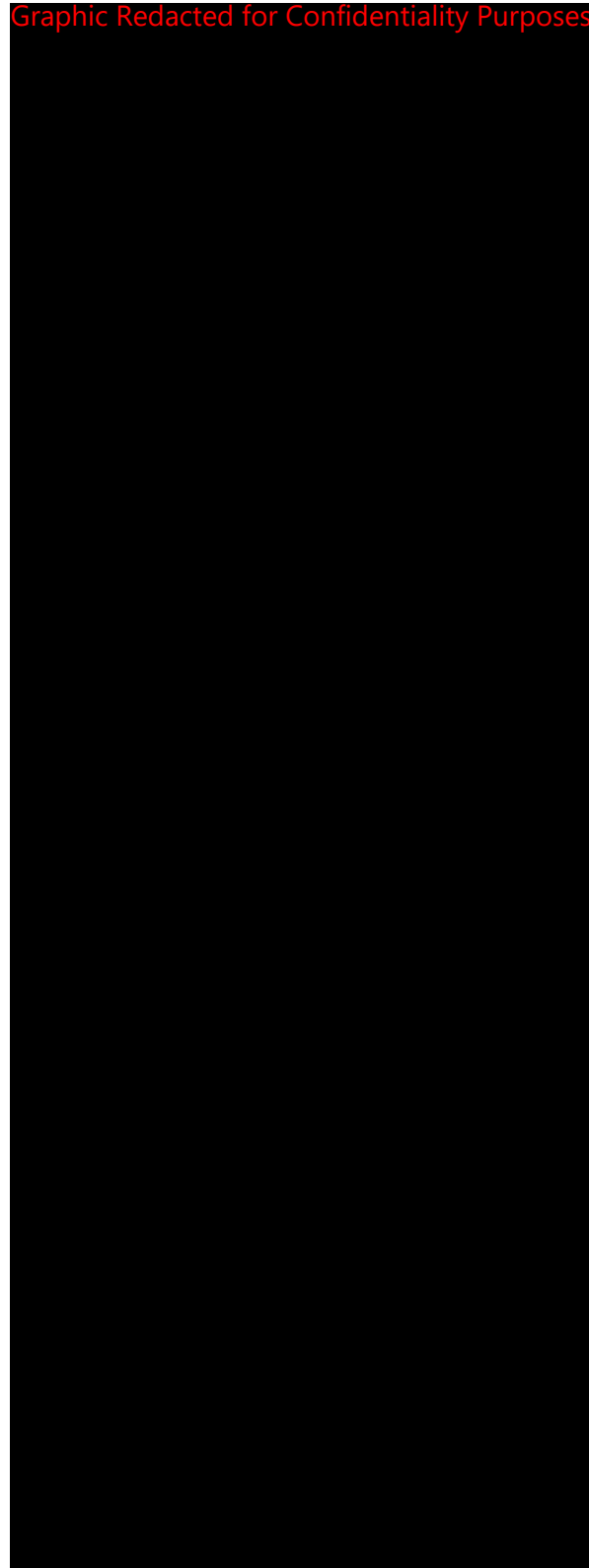
Figure 6. 1848 General Land Office (GLO) plat map of current APE (blue outline) and the area targeted for Phase I field survey (pink outline) overlaid on modern map.
Sources: ArcGIS - Iowa Geographic Map Server 2018; GLO 1848.



"Catholic Cemetery" shown only on 1885 map is highlighted in yellow.

Figure 7. Historical plat maps of current APE (blue dashed outline) and area targeted for Phase I field survey (pink outline). Sources: McVicker 1872 (obtained from the Library of Congress website); Warner and Foote 1885; Iowa Engraving 1895; Hovey 1902

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1911-1930

Figure 8. Historical plat maps of current APE (blue dashed outline) and area targeted for Phase I field survey (pink outline). Sources: Northwest Publishing 1907; Kenyon 1914; Midland Map 1911-1930.

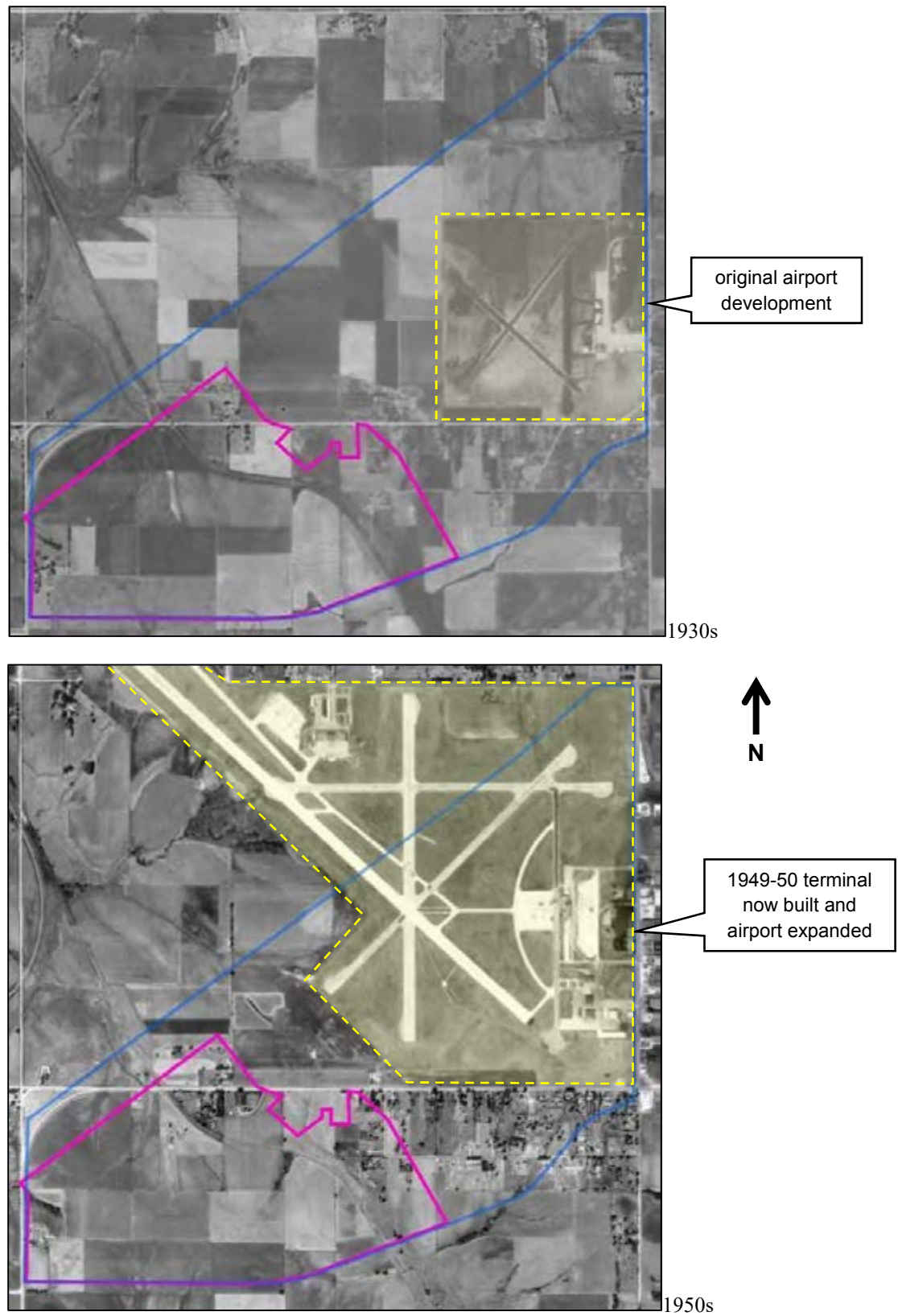


Figure 9. Historical aerals of current APE (blue outline) showing area targeted for Phase I field survey (pink outline). Source: Aerials obtained from ArcGIS - Iowa Geographic Map Server 2018

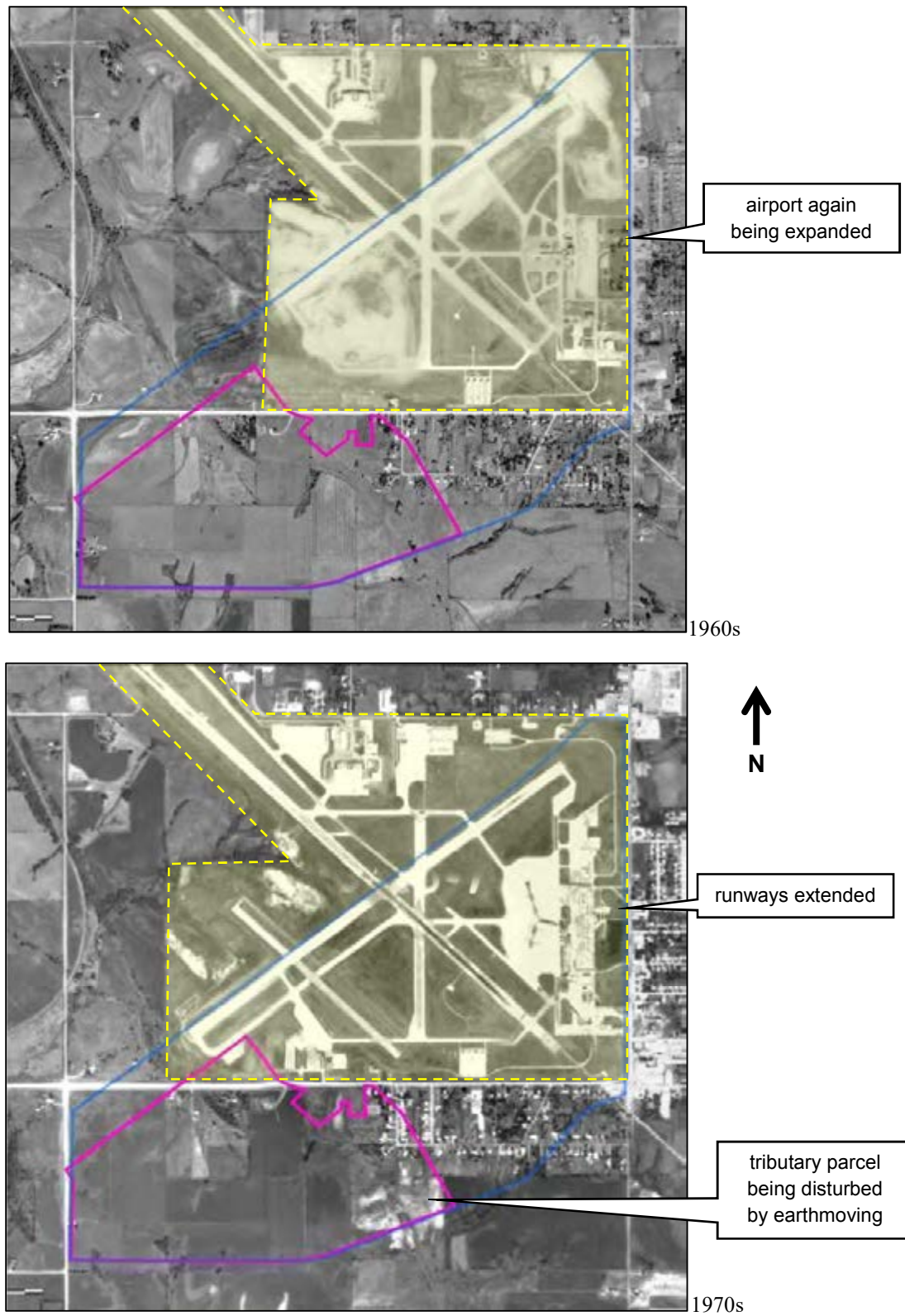


Figure 10. Historical and modern aerals of current APE (blue outline) showing area targeted for Phase I field survey (pink outline). Source: Aerials obtained from ArcGIS - Iowa Geographic Map Server 2018

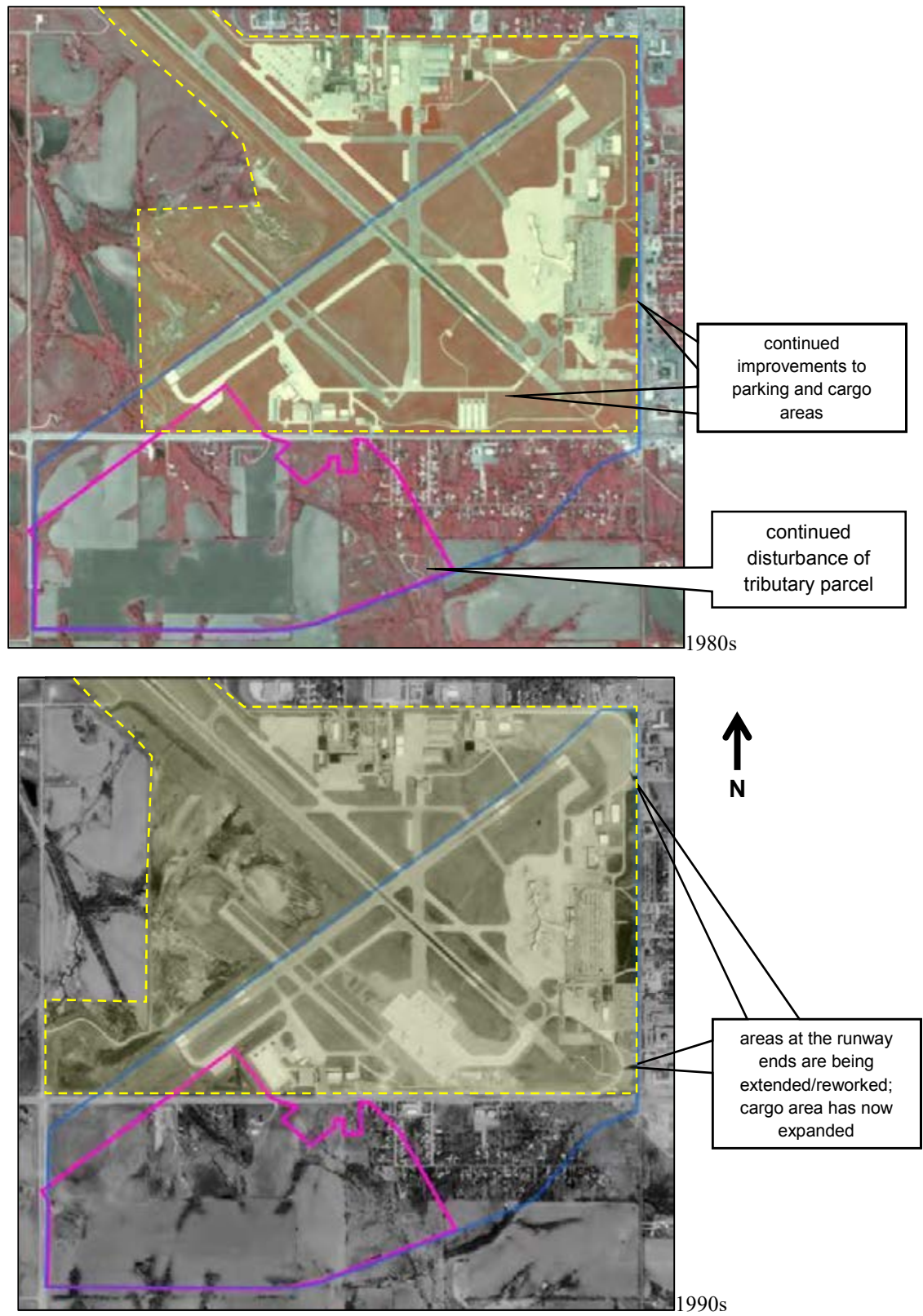


Figure 11. Modern aerals of current APE (blue outline) showing area targeted for Phase I field survey (pink outline). Source: Aerials obtained from ArcGIS - Iowa Geographic Map Server 2018

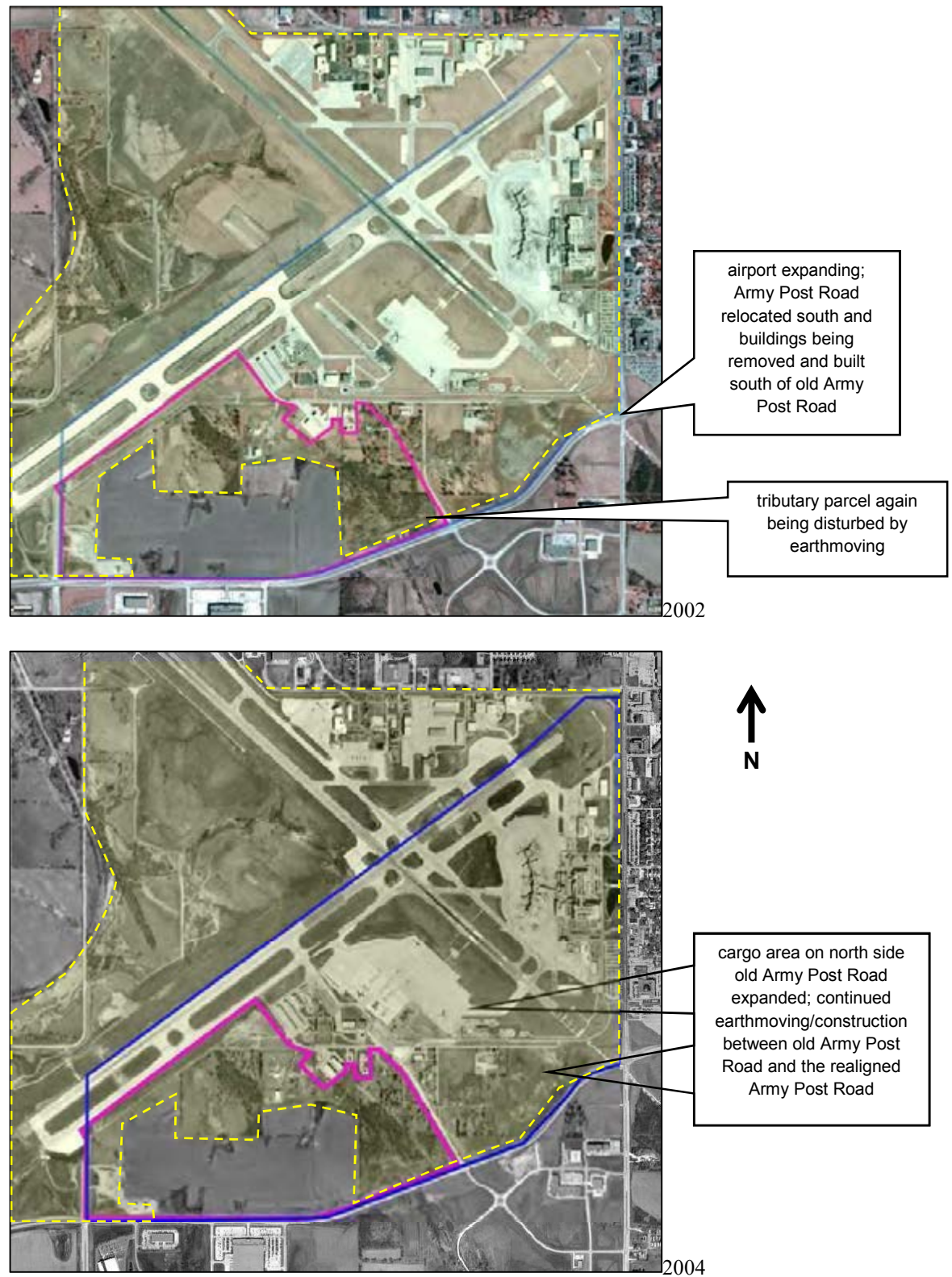


Figure 12. Modern aerals of current APE (blue outline) showing area targeted for Phase I field survey (pink outline). Source: 2002 obtained from ArcGIS - Iowa Geographic Map Server 2018; 2004 aerial obtained from Polk County Iowa GIS, 2018.

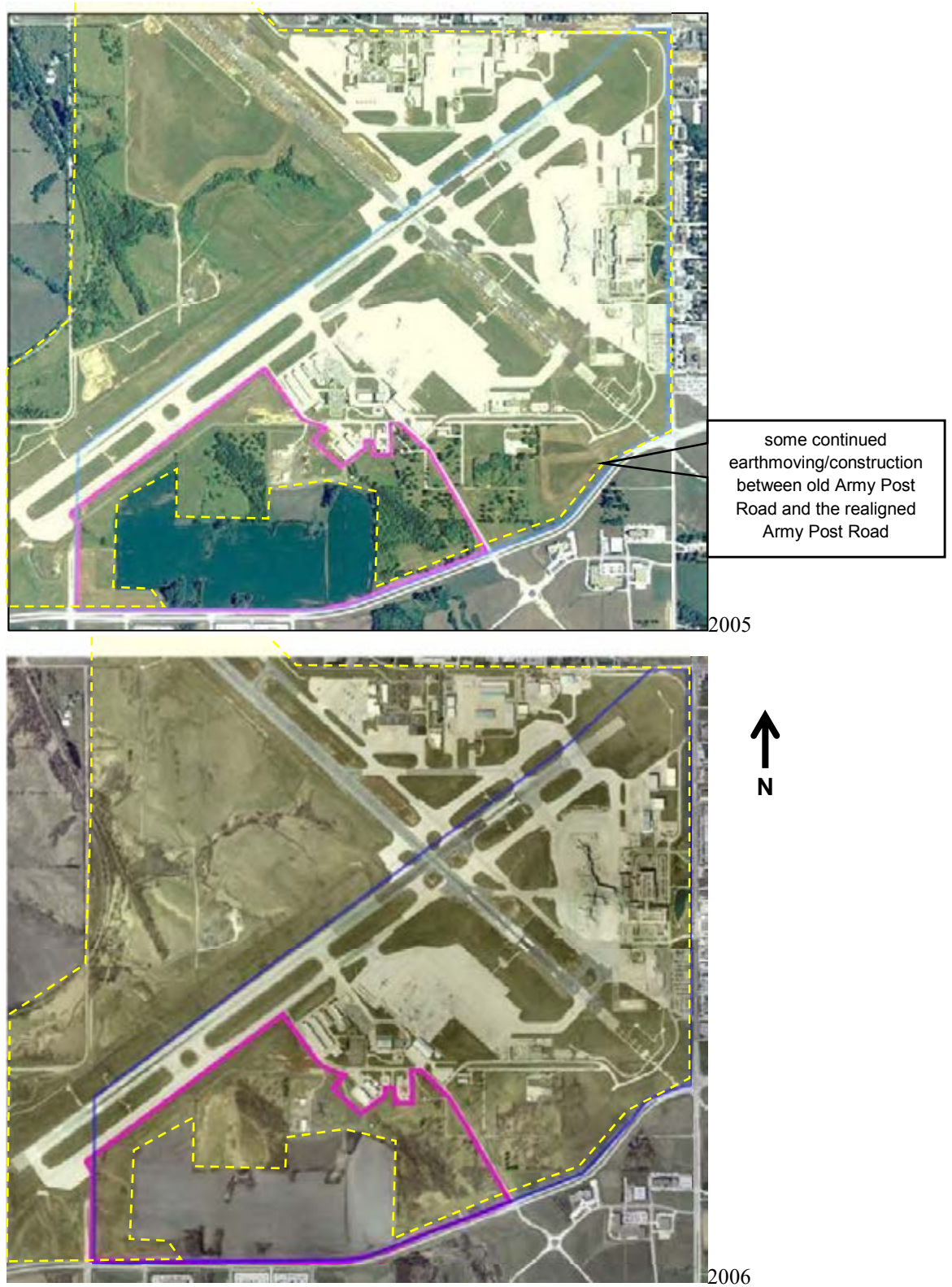


Figure 13. Modern aerals of current APE (blue outline) showing area targeted for Phase I field survey (pink outline). Source: 2005 obtained from ArcGIS - Iowa Geographic Map Server 2018; 2006 aerial obtained from Polk County Iowa GIS, 2018.

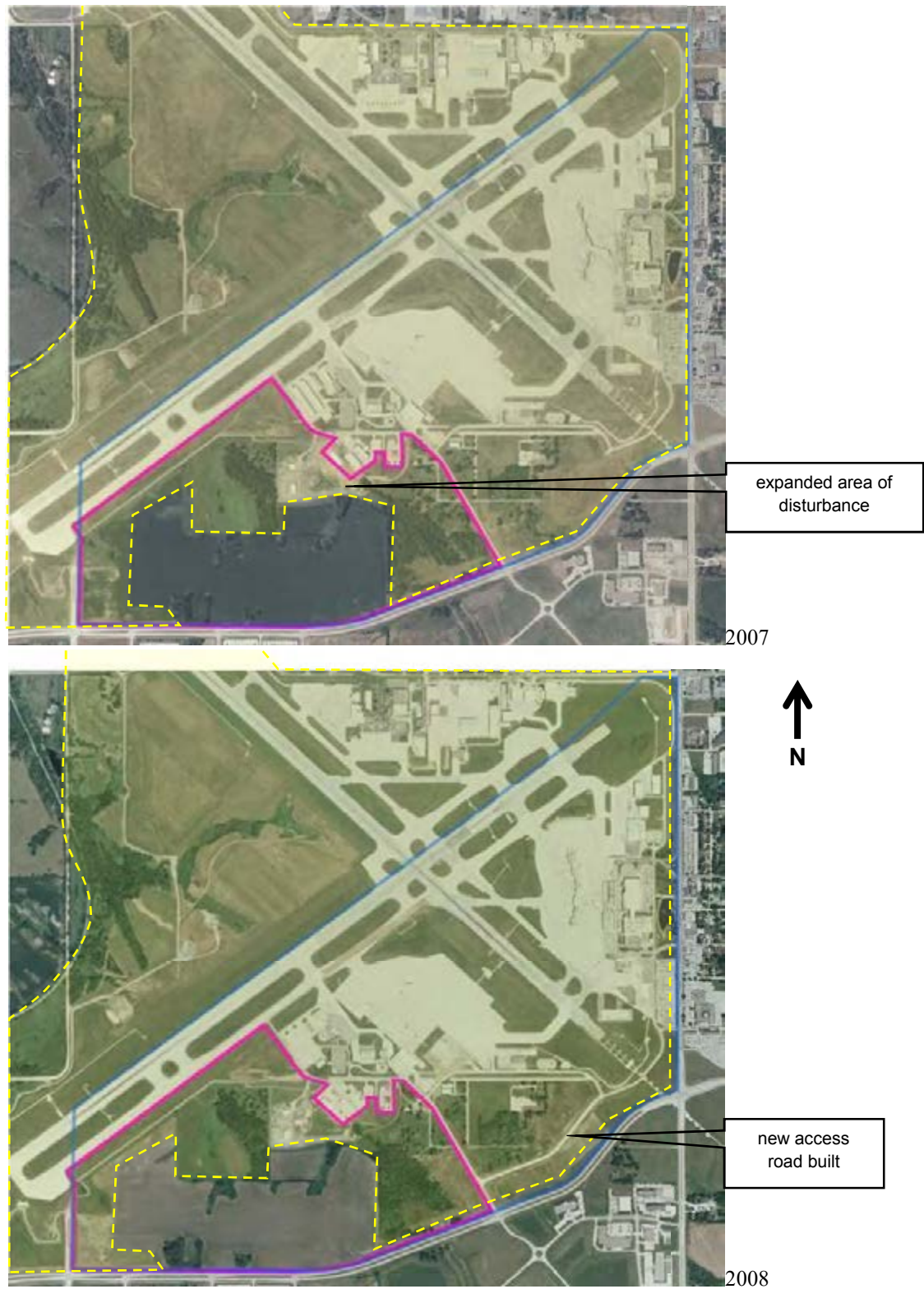


Figure 14. Modern aerals of current APE (blue outline) showing area targeted for Phase I field survey (pink outline). Source: Aerials obtained from ArcGIS - Iowa Geographic Map Server 2018

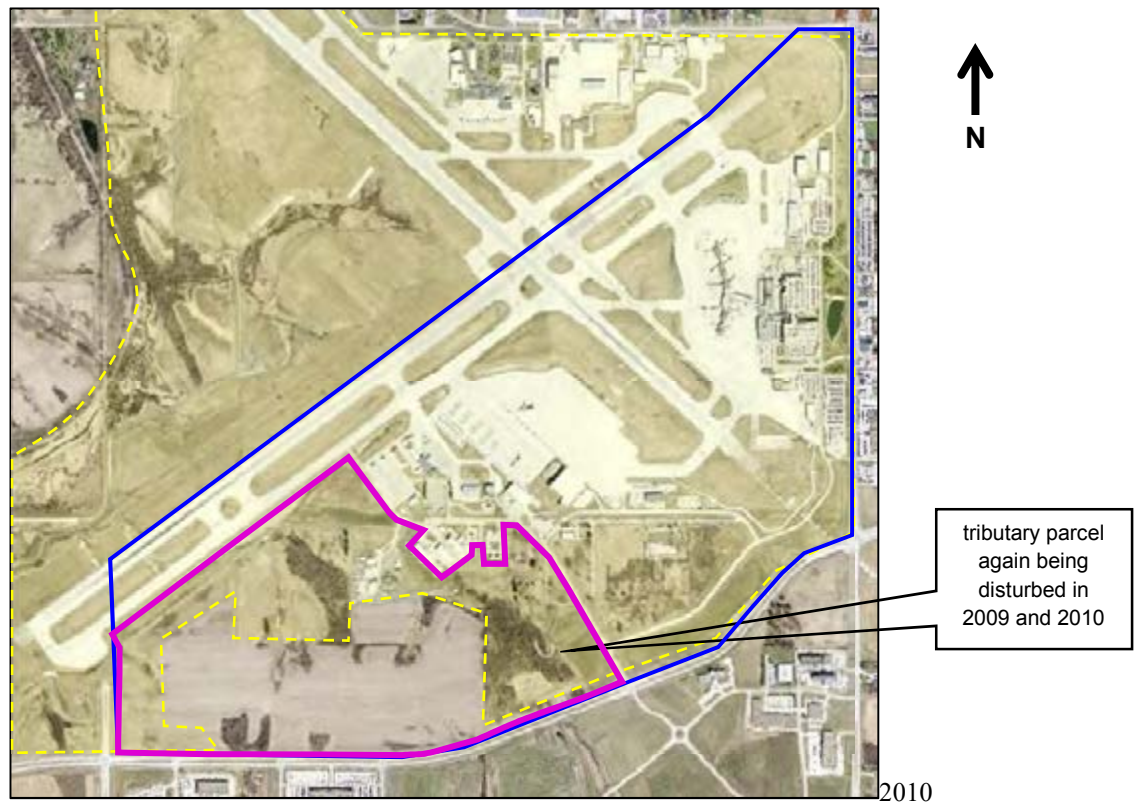
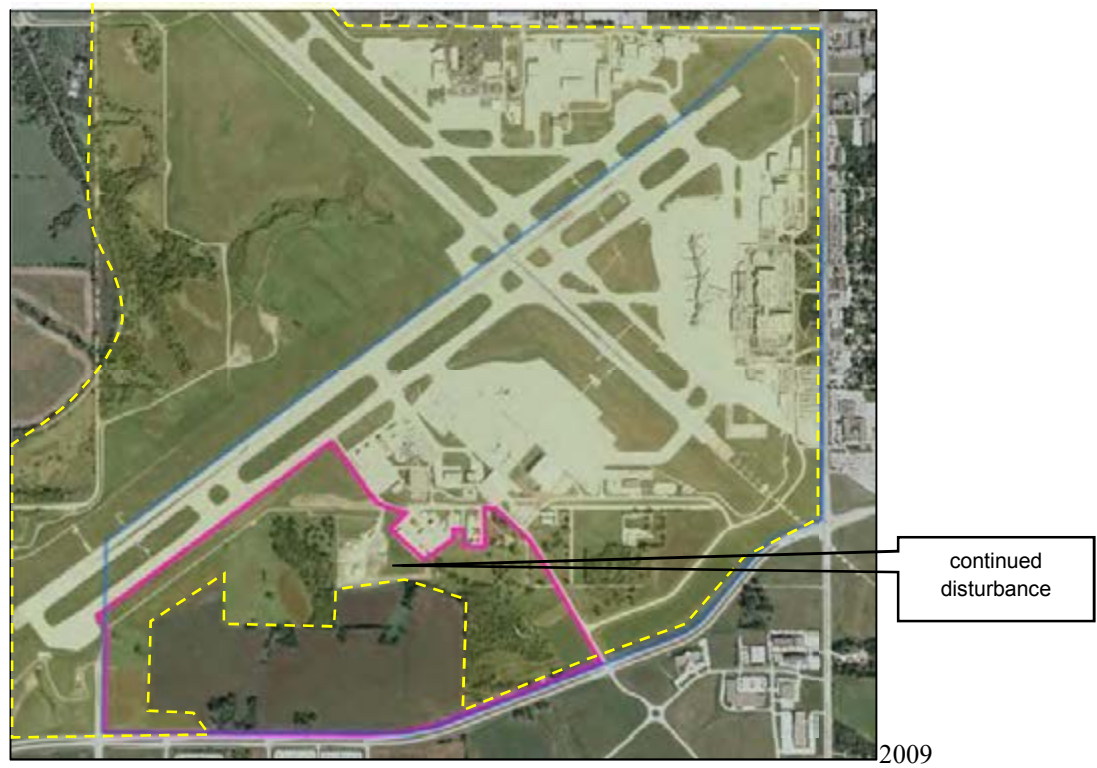


Figure 15. Modern aerals of current APE (blue outline) showing area targeted for Phase I field survey (pink outline). Source: 2009 obtained from ArcGIS - Iowa Geographic Map Server 2018; 2010 aerial obtained from Polk County Iowa GIS, 2018.

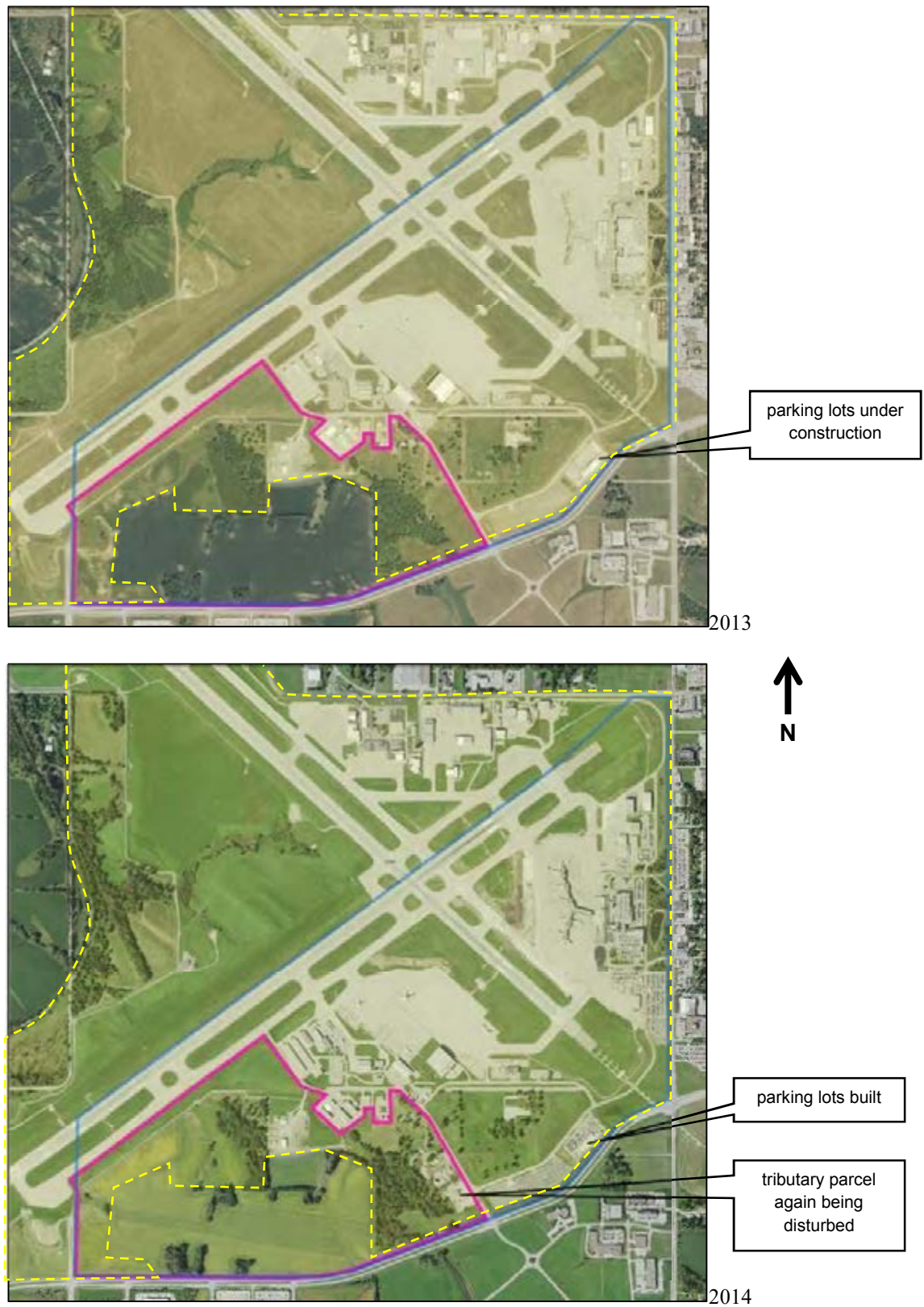


Figure 16. Modern aerals of current APE (blue outline) showing area targeted for Phase I field survey (pink outline). Source: Aerials obtained from ArcGIS - Iowa Geographic Map Server 2018

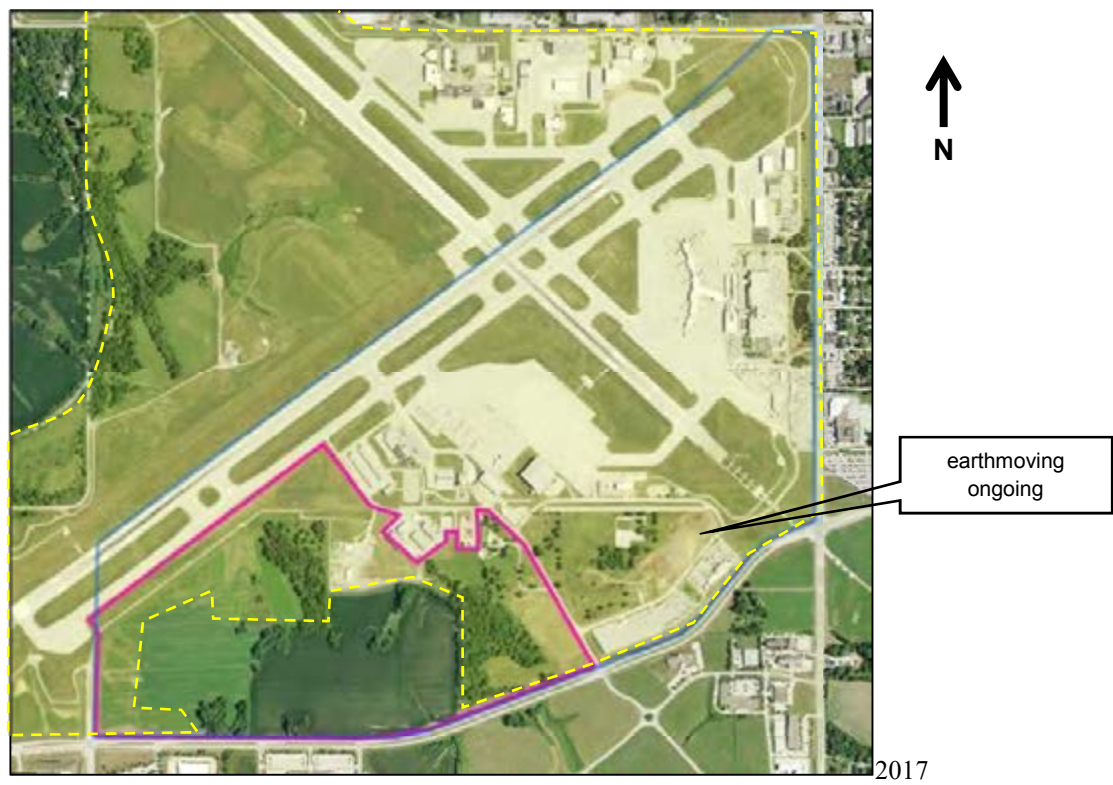
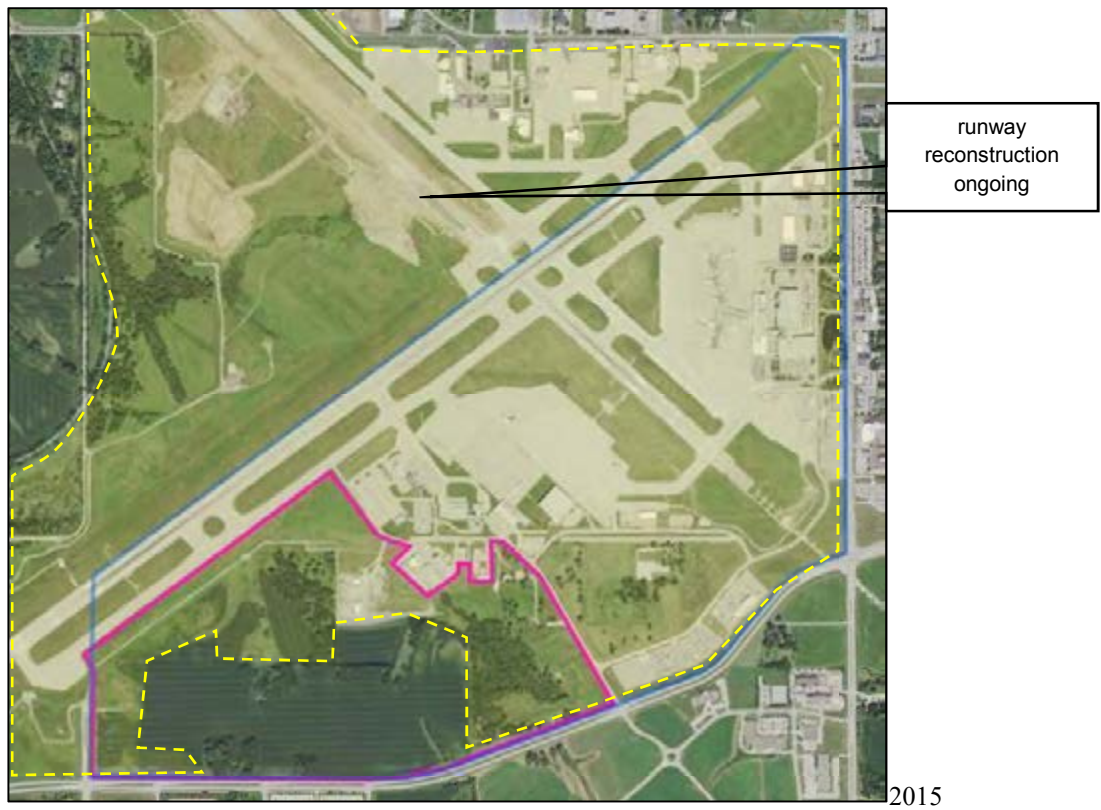


Figure 17. Modern aeriels of current APE (blue outline) showing area targeted for Phase I field survey (pink outline). Source: Aerials obtained from ArcGIS - Iowa Geographic Map Server 2018.

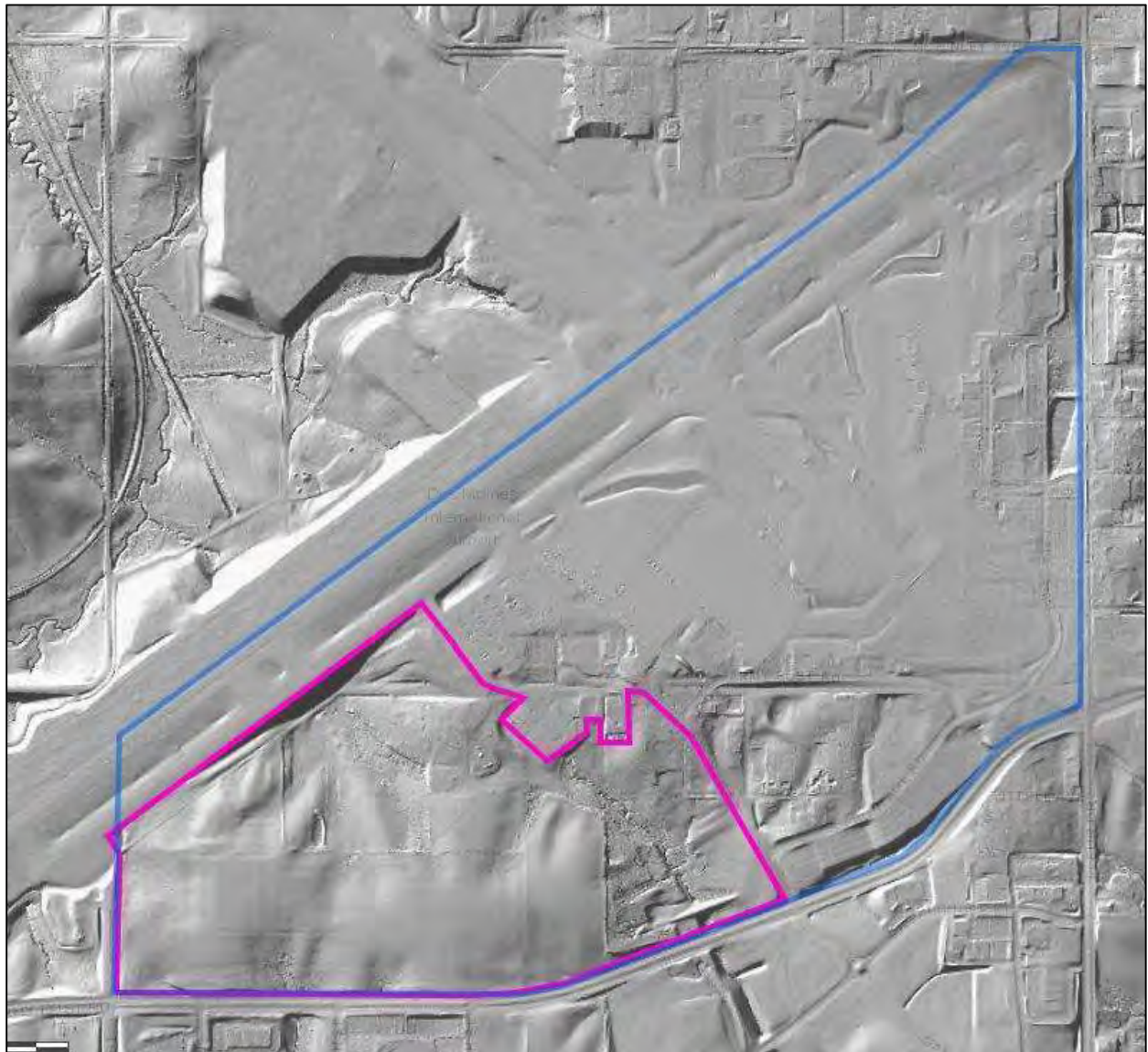
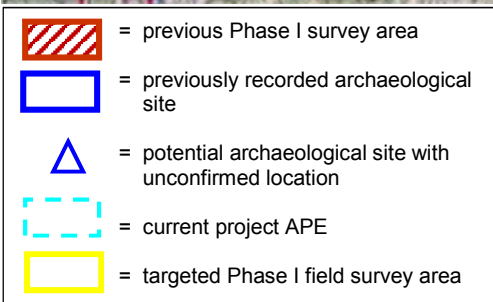


Figure 18. LiDAR image of current APE (blue outline) and showing area targeted for Phase I field survey (pink outline). Source: Aerial obtained from Polk County Iowa GIS, 2018; LiDAR image obtained from ArcGIS - Iowa Geographic Map Server 2018.

[illegible]

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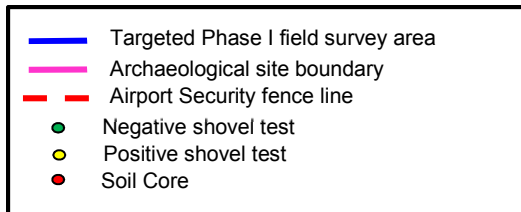
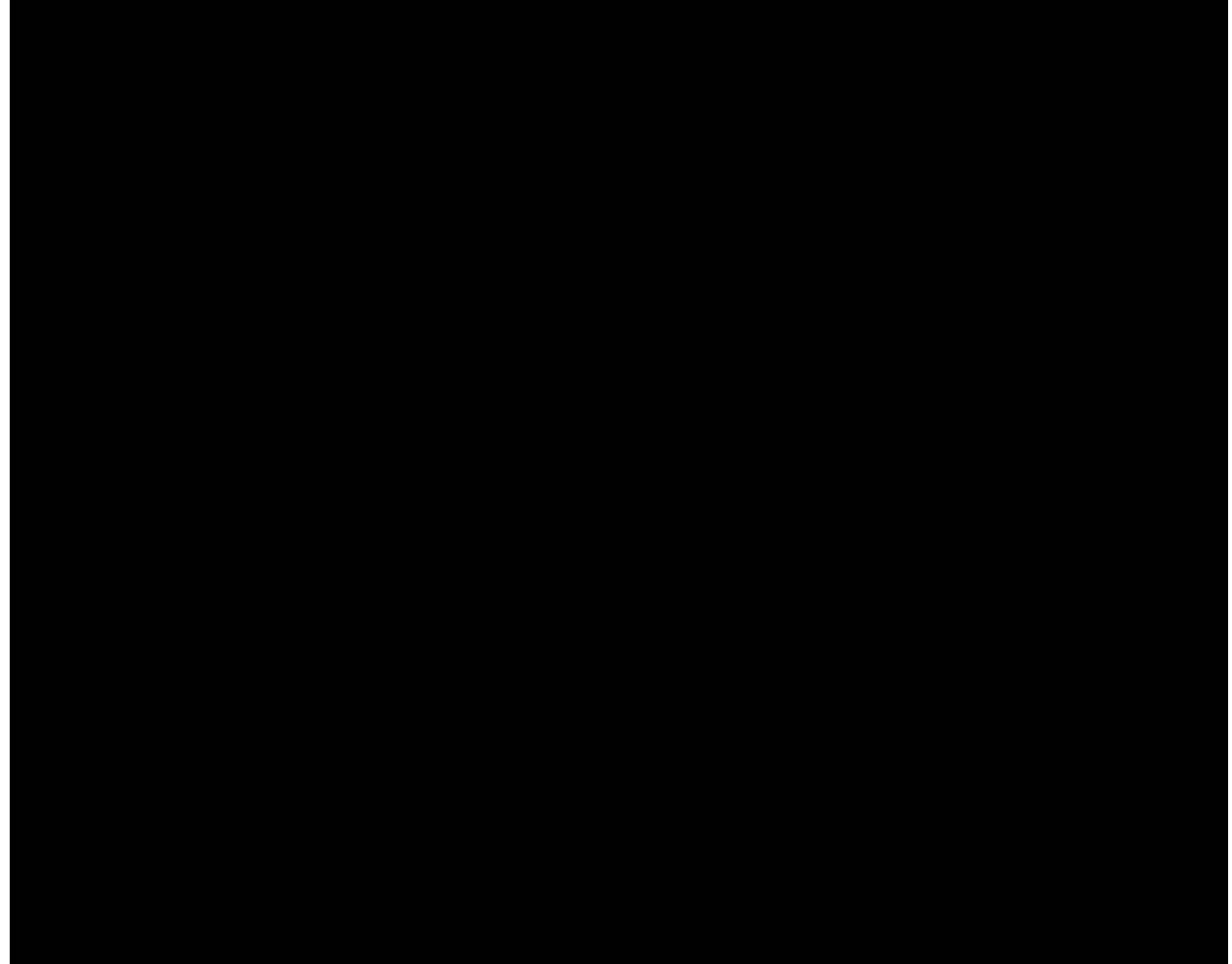


Figure 20. Aerial map showing Phase I survey field conditions and location of subsurface tests, survey areas, and archaeological site locations. Source: 2013 aerial, obtained from ExpertGPS Pro mapping software 2018.

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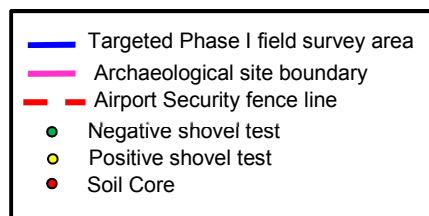
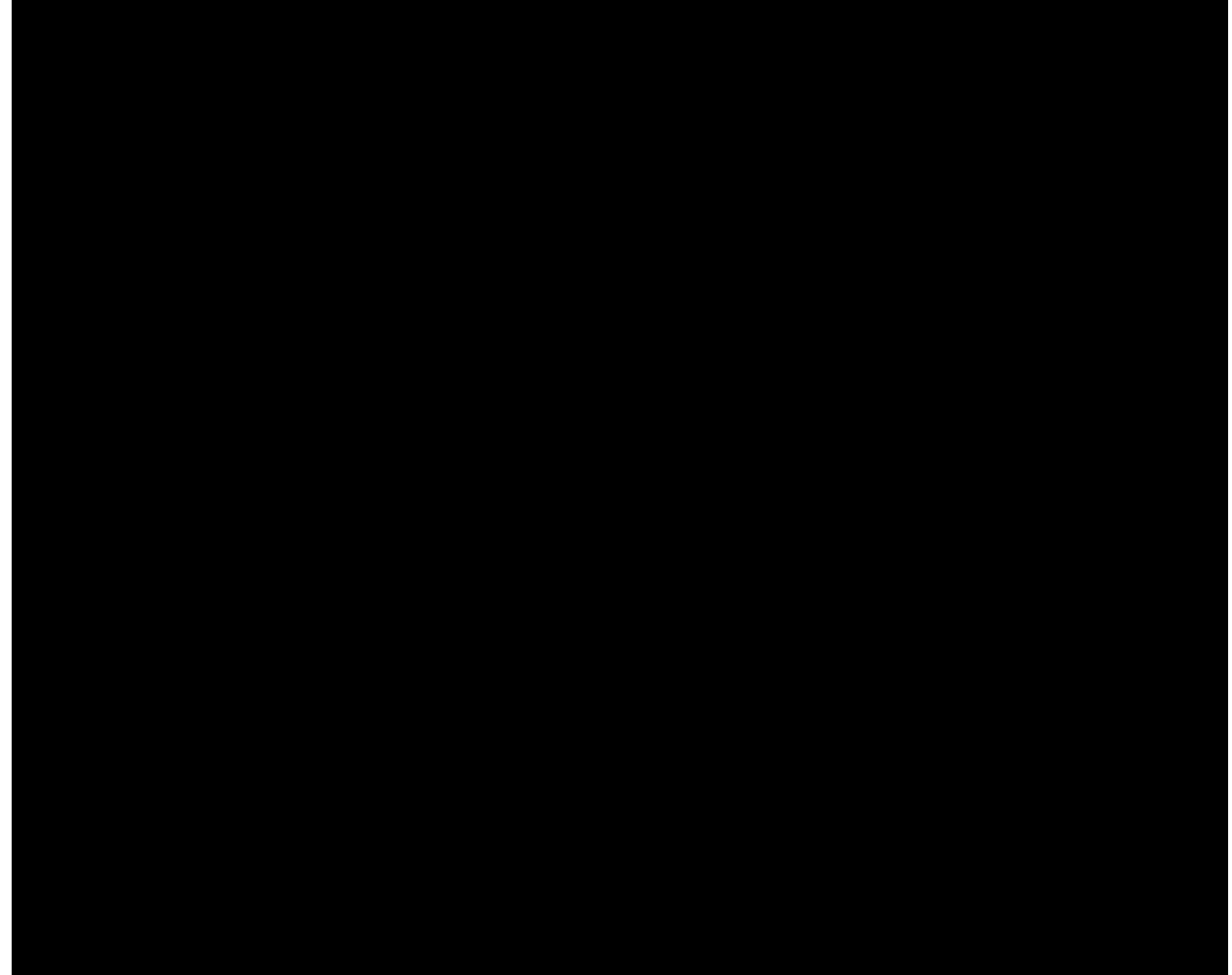
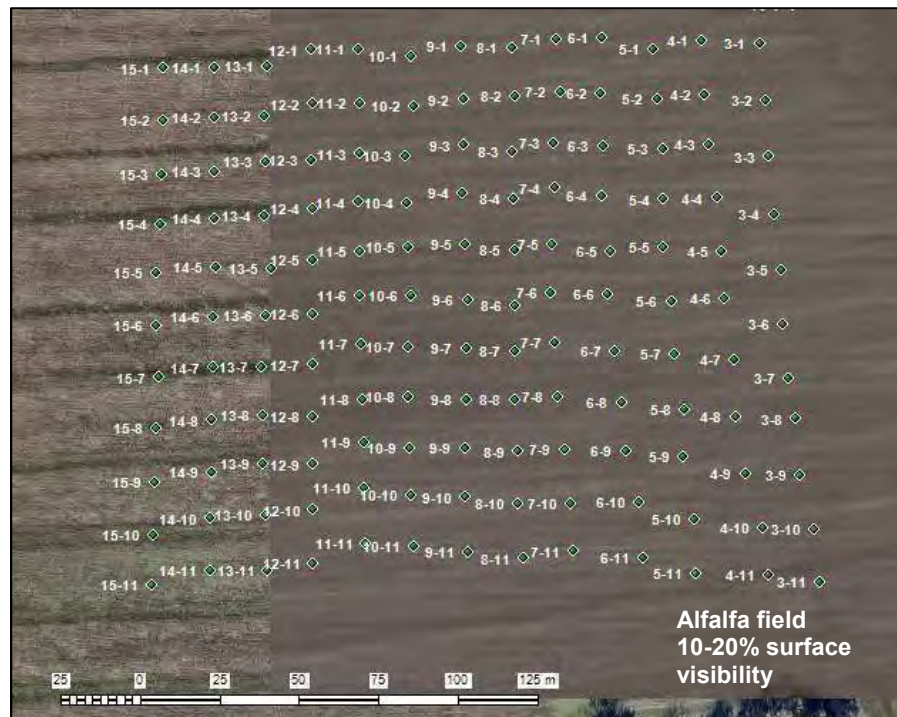


Figure 21. Topographic map showing Phase I survey field conditions and location of subsurface tests, survey areas, and archaeological site locations. Source: USGS Des Moines SW 1956 (photorevised to 1976) quadrangle map obtained from ExpertGPS Pro mapping software 2018.



● Negative shovel test

Figure 22. Aerial and topographical maps showing Phase I survey field conditions and location of subsurface tests in Area E. Source: aerial and topographical maps obtained from ExpertGPS Pro mapping software 2018.

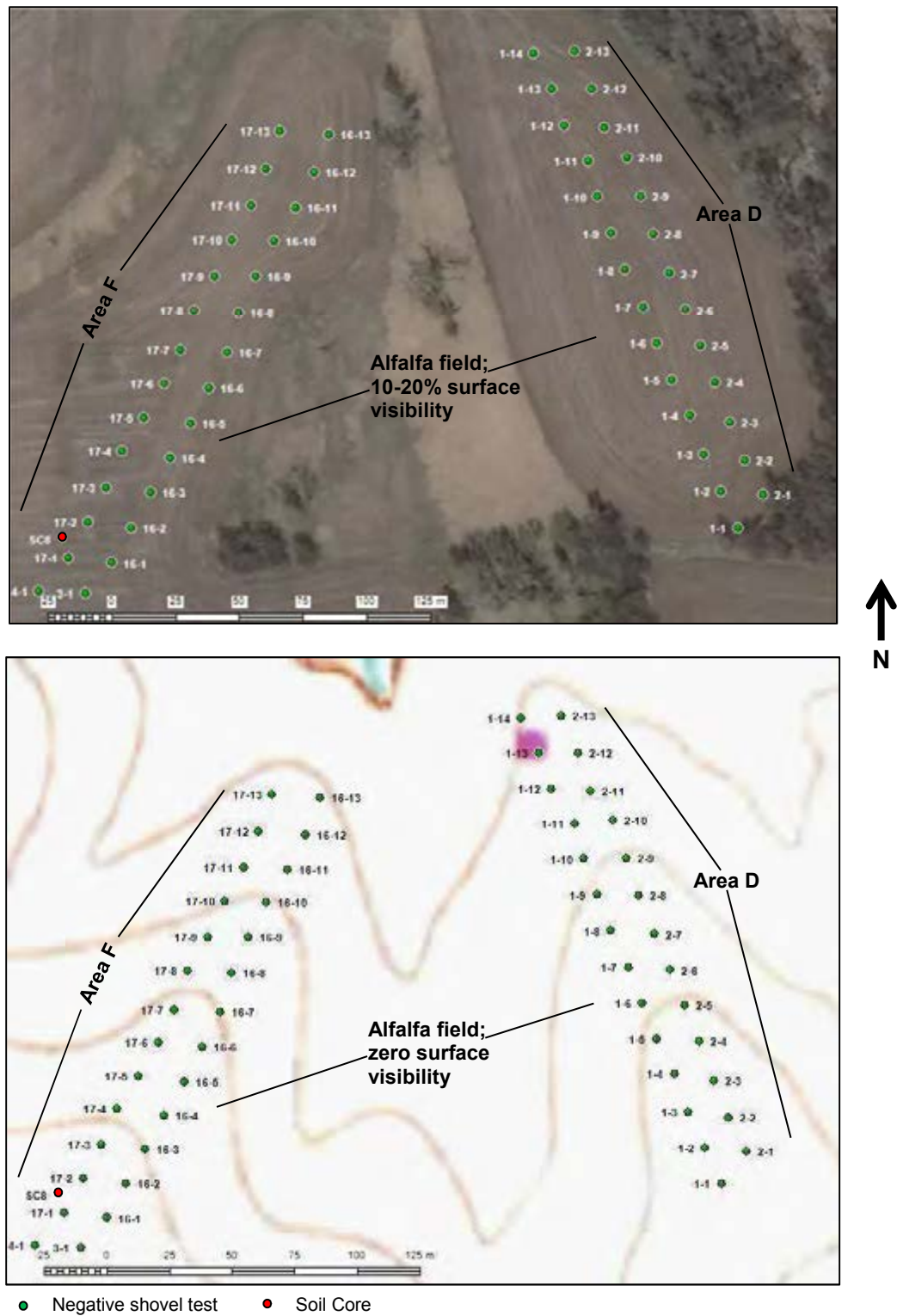


Figure 23. Aerial and topographical maps showing Phase I survey field conditions and location of subsurface tests in Areas D and F. Source: aerial and topographic maps obtained from ExpertGPS Pro mapping software 2018.

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Figure 24. Topographical location of Sites 13PK1058 through 13PK1063 (red-shaded/black-outlined) within targeted Phase I field survey area (blue outline). Source: ExpertGPS Pro mapping software, 2018.

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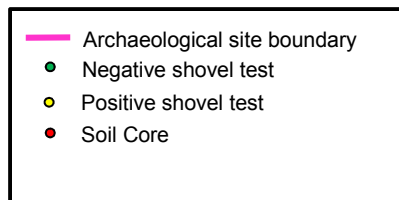


Figure 25. Aerial and topographical maps of Phase I survey of sites 13PK1058 and 13PK1062 showing location of subsurface tests, soil cores, and field conditions.
Source: aerial and topographical maps obtained from ExpertGPS Pro mapping software, 2018.

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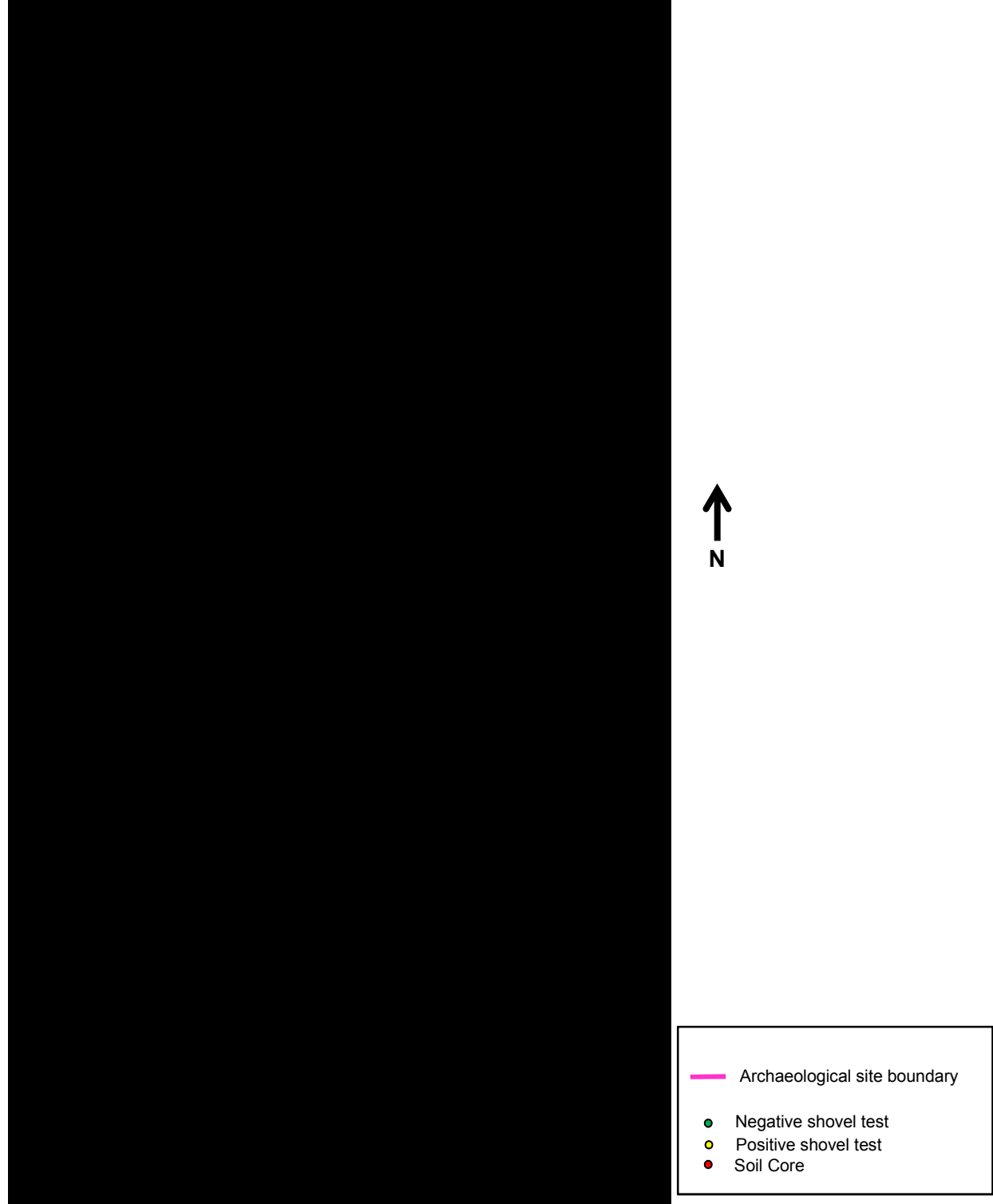


Figure 26. Aerial and topographical maps of Phase I survey of Site 13PK1059 showing subsurface test locations, soil cores, and field conditions. Source: aerial and topographical maps obtained from ExpertGPS Pro mapping software, 2018.

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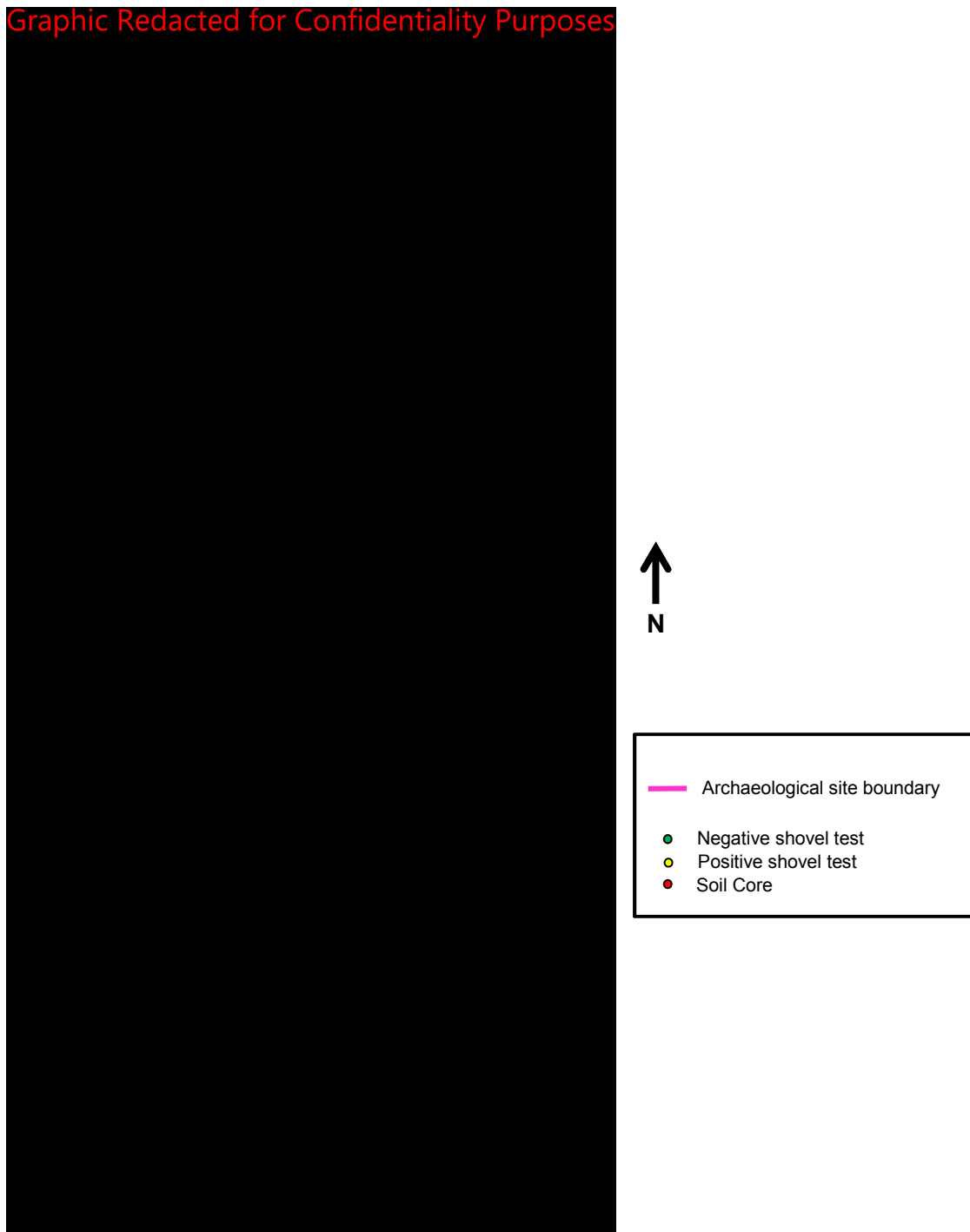


Figure 27. Aerial and topographical maps of Phase I survey of Site 13PK1060 showing subsurface test locations, soil cores, and field conditions. Source: aerial and topographical maps obtained from ExpertGPS Pro mapping software, 2018.

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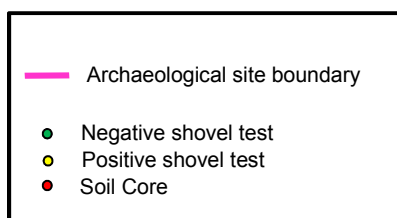


Figure 28. Aerial and topographical maps of Phase I survey of sites 13PK1063 and 13PK1061 showing subsurface test locations, soil cores, and field conditions. Source: aerial and topographical maps obtained from ExpertGPS Pro mapping software, 2018.



Graphic Redacted for Confidentiality Purposes

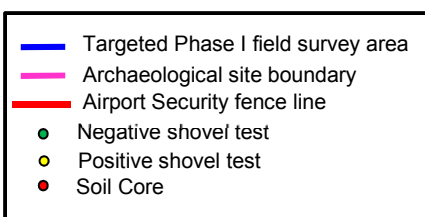


Figure 29. Aerial and topographical maps of Phase I survey of Area H showing subsurface test locations, soil cores, and field conditions. Source: aerial and topographical maps obtained from ExpertGPS Pro mapping software, 2018.



Plate 1. Looking north from west edge of APE. Photograph taken May 8, 2018.



Plate 2. Looking east from west edge of APE. Photograph taken May 8, 2018.



Plate 3. Looking south from west edge of APE. Photograph taken May 8, 2018.



Plate 4. Timber area along Army Post Road, looking east. Photograph taken May 9, 2018.



Plate 5. Looking NE from between ST 4-1 and ST 5-1. Photograph taken May 10, 2018.



Plate 6. View north from ST 14-6. Photograph taken May 16, 2018.



Plate 7. View southwest from ST 16-13. Photograph taken May 17, 2018.



Plate 8. Looking east from ST 17-13. Photograph taken May 17, 2018.



Plate 9. View south from T1-14. Photograph taken May 17, 2018



Plate 10. ST 1-14, north wall profile. Photograph taken May 17, 2018.



Plate 11. ST 10-5, north wall profile. Photograph taken May 15, 2018.



Plate 12. ST 16-13, west wall profile. Photograph taken May 17, 2018.



Plate 13. Looking north from 13PK1058. Photograph taken May 8, 2018.



Plate 14. Projectile point found in cornfield, Site 13PK1058. Photograph taken on May 7, 2018.



Plate 15. South wall profile of ST 1, 13PK1058. Photograph taken May 8, 2018.



Plate 16. Looking north at 13PK1059. Photograph taken May 15, 2018.



Plate 17. West wall profile ST 1, 13PK1059. Photograph taken May 15, 2018.



Plate 18. Looking east at site 13PK1060. Photograph taken on May 7, 2018.



Plate 19. North wall profile of ST1 site 13PK1060, N Wall.



Plate 20. Looking east at site 13PK1061. Photograph taken May 10, 2018.



Plate 21. South wall profile of ST2 site 13PK1061. Photograph taken May 10, 2018



Plate 22. Looking southeast at site 13PK1062. Photograph taken May 14, 2018.



Plate 23. East wall profile of ST 1 site 13PK1062. Photograph taken May 14, 2018.



Plate 24. Looking east at site 13PK1063. Photograph taken May 14, 2018.



Plate 25. East wall profile of ST P7-1 site 13PK1063. Photograph taken May 15, 2018.



Plate 26. Looking north at Area H in northeast corner of project area. Photograph taken June 14, 2018.



Plate 27. Looking northwest at Area H in northeast corner of project area.
Photograph taken June 14, 2018.



Plate 28. North wall profile of ST 4-6 Area H. Photograph taken June 14, 2018.



Plate 29. Looking southwest to tributary in the east end of project area showing artificial berm structure.
Photograph taken June 14, 2018.



Plate 30. Eroded unnamed tributary of Middle Creek along eastern edge of project boundary.
Photograph taken June 14, 2018.

APPENDIX A:
Subsurface Tests Soil Profile Descriptions

Subsurface Tests Soil Profile Descriptions

Area/Site Number	Test Number	Depth (cm b.s.)	Description
13PK1058	P1-1	0-23	10YR 3/1 (very dark grey) silty loam
		23-47	10YR 2/1 (black) silty clay loam
		47-50	10YR 3/4 (dark yellowish brown) silty clay loam
13PK1058	P1-2	0-24	10YR 3/1 (very dark grey) silty loam
		24-46	10YR 3/2 (very dark grayish brown) silty clay loam
		46-50	10YR 4/3 (brown) silty clay loam
13PK1058	P1-3	0-22	10YR 3/1 (very dark gray) silt loam
		22-37	10YR 3/2 (very dark grayish brown) silty clay loam
		37-50	10YR 4/2 (dark grayish brown) silt loam
13PK1058	P1-4	0-25	10YR 2/1 (black) silty clay loam, loose
		25-50	10YR 2/1 (black) silty clay loam
13PK1058	P1-5	0-25	10YR 2/1 (black) silty clay loam, loose
		25-50	10YR 2/1 (black) silty clay loam
13PK1059	P2-1	0-12	10YR 3/2 (very dark grayish brown) silt loam; roots
		12-32	10YR 4/3 (brown) silty clay loam; few 10YR 3/2 (very dark grayish brown) mottles; roots
		32-50	10YR 5/4 (yellowish brown) silty clay loam; few 10YR 3/2 and 10YR 4/3 (very dark grayish brown and brown) mottles; roots
13PK1059	P2-2	0-24	10YR 3/2 (very dark grayish brown) silty clay loam
		24-35	10YR 3/3 (dark brown) silty clay loam
		35-50	10YR 4/3 (brown) silty clay loam
13PK1059	P2-3	0-14	10YR 4/2 (dark grayish brown) silty clay loam
		14-26	10YR 3/2 (very dark grayish brown) silty clay loam
		26-50	10YR 4/3 (brown) silty clay loam
13PK1059	P2-4	0-23	10YR 3/2 (very dark grayish brown) silty clay loam
		23-43	10YR 4/3 (brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles
		43-50	10YR 4/4 (dark yellowish brown) silty clay loam
13PK1059	P2-5	0-27	10YR 3/2 (very dark grayish brown) silty clay loam
		27-45	10YR 3/3 (dark brown) silty clay loam
		45-50	10YR 4/3 (brown) silty clay loam

13PK1059	P6-1	0-24	10YR 3/2 (very dark grayish brown) silty clay loam
		24-46	10YR 4/4 (dark yellowish brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles
		46-50	10YR 4/4 (dark yellowish brown) silty clay loam; Fe
13PK1059	P6-2	0-20	10YR 3/2 (very dark grayish brown) silty clay loam; sticky
		20-50	10YR 4/4 (dark yellowish brown) silty clay loam; sticky
13PK1059	P6-3	0-36	10YR 3/2 (very dark grayish brown) silty clay loam
		36-50	10YR 4/3 (brown) silty clay loam
13PK1059	P6-4	0-34	10YR 3/2 (very dark grayish brown) silt loam
		34-50	10YR 4/3 (brown) silty clay loam
13PK1059	P6-5	0-27	10YR 3/2 (very dark grayish brown) silt loam; sticky
		27-50	10YR 4/4 (dark yellowish brown) silty clay loam; sticky
13PK1060	P3-1	0-22	10YR 3/2 (very dark grayish brown) silty loam; top 3cm very dry; roots
		22-50	10YR 5/3 (brown) silty clay loam; few 10YR 4/4 (dark yellowish brown) mottles
13PK1060	P3-2	0-32	10YR 3/2 (very dark grayish brown) silty clay loam; roots; top 3cm dry
		32-42	10YR 4/3 (brown) silty clay loam; few 10YR 3/2 (very dark grayish brown) mottles; roots; 1cm diameter Fe deposit in wall
		42-50	10YR 5/3 (brown) silty clay loam; few 10YR 3/2 and 4/3 (very dark grayish brown and brown) mottles; roots
13PK1060	P3-3	0-16	10YR 2/1 to 3/2 (black to very dark grayish brown) silty clay loam; top 3cm dry; roots
		16-39	10YR 3/3 to 3/4 (dark brown to dark yellowish brown) silty clay loam; roots
		39-50	10YR 5/6 (yellowish brown) silty clay loam; large 10YR 3/2 and 10YR 3/4 (very dark grayish brown and dark yellowish brown) mottles; small common Fe
13PK1060	P3-4	0-22	10YR 3/2 (very dark grayish brown) silty clay loam
		22-46	10YR 4/3 (brown) silty clay loam
		46-50	10YR 4/4 (dark yellowish brown) silty clay loam
13PK1060	P3-5	0-22	10YR 3/2 (very dark grayish brown) silty clay loam
		22-38	10YR 4/3 (brown) silty clay loam
		38-50	10YR 4/4 (dark yellowish brown) silty clay loam

13PK1061	P4-1	0-26	10YR 4/3 (brown) silty clay loam; sticky
		26-50	10YR 4/6 (dark yellowish brown) silty clay loam; very sticky
13PK1061	P4-2	0-24	10YR 3/3 (dark brown) silty clay loam; 10YR 2/3 (very dark grayish brown) mottles; few roots
		24-50	10YR 4/4 (dark yellowish brown) silty clay loam; roots; hard and sticky
13PK1061	P4-3	0-22	10YR 4/2 (dark grayish brown) silty clay; loose
		22-40	10YR 4/2 (dark grayish brown) silty clay
		40-50	10YR 4/4 (dark yellowish brown) silty clay
13PK1061	P4-4	0-13	10YR 4/2 (dark grayish brown) silty clay loam
		13-50	10YR 4/4 (dark yellowish brown) silty clay
13PK1061	P4-5	0-15	10YR 4/2 (dark grayish brown) silty clay loam
		15-50	10YR 4/4 (dark yellowish brown) silty clay
13PK1061	P4-6	0-16	10YR 3/2 to 3/3 (very dark grayish brown to dark brown) silty clay loam; roots
		16-40	10YR 4/4 (dark yellowish brown) silty clay loam; roots; hard and sticky
		40-50	10YR 5/6 (yellowish brown) silty clay loam; roots
13PK1061	P4-7	0-21	10YR 3/4 (dark yellowish brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles; few roots
		21-42	10YR 4/4 (dark yellowish brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles; roots; hard and sticky
		42-50	10YR 5/6 (yellowish brown) silty clay loam; hard and sticky
13PK1061	P4-8	0-22	10YR 3/4 (dark yellowish brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles
		22-35	10YR 4/3 (brown) silty clay loam; sticky
		35-50	10YR 4/6 (dark yellowish brown) silty clay loam; very sticky
13PK1061	P4-9	0-23	10YR 3/3 and 3/4 (dark brown and dark yellowish brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles
		23-35	10YR 4/3 (brown) silty clay loam; sticky
		35-50	10YR 4/6 (dark yellowish brown) silty clay loam; very sticky
13PK1061	P4-10	0-14	10YR 3/3 and 3/4 (dark brown and dark yellowish brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles; roots
		14-42	10YR 4/4 (dark yellowish brown) silty clay loam; roots; hard and sticky
		42-50	10YR 5/6 (yellowish brown) silty clay loam; few roots; hard and sticky

13PK1061	P4-11	0-19	10YR 3/4 (dark yellowish brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles
		19-32	10YR 4/2 (dark grayish brown) silty clay loam
		32-50	10YR 4/4 (dark yellowish brown) silty clay
13PK1061	P4-12	0-22	10YR 3/4 (dark yellowish brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles
		22-46	10YR 4/2 (dark grayish brown) silty clay
		46-50	10YR 4/4 (dark yellowish brown) silty clay
13PK1062	P5-1	0-22	10YR 3/2 (very dark grayish brown) silty clay loam
		22-30	10YR 4/2 (dark grayish brown) silty clay loam
		30-50	10YR 4/4 (dark yellowish brown) silty clay loam
13PK1062	P5-2	0-29	10YR 3/2 (very dark grayish brown) silt loam
		29-50	10YR 4/2 (dark grayish brown) silty clay loam
13PK1062	P5-3	0-33	10YR 3/2 (very dark grayish brown) silt loam
		33-50	10YR 4/2 (dark grayish brown) silty clay loam
13PK1062	P5-4	0-28	10YR 3/2 (very dark grayish brown) silty clay loam
		28-50	10YR 4/3 (brown) silty clay
13PK1062	P5-5	0-30	10YR 3/2 (very dark grayish brown) silty clay loam; damp
		30-50	10YR 4/4 (dark yellowish brown) silty clay loam
13PK1063	P7-1	0-25	10YR 2/2 (very dark brown) silty clay loam
		25-42	10YR 3/3 (dark brown) silty clay loam; few 10YR 2/2 (very dark brown) mottles
		42-50	10YR 4/4 (dark yellowish brown) silty clay loam; few 10YR 5/2 (grayish brown) mottles; Fe
13PK1063	P7-2	0-14	10YR 3/2 (very dark grayish brown) silt loam
		14-38	10YR 4/3 (brown) silty clay loam
		38-50	10YR 4/4 (dark yellowish brown) silty clay loam
13PK1063	P7-3	0-17	10YR 3/2 (very dark grayish brown) silty clay loam; damp
		17-50	10YR 4/4 (dark yellowish brown) silty clay loam
13PK1063	P7-4	0-32	10YR 3/2 (very dark grayish brown) silt loam
		32-50	10YR 4/3 (brown) silty clay loam
13PK1063	P7-5	0-25	10YR 2/2 to 3/2 (very dark brown to very dark grayish brown) silty clay loam

		25-42	10YR 3/2 (very dark grayish brown) silty clay loam; 10YR 3/3 and 4/3 (dark brown and brown) mottles
		42-50	10YR 4/4 (dark yellowish brown) silty clay loam; 10YR 5/2 (grayish brown) few mottles; Fe
	SC1	0-17	10YR 3/2 (very dark grayish brown silty clay loam
		17-37	10YR 3/3 (dark brown) silty clay loam
		37-48	10YR 4/4 silty clay loam; 10YR 4/3 mottles
	SC2	0-28	10YR 2/1 to 2/2 (black to very dark brown) silt loam
		28-47	10YR 3/2 (very dark grayish brown) silty clay loam
		47-58	10YR 3/3 (dark brown) silty clay loam; Fe
		58-70	10YR 4/3 (brown) silty clay loam; redox
		70-77	10YR 4/4 (dark yellowish brown) silty clay loam; 10YR 5/3 (brown) mottles; 10YR 6/3 (pale brown) clay inclusions; redox
	SC3	0-24	10YR 2/2 (very dark brown) silty clay loam
		24-38	10YR 3/2 to 3/3 (very dark grayish brown to dark brown) silty clay loam
		38-52	10YR 3/3 (dark brown) silty clay loam; 10YR 4/3 (brown) mottles
		52-65	10YR 4/4 (dark yellowish brown) silty clay loam; redox
		65-76	10YR 4/4 (dark yellowish brown) silty clay loam; 10YR 5/4 (yellowish brown) mottles; redox
	SC4	0-29	10YR 2/2 (very dark brown) silty clay loam
		29-57	10YR 3/2 (very dark yellowish brown) silty clay loam
		57-65	10YR 3/3 (dark brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles
		65-77	10YR 5/4 (yellowish brown) silty clay loam; few 6/2 (light brownish gray) mottles; redox
	SC5	0-16	10YR 2/2 to 3/2 (very dark brown-very dark grayish brown) silty clay loam
		16-25	10YR 3/3 (dark brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles
		25-52	10YR 4/3 (brown) silty clay loam; 10YR 4/4 and 5/4 (dark yellowish brown and yellowish brown) mottles
		52-74	10YR 5/4 (yellowish brown) silty clay loam; few small faint Fe
		74-78	10YR 6/3 (pale brown) silty clay loam; 10YR 6/2 (light brownish gray); common Fe stains; small concretions
	SC6	0-31	10YR 2/2 (very dark brown) silt loam; compact
		31-56	10YR 3/8 (dark yellowish brown) silty clay loam; 10YR 3/3 (dark brown) mottles

	SC7	0-10	10YR 3/2 (very dark grayish brown) silt loam; 10YR 3/3 to 10YR 3/4 (dark brown to dark yellowish brown) mottles; roots; very dry; disturbed
		10-25	10YR 4/4 (dark yellowish brown) silty clay loam; Fe; 10YR 5/2 and 10YR 5/3 (grayish brown and brown) mottles
		25-39	10YR 4/3 (brown) silty clay loam; 10YR 4/2 (dark grayish brown) mottles; Fe
		39-51	10YR 5/3 (brown) silty clay loam; 10YR 5/2 (grayish brown) mottles; common Fe; small concretions
	SC8	0-13	10YR 2/2 to 10YR 3/2 (very dark brown to dark brown) silt loam; dry; roots
		13-30	10YR 3/3-3/4 (dark brown-dark yellowish brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles
		30-44	10YR 4/4 (dark yellowish brown) silty clay loam; few redox
		44-58	10YR 4/4 (dark yellowish brown) silty clay loam; common redox
		58-77	10YR 4/4 (dark yellowish brown) silty clay loam; 10YR 5/2 (grayish brown) mottles; common redox
Area D	1-1	0-32	10YR 3/1 (very dark gray) silt loam
		32-50	10YR 4/3 (brown) silty clay loam
Area D	1-2	0-30	10YR 3/2 (very dark grayish brown) silty clay loam
		30-50	10YR 3/4 (dark yellowish brown) silty clay loam
Area D	1-3	0-32	10YR 3/2 (very dark grayish brown) silt loam; many big and small roots
		32-42	10YR 4/3 (brown) silty clay loam; roots; 10YR 3/2 (very dark grayish brown) mottles
		42-50	10YR 5/4 (yellowish brown) silty clay loam; 10YR 3/4 (dark yellowish brown) mottles
Area D	1-4	0-32	10YR 3/1 (very dark gray) silt loam; heavily rooted
		32-42	10YR 4/3 (brown) silty clay loam; roots; 10YR 3/1 (very dark gray) mottles
		42-50	10YR 5/4 (yellowish brown) silty clay loam; 10YR 4/3 (brown) mottles
Area D	1-5	0-32	10YR 3/2 (very dark grayish brown) silty clay loam
		32-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area D	1-6	0-28	10YR 3/1 (very dark brown) silt loam; roots
		28-50	10YR 4/4 (dark yellowish brown) silty clay loam; roots
Area D	1-7	0-30	10YR 3/2 (very dark grayish brown) silty clay loam
		30-50	10YR 4/4 (dark yellowish brown) silty clay loam

Area D	1-8	0-35	10YR 3/1 (very dark brown) silt loam; roots
		35-50	10YR 4/4 (dark yellowish brown) silty clay loam; roots
Area D	1-9	0-30	10YR 3/2 (very dark grayish brown) silty clay loam
		30-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area D	1-10	0-33	10YR 3/2 (very dark grayish brown) silt loam; roots
		33-48	10YR 4/4 (dark yellowish brown) silty clay loam; roots; 10YR 3/2 (very dark grayish brown) mottles
		48-50	10YR 5/4 (yellowish brown) silty clay loam; roots; 10YR 3/2 (very dark grayish brown) mottles
Area D	1-11	0-35	10YR 2/2 (dark grayish brown) silty clay loam
		35-50	10YR 3/4 (dark yellowish brown) silty clay loam
Area D	1-12	0-30	10YR 3/2 (very dark grayish brown) silty clay loam
		30-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area D	1-13	0-30	10YR 3/2 (very dark grayish brown) silty clay loam
		30-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area D	1-14	0-33	10YR 3/2 (very dark grayish brown) silty clay loam
		33-50	10YR 4/6 (dark yellowish brown) silty clay loam
Area D	2-1	0-37	10YR 3/2 (very dark grayish brown) silt loam
		37-50	10YR 4/3 (brown) silty clay loam
Area D	2-2	0-34	10YR 3/2 (very dark grayish brown) silt loam
		34-50	10YR 4/3 (brown) silty clay loam
Area D	2-3	0-37	10YR 3/2 (very dark grayish brown) silt loam
		37-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area D	2-4	0-27	10YR 3/2 (very dark grayish brown) silty clay loam
		27-46	10YR 4/3 (brown) silty clay loam
		46-60	10YR 4/3 (brown) silty clay loam; Mn
Area D	2-5	0-30	10YR 3/2 (very dark grayish brown) silty clay loam
		30-50	10YR 4/3 (brown) silty clay loam
Area D	2-6	0-35	10YR 3/2 (very dark grayish brown) silty loam
		35-50	10YR 4/3 (brown) silty clay loam

Area D	2-7	0-30	10YR 3/2 (very dark grayish brown) silty clay loam
		30-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area D	2-8	0-35	10YR 3/2 (very dark grayish brown) silt loam; roots
		35-46	10YR 4/3 (brown) silty clay loam; roots; 10YR 3/2 (very dark grayish brown) mottles
		46-50	10YR 5/4 (yellowish brown) silty clay loam; roots
Area D	2-9	0-35	10YR 3/2 (very dark grayish brown) silt loam; roots
		35-50	10YR 4/3 (brown) silty clay loam; roots; 10YR 3/2 (very dark grayish brown) mottles
Area D	2-10	0-33	10YR 3/2 (very dark grayish brown) silty clay loam
		33-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area D	2-11	0-30	10YR 3/2 (very dark grayish brown) silt loam
		30-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area D	2-12	0-35	10YR 3/2 (very dark grayish brown) silty clay loam
		35-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area D	2-13	0-24	10YR 2/2 (very dark brown) silt loam; 2 rocks
		24-43	10YR 4/4 (dark yellowish brown) silty clay loam; 10YR 4/3 and 10YR 4/2 (brown and dark grayish brown) mottles
		43-51	2.5Y 4/4 (olive brown) silty clay loam; 10YR 5/2 and 10YR 5/4 (grayish brown and yellowish brown) mottles; common Fe
Area E	3-1	0-29	10YR 3/2 (very dark grayish brown) silt loam; roots
		29-39	10YR 4/3 (brown) silty clay loam; roots; 10YR 3/2 (very dark grayish brown) mottles
		39-50	10YR 4/4 (dark yellowish brown) silty clay loam; roots
Area E	3-2	0-25	10YR 3/3 to 10YR 3/4 (dark brown to dark yellowish brown) silt loam; 10YR 3/2 (very dark grayish brown) mottles
		25-50	10YR 4/4 (dark yellowish brown) silty clay loam; roots
Area E	3-3	0-24	10YR 3/2 10YR 3/3 (very dark grayish brown) silt loam; roots
		24-45	10YR 3/3 (dark brown) silt loam
		45-50	10YR 4/4 (dark yellowish brown) silty clay loam; roots
Area E	3-4	0-23	10YR 3/2 10YR 3/3 (very dark grayish brown) silt loam; roots
		23-42	10YR 3/3 (dark brown) silt loam
		42-50	10YR 4/4 (dark yellowish brown) silty clay loam; roots

Area E	3-5	0-26	10YR 3/2 10YR 3/3 (very dark grayish brown) silt loam; roots
		26-46	10YR 3/3 (dark brown) silt loam
		46-50	10YR 4/4 (dark yellowish brown) silty clay loam; roots
Area E	3-6	0-23	10YR 3/2 (very dark grayish brown) silt loam
		23-46	10YR 3/3 (dark brown) silt loam
		46-50	10YR 4/2 (dark grayish brown) silty clay loam
Area E	3-7	0-28	10YR 3/2 (very dark grayish brown) silt loam
		28-38	10YR 3/3 (dark brown) silt loam
		38-50	10YR 4/3 (brown) silty clay loam
Area E	3-8	0-36	10YR 3/2 (very dark grayish brown) silt loam
		36-50	10YR 4/3 (brown) silty clay loam
Area E	3-9	0-35	10YR 3/2 (very dark grayish brown) silt loam
		35-50	10YR 4/3 (brown) silty clay loam
Area E	3-10	0-36	10YR 2/2 (very dark brown) silt loam
		36-50	10YR 4/3 (brown) silty clay loam
Area E	3-11	0-25	10YR 2/2 (very dark brown) silty clay loam
		25-50	10YR 4/3 (brown) silty clay loam
Area E	4-1	0-23	10YR 3/2 (very dark grayish brown) roots; hard on top 20cm
		23-40	10YR 3/3 (dark brown) silt loam
		40-50	10YR 4/3 (brown) silty clay loam
Area E	4-2	0-26	10YR 3/2 (very dark grayish brown) roots; hard on top 20cm
		26-38	10YR 3/3 (dark brown) silt loam
		38-50	10YR 4/3 (brown) silty clay loam
Area E	4-3	0-24	10YR 3/2 (very dark grayish brown) roots; hard on top 20cm
		24-35	10YR 3/3 (dark brown) silt loam
		35-50	10YR 4/3 (brown) silty clay loam
Area E	4-4	0-38	10YR 3/2 (very dark grayish brown) silt loam
		38-50	10YR 4/2 (dark grayish brown) silt loam
Area E	4-5	0-37	10YR 3/2 (very dark grayish brown) silt loam
		37-50	10YR 4/2 (dark grayish brown) silty clay loam

Area E	4-6	0-35	10YR 3/2 (very dark grayish brown) silty clay loam
		35-50	10YR 3/4 (dark yellowish brown) silty clay loam
Area E	4-7	0-37	10YR 3/2 (very dark grayish brown) silty clay loam
		37-50	10YR 3/4 (dark yellowish brown) silty clay loam
Area E	4-8	0-35	10YR 3/2 (very dark grayish brown) silty clay loam
		35-50	10YR 3/4 (dark yellowish brown) silty clay loam
Area E	4-9	0-35	10YR 3/2 (very dark grayish brown) silty clay loam, metal clinkers at 30 to 40
		35-50	10YR 3/4 (dark yellowish brown) silty clay loam
Area E	4-10	0-25	10YR 2/2 (very dark brown) silty clay loam
		25-50	10YR 3/4 (dark yellowish brown) silty clay loam
Area E	4-11	0-23	10YR 3/2 (very dark grayish brown) silty clay loam
		23-50	10YR 2/1 (black) silty clay loam
Area E	5-1	0-36	10YR 3/2 (very dark grayish brown) silt loam; roots; first 20cm hard
		36-50	10YR 3/3 and 10YR 4/4 (dark brown and dark yellowish brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles
Area E	5-2	0-32	10YR 3/2 (very dark grayish brown) silt loam; roots; first 20cm hard
		32-50	10YR 3/3 (dark brown) silty clay loam; roots; 10YR 3/2 and 10YR 4/4 (very dark grayish brown and dark yellowish brown) mottles
Area E	5-3	0-32	10YR 3/2 (very dark grayish brown) silt loam
		32-50	10YR 3/3 (dark brown) silty clay loam
Area E	5-4	0-36	10YR 3/2 (very dark grayish brown) silt loam
		36-50	10YR 4/2 (dark grayish brown) silt loam
Area E	5-5	0-32	10YR 3/2 (very dark grayish brown) silt loam
		32-50	10YR 4/2 (dark grayish brown) silty clay loam
Area E	5-6	0-36	10YR 3/2 (very dark grayish brown) silt loam
		36-50	10YR 4/2 (dark grayish brown) silt loam
Area E	5-7	0-37	10YR 3/2 (very dark grayish brown) silty clay loam

		37-50	10YR 3/4 (dark yellowish brown) silty clay loam
Area E	5-8	0-37	10YR 3/2 (very dark grayish brown) silty clay loam
		37-50	10YR 3/4 (dark yellowish brown) silty clay loam
Area E	5-9	0-35	10YR 3/2 (very dark grayish brown) silty clay loam
		35-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area E	5-10	0-30	10YR 3/2 (very dark grayish brown) silty clay loam; a little dry
		30-50	10YR 4/4 (dark yellowish brown) silty clay loam; sticky
Area E	5-11	0-38	10YR 3/2 (very dark grayish brown) silty clay loam; a little dry
		38-50	10YR 4/4 (dark yellowish brown) silty clay loam; sticky
Area E	6-1	0-31	10YR 3/2 (very dark grayish brown) silt loam; roots
		31-49	10YR 3/4 (dark yellowish brown) silty clay loam; roots; 10YR 2/3 (very dark grayish brown) mottles
		49-50	10YR 4/4 (dark yellowish brown) silty clay loam; roots; 10YR 3/2 (very dark grayish brown) mottles
Area E	6-2	0-39	10YR 3/1 to 10YR 3/2 (very dark gray to very dark grayish brown) silt loam; roots
		39-45	10YR 3/4 (dark yellowish brown) silty clay loam; roots; 10YR 3/2 (very dark grayish brown) mottles
		45-50	10YR 4/4 (dark yellowish brown) silty clay loam; roots
Area E	6-3	0-34	10YR 3/2 (very dark grayish brown) silt loam
		34-50	10YR 4/3 (brown) silty clay loam
Area E	6-4	0-35	10YR 3/2 (very dark grayish brown) silt loam
		35-50	10YR 4/2 (dark grayish brown) silty clay loam
Area E	6-5	0-31	10YR 3/1 to 3/2 (very dark gray to very dark grayish brown) silt loam; roots
		31-47	10YR 3/4 (dark yellowish brown) silty clay loam; roots; 10YR 3/2 (very dark grayish brown) mottles
		47-50	10YR 4/4 (dark yellowish brown) silty clay loam; roots
Area E	6-6	0-36	10YR 3/1 (very dark gray) silt loam; roots
		36-45	10YR 4/3 (brown) silty clay loam; roots; 10YR 3/1 (very dark gray) mottles
		45-50	10YR 5/4 (yellowish brown) silty clay loam; roots; 10YR 3/1 (very dark gray) mottles

Area E	6-7	0-32	10YR 3/2 to 10YR 3/3 (very dark grayish brown to dark brown) silt loam
		32-50	10YR 4/4 (dark yellowish brown) silty clay loam; roots; 10YR 3/2 (very dark grayish brown) mottles; gradual increase of mottles to this point
Area E	6-8	0-34	10YR 3/2 (very dark grayish brown) silt loam
		34-50	10YR 4/4 (dark yellowish brown) silty clay loam; roots; 10YR 3/2 (very dark grayish brown) mottles; gradual increase of mottles to this point
Area E	6-9	0-31	10YR 3/2 (very dark grayish brown) silt loam; roots
		31-44	10YR 3/2 (very dark grayish brown) silt loams; 10YR 4/4 (dark yellowish brown) mottles; gradual increase of mottles to this point; roots
		44-50	10YR 4/4 (dark yellowish brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles
Area E	6-10	0-34	10YR 3/2 (very dark grayish brown) silt loam; roots
		34-43	10YR 3/3 to 10YR 3/4 (dark brown to dark yellowish brown) silt loam; gradual change in color to this point; roots
		43-50	10YR 4/4 (dark yellowish brown) silty clay loam; roots; 10YR 3/2 to 3/3 (very dark grayish brown to dark brown) mottles
Area E	6-11	0-36	10YR 3/2 (very dark grayish brown) silty clay loam
		36-50	10YR 4/4 (dark yellowish brown) silty clay loam; sticky
Area E	7-1	0-31	10YR 3/2 (very dark grayish brown) silt loam
		31-50	10YR 4/3 (brown) silty clay loam
Area E	7-2	0-37	10YR 3/2 (very dark grayish brown) silt loam
		37-50	10YR 4/4 (dark grayish brown) silty clay loam
Area E	7-3	0-30	10YR 3/2 (very dark grayish brown) silt loam
		30-50	10YR 4/3 (brown) silty clay loam
Area E	7-4	0-32	10YR 3/2 (very dark grayish brown) silt loam
		32-50	10YR 4/2 (dark grayish brown) silt loam
Area E	7-5	0-30	10YR 3/2 (very dark grayish brown) silt loam
		30-46	10YR 4/2 (dark grayish brown) silt loam
		46-50	10YR 4/3 (brown) silty clay loam
Area E	7-6	0-35	10YR 3/2 (very dark grayish brown) silt loam
		35-48	10YR 4/2 (dark grayish brown) silt loam

		48-50	10YR 4/3 (brown) silty clay loam
Area E	7-7	0-39	10YR 3/2 (very dark grayish brown) silt loam
		39-50	10YR 4/2 (dark grayish brown) silty clay loam
Area E	7-8	0-31	10YR 3/2 (very dark grayish brown) silt loam
		31-50	10YR 4/2 (dark grayish brown) silty clay loam
Area E	7-9	0-33	10YR 3/2 (very dark grayish brown) silt loam
		33-50	10YR 4/3 (brown) silty clay loam
Area E	7-10	0-32	10YR 3/2 (very dark grayish brown) silt loam
		32-50	10YR 4/2 (dark grayish brown) silty clay loam
Area E	7-11	0-36	10YR 3/2 (very dark grayish brown) silt loam
		36-50	10YR 4/3 (brown) silty clay loam
Area E	8-1	0-35	10YR 3/2 (very dark grayish brown) silty clay loam
		35-50	10YR 3/4 (dark yellowish brown) silty clay loam
Area E	8-2	0-35	10YR 3/2 (very dark grayish brown) silty clay loam
		35-50	10YR 3/4 (dark yellowish brown) silty clay loam
Area E	8-3	0-32	10YR 3/2 (very dark grayish brown) silty clay loam
		32-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area E	8-4	0-30	10YR 3/2 (very dark grayish brown) silty clay loam
		30-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area E	8-5	0-30	10YR 3/2 (very dark grayish brown) silty clay loam
		30-50	10YR 3/4 (dark yellowish brown) silty clay loam
Area E	8-6	0-38	10YR 4/2 (dark grayish brown) silty clay loam; dry
		38-50	10YR 3/4 (dark yellowish brown) silty clay loam
Area E	8-7	0-30	10YR 3/2 (very dark grayish brown) silty clay loam; dry
		30-50	10YR 3/4 (dark yellowish brown) silty clay loam
Area E	8-8	0-37	10YR 3/2 (very dark grayish brown) silty clay loam; dry
		37-50	10YR 3/4 (dark yellowish brown) silty clay loam

Area E	8-9	0-40	10YR 4/2 (dark grayish brown) silty clay loam; dry
		40-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area E	8-10	0-30	10YR 4/2 (dark grayish brown) silty clay loam; dry
		30-50	10YR 4/4 (dark yellowish brown) silty clay loam; 10YR 4/2 (dark grayish brown) mottles
Area E	8-11	0-30	10YR 3/2 (very dark grayish brown) silty clay loam; dry
		30-50	10YR 3/4 (dark yellowish brown) silty clay loam; dry
Area E	9-1	0-26	10YR 3/2 (very dark grayish brown) silt loam; roots
		26-44	10YR 3/2 and 10YR 4/3 (very dark grayish brown and brown) silt loam; mix; roots; 10YR 4/3 (brown) mottles; gradually increase with depth
		44-50	10YR 4/3 (brown) silty clay loam; roots; 10YR 3/2 (very dark grayish brown) mottles
Area E	9-2	0-25	10YR 3/2 (very dark grayish brown) silt loam; roots; dry and hard
		25-50	10YR 3/2 (very dark grayish brown) silt loam; many 10YR 4/3 (brown) mottles; gradually increase with depth
Area E	9-3	0-26	10YR 3/2 (very dark grayish brown) silt loam; roots; dry and hard
		26-43	10YR 3/2 (very dark grayish brown) silt loam; mix of 10YR 4/3 (brown) mottles; gradually increase with depth
		43-50	10YR 4/3 (brown) silty clay loam; roots; 10YR 3/2 (very dark grayish brown) mottles
Area E	9-4	0-24	10YR 3/2 (very dark grayish brown) silt loam; roots; dry and hard
		24-46	10YR 3/2 (very dark grayish brown) silt loam; mix of 10YR 4/3 (brown) mottles; gradually increase with depth
		46-50	10YR 4/3 (brown) silty clay loam; roots; 10YR 3/2 (very dark grayish brown) mottles
Area E	9-5	0-39	10YR 3/2 (very dark grayish brown) silty clay loam; roots; dry and hard
		39-50	10YR 3/2 (very dark grayish brown) silty clay loam; many 10YR 4/3 (brown) mottles; gradually increase with depth
Area E	9-6	0-37	10YR 3/2 (very dark grayish brown) silt loam; roots; dry and hard
		37-46	10YR 3/2 (very dark grayish brown) silt loam; mix of 10YR 4/3 (brown) mottles; gradually increase with depth
		46-50	10YR 4/3 (brown) silty clay loam; roots; 10YR 3/2 (very dark grayish brown) mottles

Area E	9-7	0-32	10YR 3/2 (very dark grayish brown) silt loam; roots; hard
		32-41	10YR 3/4 (dark yellowish brown) silt loam; roots; fine 10YR 3/2 (very dark grayish brown) mottles; gradual increase with depth
		41-50	10YR 4/4 (dark yellowish brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles
Area E	9-8	0-37	10YR 3/2 to 3/3 (very dark grayish brown to dark brown) silt loam; roots
		37-50	10YR 4/4 (dark yellowish brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles
Area E	9-9	0-33	10YR 3/2 (very dark grayish brown) silt loam; roots
		33-50	10YR 4/3 to 4/4 (brown to dark yellowish brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles
Area E	9-10	0-30	10YR 3/2 (very dark grayish brown) silt loam; roots
		30-46	10YR 4/4 (dark yellowish brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles;
		46-50	10YR 5/4 (yellowish brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles
Area E	9-11	0-36	10YR 3/2 (very dark grayish brown) silt loam
		36-44	10YR 4/4 (dark yellowish brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles
		44-50	10YR 5/4 (yellowish brown) silty clay loam; 10YR 4/4 (dark yellowish brown) mottles
Area E	10-1	0-20	10YR 2/2 to 10YR 3/2 (very dark brown to very dark grayish brown) silty clay loam; roots
		20-42	10YR 3/2 (very dark grayish brown) silty clay loam; many 10YR 5/4 to 10YR 5/6 (yellowish brown) mottles; roots
		42-50	10YR 4/4 (dark yellowish brown) silty clay loam; 10YR 3/3 (dark brown) mottles
Area E	10-2	0-31	10YR 2/2 to 3/2 (very dark brown to very dark grayish brown) silty clay loam; roots
		31-50	10YR 4/3 (brown) silty clay loam; worm castings
Area E	10-3	0-28	10YR 2/2 (very dark brown) silty clay loam; roots; compacted
		28-50	10YR 3/3 (dark brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles; worm castings; compacted
Area E	10-4	0-38	10YR 2/1 to 10YR 2/2 (black to very dark brown) silt loam; roots
		38-53	10YR 3/2 (very dark grayish brown) silty clay loam; 10YR 2/2 (very dark brown) mottles; worm castings
Area E	10-5	0-31	10YR 2/2 (very dark brown) silt loam; roots

		31-50	10YR 3/2 (very dark grayish brown) silt loam; roots
Area E	10-6	0-34	10YR 2/2 (very dark brown) silt loam; roots
		34-52	10YR 2/2 to 10YR 3/2 (very dark brown to very dark grayish brown) silty clay loam; roots
Area E	10-7	0-37	10YR 3/2 (very dark grayish brown) silt loam
		37-50	10YR 4/2 (dark grayish brown) silty clay loam
Area E	10-8	0-35	10YR 3/2 (very dark grayish brown) silt loam
		35-50	10YR 4/3 (brown) silty clay loam
Area E	10-9	0-27	10YR 3/2 (very dark grayish brown) silt loam
		27-50	10YR 4/2 (dark grayish brown) silt loam
Area E	10-10	0-33	10YR 3/2 (very dark grayish brown) silt loam
		33-50	10YR 3/3 (dark brown) silty clay loam
Area E	10-11	0-28	10YR 3/2 (very dark grayish brown) silt loam
		28-50	10YR 4/3 (brown) silty clay loam
Area E	11-1	0-35	10YR 3/2 (very dark grayish brown) silty clay loam
		35-50	10YR 4/3 (brown) silty clay loam
Area E	11-2	0-32	10YR 3/2 (very dark grayish brown) silt loam
		32-50	10YR 4/3 (brown) silty clay loam
Area E	11-3	0-37	10YR 3/2 (very dark grayish brown) silt loam
		37-50	10YR 4/3 (brown) silty clay loam
Area E	11-4	0-32	10YR 3/2 (very dark grayish brown) silt loam
		32-50	10YR 4/3 (brown) silty clay loam
Area E	11-5	0-38	10YR 3/2 (very dark grayish brown) silt loam
		38-50	10YR 4/2 (dark grayish brown) silt loam
Area E	11-6	0-39	10YR 3/2 (very dark grayish brown) silt loam
		39-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area E	11-7	0-31	10YR 3/2 (very dark grayish brown) silt loam
		31-50	10YR 4/4 (dark yellowish brown) silt loam
Area E	11-8	0-38	10YR 3/2 (very dark grayish brown) silt loam

		38-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area E	11-9	0-38	10YR 3/2 (very dark grayish brown) silt loam
		38-50	10YR 3/3 (dark brown) silty clay loam
Area E	11-10	0-38	10YR 3/2 (very dark grayish brown) silt loam
		38-50	10YR 4/2 (dark grayish brown) silty clay loam
Area E	11-11	0-36	10YR 3/2 (very dark grayish brown) silty clay loam
		36-50	10YR 4/2 (dark grayish brown) silty clay loam
Area E	12-1	0-34	10YR 3/2 (very dark grayish brown) silt loam; roots
		34-50	10YR 4/3 (brown) silty clay loam; roots; 10YR 3/2 (very dark grayish brown) mottles
Area E	12-2	0-32	10YR 3/2 (very dark grayish brown) silt loam; roots
		32-50	10YR 4/4 (dark yellowish brown) silty clay loam; roots; 10YR 3/2 (very dark grayish brown) mottles
Area E	12-3	0-37	10YR 2/2 (very dark brown) silty clay loam
		37-50	10YR 3/4 (dark yellowish brown) silty clay loam
Area E	12-4	0-38	10YR 2/2 (very dark brown) silty clay loam
		38-50	10YR 3/4 (dark yellowish brown) silty clay loam
Area E	12-5	0-32	10YR 2/2 (very dark brown) silty clay loam
		32-50	10YR 3/4 (dark yellowish brown) silty clay loam
Area E	12-6	0-30	10YR 2/2 (very dark gray) silty clay loam
		30-50	10YR 3/3 (dark brown) silty clay loam
Area E	12-7	0-30	10YR 2/2 (very dark gray) silty clay loam
		30-50	10YR 3/3 (dark brown) silty clay loam
Area E	12-8	0-32	10YR 2/2 (very dark gray) silty clay loam
		32-50	10YR 3/3 (dark brown) silty clay loam
Area E	12-9	0-37	10YR 2/2 (very dark gray) silty clay loam
		37-50	10YR 3/4 (dark yellowish brown) silty clay loam
Area E	12-10	0-30	10YR 2/2 (very dark gray) silty clay loam
		30-50	10YR 3/3 (dark brown) silty clay loam

Area E	12-11	0-32	10YR 2/2 (very dark gray) silty clay loam
		32-52	10YR 3/4 (dark yellowish brown) silty clay loam
Area E	13-1	0-30	10YR 3/1 (very dark gray) silt loam
		30-50	10YR 3/2 (very dark grayish brown) silty clay loam
Area E	13-2	0-38	10YR 3/2 (very dark grayish brown) silt loam
		38-50	10YR 4/3 (brown) silty clay loam
Area E	13-3	0-37	10YR 3/2 (very dark grayish brown) silt loam
		37-50	10YR 3/3 (dark brown) silty clay loam
Area E	13-4	0-30	10YR 3/2 (very dark grayish brown) silt loam
		30-50	10YR 3/3 (dark brown) silty clay loam
Area E	13-5	0-32	10YR 3/2 (very dark grayish brown) silt loam
		32-50	10YR 4/2 (dark grayish brown) silty clay loam
Area E	13-6	0-34	10YR 3/2 (very dark grayish brown) silt loam
		34-50	10YR 4/2 (dark grayish brown) silty clay loam
Area E	13-7	0-36	10YR 3/1 (very dark gray) silt loam
		36-50	10YR 3/3 (dark brown) silty clay loam
Area E	13-8	0-38	10YR 3/2 (very dark grayish brown) silty clay loam
		38-50	10YR 3/3 (dark brown) silty clay loam
Area E	13-9	0-37	10YR 3/2 (very dark grayish brown) silt loam
		37-50	10YR 4/2 (dark grayish brown) silty clay loam
Area E	13-10	0-30	10YR 3/2 (very dark grayish brown) silt loam
		30-50	10YR 4/2 (dark grayish brown) silty clay loam
Area E	13-11	0-37	10YR 3/2 (very dark grayish brown) silty clay loam
		37-50	10YR 4/2 (dark grayish brown) silty clay loam
Area E	14-1	0-31	10YR 2/2 (very dark brown) silt loam; roots
		31-51	10YR 4/3 (brown) silty clay loam; 10YR 4/2 (dark grayish brown) mottles
Area E	14-2	0-31	10YR 2/2 (very dark brown) silt loam; roots

		31-50	10YR 4/3 (brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles
Area E	14-3	0-34	10YR 2/2 (very dark brown) silt loam; roots
		34-52	10YR 4/3 (brown) silty clay loam; 10YR 5/3 (brown) mottles; worm castings
Area E	14-4	0-38	10YR 2/2 (very dark brown) silt loam; roots; sub angular blocky
		38-50	10YR 3/3 (dark brown) silty clay loam; 10YR 3/2 (very dark grayish brown) mottles
Area E	14-5	0-28	10YR 2/2 (very dark brown) silt loam; roots
		28-42	10YR 3/3 (dark brown) silty clay loam; 10YR 4/3 and 10YR 3/2 (brown and very dark grayish brown) mottles
		42-50	10YR 4/4 (dark yellowish brown) silty clay loam; 10YR 3/3 (dark brown) mottles
Area E	14-6	0-27	10YR 2/2 (very dark brown) silt loam; roots
		27-45	10YR 3/2 (very dark grayish brown) silty clay loam; 10YR 4/3 (brown) mottles; worm castings
		45-51	10YR 4/3 (brown) silty clay loam; few 10YR 4/2 (dark grayish brown) mottles
Area E	14-7	0-26	10YR 2/2 (very dark brown) silt loam; roots
		26-43	10YR 3/2 (very dark grayish brown) silty clay loam; few 10YR 4/3 (brown) mottles
		43-51	10YR 4/3 (brown) silty clay loam; few 10YR 4/2 (dark grayish brown) mottles
Area E	14-8	0-38	10YR 2/2 (very dark brown) silt loam; roots; rodent run at 38cms
		38-50	10YR 3/3 (dark brown) silty clay loam; 10YR 4/3 and 4/2 (brown and dark grayish brown) mottles
Area E	14-9	0-27	10YR 2/2 (very dark brown) silt loam; roots
		27-42	10YR 3/2 (very dark grayish brown) silt loam; few 10YR 4/2 (dark grayish brown) mottles; roots
		42-52	10YR 3/3 (dark brown) silty clay loam; few 10YR 4/3 (brown) mottles
Area E	14-10	0-32	10YR 3/2 (very dark grayish brown) silt loam
		32-50	10YR 4/2 (dark grayish brown) silty clay loam
Area E	14-11	0-34	10YR 3/2 (very dark grayish brown) silty clay loam
		34-50	10YR 3/3 (dark brown) silty clay loam
Area E	15-1	0-31	10YR 2/2 (very dark brown) silty clay loam
		31-50	10YR 3/4 (dark yellowish brown) silty clay loam

Area E	15-2	0-38	10YR 2/2 (very dark brown) silty clay loam
		38-50	10YR 3/4 (dark yellowish brown) silty clay loam
Area E	15-3	0-30	10YR 2/2 (very dark brown) silty clay loam
		30-50	10YR 5/6 (yellowish brown) silty clay loam
Area E	15-4	0-35	10YR 2/2 (very dark brown) silty clay loam
		35-50	10YR 5/6 (yellowish brown) silty clay loam
Area E	15-5	0-34	10YR 2/2 (very dark brown) silty clay loam
		34-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area E	15-6	0-30	10YR 2/2 (very dark brown) silty clay loam
		30-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area E	15-7	0-32	10YR 2/2 (very dark brown) silty clay loam
		32-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area E	15-8	0-37	10YR 2/2 (very dark brown) silty clay loam
		37-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area E	15-9	0-23	10YR 2/2 (very dark brown) silty clay loam
		23-46	10YR 4/3, 3/3, and 3/2 (brown, dark brown, and very dark grayish brown) mottles; roots
		46-50	10YR 4/4 (dark yellowish brown) silty clay loam; 10YR 5/2 and 10YR 5/3 (grayish brown and brown) mottles
Area E	15-10	0-29	10YR 3/2 (very dark grayish brown) silt loam
		29-47	10YR 4/2 (dark grayish brown) silt loam
		47-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area E	15-11	0-34	10YR 3/2 (very dark grayish brown) silty clay loam
		34-50	10YR 4/2 (dark grayish brown) silty clay loam
Area F	16-1	0-35	10YR 3/2 (very dark grayish brown) silty clay loam
		35-50	10YR 4/6 (dark yellowish brown) silty clay loam; sticky
Area F	16-2	0-30	10YR 3/2 (very dark grayish brown) silty clay loam
		30-50	10YR 3/4 (dark yellowish brown) silty clay loam
Area F	16-3	0-30	10YR 3/2 (very dark grayish brown) silty clay loam
		30-50	10YR 4/4 (dark yellowish brown) silty clay loam

Area F	16-4	0-32	10YR 3/2 (very dark grayish brown) silty clay loam
		32-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area F	16-5	0-32	10YR 3/2 (very dark grayish brown) silty clay loam
		32-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area F	16-6	0-27	10YR 3/2 (very dark grayish brown) silty clay loam
		27-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area F	16-7	0-25	10YR 3/2 (very dark grayish brown) silty clay loam
		25-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area F	16-8	0-20	10YR 3/2 (very dark grayish brown) silty clay loam
		20-50	10YR 5/6 (yellowish brown) silty clay loam
Area F	16-9	0-24	10YR 3/2 (very dark grayish brown) silty clay loam
		24-50	10YR 4/6 (dark yellowish brown) silty clay loam
Area F	16-10		Not Dug—missed in field due to tall grass
Area F	16-11	0-22	10YR 3/2 (very dark grayish brown) silty clay loam; roots; disturbed
		22-36	10YR 4/3 (brown) silty clay loam; mottled 10YR 3/2 and 4/4 (very dark grayish brown and dark yellowish brown); roots; road rock
		36-50	10YR 4/4 (dark yellowish brown) silty clay loam; 10YR 5/4 (yellowish brown) mottles
Area F	16-12	0-15	Road rock/gravel; 10YR 3/2 (very dark grayish brown) silty clay loam; roots; disturbed
		15-36	10YR 4/4 (dark yellowish brown) silty clay loam; many 10YR 5/2 (grayish brown) mottles; rock
		36-50	10YR 4/6 (dark yellowish brown) silty clay loam; redox
Area F	16-13	0-12	10YR 3/2 (very dark grayish brown) silty clay loam; road rock; roots; disturbed
		12-34	mottled 10YR 4/4, 10YR 5/4, and 10YR 4/2 (dark yellowish brown, yellowish brown, and dark grayish brown) silty clay loam; few rocks; disturbed
		34-50	10YR 5/4 to 10YR 5/6 (yellowish brown) silty clay loam
Area F	17-1	0-38	10YR 3/2 (very dark grayish brown) silt loam
		38-50	10YR 4/2 (dark grayish brown) silt loam
Area F	17-2	0-36	10YR 3/2 (very dark grayish brown) silty clay loam

		36-50	10YR 4/3 (brown) silty clay loam
Area F	17-3	0-38	10YR 3/2 (very dark grayish brown) silt loam
		38-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area F	17-4	0-36	10YR 3/2 (very dark grayish brown) silty clay loam
		36-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area F	17-5	0-38	10YR 3/2 (very dark grayish brown) silty clay loam
		38-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area F	17-6	0-30	10YR 3/2 (very dark grayish brown) silt loam
		30-50	10YR 4/3 (brown) silty clay loam
Area F	17-7	0-34	10YR 3/2 (very dark grayish brown) silty clay loam
		34-50	10YR 4/3 (brown) silty clay loam
Area F	17-8	0-29	10YR 3/2 (very dark grayish brown) silty loam
		29-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area F	17-9	0-27	10YR 3/2 (very dark grayish brown) silty clay loam
		27-50	10YR 4/3 (brown) silty clay loam
Area F	17-10	0-27	10YR 3/2 (very dark grayish brown) silt loam
		27-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area F	17-11	0-21	10YR 3/2 to 10YR 3/3 (very dark grayish brown to dark brown) silt loam; roots
		21-38	10YR 4/4 (dark yellowish brown) silty clay loam; 10YR 4/3 (brown) mottles; disturbed
		38-50	10YR 5/4 (yellowish brown) silty clay loam; redox
Area F	17-12	0-9	10YR 3/2 to 3/3 (very dark grayish brown to dark brown) silt loam; roots; road rock
		9-41	10YR 4/4 (dark yellowish brown) silty clay loam; many 10YR 3/2 and 10YR 3/3 (very dark grayish brown and dark brown) mottles; few rock; disturbed
		41-50	10YR 4/4 to 10YR 4/6 (dark yellowish brown) silty clay loam; few redox
Area F	17-13	0-21	10YR 3/2 (very dark grayish brown) silty clay loam; roots; road rock
		21-40	10YR mottles 3/3, 4/4, and 3/2 (dark brown; dark yellowish brown, and very dark grayish brown) silty clay loam; few rocks; disturbed

		40-50	10YR 4/4 to 10YR 4/6 (dark yellowish brown) silty clay loam; few redox
Area H	1-1	0-23	10YR 3/2 (very dark grayish brown) silt loam
		23-50	10YR 4/2 (dark grayish brown) silty clay loam
Area H	1-2	0-28	10YR 2/2 (very dark brown) silty clay loam; wet
		28-38	10YR 3/4 (dark yellowish brown) silty clay loam; wet; sticky
Area H	1-3	0-20	10YR 3/3 (dark brown) silt loam; rocks; many 10YR 4/4 and 10YR 5/3 mottles (dark yellowish brown and brown); large roots
		20-30	10YR 4/4 (dark yellowish brown) silty clay loam; rocks; roots; 10YR 3/3, 10YR 5/3, 10YR 6/1 (dark brown, brown, gray) mottles
		30-50	10YR 4/4 (dark yellowish brown) silty clay loam; few rocks; roots; 10YR 3/3, 10YR 5/3, 10YR 6/1 (dark brown, brown, gray) mottles
Area H	2-1	0-24	10YR 3/1 (very dark gray) silt loam
		24-36	10YR 4/2 (dark grayish brown) silty clay loam
		36-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area H	2-2	0-23	10YR 4/2, 10YR 3/2, and 10YR 4/3 (dark grayish brown, very dark grayish brown, and brown) mottled
		23-30	10YR 3/2 (very dark grayish brown) silty clay loam; 10YR 4/3 (brown) mottles
		30-40	10YR 3/2 (very dark grayish brown) silty clay loam; 10YR 4/3 (brown) mottles; nails; hard and blocky
		40-50	10YR 4/4 (dark yellowish brown) silty clay loam; hard and blocky
Area H	2-4	0-20	10YR 3/3 (dark brown) silty clay loam; few pebbles; roots; clinker
		20-30	10YR 3/3 (dark brown) silty clay loam
		30-40	10YR 4/4 (dark yellowish brown) silty clay loam
		40-50	10YR 5/4 (yellowish brown) silty clay loam; slightly dry and crumbly
Area H	2-5	0-10	10YR 3/2 (very dark grayish brown) silt loam; roots; slightly sticky
		10-35	10YR 3/2 (very dark grayish brown) silty clay loam; slightly sticky
		35-40	10YR 4/3 (brown) silty clay loam; slightly dry and crumbly; few small 10YR 3/2 (very dark grayish brown) mottles
		40-50	10YR 5/6 (yellowish brown) silty clay loam
Area H	2-6	0-15	Mottles of 10YR 3/2, 10YR 5/3, 10YR 5/8, 10YR 6/3, 10YR 6/1 (very dark grayish brown, brown, yellowish brown, pale brown, gray) silty clay
		15-41	10YR 3/2 (very dark grayish brown) silty clay loam; few limestone rocks
		41-52	10YR 5/4 (yellowish brown) silty clay loam; slightly dry and crumbly
Area H	2-7	0-34	10YR 3/2 (very dark grayish brown) silty clay loam; roots

		34-41	10YR 3/2 (very dark grayish brown) silty clay loam; 10YR 4/2 (dark grayish brown); few Fe
		41-50	10YR 3/2 (very dark grayish brown) silty clay loam; 10YR 4/2 and 10YR 5/3 (dark grayish brown and brown) mottles; few bigger Fe
Area H	2-8	0-18	10YR 3/2 (very dark grayish brown) clay loam; 10YR 2/2, 10YR 5/6, and 10YR 6/2 (very dark brown, yellowish brown; grayish brown) mottles
		18-50	10YR 2/2 (very dark brown) silty clay loam; few 10YR 5/6 mottles
Area H	2-9	0-10	10YR 3/2 to 10YR 2/2 (very dark grayish brown to very dark brown) silt loam; roots
		10-50	10YR 2/2 (very dark brown) silty clay loam; fence wire at 20-30cmbs
Area H	3-1	0-19	10YR 3/1 (very dark gray) silt loam
		19-34	10YR 4/2 (dark grayish brown) silty clay loam
		34-50	10YR 4/4 (dark yellowish brown) silty clay
Area H	3-2	0-13	10YR 3/2 (very dark grayish brown) silty clay loam
		13-46	10YR 4/4 (dark yellowish brown) silty clay loam; 10YR 4/3 (brown) mottles
			Hole terminated at 46cmbs due to obstruction of fence post
Area H	3-3	0-33	10YR 3/2 (very dark grayish brown) silty clay loam
		33-50	10YR 4/2 (dark grayish brown) silty clay
Area H	3-4	0-15	10YR 4/3 to 4/4 (brown to dark yellowish brown) silt loam
		15-38	10YR 3/1 (very dark gray) silty clay loam
		38-50	10YR 4/3 (brown) silty clay
Area H	3-5	0-27	10YR 2/2 (very dark brown) silty clay loam
		27-50	10YR 4/4 (dark yellowish brown) silty clay loam
Area H	3-6	0-15	10YR 2/2 (very dark brown) silty clay loam; 10YR 4/2 (dark grayish brown) mottles
		15-50	10YR 2/2 (very dark brown) silty clay loam
Area H	3-7	0-30	10YR 2/1 (black) silty clay loam
		30-50	10YR 2/1 (black) silty clay loam; very sticky
Area H	3-8	0-35	10YR 2/1 (black) silty clay loam
		35-50	10YR 2/1 (black) silty clay loam; sticky
Area H	4-1	0-22	10YR 3/1 (very dark gray) silty clay loam; sub angular

		22-47	10YR 2/2 to 10YR 3/2 (very dark brown to very dark grayish brown) silty clay loam; 10YR 4/3 and 10YR 4/4 (brown and dark yellowish brown) mottles
		47-52	10YR 3/3 (dark brown) silty clay loam
Area H	4-2	0-28	10YR 3/2 (very dark grayish brown) silt loam
		28-50	10YR 4/4 (dark yellowish brown) silty clay
Area H	4-3	0-16	10YR 3/2 (very dark grayish brown) silt loam
		16-41	10YR 4/4 (dark yellowish brown) silty clay; Fe; 10YR 6/2 (light brownish gray) mottles
		41-50	10YR 6/2 (light brownish gray) silty clay
Area H	4-4	0-24	10YR 3/2 (very dark grayish brown) silty clay loam
		24-50	10YR 4/4 (dark yellowish brown) silty clay
Area H	4-5	0-37	10YR 3/2 (very dark grayish brown) silty clay loam
		37-50	10YR 3/3 (dark brown) silty clay
Area H	4-6	0-30	10YR 2/1 (black) silty clay loam
		30-50	10YR 3/2 (very dark grayish brown) silty clay loam
Area H	4-7	0-32	10YR 2/1 (black) silty clay loam; little sticky
		32-50	10YR 3/2 (very dark grayish brown) silty clay loam; very sticky
Area H	5-1	0-16	10YR 2/2 (very dark brown) silt loam
		16-50	10YR 3/3 (dark brown) silt loam; 10YR 3/2 (very dark grayish brown) mottles
Area H	5-2	0-8	10YR 2/2 (very dark brown) silty clay loam; roots; few limestone rocks
		8-18	10YR 2/2 (very dark brown) silty clay loam; roots; few small 10YR 6/2 and 10YR 5/6 (light brownish gray and yellowish brown) mottles
		18-39	10YR 3/2 (very dark grayish brown) silty clay loam; many small 10YR 2/2 (very dark brown) mottles
		39-47	10YR 4/3 (brown) silty clay loam
		47-50	10YR 5/4 (yellowish brown) silty clay loam
Area H	5-3	0-6	10YR 4/3 (brown) silty clay loam; roots; few very small 10YR 3/2, 10YR 5/8, 10YR 6/2 (very dark grayish brown, yellowish brown, light brownish gray) mottles
		6-50	10YR 4/3, 10YR 3/2, 10YR 5/8, 10YR 6/2 (brown, very dark grayish brown, yellowish brown; light brownish gray) silty clay loam large mottles
Area H	5-4	0-9	10YR 2/2 (very dark brown) silt loam; slightly sandy; small river rock; roots
		9-42	10YR 2/2 (very dark brown) silt loam

		42-50	10YR 3/2 (very dark grayish brown) silt loam
Area H	5-5	0-10	10YR 2/2 to 10YR 3/2 (very dark brown to very dark grayish brown) silt loam; roots; few limestone
		10-50	10YR 2/2 (very dark brown) silty clay loam
Area H	6-1	0-30	10YR 2/2 (very dark brown) silty clay loam; brick frag; mod trash
		30-50	10YR 3/3 (dark brown) silty clay loam; very dry
Area H	6-2	0-13	10YR 3/3 (dark brown) silty clay loam; 10YR 5/6 (yellowish brown) mottles; disturbed; Fe
		13-27	10YR 3/3 (dark brown) silty clay loam
		27-50	10YR 5/6 (yellowish brown) silty clay loam; sticky
Area H	6-3	0-37	10YR 3/2 (very dark grayish brown) silty clay loam
		37-50	10YR 4/4 (dark yellowish brown) silty clay loam; dry
Area H	7-1	0-19	10YR 2/2 (very dark brown) silt loam; few clinkers
		19-39	10YR 4/4 (dark yellowish brown) silt loam; 10YR 3/2 and 10YR 4/3 (very dark grayish brown and brown) mottles
		39-50	10YR 4/4 (dark yellowish brown) silt loam
Area H	7-2	0-18	10YR 2/2 (very dark brown) silt loam; few charcoal
		18-30	10YR 4/4 (dark yellowish brown) silt loam; 10YR 3/2 and 10YR 4/3 (very dark grayish brown) mottles
		30-50	10YR 4/4 (dark yellowish brown) silt loam
Area H	7-3	0-21	10YR 2/2 (very dark brown) silt loam
		21-40	10YR 4/3 (brown) silt loam; 10YR 3/2 and 4/4 (very dark grayish brown and dark yellowish brown) mottles
		40-50	10YR 4/4 (dark yellowish brown) silt loam
Area H	SC9	0-29	10YR 3/1 (very dark gray) silty clay loam with 10YR 4/3 (brown) and 10YR 4/6 (dark yellowish brown) mottles; very compact; roots; small gravels; refused
Area H	SC10	0-32	10YR 3/1 (very dark gray) silt loam; roots
		32-48	10YR 4/3 (brown) silty clay loam; few 10YR 3/1 very dark gray mottles; redox
		48-77	10YR 5/4 (yellowish brown) silty clay loam; few, medium Fe
Area H	SC11	0-8	10YR 3/1 (very dark gray) silty clay loam; common 10YR 4/6 (dark yellowish brown) mottles; roots; small gravels
		8-41	mottled 10YR 4/1 (dark gray), 10YR 5/4 (yellowish brown); and 10YR 5/2 (grayish brown) silty clay loam; many Fe; many pebbles; refused

Area H	SC12	0-4	mottled 10YR 3/2 (very dark grayish brown) and 10YR 4/6 (dark yellowish brown) silty clay loam; roots
		4-56	10YR 5/4 (yellowish brown) silty clay loam; many 10YR 5/2 (grayish brown) striations and Fe; dense
Area H	SC13	0-22	10YR 3/1 (very dark gray) silt loam; small gravels
		22-48	mottled 10YR 3/1 (very dark gray), 10YR 5/3 (brown), 10YR 5/4 (yellowish brown), 10YR 5/2 (grayish brown)
		48-52	common medium gravels; refused

APPENDIX B:

Artifact Descriptions and Photographs

Site 13PK1058

Surface collection, Cat.1

- 1 Prehistoric lithic, fusulinid chert, projectile point fragment (tip missing), side-notched, concave base (no grinding; no basal thinning flakes), pointed basal ears, triangular blade, 2.1 cm long (minus the tip), 1.4 cm wide at base, possible Haskell point type (Late Woodland to Late Prehistoric).

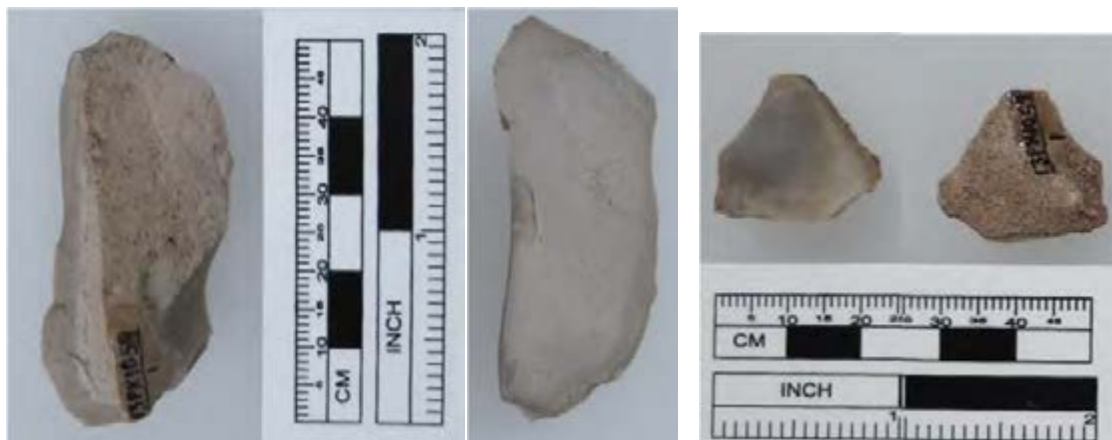


Both sides of side-notched projectile point from surface of Site 13PK1058

Site 13PK1059

Surface collection, Cat.1

- 1 Prehistoric lithic, chert, primary decortication flake, use-wear on one edge
- 1 Prehistoric lithic, chert, secondary decortication flake



Left: Both sides of utilized secondary decortication flake from surface of Site 13PK1059;

Right: both sides of primary decortication flake (utilized) from surface of Site 13PK1059

Site 13PK1060

Surface collection, Cat.1

- 1 Prehistoric lithic, fusulinid chert, secondary thinning flake fragment



Both sides of secondary thinning flake recovered from surface of Site 13PK1060

Site 13PK1061

Surface collection, Cat.1

- 1 lithic, fusulinid chert, secondary thinning flake, heated
- 1 lithic, chert, tertiary thinning flake fragment, heated
- 1 lithic, chert, bifacial tool fragment, possible graver



Left: tertiary thinning flake (heated); center: secondary thinning flake (heated); right: both sides possible graver tool

Site 13PK1062

Surface collection, Cat.1

- 1 Prehistoric lithic, chert, secondary thinning flake



Both sides of secondary thinning flake from surface of site 13PK1062

Site 13PK1063

Surface collection, Cat.1

- 1 Prehistoric lithic, glacial cobble tool, pitted on both sides, possible nutting stone, plow scarred



Both sides of pitted glacial cobble (pitted areas are in center of each side) from surface of site 13PK1063.

Non-site materials:

Area H, ST2-2, 30-40 cm b.s.

- 1 metal, iron/steel, 2 inch wire nail - discarded
- 1 metal, iron/steel, 2-1/8 inch wire nail - discarded
- 1 metal, iron/steel, 2-1/4 inch wire nail - discarded

Area H, ST2-9, 20-30 cm b.s.

- 1 metal, steel, woven wire fragment - discarded

Appendix C:
National Archaeological Data Base (NADB) and
Iowa Archaeological Site Forms

National Archeological Data Base – Reports: Data Entry Form

R and C #: _____

Authors: Nagel, Cindy L. and Leah D. RogersPublication Date: 2018

Title: _____

=====

4. Report Title: Des Moines International Airport Replacement Terminal Environmental Assessment, City of Des Moines, Polk County, Iowa: Phase I Archaeological InvestigationVolume #: _____ Report #: TA18-698--2 NTIS: _____

Publisher: _____

Place: _____

=====

7. Unpublished Sent from: Tallgrass Archaeology LLC, Iowa City, IA
Sent to: RS&H, 7800 E. Union Avenue, Suite 700, Denver, CO
Contract #: _____

=====

Federal Agency: FAA

=====

State: IowaCounty: Polk CountyTown: Des Moines

=====

Worktype: 31 (Phase I)

=====

Keyword: 0-Types of Resources/Features 1-Generic Terms/Research Questions 2-Taxonmic Names 3-Artifact
Types/Material Classes 4-Geographic Names/Locations 5-Time Periods 6- Project Name/Study Unit 7-Other
Keywords803 acres [7] cobble tool [3]Des Moines River Basin [4] biface tool [3]Bloomfield Township [4] chert flakes [3]prehistoric open habitation sites [0] upland divide [4]prehistoric scatters [3] upland interfluve [4]projectile point [3] unnamed tributary [4]

=====

UTM Zone: 15 Easting: _____ Northing: _____

15 Easting: _____ Northing: _____

15 Easting: _____ Northing: _____

15 Easting: _____ Northing: _____

=====

Township: 78N _____Range: 24W _____

Other Publication Types

1. **Monograph**

Name: _____

Place: _____

2. **Chapter**

In: _____ First: _____ Last: _____

3. **Journal**

Volume: _____ Issue #: _____ First: _____ Last: _____ ISSN: _____

5. **Dissertation**

Degree: _____ Ph.D. LL.D. M.A. B.A. B.S. Institute: _____

6. **Paper**

Meeting: _____

Place: _____

8. **Other**

Reference Line: _____

=====

Site #: 13PK1058 13PK1059 13PK1060 13PK1061
13PK1062 13PK1063

_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

=====

Quad Map: Des Moines SW (photorevised to 1976)

IOWA ARCHAEOLOGICAL SITE FORM

Office of the State Archaeologist
700 Clinton Street Building
University of Iowa
Iowa City, Iowa 52242-1030

Site Number: 13PK1058

County: POLK

Name/Field No.:

New Form: ☒ **Supplemental:** ☐

I. SITE TYPE INFORMATION

Legal Location:

Graphic Redacted for Confidentiality Purposes

Quadrangle(s): DES MOINES SW

Reliability of Site Location: Good

Site Type/Function: Isolated find

Period/Cultural Affiliation

Period: Late Woodland

Basis: projectile point typology Haskell point

II. CULTURAL MATERIALS: 13PK1058

Location of Artifact Collection: Office of the State Archaeologist

Category

Description

Collected?

Projectile point(s) 1 side-notched projectile point yes

Collection Method(s): surface

Ground Cover: ☒ row crops ☐ grass ☐ brush/weedy/open woods ☐ forest/heavy

timber ☐ exposed/eroded ☐ unknown

Amount of Ground Surface Visible: ☐ <10% ☒ 10-50% ☐ 50-90% ☐ 90-100% ☐ unknown

Surface Conditions in Cropland: ☒ dry ☐ recent rain ☐ wet ☐ unknown

Recently Tilled Cropland: ☐ true ☒ false

III. GEOGRAPHIC INFORMATION 13PK1058

Topography/Landform: Uplands, Summit

Nearest Water Source: Intermittent stream

Distance to Nearest Water: 630 m

Site Size: Dimensions: 10 x 10 m; Area: 100 sq m

Map Method(s): Global Positioning System, Measured from map

Integrity: ☐ excellent ☐ good ☒ poor ☐ completely destroyed ☐ unknown

Threats To Site

Past/ Present	Future	Threat Type	Description
X		agriculture/livestock	
X		erosion/weathering/rodents	
	X	development/construction	

Current Land Use: cultivation

IV. INVESTIGATION INFORMATION 13PK1058

Recorder(s)

Name

Address

Nagel, Cindy L. Tallgrass Archaeology LLC

Rogers, Leah D. Tallgrass Archaeology LLC

Start Date of Investigation: 5/7/2018

Level of Investigation: Phase I Recommendations: No further work

National Register Eligibility Recommendation: Not Eligible for NR

Present Landowner(s)

Name

Address

Attitude Toward Investigation

Des Moines Airport Authority 5800 Fleur Drive, Suite 207 Des Moines IA 50321 positive

Photo(s)

Photo Type

Curated At

Digital Tallgrass Archaeology LLC

V. VERBAL DESCRIPTION 13PK1058

Location: Provide a verbal description of how to locate the site, including distances and direction. This information must be sufficiently detailed to permit accurate site relocation. If possible, include permanent landmarks, roadways, and distances.

Text Redacted for Confidentiality Purposes

Site Description: Describe the site and include dimensions, features, nature and content of artifacts and concentrations, extent and location of disturbances, etc.

Site consists of an isolated surface find, specifically a small Late Woodland projectile point found on the surface of the cornfield. The site was further examined by systematic shovel test excavation, with five shovel tests excavated at intervals of 10 meters or less around the surface find. There was no indication in any of the shovel tests of intact cultural deposits, with the shovel tests encountering the Bt horizon just below the plow zone. While of interest as a Late Woodland arrow point, this single artifact has a low potential to yield information of significance to the prehistory of this region beyond its identification of this location as having been used during the Late Woodland period for hunting activities. Therefore, site 13PK1058 does not possess sufficient integrity or significance to be considered eligible for inclusion in the NRHP under Criterion D or any other NRHP significance criteria. Site 13PK1058 is recommended for no further archaeological investigation.

IOWA ARCHAEOLOGICAL SITE FORM

Office of the State Archaeologist
700 Clinton Street Building
University of Iowa
Iowa City, Iowa 52242-1030

Site Number: 13PK1059

County: POLK

Name/Field No.:

New Form: ☒ **Supplemental:** ☐

I. SITE TYPE INFORMATION

Legal Location:

Text Redacted for Confidentiality Purposes

Quadrangle(s): DES MOINES SW

Reliability of Site Location: Good

Site Type/Function: Lithic scatter

Period/Cultural Affiliation

Period: Prehistoric

II. CULTURAL MATERIALS: 13PK1059

Location of Artifact Collection: Office of the State Archaeologist

Category	Description Collected?
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Stone, chipped, debitage	2 chert flakes yes
--------------------------	--------------------

Collection Method(s): surface

Ground Cover: ☒ row crops ☐ grass ☐ brush/weedy/open woods ☐ forest/heavy timber ☐ exposed/eroded ☐ unknown

Amount of Ground Surface Visible: ☐ <10% ☒ 10-50% ☐ 50-90% ☐ 90-100% ☐ unknown

Surface Conditions in Cropland: ☒ dry ☐ recent rain ☐ wet ☐ unknown

Recently Tilled Cropland: ☐ true ☒ false

III. GEOGRAPHIC INFORMATION 13PK1059

Topography/Landform: Uplands, Shoulder

Nearest Water Source: Intermittent stream

Distance to Nearest Water: 290 m

Site Size: Dimensions: 12 x 10 m; Area: 120 sq m

Map Method(s): Global Positioning System, Measured from map

Integrity: ☐ excellent ☐ good ☒ poor ☐ completely destroyed ☐ unknown

Threats To Site

Past/Present	Future	Threat Type	Description
X		agriculture/livestock	
X		erosion/weathering/rodents	
	X	development/construction	

Current Land Use: cultivation

IV. INVESTIGATION INFORMATION 13PK1059

Recorder(s)

Name **Address**
 Nagel, Cindy L. Tallgrass Archaeology LLC
 Rogers, Leah D. Tallgrass Archaeology LLC
 Start Date of Investigation: 5/7/2018
 Level of Investigation: Phase I Recommendations: No further work
 National Register Eligibility Recommendation: Not Eligible for NR
 Present Landowner(s)

Name	Address	Attitude Toward Investigation
Des Moines	5800 Fleur Drive, Suite 207 Des Moines	positive
Airport Authority	IA 50321	

Photo(s)

Photo Type	Curated At
Digital	Tallgrass Archaeology LLC

V. VERBAL DESCRIPTION 13PK1059

Location: Provide a verbal description of how to locate the site, including distances and direction. This information must be sufficiently detailed to permit accurate site relocation. If possible, include permanent landmarks, roadways, and distances.

Text Redacted for Confidentiality Purposes

Site Description: Describe the site and include dimensions, features, nature and content of artifacts and concentrations, extent and location of disturbances, etc.

This site consists of a sparse scatter of prehistoric lithic artifacts found on the surface of a cultivated field. The surface collection produced two chert flakes. The site deposit was then examined by means of shovel test excavation around the surface finds. A total of nine shovel tests were excavated at 10-meter (32.8-foot) intervals across the site location to further examine site integrity and potential significance. No additional cultural material was recovered in any of these tests. The profiles showed a location deflated from surface erosion, with the Bt horizon encountered just below the plow zone. The scatter of lithic material indicates a limited activity area where the early stages of lithic tool reduction were taking place likely during resource procurement forays in this region. One of the flakes also exhibited use-wear indicating some resource processing. The flakes are non-diagnostic beyond a general Prehistoric Period affiliation. The lack of sub-plow zone artifacts or any indication of intact cultural deposits indicates a low potential for this site to yield information of significance to the prehistory of this region. Therefore, site 13PK1059 is recommended as not eligible for inclusion in the NRHP for lack of sufficient integrity and significance under Criterion D or any other NRHP criteria. Site 13PK1059 is recommended for no further archaeological investigation.

IOWA ARCHAEOLOGICAL SITE FORM

Office of the State Archaeologist
700 Clinton Street Building
University of Iowa
Iowa City, Iowa 52242-1030

Site Number: 13PK1060

County: POLK

Name/Field No.:

New Form: ☒ **Supplemental:** ☐

I. SITE TYPE INFORMATION

Legal Location:

Text Redacted for Confidentiality Purposes

Quadrangle(s): DES MOINES SW

Reliability of Site Location: Good

Site Type/Function

Lithic scatter

Period/Cultural Affiliation

Period: Prehistoric

II. CULTURAL MATERIALS: 13PK1060

Location of Artifact Collection: Office of the State Archaeologist

Category	Description Collected?
----------	------------------------

Stone, chipped, debitage	1 chert flake yes
--------------------------	-------------------

Collection Method(s): surface

Ground Cover: ☒ row crops ☐ grass ☐ brush/weedy/open woods ☐ forest/heavy timber ☐ exposed/eroded ☐ unknown

Amount of Ground Surface Visible: ☐ <10% ☒ 10-50% ☐ 50-90% ☐ 90-100% ☐ unknown

Surface Conditions in Cropland: ☒ dry ☐ recent rain ☐ wet ☐ unknown

Recently Tilled Cropland: ☐ true ☒ false

III. GEOGRAPHIC INFORMATION 13PK1060

Topography/Landform: Uplands, Shoulder

Nearest Water Source: Intermittent stream

Distance to Nearest Water: 486 m

Site Size

Dimensions: 10 x 10 m

Area: 100 sq m

Map Method(s): Global Positioning System, Measured from map

Integrity: ☐ excellent ☐ good ☒ poor ☐ completely destroyed ☐ unknown

Threats To Site

Past/Present	Future	Threat Type	Description
X		agriculture/livestock	
X		erosion/weathering/rodents	
	X	development/construction	

Current Land Use: cultivation

IV. INVESTIGATION INFORMATION 13PK1060

Recorder(s)

Name

Address

Nagel, Cindy L. Tallgrass Archaeology LLC

Rogers, Leah D. Tallgrass Archaeology LLC

Start Date of Investigation: 5/7/2018

Level of Investigation: Phase I Recommendations: No further work

National Register Eligibility Recommendation: Not Eligible for NR

Present Landowner(s)

Name

Address

Attitude Toward Investigation

Des Moines Airport Authority 5800 Fleur Drive, Suite 207 Des Moines IA 50321

positive

Photo(s)

Photo Type

Curated At

Digital Tallgrass Archaeology LLC

V. VERBAL DESCRIPTION 13PK1060

Location: Provide a verbal description of how to locate the site, including distances and direction. This information must be sufficiently detailed to permit accurate site relocation. If possible, include permanent landmarks, roadways, and distances.

Text Redacted for Confidentiality Purposes

Site Description: Describe the site and include dimensions, features, nature and content of artifacts and concentrations, extent and location of disturbances, etc.

This site consists of a single chert flake found on the surface of a cultivated field not yet prepped for spring planting. The site deposit was then examined by means of shovel test excavation around the surface find. Five shovel tests were excavated at 10-meter intervals across the site location to further examine site integrity and potential significance. No additional cultural material was recovered in these tests, which showed a location deflated from surface erosion, with the Bt horizon encountered just below the plow zone. The single chert flake is non-diagnostic beyond a general Prehistoric Period affiliation and reflects some tool manufacture/ repair at this location. The lack of sub-plow zone artifacts or any indication of intact cultural deposits indicates a low potential for this site to yield information of significance to the prehistory of this region. Therefore, site 13PK1060 is recommended as not eligible for inclusion in the NRHP for lack of sufficient integrity and significance under Criterion D or any other NRHP criteria. Site 13PK1060 is recommended for no further archaeological investigation.

IOWA ARCHAEOLOGICAL SITE FORM

Office of the State Archaeologist
700 Clinton Street Building
University of Iowa
Iowa City, Iowa 52242-1030

Site Number: 13PK1061

County: POLK

Name/Field No.:

New Form: ☒ **Supplemental:** ☐

I. SITE TYPE INFORMATION

Legal Location:

text Redacted for Confidentiality Purposes

Quadrangle(s): DES MOINES SW

Reliability of Site Location: Good

Site Type/Function: Lithic scatter

Period/Cultural Affiliation

Period: Prehistoric

II. CULTURAL MATERIALS: 13PK1061

Location of Artifact Collection: Office of the State Archaeologist

Category	Description	Collected?
Stone, chipped, tools	1 chert biface tool fragment	yes
Stone, chipped, debitage	2 chert flakes	yes

Collection Method(s): surface

Ground Cover: ☒ row crops ☐ grass ☐ brush/weedy/open woods ☐ forest/heavy timber ☐ exposed/eroded ☐ unknown

Amount of Ground Surface Visible: ☐ <10% ☒ 10-50% ☐ 50-90% ☐ 90-100% ☐ unknown

Surface Conditions in Cropland: ☒ dry ☐ recent rain ☐ wet ☐ unknown

Recently Tilled Cropland: ☐ true ☒ false

III. GEOGRAPHIC INFORMATION 13PK1061

Topography/Landform: Uplands, Shoulder

Nearest Water Source: Intermittent stream

Distance to Nearest Water: 156 m

Site Size: Dimensions: 26 x 7 m; Area: 182 sq m

Map Method(s): Global Positioning System, Measured from map

Integrity: ☐ excellent ☐ good ☒ poor ☐ completely destroyed ☐ unknown

Threats To Site

Past/Present	Future	Threat Type	Description
X		agriculture/livestock	
X		erosion/weathering/rodents	
	X	development/construction	

Current Land Use: cultivation

IV. INVESTIGATION INFORMATION 13PK1061

Recorder(s)

Name	Address
Nagel, Cindy L.	Tallgrass Archaeology LLC
Rogers, Leah D.	Tallgrass Archaeology LLC

Start Date of Investigation: 5/7/2018

Level of Investigation: Phase I Recommendations: No further work

National Register Eligibility Recommendation: Not Eligible for NR

Present Landowner(s)

Name	Address	Attitude Toward Investigation
Des Moines	5800 Fleur Drive, Suite 207	positive
Airport Authority	Des Moines IA 50321	

Photo(s)

Photo Type	Curated At
Digital	Tallgrass Archaeology LLC

V. VERBAL DESCRIPTION 13PK1061

Location: Provide a verbal description of how to locate the site, including distances and direction. This information must be sufficiently detailed to permit accurate site relocation. If possible, include permanent landmarks, roadways, and distances.

Text Redacted for Confidentiality Purposes

Site Description: Describe the site and include dimensions, features, nature and content of artifacts and concentrations, extent and location of disturbances, etc.

This site consists of a sparse scatter of prehistoric lithic artifacts found on the surface of a cultivated field not yet prepped for spring planting. The surface collection of this site produced three chert flakes. The site deposit was then examined by means of shovel test excavation around the surface finds. A total of 12 shovel tests was excavated at 10-meter intervals across the site location to further examine site integrity and potential significance. No additional cultural material was recovered in these tests, which showed a surface deflated by erosion and the Bt horizon just below the plow zone. The artifacts consist of two heated chert thinning flakes (one secondary and one tertiary) and a chert biface tool fragment, possibly used as a graver. These items are non-diagnostic beyond a general Prehistoric Period affiliation and reflect some tool manufacture/repair at this location and some limited resource processing. The lack of sub-plow zone artifacts or any indication of intact cultural deposits indicates a low potential for this site to yield information of significance to the prehistory of this region. Therefore, site 13PK1060 is recommended as not eligible for inclusion in the NRHP for lack of sufficient integrity and significance under Criterion D or any other NRHP criteria. Site 13PK1060 is recommended for no further archaeological investigation.

IOWA ARCHAEOLOGICAL SITE FORM

Office of the State Archaeologist
700 Clinton Street Building
University of Iowa
Iowa City, Iowa 52242-1030

Site Number: 13PK1062

County: POLK

Name/Field No.:

New Form: ☒ **Supplemental:** ☐

I. SITE TYPE INFORMATION

Legal Location:

Text Redacted for Confidentiality Purposes

Quadrangle(s): DES MOINES SW

Reliability of Site Location: Good

Site Type/Function: Lithic scatter

Period/Cultural Affiliation

Period: Prehistoric

II. CULTURAL MATERIALS: 13PK1062

Location of Artifact Collection: Office of the State Archaeologist

Category	Description Collected?
----------	------------------------

Stone, chipped, debitage	1 chert flake yes
--------------------------	-------------------

Collection Method(s): surface

Ground Cover: ☒ row crops ☐ grass ☐ brush/weedy/open woods ☐ forest/heavy

timber ☐ exposed/eroded ☐ unknown

Amount of Ground Surface Visible: ☐ <10% ☒ 10-50% ☐ 50-90% ☐ 90-100% ☐ unknown

Surface Conditions in Cropland: ☒ dry ☐ recent rain ☐ wet ☐ unknown

Recently Tilled Cropland: ☐ true ☒ false

III. GEOGRAPHIC INFORMATION 13PK1062

Topography/Landform: Uplands, Summit

Nearest Water Source: Intermittent stream

Distance to Nearest Water: 910 m

Site Size: Dimensions: 10 x 10 m; Area: 100 sq m

Map Method(s): Global Positioning System, Measured from map

Integrity: ☐ excellent ☐ good ☒ poor ☐ completely destroyed ☐ unknown

Threats To Site

Past/Present	Future	Threat Type	Description
X		agriculture/livestock	
X		erosion/weathering/rodents	
	X	development/construction	

Current Land Use: cultivation

IV. INVESTIGATION INFORMATION 13PK1062

Recorder(s)

Name	Address
Nagel, Cindy L.	Tallgrass Archaeology LLC
Rogers, Leah D.	Tallgrass Archaeology LLC

Start Date of Investigation: 5/7/2018

Level of Investigation: Phase I Recommendations: No further work

National Register Eligibility Recommendation: Not Eligible for NR

Present Landowner(s)

Name	Address	Attitude Toward Investigation
Des Moines Airport Authority	5800 Fleur Drive, Suite 207 Des Moines IA 50321	positive

Photo(s)

Photo Type	Curated At
Digital	Tallgrass Archaeology LLC

V. VERBAL DESCRIPTION 13PK1062

Location: Provide a verbal description of how to locate the site, including distances and direction. This information must be sufficiently detailed to permit accurate site relocation. If possible, include permanent landmarks, roadways, and distances.

Text Redacted for Confidentiality Purposes

Site Description: Describe the site and include dimensions, features, nature and content of artifacts and concentrations, extent and location of disturbances, etc.

This site consists of a single chert flake found on the surface of a cultivated field not yet prepped for spring planting. The site deposit was then examined by means of shovel test excavation around the surface find. Five shovel tests were excavated at 10-meter intervals across the site location to further examine site integrity and potential significance. No additional cultural material was recovered in these tests, with the tests showing a surface deflated by erosion and the Bt horizon encountered just below the plow zone. The artifact consist of a secondary thinning chert flake. The flake is non-diagnostic beyond a general Prehistoric Period affiliation and reflects some tool manufacture/repair at this location. The lack of sub-plow zone artifacts or any indication of intact cultural deposits indicates a low potential for this site to yield information of significance to the prehistory of this region. Therefore, site 13PK1062 is recommended as not eligible for inclusion in the NRHP for lack of sufficient integrity and significance under Criterion D or any other NRHP criteria. Site 13PK1062 is recommended for no further archaeological investigation.

IOWA ARCHAEOLOGICAL SITE FORM

Office of the State Archaeologist
700 Clinton Street Building
University of Iowa
Iowa City, Iowa 52242-1030

Site Number: 13PK1063

County: POLK

Name/Field No.:

New Form: ☒ **Supplemental:** ☐

I. SITE TYPE INFORMATION

Legal Location:

Text Redacted for Confidentiality Purposes

Quadrangle(s): DES MOINES SW

Reliability of Site Location: Good

Site Type/Function

Isolated find

Period/Cultural Affiliation

Period: Prehistoric

II. CULTURAL MATERIALS: 13PK1063

Location of Artifact Collection: Office of the State Archaeologist

Category	Description	Collected?
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Stone, ground or pecked 1 pitted cobble stone tool	yes
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Collection Method(s): surface

Ground Cover: ☒ row crops ☐ grass ☐ brush/weedy/open woods ☐ forest/heavy timber ☐ exposed/eroded ☐ unknown

Amount of Ground Surface Visible: ☐ <10% ☒ 10-50% ☐ 50-90% ☐ 90-100% ☐ unknown

Surface Conditions in Cropland: ☒ dry ☐ recent rain ☐ wet ☐ unknown

Recently Tilled Cropland: ☐ true ☒ false

III. GEOGRAPHIC INFORMATION 13PK1063

Topography/Landform: Uplands, Shoulder

Nearest Water Source: Intermittent stream

Distance to Nearest Water: 313 m

Site Size: Dimensions: 10 x 10 m; Area: 100 sq m

Map Method(s): Global Positioning System, Measured from map

Integrity: ☐ excellent ☐ good ☒ poor ☐ completely destroyed ☐ unknown

Threats To Site

Past/Present	Future	Threat Type	Description
X		agriculture/livestock	
X		erosion/weathering/rodents	
	X	development/construction	

Current Land Use: cultivation

IV. INVESTIGATION INFORMATION 13PK1063

Recorder(s)

Name	Address
Nagel, Cindy L.	Tallgrass Archaeology LLC
Rogers, Leah D.	Tallgrass Archaeology LLC

Start Date of Investigation: 5/7/2018

Level of Investigation: Phase I Recommendations: No further work

National Register Eligibility Recommendation: Not Eligible for NR

Present Landowner(s)

Name	Address	Attitude Toward Investigation
Des Moines Airport Authority	5800 Fleur Drive, Suite 207 Des Moines IA 50321	positive

Photo(s)

Photo Type	Curated At
Digital	Tallgrass Archaeology LLC

V. VERBAL DESCRIPTION 13PK1063

Location: Provide a verbal description of how to locate the site, including distances and direction. This information must be sufficiently detailed to permit accurate site relocation. If possible, include permanent landmarks, roadways, and distances.

Text Redacted for Confidentiality Purposes

Site Description: Describe the site and include dimensions, features, nature and content of artifacts and concentrations, extent and location of disturbances, etc.

This site consists of single prehistoric artifact found on the surface of a cultivated field not yet prepped for spring planting. The artifact is natural glacial cobble that was used as a nutting stone. The site was then examined by means of shovel test excavation around the surface find. Five shovel tests were excavated at 10-meter intervals across the site location to further examine site integrity and potential significance. No additional cultural material was recovered in these tests, which showed a surface that was deflated from erosion and encountered the Bt horizon just below the plow zone. The single artifact consists of a pitted cobble tool used for food processing, possibly for cracking open nuts or processing other hard foodstuffs. The artifact is pitted on both sides of this cobble. Cobble tools of this type can be found on Archaic to Woodland age sites, but the lack of additional artifacts from this location precludes a more specific temporal/cultural identification. The lack of sub-plow zone artifacts or any indication of intact cultural deposits indicates a low potential for this site to yield information of significance to the prehistory of this region. Therefore, site 13PK1063 is recommended as not eligible for inclusion in the NRHP for lack of sufficient integrity and significance under Criterion D or any other NRHP criteria. Site 13PK1063 is recommended for no further archaeological investigation.